

The Investment Analysts Journal

Number 19 June 1982

Die Beleggings- Navorsers Tydskrif

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Inhoud

This issue in brief

An eclectic role for monetary policy

The justification of macro-economic stabilisation policies resides in the belief that governments can and, indeed, should intervene in the economy to smooth out business cycles and, thus, prevent the wastage of resources that results from booms and slumps. However, that belief, while still generally accepted by the conventional wisdom has come in for a good deal of criticism in recent years by neo-classical economists. Dr Johan Cloete, Chief Economist of Barclays National Bank, examines the role of monetary policy against this background with particular regard to its formulation and implementation in South Africa. He discusses, amongst other things, the difficulties of applying a constant money rule in this country and comes to a pessimistic conclusion regarding official efforts permanently to reduce inflation.

Trading in low priced shares: An empirical investigation 1968-1979

The view that low priced shares are more risky than high priced shares is held by many investors in many stock markets and this explains the resistance of some companies to stock splits and capitalisation issues. An investigation of such shares by Messrs Gilbertson, Affleck-Graves and Money suggests that while such a view might have a measure of validity it should not be allowed to obscure the fact that low priced shares often provide a relatively favourable return. Indeed, their research suggests that low priced shares are deserving of more attention than they receive on the JSE.

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A graphical solution to the lease evaluation problem

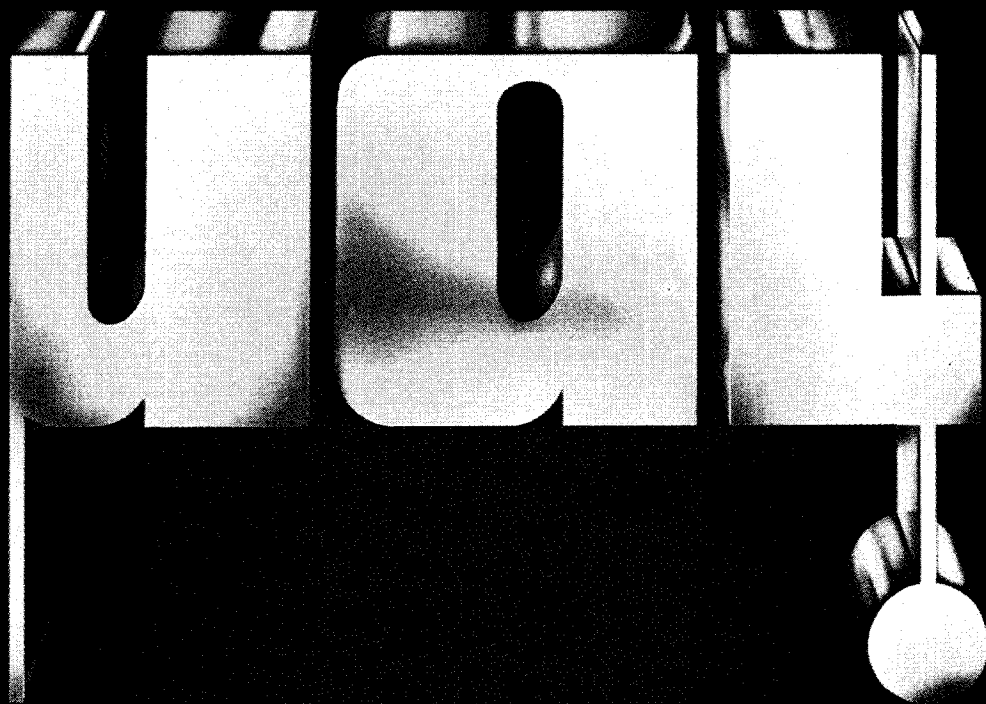
The growing popularity of lease finance, not least of all because of its tax advantages, has increased the need for effective evaluation techniques. This contribution from Australia develops a mathematical model which, through a graphical presentation, is easy to use. Presentations of the kind employed here are extremely valuable in sensitivity analysis and lend themselves to adaptations suited to the special requirements of particular users.

The puzzle of the two markets

Can two markets, both of which are efficient, react in different ways to the same information? This is an interesting question and is examined in this study of the comparative performance of gold share prices and the price of gold between March 1976 and August 1980. While there are factors that affect gold shares prices which have no direct bearing on the bullion market, one might expect such prices to reflect fairly accurately gold price changes from time to time. However, this has not always been so and Mr G. D. I. Barr of the Department of Mathematical Statistics at Cape Town University investigates why. He concludes that it has to do with the process through which expectations in the stock market are formulated.

The effect of taxation on earnings per share

The importance of taxation to the evaluation of ordinary shares can hardly be over-estimated for it is an expense of magnitude which has to be met before any payment of dividends can be made. To the extent, too, that taxation absorbs available cash resources these are diminished and may have to be supplemented if new capital projects are to be undertaken. Taxation also has a direct bearing on the cost of equity capital relative to that of loan capital and, therefore, is important to the determination of capital structure. This is the tenth article in our investment basics series and deals with essential tax issues. Mr I. J. Poluta is the tax consultant of JCI.



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The Investment Analysts Journal

Nineteenth issue

May 1982

*"We are determined to carry the policy of 'consolidation and adjustment' to its logical conclusion. This means exercising tight control over government spending, banking liquidity and the money supply. It also means permitting financial markets to tighten further if necessary and accepting **realistic*** interest rates. The lower average gold price and ... other adverse external developments ... are facts of life which cannot be ignored or neutralised by money creation or fiscal manipulation. We can argue about the appropriate **methods** of adjustment, weighing up their different costs and benefits. But the inevitability of adjustment must be accepted."*

Dr Gerhard de Kock
Governor of S.A. Reserve Bank
9 March 1982

*Our bold italics

The key word in the above statement is "realistic". For interest rates to be realistic they have to be politically acceptable, but equally, they cannot be realistic if they are not economically effective. Do we now have a level of interest rates in South Africa that will be effective in hastening the process of adjustment to which Dr De Kock refers? This is not a question that an editorial of this kind either can or should attempt to answer. Suffice it to observe that while short-term interest rates in South Africa at present are historically very high and in nominal terms are also higher than short-term interest rates in the US, Britain, Germany or Japan, they are neither extraordinarily high nor higher than the rates in these countries in real terms. To the extent to which it is real interest rates that govern the movement of physical resources, this must invite doubt as to whether interest rates here are yet high enough. However, it would be wrong to be dogmatic about that. What is real in the way of investment returns must depend, ultimately, on what happens to inflation, and investment decisions, therefore, inevitably hinge on expectations. In the final reckoning, the rate of interest is a price, and for any price to be effective in balancing the opposing forces of demand and supply, it must be left to find its own level. When prices of any kind, but especially interest rates, are ineffective in this regard, it is usually so because they have been interfered with. The merit of recent changes in South African financial markets is that they have taken us further along the road of deregulation though not far enough yet to attain the destination now generally acknowledged as being desirable by both the Government and the business community.

Although the prices of industrial shares have declined and are today about 17,5 per cent, on average, below their peak, they have not fallen quite to the extent that might have been expected considering the level to which nominal interest rates have risen or to which the gold price has fallen. In historical terms both the rise in interest rates and the fall in the gold price (two events not unrelated to one another), have been extraordinary and will inevitably have, in time, a material impact on the real economy. It is that impact to which Dr De Kock has referred. Clearly,

Die Beleggingsnavorsers Tydskrif

Negentiende uitgawe

Mei 1982

*"Ons is vasberade om die beleid van 'konsolidasie en aanpassing' tot die logiese afloop daarvan deur te voer. Dit beteken dat streng beheer oor staatsbesteding, banklikwiditeit en die geldvoorraad uitgeoefen sal moet word. Dit beteken ook dat finansiële markte toegelaat sal moet word om nog meer gespanne te word as dit nodig is en om **realisties*** rentekoerse te aanvaar. Die laer gemiddelde goudprys en ... ander nadelige eksterne ontwikkelings ... is lewensfeite wat nie verontagsaam of deur geldskepping of fiskale manipulasie geneutraliseer kan word nie. Ons kan redeneer oor die toepaslike **aanpassingsmetodes**, en hulle onderskeie koste en voordele teen mekaar opweeg. Maar die onafwendbaarheid van aanpassing moet aanvaar word."*

Dr Gerhard de Kock
President van die S.A. Reserwebank
9 Maart 1982

*Ons vetkursivering

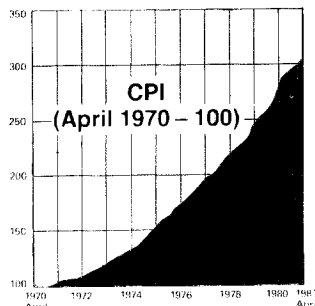
Die sleutelwoord in bostaande verklaring is "realisties". Vir rentekoerse om realisties te wees, moet dit polities aanvaarbaar wees, maar terselfdertyd kan dit nie realisties wees as dit nie ekonomies doeltreffend is nie. Het ons nou 'n rentekoersepeil in Suid-Afrika wat doeltreffend sal wees vir die bespoediging van die aanpassingsproses waarna dr De Kock verwys? Dit is nie 'n vraag wat 'n hoofartikel soos dié kan of moet poog om te beantwoord nie. Dit is voldoende om op te merk dat, hoewel korttermynrentekoerse in Suid-Afrika tans histories baie hoog is en nominaal gestel ook hoër is as korttermynrentekoerse in die VSA, Brittanje, Duitsland of Japan, dit nóg buitengewoon hoog nóg reël gesproke hoër is as die koerse in dié lande. Vir sover dit reële rentekoerse is wat die beweging van fisiese hulpmiddele reël, laat dit die twyfel ontstaan of ons rentekoerse inderdaad hoog genoeg is. Dit sal egter verkeerd wees om dogmaties te wees daaroor. Wat reël is in die sin van rendemente op beleggings moet uiteindelik afhang van wat met inflasie gebeur, en beleggingsbesluite staan dus noodwendig in verband met verwagtinge. Op slot van rekening is die rentekoers 'n prys, en vir enige prys om van die strydige magte van vraag en aanbod op doeltreffende wyse te balanseer, moet dit toegelaat word om sy eie plek te vind. Wanneer pryse van enige aard, maar veral rentekoerse, in dié verband nie doeltreffend is nie, is dit gewoonlik die geval omdat daar ingegryp is. Die verdienstelikheid van onlangse veranderinge in Suid-Afrikaanse finansiële markte is dat dit ons verder gevoer het op die pad weg van regulering, hoewel nog nie ver genoeg om die bestemming te bereik wat nou alom deur die Regering sowel as die sakegemeenskap as wenslik erken word nie.

Hoewel die pryse van nywerheidsaandele gedaal het en vandag gemiddeld ongeveer 17,5 persent laer as hulle hoogtepunt is, het hulle nie heeltemal soveel gedaal as wat verwag kon word as die peil waartoe nominale rentekoerse gestyg het of waartoe die goudprys gedaal het in ag geneem word nie. Histories gesproke was die styging in rentekoerse sowel as die daling in die goudprys (twee



INFLATION

The cancer and the cure



The graph illustrates the escalation in the cost of living since 1970 as measured by the S.A. Consumer Price Index.

	PRICE 1970	PRICE 1981	PRICE 1991
Litre of petrol	9,2c	61,0c	?
Small car	R2 315	R7 795	?
Loaf of bread	9,4c	31,0c	?
Carton of milk	17,0c	55,0c	?

Examples of the alarming rate at which the purchasing power of money has reduced.

Assuming	1981	1986	1991
7½% pa	R10 000	R6 966	R4 852
10% pa	R10 000	R6 209	R3 855
12½% pa	R10 000	R5 549	R3 079

The purchasing power of R10 000 will reduce as above, assuming various rates of inflation.

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what concerns him is that the level of economic activity in the domestic economy should be brought more into line with the level of economic activity in the world economy so as to avoid an aggravation of the country's already serious balance of payments problem. It is evident that the adjustment process is taking time, perhaps more time than is desirable, and has been delayed in part by the action the Reserve Bank has itself taken to ease the cash shortage that the external deficit has caused. Public officials, like Dr De Kock, cannot escape the political pressures that in any democratic country are brought to bear in the formulation of policy. Even in the US, where the Federal Reserve Board enjoys a greater degree of independence than does our Reserve Bank, that is so. They cannot, therefore, enjoy compromising what they know needs to be done when compromising may put at risk the attainment of objectives their office demands that they commit themselves to publically and unambiguously. It is a sad fact, but one for which Dr De Kock cannot be held personally responsible, that his term of office as Governor has coincided with one of the largest ever increases in the country's money supply and the largest ever decline in the external value of the rand. Who can doubt that in time this will feed back, and in an adverse way, to affect the rand's internal value. Inflation in South Africa is currently in excess of 15 per cent, and rising. In the US, West Germany and Japan it is closer to 5 per cent, and falling. Such a disparity in rates cannot persist for long without something happening. We have here all the unfortunate ingredients of a circle which is not only vicious but also unrelenting.

Our comments concerning the general desirability of a free determination of prices, particularly of interest rates and exchange rates, should not be read to mean that all attempts at macro-economic stabilization must needs be misguided. No doubt those occasions exist where changes of policy are necessary in order to alter the direction in which normal competitive forces are pushing the economy. However, given intervention, the onus must rest on governments to show that it has indeed been beneficial. There is a growing body of opinion in the US and Britain that intervention in these two countries in the post-war period has not been promoting of real growth in the long run but instead has directly contributed to the enigmatic coincidence of rising unemployment and inflation. If financial markets are efficient, as much of the evidence suggests, interventionist policies can never really succeed because the monetary and fiscal authorities do not have better information about the future than do private sector agents and cannot, therefore, prevent policy actions being anticipated and their effects neutralised. The corollary of this must be that it is only in a world of inefficient markets that such policies can be justified. Official efforts, thus, might better be spent promoting efficiency especially through the removal of controls, the encouragement of competition and the provision of information (including information about policy objectives and the means intended to be employed in their realisation), that such efficiency requires. Unfortunately, one of the factors which has worked against the efficient adjustment of the South African economy to a changed external situation over the past 15 to 18 months has been public confusion about official policy. While some of the actions of the authorities (e.g. encouraging off-shore borrowing, financing the public sector via Reserve Bank credit and devaluing the rand) have been easing of the liquidity shortage and encouraging of the business community, other actions (e.g. restricting current departmental spending, increasing taxes and raising interest rates) have been discouraging. Oscillation between conflicting policy actions is not helpful to public

gebeure wat nie onverwant is nie) buitengewoon en sal dit onvermydelik mettertyd 'n wesentlike impak op die reële ekonomie hê. Dit is dié impak waarna dr De Kock verwys het. Dit is duidelik dat hy besorg is oor die feit dat die peil van ekonomiese bedrywigheid in die binnelandse ekonomie in nouer ooreenstemming gebring moet word met die peil van ekonomiese bedrywigheid in die wêreld ekonomie om 'n verergering van die land se reeds ernstige getalingsbalansprobleem te vermy. Die aanpassingsproses duur klaarblyklik lank, miskien langer as wat wenslik is, en is gedeeltelik vertraag deur die stappe wat die Reserwebank self gedoen het om die kontanttekort wat die buitelandse tekort meegebring het te verlig. Owerheidsamptenare, soos dr De Kock, kan nie die politieke druk vryspring wat in enige demokratiese land op beleidsformulering uitgeoefen word nie. Selfs in die VSA, waar die Federale Reserwebank 'n groter mate van onafhanklikheid as ons Reserwebank geniet, is dit die geval. Hulle kan dus nie die maklike uitweg van 'n kompromis kies nie, want dit kan die doelstellings waartoe hulle uit hoofde van hulle amp openlik en onomwonde verbonde is in gevaar stel. Dit is 'n ongelukkige feit, maar een waarvoor dr De Kock nie persoonlik verantwoordelik gehou kan word nie, dat sy ampstermyn as President saamgeval het met een van die grootste toenames ooit in die land se geldvoorraad en die grootste afname ooit in die buitewaarde van die rand. Niemand kan daaraan twyfel dat dit mettertyd 'n terugwerkende uitwerking op die binnewaarde van die rand sal hê nie, en wel op nadelige wyse. Inflasie in Suid-Afrika is tans meer as 15 persent, en dit styg steeds. In die VSA, Wes-Duitsland en Japan is dit nader aan 5 persent, en dit neem af. Dié verskil in koerse kan nie lank voortduur sonder dat iets gebeur nie. Ons het hier al die ongelukkige bestanddele van 'n kringloop wat nie net boos is nie, maar ook onverbidlik.

Ons opmerkings met betrekking tot die algemene wenslikheid van 'n vrye prysvasstelling, veral ten opsigte van rentekoerse en wisselkoerse, moet nie vertolk word as 'n uitspraak dat alle pogings om makro-ekonomiese stabiliteit te bewerkstellig noodwendig ombesone is nie. Daar bestaan ongetwyfeld wel geleenthede waar beleidsveranderinge nodig is om die rigting te wysig waarin normale mededingende magte die ekonomie dwing. As daar wel ingegryp word, moet die onus egter op regerings berus om aan te toon dat dit inderdaad voordelig was. In die VSA en Brittanje word die mening al hoe meer gehuldig dat ingryping in dié twee lande in die naoorlogse tydperk nie op die lang duur reële groei bevorder het nie, maar in plaas daarvan regstreeks bygedra het tot die raaiselagtige sameval van toenemende werkloosheid en stygende inflasie. As finansiële markte doeltreffend is, soos baie van die bewyse ook aandui, kan 'n beleid van ingryping nooit werklik slaag nie omdat die monetêre en belastingowerheid nie oor beter toekomsinligting as die privaatsektoragente beskik nie en dus nie kan voorkom dat beleidsoptrede voorsien en die uitwerkings daarvan geneutraliseer word nie. Die logiese afleiding is dat dit net in 'n wêreld van ondoeltreffende markte is dat dié soort beleid geregverdig kan word. Pogings van ampsweë moet dus eerder ingestel wees op die bevordering van doeltreffendheid, veral deur middel van die verwydering van beheer, die aanmoediging van mededinging en die verstrekking van inligting (met inbegrip van inligting oor beleidsdoelstellings en die middele wat aangewend gaan word om dit te realiseer), wat noodsaaklik is vir doeltreffendheid. Ongelukkig is een van die faktore wat die doeltreffende aanpassing van die Suid-Afrikaanse ekonomie by 'n veranderde buitelandse situasie oor die afgelope 15 tot 18 maande teëgewerk het, verwarring by die publiek aangaande amptelike beleid. Hoewel sommige

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understanding or persuasive that the authorities know their own mind but suggestive rather of fine tuning techniques which elsewhere have been fairly thoroughly discredited.

The editor

van die owerheidstappe (bv. die aanmoediging van aflandige lening, die finansiering van die owerheidsektor deur middel van Reserwebankkrediet en die devaluasie van die rand) die verligting van die likwiditeitskort en die aansporing van die sakegemeenskap was, was ander stappe (bv. die inperking van huidige departementele besteding en die verhoging van belastings en rentekoerse) ontmoedigend. Weifeling tussen strydige beleidstappe gaan nie begrip aan die kant van die publiek bevorder nie en ook nie die publiek oorreed dat die owerheid doelgerig optree nie, maar skep eerder die indruk van fyn verstellingstegnieke wat elders geheel en al in onguns geraak het.

Die redakteur



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An eclectic role for monetary policy

The report of the De Kock Commission which is due to be published this year is expected to contain important recommendations on the use of monetary policy in South Africa. It accordingly seems appropriate at this stage to take a look at the role which mainstream economic theory currently assigns to monetary policy in general economic stabilisation policy.

In order to assign any role to monetary policy at all, it is necessary to accept (a) that if the business cycle is allowed to take its course, booms and slumps might well develop, which would inflict considerable damage to economic growth and employment in the medium to longer run; and (b) that it is accordingly desirable as well as possible to smooth out the business cycle by applying deliberate stabilisation measures. It follows from this that monetary policy should always be contra-cyclical, i.e. it should attempt to prevent booms and slumps from developing, otherwise monetary control measures would serve no purpose and, in fact, would accentuate the business cycle swings and destabilise rather than stabilise economic activity.

The monetarist view

The next question to decide is whether it is possible to apply a contra-cyclical monetary policy in practice. It is not always easy to recognise the particular stage to which the business cycle has progressed. There are also time lags between recognising the need for policy action and the subsequent implementation and impact of the appropriate monetary control measures. In fact, monetarist economists like Milton Friedman believe that the problems surrounding these time lags are so difficult to overcome that any deliberate monetary action taken is more likely to accentuate rather than smooth out the business cycle upswings and downswings. Friedman accordingly recommends that the money supply should be expanded at a pre-determined constant rate, just sufficient to finance the potential growth of output in the economy so as to avoid inflation.

Friedman's constant money 'rule', however, also has serious drawbacks. In the first place, it is virtually impossible in practice for the central bank to control the cash base and with this the cash/credit multiplier of the banking system sufficiently closely to maintain a constant rate of increase in the money supply over the business cycle. The cash base of the banking system is subject to considerable fluctuations under the impact of balance of payments movements and the financing operations of the Treasury, both of which cannot be accurately calculated or foreseen. The banks themselves can change the size of the cash/credit multiplier by inducing the public to change the proportion of its total cash holdings that it places on deposit with them or by increasing or reducing the excess cash and liquid asset reserves that they maintain. Furthermore, the central bank often has to provide the banks with additional cash as lender of last resort, a function which it is fundamental for a central bank to fulfil if good order is to prevail in the financial markets and if the banks are to be able to use their own cash resources flexibly and efficiently.

In the second place, the central bank's control over economic activity and over the price level through control

over the cash base of the banking system is further weakened by the fact that the velocity of circulation of money is not constant. On the contrary, as can be seen from the accompanying graph, the velocity of circulation of money fluctuates from one year to the next, normally changing to offset to a significant extent changes in the actual stock of money.

Thus, a central bank is likely to find it very difficult (particularly in an 'open' economy like South Africa) to maintain sufficiently close control over the cash base of the banking system to keep to a pre-determined constant or target rate of money growth. Moreover, each time such a monetary target is not met, there is likely to be an unfavourable reaction on the part of the financial markets, which would not only destabilise the economy but would also make it even more difficult to keep to a pre-determined monetary rule in the future.

As previously indicated, the central bank or monetary authority also has no close control over the velocity of circulation of money. This means, in turn, that changes in the velocity of money circulation can unduly undermine the influence which the monetary authority might seek to exercise over the price level or the level of economic activity generally through changes in the actual money stock.

All this does not mean that the money supply is entirely beyond control by the monetary authority. It does mean, however, that such control cannot be absolute, as compliance with a pre-determined money growth target would probably require. It also means it must be accepted that under the present-day system, where the greater part of the money supply consists of credit created by private banks against a cash base not amenable to absolute control by the central bank, the money supply possesses a considerable degree of flexibility. In other words, the money supply is to a significant extent endogenous to the economic system over the period of the business cycle which matters for stabilisation policy, i.e. the money supply is responsive to the demand for it which, in turn, is governed by the need to finance the total spending decisions in the economy.

The post-Keynesian view

Even Friedman, of course, accepts that there is a need to have a money supply which is responsive to expenditure decisions, at least to an extent sufficient to finance the growth in output and employment which the economy is potentially capable of achieving. The problem with a pre-determined constant or money growth target as recommended by Friedman is, however, that this by implication assumes that the central bank or monetary authority is in a position to decide or to determine what growth rate and employment level the economy is, in fact, capable of achieving. This is virtually an impossible task, especially as the structure and the entire fabric of the economy are constantly changing under the impact of such factors as innovation, changing demands and unforeseen internal as well as external shocks intermittently hitting all economies.

The post-Keynesian mainstream economic approach, on the other hand, is to allow market forces and the evolution of the business cycle to push along growth and



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employment levels and rather to put on the monetary brakes once there are signs (such as rising interest rates, a depreciation of the exchange rate and increasing deficits on current account of the balance of payments) that the economy is starting to overheat. Such a policy of putting on the monetary brakes in good time also requires considerable skill and judgment on the part of the monetary authority but almost certainly less so than would be required by a policy of deciding on an appropriate growth rate in advance, in the face of constant shifts in demand/supply relationships in the economy. Any mistakes in this respect would unnecessarily put the economy in a monetary 'straitjacket' which would be particularly detrimental to the important process of innovation that has to be financed by new bank credit to a significant extent.

Integration of monetary and fiscal policy

The majority of economists would probably agree that monetary control measures cannot by themselves effectively smooth out the business cycle or, for that matter, maintain price stability and that for this to happen monetary control measures need to be integrated with fiscal policy, i.e. with the tax and expenditure decisions of government.

In the latest edition of his famous economics textbook, the American economist, Samuelson, remarks as follows in this respect¹: the way we tend to run the modern economy is almost a prescription for a low investment, high consumption economy. Monetary and fiscal policy do interact, but they are not co-ordinated. Our system tends to rely on the central bank to fight inflation, raising interest rates when the economy overheats and thereby clamping down on investment spending for equipment, plant, inventory and housing.

Politically, the fiscal budget tends to be used to fight against unemployment and low growth. When production languishes, we vote tax cuts to boost incomes and so consumption spending. We vote public works, transfer assistance and other deficit financed programmes to stimulate the economy, thereby raising the consumption plus government expenditure total of GNP. The result of such a policy mix is to keep the investment expenditure component of GDP low and the consumption and government spending component high.

Samuelson goes on to say that for 25 years he himself and economists like James Tobin of Yale University (winner of the Nobel Prize for Economics for 1981) have urged the following rationale in order to promote the capital formation needed if real wages are to grow faster and living standards are to be improved:

*"Over the business cycle as a whole, tax and spend to run budget surpluses (or lean deficits). But, ensuring that this does not depress the economy and hurt job opportunity, let the Fed offset fiscal tightness with monetary policy that keeps down the interest cost of investment and facilitates the availability of capital funds."*²

Thus, Samuelson, and with him probably the majority of mainstream post-Keynesian economists, assigns to fiscal policy the principal stabilising role. This is in recognition of the fact that over the course of the business cycle, the supply of money is not under the absolute control of the central bank and that it tends to respond to the demand for it through changes in the velocity of circulation of money and as the banking system changes the money stock itself by creating more or less credit to finance changes in output and employment and in wages and prices in the real sphere of the economy.

In other words, unlike the monetarist school of economists who tend to relate changes in the level of output, employment and prices to prior changes in the supply of the stock of money in the narrow sense, post-Keynesian economists take a wider view of the matter, relating changes in output, employment and prices to changes in total money expenditures in the economy which, of course, generate and are equal to total money incomes.

Mainstream propositions

From the point of view of what should be an appropriate stabilisation policy mix, it is important to note that the post-Keynesian mainstream approach specifically allows for the following possibilities:

- (i) There can be a simultaneous increase (at least to quite a significant extent) in output and employment as well as in prices and wages without a prior increase in the supply of the actual money stock, because a change in the velocity of money circulation can accommodate such increases. In fact, it can be seen that an increase in interest rates is the only ultimate check on the extent to which changes in the velocity of money circulation or, for that matter, increases in bank credit can accommodate increases in total money expenditures in the economy.
 - (ii) Prices and wages can also increase without an increase in the money supply since output and employment can be reduced. This makes it possible in particular for inflation to continue, at least for quite some time, with output and employment being cut back rather than wages and prices in response to cutbacks in the money supply through monetary control measures.
 - (iii) Given flexibility in the supply of and velocity of circulation of money, additional money claims in the form of wage and price (or profit) increases can be readily created which bear no close relationship to increases in physical output or productivity. This means that excessive total monetary demand relative to the supply of physical national product which can be produced with the available capital and labour resources can also come about as a result of simultaneous wage and price increases and need not necessarily be the result of prior increases in the money supply. In fact, in the process of wage and price negotiations, both wages and prices are to a considerable extent set without direct or prior reference to whether or not the necessary finance will be available to support such increases. This is particularly true of prices and wages in the public sector. The same position applies, however, to large producers and employers in the private sector who naturally assume that their banks will be prepared and able to finance such increases in their working capital requirements. Thus, given a significant degree of flexibility in the money supply in the short period, excessive wage and price increases are to a considerable extent validated, after the event.
- Furthermore, experience clearly shows that once wage and price increases have reached the self-propelling stage, monetary policy can only enforce and restore the necessary discipline at considerable cost to growth and employment. These costs are normally not socially or politically acceptable, which means that monetary controls are almost invariably relaxed or abandoned prematurely. And as soon as

⁽¹⁾Economics, Eleventh Edition, 1980, by Paul A. Samuelson, p. 341.

⁽²⁾Op cit., p. 341.

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this happens, then a process of catching up inevitably starts, as both employers and employees make attempts to recoup what they regard as ground lost during the period of monetary restraint and recession.

In other words, in the end, the monetary authorities, too, are normally forced to validate the wage and price increases on which the community insists; and then the sacrifices imposed by monetary policy in terms of growth and employment lost have been in vain.

The basic reason for the excessive monetary demand created through simultaneous wage and price increases is the struggle for the distribution of the total national product in the modern economy. This, in turn, is probably mainly the result of the communications revolution together with the spread of education.

It is worth noting that there is basically no difference between this type of excessive demand (and the wage and cost or price 'push' inflation arising from this) and the excess demand and inflation which are typically generated during the upswing of the business cycle, as the supply of resources becomes limited and factor of production prices are bid up. It is true that both types of excessive demand can only eventuate if there is an accommodating increase in the supply of money and credit or an increase in the velocity of circulation of money (or, of course, a reduction in output and employment levels). The availability of finance in the economy, however, does possess this flexibility.

Perhaps it should also be noted that, as prices are incomes, a general increase in prices must always be matched by an equivalent simultaneous increase in total money incomes. However, wages and profits (i.e. the two main categories of incomes) need not go up to the same extent, in which case the 'surplus' units in the economy will have to lend their surpluses to the 'deficit' units or the banks will have to create credit, otherwise the goods and services cannot be purchased at the higher prices. Thus, wage and price 'push' inflation leads to and is probably ultimately constrained by an ever-large burden of debt in the economy.

- (iv) Keynesian mainstream economists have long maintained that an increase in the money supply need not always be inflationary, i.e. that while there are still idle resources of capital and labour available in the economy, an increase in the money supply might well reflect increases in output and employment rather than in prices. On the other hand, given the prevailing struggle for income distribution and the way in which prices and wages are formed, a reduction in the money supply will almost invariably lead to a reduction of output and employment in the first place and only as a result of such a depression of output and employment can an eventual abatement of price and wage increases be expected.

An eclectic role for monetary policy

The foregoing analysis suggests that monetary policy should play the following rôle in the 'mix' of policy measures used to smooth out the business cycle.

As economic activity is usually related to or the result of spending or savings decisions, the basic guide for economic stabilisation policy decisions should be the evolution of total monetary spending or demand, as measured, say, by the Gross Domestic Product at constant prices, at any particular point in time. It seems that what ultimately counts is a proper balance between total monetary demand and total physical supply, so as to maintain the latter in the region of full employment output.

The degree of balance between these two quantities prevailing at any particular point in time can be readily gauged by the economic policy-makers from such specific indicators of pressure in the economy as the movement in interest rates, the situation on current account of the balance of payments and trends in the exchange rate.

Fundamental to a post-Keynesian contra-cyclical stabilisation policy is the government's fiscal policy. This is in line with the thinking that changes in the level of government expenditure (which usually makes up a substantial part of total expenditure in the modern economy) and in taxation have a much more direct bearing on output and employment levels than changes in the money supply. As pointed out earlier, money supply changes in any event only ultimately affect output and employment through changes in interest rates, to which economic agents are not always very responsive.

It is not easy to change the thrust of government expenditure in the short run and, hence, changes in the level of taxation will have to serve as the main weapon to produce a contra-cyclical Budget, as is required to smooth out the business cycle. Government tax collections tend to accelerate and decelerate with the upswings and downswings of the business cycle, while social security payments move contra-cyclically. This acts as a 'built-in' stabiliser. For the greater part, however, tax increases and tax cuts should be used to run a budget deficit during the business cycle downswing and a budget surplus during the upswing. Such a proper contra-cyclical tax policy should by itself go a long way to achieve a smoother business cycle.

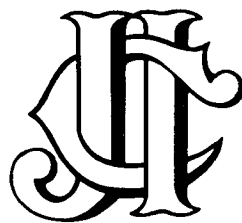
The task of monetary policy should then be to supplement and to reinforce a contra-cyclical fiscal policy. In other words, if the business cycle upswing should be so strong that the economy is still overheating even though the Treasury is running a surplus, then the central bank should additionally tighten the money supply and so interest rates. Similarly, the central bank should reinforce the expansionary effects of budget deficits when a severe recession is to be fought by relaxing the money supply and lowering interest rates. Thus, the task of monetary policy should basically be to match the supply of money forthcoming from the banking system to the demand for it emanating from the economy so as to produce a level of interest rates which will help fiscal policy to maintain total monetary demand in the economy at a level which is neither unduly excessive (inflationary) or unduly deflationary relative to the output and employment potential of the economy.

With fiscal policy performing the main stabilising role, the adverse interest rate impact on employment and growth connected with monetary policy and commented on by Samuelson in the above quotation can be largely avoided. There will still be times when interest rates will have to go up quite substantially to reduce excess demand. But such increases in rates will be much more moderate (and hence less hurtful to growth and employment) than would be the case if monetary policy has to shoulder the entire burden of stabilisation policy.

Perhaps the majority of economists writing in the 1980's agree that monetary policy should be used in such an eclectic role. Instead, as Samuelson has pointed out, it tends to be used to fight inflation. Indeed, instead of being integrated with fiscal policy, monetary policy is often used to counteract the inflationary consequences of excessive government expenditure or of the excessive money claims created through increases in prices and wages administered by government or of politically motivated tax reductions.



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Used by itself, monetary policy will almost certainly do more harm than good. The impact of monetary restrictions and the accompanying high interest rates are at the best of times discriminatory and disproportionate as far as the various classes of economic agents in the private sector of the economy are concerned. But the unco-ordinated use of monetary restrictions to combat modern-day wage and price inflation in particular can only hurt investment, employment and growth in the private sector which, unlike the government and its agencies, bear the full impact of such high interest rates.

Indeed, the costs which high interest rates, associated with a restrictive monetary policy, can impose on business firms and producers in the private sector can be very substantial, especially if monetary and fiscal policies are pulling in opposite directions. This can be seen from the prevailing experience in the United States and in Britain, where monetary controls are currently depressing both private sector growth and government tax revenues, while the thrust of fiscal policy is expansionary. This tends to raise rather than reduce government borrowing requirement, thereby shifting still more resources to the public sector and negating the favourable effects on growth and productivity which the policy-makers are endeavouring to achieve on the supply side of the economy through tax cuts. In this respect, Richard Coghlan recently pointed out in an article in 'The Banker' that over the short to medium term, monetary policy has important supply side implications and that low interest rates are likely to make a greater contribution to the supply side of the economy than would a general cut in marginal personal tax rates.³

Thus, economic policy-makers ignore at their peril Samuelson's dictum that wherever possible monetary policy should aim at keeping down rather than raise the interest cost of investment and of facilities. After all, society cannot produce or, for that matter, save for a higher investment and growth in the future, if it does not invest in the current period.

The third leg of policy

Unfortunately, even an integrated fiscal and monetary policy conducted along the lines suggested by Samuelson cannot cope adequately with excessive monetary demand and the associated inflation generated by simultaneous wage and price increases stemming from the struggle for the distribution of the national income. It is true that a properly integrated contra-cyclical monetary and fiscal policy will go a long way to keep down even this wage and price 'push' inflation. Nevertheless, wage and price 'push' inflation might well continue at an excessive rate, especially once it has reached a highly visible level, despite the application of a proper contra-cyclical monetary and fiscal policy.

It is, of course, always possible to push down inflation by depressing growth and employment by means of a tight monetary and fiscal policy. The cost of such a policy is, however, likely to be high. Moreover, this is unlikely to provide a permanent solution to the problem of 'push' inflation, as both employers and employees are likely to engage in a process of catching up (in order to recoup profits and incomes lost during the recession) once the economy starts growing again. In other words, the process of 'push' inflation will be resumed once the economy commences to expand again and the fiscal and monetary authorities will have to validate such inflation, otherwise a return to the economy's potential growth rate cannot be accomplished.

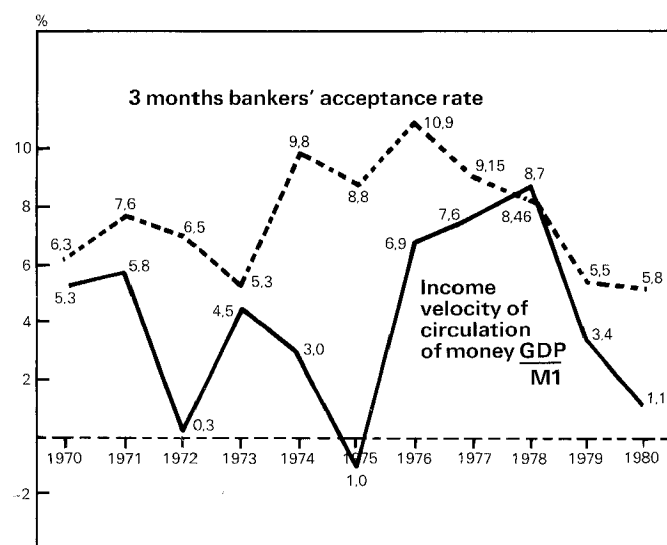
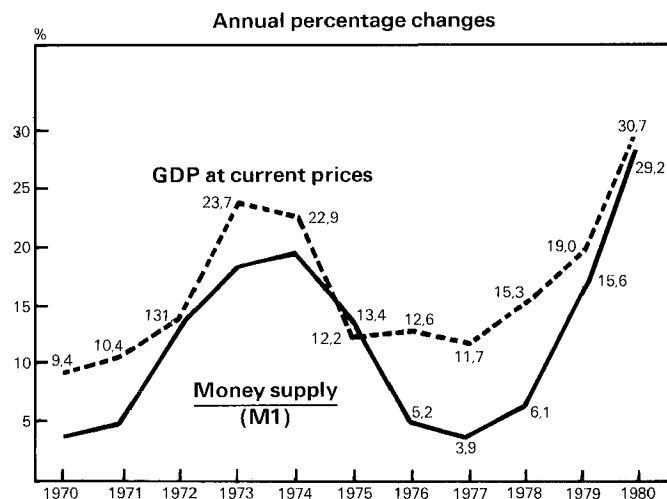
The only way in which this type of inflation can be permanently overcome is to somehow induce or persuade

the large monopolistic or oligopolistic employers and the large groups of workers not to indulge in the excessive creation of money claims against the available national product in the process of negotiating wage increases and setting prices.

Samuelson admits that economic stabilisation policy requires a third leg if price stability is to be achieved simultaneously with a satisfactory rate of growth and employment. He summarises the position in this respect as follows:

"An 'incomes policy' is needed to supplement fiscal and monetary policy – in order to give the mixed economy a better long-run Phillips curve or natural rate. But it remains an unsolved problem of modern economics to get experts to agree on an incomes policy.

*Benign neglect, governmental guideposts (voluntary or quasi-voluntary), direct wage-price controls, centralized collective bargaining, a stop-go driving of the economy to cool it down, labor retraining programs to lower the natural level and range of structural unemployment – all these need study to retain the humane qualities of the modern order while achieving efficiency and stability."*⁴



⁽³⁾Richard Coghlan, "The supply side of fiscal and monetary policy", 'The Banker', November 1981.

⁽⁴⁾Economics, Eleventh Edition, 1980, by Paul A. Samuelson, p. 781/2.



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Note

The graph shows that over the complete business cycle 1971/74, Gross Domestic Product in South Africa at current prices went up at an average annual rate of 17,5 per cent, made possible by an average annual increase in the money supply of 13,8 per cent and an increase in the velocity of circulation of money of 3,4 per cent. Over the 1975/80 business cycle, GDP increased at a somewhat lower average annual rate of 16,9 per cent. The average annual increase of the money supply over this business cycle, at 12,2 per cent, was also somewhat lower than over the previous cycle, while the increase in the velocity of circulation was significantly higher at 4,5 per cent. In line with the higher average increase in the latter, the average bankers' acceptance rate (at 8,0 per cent) over the 1975/80 business cycle was also higher than that of 7,3 per cent recorded during the 1971/74 cycle.

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Trading in low priced shares: An empirical investigation 1968-1979

INTRODUCTION

Many investors appear to have an aversion to investing in stock market securities having very low prices. This stems from a fear that such shares are extremely risky which might result in insolvency of the company concerned and the investor's loss of his entire capital.

There appears to be little in the way of empirical research to evaluate this policy of avoiding low-priced shares. Accordingly, this paper presents an initial look at the effects of investing in low-priced shares. If nothing more, it should give an impression of the results which may be achieved by following an investment criterion of buying all quoted low-priced shares.

APPROACH EMPLOYED

Firstly, consider the expression 'low-priced share'. Clearly, the cut-off price below which a share will be classified as 'low-priced' must be defined. It is equally clear that this is a subjective decision and that different investors will have different concepts of what constitutes 'low-priced'. For the purposes of this report, 30 cents was chosen as the cut-off point. It was found that by choosing 30 cents as the cut-off point a set of shares of workable size (less than 50 in most years) was obtained. Secondly, a portfolio strategy had to be defined; that is how the shares below 30 cents should be included in the portfolio. In order to avoid the problem of selecting a portfolio of a few shares from all those under 30 cents it was decided to include *all* shares below 30 cents. Two obvious portfolio strategies are available and each was examined.

- (i) Invest equal rand amounts in each share.
- (ii) Purchase an equal number of shares in each company.

For both of these strategies a certain number of each share priced under 30 cents at the start of each calendar year would be purchased and the entire portfolio would be sold at the end of the year.

Finally, separate computations were performed for those shares priced at below 20 cents and for those between 20 and 29 cents at the start of each year. The results of each of these sets were compared with one another and with the combined set of all shares under 30 cents.

THE DATA SET

The period examined stretched from January 1968 to December 1979. Data was obtained on all shares priced below 30 cents on the first day of each year in that period.² For each share the opening price, closing price,

and dividend paid were recorded. The return for each share was then computed using the formula

$$R_t = \frac{P_t - P_{t-1} + D_t}{P_{t-1}}$$

- where
- R_t is the return on the share in year t
 - P_t is the price of the share at the end of year t
 - P_{t-1} is the price of the share at the beginning of year t
 - D_t is the total dividend paid during year t .

It should be noted that on some occasions shares 'disappeared' during the course of a year due to insolvencies, takeovers, delistings etcetera. The reason for each share's 'disappearance' was investigated and, where possible, an appropriate adjustment was made. One particular problem encountered was where shares were de-listed by The Johannesburg Stock Exchange but did not go insolvent. Due to the difficulty of establishing the year-end value of such shares their closing price was assumed to be nil. Thus the results presented below are somewhat conservative. In a few other cases it was necessary to work through a maze of name changes, stock splits etcetera in order to arrive at the year-end value.^{3,4}

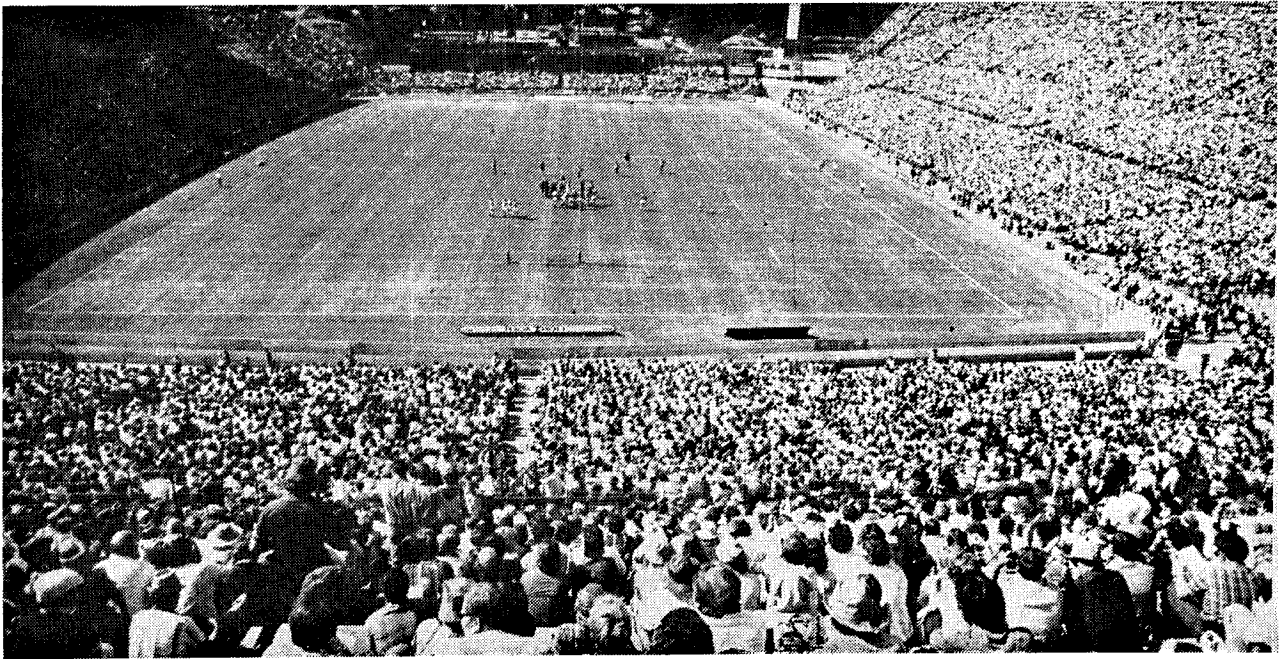
Nevertheless, despite all attempts to trace all 'disappearances', in the case of six shares a final year-end value could not be obtained in such a way as to give a meaningful estimate of the final price. As a result, these six shares were omitted from the study.

Finally, it must be noted that this study considered only ordinary shares in the listed companies. Other securities, for example options, debentures, preference shares and letters of allocation, were not considered.

EMPIRICAL RESULTS

As mentioned above, two portfolios were chosen for each year and the performance of each selection strategy was evaluated. The 'equal rand amount' portfolios were evaluated by taking an arithmetic average of the returns on each share in the portfolio. For the 'equal number of shares' portfolio the results were obtained by taking a weighted average (weighted by opening price) of all shares in the portfolio.

The results are presented in Table 1 below (in % return). It must be noted that brokerage was not taken into account in the computations leading to Table 1. However, an indication of the annual brokerage which would have been incurred is given (in parenthesis) in the heading of Table 1.



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Table 1

Year	0 – 19c (12%)			20 – 29c (7%)			Combined (9%)		
	Number of shares	Equal rand	Equal numbers	Number of shares	Equal rand	Equal numbers	Number of shares	Equal rand	Equal numbers
1968	19	92,93	128,98	13	109,91	118,59	32	99,83	123,20
1969	11	36,53	35,04	8	22,03	22,50	19	30,42	27,60
1970	7	-18,38	-16,49	9	-15,81	-13,65	16	-16,93	-14,51
1971	18	0,20	4,39	20	5,64	6,86	38	3,06	6,01
1972	19	118,88	130,12	23	57,53	54,13	42	85,28	77,82
1973	6	22,73	22,22	14	81,89	69,01	20	64,14	59,96
1974	5	9,27	7,58	7	79,24	86,57	12	50,09	71,89
1975	10	17,07	24,00	26	30,58	29,58	36	26,83	28,86
1976	12	-34,39	-27,37	23	-18,23	-17,61	35	-23,77	-19,74
1977	22	26,95	28,98	28	4,26	5,00	50	14,24	12,62
1978	31	64,19	52,06	36	56,70	59,54	67	60,17	57,04
1979	19	211,77	216,21	14	152,86	152,39	33	186,78	179,39

The significance of these results can perhaps be best illustrated by computing the capital that would have been available at the end of 1979 if an initial sum of R100 had been invested in January 1968. These results are presented in Table 2 for both of the selection strategies investigated.

However, for such figures to be meaningful in a practical sense brokerage must be considered. Accordingly, the results presented in Table 2 are based on the figures presented in Table 1 after adjusting the latter for brokerage and market securities tax.⁵

Table 2

Amount received in December 1979 from initial investment of R100 in January 1968

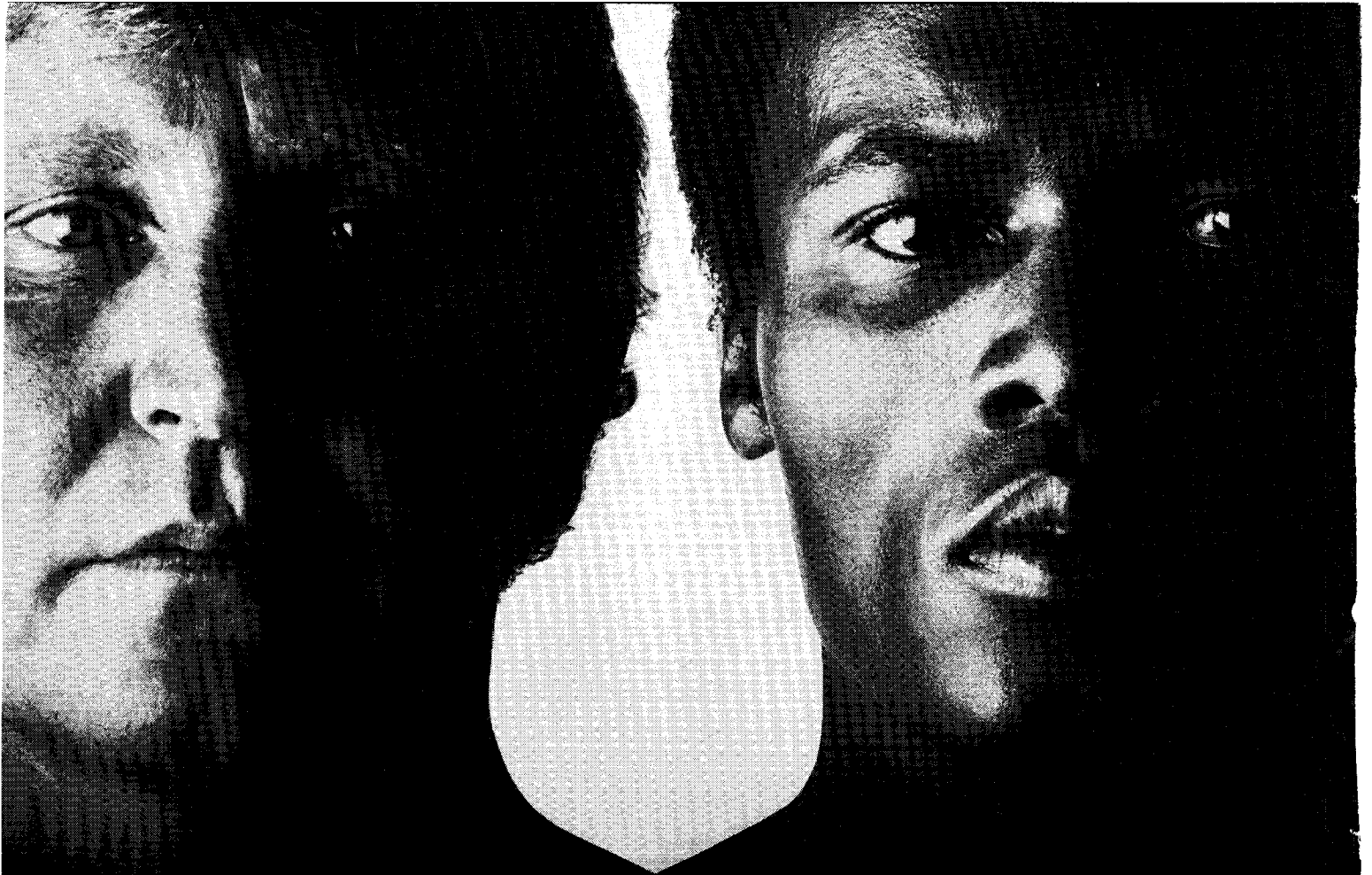
Strategy	Shares 0 – 19c	Shares 20 – 29c	Combined
Equal rand amounts	910,66	2 665,45	2 180,59
Equal numbers of shares	1 371,78	2 965,07	2 772,29

Examination of Table 2 reveals that all portfolio strategies would have yielded very substantial returns and that the best policy would, in retrospect, have been to buy equal numbers of all shares priced between 20 and 29 cents at the beginning of the year. In each case the equal numbers of shares strategy resulted in better performance than the equal rand amount strategy. However, the results are not markedly different and could be due to coincidence.

Preliminary examinations indicate that this strategy is highly satisfactory – perhaps startlingly so. However, in order to assess the results more meaningfully they should be contrasted with the results that would have been obtained with other possible strategies over the same period. This is done in the following sections.

COMPARISON WITH OTHER INVESTMENTS

Firstly, it is of interest to examine how the various portfolios selected compare with the stock market as a whole. Accordingly the returns which would have been obtained from investing in the market as a whole were computed. This was done by computing the returns on two of the JSE Actuaries indices.⁶ The indices used were the "All-Share" Index and the "Industrial and Financial" Index. The former was chosen as being representative of the market as a whole while the latter was chosen because the majority of shares priced below 30 cents fell into these two broad sectors of the market. The results obtained are presented in Table 3.



FINANCIAL STATEMENT

Turnover	R3 459 473 000
Group profit before taxation	R516 408 000
Group profit after taxation	R343 470 000
Group profit after taxation attributable to ordinary shareholders in Barlow Rand Limited	R221 855 000
Earnings per share before non-trading items	179,6 cents
Dividends per ordinary share	58,0 cents
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Number of shareholders	24 644
Number of employees — subsidiaries	114 292
— managed associates	77 403

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 - * To provide, where necessary, financial assistance for the education of our employees' dependants.
 - * To continue to finance the development of education and training institutions through our C.S. Barlow Foundation.
 - * To improve the quality of life of our people.
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Table 3 also represents the annual Internal Rate of Return (IRR) which would have resulted in the same return at the end of 1979 as that obtained by the strategies examined.

This was done for the combined case of all shares under 30 cents after allowing for transaction costs.

Table 3

Strategy	Amount of R100 Initial investment	IRR
Equal rand amounts	2 180,59	29,3%
Equal numbers of shares	2 772,29	31,9%
All share index	644,64	16,8%
Industrial and financial index	417,11	12,6%
Gold price (London Metal Exchange)	1 598,57	25,9%
Kruger Rands (JSE)	1 760,53	27,6%

The Internal Rate of Return enables comparison with any other fixed interest bearing securities. Table 3 thus clearly indicates the superiority of the 'low-priced share' investment strategies compared to:

- (i) Investment in the market as a whole;
- (ii) Investment in a building society (the rate of interest has never remotely approached these IRR's);
- (iii) Participating mortgage bonds (whose present rate is about 12,5%);

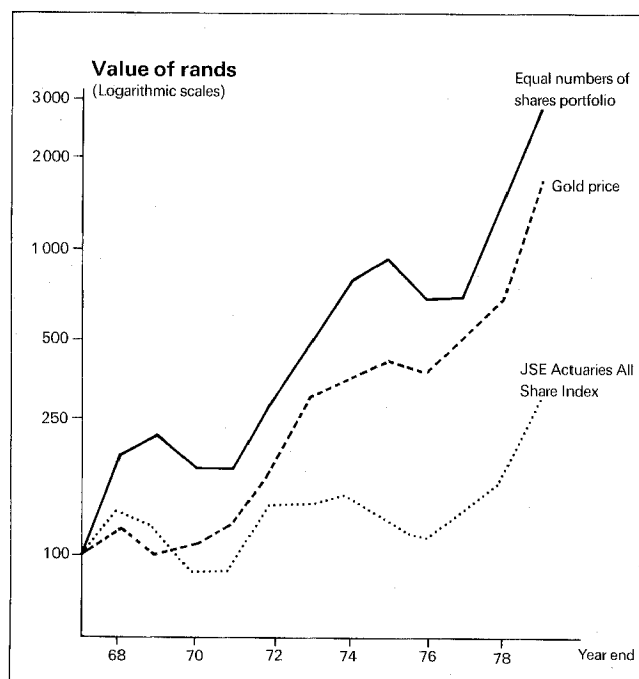
(iv) PO certificates (which bear 8% interest but are tax-free thus giving a maximum effective rate of the order of 16% per annum); and

(v) Most, if not all, other forms of investment (for example, Kruger Rands).

The behaviour of certain of the strategies over time is shown in Figure 1 below. This figure shows the accumulation over time of an initial investment of R100 on 31 December 1967 to 31 December 1979.

Figure 1

Accumulation of an initial investment of R100 on 31 December 1967



This figure together with Table 3 clearly indicates the potential benefits which can be derived from investing in low priced shares. It is extremely interesting to note the satisfactory performance relative to an investment in gold or in Kruger Rands. If anything the performance of the low priced shares is understated since brokerage was taken into account in the case of the share portfolio but not in the

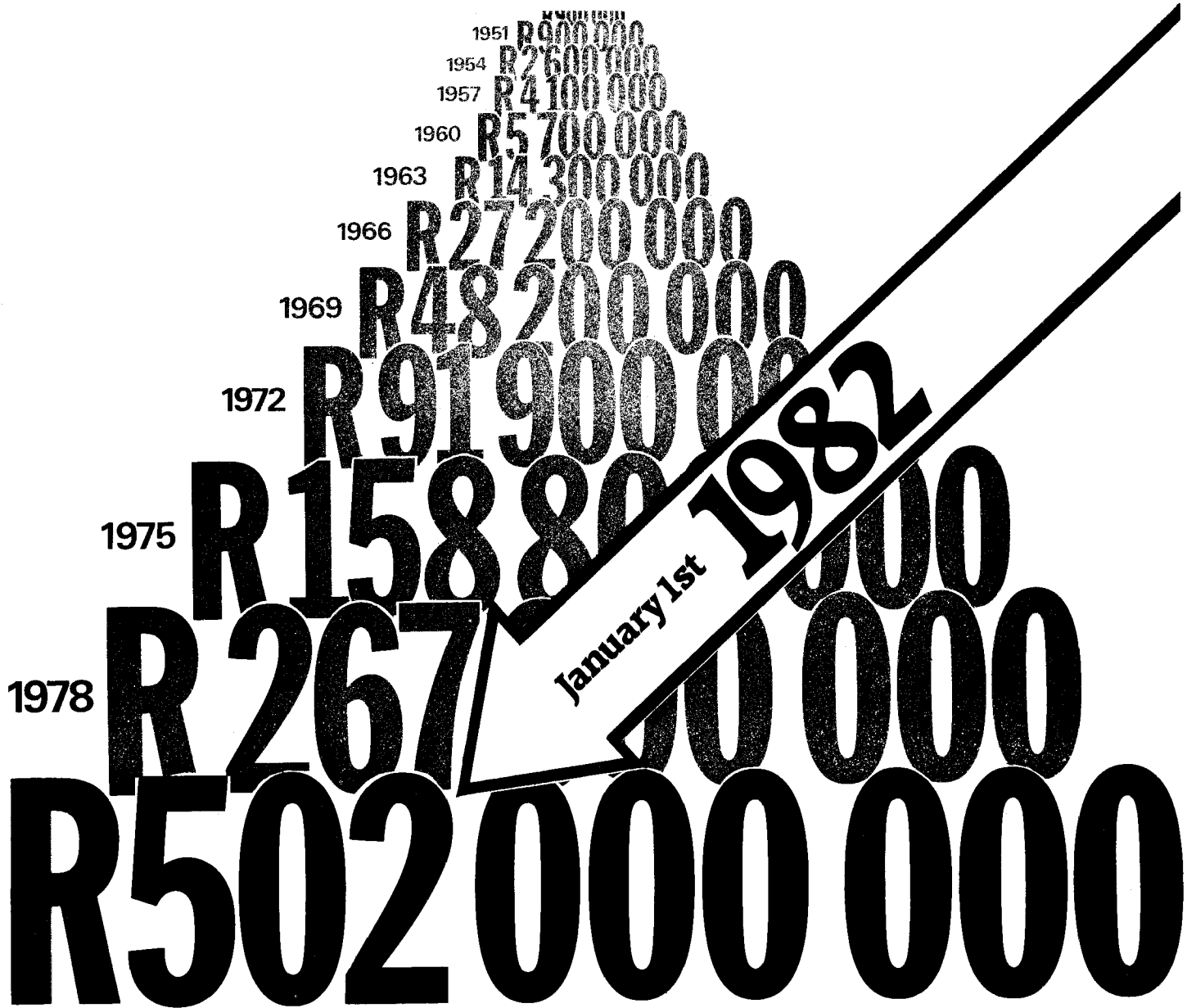
case of the gold prices, Kruger Rands, the All Share Index or the Industrial and Financial Index.

On this basis it might be claimed that the low-priced share portfolios outperform most other investments. Certainly this is true if the sole criterion is return. However, risk also plays an important role in the investment decision. It is fairly widely accepted that greater return can be achieved by accepting greater risks. Thus it could be argued that the apparently superior performance of the low-priced share portfolios occurs merely because they have far greater risk than, for example, the JSE Actuaries Indices. In fact, examination of the portfolios shows that the 'spectacular' results were achieved despite the fact that in almost each year some of the companies included in the portfolio went insolvent resulting in a 100% loss. But, such losses were more than offset by the occasional dramatic surges in other shares – such as that of Bristol Industries in 1968, whose price increased ten-fold in the year.

In order to take the risk factor into account it was decided to compute Sharpe's Reward-to-Variability Ratio.⁷ This ratio adjusts the expected return by dividing by the standard deviation of the return which is a measure of the riskiness of the investment. In the case of the low-priced share portfolio this ratio was computed by averaging the yearly return on the portfolio over the 12 years to get an average or expected return. The standard deviation was similarly computed using the 12 years data. Then the reward-to-variability ratio was calculated as:

$$RV = \frac{\text{Expected return}}{\text{Standard deviation}} \times 100$$

The results are presented in Table 4.



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Table 4
Sharpe's Reward-to-Variability Ratio

Strategy	Average return	Standard deviation	RV ratio
Equal rand amounts			
0 – 19c	33,65	68,23	49
20 – 29c	40,22	52,45	77
Combined	39,35	58,02	68
Equal numbers of shares			
0 – 19c	38,56	71,89	54
20 – 29c	41,60	53,49	78
Combined	41,85	57,84	72
All Shares Index	21,17	34,99	60
Industrial/Finance Index	17,77	35,55	50

Table 4 indicates that the 0 – 19 cent strategies do not perform as well as the JSE Actuaries All Share Index in terms of the RV ratio. However both the combined and the 20 – 29 cents groups do outperform this index in terms of Sharpe's RV ratio. Similar remarks also hold for the Industrial and Financial Index.

A further point to emerge from Table 4 is that the portfolios which contain only shares between 20 and 29 cents at the start of each year perform much better than those which include only shares in the 0 – 19 cent price range. The results are also better for this class than the 'combined' group but the difference in this case is not very marked.

Hence, Table 4 suggests that a good investment policy might be to purchase low-priced shares but avoid those with very low prices (in this case 0 – 19 cents) although a similar study investigating the omission of the 0 – 10 cent group only would be of interest. The reason for this is possibly the high transaction costs involved in the purchase and sale of extremely low-priced securities.

USE OF DIVIDEND INFORMATION

The proposed strategy of purchasing all low-priced securities can be modified in numerous ways so as to attempt to avoid purchasing shares of those companies which might go insolvent during the year. One way of achieving this is to purchase only those low-priced shares (under 30 cents) which paid a dividend in the preceding year. It might be argued that the payment of a dividend the previous year implies the company has better prospects of survival than if no dividend were paid.

In order to investigate this rule the study was repeated applying the new criterion for selection (namely, opening price below 30 cents and a dividend in the previous year). The average return obtained on a portfolio comprising of equal rand investment in each of the securities chosen was 35,47%.⁸ The standard deviation of the returns was 55,14% resulting in a reward-to-variability ratio of 0,66.

Comparison of these results with those presented in tables 1 to 4 reveal that superior results are not achieved using the modified strategy. In fact, if anything the results are worse.

Therefore, it can be concluded that the original strategy of purchasing all shares under 30 cents is the more suitable.

CONCLUSIONS AND COMMENTS

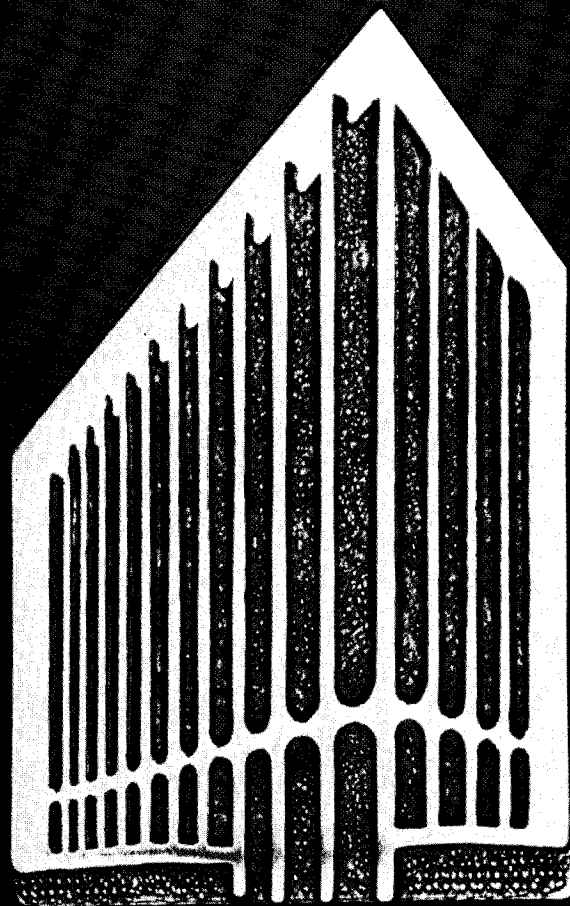
This is not a rigorous study of all possible strategies incorporating the purchase of low-priced securities. Rather it is an attempt to give an indication of the investment opportunity existing in such securities.

The study contains a number of very subjective areas. For instance, the choice of 30 cents as the cut-off point was arbitrary. It could be argued that if a cut-off point of 30 cents was used in 1968 this should have been adjusted upwards over time for the effects of inflation (for example, by adjusting by the increase in the Consumer Price Index each year). However, it is felt that such additional sophistications would not greatly influence the results. Moreover, Table 1 shows that the number of shares under 30 cents in 1978 and 1979 (100) was in fact larger than the number of shares under 30 cents in any other two year period (except 1977 and 1978). Thus there does not appear to be a need to adjust the cut-off point for the effects of inflation.

A second general comment which must be made is that the results should be time independent. That is, whether the beginning of the year is chosen as the purchase date (as in the study) or the middle of the year, or any other date in the year, the results should remain valid provided the holding period is the same (that is one year).

Thirdly, the proposed strategy is obviously a 'small man's' strategy. Large institutional investors would have numerous problems in investing large sums in many of the low-priced companies. In addition, the problems of being 'locked in' would affect the investment performance since it has been assumed in the study that all shares could be sold at the end of the year at the closing price.

Finally, in conclusion, it can be stated that the low-priced shares on the JSE have performed surprisingly well over the last 12 years. Although the risk might be high, the returns appear to be great, particularly if the loss resulting from one or two poor years of investments can be borne. It certainly appears that the low-priced shares are deserving of more attention than they have received in the past.



A SYMBOL OF GROWTH

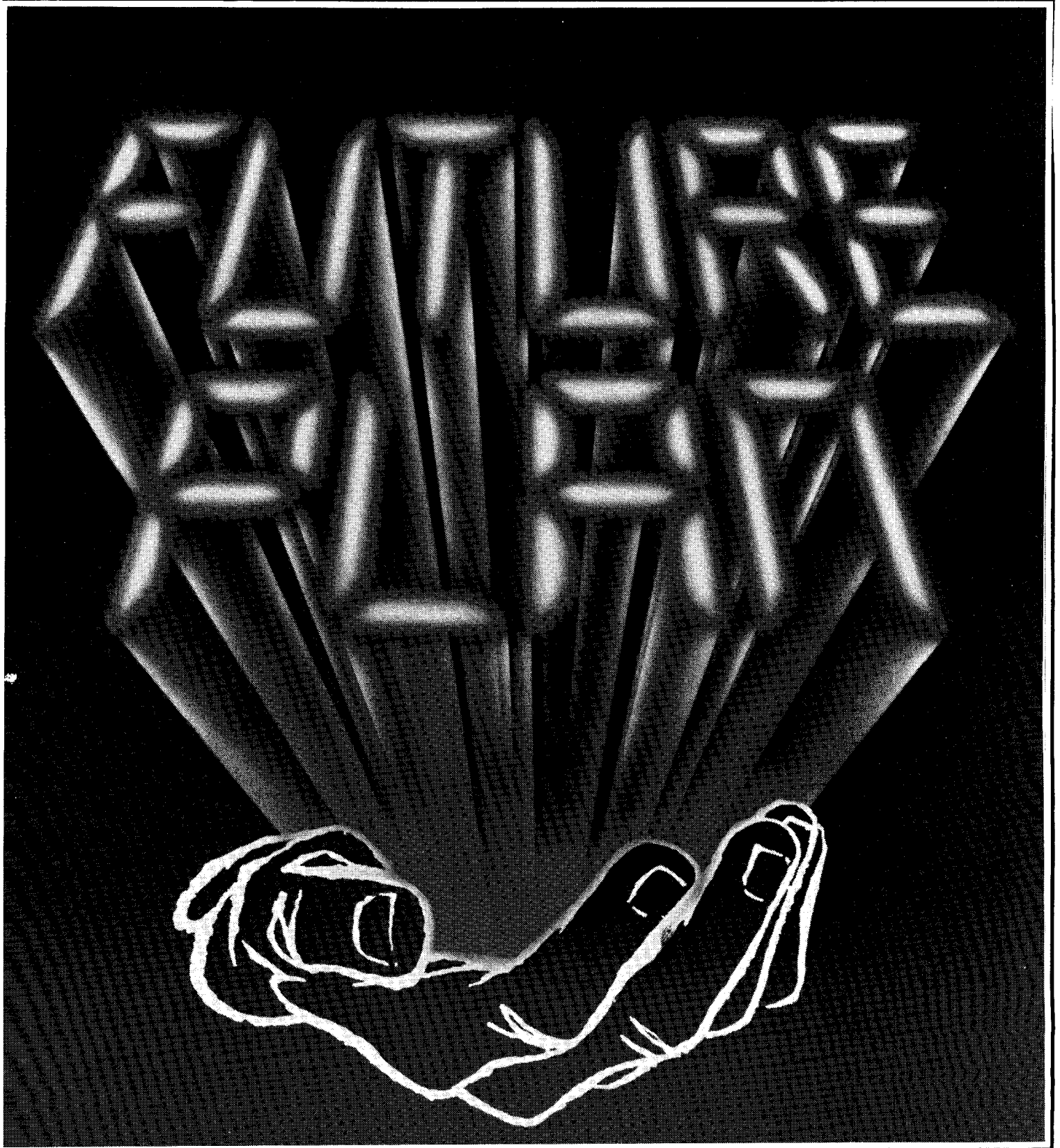
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FOOTNOTES

1. The authors wish to acknowledge the financial support given by the C.S.I.R. and the University of Cape Town's Staff Research Fund.
2. The data was obtained from back copies of the Financial Mail.
3. The Johannesburg Stock Exchange Monthly Bulletin was of considerable use in establishing the reason for each share's 'disappearance'.
4. The authors would like to thank Mr P. van der Spuy, company secretary of I. L. Back & Company who was kind enough to trace out the movements of that company's shares during a period in which they changed hands several times.
5. Brokerage was calculated at the rate of $\frac{1}{2}$ c per share plus 0,85% both on buying and selling while market securities tax is payable only on a purchase and amounts to 1%. Hence, total transactions costs involved in the purchase and sale of a share at 10 cents is approximately 12%. Accordingly 12% was used as a flat transaction cost rate for the 0 – 19c transactions.
6. For the purchase and sale of a share at 25 cents the brokerage costs are approximately 7% and hence this figure (7%) was used as a flat transaction cost rate for the 20 – 29 cent group.
Finally, for the combined group a flat rate of 9% was used. Clearly these figures result in an approximate adjustment for the transaction costs involved. However, in practice not all of the shares would have to be sold and re-bought at the end of a year (if still below 30 cents) and thus the use of the above rates is likely to err, if anything, on the conservative side.
7. The data was obtained from: "The JSE Actuaries Index", Second Edition. Published by Old Mutual.
8. Sharpe W. F.: "Adjusting for Risk in Portfolio Performance Measurement". In Lorie J. and Brealey R. (eds): Modern Developments in Investment Management. Dryden Press, Hinsdale, Illinois, 1978.
9. There were in all 104 shares under 30 cents which had paid a dividend in the previous year. However no such shares existed at the beginning of 1970. Hence this year was ignored for this section and all the results are therefore based on 11 years and not 12 years of data.




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A graphical solution to the lease evaluation problem

1 INTRODUCTION

Over recent years, the problem of lease evaluation has been discussed widely throughout the literature, yielding many methods of solution and several mathematical models. Many approaches to this problem have been based on a "lease versus borrow" assumption, where leasing is considered as a direct alternative to borrowing a sufficient amount of cash for purchase.

Often, the leasing problem has been discussed using an explanatory example and then including a model which attempts to represent the situation encountered in the example.

The purpose of this paper is to develop a concise algebraic model for the leasing problem and then provide a graphical method of solution which is easy to use.

2 MODEL WITH NO LAG

The analysis in this section follows that provided by Burrows [3] and is therefore based on his three main assumptions:

- (i) the firm only uses the weighted average cost of capital as its rate in investment evaluation;
- (ii) the lease payments displace an equivalent amount of debt;
- (iii) tax deductions for lease payments, depreciation, maintenance and insurance are assumed to be realised in the year which payments are made or deductions claimed.

The validity of the second assumption has also been discussed in [6], while the last assumption can be relaxed to consider the more usual case of a one-year lag. The latter situation is not considered in this paper.

Under these assumptions, Burrows developed the following model:

If the asset is leased, the present value at time $t = 0$ of the cash flows associated with the lease is

$$PV(L) = A + \sum_{t=0}^T \frac{O_t(1-a)}{(1+k)^t} \quad (1)$$

and the present value at time $t = 0$ of the cash flows associated with borrowing is

$$PV(B) = C + \sum_{t=0}^T \frac{P_t(1-a) - aD_t}{(1+k)^t} - \frac{S-a(S-W)}{(1+k)^T} \quad (2)$$

where

- C = cash price of the asset
- A = present value of after-tax lease payments, net of operating expenses, discounted at the after-tax borrowing rate
- W = written down (book) value of asset at time T
- S = estimated salvage value of asset at time T
- O_t = operating expenses included in lease payments at time t
- P_t = operating expenses at time t if asset is bought
- D_t = depreciation allowance for tax purposes at time t if asset is bought
- k = weighted average cost of capital
- a = company tax rate
- T = useful economic life of asset.

Burrows concludes that it is preferable to lease when $PV(B) > PV(L)$ and preferable to borrow when $PV(L) > PV(B)$.

The model may be generalised immediately by defining an extra term to cover the situation where external operating costs must also be met when the asset is leased. Letting E_t represent these external costs at time t, (1) becomes

$$PV(L) = A + \sum_{t=0}^{T-1} \frac{(O_t + E_t)(1-a)}{(1+k)^t} \quad (3)$$

where O_t and E_t are assumed to be paid at the beginning of each year.

This is more realistic than Burrows' suggestion (1) since O_t and E_t include insurance payments.

Following this suggestion further, (2) becomes

$$PV(B) = C + \sum_{t=0}^{T-1} \frac{P_t(1-a)}{(1+k)^t} - \sum_{t=1}^T \frac{aD_t}{(1+k)^t} - \frac{S-a(S-W)}{(1+k)^T} \quad (4)$$

This model could be further extended by separately treating insurance and maintenance payments, and thus using different limits in the present value summations if necessary.

Burrows' model was applied to an example discussed in [1, 2, 8, 9, 10] in which a firm could purchase an asset (in this hypothetical case, a computer) for \$1 600 000 or lease it for five years with annual lease repayments of \$500 000. Maintenance and insurance payments of \$40 000 must be paid separately if the firm buys the computer, but are included in the leasing arrangements. The values of all the parameters are:

- C = \$1 600 000
- W = \$350 000
- S = \$350 000
- O_t = \$40 000 for all t
- P_t = \$40 000 for all t
- D_t = \$250 000 for all t
- k = 0,15
- a = 0,5
- T = 5 years
- E_t = \$0 for all t
- h = 0,04

where h is defined to be the after-tax borrowing rate, and $t = 0, 1, \dots, T-1$.

Under the reasonable assumption of constancy over t of O_t , P_t , D_t and E_t , equations (3) and (4) can be substantially reduced to

$$PV(L) = A \quad (5)$$

and

$$PV(B) = C - \sum_{t=1}^T \frac{aD_t}{(1+k)^t} - \frac{S}{(1+k)^T} \quad (6)$$

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since only the relative present values of the leasing and borrowing alternatives are important.

The limitation of the construction of Burrows' model is now evident since (5) would suggest that $PV(L)$ may be evaluated directly. This is however not the case as some calculations are required to find $PV(L)$, as shown in [3]. The next step in improving the model is to give an algebraic expression for A , for which the definition

L_t = lease payment at time t is needed.

At time t , the after-tax lease payment, net of operating expenses is $(1-a)(L_t - O_t)$. When finding the present value of these payments discounted at the after-tax borrowing rate h , the expression for A becomes

$$A = \sum_{t=0}^{T-1} \frac{(1-a)(L_t - O_t)}{(1+h)^t} \quad (7)$$

Thus (3) becomes

$$\sum_{t=0}^{T-1} \left\{ \frac{(1-a)(L_t - O_t)}{(1+h)^t} + \frac{(O_t + E_t)(1-a)}{(1+k)^t} \right\} \quad (8)$$

which, with (4), represents a general model for evaluating a leasing problem subject to assumptions (i), (ii) and (iii). Also (4) can be further explained by noting that W , the book value of the asset, is simply

$$W = C - \sum_{t=1}^T D_t$$

3 THE NOMOGRAMS

In this section, a graphical solution to the leasing problem in the form of nomograms is presented. A nomogram is a collection of graphs that share common axes. Nomograms have already been shown to be of practical benefit in the valuation of call options [5], the comparison of different rates of interest [11], [12] and finding present and future values of annuities [7].

Under the simplifying restrictions of the above example the model becomes

$$\begin{aligned} PV(L) &= \sum_{t=0}^{T-1} \frac{(1-a)L}{(1+h)^t} \\ &= (1-a)L \left(\frac{1+h}{h} \right) [1 - (1+h)^{-T}] \end{aligned} \quad (9)$$

and

$$\begin{aligned} PV(B) &= C - \left\{ \sum_{t=1}^T \frac{aD}{(1+k)^t} \right\} - \frac{S}{(1+k)^T} \\ &= C - \frac{aD}{k} [1 - (1+k)^{-T}] - \frac{S}{(1+k)^T} \end{aligned} \quad (10)$$

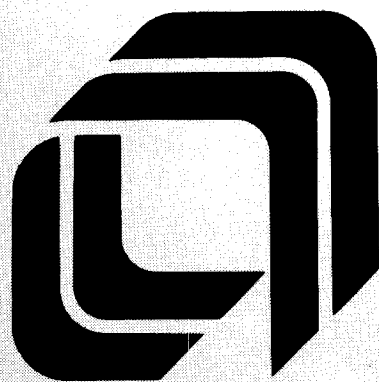
using the sums of geometric progressions, where L is the constant lease payment, net of operating expenses.

Most of the restrictions are often used in practice, except for the equivalence of the book value W and the salvage value S , so a more realistic model is

$$PV(B) = C - \frac{aD}{k} [1 - (1+k)^{-T}] - \frac{S - a(S-W)}{(1+k)^T} \quad (11)$$

Nomograms have an advantage over normal methods of calculation in that no actual calculations are required, as a few straight lines that are drawn on the nomogram provide the answer. However, the main advantage of the nomogram is not its ease of solution, but rather its illustrative nature of solution. For example, a measure of the sensitivity of the leasing problem to changes in any of the variables can be gained immediately by solving the problem with new values for some variables.

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The first nomogram (figure 1) can be constructed directly from (9). Initially a set of contours $T = \text{constant}$ are used to plot h against

$$\left(\frac{1+h}{h}\right) [1 - (1+h)^{-T}]$$

Following in the same direction, a set of contours $a = \text{constant}$ are used to plot

$$\left(\frac{1+h}{h}\right) [1 - (1+h)^{-T}] \text{ against}$$

$$(1-a)\left(\frac{1+h}{h}\right) [1 - (1+h)^{-T}].$$

Then, in the first quadrant, contours of $L = \text{constant}$ are used to plot

$$(1-a)\left(\frac{1+h}{h}\right) [1 - (1+h)^{-T}] \text{ against}$$

$$(1-a)L \left(\frac{1+h}{h}\right) [1 - (1+h)^{-T}]$$

which is equal to $PV(L)$. Thus the value of $PV(L)$ can be read off the horizontal axis in the first quadrant.

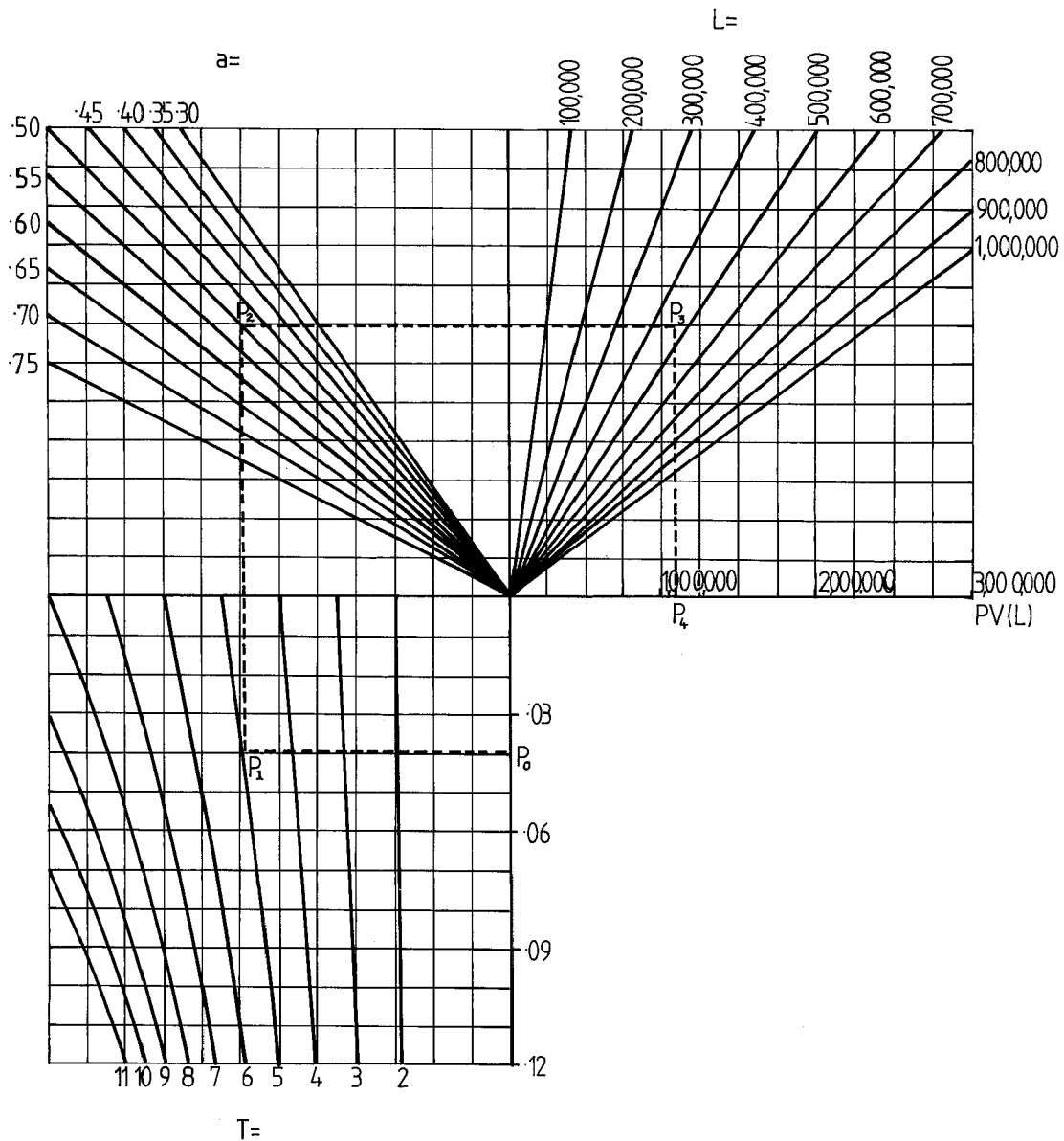
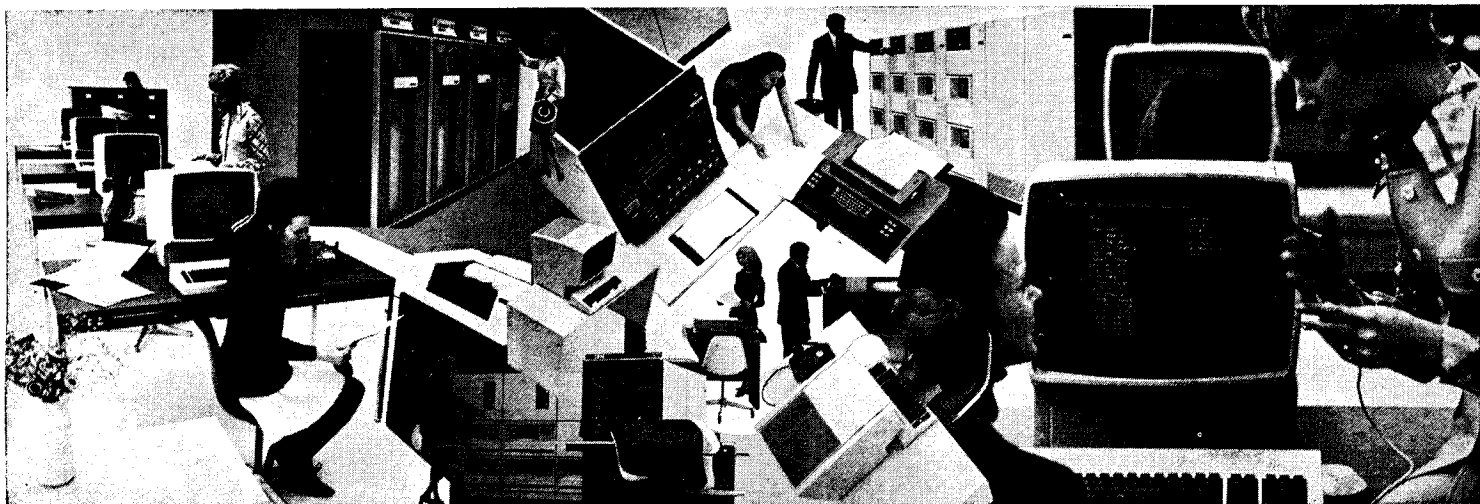


Figure 1.



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Because of the more complicated expression (11), two nomograms (figures 2 and 3) are needed to evaluate PV(B), where each nomogram consists of five sectors. The construction of these nomograms follows in a manner similar to that presented above. It may be noted that the first of these two nomograms (figure 2) has the sole purpose of evaluating the term

$$\frac{S-a(S-W)}{(1+k)^T}$$

The use of all these nomograms is shown by solving the example already stated, after which the value of the illustrative nature of the nomogram becomes apparent (figure 1, 2 and 3).

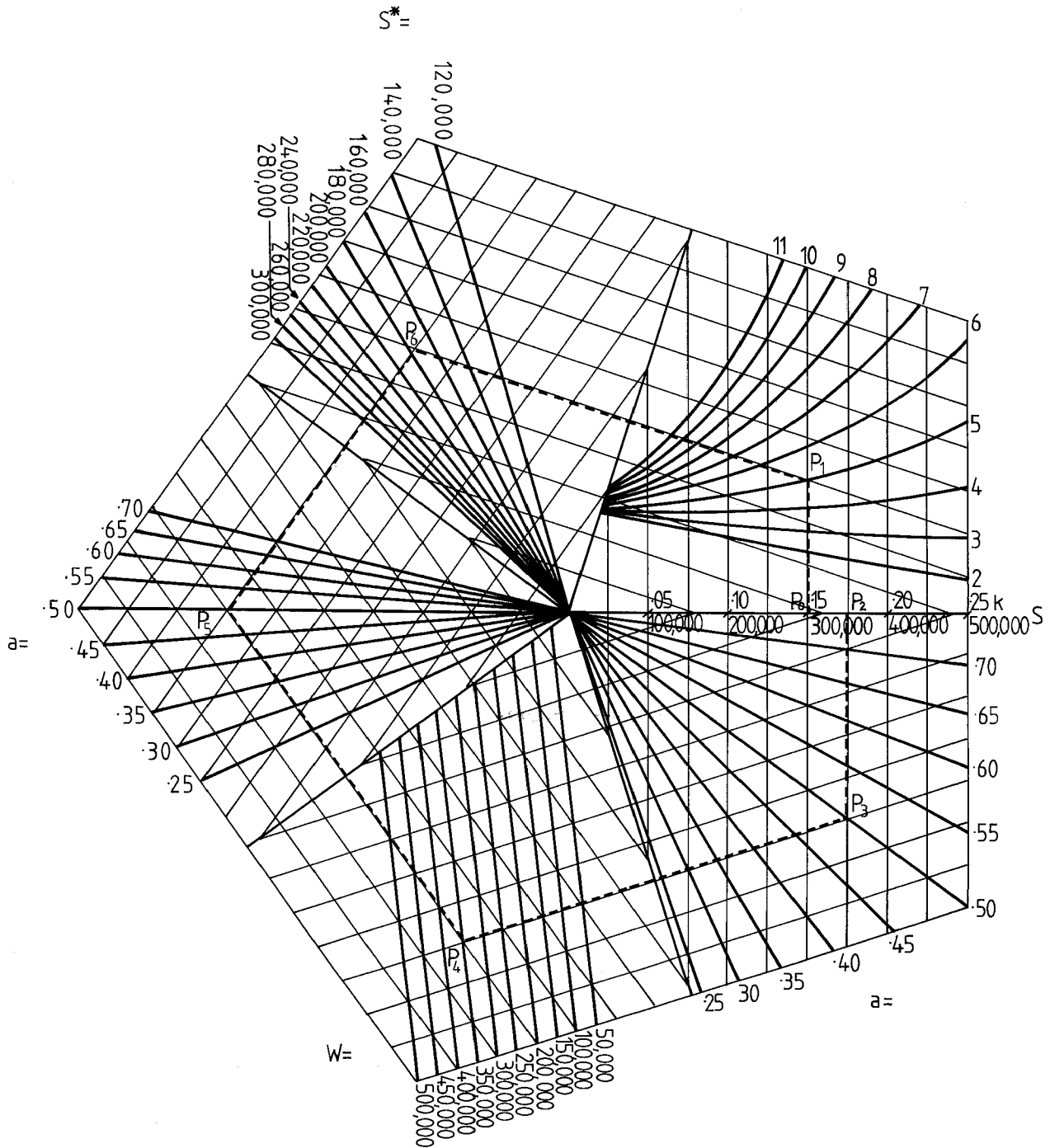


Figure 2.



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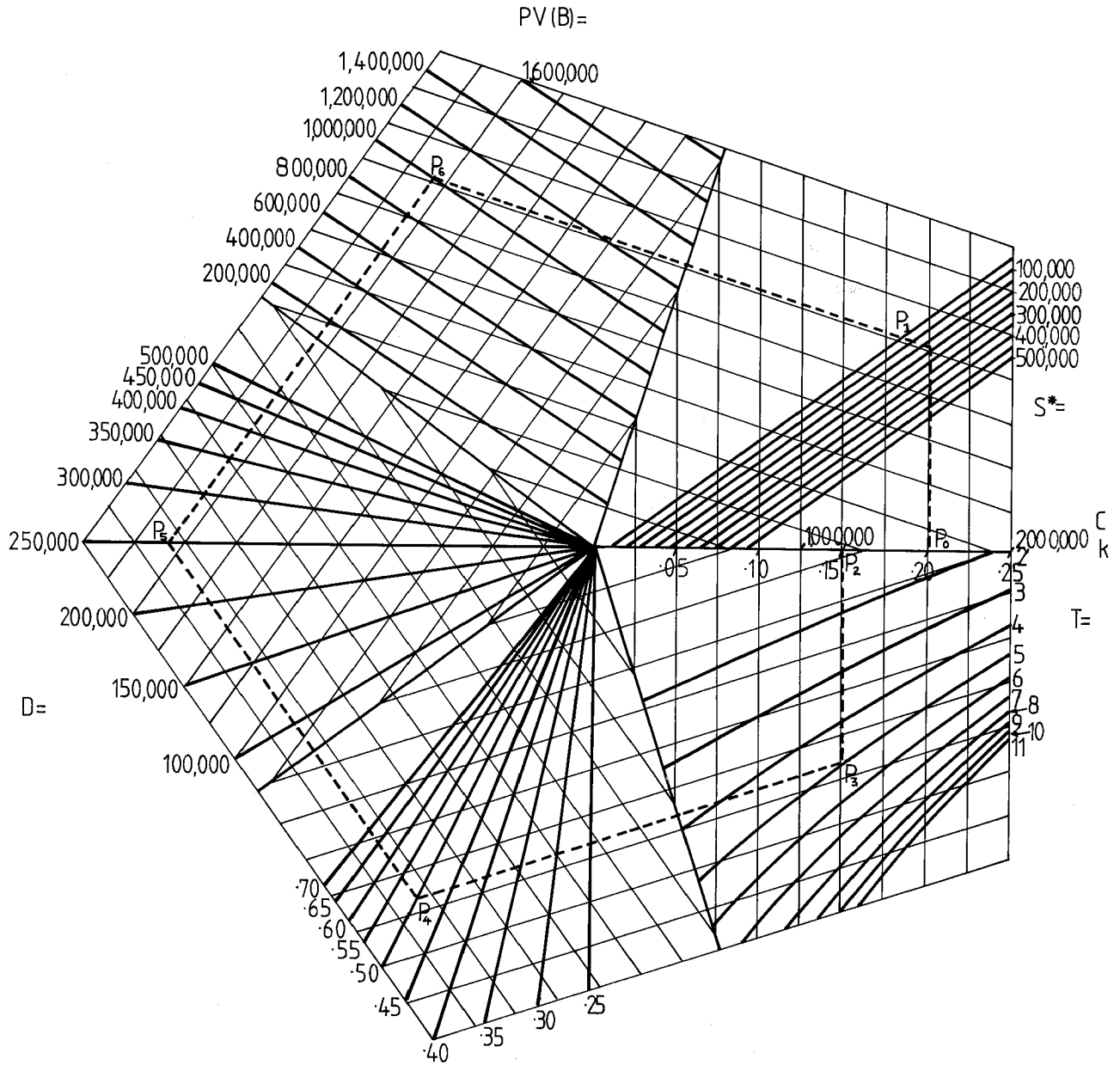


Figure 3.

4 ILLUSTRATION

For all the nomograms presented, the solution is found by drawing suitable straight lines parallel to a given grid and noting the point of intersection with the relevant contour.

For example, in figure 1, start at the h-axis at the point P₀ where h = .04 and draw a horizontal line until it intersects the contour T = 5 at P₁. Draw a vertical line upwards from P₁ until this line intersects the a = .5 contour at P₂. From P₂ draw a horizontal line through to intersection at P₃ at the contour L = 460 000. A vertical line is then drawn from P₃ until it intersects the axis at P₄, where the value PV(L) = \$1 075 000 can be read off. (All of the values referred to in this section were read from a nomogram which was considerably larger than those in figures 1 - 3). This value yields an error of less than 1% when compared to the correct answer PV(L) = \$1 065 000.

Although the nomograms for calculation of PV(B) are slightly different in that they have five sectors, the method of solution is very similar to that described above.

a=

The example is completed by using figures 2 and 3, where straight lines parallel to the grid must be used with the relevant contours. However, in each of these cases, the final answers occur through an intersection of these lines in the relevant sector. The contours in these sectors must then be used for interpolating the answer. The results, as shown in figures 2 and 3, are

$$\frac{S - a(S - W)}{(1 + k)^T} = \$175\,000 \quad (\text{correct answer } \$174\,011)$$

and thus PV(B) = \$1 015 000 (correct answer \$1 007 000), each with very small errors.

Nomograms are very useful in the field of sensitivity analysis, and give a clear indication of the relationship between changes in the values of some variables and changes in the solution. The reader can easily justify this for himself by slightly varying one or more of the variables in our example.

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The puzzle of the two markets†

One might expect the relationship between the price of gold and the price of a high quality gold share to be quite straightforward and established. A closer look at the situation, however, reveals that gold shares often move out of line with the gold price. Periods of price stability in the metal are often associated with upward surges in the price of shares; in fact movements in the price of gold have often been associated with contrary movements in gold share prices.

Implicit in the price of a gold share is of course an expected future path of gold prices which reflects the markets' rational expectation (see Muth (1961)) on factors which affect the price of gold.

It is not clear, however, why the gold share market should reflect a price of gold which is other than the free market price of gold – which again embodies all known relevant information. It is obvious, however, that these two markets do appear to be often out of line. For example at the peak 1980 gold price of \$850, reached on 24th January, 1980, East Driefontein was standing at approximately 2700, while five months later, on 24th June, with the gold price at \$600 the share price had moved to 3000.

Quite clearly gold share prices represent an estimate of the present value of the future stream of dividends, which apart from the gold price is determined by considerations such as costs, ore grade and tax structure. The crucial point is how, in the short term when factors apart from the gold price are quite accurately known, share price movements react to new information about the price of gold.

Some analysts have talked in terms of gold shares anticipating movements in the gold price – they remark that shares did not move up in line with a rise in the bullion price in January 1980 because the market predicted a downward correction. This is in essence stating that the share market had a different average view of the gold price than the commodity market, on what one can assume to be the same information. For two efficient markets one might assume this to be untenable given mobility of funds between the two markets.

It should be pointed out that the markets are dissimilar in several respects. Future contracts are generally only available in the commodities market. In fact the sharp up and down jerks in the gold price are caused, to some extent, by dealers either liquidating long positions or covering short positions in the face of unexpected (to them) changes in the gold price. On the Johannesburg Stock Exchange restrictions dictate that bear sales be explicitly declared and that the maximum term of a long position be two weeks.

What does seem to be in evidence is that gold share investors take an adaptive expectations view of the gold price. (Share prices respond with a time lag to changes in the gold price – see Cagan (1956).) Thus they considered the jump up to over \$800 as not being representative of the most accurate future prediction (in real terms) of the price of gold but rather were more sceptical and considered gold to have considerable downside potential, given its trading range of \$250–\$400 in the previous four months. When gold established itself above \$600 in July they were prepared to come into the market and buy shares at much higher prices than those pertaining in January.

In order to calculate the price of gold reflected by gold shares, a study of the share East Driefontein was made over the period January, 1978 to September, 1980 (using weekly data) because of its supposed close relationship to the price of gold. This should be the case because:

1. it is a long life mine;
2. it has a low cost profile in comparison to the price of gold; and
3. the variability of the grade of ore mined has been relatively low over the period for which the exercise was conducted.

It is known that in 1979 East Driefontein had distributable earnings of R195 per share after a profit averaging \$245 per ounce of gold extracted. Costs for the last quarter of 1979 were \$64 per ounce.

It was assumed that over the period studied that:

1. cost changes were 12% per year (reaching \$64 at end of 1979);
2. the relationship between distributable earnings and profit was constant (i.e. that the proportion of profit retained for the non-distributable reserve remains constant);
3. tax rates remain unchanged.

A yield on distributable earnings demanded by the market reflects a certain expected gold price according to the formula

$$\frac{(\text{implicit gold price } (\$/\text{oz}) - \text{cost } (\$/\text{oz}))}{\text{share price}} \times k^t = \text{Yield}^*$$

Two different scenarios were considered, that of

- (a) The local investor, whose mobility of funds is restricted and thus his choice of investment. It seems reasonable that he would demand a return on distributable earnings in the range 8–12% given his set of alternatives and attitude towards risk for this investment, and
- (b) The foreign investor who has a wider set of alternatives and buys shares at the financial rand discount. One might expect this investor to demand between 14–18%.

Using * the implicit gold price was calculated for:

- (a) at 8, 10 and 12%, and
- (b) at 14, 16 and 18%.

For (b) the share price was deflated by the financial rand discount.

Examination of the figures provided illustrates the points made. (Figure 1 treats local expectations and Figure 2 foreign expectations.) Primarily, that the discrepancy between actual and expected gold price is not constant at

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 † The author would like to thank Professor A. H. Money, Dr J. F. Affleck-Graves and Mr D. R. Strong for some useful suggestions in connection with this paper

*k = $\frac{195}{245} \times \frac{\text{R per } \$ \text{ exchange rate}}{\text{R per } \$ \text{ exchange rate at 31/12/79}}$



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Figure 1

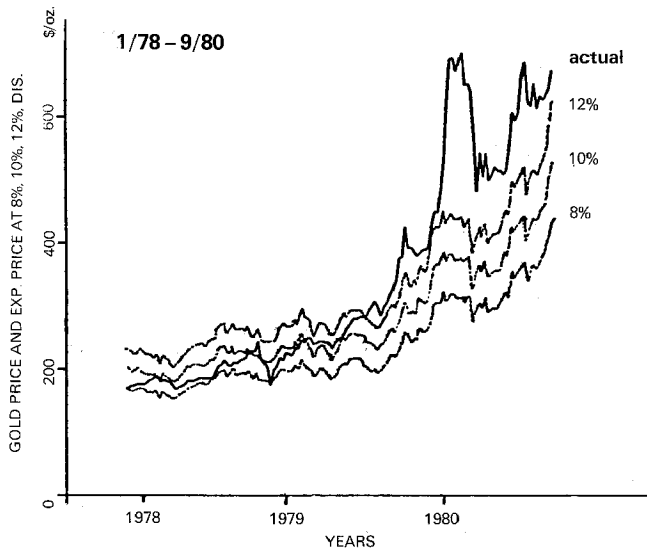
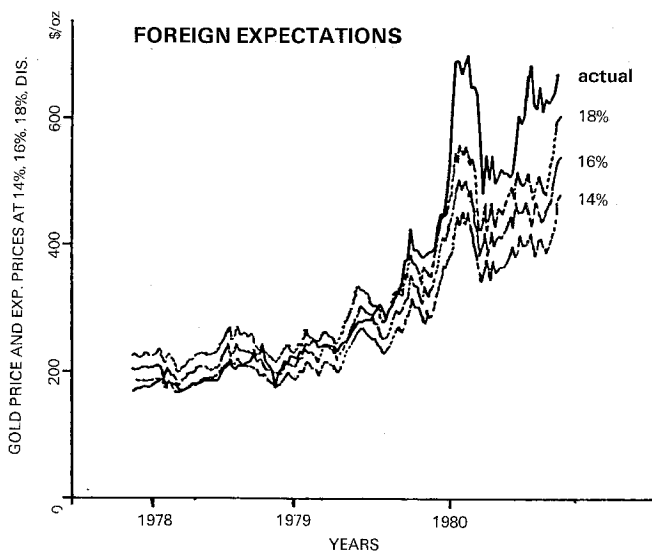


Figure 2

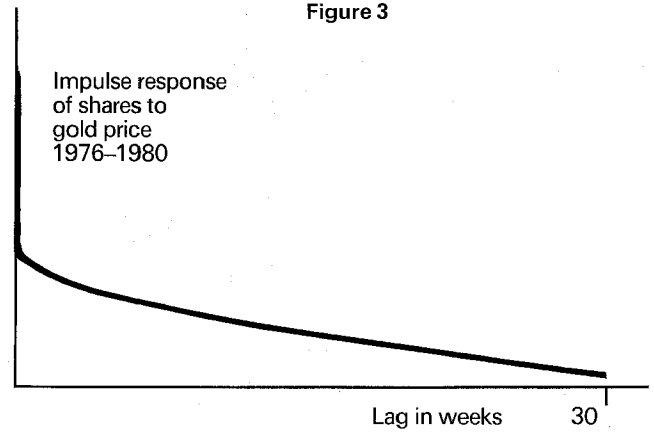


any required yield rate. Considering scenario (a) it is seen that at a 12% discount rate the deviation was considerable in the first part of 1980. Only subsequently did the two begin to fall in line. Scenario (b) reveals a similar pattern.

In order to consider the proposed hypothesis of an adaptive expectations attitude in the share market the relationship between 19 gold shares and the gold price over 30 previous weeks was made over the period March 1976 to August 1980. In order to do this a regression was performed for each gold share of the share price against the contemporaneous gold price and the set of 30 previous gold prices over the period indicated. It was shown that

although there was a strong contemporaneous relationship between share prices and the gold price there was an important relationship between the share price and previous gold prices. The general form of the impulse response (as represented by the values of the coefficients of the independent variables in the regression) was not unlike one predicted by adaptive expectations. (See Figure 3 below.)

Figure 3



Such a relationship is instrumental in explaining the behaviour of gold shares in 1980. In late January the response of gold shares to increases in the gold price was limited because of the much lower gold prices pertaining over the previous six months. When the gold price had stayed above \$450 for a number of weeks the market began to revise its expectations about the future, and demand strengthened. In order to quantify the degree to which gold share prices are related to previous gold prices the degree of linear explanation of the share price by the present and 30 lagged gold prices as represented by the coefficient of multiple determination (adjusted for degrees of freedom) was calculated. This was then compared with the explanation of a regression with only one independent variable, the contemporaneous gold price. The results are given in Table 1. It is seen that viewed in this way all share prices were to some extent explained by previous gold prices.

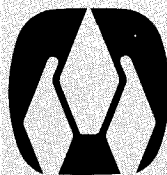
The above study was repeated with each data series first undergoing a difference of log transformation. The sharp drop off in \bar{R}^2 goes some way to support the earlier conclusions of this paper. Namely, that in the longer term there is a strong relationship between levels of share prices and the gold price (as represented by the \bar{R}^2 in Table 1) but in the short term the changes in gold share prices and the metal price often occur in different directions and therefore the first differences of logs relationship (as represented by the \bar{R}^2 in Table 2) is a very weak one. We have shown above that short term spurts in the gold price are often associated with stable share prices and stable gold prices are often associated with rising share prices; it is this short term unstable relationship which is giving rise to a low correlation. The first difference of log models are thus grossly misspecified and no reliable conclusions can be drawn from that part of the analysis.

To sum up it appears that there is some considerable evidence to support the hypothesis that the commodity and share markets are reacting differently to the same information. The analysis implies in particular that levels of gold share prices are determined in a way which corresponds to that predicted by an adaptive expectations process.

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Table 1

	(a)	(b)
Marievale	,901	,790
Simmers	,826	,720
Sallies	,803	,731
Wit Nigel	,932	,884
Leslie	,947	,919
Winkels	,969	,927
Buffels	,935	,813
Vaal Reefs	,964	,922
Zandpan	,971	,922
Harmony	,960	,909
President Brand	,911	,737
Western Holdings	,925	,713
Blyvoor	,894	,711
Kloof	,966	,954
West Driefontein	,904	,735
Western Deep	,956	,889
Rand Lease	,873	,751
Lorraine	,871	,834
ERPM	,909	,868

(a) \bar{R}^2 (the coefficient of multiple determination) for the regression of share price on contemporaneous and 30 lagged gold prices

(b) \bar{R}^2 for regression of share price on contemporaneous gold price

Table 2

	(a)	(b)
Marievale	,072	,041
Simmers	,063	,038
Sallies	,114	,152
Wit Nigel	,196	,206
Leslie	,227	,194
Winkels	,218	,213
Buffels	,022	,004
Vaal Reefs	,193	,202
Zandpan	,215	,167
Harmony	,243	,213
President Brand	,259	,227
Western Holdings	,140	,163
Blyvoor	,193	,143
Kloof	,212	,196
West Driefontein	,164	,157
Western Deep	,224	,218
Rand Lease	,096	,122
Lorraine	,163	,200
ERPM	,037	,062

(a) and (b) are as for Table 1 except that the data is in differences of log form

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Investment basics – X

The effect of taxation on earnings per share

Earnings per share (EPS) means the income in cents attributable to each equity share, based on the consolidated net income for the period, *after tax*, and after deducting outside shareholders interests and preference dividends, but before extraordinary items, divided by the weighted average number of equity shares in issue and ranking for dividend in respect of the period.

In comparing pre-tax EPS with post-tax EPS, and assuming a standard rate of tax of say 42%, pre-tax EPS of say 100c would be reduced to 58c post-tax.

This assumes of course that pre-tax earnings are taxable in full but in reality this is seldom the case for any of the following reasons:

1. income receivable which is not taxable – e.g. dividends;
2. expenditure which is disallowable – e.g. certain types of donations, certain foreign expenses, provisions in general etc;
3. special allowances such as exporters' allowances, plant and machinery and building investment allowances, training allowances etc;
4. the utilization of prior tax losses;
5. in the case of mining companies – expenditure on capital assets.

With the exception of (2) above taxable earnings are appropriately reduced resulting in a lower percentage tax rate.

There exists in South Africa a generally accepted accounting practice which recommends in essence that a reconciliation be made between the rate of tax included in the accounts and the actual ruling rate of taxation. This disclosure, where applied, is of considerable aid to the investment analyst in that it enables him to make whatever adjustments he deems necessary to past EPS and future projections (as far as they are affected by taxation).

These disclosures will of course only act as a guideline in assisting the analyst to determine the effect they have had on past profits and are likely to affect future profits. One would have to examine each of these in turn in relation to the nature of the company's business in order to establish items that are recurring and those which are strictly once off. For example a company that historically earns say 80% of its distributable income in the form of dividend income will continue to reflect a relatively low rate of tax. On the other hand companies enjoying the plant and machinery investment allowance will only reflect the tax benefit when replacing or expanding their existing plant, whereas a company involved in the export trade will enjoy the exporters' allowance on a continual basis.

The following example is a simple illustration of the reconciliation of rate of tax and EPS before and after taxation:

	Company A		Company B	
	R	EPS	R	EPS
Profit before tax (1 m shares)	1 000 000	R1,00	1 000 000	R1,00
Tax – (normal rate – 42%)	26,0%	260 000	42%	420 000
Tax loss – previous year	4,2%†	100 000	—	—
Dividend income	8,4%†	200 000	—	—
*Special allowances	1,3%†	(1) 30 000	—	—
	2,1%†	(2) 50 000	—	—
Profit after tax	R740 000	R0,74	R580 000	R0,58

Apart from the items mentioned in (1) to (5) above, tax payable in a particular year can be materially reduced by a change in the basis of valuing stock. Such a situation arises where a company changes from valuing stock on an average cost or first-in first-out basis (fifo) – to that of last-in first-out (lifo) – a practice becoming more and more popular in these inflationary times.

Whilst on the subject of stock, it is of prime importance in comparing EPS of companies operating in the same 'industry' to establish the method these companies use to value stock.

Apart from these differing methods of valuing stock such as lifo and fifo it is possible, particularly where by-products

are involved, that the accounting treatment of the revenue from such products is such that one company may treat the income as sundry revenue whilst another (in the same industry) may wish to treat such revenue as a reduction of cost of production of the main product. The latter treatment normally results in a lower cost per unit of the main product and consequently a lower cost of stock or work in progress, resulting (assuming all other things equal!) in a smaller tax bill.

Fortunately the information relating to the method of accounting for these items has to be fully disclosed in the notes to the accounts.

† Percentage reduction in normal rate of tax due to the effect on taxable income of the inclusion of these items.

*1. **Investment allowances** of 30% on plant and machinery costing R100 000. (Assume B does not qualify for the allowances and ignore the initial allowance of 25% available to A as this will even itself out between A and B for tax purposes over the life of the assets.)

2. **Exports allowances** – Assume that A exports its product overseas while B does not. Expenditure qualifying for the allowance is R50 000 and A is entitled to 100% of the allowance.

Set out below is a simple comparison of the LIFO and FIFO methods of stock valuation. Note that while company B (FIFO) shows the larger profit, it pays more tax than A and subsequently has that much less cash.

	LIFO	FIFO
1. Closing stock year 1 100 units R10 per unit	R1 000	R1 000
2. Purchases year 2 500 units R15 per unit	R7 500	R7 500
3. Closing stock year 2 100 units R15 per unit	(R1 000)	(R1 500)
4. Cost of sales		
5. Sales year 2 500 units R20 per unit	R7 500	R7 000
Profit before tax	R10 000	R10 000
6. Tax at 42%	R2 500	R3 000
	R1 050	R1 260
Profit after tax	R1 450	R1 740
Net cash [5 - (2 + 6)]	R1 450	R1 240

When it comes to reporting EPS in mining companies it would be fair to say that there is little or no consistency.

Some mines show EPS before allowing for capital expenditure while others show EPS after allowing for capital expenditure thus reflecting an amount that is 'distributable'.

The real point in referring to this method of reporting EPS is that capital expenditure is allowable in full as a deduction for tax purposes in the year in which it is incurred. As capital expenditure is not shown as an expense in the income statement (it is usually reflected as an appropriation from after-tax profits, below the line) yet allowed as an expense for tax purposes, the result would be an appropriately lower rate of tax in any year in which there is capital expenditure. This leads to widely fluctuating rates of tax, relative to pre-tax profits, from year to year.

In certain mining industries such as coal mining this problem may be overcome to some extent by amortizing the assets of the mine over a declared period of time and accordingly creating a provision for deferred taxation. This treatment results in the standard rate of tax being charged against profits on an annual basis.

One mining group in particular has changed its accounting policies over the past few years so as to reflect as correctly

as possible EPS that are distributable. The first stage consisted of breaking down capital expenditure into 'maintenance capital' and 'expansion capital' – the former expense being treated as a charge against profits – above the line. The next stage was to include the tax relief obtained from the 'expansion capital' as a charge above the line – described as tax normalisation – reflecting in effect the tax that would have been payable had the company not incurred the capital expenditure – and consequently showing a lower appropriation below the line representing the after tax cost of the capital expenditure. This particular method of reporting falls somewhere between reporting EPS without taking into account capital expenditure and the resulting tax benefit and perhaps the more pragmatic method of reporting EPS after allowing for capital expenditure. It does, however, reflect more accurately in the accounts of the company the tax consequences of investing in both maintenance and expansion 'capital'.

On balance (ignoring extremes) there is usually enough information available in the accounts of a company to enable the analyst to determine a reasonable rate of tax in estimating future EPS. There is little doubt that a certain skill is required in order to uncover, assimilate and extrapolate all this information.