# The Investment Analysts Journal

Number 37 – Winter 1993

# Die Beleggings-ontleders Tydskrif

Nommer 37 – Winter 1993

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The primary advantages of asset securitisation are perceived to be that it provides savings on capital, has the potential to increase the non-interest income earned by banks, can improve returns ratios and will provide diversification benefits to investors.

Major concerns expressed are that it is initially a complicated and time consuming process with high transaction costs. The reluctance of investors to accept these new securities is expected to be the most significant obstacle to their growth.

**A future-oriented approach to company annual reporting in South Africa: unit trust views**
To enhance the decision-usefulness value of company annual report information, the boundaries of traditional reporting have been extended to include management projections, predictions or forecasts of information relating to the future of a company. The approach has attracted varying attention in several countries. In South Africa, the subject is relatively new. To contribute to the knowledge on the subject, this article examines the opinions of the managing directors of unit trusts on the need for publishing future-oriented information in company annual reports, the presentation of the information, and the need for public accountant audit of the information.

**Hedging a share portfolio with futures contracts: A linear goal programming approach**
An investor wishing to hedge his share portfolio with futures contracts wants to ensure that the losses he incurs with his share portfolio during adverse market conditions are adequately covered by the profits he makes with the futures contracts he sells while wishing to minimise the costs involved with his participation in the futures market. These costs consist of transaction costs, cash outflows for margin deposits, and the opportunity cost of the margins deposited at the broker.

The traditional hedging methods do not take the above mentioned costs into consideration. A linear goal programming model for South African conditions is developed which optimises the conflicting needs of the investor by updating his position on a weekly basis.

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**Die Suid-Afrikaanse Kapitaalmark en Aandelebeurs as Vooruitskatters van Reële Ekonomiese Aktiwiteit**
Two simple forecasting models are developed to forecast future real economic activity, the one based on information contained in the industrial share index and the other based on the term structure of interest rates. It is shown that both these models provide better ex ante forecasts of real activity than a number of leading South African economic forecasters.

**Evidence of Symmetry in price behaviour**
Evidence has been found of a relationship between gradients of consecutive bull and bear markets. The gradient of a major resistance trend line of a bear market can be derived from the resistance line of the preceding bull market. Similarly, a major support line of a bull market can be derived from a support line of the previous bear market. This phenomenon reveals a symmetrical relationship between the gradients of the resistance or support lines on either side of a trend reversal, i.e. of consecutive bull and bear trends.

The relationship is inverse, as the gradient of the derived line is of opposite sign to that of the primary line. The magnitude of the new inverted gradient may be equal to that of the primary line, or it could differ by some multiple of the Fibonacci ratio.

In practice, this relationship can be used to anticipate where a key reversal could occur during a new bull or bear market.

The existence of a method to anticipate major reversals is of value for technical analysis, and is also likely to put new life into the debate on the Random Walk Hypothesis.

**Investment Basics XXVII. The design of a trading system.**
A trading system is a set of procedures and techniques, which will include the use of technical analysis, designed to make the most of the skills and abilities of the user of the system, and of decision support tools available to the user.

When one first begins to trade, the trading system should be rudimentary, to reflect the level of skill and ability of the trader. Then as one's knowledge of trading improves, and of the analytical methods needed to support profitable trading, the trading system should also grow in sophistication and complexity.

The evolution of the trading system would be determined by the kind of questions asked of the system.

This article reviews the nature of the questions the trading system should be designed to answer, and how these should change over time to reflect the growing skill and knowledge of the user.

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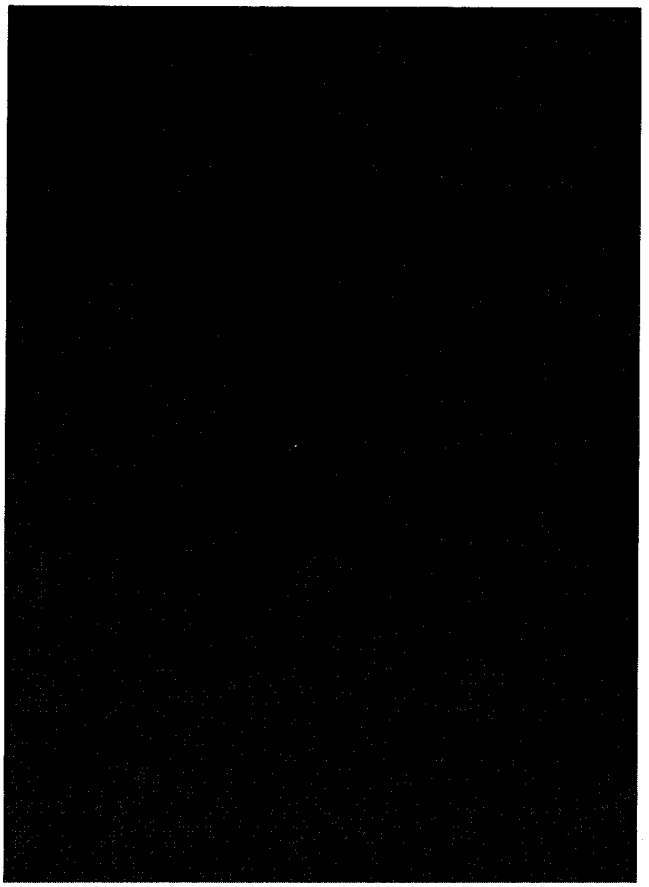
**Bo en behalwe ons adverteerders, het die onderstaande maatskappye hulp verleen met die finansiering van hierdie uitgifte van die tydskrif en hulle word bedank vir hulle vriendelikheid.**



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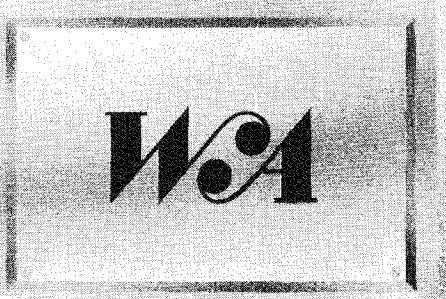

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# The Investment Analysts Journal

Thirty-seventh issue – Winter 1993

# Die Beleggings-ontleders Tydskrif

Sewe-en-dertigste uitgawe – Winter 1993

As we go to press with this issue of the Journal, South Africa stands on the threshold of momentous political change. Multilateral negotiations, which include the participation of all key political parties (even the CP and PAC are there), have made good progress and the possibility cannot be excluded that by the end of June, a Transitional Executive Council (TEC) will be in place which will act as the country's first power-sharing administration. If a TEC comes into existence, the scene will be set for the later holding of a general election (probably sometime early in 1994) which will lead to the establishment of a Constituent Assembly (CA) to serve both as an interim parliament and a constitution-making body. Once this is in place, the TEC is likely to be replaced by a new interim government of national unity which would differ from the TEC in that parties forming part of it would be represented on the basis of their CA representation. In other words, whereas the TEC would have all key players represented on some arbitrary basis, the national unity government would be a democratic one and would reflect the seniority of parties according to constituency support. South Africa would have made its conversion from white minority domination to non-racial democracy, albeit in a framework of power-sharing, through negotiation rather than through revolution.

It is hardly surprising that there are many people, individuals and organisations, who withdraw in horror at this prospect. They are the ones who have held steadfastly to the belief that the only alternative to white domination is black domination, and they have been prepared to contemplate civil war rather than allow a negotiated solution along the lines described above to be implemented. It is not coincidental that each time the multilateral negotiations have made good progress, violence has increased not only of the black-on-black but also of the black-on-white kind to confuse the situation. Political assassination, too, has been used (the killing of Chris Hani is the most outstanding but not the only example) to raise the emotional temperature in order to check the progress of the negotiations. This is the last opportunity those opposed to change have to prevent the transfer from the old order to the new.

However, the question has to be asked: Can anything now turn back the clock to the kind of South Africa that has existed here for over three centuries? Prof Jan Lombard most fittingly has described the old South Africa as having been an extension of Europe in Africa; a society in which everything was directed to promote European culture and economy, and where the indigenous black people were cast in a role not of being citizens but of being like other natural resources. Thus, when the economy expanded, they were absorbed into it, but when it contracted they were cast off into disuse much as was the case with material production inputs. Because blacks did not vote, the government had no political reason to address the matter of black unemployment as a priority in economic policy formulation. All that will change in the new South Africa. Indeed, the most important difference between the old South Africa and the new is likely to be the prioritising than can be expected to place the problem of black unemployment, *mass black unemployment*, at the top of the policy agenda. No future South Africa government, once the political process has been democratised, will be able to neglect let alone ignore this matter. The problem will have become as compelling for governments as mass unemployment, and finding a solution to it, was for governments in Western Europe and North America during the

Met die ter perse gaan van hierdie uitgawe van die Tydskrif staan Suid-Afrika op die drumpel van gewigtige politieke verandering. Veelparty onderhandelings, met die deelname van alle sleutel politieke partye (selfs die KP en die PAC is teenwoordig), het goeie vordering gemaak en die moontlikheid kan nie uitgesluit word dat daar teen die einde van Junie 'n Oorgangs Uitvoerende Raad (OUR) in plek sal wees, wat sal optree as die land se eerste magsdelende administrasie nie. 'n Sodanige OUR sal die tafel dek vir die hou van 'n algemene verkiesing (waarskynlik vroeg in 1994) wat sal lei tot die vorming van 'n Grondwetskrywende Vergadering (GV) wat sal dien beide as tussentydse parlement en konstitusie-skrywende liggaam. Nadat dit in plek is, sal die OUR waarskynlik vervang word met die nuwe interim regering van nasionale eenheid wat van die OUR sal verskil in sover die deelnemende partye verteenwoordig sal word op die basis van hul GV verteenwoordiging. Met ander woorde, terwyl die sleutelspelers op arbitrêre wyse in die OUR verteenwoordig sal wees, sal die regering van nasionale eenheid demokraties wees in sover dit die senioriteit van partye gebaseer op kiesersteun sal weerspieël. Suid-Afrika sal die oorgang gemaak het vanaf wit minderheid dominasie tot 'n nie-rassige demokrasie, alhoewel in 'n raamwerk van magsdeling, deur onderhandeling eerder dan rewolusie.

Dit is nie verrassend dat baie mense, individue en organisasies, terugdeins voor hierdie vooruitsig nie. Dit is hulle wat vasgeklou het aan die geloof dat die enigste alternatief vir wit oorheersing, swart oorheersing is en hul sou eerder burgeroorlog oorweeg as om 'n onderhandelde skikking volgens die uiteengesette riglyne te aanvaar. Dit is nie toevallig nie dat elke keer as die veelparty onderhandelings goeie vordering toon, geweldsvlakke toeneem, nie alleenlik van die swart-op-swart tipe nie, maar ook van die swart-op-wit tipe, ten einde verwarring te skep. Politieke sluipmoorde is ook gebruik (die moord van Chris Hani is die uitstaande, maar nie die enigste voorbeeld nie) om die emosionele koors te laat styg en die vooruitgang van onderhandelings te vertraag. Dit is die laaste geleentheid vir diegene wat teen verandering gekant is om die oorgang vanaf die ou na die nuwe orde te keer.

Nietemin behoort gevra te word: Kan enigiets nou die horlosie terugdraai na die soort Suid-Afrika wat ons vir meer as drie dekades geken het? Prof Jan Lombard het die ou Suid-Afrika baie gepas geskryf as 'n ekstensie van Europa in Afrika; 'n gemeenskap wat ten doel gehad het om die Europese kultuur en ekonomie te bevorder en waar die inheemse swart bevolking eerder as produksiefaktore as landsburgers gesien is. Wanneer die ekonomie uitgebrei het, is hulle hierin geabsorbeer, maar wanneer dit ingekrimp het, is hul in onbruik forseer soos fisiese produksiefaktore. Omdat swartes nie gestem het nie, was daar geen politieke dwang op die regering om swart werkloosheid as prioriteit in ekonomiese beleidsformulering te hanteer nie. Dit sal alles in die nuwe Suid-Afrika verander. Om die waarheid te sê, die belangrikste verskil tussen die ou en nuwe Suid-Afrika is waarskynlik die prioritisering van die probleem van swart werkloosheid, bo-aan die politieke agenda. Geen toekomstige Suid-Afrikaanse regering na demokratisering van die politieke proses, sal hierdie aangeleentheid kan verwaarloos, om nie te praat van ignoreer nie. Die probleem sal net so dwingend word soos massale werkloosheid, en die oplossing hiervoor, was vir regerings in Wes-Europa en Noord-Amerika gedurende die depressiejare van die 1930's.

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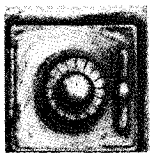

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depression years of the 1930s.
Of course, there will be those who will argue that it is precisely for these reasons that the conversion of South Africa to a democracy should have been resisted in the first place. There is little prospect, in their judgement, of reducing black unemployment, and taking the democracy option will only mean that economic growth will be sacrificed on the altar of redistribution. The taxation of whites will have to increase so much, to make any significant impact on the problem, as to drive investment even deeper into the hole into which it has already fallen. Better, they say, would it have been to have carried on ignoring black unemployment, and the disaffection that follows from it, altogether.

While the economic challenge that now faces the country is huge, this vision of its viability and its future cannot logically be defended. Already the system of white minority domination had become unsustainable and the economy was in grave trouble. It had been brought to the very edge of the precipice and it was largely this that had persuaded the government to U-turn on its previous policies. Any attempt to push on with the political exclusion of blacks would have provided a guarantee of complete disaster. It was the realisation of this that persuaded the white electorate to vote 'Yes' in last year's referendum. All the reasons for that vote remain valid today notwithstanding the decline in popularity the government has suffered amongst white voters in recent months because of its ineptness and seeming mismanagement. Violence, corruption and further economic decline (the lastmentioned not entirely its fault) have engulfed it.

But even economically, things are beginning to change, and for the better. Inflation has been brought down to single digit levels from 16,8 per cent only eighteen months ago. (It had been over 20 per cent in January 1986.) A new finance minister has introduced a tough budget which starts to address the economy's serious structural defects. And the world economy has begun to show evidence of recovery. Admittedly, this still looks tentative because of disappointing first quarter real GDP growth figures from the US, but the global evidence of improvement is wider than just America. Britain is showing recovery also while the free fall of industrial production growth in Japan now looks as if it may be over. Beyond Japan, in the Pacific Rim area, growth continues at a high rate and shows no evidence yet of cyclical reverse. The odds are that the G7 economic recovery will continue even if its pace of improvement is held back by continuing problems associated with German unification.

What does all this mean for investors in South Africa? The answer is a short one. There is life after apartheid, and the post-apartheid era will have its own opportunities. The paradigm shift politically means that the economy's direction must change. But equally when it does there will be profit to be made for those companies quick to seek the opportunities out. The South African business sector has never been flatfooted. It has met the challenge of trade sanctions as its remarkable non-gold export performance since 1983 has demonstrated, and there is every reason to believe that it will keep ahead of the game in the future. Once the country's relationship with the IMF and the World Bank is normalised, and the constraint of financial sanctions is eased, its real GDP growth, and certainly its growth of real gross domestic expenditure, on a sustained basis, might just surprise the sceptics.

THE EDITOR

Natuurlik sal daar diegene wees wat argumenteer dat dit presies om hierdie redes is dat die oorgang na 'n demokrasie in Suid-Afrika in die eerste plek teengestaan behoort te word. Daar is weinig vooruitsig, volgens hul oordeel, dat swart werkloosheid verminder kan word en die demokratiese opsie sal slegs beteken dat ekonomiese groei geoffer sal word op die altaar van herverdeling. Die belastinglas van blankes sal sodanig moet toeneem om enige betekenisvolle impak op die probleem te maak, dat investering net verder sal afneem. Dit sou beter wees, argumenteer hulle, om voort te gaan om swart werkloosheid en die gepaardgaande ontevredenheid, te ignoreer.

Terwyl die land nou geweldige ekonomiese uitdagings in die gesig staar, kan hierdie voorafgaande gesigspunt nie logieserwys verdedig word nie. Die stelsel van wit oorheersing het nou reeds nie-handhaafbaar blyk te wees en die ekonomie was in ernstige moeilikheid. Dit is tot op die rand van die afgrond gebring en dit was grootliks hierdie werklikheid wat die regering 'n ommekeer in beleid laat uitvoer het. Enige poging om die beleid van swart politieke uitsluiting voort te sit, sou 'n waarborg vir 'n totale ramp wees. Dit was hierdie insig wat blanke kiesers laat "Ja" stem het in verlede jaar se referendum. Al die redes vir daardie stemming bly vandag geldig nieteenstaande die afname in die regering se populariteit as gevolg van sy onbeholpenheid en die persepsie van wanbestuur. Geweld, korrupsie en verdere ekonomiese agteruitgang (laasgenoemde nie geheel die regering se fout nie) het die regering verswelg.

Maar selfs op die ekonomiese terrein begin positiewe veranderinge intree. Inflasie is afgebring vanaf 16,8% slegs agtien maande gelede, tot enkelsyfers. (Dit was meer as 20 persent in Januarie 1986). 'n Nuwe minister van finansies het 'n streng begroting ingedien wat begin om die ernstige strukturele gebrek van die ekonomie aan te spreek. En die wêreldekonomie het begin om tekens van herstel te toon. Toegegee, hierdie herstel lyk maar tentatief as gevolg van die teleurstellende reële BBP groei in die eerste kwartaal in die VSA, maar die globale tekens van herstel is wyer as slegs in die VSA, Brittanje toon tekens van herstel, terwyl die skerp daling in industriële produksiegroei in Japan iets van die verlede skyn te wees. In die Pasifiese Kom area word steeds hoë groeikoerse aangeteken en is daar nog geen teken van 'n sikliese omswaai nie. Die kanse is verder goed dat herstel in die G7 nasies se ekonomieë sal voortduur, alhoewel die tempo vertraag word deur die probleme geassosieer met Duitse eenwording.

Wat beteken dit alles vir beleggers in Suid-Afrika? Die antwoord is kort en bondig. Daar is lewe na apartheid en die post-apartheid tydperk sal sy eie geleenthede bied. Die politieke paradigma verskuiwing beteken dat die ekonomie se rigting behoort te verander. Maar wanneer dit gebeur, sal daar winste te maak wees vir maatskappye wat vinnig hierdie geleenthede uitbuit. Die Suid-Afrikaanse sakesektor is nog nooit onvoorbereid betrap nie. Dit het die uitdaging van handelsanksies die hoof gebied soos die verbasende nie-goud uitvoerprestasie sedert 1983 toon, en daar is alle rede om te glo dat dit ook in die toekoms die uitdagings die hoof sal bied. Wanneer Suid-Afrika se verhouding met die IMF en die Wêreldbank genormaliseer het en die beperking van finansiële sanksies verlig is, kan reële BBP groei, en sekerlik die groei in reële bruto binnelandse besteding, dalk net die skeptici verbaas.

DIE REDAKTEUR

Ms Gail Tensfeldt, Prof Colin Firer and Dr Mike Bendixen

# Bankers' Views on Securitisation in South Africa


## ABSTRACT

Asset securitisation is still in the embryonic stage of its development in South Africa. This paper documents the views of a group of senior bankers regarding the likely future trend of securitisation in South Africa. They are not convinced that the benefits of securitisation currently outweigh the costs, but believe that the phenomenon is likely to gather momentum.

The primary advantages of asset securitisation are perceived to be that it provides savings on capital, has the potential to increase the non-interest income earned by banks, can improve returns ratios and will provide diversification benefits to investors.

Major concerns expressed are that it is initially a complicated and time consuming process with high transaction costs. The reluctance of investors to accept these new securities is expected to be the most significant obstacle to their growth.


## INTRODUCTION

Asset securitisation, a process that has made significant advances as a global financing technique in recent years, has emerged as the latest financial innovation in banking in South Africa. According to the proponents of this new financial development, asset securitisation has the potential to alter the face of traditional banking and represents the way banking will be done in the future.

For centuries, banks have been selling deposits to the public to raise most of their loanable funds and have depended on the loans that they make for the bulk of their revenues and net earnings. Furthermore, banks have grown by making loans and keeping them on their books until the borrowers paid them off. Now some banks are reversing course and removing loans from their books by way of a process known as asset securitisation.

Asset securitisation is an off-balance-sheet financing technique whereby loans and other receivables are packaged, underwritten and sold to investors in the form of securities. It can be described as the process which occurs when a lending institution's assets are removed from its balance sheet and are funded instead by investors who purchase negotiable instruments evidencing the indebtedness (Henderson *and* Scott, 1988, p. 2).

## HISTORICAL DEVELOPMENT

There has been a dramatic rise in the volume and variety of assets that have been securitised overseas, particularly in the United States where asset securitisation has already become a major source of off-balance-sheet financing. In 1989 Lee (p. 69) reported that US$800 billion of mortgage-backed issues had been launched in the United States. This represented 35 per cent of the US$2,3 trillion USA residential mortgage market (Dugan, 1990, p.97). As much as 80 per cent of new single-family home mortgages are being securitised and sold into the secondary market. The success of this market has resulted in the spread of asset securitisation to many other forms of credit, including auto loans (US$15 billion in 1988), credit card receivables and data processing equipment leases (Hull, 1989a, pp. 21-22). According to Lee (1989, p. 69), the existing pool of securitised assets is US$476 billion. McKinsey and Company, Inc. estimate that up to 80 per cent of consumer assets in the United States will be securitised by 1995 (Allen *and* Pearson, 1987-88, p. 11).

In the United Kingdom, the first mortgage-backed issue appeared in 1987. By the calendar year-end 1989, sterling mortgage-backed issues totalled GBP6 billion. This is only a fraction of the available pool of GBP200 billion. Furthermore, none of the possible GBP14,1 billion of credit card receivables and car loans have been securitised (Lee, 1989, p. 69). This market is small relative to that in the United States because mortgage-backed securities in Britain do not receive the kind of state guarantee that exists in America (The Economist, 8 October 1988, p. 100).

Securitisation is also being actively pursued in France, Australia, Canada and New Zealand (Stadler *and* Jinkens, 1990).

This process of making loans and selling them to investors in the form of securities has major implications for the future of banks. Securitisation directly affects banks' ability to meet regulated capital requirements, their costs of funds and their risks (Aber, 1989, p. 57). Some banking observers believe that the survival and growth of banks are importantly connected to the future of securitisation (Ocampo, 1989, p. 8).

## THE ASSET SECURITISATION PROCESS

The process of asset securitisation can be broken down into five parts: origination, structuring, credit enhancement, placement and trading, and servicing.

Securitisation begins when a bank, known as the originator, identifies and puts together a pool of underlying primary assets. The initial decision that a bank must make, is which of its assets it is going to securitise. A homogenous pool of assets that is income producing, such as mortgage loans, automobile loans, boat loans, leases and credit card receivables must be identified. These loans must have the proper maturity and range of interest rates as well as standardised loan documentation. (Wright & Jenison, 1989, p. 13).

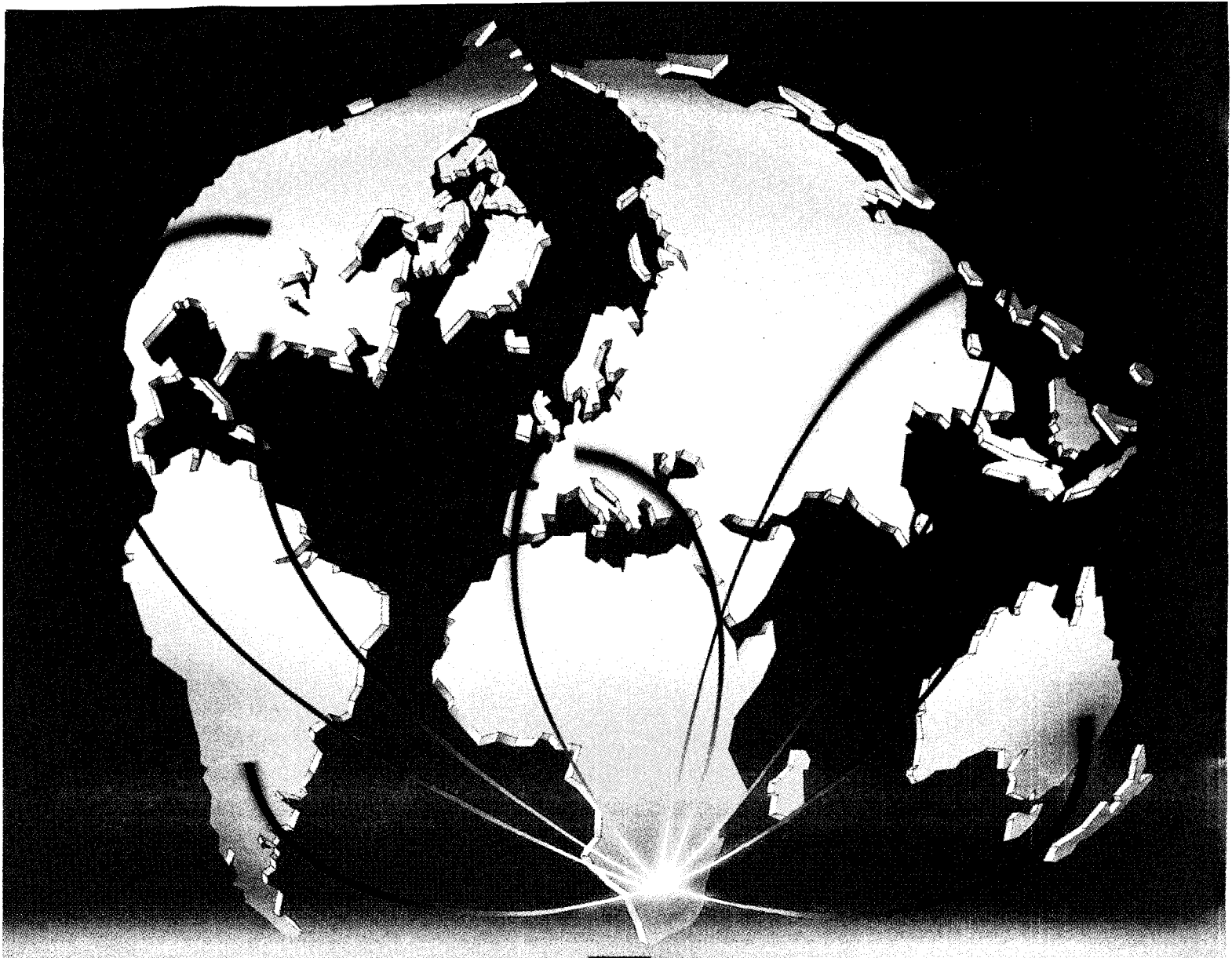
Typically, the originator sells the selected pool of assets to the issuer which is a special purpose vehicle (SPV) set up for the purpose of structuring the transaction (Ocampo, 1989, pp. 5-6). The functions of the SPV include holding and administering the assets, issuing the debt instruments and making the periodic distributions of principal and interest to investors (Ellspermann, 1988, p. 22).

The asset-backed securities issued by the SPV to investors represent undivided certificates of ownership in the pool of assets being sold, including the security interests in the underlying collateral. The securities issued have to take investors' maturity and risk/reward requirements into account as well as the cash flow of the underlying assets (Hull, 1989b, p. 29) and the costs of issuing the various money and capital market instruments.

An important factor is the marketability of the issue. As South Africa does not have an established secondary market in corporate debt instruments, it may be desirable to obtain a listing for the securities issued.

When structuring a securitisation issue it is important to satisfy the relevant accounting requirements that permit a transaction to be considered a sale of assets rather than a collateralised borrowing from the SPV to the bank, thus permitting the removal of those assets from the balance sheet (Swegle, 1989,

Since this article was written, a second securitisation issue by Sasfin has appeared



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pp. 22-23). The recording of a gain or loss on sale of the assets will have important accounting and taxation implications, which must be established at the time that the issue is structured. In South Africa guidelines for asset securitisation schemes are laid down by the Reserve Bank.

Investors in asset-backed securities are normally unable or unwilling to assume the level of credit risk equivalent to that which a bank is willing to undertake. Although pooling of loans may reduce the level of default risk and make it more predictable, investors generally prefer to reduce this risk to a minimum because they are unable to evaluate it as well as a bank can (Aber, 1988, p. 9). To make the transaction attractive to investors, and to enable the issue to obtain an investment-grade credit rating, some type of credit enhancement is usually necessary. Among the techniques employed have been over-collateralisation, subordinated debt, pool insurance, standby letters of credit and spread account. (Carnegie-Brown, 1989, pp. 37-38; Hull, 1989a, p. 29; Ellspermann, 1988, p. 24).

The SPV or a third party is usually an underwriter which issues the securities which are typically of a very high quality. To date, institutional money market investors and financial institutions have been the primary purchasers of asset-backed securities in the USA and UK markets (Ellspermann, 1988, p. 22). In South Africa, life offices and pension funds may be expected to constitute the most important groups of investors.

As asset securitisation transactions involve the sale of some type of customer loan obligations, there is a need to service the assets until their ultimate liquidation (Ellspermann, 1988, p. 22). The servicer provides the on-going administration of the collateral, is responsibile for collecting the capital and interest payments from customers and the passing on of the cash received to the SPV, following up on arrear payments and foreclosing the bad debts.

## BENEFITS AND CONCERNS OF ASSETS SECURITISATION

When a bank securitises a pool of loans it can, under typical circumstances, remove those loans or assets from its balance sheet because it no longer owns them (Aber, 1988, p. 6). As a result of this, a number of benefits accrue to banks that securitise their assets and, according to Rogowski (1988, p. 51), these benefits provide the numerous reasons why securitised credit will transform the traditional face of lending.

One of the most important benefits of securitisation is that it provides savings on capital in that if a loan is no longer on the books of a bank, it does not have to meet regulators' minimum capital requirements against that asset. (Ocampo, 1989, p. 8).

According to Kopff and Lent (1988, p. 15), many banks are likely to increase their use of securitisation during the next few years to respond to the new and more stringent risk-based capital adequacy rules proposed in the Basle Accord by the Bank for International Settlements (BIS) in July 1988.

Bank funding costs are lowered by asset securitisation which in turn improves bank profitability (Ocampo, 1989, p. 8), because receiving funds via securitisation avoids the costs associated with required capital and the liquidity costs associated with required reserves (and in the case of South Africa, liquid asset requirements).

An advantage of asset securitisation is that it increases the non-interest income earned by a bank. This, in turn, has a positive effect on profitability. A portion of the net interest spread that otherwise would be realised over the life of the financial assets is recorded as a fee income when the asset is sold, and a new source of fee income is created for those banks continuing to service or administer the loans that they sell (Rose, 1988, p. 56). The increase in fee income and simultaneous reduction in asset levels produces an improvement in the return on assets and, through the management of leverage, the return on equity.

Asset securitisation generates funds that can be used to originate new loans. This additional funding source increases the financial flexibility of banks while leaving their access to the usual funding sources unimpaired (Hull, 1989a, p. 25). By securitising their assets, banks open up new sources of funding from institutions that may not be traditional purchasers of certificates of deposits and other bank debt (Haley, 1987, p. 34).

When loan origination capabilities exceed funding growth, securitisation allows the institution to expand loan volume faster than deposit growth, often at competitors' expense (Hull *and* Annand, 1987, p. 138). Asset securitisation can, therefore, provide competitive advantages to a bank attempting to increase market share.

Securitisation offers banks a means to improve their asset/liability management (Kopff *and* Lent, 1988, p. 15). Asset-backed securities exactly hedge asset/liability flows and transfer any payment uncertainty associated with the receivables from the bank to the investor (Haley, 1987, p. 34).

Asset securitisation provides a hedge against interest rate risk (Hull, 1989a, p. 26). Since the bank sells the assets, securitisation essentially lays off all the interest rate risk. With the asset no longer on the balance sheet, the bank does not have to create a liability to match it, and the problem of mismatching effectively disappears (Ocampo, 1989, p. 9). Securitisation places this interest rate risk with investors, such as pension funds, insurance companies and unit trusts, who are more willing and able to take this risk. By securitising their assets, banks in effect change the nature of their business from attempting to maintain a loan spread in the face of interest rate volatility to earning a fee income (Johnson, 1989, p. 2).

Asset securitisation also reduces liquidity risk. Traditional credit advances produce illiquid assets. There is presently no secondary market for most bank loans and banks can, therefore, do little to adjust their portfolios to changing interest rate or market conditions. (Bryan, 1987b, p. 107).

In a properly structured securitisation transaction, three levels of risk are created, each of which is borne by the participant best suited to support it. The first level is credit risk for expected losses, which is borne by the originator. The originating bank must provide a first loss guarantee, which is usually done in the form of an insurance policy. The second level of risk is concentration risk, arising from a lack of diversification, which is borne by the credit enhancer. The third and final level of risk, catastrophic risk, is borne by the investors.

In addition to the benefits of asset securitisation that accrue to the originating bank, there are certain advantages that could be enjoyed by investors and borrowers.

For investors, asset securitisation will bring a broader array of investment choices and they will have the opportunity to invest in high-grade, asset-backed paper (Gentle, 1990, p. 63). Furthermore, investors could possibly receive a modest increase in yield as competition for investors forces issuers to share the benefits of securitisation (Bryan, 1987a, p. 12).

For borrowers, securitisation could result in lower interest rates and more readily available credit. As more credit is securitised, competition is likely to force originating banks to share the savings with borrowers, who could eventually save one per cent or more on many types of credit (Bryan, 1987a, p. 12).

While the benefits of securitisation are clear, there are a number of factors that prevent financial institutions from securitising their assets.

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Firstly, asset securitisation is a complicated, time-consuming and, at least initially, expensive process. Substantial preparation, particularly in the computer systems and accounting areas, is required (Ellspermann, 1988, p. 23). Bank systems are not developed for reporting to investors or tracking the sale of different pools of assets. In most cases, therefore, securitisation will require major systems modification (Wright *and* Jenison, 1989, p. 14). However, much of the set-up work is non-recurring. Once accomplished for the initial securitisation transaction, it can be expected to fall into place more readily and inexpensively for subsequent issues.

According to Ellspermann (1988, pp. 23-24), a common concern about asset securitisation is the expense involved. In the United States, underwriting fees have typically averaged 0,4 per cent of the offering amount and legal fees can exceed US$100 000. The cost to modify computer systems to support the transactions can be equally large. Fees to external auditors, the credit rating agency and the trustee will also add to the cost of the transaction. In South Africa, transfer fees and stamp duties, which do not exist in the United States, could hamper the liquidity of the market (Gentle, pp. 65-66).

An absolute necessity for securitisation is a historical database that tracks the risk information for assets (Wright *and* Jenison, 1989, p. 14). A bank that requires to securitise a pool of its assets would have to present historical information on portfolio performance for the previous three to five years, particularly data on loan losses and delinquencies. An impediment to securitisation could be the lack of this statistical database within banks.

The asset growth of the institution securitising its assets is diminished. This may be of concern to banks where their performance is measured in terms of the size of their assets.

Loans most easily securitised are those of the highest quality and those that remain on the balance sheet may be a portfolio of weak loans. This could lead to capital market investors and regulators being more apprehensive about the bank's exposure to risk (Rose, 1988, p. 56).

Finally, Bryan (1987a, p. 9) suggests that an impediment to the growth in the process of asset securitisation is that investors may be slow to accept the new instruments. An underdeveloped secondary market for securitised assets that lacks liquidity is an obvious problem to an emerging market that is attempting to find investor acceptance.

Aber (1989) researched senior US bank executives' opinions about the securitisation of bank loans. His survey was mailed to one hundred senior executives of twenty-five of the fifty largest commercial banks in the United States. He found that while securitisation may not yet have been embraced wholeheartedly by this group of senior bank officers, there does appear to be widespread recognition of its potential. The promise of better management of interest rate risk seemed to be the principal benefit perceived. There was a reasonably strong belief that funding costs could also be reduced through the use of securitised credit. Aber concluded that, in general, securitisation was viewed as a positive trend by his sample.

## RESEARCH QUESTION AND METHODOLOGY

In South Africa, asset securitisation is still in an embryonic stage of development. In November 1989 the first and only securitisation took place when United Building Society (UBS) securitised R250 million of its mortgage loan portfolio (Business Day, 15 February 1990). Very little has been written or researched on this subject locally.

The objectives of this study were to ascertain bank executives' views on securitisation with regard to the benefits and the concerns of the process, to establish whether, in the views of senior bank officers, asset securitisation is likely to follow a positive trend and become an important off-balance-sheet financing technique in the South African banking industry, and to determine whether South African bankers' views on asset securitisation are similar to those of bankers overseas.

The questionnaire was selected as the principal means of collecting the data. To overcome the normally poor response rate associated with mailed questionnaires (Groebner *and* Shannon 1985, p. 28), the questionnaire was telefaxed to the respondents. Prior to faxing, each potential interviewee was contacted by telephone to determine their willingness to participate in the survey. Given a positive response, an appointment was made during which the answers to the questionnaire would be obtained telephonically.

The questions were formulated largely from the literature search. Certain questions were, however, obtained directly from Aber's (1989) research. This facilitated the comparison of the results of the two surveys.

In order to make the instrument as simple to read and respond to, and since the research was concerned with opinions and attitudes, the questionnaire consisted entirely of closed-ended questions using response scales which ranged from "strongly agree" to "strongly disagree" or "very important" to "very unimportant". An "unkown" category was included to distinguish the persons who were, as described by Pirow (1990, p. 116), genuinely "middle of the road", from those who had not thought about the question and chose the middle answer because they did not know how to reply to the question.

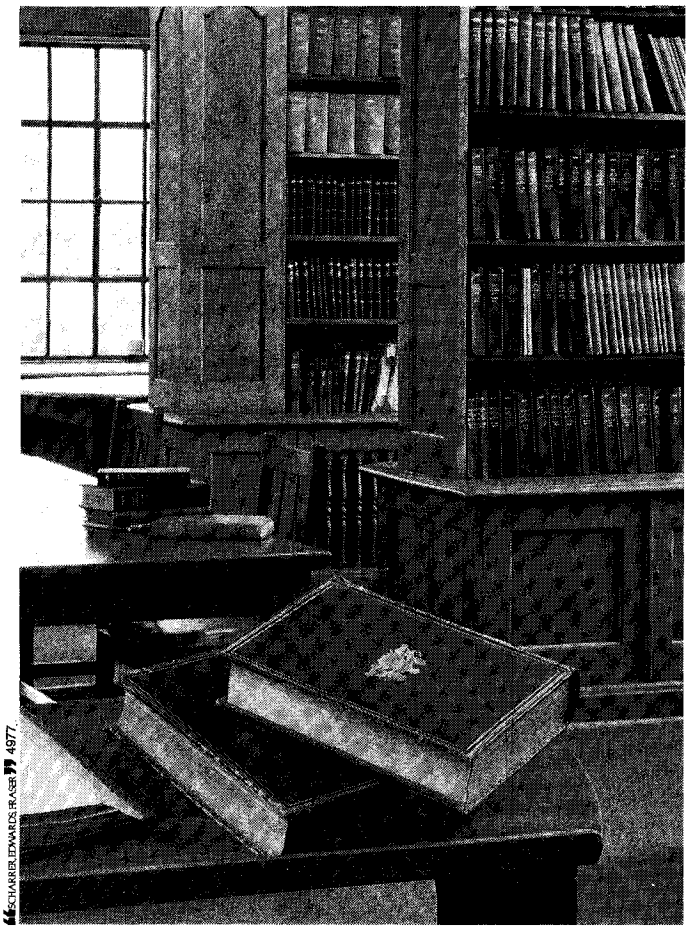
A pilot study, which consisted of four unstructured interviews, was conducted to assist in the questionnaire development. As advocated by Pirow (1990, p. 123), the participants in the pilot study did not have the precise characteristics of the sample of individuals that received the questionnaire. Instead, two persons with a superior knowledge of the subject were interviewed. One was the consultant to the first securitisation issue that took place in South Africa. The other was employed by The Discount House of South Africa which was instrumental in putting this first transaction together. The remaining two participants were colleagues of the researcher with an adequate knowledge of asset securitisation who were selected on a convenience basis. Four interviews were considered appropriate as the criticisms and comments received from the participants were relatively homogeneous.

The survey population consisted of all the senior bank executives throughout South Africa. A "senior bank executive" for the purposes of this study, was defined as a bank official employed in a middle or senior management position within a bank as defined by the Banks Act, 1965 (Act No. 23 of 1965, as amended).

Convenience sampling, a non-probability sampling technique, was used to select a sample from this population. Bankers participating in the Securitisation Interest Group, an independent forum for all parties interested in contributing to and being informed about local developments in securitisation, were contacted and requested to partake in the survey.

Despite the criticisms levelled at non-statistical sampling techniques by, for example, Leedy (1989, pp. 152-153) and Groebner *and* Shannon (1985, pp. 30-31), convenience sampling was considered the only feasible way to sample since asset securitisation is a very new development in South Africa and, therefore, relatively few bankers are familiar with this financing technique. It was necessary to select persons specifically because of their expertise and knowledge of the topic.

Of the sixty four bankers contacted, fifty two agreed to participate in the study. They were mostly employed in the finance, treasury, corporate banking, group credit, financial control and



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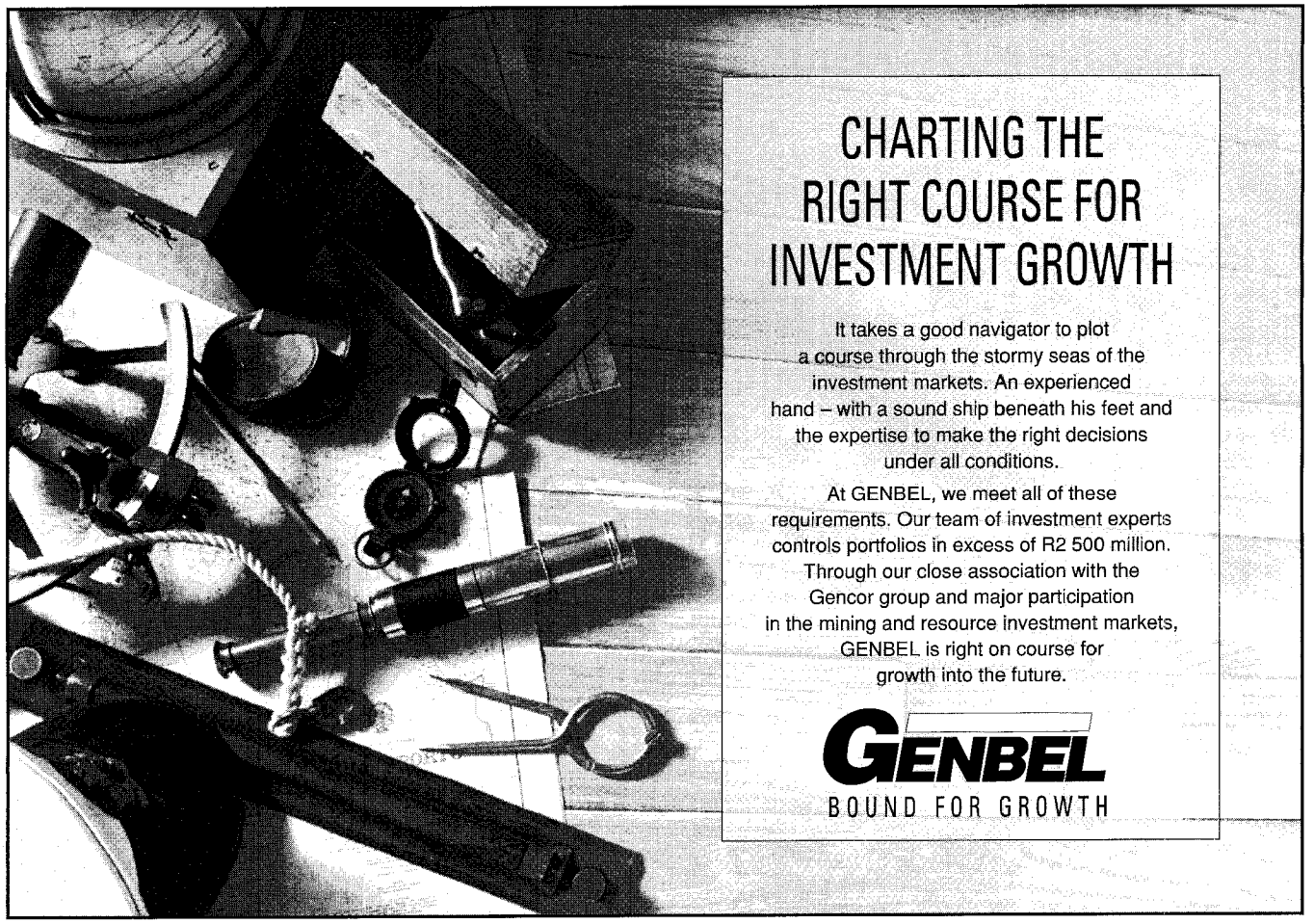

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researh and development areas of the banking sector. The designations of those bankers who agreed to participate in the survey and the organisations for whom they worked are listed in appendix 1.

## APPENDIX 1

LIST OF BANKS FROM WHOM COMPLETED QUESTIONNAIRES WERE OBTAINED

Allied Bank Limited
Bankorp Limited
Cape Investment Bank Limited
Fidelity Bank Limited
Finansbank Limited
First National Bank of Southern Africa Limited
First National Corporate and Investment Bank Limited
Investec Bank Limited
Nedfin Bank Limited
Nedcor Limited
Nedperm Bank Limited
Prima Bank Limited
Standard Bank of South Africa Limited
Standard Merchant Bank Limited
The African Bank Limited
UAL Merchant Bank Limited
United Bank Limited
Volkskas Merchant Bank Limited

DESIGNATIONS OF BANKERS SURVEYED

| Designation | Number of People |
|---|---|
| Manager | 9 |
| Consultant | 2 |
| Senior Manager | 3 |
| Senior Vice President | 1 |
| Vice President | 2 |
| General Manager's Assistant | 1 |
| Chief Accountant | 2 |
| Chief Manager | 5 |
| Senior Chief Manager | 2 |
| Assistant General Manager | 5 |
| Deputy General Manager | 3 |
| General Manager | 7 |
| Senior General Manager | 3 |
| Director | 3 |
| Deputy Managing Director | 1 |
| Managing Director | 3 |
| Total | 52 |

Correspondence analysis was applied to the data to determine which of those characteristics of asset securitisation were regarded by bankers as being significant benefits and concerns of this process as well as the attributes that were expected to have an important impact on its future growth.

Hoffman *and* Franke (1986, p. 213) describe correspondence analysis as an exploratory data analysis technique for the graphical display of contingency tables and multivariate categorical data. It is a multivariate descriptive statistical technique that represents graphically the rows and columns of a categorical data matrix in the same low dimensional space. It requires numerical scores to be assigned to the rows and columns of the data matrix so as to maximise their interrelationship. The rows and columns are scaled in corresponding units so that the variables can be plotted in the same space to assist in the interpretation of the data. The joint graphical display obtained from a correspondence analysis can be used to reveal the structure and patterns inherent in the data. This method assists, not only in detecting that a relationship exists among the variables in a data matrix, but also in showing how the variables are related.

A chi-square goodness of fit test was used to measure whether the opinions of local bankers regarding certain aspects of asset securitisation are similar to those of American bankers.

## RESULTS

Of the fifty two bankers who agreed to complete the survey, replies were received from forty one. This represents 64 per cent of the original sample size of sixty four bankers who were initially contacted and 79 per cent of those people who agreed to participate in the study. This response rate for a questionnaire can be regarded as high by most survey research standards and probably reflects a strong interest in asset securitisation.

The responses to the questions posed are summarised in table 1.

**Table 1**

| RESPONSES TO THE QUESTIONNAIRE | | EXCELLENT | VERY GOOD | GOOD | ADEQUATE | INADEQUATE |
|---|---|---|---|---|---|---|
| 1. GENERAL | | | | | | |
| 1.2 How would you regard your knowledge of the process of asset securitisation? | | 2 | 13 | 18 | 5 | 1 |
| 2. BENEFITS OF ASSET SECURITISATION | STRONGLY AGREE | AGREE | NEUTRAL | DISAGREE | STRONGLY DISAGREE | UNKNOWN |
| Asset Securitisation: | | | | | | |
| 2.1 is a positive trend that is likely to have beneficial effects on the banking industry; | 15 | 58 | 23 | 5 | 0 | 0 |
| 2.2 provides savings on capital that may assist banks in meeting their regulatory capital requirements; | 29 | 59 | 5 | 7 | 0 | 0 |
| 2.3 has the potential to lower bank funding costs; | 0 | 32 | 37 | 29 | 2 | 0 |
| 2.4 has the potential to increase the non-interest income earned by banks; | 32 | 56 | 5 | 5 | 2 | 0 |
| 2.5 can produce an improvement in the return on asset ratios of banks; | 32 | 66 | 2 | 0 | 0 | 0 |
| 2.6 can produce an improvement in the return on equity ratios of banks; | 24 | 66 | 5 | 5 | 0 | 0 |
| 2.7 creates an alternative bank funding source; | 15 | 59 | 10 | 17 | 0 | 0 |
| 2.8 can potentially assist banks in managing the maturity structure of their balance sheets; | 10 | 71 | 15 | 5 | 0 | 0 |
| 2.9 can potentially assist banks in managing their interest rate risk; | 12 | 54 | 15 | 17 | 2 | 0 |
| 2.10 can potentially assist banks in managing their liquidity risk; | 12 | 61 | 20 | 5 | 0 | 2 |
| 2.11 has the potential to reduce the credit risk incurred by banks; | 5 | 34 | 15 | 39 | 7 | 0 |
| 2.12 can result in barrowers paying lower rates of interest on bank credit; | 2 | 10 | 39 | 39 | 10 | 0 |
| 2.13 can result in bank credit being more readily available; | 0 | 49 | 17 | 32 | 2 | 0 |
| 2.14 provides diversification benefits to investors; | 10 | 80 | 5 | 5 | 0 | 0 |
| 2.15 provides investors with a market related yield without the need to sacrifice credit quality; | 5 | 51 | 27 | 10 | 5 | 2 |
| 2.16 The benefits of asset securitisation currently outweigh the costs. | 5 | 29 | 34 | 20 | 5 | 7 |
| 3. CONCERNS OF ASSET SECURITISATION | | | | | | |
| 3.1 Asset securitisation is initially a complicated process. | 27 | 54 | 10 | 10 | 0 | 0 |
| 3.2 Asset securitisation is initially a time consuming process. | 34 | 56 | 5 | 5 | 0 | 0 |

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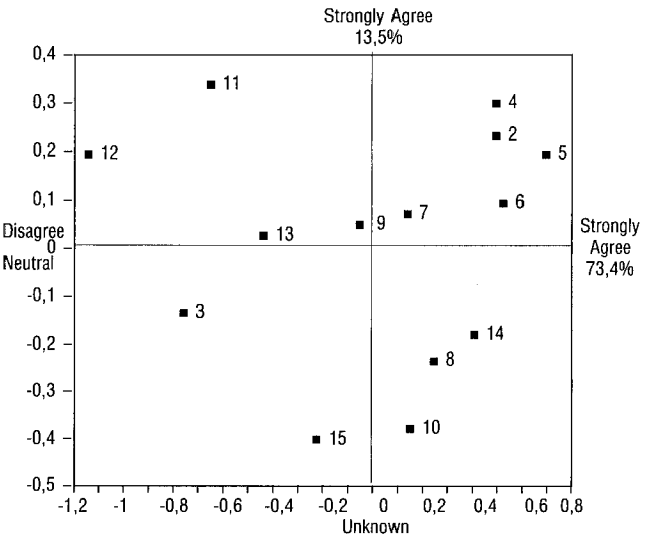
|---|---|---|---|---|---|---|---|
| 3.3 | The initial set-up costs, e.g., the cost of modifying bank accounting and computer systems, are high. | 10 | 66 | 15 | 7 | 0 | 2 |
| 3.4 | Transaction costs, including fees to external auditors, lawyers and the credit rating agency as well as the cost of credit enhancement, transfer fees and stamp duty, are high. | 17 | 71 | 7 | 2 | 0 | 2 |
| 3.5 | Asset securitisation transactions require substantial modifications to bank accounting and computer systems. | 3 | 38 | 33 | 23 | 0 | 3 |
| 3.6 | Banks do not possess the required historical statistical information on their portfolio of assets. | 5 | 39 | 27 | 22 | 5 | 2 |
| 3.7 | The on-balance-sheet asset growth of banks that securitise their assets is diminished. | 17 | 59 | 7 | 15 | 0 | 2 |
| 3.8 | Asset securitisation should have a negative effect on a bank's remaining portfolio of assets. | 10 | 39 | 20 | 22 | 5 | 0 |
| 3.9 | Investors may be slow to accept the new mortgage- and asset-backed securities | 10 | 78 | 5 | 8 | 0 | 0 |
| 3.10 | The lack of credibility of a newly established credit rating agency amongst investors. | 7 | 66 | 17 | 10 | 0 | 0 |
| 3.11 | The costs, financial and other, of engaging in the securitisation of bank loans, currently outweigh the benefits. | 2 | 28 | 28 | 35 | 2 | 5 |
| 4. | THE FUTURE OF ASSET SECURITISATION | | | | | | |
| 4.1 | Asset securitisation is likely to gather momentum in South Africa. | 10 | 62 | 22 | 2 | 2 | 2 |
| 4.2 | Asset securitisation is likely to play a major role within the South African banking industry | 10 | 29 | 46 | 10 | 2 | 2 |
| 4.3 | The growth of banks is importantly linked to the future of asset securitisation | 5 | 27 | 32 | 32 | 2 | 2 |
| 4.4 | Please indicate how important you believe the impact of the following potential benefits of asset securitisation are likely to be in stimulating the growth of this financing technique in South Africa: | VERY IMPORTANT | IMPORTANT | SOMEWHAT IMPORTANT | UNIMPORTANT | VERY UNIMPORTANT | UNKNOWN |
| 4.4.1 | Reduced regulatory capital requirements for banks. | 34 | 49 | 12 | 3 | 0 | 2 |
| 4.4.2 | The potential to lower bank funding costs. | 10 | 38 | 28 | 22 | 0 | 2 |
| 4.4.3 | The potential to increase the non-interest income earned by banks. | 25 | 40 | 20 | 15 | 0 | 0 |
| 4.4.4 | The capacity to increase the return on asset ratios of banks. | 32 | 51 | 10 | 7 | 0 | 0 |
| 4.4.5 | The capacity to increase the return on equity ratios of banks. | 32 | 48 | 15 | 5 | 0 | 0 |
| 4.4.6 | The creation of an alternative source of bank funding. | 17 | 41 | 12 | 22 | 3 | 0 |
| 4.4.7 | The potential to assist banks in managing the maturity sturcture of their balance sheets. | 10 | 32 | 34 | 20 | 2 | 2 |
| 4.4.8 | The potential to assist banks in managing their interest rate risk. | 10 | 32 | 22 | 29 | 0 | 7 |
| 4.4.9 | The potential to assist banks in managing their liquidity risk. | 10 | 27 | 32 | 22 | 2 | 7 |
| 4.4.10 | The potential to reduce the credit risk incurred by banks. | 5 | 17 | 24 | 32 | 20 | 2 |
| 4.4.11 | The possibility of charging lower interest rates to borrowers. | 3 | 15 | 30 | 40 | 10 | 2 |
| 4.4.12 | More readily available bank credit. | 0 | 29 | 32 | 27 | 10 | 2 |
| 4.4.13 | Broader array of investment opportunities available to investors. | 12 | 56 | 24 | 8 | 0 | 0 |
| 4.4.14 | Market related yields available to investors without the need to sacrifice credit quality. | 5 | 61 | 12 | 12 | 0 | 5 |
| 4.5 | Please indicate how important you believe the impact of the following concerns of asset securitisation are likely to be in restricting the growth of this process in South Africa: | | | | | | |
| 4.5.1 | Asset securitisation is initially a complex task. | 12 | 40 | 32 | 7 | 0 | 0 |
| 4.5.2 | Asset securitisation is initially a time consuming process. | 7 | 59 | 24 | 10 | 0 | 0 |
| 4.5.3 | The initial set-up costs are high. | 7 | 68 | 20 | 5 | 0 | 0 |
| 4.5.4 | The transaction costs are large. | 7 | 54 | 20 | 7 | 2 | 0 |
| 4.5.5 | Substantial modifications are required to bank accounting and computer systems. | 7 | 39 | 37 | 12 | 5 | 0 |
| 4.5.6 | The lack of historical database within banks that tracks the risk information of assets. | 15 | 32 | 34 | 15 | 5 | 0 |
| 4.5.7 | The on-balance-sheet asset growth of banks is diminished. | 10 | 34 | 22 | 29 | 2 | 2 |
| 4.5.8 | The possible negative impact on a bank's remaining portfolio of assets. | 10 | 25 | 43 | 15 | 5 | 2 |
| 4.5.9 | Reluctance of investors to accept the new mortgage- and asset-backed securities. | 38 | 48 | 10 | 2 | 0 | 2 |
| 4.5.10 | The lack of credibility of a newly established credit rating agency amongst investors. | 12 | 55 | 28 | 5 | 0 | 0 |

84 per cent of the respondents regarded their knowledge of asset securitisation as being either excellent, very good or good. 13 per cent felt their knowledge was adequate.

Correspondence analyses were conducted on the responses to the four sections of the questionnaire:

- the benefits of asset securitisation (questions 2.2 to 2.15);
- the concerns of asset securitisation (questions 3.1 to 3.10);
- the importance of the impact of the potential benefits of securitisation in stimulating the growth of this financing technique in South Africa (question 4.4) and
- the importance of the concerns of securitisation in restricting the growth of this process (question 4.5).




The graphical display of the two dimensional correspondence analysis pertaining to the benefits of asset securitisation is presented in figure 1. From this display it can be deduced that bankers strongly agree that asset securitisation: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- provides savings on capital that may assist banks in meeting their regulatory capital requirements (statement 2);
- has the potential to increase the non-interest income earned by banks (statement 4);
- can produce an improvement in the return on asset ratios of banks (statement 5);
- can produce an improvement in the return on equity ratios of banks (statement 6); and
- provides diversification benefits to investors (statement 14).

There are, however, a number of benefits presented in the literature that are not perceived by bankers as being advantages of securitisation. They are, for instance, neutral on or disagree that the following are benefits of asset securitisation:

- it has the potential to lower bank funding costs (statement 3);
- it has the potential to reduce the credit risk incurred by banks (statement 11);
- it can result in borrowers paying lower rates of interest on bank credit (statement 12); and
- it can result in bank credit being more readily available (statement 13).

Furthermore, bank officers did not know whether securitisation can:

- potentially assist banks in managing their liquidity risk (statement 10); or
- provide investors with a market related yield without the need to sacrifice credit quality (statement 15).

Moreover, they seem to be evenly in strong agreement with and unsure about the statement, asset securitisation can assist banks in managing the maturity structure of their balance sheets (statement 8).

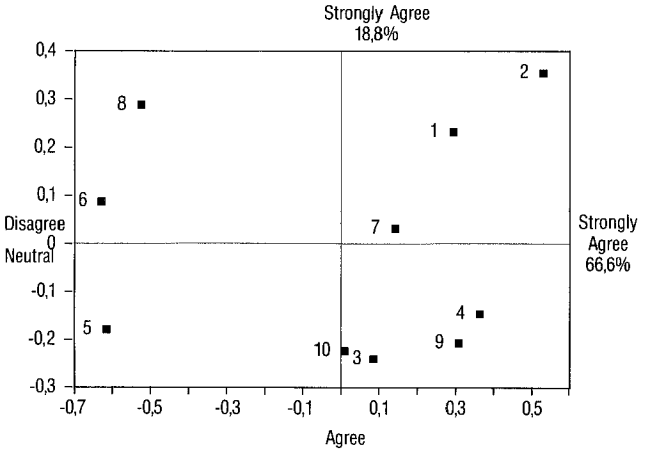


**Figure 2.**

The analysis of the concerns of asset securitisation is presented in figure 2. Senior bank officers are shown to strongly agree with the following statements about the concerns of asset securitisation:

- asset securitisation is initially a complicated process (statement 1);
- asset securitisation is initially a time consuming process (statement 2);
- transaction costs, including fees to the external auditors, lawyers and the credit rating agency as well as the cost of credit enhancement, transfer fees and stamp duty, are high (statement 4); and
- investors may be slow to accept the new mortgage- and asset-backed securities (statement 9).

Further, they agree, that the following are concerns associated with this financing technique:

- the initial set-up costs, e.g., the cost of modifying bank accounting and computer systems, are high (statement 3); and
- the lack of credibility of a newly established credit rating agency (statement 10).

A number of the disadvantages proposed in the literature do not appear to be of concern to bankers. They are neutral on or disagree that,

- this process requires substantial modifications to bank accounting and computer systems (statement 5);
- banks do not possess that required historical statistical information on their portfolio of assets (statement 6); and
- asset securitisation could have a negative effect on a bank's remaining portfolio of assets (statement 8).

Overall the respondents did not appear to be convinced that the benefits of asset securitisation currently outweigh the costs, although is was noted that the results of a cost-benefit analysis will vary from institution to institution.

Regarding the future of asset securitisation in South Africa, bankers were generally of the opinion that this process will gather momentum. The perception, however, was that it will be unlikely to play a major role within the banking industry in this country. They did not feel strongly one way or the other that the growth of South African banks is importantly linked to the future of asset securitisation.

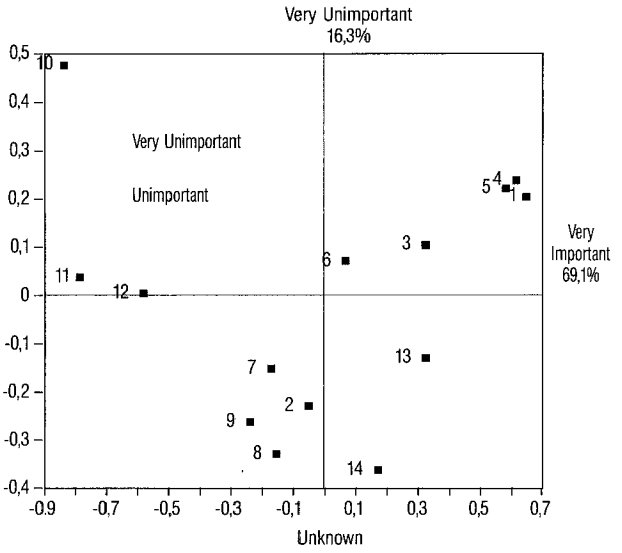


**Figure 3.**

The graphical display of the correspondence analysis relating to opinions regarding the benefits of asset securitisation that are likely to encourage the growth of this process are presented in figure 3. It is apparent that the respondents believe that the following benefits of securitisation will have a very important stimulating effect on the growth of this process in South Africa:

- it provides savings on capital that may assist banks in meeting their regulatory capital requirements (statement 1);
- it has the potential to increase the non-interest income earned by banks (statement 3);
- it has the capacity to increase the return on asset ratios of banks (statement 4);
- it has the capacity to increase the return on equity ratios of banks (statement 5); and
- it provides investors with a broader array of investment opportunities (statement 13).

Bankers, however, do not know whether the following benefits

of asset securitisation will be important in promoting the growth of this process:

- the potential to lower bank fundings costs (statement 2);
- the potential to assist banks in managing their interest rate risk (statement 8); and
- the provision of investors with a market related yield without the need to sacrifice credit quality (statement 14).

Furthermore, the following three benefits of securitisation are regarded as very unimportant or unimportant stimulants for the growth of this process:

- the potential to reduce the credit risk incurred by banks (statement 10);
- the possibility of charging lower interest rates to borrowers (statement 11); and
- the possibility of bank credit being more readily available (statement 12).

Finally, bankers are equally divided between being unsure about and regarding the advantage, securitisation has the potential to assist banks in managing their liquidity risk (statement 9), as being a very unimportant/unimportant stimulant to the growth of this process.

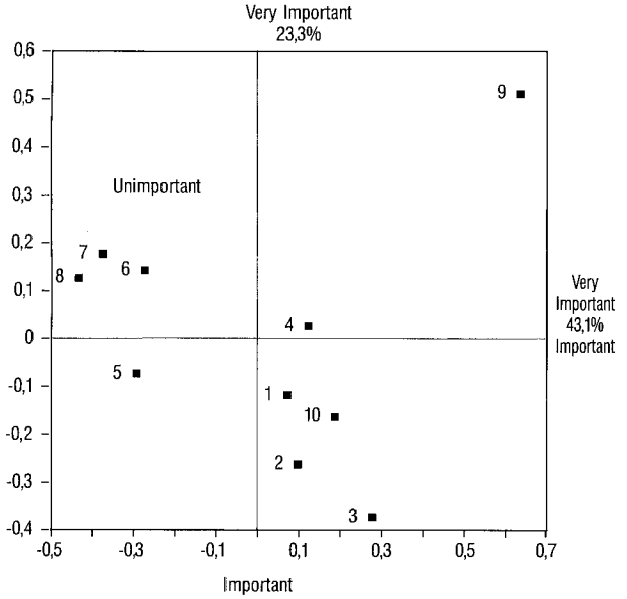


**Figure 4.**

Finally, figure 4 presents an analysis of the concerns of asset securitisation that are likely to restrict the growth of the process.

It can be inferred that bank officers consider the reluctance of investors to accept the new mortgage- and asset-backed securities as the most important impediment to the growth of securitisation in South Africa (statement 9).

In the opinion of bankers, three further important factors that are likely to constrain the development of this financing technique are:

- asset securitisation is initially a time consuming process (statement 2);
- the initial set-up costs are high (statement 3); and
- the lack of credibility of a newly established credit rating agency amongst investors (statement 10).

The following four concerns of asset securitisation are, however, expected to have an unimportant effect on the growth of this process:

- substantial modifications are required to bank accounting and computer systems (statement 5);
- the lack of historical database within banks that tracks the risk information of assets (statement 6);
- the on-balance-sheet asset growth of banks that securitise their assets is diminished (statement 7); and
- the possibility that asset securitisation could have a negative effect on a bank's remaining portfolio of assets (statement 8).

Finally, the results obtained from this study are compared to those of Aber's (1989). As Aber asked relatively few questions in his study, it is only possible to compare the responses obtained to the questions pertaining to the following four issues:

- securitisation is both positive and beneficial;
- securitisation can lower bank funding costs;
- asset securitisation has potential for interested rate risk management; and
- the costs of asset securitisation currently outweigh the benefits.

The results of the comparisons are shown in table 2.

**TABLE 2**

**Comparison of Results of SA and USA Studies**

| | | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|---|
| Securitisation is both positive and beneficial | SA | 15 | 58 | 23 | 4 | 0 |
| | USA | 34 | 50 | 8 | 6 | 2 |
| Securitisation can lower bank funding costs | SA | 0 | 32 | 37 | 29 | 2 |
| | USA | 18 | 40 | 20 | 16 | 6 |
| Securitisation has potential for interest rate risk management | SA | 12 | 54 | 15 | 17 | 2 |
| | USA | 34 | 50 | 12 | 4 | 0 |
| Securitisation costs currently outweigh benefits | SA | 3 | 29 | 29 | 36 | 3 |
| | USA | 4 | 22 | 18 | 34 | 22 |

In all four cases the chi-square test rejected the hypothesis (at a 5% significance level) that the distribution of responses in the present study is the same as that found by Aber. American banks appear to be much more positive about the value of asset securitisation than their local counterparts.

## CONCLUSIONS

The analysis of the results of this study indicates that bankers in South Africa perceive the primary advantages of asset securitisation to be that it provides savings of capital; it has the potential to increase the non-interest income earned by banks; it can improve the return on asset and return on equity ratios of banks; and it provides diversification benefits to investors. Furthermore, in the opinion of these bank officers, these benefits of securitisation will have a very important stimulating effect on the growth of this process in South Africa.

The respondents are neutral toward or disagree that this financing technique has the potential to lower bank funding costs or to reduce the credit risk incurred by banks. They also do not believe that this process will result in cheaper bank credit or in bank funding being more readily available, as advocated in the literature on this subject.

The major concerns expressed about this process are that it is initially a complicated and time consuming process; the transaction costs are high; and investors may be slow to accept the new asset-backed securities. Further important con-

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cerns are that the initial set-up costs are high and the lack of credibility of a newly established credit rating agency.

As far as bankers are concerned, the reluctance of investors to accept these new securities is expected to be the most significant obstacle to the growth of this process. Other issues that are likely to constrain the development of securitisation are that it is initially a time consuming and expensive process and the lack of credibility of a newly established rating agency.

Generally, however, banks do appear to possess the required historical statistical information on their asset portfolios and bankers appear unperturbed about the modifications that would be required to bank accounting and computer systems. Furthermore, bank officers do not believe that asset securitisation will have a negative effect on banks' remaining asset portfolios. Also, the fact that the on-balance-sheet asset growth of banks that securitise their assets is diminished, is expected to have an unimportant effect on the growth of this process.

The comparison of the results of this survey with those of the research conducted overseas indicates that South African and American bankers do not share the same opinions about asset securitisation. US bankers appear far more positive about this process and less concerned that the costs of asset securitisation currently outweigh the benefits. Furthermore, they seem more convinced that securitisation can lower bank funding costs and has the potential for interest rate risk management.

Apart from the fact that this financing technique was first applied in the United States twenty years ago, whereas the first securitisation issue in South Africa only took place in 1989, this discrepancy in opinions could be due to the fact that mortgage-backed securities in South Africa have not received the kind of state guarantee that exists in America.

Although this research has indicated that bankers are not convinced that the benefits of asset securitisation currently outweigh the costs, securitisation is largely seen as a positive trend that is likely to have beneficial effects on the banking industry. Moreover, despite the fact that bankers are not assured that this financing technique will play a major role within the South African banking industry in the foreseeable future, they generally appear to believe that securitisation is likely to gather momentum in this country. This view is supported by a report in the Business Day (30 November 1990) which stated that five known new securitisation issues worth an estimated R1,5 billion are believed to be in the pipe line in South Africa.

It should be noted that the views of the senior bank officers presented in this paper were provided expressly on the basis that they did not represent the official views of their employers. Also future trends in asset securitisation in South Africa will not only be influenced by those bankers who are knowledgable about this process and, therefore, aware of its potential, but will also be affected by the level of knowledge in the financial community as a whole. The choice of sample therefore may have introduced some bias into this study.

Finally, the success of securitisation issues and the development of this process will be strongly influenced by the demand from investors for asset-backed securities. These issues also need researching.

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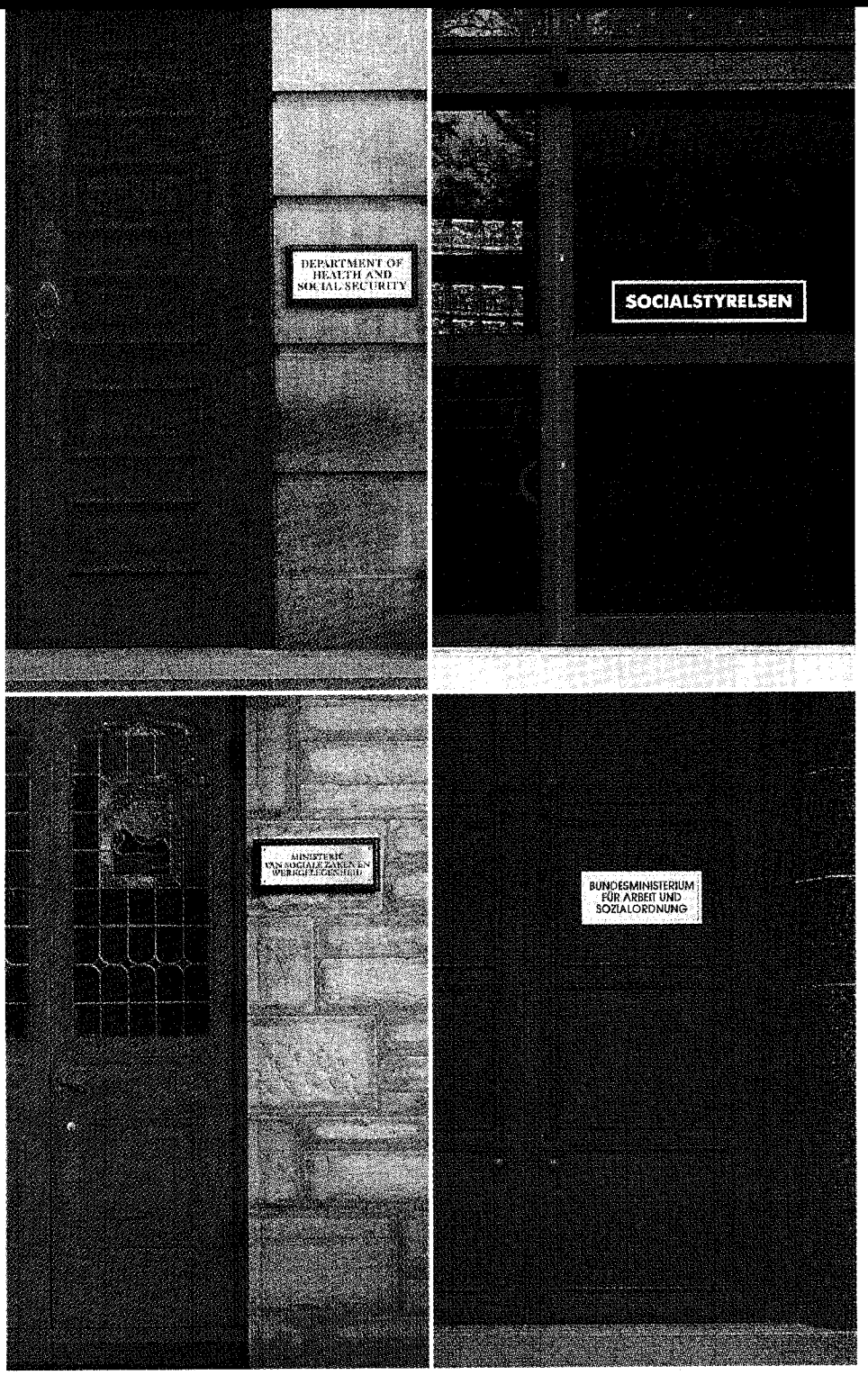


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Prof E Saenger, Dept of Accounting, University of South Africa

# A future-oriented approach to company annual reporting in South Africa: unit trust views


## ABSTRACT

To enhance the decision-usefulness value of company annual report information, the boundaries of traditional reporting have been extended to include management projections, predictions or forecasts of information relating to the future of a company. The approach has attracted varying attention in several countries. In South Africa, the subject is relatively new. To contribute to the knowledge on the subject, this article examines the opinions of the managing directors of unit trusts on the need for publishing future-oriented information in company annual reports, the presentation of the information, and the need for public accountant audit of the information.



## ACKNOWLEDGEMENT

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## NOTE

This article is based on the author's thesis which was completed for the D.Com. degree in Accounting at the University of South Africa.

## 1. INTRODUCTION

In response to the information needs of various segments of the financial community world-wide, the quantity of information included in company annual reports has continually increased over the years. Although this enhanced the reporting function in that more relevant information became available, the usefulness of the information was found to be lacking as it only enabled users to assess the past and current performance of companies. To be useful for economic decision-making (the primary objective of financial reporting identified by inter alia the FASB (1978, par 34), the IASC (1989, par 12) and SAICA (1990, par 12)), company annual report information should also enable users to assess the future prospects of companies.

Responsive to this need the boundaries of traditional company annual reporting were extended to include a future-oriented approach, that is, the reporting, either by means of management projections, predictions or forecasts, of any information relating to the future of a company.

This topical subject is at present enjoying considerable support in some leading Western countries where it is continually subjected to empirical scrutiny and governmental and professional accounting discussion, evaluation and regulation.

## 2. RESEARCH OBJECTIVE

Compared with the above countries, future-oriented company annual reporting is very much in its infancy in South Africa, with only a few companies practising it to varying extent. These practices are supported by only an audit and accounting guide on one component of this type of reporting, namely, profit forecasts (SAICA, 1989), which guide does not carry the same authority as Statements on Auditing Standards or Statements of Generally Accepted Accounting Practice. In addition, very limited empirical investigation of the subject has been undertaken in South Africa. Consequently, this study, which forms part of a wider investigation of the issue, attempts to contribute to the South African literature on the subject, to give insight into the issue and its implications for company annual reporting, and to provide some recommendations regarding its further development.

To attain this, survey research, and in particular postal opinion research, was used to test the opinions of the managing directors of unit trusts in South Africa on the need for disclosing future-oriented information in company annual reports, the type of information to be disclosed and the manner in which it should be presented in company annual reports, and the need for public accountant audit of the information.

## 3. RESEARCH METHODOLOGY

The investor group was selected as population for purposes of this study because the findings of various research studies (refer to, for example, Hawkins and Hawkins, 1986, p8-9) and professional points of view (FASB, 1978, par30; IASC, 1989, par10; SAICA, 1990, par9) identified investors, including institutional investors, as primary users of company annual reports. From this population the institutional investors and specifically the unit trusts (comprising 34 potential respondents) were chosen as target group mainly because of the volume of individuals included in the individual investor group and the assumed sophistication of the unit trusts in company annual reporting matters. Their handling of large numbers of national as well as international investments furthermore renders them an influential sector of the total investor group.

To obtain more detail on the responses of the target group, information on the total asset values as at 30 June 1990 of the respective unit trusts was obtained from the August 1990 *Stock Exchange Handbook.* To facilitate analysis, this information was used to divide the responding unit trusts into three groups: a "small" group (total asset value of R0 – R99 999 999), a "medium-sized" group (total asset value of R100 000 000 – R299 999 999), and a "big" group (total asset value of more than R300 000 000).

A questionnaire, compiled with the assistance of the Bureau of Market Research at the University of South Africa, was sent to the managing director of each unit trust. The individual questions in the questionnaire were based on data obtained from the available literature and relevant prior research studies to facilitate the comparison of the results of this study with South African and overseas developments and research findings.

The first batch of questionnaires was posted during October 1990, followed by a second and third dispatch during November 1990 and January 1991, respectively. A response rate of 91% (41% from the first, 35% from the second and 15% from the third dispatch) was obtained.

The questionnaires were processed by the Department of Computer Services at the University of South Africa in co-operation with the Bureau of Market Research. The all-purpose Statistical Analysis System (SAS) was used for the analysis of the data.

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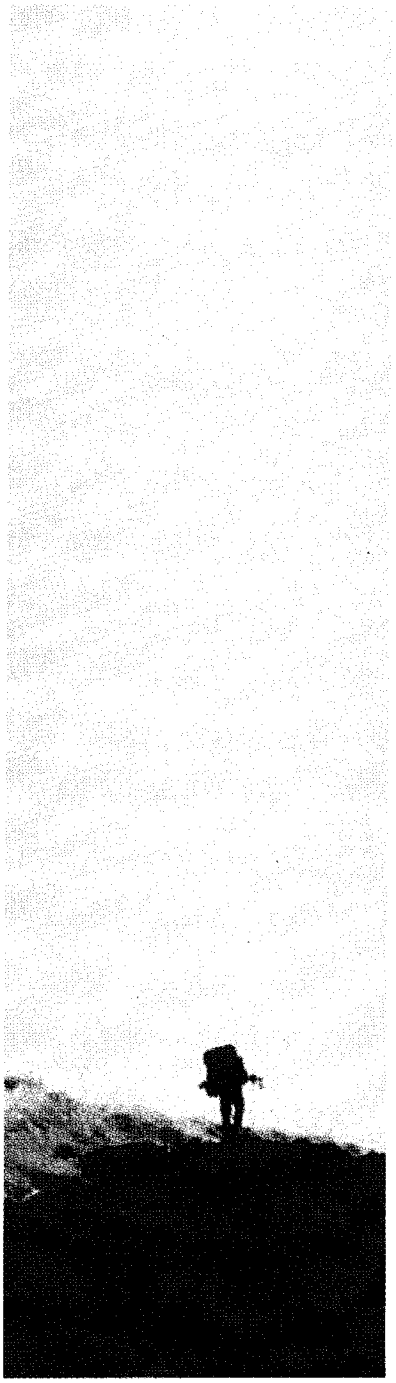

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## 4. RESEARCH FINDINGS

### 4.1 THE NEED FOR PUBLISHING FUTURE-ORIENTED INFORMATION IN COMPANY ANNUAL REPORTS

Analysis of the responses to the question posed in this regard, reveals that a majority of the respondents were in favour of the disclosure of future-oriented information (refer to table 1). This result corresponds with the findings of, for example, Chang and Most (1985) and Howell (1987) who also found institutional investor support for published future-oriented information.

**Table 1**
**NEED FOR PUBLISHING FUTURE-ORIENTED INFORMATION IN COMPANY ANNUAL REPORTS**

| | Total asset value | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | R0 – R99 999 999 | | R100 000 000– R299 999 999 | | R300 000 000 or more | | Total | |
| | Number | % | Number | % | Number | % | Number | % |
| Yes | 13 | 72 | 3 | 50 | 4 | 57 | 20 | 65 |
| No | 5 | 28 | 3 | 50 | 3 | 43 | 11 | 35 |
| Total | 18[1] | 100 | 6[1] | 100 | 7[1] | 100 | 31[1] | 100 |

**Note:**
1. Number of respondents.

The majority support for the issue was predictable as writers in the field of future-oriented information have for many years maintained that investors need future-oriented information for decision-making purposes. This type of information is especially important in the case of unit trust investments as such investments are always of a long-term nature. Decisions regarding the investments must inevitably be based on estimates of the future growth and prospects of the investments.

A surprising result evident from table 1 is that 65% of the responding unit trusts giving support were "small" trusts, 15% were "medium-sized" trusts and 20% were "big" trusts. It was expected that the "medium-sized" and especially the "big" unit trusts would provide much stronger support in view of their greater exposure to investor needs for decision-useful information.

To get a more complete view of the respondents' attitudes, the reasons for their respective points of view were also considered.

Seventy seven percent of the "small" unit trusts, all the "medium-sized" unit trusts and 75% of the "big" unit trusts regarded the provision of information useful in making investment decisions and the advantageous position of management to provide the information as the two most important reasons why companies should disclose future-oriented information. The respondents therefore support proponents in overseas countries and professional accounting organisations, such as the FASB (1978, par34, 37), the IASC (1989, par12, 16, 17) and SAICA (1990, par12, 16, 17), which argue that future-oriented information is relevant and important to the decision-making process. They furthermore also side with the argument presented in, for example, Boynton (1976, p8), that the best source of future-oriented information lies within a company itself.

Fifty four percent of the "small" unit trusts, 67% of the "medium-sized" unit trusts and 50% of the "big" unit trusts agreed that the dissemination of the information on an equal basis to all interested parties is also an important reason why companies should disclose future-oriented information. This illustrates that they are not satisfied with the current dissemination of future-oriented information by means of inter alia financial press releases, prospectuses and comments to financial analysts and other parties.

In so far as the reasons against the disclosure of future-oriented information are concerned, the respondents based their unfavourable attitude primarily on the possibility that management could manipulate the information. In overseas countries this possibility proved to be a very strong argument against the publication of future-oriented information with research studies by various segments of the financial community underlining the extent and very real danger of the problem. (Hock, 1974, p30). The respondents in this study also regard this to be a serious problem in South Africa as all of them provided support for the reason.

Another fear expressed by the respondents was that companies which disclose future-oriented information could suffer competitive damage. By giving support for the reason (67% in the case of the "big" and "medium-sized" unit trusts and 20% in the case of the "small" unit trusts), the respondents acknowledge it as a valid and important reason against the disclosure of the information.

Thirty three percent of the "big" and "medium-sized" unit trusts and 80% of the "small" unit trusts rated the doubtful reliability of the information as a further reason against its disclosure. They therefore support the argument that should unwarranted reliance be attached to the information, material variances from the actual results could jeopardise the credibility and usefulness of the information and consequently also of the traditional financial reports. (Baker and Tralins, 1976, p43).

Lastly, 33% of the "big" and "medium-sized" unit trusts and 60% of the "small" unit trusts indicated that management could, in view of the inherent unreliability of future-oriented information and the lack of standards for the preparation and presentation of the information, be held liable if published future-oriented information differed significantly from actual results.

### 4.2 THE PRESENTATION OF FUTURE-ORIENTED INFORMATION IN COMPANY ANNUAL REPORTS

Using the support for published future-oriented information identified above as foundation, various issues relating to the presentation of the information in company annual reports were examined next. The results of this examination are summarised in table 2.

#### 4.2.1 The format and form of disclosure

With regard to the general format for the presentation of future-oriented information, the results reveal majority support for the selective (summarised) disclosure of the information, which support apparently increases with an increase in total asset value. This preference probably reflects the fixation many annual report users have for individual report items. From comments made by respondents, the Chairman's and/or Directors' statement seems to be the place in the annual report where the information should be reported.

To determine the preferred content of the chosen format of disclosure, respondents were asked to identify the items of information they would like to have forecasted. The respondents agreed that future sales, future capital expenditure and future earnings per share should be disclosed. A trend is again discernible in that support for all three items grows with an increase in total asset value. The respondents also indicated that both narrative comments and quantified amounts should be provided on these items of information.

The above results underline the argument advanced in the available literature that specific financial information should

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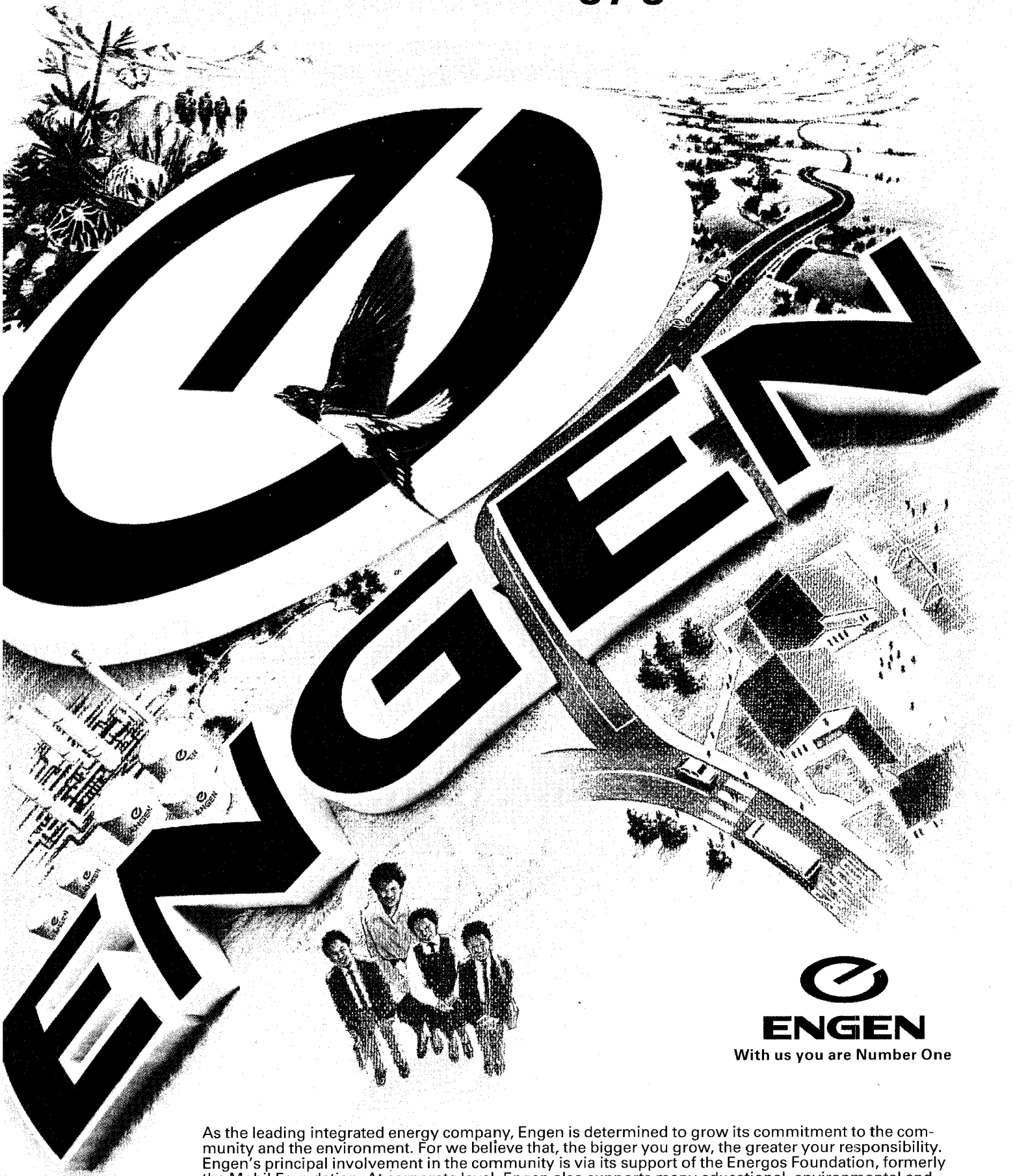


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## Table 2

### PRESENTATION OF FUTURE-ORIENTED INFORMATION IN COMPANY ANNUAL REPORTS

| | Total asset value | | | |
|---|---|---|---|---|
| | R0-R99 999 999 (13)[1] | R100 000 000-R299 999 999 (3)[1] | R300 000 000 or more (4)[1] | Total (20)[1] |
| | % | % | % | % |
| **1. Format to be used** | | | | |
| Selective | 61 | 67 | 75 | 65 |
| Detailed | 8 | — | — | 5 |
| Selective and detailed | 31 | 33 | 25 | 30 |
| **2. Content of format** | | | | |
| Future sales: | 92 | 100 | 100 | 95 |
| – Only narrative comments | 39 | — | 25 | 30 |
| – Both narrative comments and quantified amounts | 53 | 100 | 75 | 65 |
| Future capital expenditure: | 92 | 100 | 100 | 95 |
| – Only narrative comments | 31 | — | 25 | 25 |
| – Both narrative comments and quantified amounts | 61 | 100 | 75 | 70 |
| Future earnings per share: | 92 | 100 | 100 | 95 |
| – Only narrative comments | 31 | — | 25 | 25 |
| – Both narrative comments and quantified amounts | 61 | 100 | 75 | 70 |
| Other: | 39 | 33 | 50 | 40 |
| – Future dividend policy | 31 | 33 | 50 | 35 |
| – Future funding requirements | 8 | — | — | 5 |
| **3. Form to be used** | | | | |
| Single figures | 15 | 33 | 25 | 20 |
| Ranges | 62 | 67 | 50 | 60 |
| No answer | 23 | — | 25 | 20 |
| **4. Period to be covered** | | | | |
| 6 – 12 months | 62 | 33 | 50 | 55 |
| 13 – 24 months | 8 | 33 | — | 10 |
| 25 – 60 months | 15 | — | 25 | 15 |
| Other | 15 | 33 | 25 | 20 |
| **5. Importance of underlying assumptions** | | | | |
| General economic assumptions: | 100 | 100 | 100 | 100 |
| – Extremely important | 77 | 100 | 75 | 80 |
| – Important | 23 | — | 25 | 20 |
| Industry assumptions: | 100 | 100 | 100 | 100 |
| – Extremely important | 54 | 100 | 75 | 65 |
| – Important | 46 | — | 25 | 35 |
| Assumptions unique to a company: | 100 | 100 | 100 | 100 |
| – Extremely important | 46 | 67 | 50 | 50 |
| – Important | 31 | — | 25 | 25 |
| – Less important | 23 | 33 | 25 | 25 |
| **6. Need for updating and revision** | | | | |
| Yes | 100 | 100 | 100 | 100 |
| **7. Frequency of updating and revision** | | | | |
| Quarterly | 23 | 33 | — | 20 |
| Annually | 38 | — | 25 | 30 |
| Other | | | | |
| – Half-yearly | 31 | 67 | 75 | 45 |
| – Whenever relevant | 8 | — | — | 5 |

**Notes:**

1. Number of respondents who support the disclosure of future-oriented information in company annual reports.
2. In the case of 2. and 5. above the respondents could indicate more than one alternative.

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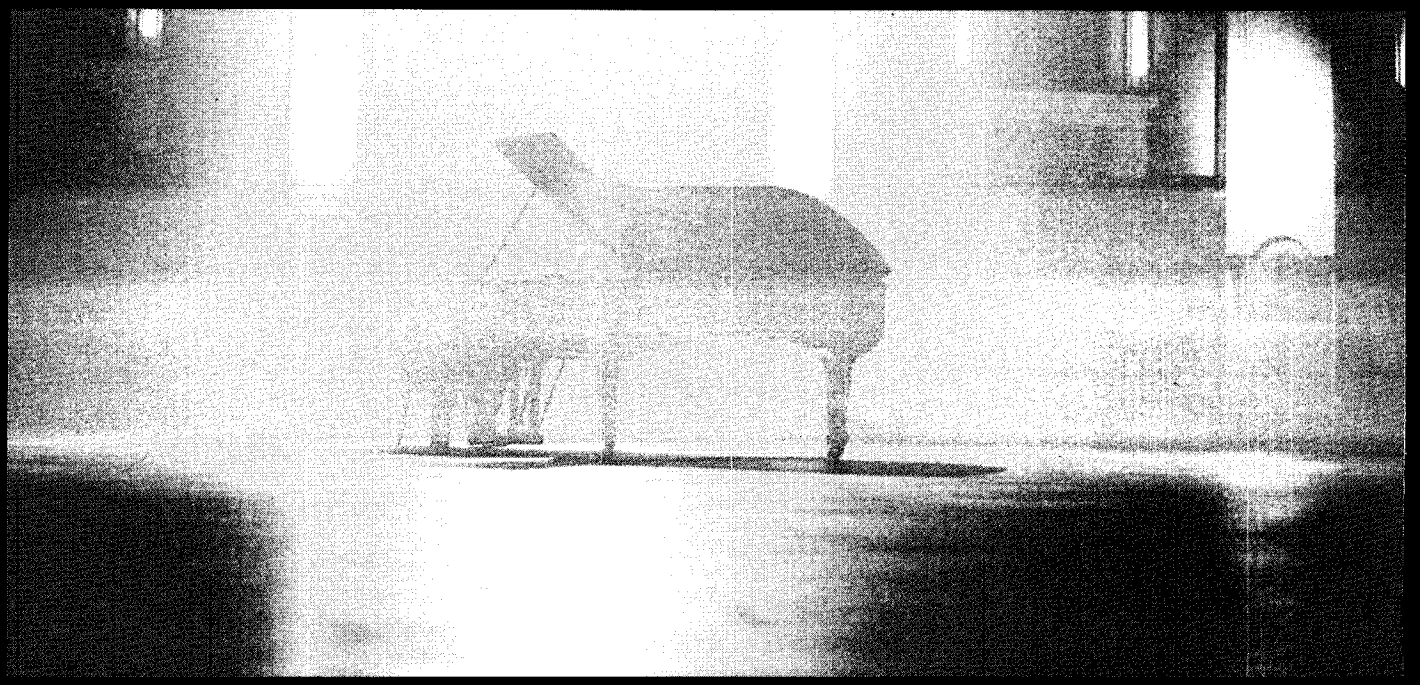

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be one of the components on which future-oriented information should hinge. Thus the AICPA (1986, par400.06), for example, stipulates that prospective financial information can be prepared in the format of summarised or condensed financial statements or comments on significant items of financial information. The results also support the findings of prior research studies, such as the Tonkin (1989) study.

The results pertaining to the form to be used for the presentation of quantified future-oriented information, show that a majority of the respondents preferred a range form to a single figure form of presentation. This implies that they recognise the argument advanced in overseas countries that the form in which future-oriented information is presented should communicate the probabilistic nature of the information. (Carmichael, 1973, p43). The results of prior research studies, such as the Howell (1987) study, support this finding, while the Boynton (1976) study, for example, found both forms to be significant. The results are also in line with the viewpoints of professional accounting organisations, such as the AICPA (1986, par 400.18) and CICA (1989, par23), which recommend ranges as one form of disclosure for prospective amounts.

### 4.2.2 The period to be covered by the information

Consistent with the findings of, for example, the Boynton (1976) study, table 2 shows that the respondents, with the exception of the "medium-sized" unit trusts which were ambivalent on a 12 and 24 month period, felt that future-oriented information should cover a maximum period of 12 months. These results also underline professional accounting viewpoints on the issue (refer, for example, to AICPA, 1986, par400.43 and CICA, 1989, par16). The respondents' favouring of this period probably reflects their doubt about the reliability of information extending beyond this period.

### 4.2.3 The importance of disclosing underlying assumptions

The survey also tested the importance the respondents attach to the disclosure of general economic assumptions, industry assumptions and assumptions unique to a company with future-oriented information.

The respondents were in complete agreement that all three categories should be disclosed. Interesting is the fact that three of the "small" unit trusts, one of the "medium-sized" unit trusts and one of the "big" unit trusts regarded the disclosure of assumptions unique to a company as less important.

The results indicate that the respondents obviously agree with proponents in overseas countries that the disclosure of assumptions would enhance the usefulness of the information, prevent users from relying unduly on the information and reduce the legal liability of company managements should the information differ significantly from actual results. The results are also in line with the AICPA's (1986, par400.22), CICA's (1989, par32) and SAICA's (1989, p29) viewpoint that assumptions are important to the understanding of future-oriented information. The disclosure of underlying assumptions can therefore be regarded as an essential component of any future-oriented policy, a conclusion with which Howell (1987, p51) concurs.

### 4.2.4 The updating and revision of the information

In the last instance, the respondents were surveyed on the need for updating and revising the information and the frequency with which this should be done.

From table 2 it is apparent that there is total agreement that the information should be updated and revised. This indicates that the respondents obviously support the overseas argument that updating and revision will enhance the relevance of the information and impress on users the uncertain nature of the information.

In so far as the frequency of updating and revision is concerned, the respondents favoured a half-yearly frequence (with the exception of the "small" unit trusts which favoured an annual frequence), the support for which seems to grow with an increase in total asset value. Judging from comments made by the respondents, the revisions and updates should be disclosed by means of the interim financial reports.

## 4.3 THE NEED FOR PUBLIC ACCOUNTANT AUDIT OF FUTURE-ORIENTED INFORMATION PUBLISHED IN COMPANY ANNUAL REPORTS

Having established the need for published future-oriented information and the details relating to its presentation, the remaining question is whether or not the information should be audited by an independent public accountant.

To determine the need for extending the public accountant's audit duty to include published future-oriented information, the respondents who supported the disclosure of the information were asked to indicate whether or not they agreed with the issue. These results, which appear as table 3, show that 90% of the respondents rejected public accountant audit of the information, which rejection apparently increases with an increase in total asset value. This finding coincides with the results of, for example, the Howell (1987) study, but differs from, for example, the Ferris and McDonald (1982) study which found investor support for the issue. The results underline the earlier statement (refer to section 4.2.1) that future-oriented information should, for example, be disclosed in the Chairman's statement which is not audited in the traditional sense of the word, and emphasise the danger of public accountant involvement because of the lack of authoritative professional guidance on the issue.

**Table 3**

**NEED FOR PUBLIC ACCOUNTANT AUDIT OF FUTURE-ORIENTED INFORMATION PUBLISHED IN COMPANY ANNUAL REPORTS**

| | Total asset value | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | R0 – R99 999 999 | | R100 000 000 – R299 999 999 | | R300 000 000 or more | | Total | |
| | Number | % | Number | % | Number | % | Number | % |
| Yes | 2 | 15 | — | — | — | — | 2 | 10 |
| No | 11 | 85 | 3 | 100 | 4 | 100 | 18 | 90 |
| Total | 13[1] | 100 | 3[1] | 100 | 4[1] | 100 | 20[1] | 100 |

**Note:**
1. Number of respondents who support the disclosure of future-oriented information in company annual reports.

The above result was surprising as it was expected that because of their majority support for the disclosure of future-oriented information, the respondents would also be in favour of public accountant audit of the information. A possible explanation for this could be a lack of confidence in audited financial statements. Criticism of the audit function in the financial and lay press (see, for example, Terry (1989, p231)) and recent court cases involving audited financial statements could have contributed to such a point of view. Additional research is, however, required to determine whether this explanation (or others) account for the respondents' strong opposition.

As a next step, the survey sought to establish the reasons for the answers furnished to the previous question.

The two "small" unit trusts which supported public accountant audit, regarded the prevention of purposely overstated or

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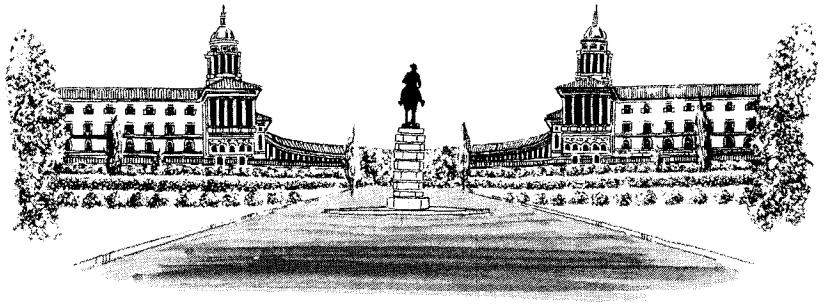

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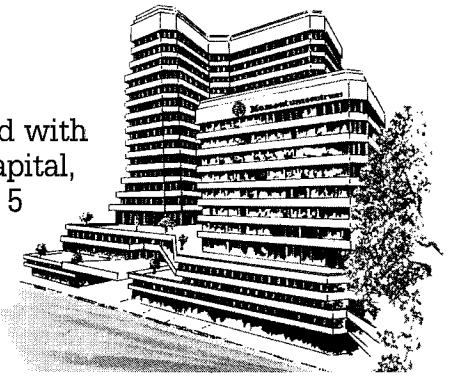

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understated information as primary reason for public accountant audit of the information, while the improvement of the credibility and usefulness of the information and the competence of public accountants to examine and report on the information, were jointly regarded as second most important reason.

In so far as the reasons against public accountant audit are concerned, 61% of the respondents regarded undue user faith in and reliance on the accuracy of the information as the most important reason. They therefore provide support for the fear expressed in overseas countries that if the public accountant associates his name with the information, users could construe it as an indication of its reliability even if he clearly distances himself from the achievability of the information in his audit report. (Carmichael, 1973, p38).

Other reasons identified by the respondents as arguments against public accountant audit, include the following:

- The lack of appropriate accounting and auditing standards (33%).
- Increase in audit costs (28%).
- Exposure to undue legal liability (28%).
- Lack of company specific knowledge (28%).

As was the case with the principal reason, most of these reasons were identified in the available literature as important arguments against the audit of future-oriented information. Most of them were also presented in prior studies, such as the Asebrook and Carmichael (1973) study, as potential problems in so far as public accountant involvement with the information is concerned.

Lastly, it is interesting to note that the total asset value of the responding unit trusts had a great influence on the above ranking. The respondents agreed on the first reason only and gave varying support for the other reasons.

## 5. SUMMARY

Future-oriented company annual reporting evolved because of the need of users to also assess the future prospects of companies. Compared to overseas countries, the subject is in its infancy in South Africa. To contribute to the development of the subject, this study investigated the opinions of unit trust managing directors in South Africa on certain issues important to the subject.

The investigation showed that the respondents are of the opinion that a need exists for the disclosure of future-oriented information in company annual reports. Apart from the findings of this research, support for such action is also provided by, for example, Dickinson (1976, p432), Wagner (1983, p90), SAICA (1989) and Adams (1990, p6). Further encouragement for future-oriented disclosures also come from annual report awards, such as The South African Chartered Accountants/'Business Times' Reporting Award, which is inter alia based on the extent to which information useful for future decision-making is disclosed. The disclosure of the information, preferably by means of the Chairman's and/or Directors' report and along the lines described in section 4.2 above, should, however, at this stage be voluntary (only for public companies).

In so far as public accountant audit of future-oriented information published in company annual reports is concerned, the results indicated that such involvement should for the time being be avoided.

Due to space limitations, the study concentrated on only the above issues. Cognisance must, however, be taken of the fact that future-oriented company annual reporting is a complicated subject requiring careful consideration of various other related issues. More research therefore needs to be undertaken before definite conclusions on the subject can be made.

At this stage of its development, it is believed that the practice of future-oriented company annual reporting should be allowed to develop as the need arises. What is required, however, is concerted action from the users of company annual reports to push for the enhancement of the decision-usefulness value thereof. This will not only result in future-oriented company annual reporting practices becoming more pronounced, but will also stimulate additional research on the subject which could contribute to the development of the subject into a fully-fledged and useful extension of company annual reporting in South Africa.

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Abbreviations:

AICPA = American Institute of Certified Public Accountants
CICA = Canadian Institute of Chartered Accountants
FASB = Financial Accounting Standards Board
IASC = International Accounting Standards Committee
SAICA = South African Institute of Chartered Accountants


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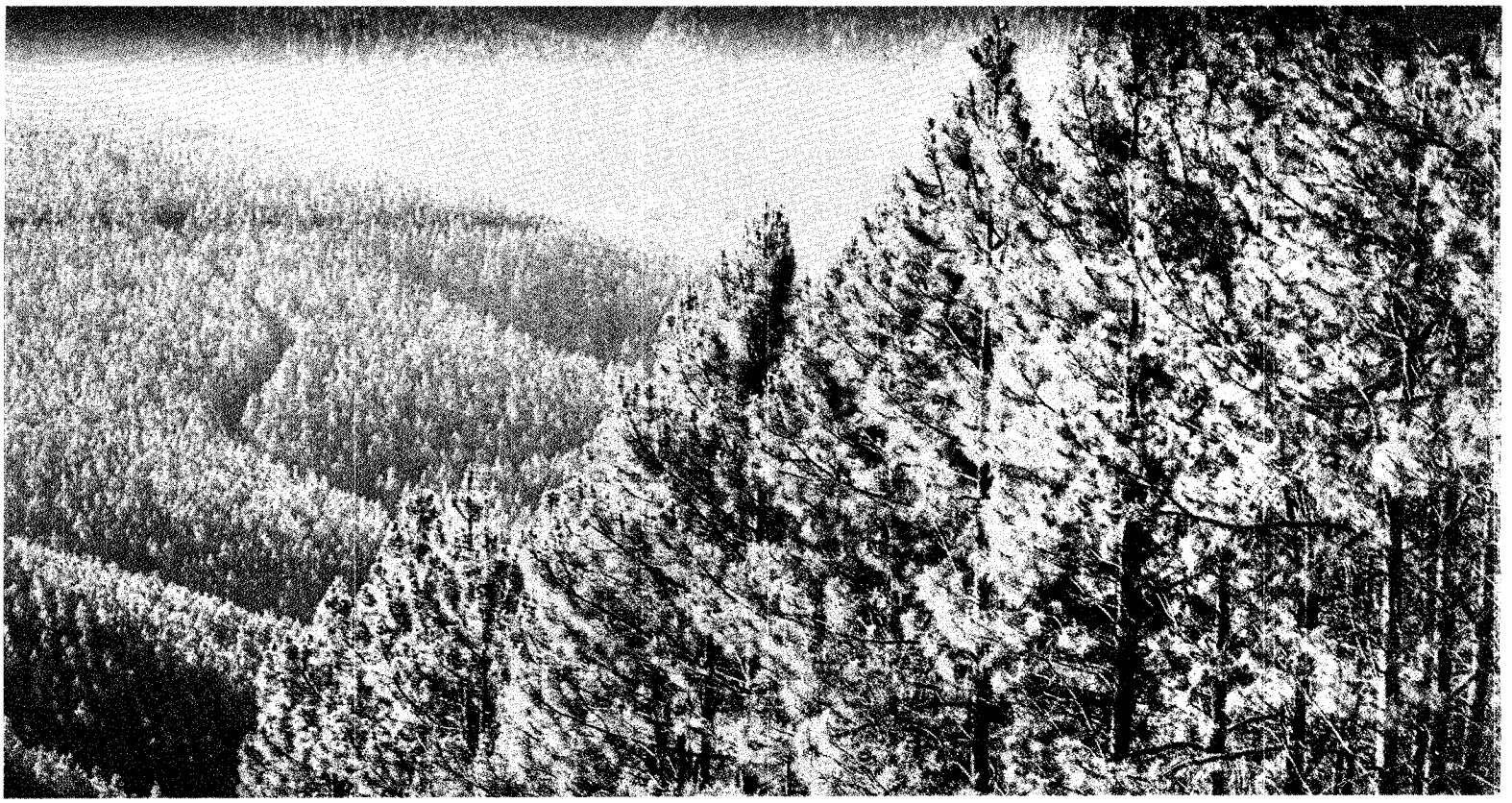

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J J Bornman, E vd M Smit and W R Gevers

# Hedging a share portfolio with futures contracts: A linear goal programming approach


## ABSTRACT

An investor wishing to hedge his share portfolio with futures contracts wants to ensure that the losses he incurs with his share portfolio during adverse market conditions are adequately covered by the profits he makes with the futures contracts he sells while wishing to minimise the costs involved with his participation in the futures market. These costs consist of transaction costs, cash outflows for margin deposits, and the opportunity cost of the margins deposited at the broker.

The traditional hedging methods do not take the above mentioned costs into consideration. A linear goal programming model for South African conditions is developed which optimises the conflicting needs of the investor by updating his position on a weekly basis.


## 1. INTRODUCTION

The principal aim of an investor on the stock exchange is to increase the value of his investment. However, he also has to protect the investment against a decline in value. When he perceives an impending downturn in the market, he has two options, he can either sell his investments and repurchase them at a later, more favourable time, or he can keep his investments and hedge them against the impending decline. In the case of a portfolio manager, hedging would be more attractive because it would incur much lower commission costs. Furthermore, should he sell the shares, there is some uncertainty as to his ability to repurchase the same portfolio.

Hedging by means of financial futures is one way of protecting an investment in shares. In order to hedge against a decline in the value of his shares, the investor will sell futures contracts short. A futures contract represents a firm commitment to buy or sell a specific financial instrument, on a specific date, at a price mutually agreed upon beforehand. Thus losses which might arise from adverse trends in the share market, are offset by profits, resulting from the same market trends, in the futures market.

The traditional hedging approach entails the selection of an appropriate hedge ratio. Usually it is a rand-for-rand ratio. The investor thus sells a number of futures contracts equivalent in rand value to the investment he wants to protect. He never actually delivers the shares he promises to sell, but on the last day of the contract period he buys back the equivalent number of contracts he has sold (hopefully at a lower price), thereby closing out his position. The traditional hedger thus maintains the same short position in the futures market throughout the hedging period, regardless of intervening price movements. Consequently he loses out on opportunities to profit from positive variation margins, incurs considerable cash flows when the variation margin moves against him and can be dangerously overhedged, which may at times leave him with a net short position.

The hedger is faced with a dilemma of conflicting goals. He would like to minimise his risks, costs and cash flows, but at the same time to maximise the return on his equity. These are indeed conflicting needs because the lower the risk involved, the lower the return on the investment and vice versa. Conflicting goals and/or constraints can, however, be addressed by goal programming, which offers one method of optimisation. Based on the work of Sharda and Musser (1986), a goal programming model for South African conditions is developed. In order to optimise his holding position, this model, based on the most recent price information and -forecasts, seeks to guide the investor in the weekly adjustment of his futures position. Although the model is general in nature and can be applied to a particular share, a portfolio of shares or any share index for which corresponding futures contracts are available, this study is limited to the All Gold Index and the All Gold Index futures contracts, a market in which forecasting is notoriously difficult.

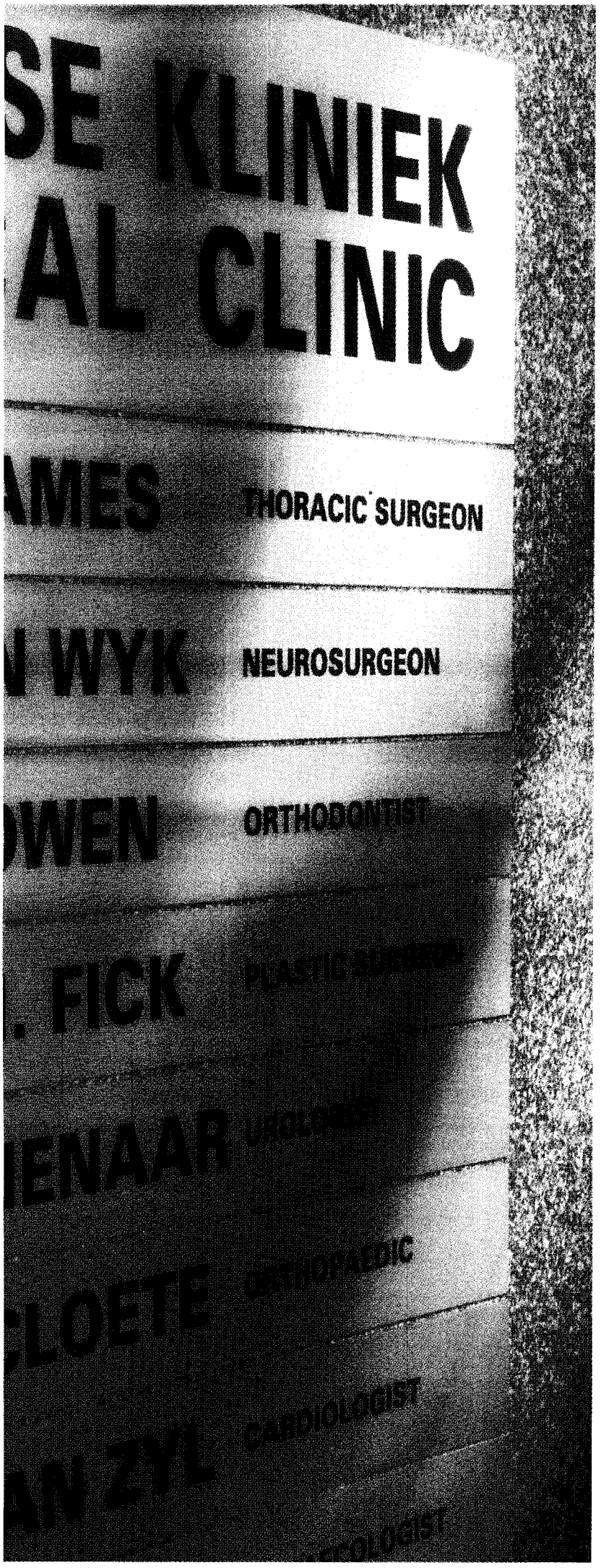
## 2. METHODOLOGY

Literature on futures contracts often seem to imply that investors should automatically hedge their whole share portfolios. Hedging however, should only be considered if the futures-implied price is desirable, i.e. if the hedger will show a greater profit on the futures market than the loss he will show on the shares market, given the same market forces. Otherwise one is only substituting the futures implied price for the subsequent actual cash price. If this is the case, one should break even in terms of the profits on the futures market and the losses on the share market, but will in the long run be in a net loss situation because of administration costs. Thus it follows that a hedge should only be maintained as long as the implied price protection is deemed desirable. The investor should shell only sufficient futures contracts to hedge the decline in his portfolio value. Should the portfolio value rise again, he can offset his position by buying back futures contracts to the same value.

In order to assess the attractiveness of the futures-implied price protection, it is necessary for the hedger to do price forecasting for both the share portfolio and the futures portfolio. This forms the basis of the goal programming model under investigation. Two forecasting methods, a moving average model and a Box-Jenkins model are compared to the traditional hedge approach, as well as to a perfect foresight application. As it is assumed that the investor has limited time available to update his holding position and both the optimisation model and the forecasting exercise have to be run weekly over the three month holding period, relatively simple forecasting models are deemed appropriate.

The model is tested ex-post over two periods, on the basis of availability: a period of relatively high volatility in market prices represented by the March 1990 futures contract and a period of a relatively steady decline in market prices represented by the December 1990 contract. On the basis of historical fit, a three term moving average is selected, while an ARIMA (1,1,0) model is also utilised as a forecasting device. As each week's data becomes available, it is incorporated into the data set to be used to forecast the next week's prices. Thus for a thirteen week contract period, thirteen sets of data, one for each week, are created.

This forecasting procedure implies two limitations: firstly, price forecasting is done on a purely technical basis. The mid-points between the daily closing bid and offer, called the mark to market, of the futures contract prices and the closing All Gold Index, are used as price information. No fundemental analysis of the prevailing market conditions and – sentiment is involved.

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Secondly, as the positions are updated on a weekly basis, the forecasts are based on the average weekly prices of the preceding periods. Forecasts are thus of the average price of the instrument for the following week and not the Friday price (the price on the day of the next update). Because one of the aims of the model is to minimise the cash flows for the investor, it is felt that forecasting an average weekly price would be more suitable.

The All Gold Index future contracts, written as GLDI, on which the model is tested has the JSE Actuaries All Gold Index as underlying instrument. The contract size, or value, is ten rand multiplied by the index level. The initial margin in R2 000 plus a maintenance margin of, say R1 500 (as required by his broker, over and above the initial margin) per contract sold. The value of the variation margin on open contracts is ten rand per point movement on the All Gold Index.

The length of an All Gold Index future contract's term in South Africa is three months (thirteen weeks) and expiry takes place at 16:00 on 15 March, June, September and December (or the next business day if the 15th is a public holiday or weekend) (SAFIA (1990)).

The daily mark-to-market data of the All Gold Index futures contracts, as well as the daily JSE Actuaries All Gold Index from mid 1987, were collected from Sanlam's financial division. Instead of using a hypothetical gold shares portfolio, the All Gold Index is used since the historical series are readily available. An existing or fictitious portfolio of gold shares could also have been used if its historical data or beta were available. For forecasting purposes, only the data from the beginning of 1989 is used. The earlier data, including the October 1987 Stock Exchange crash, are excluded as representing an emerging market not yet stabilised. In the model, for each successive week, the data base stretches from the beginning of 1989 up to that week's Friday price.

Opportunity cost is the difference between the interest paid by the broker to the investor on the margins held by the broker, and the interest the investor may have received in the market at say, the call rate. The interest rate paid by the brokers on margins, published daily, is approximately between fifty and a hundred points less than the call money rates. Thus the investor is losing between 0,5 and one percent interest per year on his money being kept by the broker as margins.

The following assumptions apply:

(i) The opportunity cost on the margin deposit stays constant at 0,5 percent per annum. In other words, if the call money rate goes up by two percent, the interest rate paid by the broker will also go up by two percent, but the difference will remain half a percent lower than that of the call money rate.

(ii) The portfolio of shares pays no dividends or other distributions throughout the hedging period. In real life the payment of dividends or other distributions does take place, but it is virtually impossible to include these in the model. As their influence on the effectiveness of the model will not be dramatic, it was decided to omit any such income.

(iii) A position can be closed out at any moment, regardless of size. There are enough sellers of contracts at any given moment for the investor to close out his position (buy back the number of contracts he had sold before), should he so wish.

(iv) The investor has enough funds to comply with any variance margin. He can thus pay in any amount in order not to be closed out by his broker, should the market move against him.

(v) Fractions of contracts can be sold. Normally this cannot be done, but in order to make the model practical and manageable to be used on ordinary personal computers, integer programming is avoided in the modelling as far as possible. In practical applications, the contracts can be rounded off to the nearest integer.

(vi) In the model it is assumed that a big creditworthy institution is doing the trading. A maintenance margin of say R1 500, as required by the broker, over and above the initial margin of R2 000 per contract, is therefore not required. However, the model can easily be adapted to include a maintenance margin, should one so desire. The booking fee is seven rand per transaction and two rand per contract.

(vii) The investor is hedging a portfolio of gold shares that is congruent with the All Gold Index. The portfolio is spread in such a way that it behaves exactly in the same way as the All Gold Index in sympathy with market forces. If the index rises ten points, the portfolio will increase in value by the same amount, and vice versa. In the case of a personal portfolio, its beta with the All Gold Index can be determined if the individual histories of the share prices are known. However, for the development of the model, the proxy portfolio is used.

## 3. MODEL FORMULATION

### 3.1 Variables

In order to develop the goal programming model the following variables are defined.

Let: $X_{1t}$ = number of futures contracts held at the end of week t;
$X_{2t}$ = number of contracts sold during week t;
$X_{3t}$ = number of contracts offset during week t;
$\delta_{1t}$ = change in price (in basis points) of cash instrument (gold shares);
$\delta_{2t}$ = change in price (in basis points) of the futures contract (mark to market);
$B_t$ = gross margin account balance at the end of week t (before any profits are withdrawn or deposits are made to the margin account);
$E_t$ = net margin account balance at the end of week t (after the deposits and/or withdrawals), or the beginning balance in week t+1;
$R_t$ = required margin at the end of week t;
$P_t$ = opportunity cost interest rate (assumed constant at 0,5 percent in our case);
C = transaction cost of acquiring a contract (two rand per contract);
V = value of one basis point, i.e. ten rand; and
N = number of weeks.

The deviational variables which measure the under- and over achievement of the m-th goal constraint are given by:

$$d^-_m, d^+_m \geq 0$$

where $d^-_m \cdot d^+_m = 0.$

The above variables prohibit the simultaneous over- and under achievement of, say, minimising the margin opportunity costs when the model is run.

The objectives of the goal program are the following:

(i) minimise the risk by acquiring sufficient futures contracts to offset cash market value changes (fall or rise in gold shares values), given the corresponding futures contract price changes during each week;

(ii) minimise total transaction costs over the hedging period;

(iii) minimise margin opportunity costs; and
(iv) minimise futures-related cash outflows.

The program strives to realise these objectvies by minimising the appropriate deviational variables.

### 3.2 System constraints

The contracts held in week t are related as follows to those in week t-1:

$$X_{1t} = X_{1,t-1} + X_{2t} - X_{3t} \quad (1)$$

Thus the contracts held in week t are equal to the contracts held the previous week, plus any contracts sold during week t, minus any contracts offset (bought back) during week t.

To ensure the contracts are not sold and bought simultaneously, binary integer variables are introduced in the following constraints:
If contracts are sold in week t, then:

$Y_t = 1$
otherwise: $Y_t = 0$
for $t = 1,....,N.$

The following constraints then will negate simultaneous buying and selling:

$$X_{2t} \leq MY_t \qquad t = 1,....,N. \quad (2)$$
$$X_{3t} \leq M\,(1-Y_t) \qquad t = 1,....,N. \quad (3)$$

where M is a large number, say 200.

This kind of formulation is only really necessary if a higher priority in the goal function will affect the simultaneous buying and selling of contracts. Normally the effect of transaction costs will prevent that too many contracts are entered into.

The gross margin balance at the end of the week, prior to any withdrawals or deposits, will equal the previous end-of-week balance, plus/minus any futures market gains/losses during the week. Futures market gains/losses are, in turn, dependent upon the number of contracts held as well as the weekly price changes per contract. The gross margin can be expressed as:

$$B_t = E_{t-1} - \delta_{2t}\, V\, X_{1t} \qquad t = 1,....,N. \quad (4)$$

A decline in the futures price is a profit for the seller of a contract, thus the negative sign.

The required margin for an investor is R2 000 per contract in South Africa. A maintenance margin of an additional, say R1 500, is required by the brokers for ordinary clients. As we assume that a large creditworthy company is doing the selling, only the R2 000 per contract is taken into consideration. This figure can easily be changed in the model. The week's required margin balance thus becomes:

$$R_t = 2\,000\, X_{1t} \quad (5)$$

Because the net margin must equal the required margin in order to determine deposits or withdrawals, the following constraint is necessary:

$$E_t - R_t = 0 \quad (6)$$

### 3.3 Goal constraints

(i) Weekly cash/futures position constraints:

The investor seeks to hold enough futures contracts (given their current value) during each week to exactly offset the realised change in his total cash portfolio value. He thus seeks to hedge only the loss and not the total value of his portfolio.

The value change per futures contract equals:
± Price change (in basis points) x Value of one basis point (R10,00).

Similarly, the total value change in the cash position equals:
± Price change x Value of one basis point x 100 (on the assumption that a portfolio equivalent to the value of 100 index points is held).

Under-achievement and over-achievement deviational variables are introduced to allow for under- and over-achievement of the goal. The under-achievement deviational variable $d^-_{ct}$ represents the amount of net gain between the cash and futures positions during a given week (i.e., excess of futures gain over cash loss or excess of cash gain over futures loss). The over-achievement deviational variable $d^+_{ct}$ on the other hand denotes the net amount of any weekly losses (i.e., excess of futures losses over cash gains or excess of cash losses over futures gains).

The goal constraint can then be written as:

$$\delta_{2t}\, V\, X_{1t} + d^-_{ct} - d^+_{ct} = \delta_{1t}\, V\, 100, \qquad t = 1,..,N \quad (7)$$

In a strict risk minimisation environment the investor may presumably not be interested in any gains or losses. In that case, both $d^-_{ct}$ and $d^+_{ct}$ should be minimised. If the investor is interested in minimising only losses (as in our case), only $d^+_{ct}$ should be minimised.

(ii) Transaction costs

Under South African conditions the transaction costs are R2 per contract and R7 per transaction. If contracts are either sold or bought, R7 must be added to the costs. If, however, the investor maintains his position from one week to the next, the R7 must be omitted.

Another binary integer variable must be introduced to effect this switch,

thus: $Z_t = 1$ if contracts are sold or bought,
otherwise: $Z_t = 0$, $t = 1,....,N.$

The following constraints will ensure that the proper transaction costs are calculated.
To determine the value of $Z_t$:

$$X_{2t} + X_{3t} \leq M\, Z_t \qquad t = 1,....,N. \quad (8)$$

where M is a large number, say 200

If contracts are either sold ($X_{2t}$) or bought ($X_{3t}$), Equation 8 will cause $Z_t$ to assume a value, which will become a 1 (one) as $Z_t$ is binary integer. However, if both $X_{2t}$ and $X_{3t}$ are zero (investor maintains his current position), the transaction cost will force $Z_t$ to be zero.

To determine the total transaction costs:

$$CX_{2t} + CX_{3t} + 7Z_t + d^-_{TC} - d^+_{TC} = O, \qquad t = 1,...,N. \quad (9)$$

The objective is to minimise the over-achievement of the transaction costs, $d^+_{TC}$.

(iii) Margin opportunity costs

The investment income foregone on week-to-week margin funds (deposited at the broker) can be written as follows:

$$P_t(^7/_{365})\, E_t + d^-_{OCt} - d^+_{OCt} = 0, \qquad t = 1,....,N. \quad (10)$$

The over-achievement variable $d^+_{OCt}$, gives the margin opportunity cost and should be minimised.

(iv) Regulation of margin deposits

If the required margin $R_t$ is not equal to the gross balance $B_t$ in the margin account, a deposit or withdrawal will be made to the effect that the ending net balance in the margin account is equal to the required balance. A set of under-achievement and over-achievement deviational variables can denote the additional deposits and withdrawals respectively. The constraint may be written as:

$$B_t + d^-_{Mt} - d^+_{Mt} = R_t, \qquad t = 1,\ldots,N. \qquad (11)$$

The margin deposits will then be minimised by minimising $d^-_{Mt}$.

### 3.4 Objective function

If equal priorities are given to all the variables in the objective function, it is found that the model minimises the cost by not selling any futures contracts at all. In order to force the model to make a choice, it is necessary to give a higher priority to the minimisation of $d^+_{ct}$, the over-achievement deviational variable denoting the net amount of any weekly losses (i.e., excess of futures losses over cash gains or excess of cash losses over futures gains). The rest of the variables all have equal priorities and the investor wants to minimise only his losses, that is, he is not totally risk averse.

The objective function can then be written as:

$$\text{Minimise } Z = 10d^+_{ct} + d^+_{TC} + d^+_{OCt} + d^-_{Mt}. \qquad (12)$$

### 3.5 Goal programming model

The complete model can be summarised as:

$$\text{Minimise } Z = 10d^+_{ct} + d^+_{TC} + d^+_{OCt} + d^-_{Mt}$$

subject to:

$$X_{1t} = X_{1,t-1} + X_{2t} - X_{3t}$$
$$X_{2t} \leq MY_t$$
$$X_{3t} \leq M(1-Y_t)$$
$$B_t = E_{t-1} - \delta_{2t} \text{ V } X_{1t}$$
$$R_t = 2\,000\,X_{1t}$$
$$E_t - R_t = 0$$
$$\delta_{2t} \text{ V } X_{1t} + d^-_{ct} - d^+_{ct} = \delta_{1t} \text{ V } 100$$
$$X_{2t} + X_{3t} \leq M\,Z_t$$
$$CX_{2t} + CX_{3t} + 7Z_t + d^-_{TC} - d^+_{TC} = 0$$
$$P_t\,(^7/_{365})\,E_t + d^-_{OCt} - d^+_{OCt} = 0$$
$$B_t + d^-_{Mt} - d^+_{Mt} = R_t$$

## 4. APPLICATION OF THE MODEL

Two software packages are used to run the model. A Lotus 123 spreadsheet is used as input for the linear goal programming model. MILP 88, a mixed integer linear programming software package, is used to solve the model. It can read the coefficients of the variables in the constraints directly form the Lotus input-spreadsheet.

The first week's figures are read into a MILP 88 model and the number of contracts to be sold, as well as the margin to be deposited, are calculated. The next week's model is subsequently read in. However, this time the contracts held at the end of the previous week, $X_{1,t-1}$, as well as the net margin account balance at the end of the previous week, $E_{t-1}$, are entered by hand into the MILP 88 spreadsheet and the model solved. This procedure is carried out successively for the thirteen week period. The model does not respond if all the variables in the goal function carry equal weights, as it would incur the lowest costs (the goal is to minimise costs) when it does not sell any contracts. In order to force the program to hedge, a weight of ten is allocated to the over-achievement deviational variable $d^+_{ct}$. It was found empirically that a weight of ten (10) gave the necessary sensitivity to the model. Smaller weights could not sensitise the model and larger weights deadened the model to the effect of the other constraints.

Another quirk in the model is the calculation of the margin deposits. The gross balance $B_t$ at the end of the first week that contracts are sold, reflects only the decrease in futures contract prices (Equation 4) since the required margin has also not been taken into consideration ($E_0 = 0$ and $E_1 = R_1$). From Equation 11 it follows that $d^-_{Mt}$ is the difference between the gross margin $B_t$ and the required margin $R_t$. Since $B_t$ does not reflect the real gross margin under these circumstances, it must be ignored and $d^-_{Mt}$ (the under-achievement deviational variable indicating the margin to be paid in), is thus equal to the required margin $R_t$. Because the gross margin is calculated by considering the increase or decrease in futures contract prices, $d^-_{Mt}$ (the under-achievement deviational variable indicating the margin to be paid in) will always be less than $R_t$ (the required margin) in the first week that contracts are sold. If no contracts are held the previous week, $R_t$ and not $d^-_{Mt}$ must be used as the margin deposit for the week in which contracts are sold.

By including $d^-_{ct}$ in the objective function, the risk is minimised. Low risk investments also yield lower returns. Thus if $d^-_{ct}$, the under-achievement deviational variable representing the net gain between the cash and the futures positions during a given week, is included in the objecitve function, as Sharda and Musser (1986) had done, the results of the model compare very unfavourable with the naive hedge. It is thus excluded from the objective function.

In order to simulate the real situation, two calculations have to be done for the last week of the contract period. By using the price forecasts, the number of contracts to be held at the end of the thirteenth week are calculated. However, the position must be closed out (contracts bought back) at the end of the contract period at the real mark to market prices, and not the projected prices. Thus the calculated number of contracts, as well as the real closing prices, are used to calculate the cost for the hedger to close out his position.

## 5. RESULTS

The model behaves as follows: no contracts are sold until there is a predicted drop in the market. This is logical as one will only hedge against an expected decline in the value of one's portfolio. As soon as there is a predicted improvement in the market, only enough contracts are offset to cover the variance margin which the hedger then has to pay his broker. This ensures that the hedger experiences the minimum cash outflows, one of the aims of the model. This contrasts sharply with the cash flows of the naive hedge, which are considerably higher.

Table 1 summarises and compares the results of the different hedging strategies for the volatile March 1990 GLDI futures contracts. The naive hedge strategy required nearly twice as much (R785 890) margin deposits as the goal programming strategy with perfect foresight (R397 513). However, the naive hedge outperformed the goal programming approach except in the case of perfect foresight.

Table 2 gives the same information as Table 1 for the steadily declining period. In this case the margin deposits for the perfect foresight application were slightly more (R342 889) than those required for the naive hedge approach (R310 280), but the total futures value change for the perfect foresight application was more (R280 927) than that of the naive hedge approach (R264 604). In both simulation runs, the goal programming approach with perfect foresight outperformed the naive hedge. This holds some promise for the goal programming approach if forecasting accuracy can be improved upon by either utilising more sophisticated models or by implementing the approach on a daily, rather than weekly basis, thus utilising the most recent market information coupled to a shorter forecasting horizon.

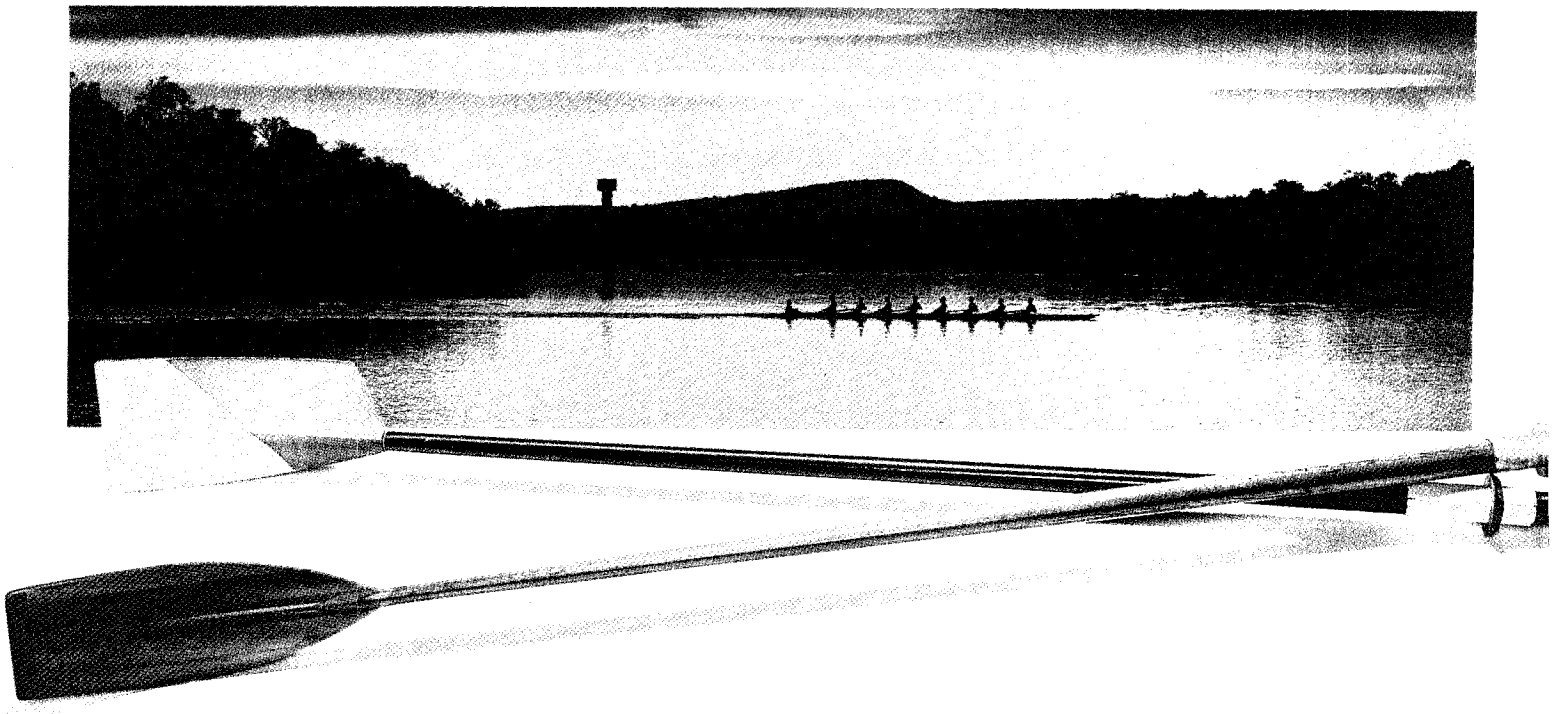

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**Table 1**
**Hedging strategies and their performance during a volatile period**

| | NUMBER OF FUTURES CONTRACTS HELD | | | |
|---|---|---|---|---|
| | GOAL PROGRAMMING APPROACH | | | HEDGE RATIO APPROACH |
| WEEK | MOVING AVERAGE | BOX-JENKINS | PERFECT FORESIGHT | NAIVE 1:1 |
| 1 | 56 | 0 | 141 | |
| 2 | 56 | 0 | 141 | |
| 3 | 42 | 60 | 0 | |
| 4 | 42 | 66 | 0 | |
| 5 | 67 | 66 | 28 | |
| 6 | 41 | 40 | 19 | |
| 7 | 105 | 54 | 19 | 96* |
| 8 | 105 | 54 | 68 | |
| 9 | 92 | 39 | 100 | |
| 10 | 45 | 41 | 100 | |
| 11 | 22 | 31 | 100 | |
| 12 | 15 | 31 | 93 | |
| 13 | 12 | 25 | 58 | |
| TOTAL TRANSACTION COSTS (R) | 626 | 335 | 941 | 399 |
| MARGIN DEPOSITS (R) | 216 768 | 150 662 | 397 513 | 785 890 |
| MARGIN OPPORTUNITY COSTS (R) | 134 | 97 | 166 | 259 |
| MARGIN WITHDRAWALS AVAILABLE (R) | 218 248 | 190 736 | 570 048 | 862 938 |
| TOTAL CASH VALUE CHANGE (R) | – 195 000 | – 195 000 | – 195 000 | – 195 000 |
| TOTAL FUTURES VALUE CHANGE (R) | 720 | 39 683 | 171 428 | 76 390 |
| NET VALUE CHANGE (R) | – 194 280 | – 155 317 | – 23 572 | – 118 610 |

* Number of contracts held remains static for the period of hedging.

**Table 2**
**Hedging strategies and their performance during a declining period**

| | NUMBER OF FUTURES CONTRACTS HELD | | | |
|---|---|---|---|---|
| | GOAL PROGRAMMING APPROACH | | | HEDGE RATIO APPROACH |
| WEEK | MOVING AVERAGE | BOX-JENKINS | PERFECT FORESIGHT | NAIVE 1:1 |
| 1 | 0 | 14 | 154 | |
| 2 | 0 | 14 | 109 | |
| 3 | 88 | 14 | 109 | |
| 4 | 88 | 14 | 109 | |
| 5 | 59 | 14 | 128 | |
| 6 | 41 | 14 | 113 | |
| 7 | 0 | 85 | 150 | 98* |
| 8 | 0 | 84 | 150 | |
| 9 | 0 | 84 | 150 | |
| 10 | 0 | 84 | 161 | |
| 11 | 0 | 84 | 155 | |
| 12 | 0 | 80 | 155 | |
| 13 | 0 | 32 | 155 | |
| TOTAL TRANSACTION COSTS (R) | 382 | 320 | 624 | 406 |
| MARGIN DEPOSITS (R) | 176 923 | 141 588 | 342 889 | 310 280 |
| MARGIN OPPORTUNITY COSTS (R) | 53 | 118 | 345 | 244 |
| MARGIN WITHDRAWALS AVAILABLE (R) | 86 248 | 98 176 | 624 785 | 575 534 |
| TOTAL CASH VALUE CHANGE (R) | – 437 000 | – 437 000 | – 437 000 | – 437 000 |
| TOTAL FUTURES VALUE CHANGE (R) | – 91 074 | – 43 850 | 280 927 | 264 604 |
| NET VALUE CHANGE (R) | – 528 074 | – 480 850 | – 156 073 | – 172 396 |

* Number of contracts held remains static for the period of hedging.

## 6. CONCLUSION

A naive hedge against an expected decline in a portfolio's value will always give a net positive return in a bear market, regardless of the intervening price movements. The opposite holds true in a bull market. Should the market turn against the hedger by going bull instead of bear, he will incur losses on the futures market if he does not close out his position. It is envisaged that the model (depending on its forecasting accuracy) will lessen the loss or even show a profit on the contract in such a case, by taking advantage of the intervening price movements.

The model performs relatively poorer than the naive hedge during the bear phases of the market. This can be attributed to the inaccuracies of the forecasting methods. For better forecasting results, the technical forecasts must be accompanied by a fundamental analysis of the market as well. The fact that the perfect foresight model outperformed the naive hedge every time, is an indication of the model's inherent strength.

The real merit of the model lies in its ability to determine a hedging strategy suitable for investors who want to take advantage of current price movements, and who do not have unlimited funds to cover the variance margins incurred with a naive hedge.

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M J van der Mescht en E vd M Smit

# Die Suid-Afrikaanse Kapitaalmark en Aandelebeurs as Vooruitskatters van Reële Ekonomiese Aktiwiteit


## ABSTRACT

Two simple forecasting models are developed to forecast future real economic activity, the one based on information contained in the industrial share index and the other based on the term structure of interest rates. It is shown that both these models provide better ex ante forecasts of real activity than a number of leading South African economic forecasters.


## 1. Inleiding

Een van die moderne tendense in makro-ekonometriese modelbou, tot 'n groot mate genoodsaak deur struktureel onstabiele verbande, is die vervanging van groot, komplekse nielineêre stelsels deur kleiner, eenvoudiger modelle. Hierdie neiging word tot die uiterste gevoer deur Harvey (1989, 1991) wat reële ekonomiese aktiwiteit, in hoogs geaggregeerde vorm, vooruitskat met baie eenvoudige enkelvergelyking-regressiemodelle wat op kapitaalmark- en effektebeursinformasie gebaseer is en wat in 'n vergelykende studie, die bekende makromodelle in die VSA in akkuraatheid ewenaar of oortref.

In hierdie artikel word 'n aantal modelle, analoog aan dié van Harvey (1989, 1991) geskat om groeikoerse in die Suid-Afrikaanse bruto binnelandse produk en bruto binnelandse besteding vooruit te skat. Die modelle is onderskeidelik gebaseer op die termynstruktuur van rentekoerse en aandelebeursaktiwiteit. Daar word aangetoon dat beide die kapitaalmark- en aandelebeurs informasie oor die periode 1960 tot 1991 meer as 65% van reële ekonomiese groei verklaar en dat hierdie vooruitskattings die waargenome akkuraatheid van Suid-Afrikaanse ekonomiese vooruitskatters in die skadu stel. Die modelle toon verder 'n besondere goeie vermoë om draaipunte korrek vooruit te skat.

## 2. Teoretiese agtergrond

Moderne prysteorie (bv. Merton (1973)) postuleer 'n verband tussen 'n bate se verwagte opbrengs en beleggers se toekomstige verbruiksplanne. Hierin setel die verbande tussen kapitaalmarkopbrengste en reële ekonomiese aktiwiteit. Beleggers kry groter nut uit 'n addisionele rand in 'n resessie, wanneer hul inkomste laag is, as uit dieselfde rand gedurende 'n voorspoedfase gekarakteriseer deur hoër inkomste. Gedurende voorspoedfases neig beleggers dus om in bates te belê wat hul inkomste sal verskans in resessies, sodat verbruik gladgestryk word. Die mate waarteen huidige verbruik afgeruil word vir toekomstige verbruik, die marginale substitusiekoers, word dus bepaal deur verwagtings omtrent die reële ekonomie en word weerspieël in die pryse van kapitaalmarkinstrumente. Gevolglik weerspieël rentekoerse in 'n bepaalde jaar die marginale waarde van inkomste in daardie jaar relatief tot die marginale waarde in daaropvolgende jare. Dit impliseer dat, indien daar byvoorbeeld 'n resessie verwag word binne 'n periode van een jaar, daar 'n behoefte by die belegger sal ontstaan om homself te verskans deur middel van een of ander finansiële intrument, byvoorbeeld 'n twaalf-maande effek. Die toenemende vraag na sodanige effekte sal tot gevolg hê dat pryse sal styg en die opbrengskoers dienooreenkomstig sal daal. Om die aankope van sodanige effekte te finansier, kan die belegger van sy korttermynbates verkoop. Die verkoopsdruk sal tot gevolg hê dat die prys van die korttermyninstrument onder druk kom en die opbrengskoers dienooreenkomstig styg. Hiervolgens behoort langkoerse te daal en kortkoerse te styg. Dit impliseer dat die termynstruktuur van rentekoerse (die verskil tussen die langkoerse en kortkoerse) inligting bevat omtrent verwagte toekomstige ekonomiese groei.

Wat die aandelebeurs betref, bestaan daar konsensus omtrent die positiewe verband tussen aandelebeursopbrengste en reële ekonomiese aktiwiteit (sien bv. Fama (1981), Schwert (1990), Fama (1990) en Siegel (1991)). Ook in Suid-Afrika word aandelepryse as voorspellers van toekomstige reële aktiwiteit erken. In hierdie hoedanigheid word 'n aandeleprysindeks bv. konsekwent as komponent van die Buro vir Ekonomiese Ondersoek se leidende ekonomiese indikator gebruik. Die prys van 'n aandeel verteenwoordig die verdiskonteerde waarde van die verwagte toekomstige kontantvloei wat onder andere deur die vlak van die reële ekonomie bepaal sal word. Aandeelpryse reflekteer dus verwagte reële ekonomiese aktiwiteit en enige veranderinge in aandeelpryse is gedeeltelik die gevolg van hersiene verwagtinge omtrent toekomstige reële aktiwiteite.

Harvey (1991) argumenteer dat die verbande tussen aandelepryse en reële aktiwiteit minder stabiel behoort te wees as dié tussen die termynstruktuur van rentekoerse en reële aktiwiteit. Hy vind ook empiriese bewyse vir hierdie uitgangspunt. In die eerste plek word die prys van 'n aandeel bepaal deur die waarde van toekomstige dividende te verdiskonteer oor die volle tydperk wat die maatskappy in bedryf is. Kontantvloei op die kort- tot mediumtermyn dra dus 'n relatief groot gewig, terwyl dividende in die langtermyn oor verskeie toekomstige konjunktuursiklusse versprei is. Hierteenoor het effekte vaste vervaldae. Die tweede argument spruit uit die manier waarop die kontantvloei gewaardeer word. Terwyl toekomstige dividende, 'n belangrike faktor by die bepaling van die aandeelprys, onseker is, is die toekomstige uitkeerwaarde van effekte vandag bekend. Derdens dra aandele en effekte verskillende risiko's. Dit word algemeen aanvaar dat aandele aan hoër risiko's onderworpe is as vaste-inkomste draende staatseffekte. Die verdiskonteringskoers reflekteer beide die risiko in die ekonomie sowel as die risiko van die aandeel self. Namate die risiko van die aandeel styg, sal die verdiskonteringskoers styg en die aandeelprys dienooreenkomstig daal. Verskuiwings in risiko is egter minder belangrik in prysbepaling in die effektemark.

## 3. Data en modelle

Kwartaallikse data ten opsigte van die bruto binnelandse produk (BBP) en die bruto binnelandse besteding (BBB) is verkry uit die Suid-Afrikaanse Reserwebank se Kwartaalblaaie vanaf die eerste kwartaal in 1960 tot en met die eerste kwartaal in 1991. Meting is teen konstante 1985-pryse, seisoensinvloede uitgeskakel en teen jaarkoerse.

In die bepaling van die termynstruktuur van rentekoerse is die bankaksepkoers (BA) gebruik as korttermynkoers terwyl die koers op die Eskom 168 effekte gebruik is as langkoers. Beide koerse is kwartaalliks gemeet vanaf die eerste kwartaal van 1960 tot en met die eerste kwartaal van 1991. Die koerse is die sluitingskoerse op die laaste Vrydag in elke maand. Die gemiddelde van hierdie sluitingskoerse is gebruik vir die berekening van kwartaalkoerse. Die nywerheidsindeks is die aktuariële indeks van nywerheidsmaatskappye genoteer op die Johannesburgse Effektebeurs. Die sluitingspryse op die

laaste werksdag van die maand word gebruik in die berekening van die indekse en die kwartaalindeks is bereken as die gemiddelde van hierdie maandelikse indekse vanaf die eerste kwartaal van 1960 tot en met die eerste kwartaal van 1991.

Die BBP- en BBB-vlakke is getransformeer tot persentasieveranderinge vanaf kwartaal tot dieselfde kwartaal een jaar tevore. Nadat die nywerheidsindeks met die BBB-deflator na konstante pryse omgeskakel is, is dit op 'n soortgelyke wyse tot groeikoerse omgeskakel.

Die termynstruktuur is op twee verskillende maniere bereken. Enersyds is die verskil tussen die langkoerse en die kortkoerse bereken (gewone termynstruktuur) en andersyds is die natuurlike logaritme van een plus die langkoers verdeel deur een plus die kortkoers bereken (termynstruktuur (log)). Die steekproefperiode vanaf 1960 tot 1991 is opgedeel in drie subperiodes. Die eerste periode strek vanaf 1960 tot en met die laaste kwartaal van 1972. Hierdie breekpunt is gekies om saam te val met die inwerkingstelling van die Wysigingswet op Banke. Die tweede periode strek vanaf 1973 tot en met die laaste kwartaal van 1980 om saam te val met die begin van 'n meer markgerigte beleid in Suid-Afrikaanse ekonomie. Die derde periode strek vanaf 1981 tot en met die eerste kwartaal 1991. Dataverwerking het geskied met behulp van die TSP-rekenaarprogram.

Harvey (1989, 1991) spesifiseer 'n eenvoudige lineêre regressiemodel waarin die verklarende veranderlike (termynstruktuur of aandeleprysgroei) die afhanklike veranderlike (reële groei) met vyf periodes lei, sonder om hierdie sloering te motiveer. 'n Kruiskorrelasie-ontleding tussen die gekose afhanklike en verklarende veranderlikes toon egter dat maksimum korrelasies in die Suid-Afrikaanse geval telkens by 'n vierkwartaal sloering voorkom (Van der Mescht (1991)). Dit word bevestig deur die grafiese voorstellings in Figure 1 en 2.

Die onderliggende model is dus as volg:

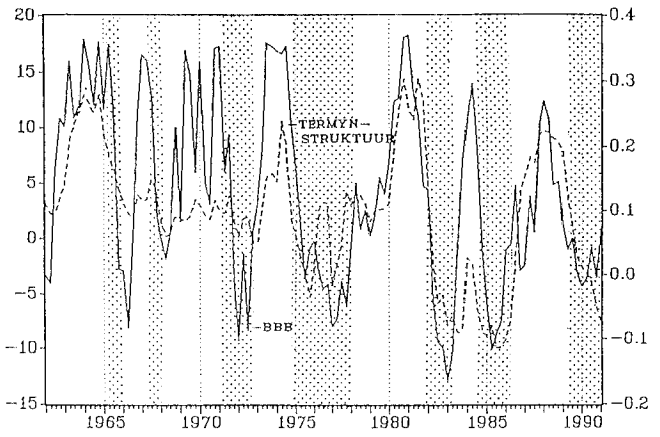
$$\Delta Y_t = \beta_0 + \beta_1 X_{t-4} + \varepsilon_t$$

waar $\Delta Y_t$ = jaarlikse persentasie reële groei in BBB of BBP van kwartaal t-4 tot kwartaal t;

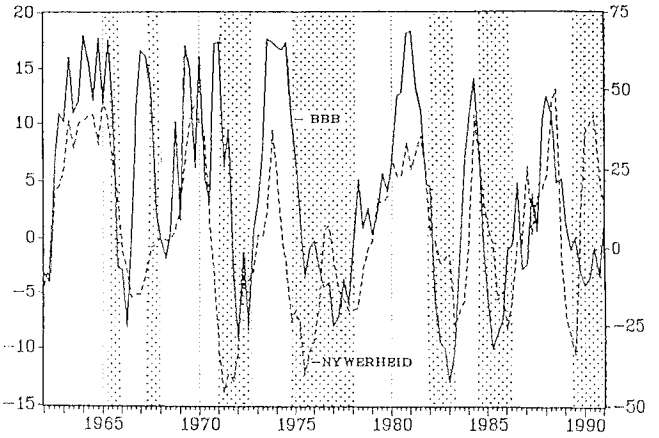
$X_t$ = termynstruktuur of jaarlikse groei in die nywerheidsindekse vanaf kwartaal t-4 tot kwartaal t; en

$\varepsilon_t$ = fouteterme wat die klassieke aannames gehoorsaam.

Gewone kleinste kwadrate skattings het feitlik sonder meer op die teenwoordigheid van outokorrelasie gedui. Die modelle is gevolglik herskat deur eksplisiet vir 'n AR(1) komponent in die fouteterme voorsiening te maak.




**Figuur 1: Persentasieverandering in die reële bruto binnelandse besteding en die termynstruktuur van rentekoerse gesloer met vier kwartale**




**Figuur 2: Persentasieverandering in die reële bruto binnelandse besteding en die persentasieverandering in reële vlakke van die nywerheidsindeks gesloer met vier kwartale**

## 4. Resultate

Tabel 1 bevat die passingsresultate van die regressielopies met die persentasieverandering in die reële bruto binnelandse besteding as afhanklike veranderlike. Tabel 2 is 'n soortgelyke tabel met die persentasieverandering in die reële bruto binnelandse produk as afhanklike veranderlike.

Die geskatte koëffisiënte is nie in die voorafgaande tabelle verstrek nie, aangesien dit nie belangrike strukturele informasie bevat nie. Die resultate is geskakeerd en varieer van periode tot periode. Twee veralgemenings kan egter gemaak word: in die eerste plek, in teenstelling met Harvey (1991) se bevindings, bied die termynstruktuurmodelle nie duidelike beter passingsresultate as die nywerheidsindeks nie en tweedens blyk die verskille tussen die twee termynstruktuurmodelle gering te wees. Die meerderheid verbande is betekenisvol positief, soos verwag op teoretiese gronde.

**Tabel 1**
**Passingsresultate met BBB as afhanklike veranderlike**

| Verklarende Veranderlike | Maatstaf | Periode | | | |
|---|---|---|---|---|---|
| | | 1960 – 1972 | 1973 – 1980 | 1981 – 1991 | 1960 – 1991 |
| Nywerheids-indeks | $R^2$(%) | 42,2 | 80,3 | 67,4 | 60,7 |
| | Durbin-Watson | 1,93 | 1,58 | 1,50 | 1,87 |
| | t-waarde | 2,14** | 1,69 | 0,70 | 2,20** |
| Termynstruktuur (log) | $R^2$(%) | 32,4 | 83,3 | 71,0 | 60,1 |
| | Durbin-Watson | 1,00 | 1,90 | 1,55 | 1,84 |
| | t-waarde | 4,51* | 2,95* | 2,36** | 1,68 |
| Termynstruktuur (gewoon) | $R^2$(%) | 49,2 | 81,4 | 70,6 | 62,7 |
| | Durbin-Watson | 1,83 | 1,74 | 1,53 | 1,90 |
| | t-waarde | 3,22* | 2,13** | 2,20** | 3,33* |

* Betekenisvol by 1% betekenispeil

** Betekenisvol by 5% betekenispeil

**Tabel 2**
**Passingsresultate met BBP as afhanklike veranderlike**

| Verklarende Veranderlike | Maatstaf | Periode | | | |
|---|---|---|---|---|---|
| | | 1960 – 1972 | 1973 – 1980 | 1981 – 1991 | 1960 – 1991 |
| Nywerheids-indeks | $R^2$(%) | 33,4 | 55,8 | 74,1 | 65,8 |
| | Durbin-Watson | 2,08 | 0,96 | 0,98 | 2,11 |
| | t-waarde | 2,88* | 1,51 | 1,75 | 2,30** |
| Termynstruktuur (log) | $R^2$(%) | 48,3 | 59,4 | 78,1 | 65,8 |
| | Durbin-Watson | 1,77 | 1,99 | 1,36 | 2,14 |
| | t-waarde | 6,09* | 2,20** | 3,36* | 2,28** |
| Termynstruktuur (gewoon) | $R^2$(%) | 45,0 | 56,0 | 72,6 | 68,0 |
| | Durbin-Watson | 2,17 | 2,00 | 1,34 | 2,26 |
| | t-waarde | 4,46* | 1,29 | 3,16* | 3,76* |

* Betekenisvol by 1% betekenispeil
** Betekenisvol by 5% betekenispeil

### 5. Ex ante vooruitskattingsakkuraatheid

'n Strenger toets vir vooruitskattingsakkuraatheid is egter geleë in 'n ex ante vergelyking van die termynstruktuur- en nywerheidsindeksmodelle met die beskikbare vooruitskattings van Suid-Afrikaanse ekonomiese vooruitskatters.

Tabel 3 verskaf die wortel-gemiddelde kwadratiese foute vir die vooruitskatting van die persentasieverandering in die reële bruto binnelandse besteding (BBB) deur die verskillende vooruitskatters, terwyl Tabel 4 die wortel-gemiddelde kwadratiese foute vir die vooruitskatting van die persentasieverandering in die reële bruto binnelandse produk (BBP) bevat. Die termynstruktuurmodel en nywerheidsindeksmodel se wortel van gemiddelde kwadratiese foute word vergelyk met dié van Standard Bank, BEO, RAU, Sanlam, Senbank, Volkskas en Ou Mutual vanaf 1979 tot 1989 in 'n ex ante situasie. Direkte vergelykings tussen die verskillende vooruitskatters word bemoeilik deur die feit dat al die inligting nie oor die volle tydperk beskikbaar is nie. Die wortel-gemiddelde kwadratiese foute (WGKF) van die vooruitskatters is gebaseer op jaarlikse vooruitskattings van die persentasieverandering in die reële bruto binnelandse besteding (BBB) en die persentasieverandering in die reële bruto binnelandse produk (BBP) wat gedurende November gedoen word vir die daaropvolgende jaar (Smit en Wesso, 1991).

**Tabel 3**
**Wortel-gemiddelde kwadratiese foute vir die vooruitskatting van die persentasieverandering in die reële bruto binnelandse besteding**

| Vooruitskatter | Tydperk | WGKF |
|---|---|---|
| Termynstruktuurmodel | 1979-89 | 2,00 |
| Nywerheidsindeksmodel | 1979-89 | 2,53 |
| BEO | 1979-89 | 3,96 |
| RAU | 1981-89 | 4,46 |
| Sanlam | 1981-89 | 3,60 |
| Volkskas | 1981; 83-89 | 5,57 |
| Ou Mutual | 1985-89 | 4,28 |

**Tabel 4**
**Wortel-gemiddelde kwadratiese foute vir die vooruitskatting van die persentasieverandering in die reële bruto binnelandse produk**

| Vooruitskatter | Tydperk | WGKF |
|---|---|---|
| Termynstruktuurmodel | 1979-89 | 0,89 |
| Nywerheidsindeksmodel | 1979-89 | 1,05 |
| Standard Bank | 1979-84; 86; 89 | 1,92 |
| BEO | 1979-89 | 1,78 |
| RAU | 1980-89 | 1,72 |
| Sanlam | 1979-89 | 1,60 |
| Senbank | 1980-81; 83-88 | 2,21 |
| Volkskas | 1981; 83-89 | 1,96 |
| Ou Mutual | 1985-89 | 2,33 |

Om die termynstruktuurmodel en die nywerheidsindeksmodel se vooruitskattings direk vergelykbaar te maak met die ander vooruitskattings van ekonomiese groei, is die twee modelle op dieselfde wyse hanteer as die res. Beskikbare data tot en met die derde kwartaal van 1979 is gebruik om die persentasieverandering in die reële bruto binnelandse produk en die persentasieverandering in die reële bruto binnelandse besteding vir die volgene vier kwartale vooruit te skat. In die vierde kwartaal van 1980 is beskikbare data tot en met die derde kwartaal gebruik om 'n verdere vier kwartale vooruit te skat. Hierdie proses is herhaal tot en met die laaste kwartaal van 1989. Aangesien beide die termynstruktuurmodel en die nywerheidsindeksmodel kwartaalliks vooruitskat, is die gemiddelde vooruitskattings van vier kwartale geneem om jaarlikse vooruitskattings te kry.

Dit is duidelik uit die tabelle dat die termynstruktuurmodel en die nywerheidsindeksmodel kleiner wortel-gemiddelde kwadratiese foute (WGKF) as die vooruitskatters het. Vir die vooruitskatting van die persentasieverandering in die reële bruto binnelandse produk en die persentasieverandering in die reële bruto binnelandse besteding het die termynstruktuurmodel die kleinste wortel-gemiddelde kwadratiese foute vir die periode 1979 tot en met 1989 en die nywerheidsindeksmodel in die tweede plek.

Wanneer die wortel-gemiddelde kwadratiese foute (WGKF) van die twee modelle op 'n kwartaalbasis bepaal word, verander die waarde vir die nywerheidsindeksmodel vanaf 2,53 na 4,66 vir die vooruitskatting van die persentasieverandering in die reële bruto binnelandse besteding en vanaf 1,05 na 1,67 vir die persentasieverandering in die reële bruto binnelandse produk. Op 'n kwartaalbasis verander die wortel-gemiddelde kwadratiese foute van die termynstruktuurmodel vanaf 2,00 na 4,17 vir die vooruitskatting van die persentasieverandering in die reële bruto binnelandse besteding en vanaf 0,89 na 1,51 vir die persentasieverandering in die reële bruto binnelandse produk. Die termynstruktuurmodel is dus selfs op 'n kwartaalbasis die beste vooruitskatter oor die periode 1979 tot 1989.

Soos in die geval van Harvey (1989), bevat die termynstrukstuur van rentekoerse dus meer informasie omtrent toekomstige ekonomiese groei as die aandeleprysindeks, maar laasgenoemde vertoon nog heelwat beter onder Suid-Afikaanse omstandighede as in die VSA.

### 6. Gevolgtrekkings

Volgens Harvey (1989) vergelyk vooruitskattings van ekonomiese groei in die VSA, gebaseer op die termynstruktuur van rentekoerse gunstig met die vooruitskattings van ander ekonometriese modelle, terwyl vooruitskattings gebaseer op

die New Yorkse Effektebeurs nie gunstig vergelyk met dieselfde ekonometriese modelle nie. Data gebaseer op die termynstruktuur van rentekoerse in Suid-Afrika en die nywerheidsindeks van die Johannesburgse Effektebeurs dui daarop dat vooruitskattings gebaseer op beide veranderlikes wel gunstig vergelyk met alternatiewe ekonomiese vooruitskattings en dat daar nie 'n betekenisvolle verskil tussen die akkuraatheid van die twee vooruitskattingsmodelle is nie, alhoewel die termynstruktuurmodel marginaal beter resultate oplewer. Op grond van hierdie resultate is dit dus moontlik om met relatief min data en 'n relatief eenvoudige model akkurate vooruitskattings van reële ekonomiese aktiwiteit te maak in ooreenstemming met die moderne neiging tot kleiner en eenvoudiger vooruitskattingsinstrumente.

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D J Joubert

# Evidence of Symmetry in price behaviour


## ABSTRACT

Evidence has been found of a relationship between gradients of consecutive bull and bear markets. The gradient of a major resistance trend line of a bear market can be derived from the resistance line of the preceding bull market. Similarly, a major support line of a bull market can be derived from a support line of the previous bear market. This phenomenon reveals a symmetrical relationship between the gradients of the resistance or support lines on either side of a trend reversal, i.e. of consecutive bull and bear trends.

The relationship is inverse, as the gradient of the derived line is of opposite sign to that of the primary line. The magnitude of the new inverted gradient may be equal to that of the primary line, or it could differ by some multiple of the Fibonacci ratio.

In practice, this relationship can be used to anticipate where a key reversal could occur during a new bull or bear market.

The existence of a method to anticipate major reversals is of value for technical analysis, and is also likely to put new life into the debate on the Random Walk Hypothesis.


## 1. INTRODUCTION

The appearance of regular patterns on price charts has been known and studied since the early days of charting. Triangles, wedges and pennants, flags and channels are familiar examples of these regular patterns, while the Elliot 5-wave repetition is also well known.

Any form of regular behaviour enables the analyst to anticipate the future actions of the price, provided that the analyst can identify the nature of the regular behaviour before the formation has been completed.

The obedience to the formation need not be absolute. If the general shape of the formation develops true in some reasonable majority of cases, the advantage conferred on the analyst by such foreknowledge will be significant.

Standard patterns suffer from the limitation that they occur rather infrequently and only at specific points during market trends. This fact, as well as the inaccuracies associated with standard patterns reduce their usefulness to traders and investors.

## 2. THE NEW SYMMETRY

Observation and analysis of price charts have revealed that trends, – the gradients of the support or resistance lines of bull and bear markets – do not vary randomly. It would appear from early evidence that important resistance or support lines of new trends subsequent to trend reversals, can be derived from major support or resistance lines of the preceding opposite trend.

This relationship between the gradients of successive trends can be seen as a form of symmetry in price behaviour. This symmetry proves to be either direct or skewed. In direct symmetry, the gradient of the new market trend is equal in magnitude to that of the preceding trend, but it has opposite sign. Skewed symmetry also requires that the direction of the gradient be inverted, but the magnitude of the gradient too is changed. The inverted gradient will differ from the original by some multiple of the primary Fibonacci ratio.

The Fibonacci ratio has the characteristic that

$$1/F = 1 + F.$$

where F is the Fibonacci ratio, approximately equal to 0,618.

This means that if a line B had been derived from another line A by increasing the gradient of A by the Fibonacci ratio, then line A in turn can be generated from B by decreasing the gradient of B by the same ratio.

Using the ratio, F, and beginning with an arbitrary line, one could generate a fan of lines of varying gradient. The same fan, and only that fan, could be recreated by beginning with any one of the lines in the fan. The fan can be inverted about the horizontal to create a mirror image. This results in a family of lines with positive and negative gradients, all of which can be derived from any one of its members through the use of only two transformations – inversion and the Fibonacci gradient transformation.

The concept of a family of lines can be used to restate the rule of symmetry as 'there is a resistance line during a bull market (or a support line during a bear market) that defines the family of lines of which at least one member will offer major resistance during the subsequent bear market (support during the next bull market)'.

The accuracy of the fit between reversal points and the trend line is high – better than 1% in most cases, and often less than 0,15%.

## 3. EXAMPLES

Six examples are shown. These have been selected to illustrate the principle of symmetry for widely differing variables.

In each case the two anchor points used to define the primary lines have been indicated by means of an 'o'. An 'x' marks a single point from where the derived lines were generated.

The program uses the internal values of the prices to calculate the parameters of the lines, to ensure a high degree of accuracy.

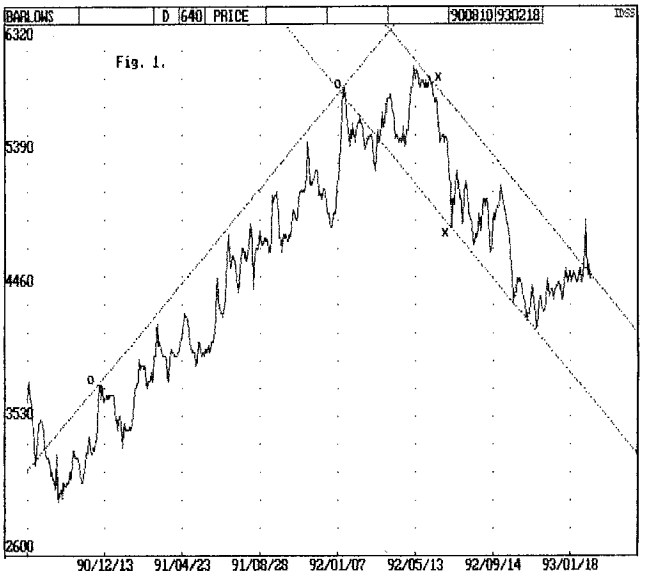


**Fig. 1** is the daily closing prices of Barlows. The primary line has been drawn as the resistance line during the major bull

Do you remember the first time your child clutched your hand, with tiny fingers full of trust?

How you knew at that moment that life was truly precious and the future was full of promise?

But you know that love alone is not enough to ensure your family's security.

What you need is a little help from the people who spend all day, every day, planning and innovating better ways to protect your financial future.

People who know that the quality of our lives tomorrow depends on how we plan today. Because the future is all we've got.

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# The future is all we've got.

ABELHEIM LEE-DUNCAN 0317

market. The two derived lines have the same gradient as the primary. They were generated from the two points marked with an 'x' respectively. As a result, they form a perfectly parallel channel.

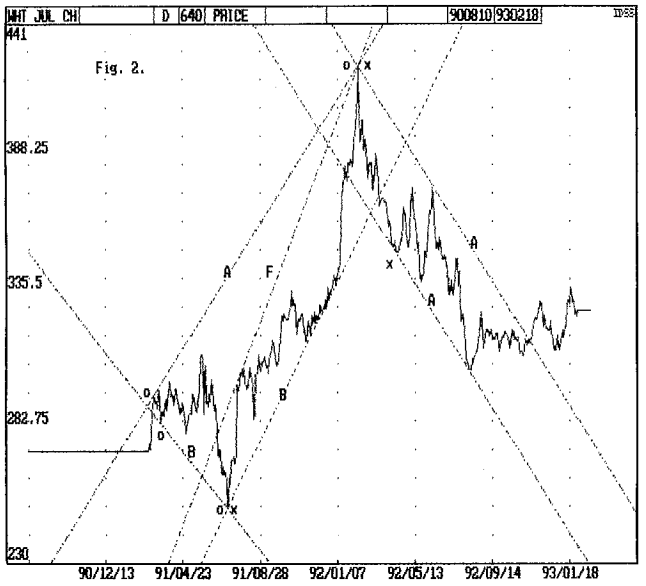



**Fig. 2** shows the daily closing prices of July wheat futures on the Chicago Board of Trade. Line A was drawn as a resistance line from the left shoulder to the sharp peak. Line F, the steeper derivative of A, is tangent to another left shoulder and it could equally well have served as the primary line. The inverse lines of line A reveal the same kind of behaviour as for Barlows, and also form a perfect channel.

Line B is the support line during a brief bear market prior to the bottom reversal. Its inverse derivative supplied support during an extended period of the steep bull market.

The fact that charts exhibit multiple examples of inverse symmetry, means that pure coincidence as the cause of this phenomenon becomes less likely.

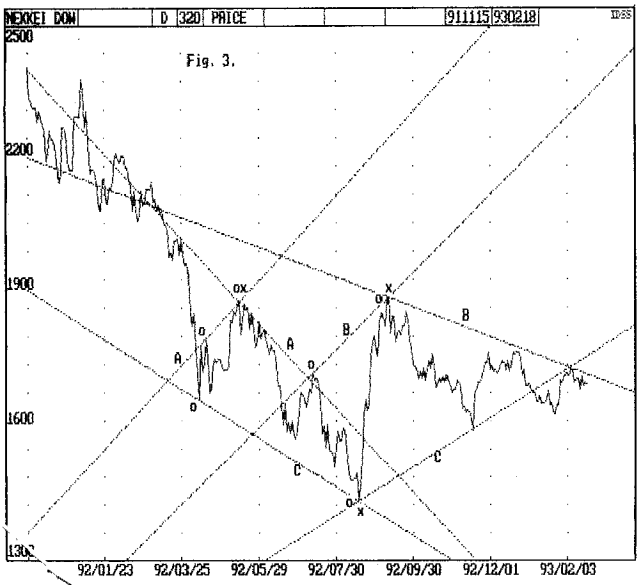



**Fig. 3** is the daily close of the Nikkei Dow. There are three cases of inverse symmetry. The direct inverse of line C is a watershed, a line that acts both as support and resistance, typically with fewer penetrations than reversals. Line A also shows direct symmetry, and it is only line B that requires a transformation of the gradient to reveal the skewed symmetry.

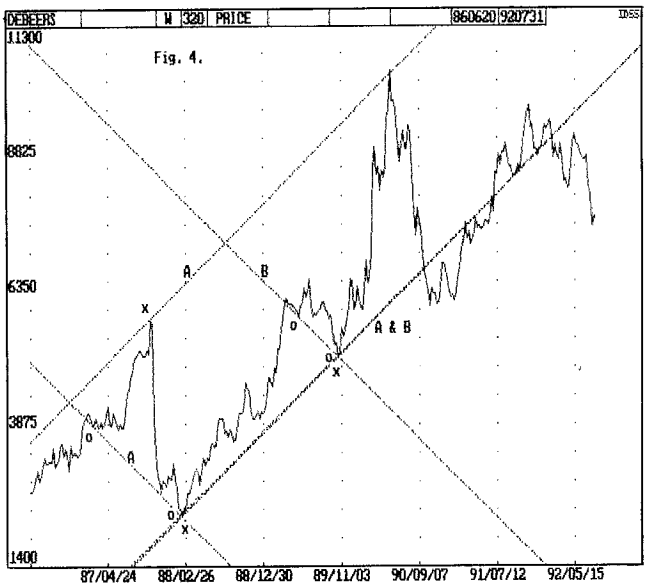



**Fig. 4** is the weekly close of DeBeers for the period from June 1986 to July 1992. The two primary lines, A and B, were both support for a correction against the major bull trend. The direct inverse lines of A and B, drawn from the low points of the corrections, come very close to being the exact same line in gradient and position. Their parallel, drawn from the peak in October 1987, also acted as resistance when the market topped out in mid 1990.

Observe that even when the price oscillated around the two superimposed inverse lines in the period 1991-1992, their effect was still made evident in the price behaviour.

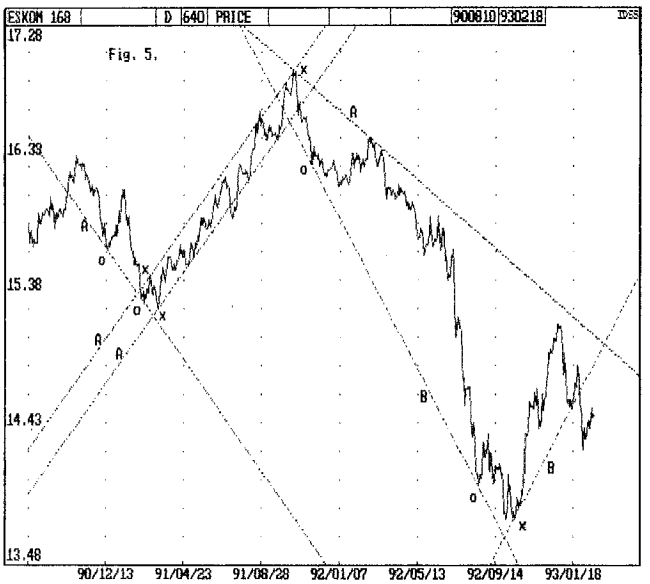
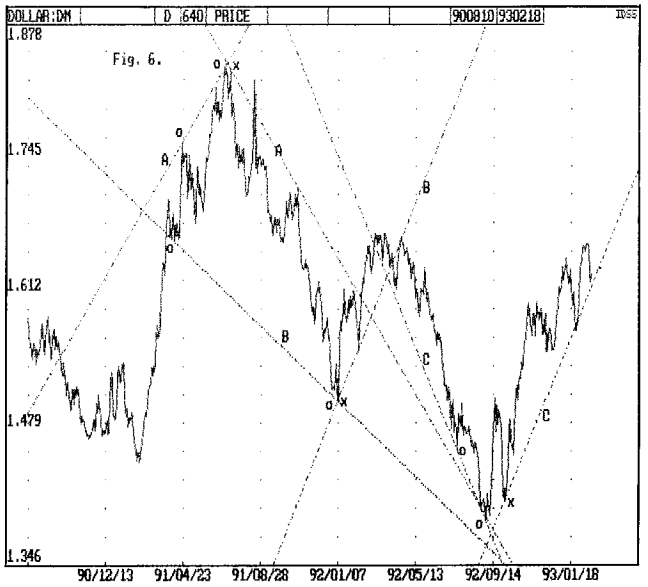



**Fig. 5** is the daily closing yield of the ESKOM E168. Here there are only two primary lines, A and B. Line B is the resistance line of a major bull market. Its inverse resulted in a good bounce before it was penetrated.

Line A is the resistance of a small bull trend early on the chart. Its direct inverse lines acted as a good channel for the subsequent bear market, although both lines were penetrated by false breaks. A derived line of A, or its inverse, acted as support for a new bull trend in the gilt.




In **Fig. 6** the Dollar-Deutschmark rate exhibits three examples of an inverse symmetry. The peak to the right of centre also shows symmetry, but the lines are not drawn to avoid clutter. Line pairs A and C are directly symmetrical, while line B had to be transformed into a steeper line to reveal the skewed symmetry. Note that the inverse line A is a major watershed line. The only false penetration occurred in August 1990 when the dollar strengthened sharply as a result of the attempted coup in Russia.

These examples illustrate the basic characteristics of this phenomenon, which include other features not discussed here. Even though multiple examples of symmetry on one chart tend to reduce the probability that it could be explained by mere coincidence, this does not provide objective evidence that the phenomenon really exists.

## 4. SAMPLE STATISTICS

A statistical analysis of this phenomenon was conducted some time ago. The analysis was designed to answer the question whether there is any objective evidence supporting the hypothesis, or whether the excamples identified on the charts could be explained either by mere chance, or the fact that one subjectively and subconsciously select those charts and those trend reversals where this phenomenon manifests itself.

Firstly, the protocol of the analysis had to exclude the possibility of a subjective filter which selected only those shares that did exhibit the phenomenon. Secondly, every significant trend reversal on the chart had to be examined for evidence of symmetry, again to exclude a subjective filter effect. Thirdly, the protocol had to be designed to reduce or limit what could be termed a 'shotgun' effect – i.e. generating many derived lines from each primary line through the Fibonacci transformation, to increase the probability of a fit.

Fourthly, when the lines of a Fibonacci fan are very steep or nearly horizontal, they lie close together. Any trend reversal in such an area would be close to a derived line and would appear to support the hypothesis. Therefore, steep or shallow parts of the Fibonacci fan have to be excluded from the analysis.

The following guidelines were used in the protocol:

1. All visibly significant reversal patterns, large and small, on a daily chart of the share price spanning approximately 30 months had to be analysed.
2. The original resistance or support line was taken as one or more of the following:
   a) The tangent from the left shoulder to the top (bottom) of the reversal formation (lines A or F or B on Fig. 2)
   b) The tangent to the full extent of the preceding market trend, in those cases where the top or bottom is obscured by a small head and shoulders pattern. (Line A on Fig. 1; line B on Fig. 5)
3. Only the direct inverse line and the first two Fibonacci derived lines are evaluated.
4. To qualify for symmetry, the price must have reversed a significant trend within 1% absolute of the derived line. The steep and shallow lines of the Fibonacci fan are excluded by a requirement that the nearest alternative derived line to the line being examined must be at least 5% away from the point of reversal.

Restricting the number of derivations exclude the more contentious examples of the hypothesis, as does the requirement for accuracy.

If trend reversals are randomly distributed in time and place, a 5% dead zone to the nearest alternative line, in conjunction with a 1% level of accuracy, should restrict spurious or false matches due to random chance to a maximum of 20% of all events analysed.

## 5. THE RESULTS

At the time the analysis was done, industrial shares were mostly in a sustained bull market. They exhibited relatively few trend reversals, and were thus poor subjects for analysis.

The study was performed on all the shares from the West Wits sector of the JSE. The selection was arbitrary, but the fact that this was one sector for which price histories for most shares were available was one consideration.

Western Areas GM Co. was not included in the analysis since Elsburg represented essentially the same mine. In all cases charts of daily closing prices for the period November 1989 to 23rd April 1992 were analysed.

Spot checks have also been done on many other shares, as part of an ongoing program of technical analysis. These indicate that symmetry is characteristic of all kinds of variables, and of all charts from a monthly average down to periods as short as 10 minute units.

Between them, the shares exhibited 72 well defined different top or bottom reversals suitable for analysis. More than one primary line could be identified in certain instances. The study was based on 98 different primary trend lines, which meant that less than half of all the trend reversals give rise to more than one primary line; an indication that the selection criteria for primary lines discriminated against any undue subjective influence in the selection of candidates for analysis.

Of the 98 lines, 63 lines (64,3%) had derivatives that were clearly the locus of significant trend reversals – more than three times the expected ressult should chance alone be the cause of the phenomenon.

The 36 lines that did not produce a positive result, included lines where the initial gradient was so extreme – steep or shallow – that more than 2 Fibonacci transformations would have been required for a derived line to intersect the chart after the trend reversal. If a greater number of transformations had been allowed, at least some of these unprofitable lines would have produced positive results.

Similarly, the requirement for a 5% dead zone also excluded a good number of lines where the visual evidence that symmetry existed was quite convincing.

Much the same result is obtained when only the number of

reversals is analysed, and not the different lines that could be generated. Here 48 of he 72 tops and bottoms (67%) exhibited symmetry. Again, of the 24 tops and bottoms that did not provide positive evidence, some primary lines were only excluded because their gradients were too extreme, or because neighbouring lines were more closely spaced than the 5% dead zone allowed.

## 5. CONCLUSIONS

Even on a limited sample, the degree of support for the hypothesis is substantially greater than could be explained by chance alone.

The homogeneity of the sample could be a matter of concern. However the high degree of accuracy required for the positive results mitigates against contamination of the results due to any possible similarity in the detailed behaviour of the share sample.

The results, while not conclusive, seem to cast a measure of doubt over one corollary of the Random Walk Hypothesis, which states that the history of a share cannot be used to forecast future price behaviour.

The hypothesis of symmetry cannot pretend to forecast every little move in the price. However it does seem effective at identifying in advance where significant reversals may occur. This could be enough of a challenge to warrant a new and closer look at the Random Walk Hypothesis, and the work based on it.

D J Joubert and A F F Mason

# Investment Basics XXVII. The design of a trading system.


## ABSTRACT

A trading system is a set of procedures and techniques, which will include the use of technical analysis, designed to make the most of the skills and abilities of the user of the system, and of decision support tools available to the user.

When one first begins to trade, the trading system should be rudimentary, to reflect the level of skill and ability of the trader. Then as one's knowledge of trading improves, and of the analytical methods needed to support profitable trading, the trading system should also grow in sophistication and complexity.

The evolution of the trading system would be determined by the kind of questions asked of the system.

This article reviews the nature of the questions the trading system should be designed to answer, and how these should change over time to reflect the growing skill and knowledge of the user.


## INTRODUCTION

Individuals tend to make their trading or investment decisions very much on an ad hoc basis. Decisions are made independently, each on its own merits, using whichever methods and parameters appear to be right and available at the time. Some technical indicators might be used consistently for some period of time, yet unless they are also interpreted exactly the same, the degree of consistency across many decisions would be low.

Further, subjective opinion and emotion could be expected to play a substantive role in the decisions, while the sources of information will often include market tips and rumours.

Not surprisingly, individual traders tend to experience fluctuating results, from highly profitable returns to devastating losses. The cause of this unfortunate situation can often be traced directly to the unsystematic and unstructured way decisions are made.

A possible solution to the problem lies in trading systems designed to match the needs, the skills and abilities and the personality of the individual trader or the investor.

A trading system is a set of procedures designed to obtain the best results over a period of time, given the trader's level, and range, of skills, knowledge, tools and personal objectives.

Trading systems have the significant advantage of providing a basis for discipline – probably the single most important ingredient for success – that would be difficult to achieve otherwise.

Trading systems have a second major advantage in that they provide a test bench for improvement.

Adequate records must be maintained of how decisions were made, and of the factors that were relevant to all the transactions. By doing so, a data base would be established to support systematic analysis of factors that can contribute to or influence various decisions.

The data could be analysed later to determine how different factors correlate with the quality of the decisions made using the trading system. Here particular attention must be paid to the generation of buy and sell signals by the technical indicators and how these were interpreted and used.

Such analysis would identify the deficiencies or weak points of the trading system, and suggest how they could be modified and improved to result in higher profitability and reduced risk.

A disciplined approach, with continuous study and improvement, must produce ever better results over a period of time.

## DESIGN CONSIDERATIONS

Trading systems can be designed to answer the following questions:

* What is the ruling trend in the market – over what time horizon?
* How far is the trend expected to continue?
* How near is the first reversal in the trend?
* What is the risk-reward ratio?
* What are the buy signals?
* What are the sell signals?
* Where is the stop loss for open positions?

However, before these questions are considered, the individual user must obtain clarity on such matters as the underlying expectations for the venture, and the risk profile of the user. From the answers to these questions, it could be decided which market or markets can be exploited, what the approximate range of time horizon should be, and the expected rate of return to provide the best balance between return and risk.

Knowledge of these parameters is essential if the trading system is to match the profile of the user, and provide meaningful signals.

Someone who elects to be active in very volatile markets – futures, or the capital market, for example – must have access to sources of intra day market information, as well as a capability for technical analysis of intra day data.

Once the groundwork has been done to define the basic parameters of the trading system, it should be decided how the system would find answers to the above questions. The investor would look for most of the answers in fundamental analysis, and turn to technical analysis only to improve the timing of the execution of the decisions.

Traders, with a time horizon of a month or two at the outside, down to only hours, or even less, can only use technical analysis as the means to make other than largely subjective decisions.

All trading systems would not use the same technical analysis.

Different time horizons would call for price data of different time periods. Investment decisions, with a time horizon of at least some years, will need weekly closing prices, perhaps even monthly data.

Futures and gilts traders, with a time horizon that could be only a few hours, must have access to intra day charts – of hourly prices, even down to 10 minutes or less – to be lfully effective.

Selection of the indicators to use is a personal matter.

Firstly, the trader must select the technical methods or indicators that the trader has confidence in. A lack of confidence in a method can only be a source of vexation. It will unavoidably mean that the trader's subjective distrust of the one signal would favour another signal generated by another indicator, which must increase the risk of poor, even costly, decisions.

Secondly, not all indicators are equally effective at answering the different questions – for example, some are better at identifying a trend, while others are better at warning that a reversal is imminent. Very few indicators indeed are able to estimate the extent or duration of a new trend.

A novice trader would not look for answers to all questions in the list. Initially, people tend to skip trend analysis, and the search for warning signals of a trend reversal, and proceed directly to an automatic response to somewhat simplistic buy signals, generated by moving averages or momentum indicators.

They soon run into the technical dilemma – the need for a trade off between the responsiveness of the signals generated, and the incidence of false signals. A fast response from the indicator, results in too many false signals; a slower response increases the reliability of the indicator, but reduces the potential for profit.

A typical first reaction to the dilemma is to change the parameters for the indicators, i.e. use different periods for averages, or for the momentums. The second step is most often to make the generation of the signals more complex. No single indicator is likely to give satisfactory results. Traders who persevere beyond this point, tend to turn to the use of different indicators in combination. They now require more specific rules to interpret these different inputs and reach a decision when to buy or sell – the beginning of the trading system.

This is usually a period of intense study. The trader no longer has a simple faith in one or two relatively simplistic indicators. Now, the visible evidence that markets move in trends is the basis for a search to identify subtle hints in the price action, able to reveal whether the ruling trend would be sustained, and when it is due for a change.

Initially, this study is likely to concentrate on ever more complex indicators and methods of calculation. In a multidimensional market these one dimensional indicators have so far proved unreliable over the longer term.

Many anylysts eventually disregard the conventional technical indicators – averages, momentums and other oscillators – to concentrate on pattern based systems, such as the Elliot Wave Analysis, and the ever more popular yet quite complex Gann analysis. Even studies of traditional patterns – triangles, wedges, megaphones and channels – are being revived, and extended through use of computerised methods to result in more accurate analysis.

At this point, the trading system begins to encroach on the domain of expert systems. Now the rules for making decisions are no longer simple; in particular, the generation of buy and sell signals will become much more complex. Patterns are not always easy to recognise or to describe. Even the analyst may not be aware of the changes to a set of price charts that causes the interpretation to change from buy to hold, or from neutral to sell.

To some, trading systems might appear too complex a way to make buy and sell decisions; others could hesitate to start off on the long path to where they would become skilled at pattern analysis.

These people should steer clear of any temptation to trade over the short term. Without the strict discipline that can only be imparted by some kind of trading system, the venture could fail.

Ref: Trading system. (Journal No. 36)

## True Survivors Show Their Colours Despite Hard Times

The ability to withstand adverse conditions and to bloom despite these is a characteristic of the Break Plough (Erythrina Zeyheri). A formidably large storage root and branching stem lie below the surface and produce new growth and an annual return of bright flowers in early summer. Evolution has enabled it to withstand the ravages of winter frost and veld fires by conserving its resources, dying back in winter whilst keeping enough in reserve to guarantee that it prospers.

Resilience in the face of adversity is also characteristic of Gold Fields. Against a background of the world economic conditions which have put considerable pressure on the mining industry, our financial results are particularly satisfying. They underline the fundamental strength which our low cost gold producers give to the Group and the success we've had in streamlining activities to improve the efficiencies of our operations. We will continue to press ahead with development of new business opportunities to take advantage of the next upturn in the commodities cycle so that, in the interests of all our stakeholders, we can continue to enrich man through minerals.

## Enriching Man Through Minerals


# GOLD FIELDS

# Specifications of format for articles to be submitted for publication in the investment analysts journal

1. Articles should normally not exceed 6 500 words.
2. They should be submitted in duplicate and in final form for consideration by the Editorial Committee.
3. Where they contain graphs, separate copies of the graphs, suitable for use by the Journal's printers, should also be submitted.
4. An attempt should be made to limit the number of graphs included in any article.
5. Tables of statistical data should be kept as clear and brief as possible.
6. A distinction should be made between footnotes and references.
7. Footnotes, elaborations or explanations of the main text, should be numbered and should appear at the end of the article not at the bottom of the page to which they relate.
8. References should be listed at the end of the article in alphabetical order according to family names of first mentioned authors and should take the forms illustrated below:–

   Smith, John (1986). An Inquiry into Market Efficiency. **Journal of Finance,** Vol 29, No 2, p 19.

   Jones, P F and De Kock, P J S (1975). **Financial Analysis.** Oxford University Press.

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