The Investment Analysts Journal

Number 41 - Winter 1995

Die Beleggings-ontleders Tydskrif

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This issue in brief

Money Market Funds: The missing link in the South African Unit Trust Industry?

Since 1993, the possibility of establishing money market funds (MMFS) in South Africa has received considerable attention. The Financial Services Board (FSB) established a study group to investigate the establishment of this type of unit trust. It met for the first time in September 1993 and the final report and recommendations were completed at the end of August 1994. This paper discusses the characteristics of money market funds, their international development, the possible effect of money market funds on the money supply and monetary control, and possible opportunities for unit trust management companies in South Africa.

The paper concludes that the establishment of money market funds in South Africa will create numerous advantages and opportunities for unit trust management companies. There are few problems, if any, which could constitute any obstacle preventing the official go-ahead from being given to an industry which is eagerly awaiting and preparing to launch this new product line.

Market timing and share returns

The relationships between business cycle peaks and troughs and turning points in two value indices based on the JSE All Share Index and Industrial Index are examined. It is shown that *ex post* and *ex ante* estimates of cyclical peaks and troughs based on share value indices lead the business cycle in an inconsistent way. However, timing strategies, based on forecasting the business cycle and switching between equities and treasury bills or equities and bonds around cyclical turning points have produced better than average returns.

Inflation and Price-earnings ratios

This paper studies the effect of inflation on price-earnings ratios. The analysis shows that price-earnings ratios could be expected to decline with increased inflation. This effect is more marked for firms employing short-lived assets than for firms employing assets with a longer life. Under high inflation investors should therefore expect lower price-earnings ratios from firms employing short-lived assets. They should expect price-earnings ratios to decline with increasing inflation. International investors should expect lower price-earnings ratios in economies with high inflation.

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Liberalising foreign trade: The interaction between the real & monetary sectors

The most important element in the external relations of less developed countries (LDCs) is the interaction between foreign trade and the domestic economy. The theoretical issues at stake have been reviewed by Krueger (1984). During recent years this particular aspect has become an important element in the debate regarding the opening up of LDCs and the emergence of the newly industrialising countries. The debate is closely related to the major policy options of import substitution and export promotion, also known as inward- versus outward-looking development options. It would appear that Adam Smith's approach in these matters can be a powerful analytical tool in explaining the issues regarding trade liberalisation. Trade liberalisation is a process which has serious implications for the interaction between the real and monetary sectors of an economy. A closer analysis of these issues appears to be helpful in understanding trade liberalisation and implementing the opening up of an economy to international trade successfully.

Earnings changes: A random walk? Some South African evidence

The article examines the concept of earnings changes as a random walk for industrial companies listed on the Johannesburg Stock Exchange. The results overwhelmingly support the hypothesis of higgledy piggledy growth using three different test procedures. There is some suggestion that investors can, on the average, identify companies with the highest growth potential.

Investment Basics: XXXI. Sustainable Growth Models

Many firms state their financial objectives in terms of a growth target for a parameter such as earnings per share. Research on the sources firms use to raise new capital has shown that there is a reluctance to raise new equity capital (Ross, Westerfield and Jaffe, 1993, p409), and yet without the injection of new equity capital there are limits to growth for the firm. The rate at which a firm can grow, without resorting to external equity finance or altering its present financial structure, is consequently a parameter of great interest to management.

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

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

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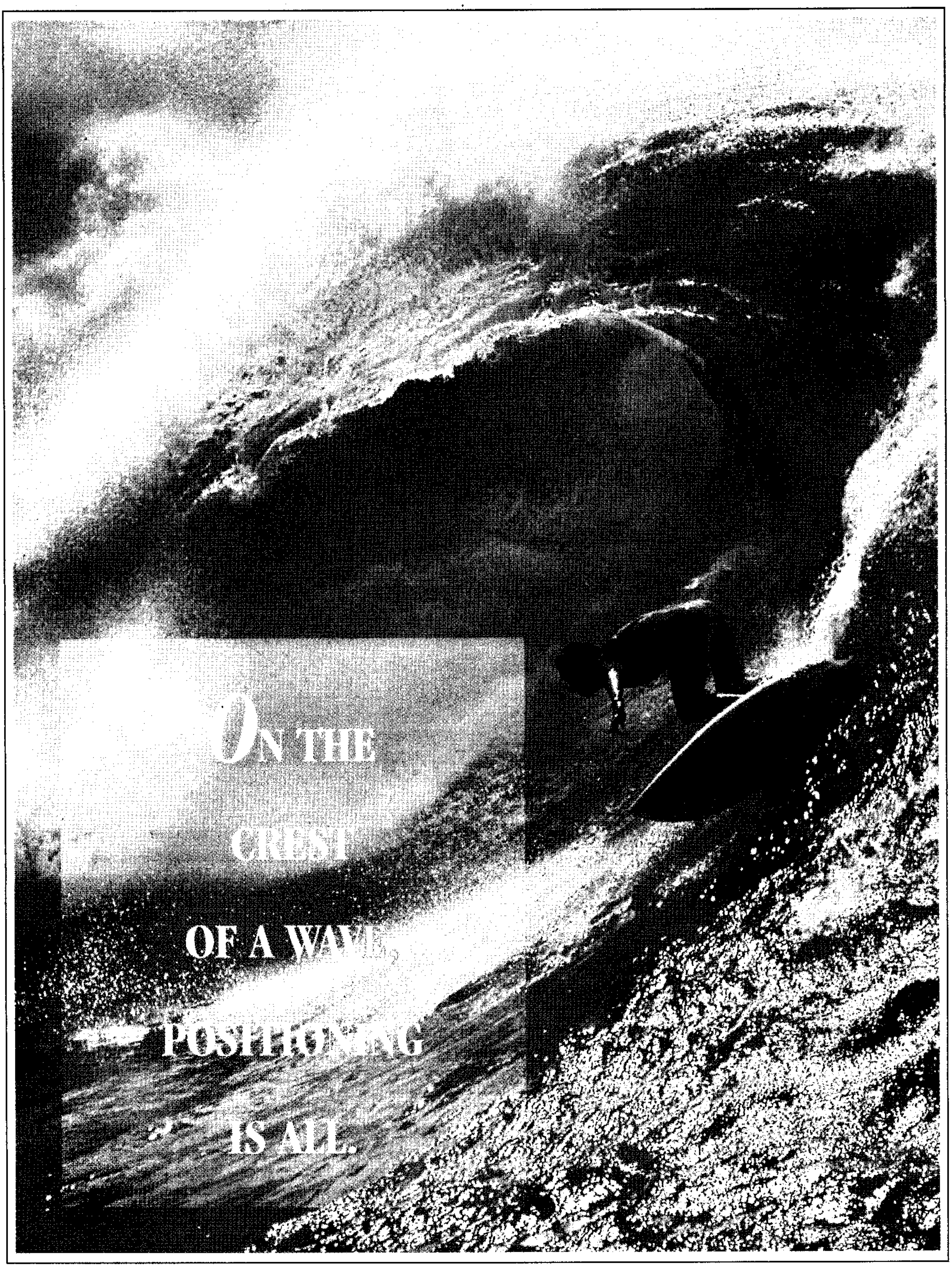

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The Investment Analysts Journal

Forty-first issue – Winter 1995

Finance Minister, Chris Liebenberg, and his Reserve Bank adviser, Dr Chris Stals, are to be congratulated for the initiative they took on 10 March 1995 in abolishing the financial rand. Although circumstances changed to make it a logical and appropriate thing to do at the time, it was bound, still, to be a difficult decision. What may seem right at a given moment, may not prove to be right when circumstances change, which of course they are bound to do. Messrs Liebenberg and Stals must have known when they decided on the finrand's abolition that this time it would have to be for ever. There could be no rushing back to it reinstatement were exogenous factors to change in a way that might once again trigger a flight of capital from South Africa. In 1983, the finrand had been abolished by the then P W Botha government, but it was hastily brought back in September 1985 after the disaster of the Rubicon speech the previous month and the financial sanctions and the flight of capital that followed.

One of the factors which contributed to making the finrand's abolition easier was an extraordinary weakening of the dollar on world foreign exchange markets. Thus the rand has been able to remain firm against the dollar even though it has declined significantly against other major currencies. On a weighted average basis, the rand has declined by more than 6,5 per cent since the end of last year. This decline is not a bad thing and will contribute to shifting production towards exports rather than imports, which is what is now required. Import growth is strong enough and is being driven by a cyclical upswing of some power. Hence, the already substantial deterioration of the current account of the balance of payments. Furtunately, the inflow of capital has been large enough to more than compensate for that deterioration so the country's gold and foreign exchange reserves have actually increased substantially, and on a net basis also.

Two things could now pose a threat to the rand-dollar exchange rate. These are, firstly, the possibility of a turn-around in the exchange performance of the dollar itself and, secondly, the possibility that political events in South Africa might take a turn for the worse. At some point the dollar is bound to recover. Already it has reached a clearly oversold position against the Deutschemark and the yen. When it recovers, the rand most likely will find the going tough although, dragged up by the dollar, it might recover some lost ground against third currencies. An adverse turn of political events in South Africa can never be ruled out, Minister Buthelezi constantly reminds us of this but there also exists the possibility of a maverick event of the Sharpeville or assassination kind. Whatever the case, were it to happen, the rand would have to be left to itself to serve the purposes of checking an outflow of funds. And that is how it should be. Exchange rate volatility, though adding to the risk of foreign investment in one way, contributes to stability in others.

These, however, are only possibilities – the kinds of hazard with which market participants continuously have to contend. There is now good reason to argue that the present institutional framework in South Africa is sufficiently robust to deal with whatever shocks they may deliver. After all the violence the country has been through, including the assassination of Chris Hani, it has demonstrated its resilience. This is why, despite such hazards, it is necessary to begin to consider the next step in the removel of exchange control.

There are a number of reasons why the complete abolition of exchange control, including its scrapping in respect of residents, is desirable. These fall into two categories, those relating to the distortions it causes to the economy, and those relating to matters of human freedom. They are, of course, linked but it serves a useful purpose to make the distinction for analytical purposes. Exchange control has had a hugely distorting impact on the South African economy. The protection it has afforded local industry through its discouragement of foreign investment, and the im-

Die Beleggingsontleders Tydskrif

Een-en-veertigste uitgawe – Winter 1995

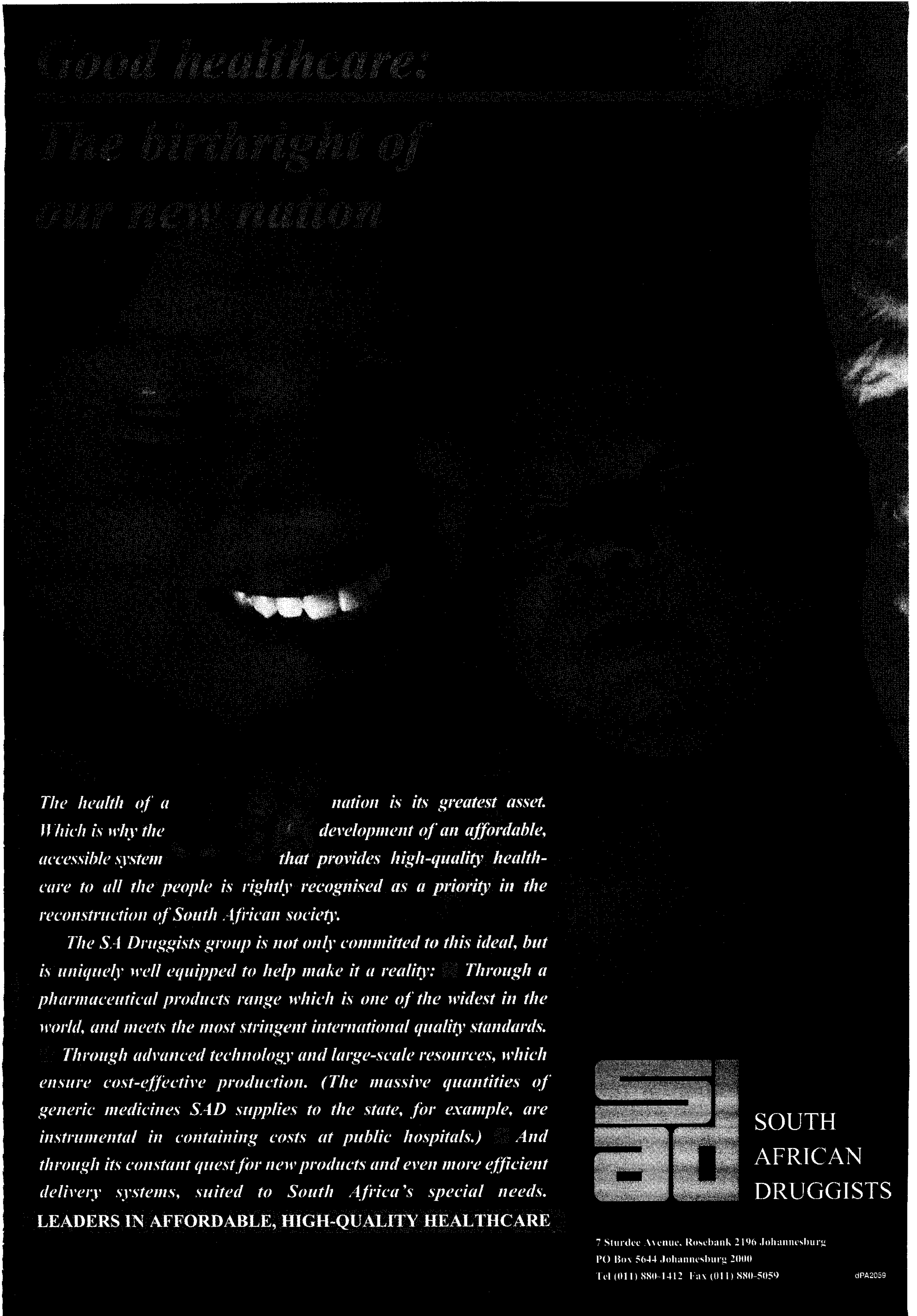
Die Minister van Finansies, Chris Liebenberg, en sy Reserwebankadviseur, dr Chris Stals, behoort gelukgewens te word met hul inisiatiewe van 10 Maart 1995 met die opheffing van die finansiële rand. Alhoewel dit onder veranderde omstandighede die logiese en toepaslike besluit was op daardie tydstip, was dit nietemin nie maklik nie. Wat reg mag lyk op 'n gegewe oomblik, mag bewys verkeerd te wees wanneer omstandighede verander, wat stellig natuurlik kan gebeur. Die here Liebenberg en Stals moes geweet het dat dit hierdie keer finaal sou wees toe hulle besluit het om die finrand op te hef. Daar sou nie teruggekeer kon word na 'n herinstelling daarvan indien eksogene faktore so sou verander dat dit weereens 'n uitvloei van kapitaal uit Suid-Afrika sou ontketen nie. Die PW Botha-regering het die finrand in 1983 opgehef, maar dit is spoedig in September 1985 heringestel na die katastrofiese Rubicontoespraak van die vorige maand, en die finansiële sanksies en kapitaalvlug wat daarop gevolg het.

Een van die faktore wat bygedra het om die opheffing van die finrand te vergemaklik, was 'n buitengewone verswakking van die dollar op die wêreld se buitelandse valutamarkte. Die rand kon homself daarom teen die dollar handhaaf, al het dit beduidend teenoor die ander belangrike geldeenhede gedevalueer. Op basis van 'n geweegde gemiddelde het die rand met meer as 6,5 persent sedert die einde van verlede jaar gedevalueer. Hierdie afname is lank nie sleg nie, en sal bydra tot 'n verskuiwing van produksie van invoere na uitvoere, iets wat tans nodig is. Invoergroei is sterk genoeg, en word ondersteun deur 'n sterk sikliese opswaai, vandaar die reeds substansiële afname in die lopende rekening van die betalingsbalans. Die invloei van kapitaal was gelukkig groot genoeg om meer as te kompenseer vir hierdie afname, sodat die land se goud- en buitelandse valuta inderwaarheid substansieel toegeneem het, ook op 'n netto basis.

Twee dinge kan moontlik 'n bedreiging vir die rand-dollarwisselkoers inhou. Eerstens die moontlikheid van 'n ommeswaai in die wisselprestasie van die dollar self, en tweedens die moontlikheid dat politieke gebeure in Suid-Afrika 'n ongunstige wending kan neem. Die dollar sal stellig op 'n sekere stadium herstel. Dit het reeds 'n oorverkoopte posisie teenoor die Deutschemark en die jen ingeneem. Wanneer die rand herstel, sal dit heelwaarskynlik opdraande kry, alhoewel dit met behulp van die dollar verlore veld teen ander geldeenhede mag herwin. 'n Ongunstige ommeswaai in politieke gebeure in Suid-Afrika kan nooit buite rekening gelaat word nie. Minister Buthelezi herinner ons voortdurend hieraan, maar daar bestaan ook die moontlikheid van onvoorspelbare gebeure, soos Sharpeville of sluipmoorde. In alle geval, sou dit gebeur, sal die rand aan homself oorgelaat wees om die uitvloei van fondse te reguleer. Dit is ook hoe dit behoort te wees. Alhoewel valutakoers volatiliteit enersyds bydra tot die riskantheid van buitelandse beleggings, dra dit andersyds by tot die stabiliteit.

Dit is egter bloot moontlikhede – die tipe risiko's waaraan markdeelnemers deurlopend blootgestel is. Daar is tans genoegsame rede om te beweer dat die huidige institusionele raamwerk in Suid-Afrika robuust genoeg is om enige moontlike skokke te hanteer. Na al die geweld in die land, insluitende die sluipmoord op Chris Hani, is hierdie weerbaarheid bewys. Ten spyte van hierdie risiko's is dit egter nodig om die volgende stap, naamlik die opheffing van valutabeheer, te oorweeg.

Daar is verskeie redes waarom die totale opheffing van valutabeheer, ook wat betref inwoners, wenslik is. Twee kategorieë kan onderskei word, naamlik dié wat verband hou met verwringings in die ekonomie en dié wat verband hou met die vryheid van die mens. Daar is natuurlik 'n verband tussen die twee, maar dit dien 'n bruikbare doel om vir analitiese doeleindes 'n onderskeid te maak. Valutabeheer het tot 'n groot mate 'n verwrigende impak op die Suid-Afrikaanse ekonomie gehad. Die beskerming wat dit plaaslike nywerhede gebied het deur buitelandse investering te ontmoedig, en die behoud van plaaslike investering wat dit afge-



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prisonment of local investment it has enforced, have been the principal reasons for the emergence of what has come to be called the hot house economy. This is an economy of high costs and low productivity that would not pay its way in an open world system. It has been perpetuated because successive South African governments, once the system was entrenched, were too fearful of what the consequences for employment and profits would be were it to be removed. The matter of human freedom speaks for itself. It requires no elaboration in the journal of a society dedicated to the cause and to the openness and transparency which are essential if financial markets are to fulfill their social function.

The abolition of the finrand, and hence of exchange control on non-residents, has now removed half the problem. This is a good thing in its own right especially because of what it implies for foreign direct investment. But going only half the way, it still leaves many distortions in place, and it perpetuates unfairness to local industry that remains at a distinct disadvantage compared to foreign industry which is able, now, to operate without restraints upon it.

Let us sketch the picture more completely.

South Africa is a geographical area characterised by a unique mineral endowment. Over the course of the last century that endowment has come to be almost completely exploited. Although the mining sector of the country's economy remains its flywheel, it is now a mature sector the costs of which, in general terms, have become high on any international comparison and which is begining to experience declining levels of production. Nevertheless, the mining sector is a source of massive cash generation and the handful of large companies which dominate it have the responsibility of managing the cash flow in a manner which is both in their shareholders and the country's best interests. Mining assets are wasting assets that have to be amortised. This means that the controlling mining houses are obliged to direct part of their cash flow into new investments that will provide for a continuity, and even a growth, of income. Because the scope for new mining ventures within the country has declined dramatically, and because exchange control prevents them from widening their involvement in mining abroad (the logical route they should follow given their accumulated capital a knowhow), they are bound to conglomerate within the country investing increasingly in the secondary and tertiary sectors of the economy. This, however, has resulted in much *criticism. The ANC, indeed,* has viewed the conglomeration of the mining houses as a manifestation of monopolistic tendencies which must be checked both if the local consumer is to be protected and if black economic empowerment is to be advanced. It has, therefore, threatened to break up the firms concerned through the application of US-style anti-trust legislation. But that could prove to be problematical. The South African mining groups are not large in a global context. Were they to be broken up, as JCI has already been broken up, their critical mass could be diminished and their global competitiveness adversely affected. This, certainly would not be in South Africa's interest. But worse still, with exchange control now removed as far as foreign companies are concerned, and with its continued enforcement with respect to South African companies, the latter must experience a clear tilting of the playing field against them. They are being required to compete in a new open South African and world economy but are not being allowed to do so, and are even being prejudiced in the exercising of their normal economic functions.

All this the MInister of Finance and the Reserve Bank Governor know. What inhibits them from moving on the abolition of exchange control on residents as they moved on the removal of non-resident controls is a fear of the destabilisation that might cause. Briefly, they assume (probably correctly) that, at the current rand-dollar exchange rate, the disinvestment requirements of residents vastly exceed the availability of the Reserve Bank's gold and foreign exchange holdings and that, therefore, any such move would be severely damaging to the exchange rate. The debate on this must now be opened up. Extensive public discussion can only be to the good particularly as it would help promote a better understanding of the policy problems and also of the position of the mining houses themselves.

THE EDITOR

dwing het, was die hoofredes vir die totstandkoming van wat bekend staan as die kweekhuisekonomie. Dit is 'n ekonomie met hoë koste en lae produktiwiteit wat homself nie sal kan handhaaf in 'n oop-wêreld stelsel nie. Dit is voortgesit omdat opeenvolgende Suid-Afrikaanse regerings bang was, nadat die sisteem reeds ingewortel was, vir die implikasies van werkloosheid en winste, indien dit verwyder sou word. Die kwessie van vryheid van die mens spreek vir sigself. Dit vra geen toeligting in 'n tydskrif van 'n vereniging wat toegewyd is aan die saak, en aan die openheid en deursigtigheid wat noodsaaklik is indien finansiële markte hul maatskaplike funksie moet vervul nie.

Die opheffing van die finrand, en daarom valutabeheer op nie-inwoners, het reeds die probleem halfpad opgelos. Op sigself is dit 'n goeie ding, veral weens die implikasies wat dit vir direkte buitelandse beleggings inhou. Deur die pad net 'n ent te loop, bly baie verwringings steeds voortbestaan, en perpetueer dit onregverdigheid teenoor plaaslike nywerhede wat steeds benadeel word in vergeleke met buitelandse nywerhede wat tans sonder beperkinge kan opereer.

Laat ons die situasie meer volledig toelig.

Suid-Afrika is 'n geografiese gebied wat gekenmerk word deur 'n unieke minerale bemaking. Hierdie bemaking is gedurende die afgelope eeu feitlik totaal geëksploiteer. Alhoewel die mynbousektor steeds die dryfkrag agter die landsekonomie is, is dit tans 'n ontwikkelde sektor waarvan die koste, in algemene terme en internasionaal gesproke, baie toegeneem het, en wat besig is om dalende produksievlakke te ervaar. Die mynbousektor is nietemin 'n bron van aansienlike kontantgenerering, en die handvol maatskappye wat dit domineer, het die verantwoordelikheid om die kontantvloei sodanig te beheer dat dit tot grootste voordeel van hul aandeelhouers en die land sal wees. Mynboubates is nie-hernieubare bates wat gearmotiseer moet word. Dit beteken dat die mynhuise verplig is om 'n deel van hul kontantvloei in nuwe beleggings te kanaliseer, sodat dit kontinuïteit, en selfs inkomstegroei kan verseker. Aangesien nuwe mynbougeleenthede in die land dramaties afgeneem het, en valutabeheer dit vir hulle onmoontlik maak om hul mynboubelange in die buiteland uit te brei (die logiese weg om te volg, gegee hul geakkumuleerde kapitaal en kundigheid), is hulle eintlik genoodsaak om binne die landsgrense te konglomereer, en om toenemend in die sekondêre en tersiêre sektore van die ekonomie te belê. Dit het egter geweldige kritiek, tot gevolg gehad. Die ANC het inderdaad die konglomerasie van die mynhuise as 'n manifestasie van monopolistiese tendense gesien, wat in toom gehou moet word indien die plaaslike verbruiker beskerm moet word, en indien swart ekonomiese bemagtiging bevorder moet word. Die betrokke firmas het daarom die gevaar geloop om te ontbondel weens die toepassing van die VSA-styl anti-trust wetgewing. Dit mag egter problematies blyk te wees. In 'n globale konteks is die Suid-Afrikaanse mynbougroepe nie groot nie. Indien hulle sou ontbondel, soos inderdaad die geval met JCI was, kan hul kritiese grootte afneem, en hul globale mededingendheid nadelig geaffekteer word. So iets sou beslis nie in Suid-Afrika se belang wees nie. Veel erger nog, met die opheffing van valutabeheer ten opsigte van buitelandse maatskappye, en met die voortgesette toepassing daarvan op Suid-Afrikaanse maatskappye, moet laasgenoemde noodwendig 'n besliste swaai van die speelveld teen hulle ervaar. Daar word van hulle verwag om in 'n nuwe, oop Suid-Afrika, sowel as 'n wêreldekonomie, mee te ding, maar hulle word nie toegelaat om dit te doen nie, en word selfs benadeel in die uitvoering van hul normale ekonomiese funksies.

Die Minister van Finansies en die President van die Reserwebank is volkome bewus hiervan. Wat hulle ontmoedig om aksies te neem wat betref die opheffing van valutabeheer op inwoners, soos wat hulle wel gedoen het met die opheffing van beheer op nie-inwoners, is 'n vrees vir die moontlike destabilisering wat dit tot gevolg kan hê. Kortom, hulle aanvaar (waarskynlik met reg), dat teen die huidige rand-dollar wisselkoers, die disinvesteringsvereistes vir inwoners die beskikbaarheid van Reserwebank gouden buitelandse valutareserwes by verre oorskry, en dat enige stap in hierdie rigting daarom ernstige nadele vir die wisselkoers inhou. Die debat hieroor moet nou geopen word. 'n Grootskaalse openbare bespreking kan net ten goede wees, veral aangesien dit 'n beter begrip vir beleidsprobleme, asook die posisie van die mynhuise sal help bevorder.

DIE REDAKTEUR

H. A. Lambrechts, Graduate School of Management, University of Pretoria

Money Market Funds: The missing link in the South African Unit Trust Industry?

Since 1993, the possibility of establishing money market funds (MMFS) in South Africa has received considerable attention. The Financial Services Board (FSB) established a study group to investigate the establishment of this type of unit trust. It met for the first time in September 1993 and the final report and recommendations were completed at the end of August 1994. This paper discusses the characteristics of money market funds, their international development, the possible effect of money market funds on the money supply and monetary control, and possible opportunities for unit trust management companies in South Africa.

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1. INTRODUCTION

Money market funds are professionally managed pools of short-term securities whose shares (units) are offered to the public. These funds are managed in order to maintain a stable principal, or net asset value, usually $1 (or £1) per unit, and, simultaneously, to provide competitive money market yields. The funds are open-ended investment companies, commonly known as mutual funds or unit trusts. As such, they are prepared and able to buy back unit holders' or investors' units (shares) at any time. Money market mutual funds were introduced in the USA in 1972 and had $578 billion in assets by May 1994, which represents more than 27 percent of the total assets ($2,107.8 billion) of all US mutual funds at that stage. Money market funds are not guaranteed or federally insured, unlike money market deposit accounts offered by all banks in the USA.

When investors (unit holders) buy shares (units) in a money market fund, the portfolio manager uses the money to purchase short-term debt instruments (issuers range from a government's treasury department to banks and individual companies). Investments are made in government securities, such as Treasury bills, and instruments issued by semi-government institutions or agencies. Money market funds also invest in short-term loans to companies (commercial paper) and negotiable certificates of deposit at banks. In the USA, tax-exempt money market mutual funds invest in the short-term obligations of state and local authorities.

Money market funds are not all identical. Depending on the investment policies of a particular fund (as spelled out in its prospectus or trust deed) the portfolio manager may invest in money market instruments, such as short-term paper issued by the treasury or other semi-government institutions, by banks and other companies, or, in the case of tax-exempt funds in the USA, by state and local governments. Some money market funds in the tax-exempt category buy only the short-term paper issued by authorities in a single state. Some money market funds in the USA limit their holdings to U.S. Treasury bills. Others hold a variety of money market instruments. Still others concentrate on corporate debt or commercial paper.

Money market funds are not guaranteed or insured, unlike bank deposits in the USA, which are insured and guaranteed. They are, however, strictly regulated by the regulatory authorities, and are considered to be among the safest types of investment because the securities they hold are of a high quality and are short-term, thus usually reducing investors' exposure to the risk of changing interest rates or the possible deterioration of the financial strength of the issuers of money market securities. In addition, most funds diversify their holdings to limit their exposure to any risk of default by a single borrower. As is the case with all unit trusts, every money market fund's investments are held by a trustee or custodian.

Certain market funds in the USA have recently experienced problems stemming from their holdings of certain adjustable rate securities. These problems appear to have occurred mainly as a result of the increase in short-term interest rates after several years of declining interest rates in the USA. The money market mutual fund shareholders (unit holders) themselves did not lose any money due to this situation. Money funds in the USA are allowed to invest in derivative securities, which must present only minimal credit and interest rate risks, as required under stringent Securities and Exchange Commission requirements (The Investment Company Institute (a), 1994:3).

2. THE DEVELOPMENT OF MONEY MARKET FUNDS IN EUROPE AND THE USA.

2.1 France

In France, money market funds have been gaining momentum since 1981, when the Mauroy government imposed strict limitations on interest payments on term deposits, as well as on short- and medium-term certificates of deposit. The banks reacted by launching money market and short-term funds. As in the USA, these funds first became popular as an alternative to term deposits, but their success and consistent performance have since provided independent reasons for their popularity.

Short-term mutual funds were created by French banks in response to the 1981 banking reform, which prohibited the paying of interest on demand deposits and curtailed payments on other types of deposit accounts. They were a success right from the start, and net sales exceeded 100 billion French francs

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*Commercial paper was the most popular type of security held by MMFs in the USA at the end of 1993 (35,7%), followed by U.S. Treasury bills and Securities (17,7%), other U.S. Securities (14,7%), Repurchase Agreements (14,6%), other domestic certificates of deposits (CDs) (4,5%) and other assets (12,8%), including Eurodollar CDs, Commercial Bank CDs and Bankers' Acceptances (Investment Company Institute (b), 1994:15).

*The benefits associated with unit trusts in general also apply to money market funds, i.e. liquidity, professional investment management, a high degree of investor protection offered via the regulatory framework of the Unit Trusts Control Act, the standing and backing of the management companies, investment diversification, access to classes of investment not ordinarily attainable by the retail investor, safe custody of assets, recordkeeping, easy access via the extensive distribution networks available in South Africa and switching facilities.
**The daily yield may be calculated and reflected as follows in the daily newspapers: Yield=The running or current yield at the end of the previous day plus any realized trading profits/losses (annualized), divided by R1.

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a year every year since 1986. Short-term funds accounted for over 90% of the total net mutual fund sales in France approximately during the period between 1987 and 1992. The increase in assets of French money market funds to well over 2 trillion French francs in little over a decade (1981-1992), is one of the great success stories of European finance. It actually became something of a problem for the French banking system.

However, the money market funds' "monopoly" of the French investment funds industry, weakened during 1993. The main reason for this was the decline in short-term interest rates in France. Investors increased their longer term investments in order to try to maximise returns. The so-called "Balladur bond" *(emprunt Balladur)* was launched in June 1993 in an attempt by the French government to encourage longer term investment. The European Fund Industry Directory (1994: 11.3-11.4) notes:

> *"The Ministry of Finance estimated that 62% of the money invested in the emprunt Balladur was at the expense of short-term funds. With a guaranteed return of 6% per annum, the Balladur bond runs for four years from launch and invests in Government debt.*
>
> *However, its principal attraction seems to have been the fact that all or part of the investment can later be used to buy shares in one or more of the major French companies which have been, or are to be, privatised. Holders of units in the Balladur bond are free to choose their companies and enjoy a certain degree of priority treatment."*

French short-term funds have investment objectives and policies similar to those of their US counterparts, but they differ in how they are sponsored and marketed, and in their role in the financial life of individuals and institutions. Perhaps the most fundamental difference is the sponsorship of short-term funds. In the USA, short-term funds were created and promoted by the fund industry in direct competition with the banking industry. In France, by contrast, short-term funds (and mutual funds in general) are really a product line of French banks. While US funds attracted money from banks and savings institutions to fund companies (moderated, of course, by the investment of much of the money in bank CDs), the financial transfers created by the French funds occurred within the banks themselves.

Much as in the USA, short-term funds in France draw money when yield curves are inverted, and have managed to keep most of it even when their yields drop below the return on long bonds. The French have a long-standing preference for safe, income-producing assets with good liquidity. In fact, French investors are among the most risk averse in Europe. The French tend to be savers rather than investors, and MMFs are now their principal form of savings. According to a recent survey, one in four French people owns at least one mutual fund (generally a money market fund), a higher ratio than in the USA.

The success of money market funds has caused various problems for French banks, whose balance sheets have suffered as deposit money was transferred into MMFs. Unlike US banking institutions, French banks do not lose control of customer assets that are transferred from deposit accounts into short-term funds (they do, however, lose revenue and profits). Instead of large spreads between rates received from loans and those paid on deposits (no interest at all is paid on most demand deposits), MMFs generate management or advisory fees. As has happened in the USA, French money market funds seem to be developing a two tier pricing structure – institutional funds with low advisory and other charges but high minimum amounts, and general purpose funds with relatively high fees and low minimum amounts. Management fees for institutional funds appear to be coming down. For retail money funds, management fees and expense ratios are approximately double the level of institutional funds, and in many cases include some form of sales or redemption fee.

In France, money funds were at first principally a vehicle for corporate treasuries looking for daily liquidity and the market yields prohibited on short-term bank deposits. Their attractiveness to individual investors was greatly enhanced by the authorization in October 1989 of the automatic reinvestment of earnings on a tax-favoured basis. As can be expected in a financial market as highly concentrated as the French market, the top ten banks now account for almost 80% of short-term fund assets. All but Paribas and Indosuez have large retail systems, and many of their money market funds are run for individual investors. Due to higher cost structures, the money funds of the big retail banks tend not to be performance stars, but are generally characterised by low volatility and high portfolio quality.

Elsewhere in Europe, money market and near money market funds have gradually won widespread acceptance. Such funds have done particularly well in those countries where an inverse interest rate structure prevails (where short-term interest rates are high in comparison to long-term rates). It should also be noted that apart from the short-term funds, near money market funds only became possible in some countries, for example in Germany, with the implementation of the EEC Directive for European harmonisation.

Money market funds are not necessarily sure winners in a highly competitive investment environment and must continue to look after themselves, but they do have a natural advantage in their high liquidity. Marc Bayot, chairman of Belguim's investment fund association, feels that money market funds in Europe have only just begun to grow.

2.2 The USA

There are 21 categories of mutual funds in the USA, and money market funds occupy three broad categories, i.e. **state tax-exempt money market funds, tax-exempt money market funds – national and taxable money market funds.**

State tax-exempt money funds (single state funds) work just like other tax-exempt money market funds, except that their portfolios contain the issues of only one state. A resident of that state has the advantage of receiving income free from both federal and state tax.

Tax-exempt money market – national funds invest in municipal securities with relatively short maturities. These are also known as short-term municipal bond funds. The yields on these funds are lower than taxable money fund yields, in order to take into account the extra benefit provided by tax exemption.

Taxable money market funds invest in the short-term securities sold in the money market. These are generally the safest, most stable securities available. These securities include Treasury bills, certificates of deposit of large banks, and commercial paper (Investment Company Institute (a), 1994:15). Money market funds are described by Business Week's Guide to Mutual Funds (1993:47) as:

> *"... the quiet giants of the mutual fund world. In the whole 'scheme of things' they are the safest investments around, and some even rival the security of a bank account. Indeed, at first glance, they look a lot like bank accounts. Interest*

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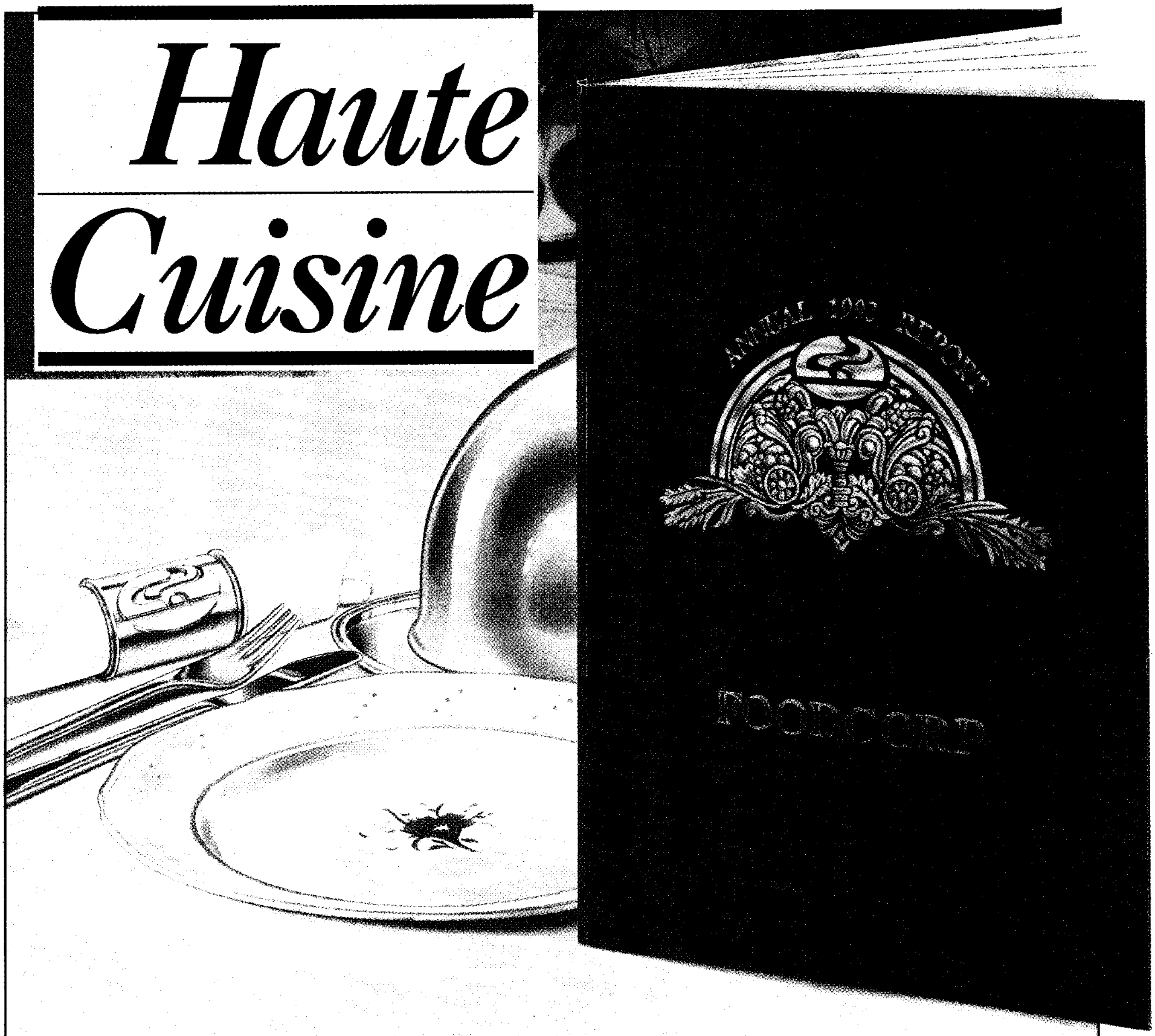

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earned each day is usually credited daily. The payments are technically 'dividends'; but they are the functional equivalent of interest. Unlike stocks and bonds, money market investments are so short-term in nature that the funds are able to maintain their net asset value constant at $1 per share. The small profits and losses in the portfolio can be accounted for by varying the dividend payout. If there's a small capital gain, the fund can pass it along as a little extra yield. By the same token, small losses in principal can be absorbed by the income stream, resulting in a slightly lowered payout."

Most people in the USA use money market funds in one or more of four main ways (The Investment Company Institute (c), 1994:1):

- First, as a "parking place" between financial transactions until the investor has decided which savings or investment route to take.
- Second, as a cash management account where the saver can earn market rates on the money used for ordinary bill-paying.
- Third, as a high yield savings instrument when, because of economic conditions or financial circumstances, other options may be too risky.
- Fourth, as a source of tax-free income, when the saver invests in tax-exempt money market funds (this benefit will most probably not be available in South Africa when money market funds are established).

Even though 1993 year-end yields on USA money market funds declined to an average of approximately 2,8%, the lowest point in 17 years, they remained one of the most spectacular growth stories of the USA investment industry. In 1975 the money fund industry counted only 33 funds with $3,7 billion in assets; by May 1994 it had increased to 935 funds with $578,3 billion in assets. That accounted for around 27,4% of the money invested in all USA open-ended mutual funds ($2,107.8 billion), according to the Investment Company Institute, the USA mutual fund trade association (ICI News, June 29, 1994).

A run-down of money fund characteristics in the USA clearly reveals their enduring appeal to investors.

- **They are totally liquid:** shareholders can withdraw money at any time without penalty.
- **They are pure "no-load" funds:** no sales commission is charged to buy or sell shares. Only an expense ratio of 0,65% of assets, on average, is deducted from shareholders.
- **They are safe:** the investor's principal is protected under SEC regulations in the USA, which structure the funds so that the net asset value remains at $1 a share, and only their yield varies (the net asset values of money market funds in other countries like France and the United Kingdom may vary).
- **They are convenient:** shareholders can usually call a toll-free number to withdraw money, switch assets to other funds, or verify the status of their accounts.

2.3 The UK

Money market (and bond) funds are the backbone of the mutual fund industry in some overseas markets, notably that of the USA and France. The situation in Britain differs quite markedly from that in these two countries. Of the 1 529 authorised unit trusts registered in the UK (June 1994), only 36 are money market funds. This sector accounts for approximately £472,1 million in assets, approximately 0,5% of the £93,1 billion total assets managed by the UK unit trust industry (June 1994). This presents, to say the least, a very different picture from that of the two other markets mentioned above.

MMFs were not permitted as authorised unit trusts in the UK until 1988, though management groups had been pressing for their introduction for some time prior to that date. Since then the number of funds has grown slowly but steadily, though there are still major groups which do not offer a money market fund. All MMFs are grouped in one sector for purposes of performance measurement, though they may vary in nature according to the type of instrument in which they invest. Some, for example, use building society deposits while others do not.

The range of permitted investments for an MMF in the UK includes various types of deposit with a maximum term of six months or twelve months, and government and other public securities whose maturity does not exceed two years. Typically, fund managers tend to keep portfolios towards the shorter end, commonly with a maximum maturity of six months. This is an attempt to protect capital values: going any longer would mean a venture into short-dated gilts, which carry the risk of being affected by a change in interest rates. This in turn could affect the capital value of units. Under the UK Financial Services Act, MMFs, like any other class of unit trust, must carry a "health warning" stating that the value of units can fall as well as rise.

One important problem which MMFs in the UK have had to contend with is the cost of distribution. A high percentage of unit trusts is sold through intermediaries, who earn a 3% commission which is paid from a front-end charge ranging between 5%-6,5%. Loading an MMF with such a high front-end charge is not feasible, since the effect carries straight through to both the yield figure and the actual performance. Managers of MMFs have had to make the decision either to charge and see their yield look uncompetitive, or not to charge and lose out on profits.

3. MONEY MARKET FUNDS, MONEY SUPPLY AND MONETARY CONTROL

One concern that is mentioned regarding the establishment of money market funds and its perceived effect on a country's money supply and the effectiveness of monetary control is that the use of money funds might alter or diminish the effectiveness of monetary operations, even in an open economy. Whether or not this will apply depends on the choice of monetary instruments. In the case of the UK, it does not matter whether a deposit is made in a cash fund or a bank deposit (the prime instrument of monetary policy is the price of money, i.e. short-term interest rates).

Mr Philip Warland, Director-General of the British Association of Unit Trusts and Investment Funds, argues that "there is not the slightest evidence in theory or in practice that cash funds will make any difference to economic management, except in a few extremely carefully defined cases" (1993:1).

However, in Germany and other countries, including the USA, it has been traditional to use reserve requirements to influence or affect monetary policy. In the UK these requirements have seldom been used because the monetary authorities take the view that altering reserve requirements on a bank is merely another way of altering the marginal price (interest rate) of money. If this applies, the use of cash funds has no impact on monetary policy.

Cash funds may, however, reduce from the profitability of banks and building societies. Cash funds pool small depositors' money and get a large depositor's rate for it. They thus drive a wedge into the usually wide margins between deposit and borrowing rates for private individuals from banks. In doing this, cash funds might be thought to be performing a welcome economic service in intermediating money at the lowest possible cost and offering savers the highest possible rewards. The viewpoint of Mr Graham Barker, executive director of Fidelity Investments (UK), in this regard is also very relevant. *"It is sometimes mentioned that money market funds may destroy the banking system of a country. This fear is totally unfounded. Money will only go around in a circle and will in the end most probably be invested in banking instruments. However, banks will have to accept (becoming) more competitive because of the existence of money funds" (1993).*

Monetary control and money market funds in the US used to be a contentious issue up to the early 1980s. The growth in the number and market value of USA money market funds has raised concern in various quarters, especially during the three year period (1979-1981) when the growth rate in MMFs was particularly rapid. From the end of 1978 to November 1981, the market value of the assets of MMFs has increased more than sixteen-fold. It would seem, though, that the arguments set forth by Warland were accepted as valid in the USA more than a decade ago. Very few recent articles are available about these concerns.

MMFs have features which make them hard to tell whether the public will use them primarily to make payments or to save. They are "chequeable" like demand deposit accounts, and in many cases an unlimited number of cheques can be written on these accounts at a relatively low cost. But they are also like savings accounts, since (unlike demand deposits) they earn interest at nearly competitive market rates. So MMFs, in a sense, dominate demand deposits. Investors are attracted to MMFs by the safety of their principal, high yields, liquidity and limited cheque-writing facilities.

There are, however, some constraints on the MMF accounts which demand deposits do not share. They typically require a minimum cheque size in the order of $500 and a substantial minimum balance. Moreover, they are not federally insured. The USA's financial system continues to evolve with new innovations which seemed to blur the distinction between transaction balances and other monetary assets even further. New ways are developed to provide access to funds invested in MMFs, which over time made them closer substitutes for transaction accounts.

Whether MMFs are used for transactions or for savings became important to the USA Federal Reserve Board (the Fed) once the extreme popularity of these assets became clear. Their rapid growth forced the Fed to decide whether these assets should, for monetary policy making purposes, be counted as part of its primary definition of money supply (M1), which consists of assets that are actively used for transaction purposes. A study by the staff of the Fed's Board of Governors concluded that only a minor portion (from 1 to 3 percent) of the balances of these assets was used that way *(Moran and Furlong, undated article).* In the light of such empirical evidence, the Federal Reserve chose to exclude MMFs from the M1 definition of money supply.

Hubbard (1983:1305) notes that the Board of Governors of the Fed at one time requested the authority to extend reserve requirements to chequeable MMFs to avoid further erosion of monetary control; the argument for reserve requirements is based on the potential use of chequeable MMFs as transaction balances. "As suggested by *Goodfriend, et al. (1980)* and *Hester (1981),* the movement of funds from reservable deposits in depository institutions to MMFs to be used as transaction balances outside the reserve requirement system further loosens the link between reserves and money" *(Hubbard: 1305).* Hubbard's paper discussed the effect of the substitution of MMF deposits for transaction balances at depository institutions on monetary control and tested the hypotheses that MMF deposits are a substitute for money in traditional money demand models, and thus should be considered part of M1 and subject to the regulations imposed on other transaction accounts.

Hubbard found that the substitution of chequeable MMF accounts for transaction accounts at depository institutions is technically feasible, but that there is no evidence that chequeable MMFs significantly affect the demand for money as a substitute for demand deposits. The low turnover rate of MMF accounts supports those findings. Therefore, an extension of the USA Monetary Control Act to include money market funds appeared unwarranted at that stage (1983).

4. ASSESSING THE OPPORTUNITIES FOR UNIT TRUST MANAGEMENT COMPANIES IN SOUTH AFRICA

4.1 Introduction

Since 1993 the possibility of establishing of money market funds in South Africa has received considerable attention. The Financial Services Board established a study group chaired by Dr Gad Ariovich (previous deputy executive officer of the FSB) to investigate the establishment of this type of unit trust. It met for the first time in September 1993 and the final report and recommendations regarding the establishment of money market funds were issued during August 1994.

4.2 Possible benefits of the establishment of money market funds in South Africa.

The establishment of money market funds in South Africa is regarded as an important new avenue for short-term investments in an industry in which the public has a great deal of confidence. Heightened sophistication of private investor cash management will be facilitated. The more advanced funds may be able to provide chequeing facilities for investors, ATM access, "sweep facilities", credit card access and interface, etc. (The largest cash trust in the UK, Fidelity Trust, offers investors with more than £5 000 a chequebook and Gold Mastercard).

Money market funds are also ideal parking bays for investors. The shorter dated maturity profile of a money market fund substantially reduces risk and facilitates the maintenance of a constant made-up unit price – typically R1 (or $1 or £1). The diversification of exposure to government, quasi-government, corporate and financial institution short-term paper also reduces risk as well as affording access to instruments that do not normally form part of household assets.

Competition for the public's short-term investments will intensify, not only between unit trust management companies, but also between the unit trust industry and the banks. This will create a more effective service to the public. It will tend to reduce/eliminate grey market activities in short-term money, i.e. it will introduce a regulated, secure environment (as opposed to uncontrolled, unregulated structures), which could result in active participation by financial institutions in money market funds.

Investor protection in general will be greatly enhanced because of the regulatory framework relating to the unit trust industry. The transparency to the public includes the daily publication of prices and yields and also the compulsory reporting requirements of the unit trust industry.

Active portfolio management should achieve higher yields (wholesale interest rates) to the benefit of the public at large. The development of money market funds could act as an important vehicle for expanding the commercial paper market. This will introduce an important new source of funding for businesses in South Africa, as well as increased diversification in the investable assets available to the public.* The development of money funds should further act to reduce the cost of capital to businesses in South Africa.

The introduction of money market funds could reduce the gap between wholesale and retail interest rates. This may result, on the one hand, in lower payments of interest rates by issuers of money market instruments and, on the other hand, in higher interest rate returns to savers. Indeed, it appears that countries which have a well-developed money market fund industry, there also tends to be a smaller difference between wholesale and retail deposit rates.

The introduction of money market funds to South Africa will provide tangible evidence to the local and international communities of the authorities' commitment to free enterprise and competition as well as to the promotion of consumer interests. In the rapidly emerging middle class in South Africa there is a proven need for structured savings vehicles. In a way the unit trust industry is a formalised "stokvel" and emergent investor access to the more sophisticated types of financial instruments will be facilitated.

Money market funds will also facilitate the accelerated development of the unit trust industry in line with the global trend, where the industry has become one of the major components of the financial markets.

A large amount of public investment in South Africa has traditionally been placed in fixed deposits. As money market funds improve the yields obtainable by means of the pooling/combining of investments, there will be less need to fix investments for long periods and therefore there will be greater liquidity for investors.

4.3 The structure of money market funds within the SA unit trust industry

It is envisaged that the fundamental structure for money market funds will be no different from the prevailing unit trust structure.*

- Money market funds will be controlled by the same act (Unit Trusts Control Act 1981, as amended).
- They will be subject to the same criteria relating to management company credentials and capital, as well as to the other requirements.
- They will be subject to the same requirements relating to trust deeds, the custody of assets, reporting requirements and annual audit requirements.
- They will provide for daily pricing, regular income distribution, quarterly and annual reporting.

Separate or amended provisions in the Act will be required, specifying the permitted investable assets, portfolio maturity limitations and other investment limitations which may be considered desirable for money market funds specifically.

4.4 The use of a constant unit price versus an accumulating unit price for money market funds in South Africa

The use of a constant unit price (R1) versus an accumulating unit price for money market funds introduces a number of interesting arguments for and against both practices. Since 1965, unit trusts in South Africa have used an accumulating unit price for the pricing of all funds.

The communication of the yield on a money market fund investment based on a constant net asset value (NAV) of R1 reflects a more realistic and "understandable" picture to the client. For example, if five cents per unit have been earned during one specific quarter, the yield on R1 is calculated simply as 5% (=5/100)** In the case of an accumulating unit price, the yield quoted in the daily financial press will be shown as 4,76% (=5/105), with the cum dividend price (105 cents) reflecting the accumulation of interest during the past quarter. The charges levied by the money fund will accrue on a daily basis and not be charged upfront (i.e. in one lump sum).

The concept of an NAV of R1 is also simple to understand and creates the perception of stability in the minds of investors. It is easier to compare with other investment alternatives. A substantial benefit from the client's point of view is that he/she knows immediately what the value of his/her investment is.

A possible disadvantage is that the R1-NAV concept may create confusion among the public, because it differs from the current system of an accumulating (increasing) value per unit. A further disadvantage from the perspective of the management company may be that different administration systems will have to be introduced and developed. The cost involved in additional systems requirements may prove to be considerable. Another question is why the management company should make an additional investment in systems when they already have a system that operates satisfactorily. Finally, a general disadvantage to money market funds is the fact that a relatively large number of transactions per day have to be accommodated by the operating system of the money market fund, compared to equity and gilt/income funds.

Another viewpoint put forward regarding the potential advantages of the R1-NAV concept comes from Barker (1993), who argues as follows:

> "*. . . the most fundamental reason why money funds operate quoting a constant unit price rather than an accumulating one is the fact that, to be effective, a money fund should look as much like a bank account as possible. With a constant unit price, an investment of R1 000 at R1 a unit buys 1 000 units. The investor always has 1 000 units, except for additions to his holding by way of interest. Whether interest is credited daily, monthly or at some other interval, is irrelevant. The customer simply gets more units at R1 each. This makes a money fund much easier to understand for the average investor and easy to compare with a bank account. With a constant net asset value of R1, the number of units held always equals the value in rands. With an appreciating net asset value, the customer needs to know the price in order to arrive at the total value of their investment.*"

A major advantage of an accumulating price is the fact that in some countries it provides tax benefits. The investor buys a share where the interest accumulates and is not subject to tax until a redemption occurs. When redeemed, a capital gain (equal to the interest accumulated) is made and this gain may be tax free or taxed at a lower rate than deposit interest. Using an accumulating fund, an investor can compound gross interest for many years until he/she decides to make a redemption.

However, there can be a serious disadvantage in using an accumulating fund for frequent transactions. Where only part of the investment is realised, it may be difficult to calculate the gain for tax purposes. With a constant net asset value any ad-

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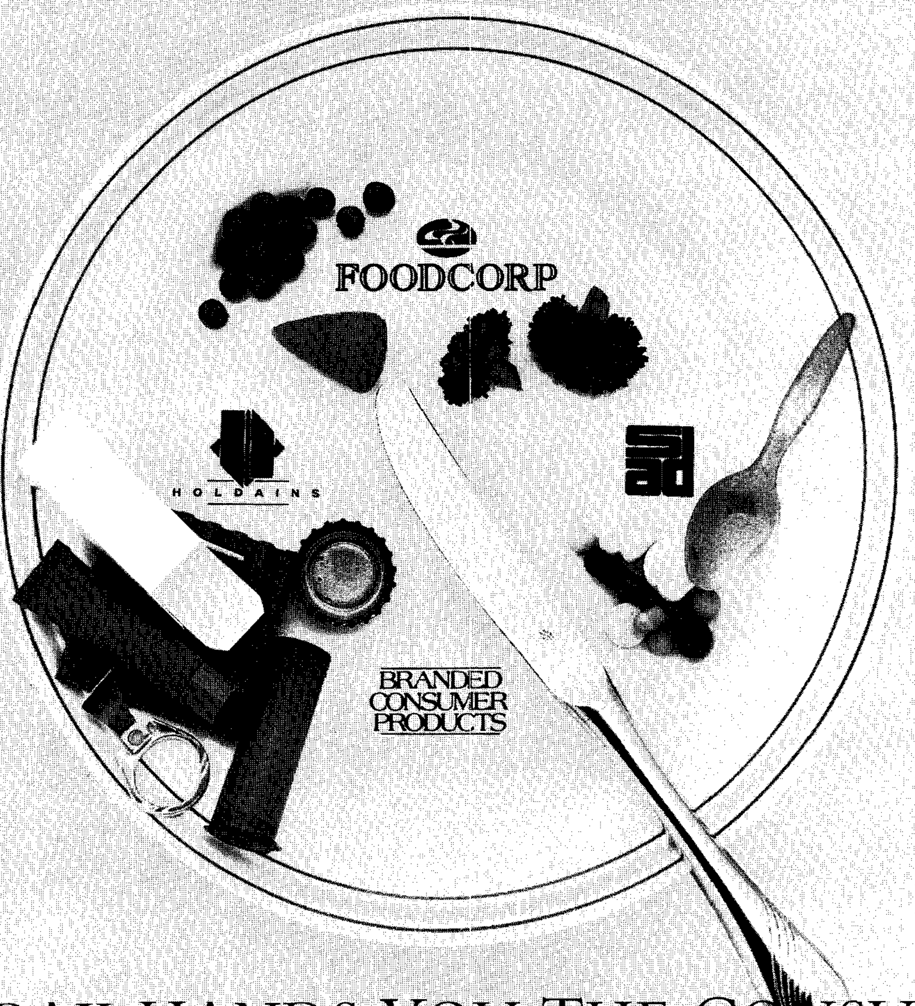

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ditional units received will represent the interest earned and the calculation will be simple. In addition, if there is an obligation to deduct tax at source, the investor simply gets credited with fewer units than if he can be paid gross.

A money market fund's yield and its unit value (R1 or US$1) is calculated on the basis that each of its holdings will pay the promised interest rate and be redeemed at face value at maturity. If a particular security were to suddenly drop in value, this may not materialize. Depending upon the size of the fund's holding of that issue, the fund's yield, its net asset value or both may change. If the fund's holding is relatively small, fund management may be able to offset the loss to the fund by temporarily reducing the fund's dividends and, therefore, its yield. If the position is more significant, the fund may have to reduce its share (unit) value. In such a case, the fund's share value would probably fall from R1 per share to 97 or 96 cents. The unitholder's annual return would remain positive, although possibly reduced from perhaps 8 or 10 percent to 6 percent, as the other securities in the portfolio would continue to earn income, which would be passed on to unit holders. The depreciation in net asset value and reduction in return would depend on the individual portfolio's exposure to the particular security. The decline in the value of a particular portfolio security would not affect any of the fund's other holdings. The fund's management could then decide to leave its share (unit) value at the lower level and could continue to pay a competitive yield or the dividend could be reduced allowing undistributed income retained by the fund to offset the capital loss. This strategy would gradually increase the fund's net asset value. Once it returned to the R1 level, the normal dividend level could be resumed (The Investment Company Institute (a), 1994:8).

4.5 Conclusion

Some overseas money market fund operators are of the opinion that unless there is a specific tax and/or monetary inducement to invest in a money market fund, these new instruments would initially not attract a great deal of interest from the investors' public in South Africa. This is certainly the case in the UK, where MMFs have not yet succeeded in attracting large deposits from the general public (one of the main reasons for MMFs' relative failure to succeed in Britain is, of course, the very strong position of the building societies in that country).

The above viewpoints are strongly disputed by some prominent local fund managers. It is argued that MMFs will be successful in South Africa, because they will be able to offer slightly higher interest rates (wholesale rates versus retail interest rates) to the public. It is believed that the opportunity to earn higher interest rates on relatively small deposits will assure the success of this new industry, should it be established in South Africa.

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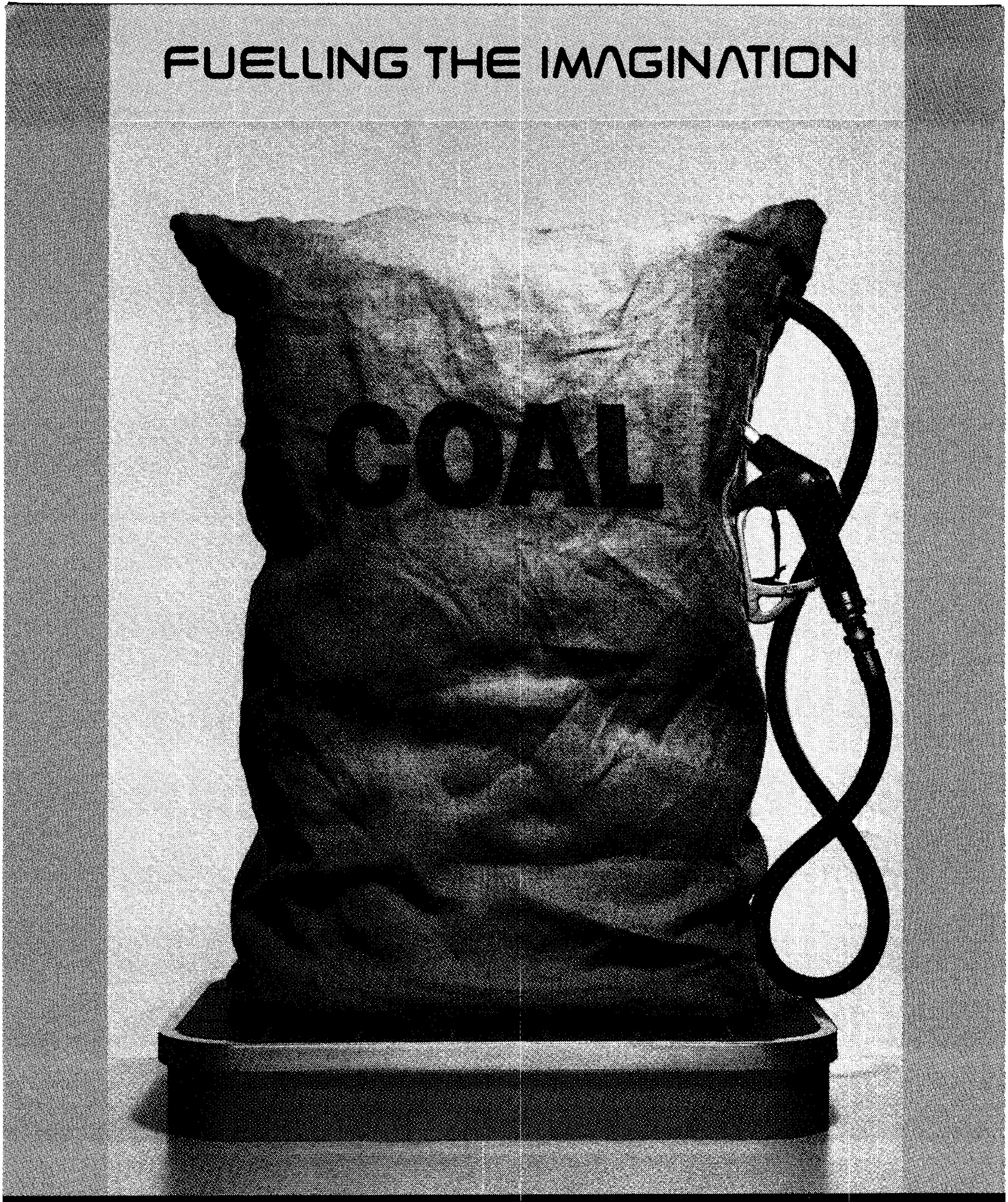

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Market timing and share returns

The relationships between business cycle peaks and troughs and turning points in two value indices based on the JSE All Share Index and Industrial Index are examined. It is shown that *ex post* and *ex ante* estimates of cyclical peaks and troughs based on share value indices lead the business cycle in an inconsistent way. However, timing strategies, based on forecasting the business cycle and switching between equities and treasury bills or equities and bonds around cyclical turning points have produced better than average returns.

1. INTRODUCTION

Stockbrokers, banks, insurance companies and other members of the investment community employ a number of high-profile economists, whose duties include, inter alia, forecasting the business cycle. The combined advice of these people have been such that historically, the share market has been one of the most sensitive leading indicators of real economic activity. Mitchell and Burns (1938), Burns (1950) and Moore (1961) have all highlighted the leading characteristics of share price indices in forecasting the business cycle. In an analysis of business cycles in the United States since 1945, Siegel (1991) shows that the monthly index of share returns reaches a peak from zero to fourteen months (with an average of 6,4 months and standard deviation of 4,6 months) before the onset of nine recessions. Returns reach a trough with leads which vary from four to nine months (with an average of 5,2 months and standard deviation of 1,55 months) before the onset of the recovery phases. In South Africa the leading indicators devised by Van Coller (1980) and Van der Walt (1983) incorporate share price information.

In spite of the combined evidence of the value of share market information in predicting real economic activity, there are those who doubt the usefulness of such an approach, especially after the share market crash of 1987 was not followed by a recession. As early as 1966 Samuelson has remarked that "The stock market has predicted nine out of the last five recessions" (Samuelson, 1966, p. 92). Siegel (1991, p. 29) modified this remark to "declines in the stock market have predicted fifteen of the last nine recessions, missed one downturn, and called two others late!" A recent South African study has also turned down the idea that share returns provide reliable forecasts of real economic growth, having found very little evidence of causality between share returns and real growth, and unstable relationships between turning points in share return indices and business cycle indices (Smit and Van Rooyen, 1993).

The theoretical relationship between share returns and real economic activity stems from the standard valuation formula for risky assets in an efficient market. The expected return over period t to t+1 of a market portfolio with dividends reinvested, R_{t+1}, is the sum of two terms, namely the risk-free return, $r_{f,t}$ and a risk premium, p_t. Therefore

$$\begin{aligned} E_tR_{t+1} &= (E_t(S_{t+1}) - S_t + D_t)/S_t \\ &= r_{f,t} + p_t \end{aligned}$$

with S_t and D_t the share price and dividend in period t respectively. Under certain general conditions (Poterba and Summers; 1986) S_t can be solved to provide the standard valuation formula according to which the current share price reflects the expected present value of future dividend streams, i.e.

$$S_t = E_t \sum_{i=0}^{\infty} D_{t+i} / (\prod_{s=0}^{i} (1 + r_{f,t+s} + p_{t+s}))$$

Real economic variables form the determinants of future dividend streams, economic growth being the basis of corporate profits. In theory, however, the effect of the business cycle on share prices may be swamped by other factors. Firstly, returns and production may react *jointly* to other variables. A decline in discount rates, for example, may cause rising share prices, but can also lead to an increase in the production of capital goods associated with an economic upswing. Cochrane (1991) shows that variables such as the time premium, lagged returns and dividend-price ratios which are used to explain share returns, are also explanatory variables for investment and real growth. Secondly, a decline in interest rates, usually associated with a recession, may offset the drop in expected future cash flows, thus leading to rising share prices. A third possibility is that share returns may be causal to changes in real activity. Increasing share prices lead to higher levels of wealth, which in turn may lead to an increasing demand for consumer and capital goods.

Should these intervening factors dominate the standard valuation formula, it may not be worthwile to employ scarce resources to forecast the business cycle. This article examines the relationship between share returns and the business cycle and argues that despite the frequent poor relationships between movements in the share market and the business cycle, share returns can be enhanced by switching between equities and cash, equities and riskless treasury bills, or equities and government bonds before business cycle turning points.

In the next section the relationships between business cycle turning points and turning points in value indices based on the JSE All Share Index and Industrial Index are examined, by defining both *ex post* and *ex ante* measures by means of which the value indices may be utilised as predictors of business cycle turning points. In a third section share, treasury bill and bond returns are analysed using different market timing strategies.

2. THE JOHANNESBURG STOCK EXCHANGE AND THE BUSINESS CYCLE

For studying the relationship between capital market performance and the business cycle, a number of cumulative value indices were constructed by Smit, Mostert and Hamman (1993) based on the methodology of Ibbotson and Sinquefield (1976). The first two indices are cumulative value indices based on the All Share and Industrial Indices. Monthly values of these indices include all capital appreciation plus dividends. A third index is a cumulative value index for long term government bonds based on yearly yields obtained from Quarterly Bulletins of the SA Reserve Bank. A fourth index utilised is a cumulative value index for short term treasury bills. Monthly discount rates were transformed into tender prices, from which yields were determined by net present value calculations.

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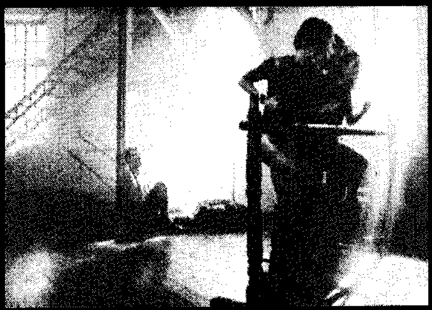

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Peaks and troughs in the value indices are compared with official peaks and troughs in the South African business cycle (S.A. Reserve Bank, 1993). Table 1 summarises these relationships over seven recessions since 1960. Column 1 reflects the peak month of the value index *during the preceding expansion phase.* It may be seen as an *ex post* estimate of the peak of the value index since the timing of the upper turning point is known. Column 5 provides an indication of the months between a cumulative decline of at least 8% in the value index over the preceding expansion phase and the peak month of the business cycle. The cumulative decline is measured over a period not exceeding 12 months and the decline must have been followed by a recession within the next 24 months. This may be seen as an *ex ante* criterion to judge when a market decline has begun.

TABLE 1
Recessions and share value indices

Peak month of share index (1)	Peak month of business cycle (2)	Lead time between peaks (months) (3)	Decline in share index from (1) to (2) (%) (4)	Months between 8% share index decline and (2) (5)
All Share Value Index				
March 1965	April 1965	1	-2,4	10
February 1967	May 1967	3	-2,7	n.a.
April 1969	December 1970	20	-52,1	18
March 1974	August 1974	5	-15,5	12
October 1980	August 1981	10	-11,3	8
April 1984	June 1984	2	-2,2	8
February 1989	February 1989	0	0	16
Average		**5,8**	**-12,3**	**12,0**
Standard deviation		**7,1**	**18,4**	**4,2**
Industrial Share Value Index				
March 1965	April 1965	1	-1,8	10
April 1967	May 1967	1	-2,3	n.a.
May 1969	December 1970	19	-55,5	18
June 1973	August 1974	14	-35,2	11
August 1981	August 1981	0	0	8
April 1984	June 1984	2	-3,9	n.a.
February 1989	February 1989	0	0	16
Average		**5,3**	**-14,1**	**12,6**
Standard deviation		**7,8**	**22,2**	**4,2**

The All Share Value Index peaked from zero to twenty months before the start of a recession. The last recession (starting in March 1989) is the only one amongst the seven recessions for which this index gave no warning of an economic downturn. The Industrial Share Value Index peaked from zero to nineteen months before the onset of a recession, and gave no warning of two recessions, using this *ex post* criterion. In both cases, the value indices give rise to very unstable estimates of the lead times between peaks. In both cases the standard deviation of the lead time exceeds the mean.

Using the *ex ante* criterion of an 8% cumulative decline in the value indices, the share market leads the business cycle by an average of 12 months in the case of the All Share Value Index, ranging from lead times of 8 to 18 months and by an average of 12,6 months in the case of the Industrial Share Value Index, ranging from lead times of 8 to 18 months. In the first case one downturn was unannounced, while in the second case two downturns remained unannounced. In the case of both indices, the lead times between the *ex ante* measures and business cycle peaks are much more stable than in the case of the *ex post* measures. Using this criterion and the All Share Value Index, one false downturn was predicted in November 1978.

TABLE 2
Expansions and share value indices

Trough month of share index (1)	Trough month of business cycle (2)	Lead time between thoughs (months) (3)	Rise in share index from (1) to (2) (%) (4)	Months between 8% share index rise and (2) (5)
All Share Value Index				
April 1961	August 1961	4	25,7	11
November 1965	December 1965	1	3,7	7
August 1967	December 1967	4	21,2	6
October 1971	August 1972	10	95,2	17
August 1976	December 1977	16	56,5	19
June 1982	March 1983	9	95,1	18
February 1985	March 1986	13	64,7	20
Average		**8,1**	**51,7**	**14,0**
Standard deviation		**5,4**	**36,2**	**5,9**
Industrial Share Value Index				
August 1960	August 1961	12	29,1	9
August 1965	December 1965	4	4,2	n.a.
August 1967	December 1967	4	13,4	6
October 1971	August 1972	10	62,3	16
August 1976	December 1977	16	36,3	24
June 1982	March 1983	9	72,5	18
September 1984	March 1986	18	58,8	18
Average		**10,4**	**39,5**	**10,0**
Standard deviation		**5,4**	**25,9**	**3,4**

The ability of the share market to predict recoveries is better than its ability to predict recessions. Table 2 compares the troughs in the share value indices with official business cycle troughs. In terms of the *ex post* criterion the average lead time for the All Share Value Index is 8,1 months with a standard deviation of 5,4 months, compared to the average lead time for the Industrial Share Value Index of 10,4 months with a standard deviation of 5,4 months. In both cases the lead times are longer and more stable than those for recessions. Waiting for an 8% rise in the value indices gives rise to average lead times of 14 and 10 months respectively, with corresponding standard deviations of 5,9 and 3,4 months. In the case of the Industrial Index, one upturn went unannounced, while two false upturns were forecast in September 1974 and June 1976, using the All Share Value Index.

Using the All Share Value Index, the South African experience may be summarised as follows: declines in the share market have predicted eight of the last seven recessions and missed one downturn, while increases in the share market have predicted nine out of the last seven expansions without missing one upturn.

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TABLE 3
Months between a turning point in the All Share Value Index and the business cycle turning point for various filters

	6%	8%	10%
Peaks			
April 1965	10	10	n.a.
May 1967	n.a.	n.a.	n.a.
December 1970	18	18	18
August 1974	13	12	11
August 1981	17	8	8
June 1984	9	8	8
February 1989	16	16	16
Average	**13,8**	**12,0**	**12,2**
Standard deviation	**3,8**	**4,2**	**4,6**
Troughs			
August 1961	11	11	11
December 1965	7	7	7
December 1967	6	6	1
August 1972	18	17	16
December 1977	23	19	19
March 1983	18	18	18
March 1986	20	20	20
Average	**14,7**	**14,0**	**13,1**
Standard deviation	**6,7**	**5,9**	**7,1**

The trade-off between the filter size and the timing relationships are examined in Table 3 for filter values of 6%, 8% and 10% respectively. As the filter size is increased from 6% to 10%, lead times tend to be shorter, while standard deviations tend to increase slightly. Only one additional case is noted where a subsequent recession goes unpredicted. The conclusion is that the results of the analysis are not very sensitive to the size of the filters, for filters in the chosen range.

3. SHARE, TREASURY BILL AND BOND RETURNS OVER BUSINESS CYCLES

Table 4 contains the summary measures of the lengths of business cycle phases over the post-war period as well as the period from 1961 to the end of 1991. It also contains the arithmetic means of the returns from investing in shares (the JSE All Share Index and treasury bills. These returns were calculated from value indices constructed by Smit, Mostert and Hamman (1993). Over the entire post-war period recessions had an average length of 18,07 months and expansions an average length of 25,83 months. Since 1961, the average length of recessions is 19,63 months, with expansions averaging 30,71 months.

TABLE 4
Share and treasury bill returns in expansions and recessions

	Period	
	1946-1991	1961-1991
(i) Average length of recession (months)	18,07	19,63
(ii) Average length of expansion (months)	25,83	30,71
(iii) Average length of a business cycle (months)	43,90	50,34
(iv) % of time in recession	43,11	42,20
(v) % of time in expansion	56,88	57,80
(vi) Average annual arithmetic return on shares (%)		17,35
(vii) Average annual arithmetic return on treasury bills (%)		7,07
(viii) Benchmark returns ((vi) x (v)+(vii) x x(iv)) (%)		13,01

From 1961 to 1991 the average annual return from investing in the share market is 17,35%, while the average return is 7,07% from investing in risk-free treasury bills. A benchmark return is defined as the weighted average of the overall share and treasury bill returns over the period, weighted by the time the economy is in an expansion (for shares) and a recession (for treasury bills). The benchmark returns reflect a policy of switching between shares and treasury bills during expansions and recessions. It reflects a risk-adjusted return. The benchmark return is used to calculate excess returns from various timing strategies.

Three different investment strategies are compared. A first strategy follows from switching from equities to cash around upper business cycle turning points and back around the lower turning points. In a second strategy cash is replaced with short-term (91 day) treasury bills, and in a third strategy, equities are substituded for long-term government bonds around business cycle turning points.

Table 5 reports returns from being 100% long in shares during economic expansions and 100% long in cash during recessions. These returns, which assume that investors can correctly time peaks and troughs, are presented in the row "Concurrent". Returns are also presented for an investor who switches from cash to shares from one to six months before the trough of the cycle and from one to six months after the trough. Investors who have followed a strategy of switching from cash to shares before the trough of the business cycle have performed better than those who have waited too long. The gain from switching between shares and cash six months before turning points, compared to six months after, is about 400 basis points per year. The performance of an investor who had been 100% long in shares over the full period, however, would have been almost 500 basis points per year up on the six-month leader. Also, in all cases, the excess returns are negative, reflecting the opportunity costs of the cash position.

TABLE 5
Average annual returns and excess returns: invested in shares during expansions and cash during recessions (%)

	Average annual arithmetic returns (%)	Excess returns (%)
6-month lead	12,54	-0,47
5-month lead	12,54	-0,47
4-month lead	12,73	-0,28
3-month lead	11,58	-1,43
2-month lead	11,05	-1,96
1-month lead	11,49	-1,52
Concurrent	10,81	-2,20
1-month lag	10,11	-2,90
2-month lag	10,23	-2,78
3-month lag	9,32	-3,69
4-month lag	9,34	-3,67
5-month lag	8,53	-4,48
6-month lag	8,54	-4,47

Table 6 reports returns from being 100% long in short-term treasury bills during downswings. Different timing strategies are examined. It is clear that investors have increased their returns by switching into treasury bills before the peak of the business cycle and into shares before the trough. The gain from switching between shares and treasury bills six months before business cycle turning points, compared to six months after, is about 550 basis points per year. Excess returns are positive for switches between shares and treasury bills with lag periods as long as four months after business cycle turning points.

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TABLE 6
Average annual returns and excess returns: invested in shares during expansions and treasury bills during recessions (%)

	Average annual arithmetic returns (%)	Excess returns (%)
6-month lead	18,71	5,70
5-month lead	17,96	4,95
4-month lead	17,80	4,75
3-month lead	16,71	3,70
2-month lead	15,91	2,90
1-month lead	15,87	2,86
Concurrent	15,06	2,05
1-month lag	15,69	2,68
2-month lag	15,56	2,55
3-month lag	14,95	1,94
4-month lag	14,28	1,27
5-month lag	12,38	-0,63
6-month lag	12,26	-0,75

Table 7 presents returns from being 100% long in shares during economic upswings and 100% long in long term government bonds during recessions. These returns which assume that investors correctly time peaks and troughs, are presented in the row "concurrent". Returns are also tabulated for investors who switch from shares to bonds from one to six months before, and one to six months after business cycle troughs. Superior positions are achieved from correctly forecasting the turning points and switching at least before four months after the turning point. The gain from switching between shares and bonds six months before turning points, compared to six months after, is about 500 basis points per year. The performance of an investor who switched between four and six months before turning points, also improves on that (risk unadjusted) of an investor who had been 100% long in shares over all business phases, although not substantially so.

TABLE 7
Average annual returns and excess returns: invested in shares during expansions and long term government bonds during recessions (%)

	Average annual arithmetic returns (%)	Excess returns (%)
6-month lead	17,59	4,58
5-month lead	17,89	4,88
4-month lead	18,26	5,25
3-month lead	16,96	3,95
2-month lead	15,53	2,52
1-month lead	16,06	3,05
Concurrent	15,33	2,32
1-month lag	14,55	1,54
2-month lag	14,80	1,79
3-month lag	13,70	0,69
4-month lag	13,54	0,53
5-month lag	12,79	-0,22
6-month lag	12,37	-0,64

Siegel (1991) argues that if investors could perfectly forecast future cash flows arising from holding shares, share returns would be independent from cyclical swings in corporate earnings. Share prices would only move sufficiently to compensate shareholders for the small cyclical dividend patterns. Large changes in share prices before business cycle turning points represent the degree to which future corporate earnings, or changes in the discount rate, are surprises. In his analysis Siegel (1991) found that prior to the Second World War shareholders were able to earn a better return than in a buy-and-hold strategy by recognising business cycle turning points as they occurred, or even up to three months after they occurred. Since the war investors have had to be able to respond before the official cycle turning points to gain a better than average return.

The South African evidence points in the same direction. Reacting to business cycle turning points before the official dates leads to increased average returns. Ignoring risk-adjusted returns, a buy-and-hold strategy is only bettered by switching between shares and bonds between three to six months before cyclical turning points.

4. CONCLUSION

Share returns are still utilised as an important indicator of the business cycle. In an *ex post* analysis it is shown that peaks in the All Share Index lead peaks in the business cycle with lead times that vary greatly, ranging from 0 to 20 months, an average of 5,8 months and a standard deviation of 7,1 months. Troughs in the All Share Index lead business cycle troughs with lead times that range from 1 to 16 months, with an average lead time of 8,1 months and standard deviation of 5,4 months. Upswings in the business cycle apear to be better forecast by the share index than downswings. An *ex ante* measure of prediction, namely waiting till the share index has increased or decreased by 8%, leads to more consistent results with an average lead time of 12 months before peaks (with a standard deviation of 4,2 months) and 10 months before troughs (with a standard deviation of 3,4 months).

Despite the weak relationship between share returns and business cycle turning points, it is profitable to predict the business cycle for timing share and bond investments. By switching from shares to treasury bills or bonds before cyclical peaks and back to shares before troughs, the average annual return can be enhanced. The salaries of economists with the ability to forecast cyclical turning points are thus well justified.

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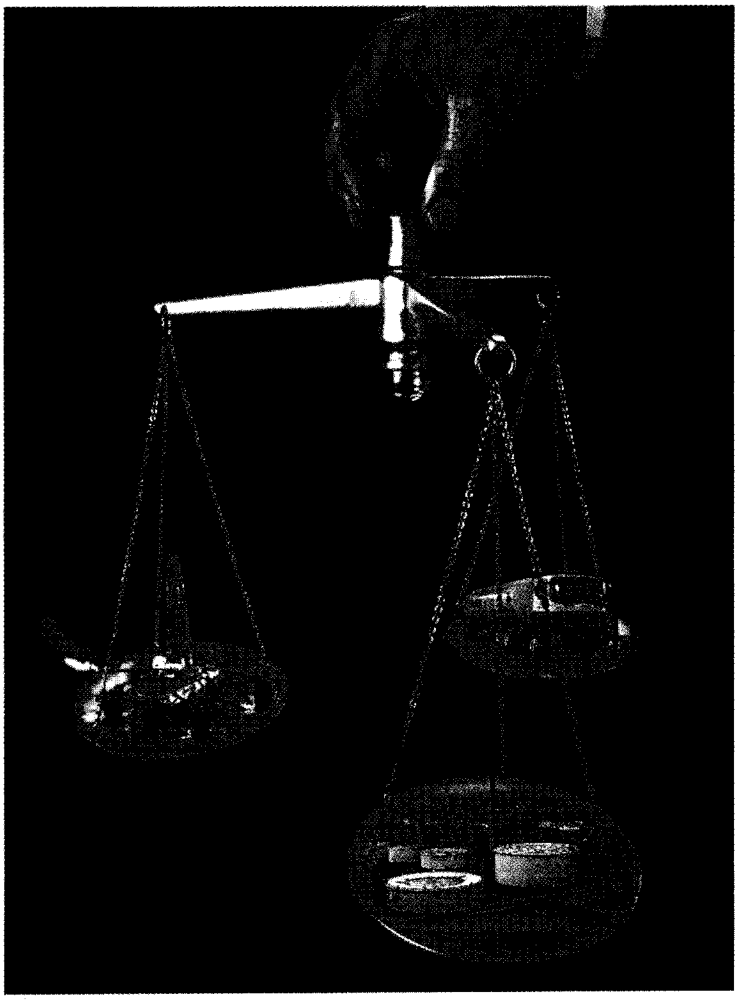

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J. U. de Villiers, Department of Business Economics, University of the Witwatersrand

Inflation and Price-earnings ratios

This paper studies the effect of inflation on price-earnings ratios. The analysis shows that price-earnings ratios could be expected to decline with increased inflation. This effect is more marked for firms employing short-lived assets than for firms employing assets with a longer life. Under high inflation investors should therefore expect lower price-earnings ratios from firms employing short-lived assets. They should expect price-earnings ratios to decline with increasing inflation. International investors should expect lower price-earnings ratios in economies with high inflation.

INFLATION AND PRICE-EARNINGS RATIOS

Price-earnings ratios are used by investment analysts for share evaluation, and by corporate finance analysts to estimate cost of capital. The effect of inflation on price-earnings ratios is important for both these applications if shares are analysed in high inflation environments, when comparing price-earnings ratios to historical ratios achieved under different inflation rates, and when making comparisons between countries with differing inflation rates.

This paper studies the effect of inflation on price-earnings ratios and finds that price-earnings ratios can be expected to decline with increasing inflation. The extent of this decline depends critically on the life of assets employed. It is more marked for firms employing short-lived assets than for firms employing long-lived assets.

The reason for the decline in price-earnings ratios is a distortion of the earnings figure produced by conventional accounting methods. This distortion remains even if the earnings figure is deflated in an effort to calculate real earnings. The reported earnings figure does not provide an accurate indication of true profitability or of the cash available for dividends and growth. In order to analyse this distortion, the paper adapts a model used by Bierman (1990) to analyse price-earnings ratios. The adapted model accounts for the difference between accounting profitability and true profitability as well as the difference between accounting profits and cash flow. The expanded model shows that the theoretical price-earnings ratio declines monotonically with an increasing inflation rate.

Previous research undertaken into the effect of inflation on price-earnings ratios is first discussed below. One of the models used in previous research is then extended, and an expression is derived for the price-earnings of a theoretical firm under inflation. This relationship, as well as its significance for share analysis, is then discussed. This is followed by a discussion of the significance of the simplifying assumptions of the model for interpreting the results. The conclusions of the paper are presented in its last section.

PREVIOUS RESEARCH

It is generally believed that fully anticipated inflation should have no effect in real terms. The real stream of a firm's earnings and its real value should remain unchanged. Modigliani and Cohn (1979), arguing along these lines, conclude that inflation should have no effect on the price-earnings ratios of firms. More recently, Bierman (1990) who bases his calculation of the share price on the dividends a firm can pay, comes to the same colclusion.

Although researchers expect price-earnings ratios not to be influenced by inflation, the opposite is observed in practice. Modigliani and Cohn (1979) observed a decline in price-earnings ratios in the United States from the late 1960's to the end of 1977; a period of increased inflation in the domestic economy. These empirical findings were inconsistent with their theory, and they concluded that the decline in price-earnings resulted from a money illusion on the part of investors. Feldstein (1980) also observed a decline in price-earnings ratios in the United States between 1967 and 1976. He ascribed this to the adverse effects of United States tax rules, which raise the effective rate of taxation under inflation.

This paper provides an alernative explanation for the observed decline in price-earnings ratios. Adapting the model used by Bierman (1990) by accounting for the difference between accounting profitability and true profitability as well as the difference between accounting profits and cash flow, the analysis shows that the price-earnings ratios could be expected to decline with increased inflation. This happens in dhe absence of corporate taxation, and the decline in therefore not related to the peculiarity of the United States tax laws as described by Feldstein (1980). The results provide an explanation for the decline in price-earnings ratios experienced in the United States during times of high inflation. It is therefore not necessary to invoke a theory of market failure caused by an inflation induced illusion on the part of investors as Modigliani and Cohn (1979) suggest.

EXTENSIONS TO PREVIOUS MODEL

The analysis presented in this paper consists of an extension of the model used by Bierman (1990) to determine theoretical price-earnings ratios. Bierman's analysis is extended firstly by allowing for the important difference between a firm's true profitability and its accounting return, and especially the extent to which this descrepancy is exacerbated by inflation. This difference has been studied extensively in the literature. Harcourt (1965), Solomon and Laya (1967), Livingston and Salamon (1970), Fisher and McGowan (1983) and Fisher (1984) have studied this descrepancy and agree that the differences between accounting returns and true returns are so serious that the former cannot be used as an indication of the latter. The effect of inflation on this descrepancy was addressed by Solomon and Laya (1967), Kay (1976), Van Breda (1981), Kay and Mayer (1986) and De Villiers (1989) who have shown that inflation exacerbates this discrepancy.

The second extension to Bierman's model is to allow for the difference between calculated earnings and cash flow. The growth rates assumed by Bierman's model only applies if the full retained earnings represent cash that can be used to finance growth. The extended model used here allows for calculating the actual cash flows generated for investment and dividends.

The aim of this paper is to calculate theoretical price-earnings ratios after allowing for the difference between the accounting return and the true return of the firm, and after determining the cash generated by the firm for investment and dividends. It incorporates the model of the firm first used by Harcourt (1965) into the analysis of price-earnings ratios as undertaken by Bierman. The analysis consists of constructing a theoretical firm of known true return. Its reported earnings, the cash required to finance its growth and the dividends it

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can pay are then calculated. From the dividends and the realised growth rate the price of the share is calculated, and the price-earnings ratio is determined by dividing the share price by the reported earnings.

CONSTRUCTING A THEORETICAL FIRM OF KNOWN RETURN

The true return (or internal rate of return) of a *project* can be measured (given a project cash flow pattern consisting of one or more cash outflows followed by cash inflows). The information needed to calculate the true return of an actual *firm* is not available (Solomon and Laya, 1967, p. 157). Therefore, to obtain a firm with a known true return we have to construct one consisting entirely of projects with the same known return. Harcourt (1965) constructed firms of this kind in his study of the relationship between accounting return and true return. A similar theoretical firm is used in the present analysis.

The theoretical firm in steady-state growth consists of (n+1) projects, each with an operating life of n years. One of the projects is just being started, one project is in its first year of operation, one in its second year of operation and so forth until the oldest project in its last (nth) year of operation. In steady state growth the firm will terminate its oldest project and start a new project every year. To maintain a real growth rate of g, each project is (1+g) times larger in real terms than the project started one year earlier.

The individual projects each consists of a single investment followed by n cash inflows. The cash inflows remain constant in real terms over the duration of the project (and increases at the rate of inflation in nominal terms). The investment consists entirely of depreciable assets, which have a zero scrap value. The investment is depreciated on a straight line basis over the life of the investment (n years).

Each of the projects that make up the theoretical firm has the same rate of return. Thus, the firm has the same rate of return as any project.

PROJECT CASH FLOWS

The projects making up the firm all consist of an investment (I) followed by a series of cash inflows. The present analysis assumes the very simplest pattern of project cash flows where the annual project cash flows are constant in real terms and increase at the rate of inflation in nominal terms. Each project shows a nominal return of k. The net present value of any project when nominal cash flows are discounted at a rate of k therefore equals zero.
For the project initiated in year zero, we therefore have that:

$$0 = -I_0 + \frac{C_1}{(1+k)} + \frac{C_1(1+j)}{(1+k)^2} + \ldots\ldots + \frac{C_1\,(l+j)^{n-1}}{(1+k)^n}$$

where:

I_0 = investment required by this project in year zero
C_1 = cash flow generated by this project in year 1
j = rate of inflation
k = nominal rate of return of the project
n = project life

But:

$$(1+k) = (1+r)\,(1+j)$$

where:

r = real rate of return of the project

So that, substituting for k and solving for I_0:

$$I_0 = \left(\frac{C_1}{(1+j)}\right)\left(\frac{1}{r} - \frac{1}{r(1+r)^n}\right)$$

But:

$$\left(\frac{1}{r} - \frac{1}{r(1+r)^n}\right) = A_{n,r}$$

where

$A_{n,r}$ = present value factor of an n year annuity at a discount rate of r

And therefore simplifying:

$$I_0 = \frac{C_1.A_{n,r}}{(l+j)} \qquad (1)$$

CASH FLOW GENERATED BY THE FIRM

In any year the firm consists of (n+1) projects. The very latest of these projects has just started and has not yet generated any income. The cash flow of the firm is therefore generated by n projects. In year 1, there will be the n projects started respectively in year 0, year -1, year -2, . . . and year -(n−1). each of these is (1+g) times smaller than the project started one year later (in real terms).

The total cash flow generated by the firm therefore consists of the n project cash flows. This is given by:

$$F_1 = C_1 + \frac{C_1}{(1+g)} + \frac{C_1}{(1+g)^2} + \ldots\ldots + \frac{C_1}{(1+g)^{n-1}}$$

where:

F_1 = Cash flow generated by the firm in year 1
g = Real steady-state growth rate

When simplified, this reduces to:

$$F_1 = C_1.(1+g).A_{n,g} \qquad (2)$$

EARNINGS REPORTED BY THE FIRM

The firm's reported earnings consist of the cash flow of the individual projects minus the depreciation of the assets employed by the projects.

Straight-line depreciation based on the historical cost of the assets is assumed. The original investment required by each project is (1+g) times smaller in real terms, and (1+h) times smaller in nominal terms than projects started the following year (where h is the nominal growth rate). Given an inflation rate of j, we have that:

$$(1+h) = (1+g)\,(1+j) \qquad (3)$$

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where:

h = nominal growth rate

To calculate straight-line depreciation, the original project cost has to be divided by n. Expressing the depreciation in terms of the investment required by the project started in year 0 yields:

$$W_1 = \left(\frac{1}{n}\right) . \left(I_0 + \frac{I_0}{(1+h)} + \frac{I_0}{(1+h)^2} + \ldots\ldots + \frac{I_0}{(1+h)^{n-1}}\right)$$

where:

W_1 = total depreciation of the firm in year 1

When simplified, this reduces to:

$$W_1 = \frac{I_0 . (1+h) . A_{n,h}}{n}$$

Expressing this in terms of C_1 by substituting from (1) and simplifying by substituting from (3):

$$W_1 = \frac{C_1 . (1+g) . A_{n,r} . A_{n,h}}{n} \tag{4}$$

The earnings in year 1 equals the cash flow minus the depreciation. From (2) and (4) therefore:

$$E_1 = C_1 . (1+g) . A_{n,g} - \frac{C_1 . (1+g) . A_{n,r} . A_{n,h}}{n} \tag{5}$$

where:

E_1 = earnings reported by the firm in year 1 (in nominal, year 1, money terms)

DIVIDEND PAID OUT BY THE FIRM

The dividend paid out by the firm is determined by the cash flow generated and the cash needed for investment during that year. The amount to be invested in year 1 is (1+h) times larger (in nominal terms) than the amount invested in year 0.

From equation (1) (which gives the investment in year 0) and simplifying by substituting from (3):

$$I_1 = C_1 . (1+g) . A_{n,r} \tag{6}$$

From (2) and (6) therefore:

$$D_1 = C_1 . (1+g) . A_{n,g} - C_1 . (1+g) . A_{n,r} \tag{7}$$

where:

D_1 = dividend paid out by the firm in year 1 (in nominal, year 1, money terms)

PRICE OF THE FIRM

The price of the firm is the discounted value of its future dividends. With the dividends and the discount rate expressed in nominal terms, the price is therefore:

$$P_0 = \frac{D_1}{(1+k)} + \frac{D_1(1+h)}{(1+k)^2} + \frac{D_1(1+h)^2}{(1+k)^3} + \ldots\ldots$$

But:

$$(1+h) = (1+g)(1+j)$$

and:

$$(1+k) = (1+r)(1+j)$$

Substituting and simplifying:

$$P_0 = \frac{D_1}{(1+j)(r-g)} \tag{8}$$

Substituting for the dividend from (7):

$$P_0 = \left(\frac{1}{(1+j)(r-g)}\right) . (C_1 . (1+g) . A_{n,g} - C_1 . (1+g) . A_{n,r}) \tag{9}$$

PRICE-EARNINGS RATIO

This paper follows the procedure of Bierman (1990) when calculating the price-earnings ratio. Bierman uses the prospective earnings (year 1 earnings) in his calculation but expresses it in year 0 money terms. The price he uses is the present (year 0) price. Therefore:

$$P/E = \frac{P_0}{E_1/(1+j)}$$

where:

P/E = price-earnings ratio

Substituting from (5) and (9):

$$P/E = \frac{A_{n,g} - A_{n,r}}{(r-g) . (A_{n,g} - (A_{n,r} . A_{n,h})/n)} \tag{10}$$

EFFECT OF INFLATION ON THE PRICE-EARNINGS RATIO

The effect of inflation on the firm's price-earnings ratio is evident from equation (10) above. The price-earnings ratio is not constant for a given real return, but depends upon the growth rate (g), the life of assets employed by the firm (n) and the inflation rate (j). If all the variables except the inflation rate are kept constant, then the nominal growth rate (h) will increase with increasing inflation. Thus, the annuity factor ($A_{n,h}$) decreases, the denominator in equation (10) increases and the price-earnings ratio decreases monotonically with increasing inflation.

The extent of this decrease in the price-earnings ratio with increasing inflation can be seen in Figure 1 below. In Figure 1 the price-earnings ratio has been calculated for firms with different asset lives.

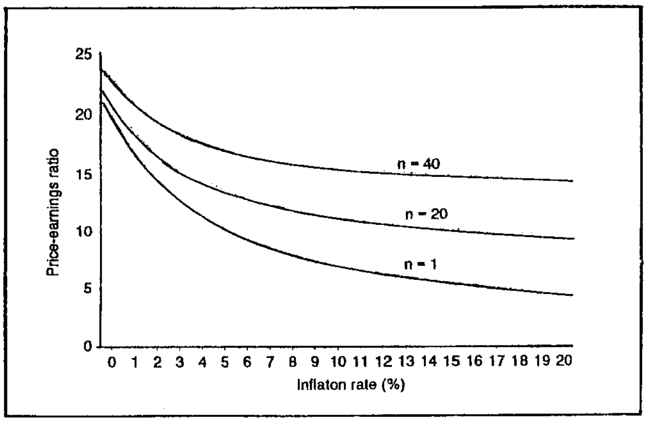
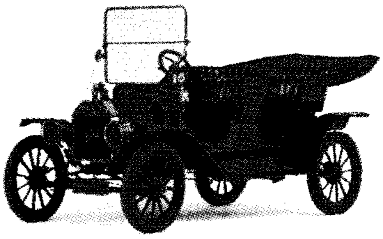


Figure 1 Price-earnings ratios of firms with real returns of 5%



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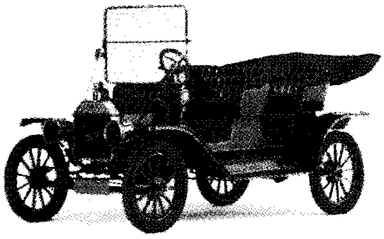

INVESTMENT BUILDER:
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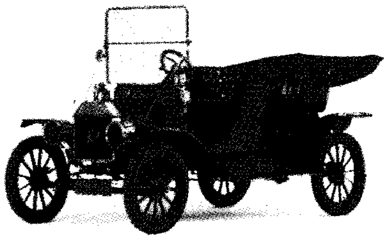

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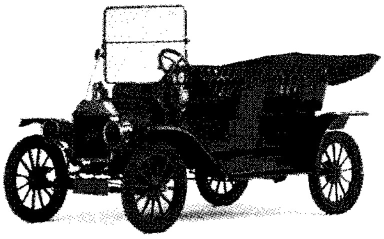

INCOME BUILDER:
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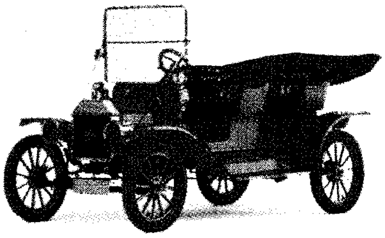

CAPITAL BOND:
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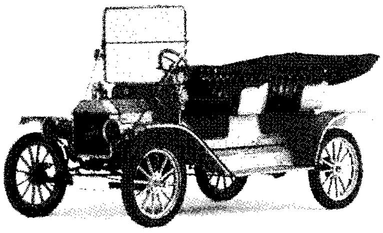
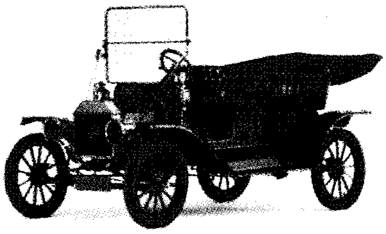


CAPITAL BOND-INCOME OPTION:
Optimum income



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The first point that is clear from Figure 1 is that, even with no inflation, price-earnings ratios differ across firms with different asset lives. This corresponds with the findings of Harcourt (1965), Solomon and Laya (1967), Livingston and Salamon (1970), Fisher and McGowan (1983) and Fisher (1984) who found that accounting earnings and true returns differ, even in the absence of inflation.

Figure 1 further shows that there is a marked decrease in price-earnings ratios with increasing inflation. This applies to each of the three firms in Figure 1. This is in contrast to the results of Bierman's original model, which predicts that the price-earnings ratio remain constant at 20 (the reciprocal of the real return).

The decline in the price-earnings ratio is more marked for firms employing short-lived assets than for firms employing assets with a longer life. The only firm for which the price-earnings ratio will remain constant is a firm employing assets that last indefinitely. In this case n will tend to infinity, so that:

$$A_{n,g} = 1/g$$

$$A_{n,r} = 1/r$$

$$1/n = 0$$

So that substituting into (10):

$$P/E = \frac{1/g - 1/r}{(r-g)\,.\,(1/g-0)}$$

And therefore:

$$P/E = 1/r$$

The decrease in price-earnings ratios with increased inflation is associated with the effect of inflation on the sustainable dividend payout ratio of the firm. According to the model used by Bierman (1990, p. 75) the firm can pay out (1−g/r) of its reported earnings as a dividend. De Villiers (1992) analysed sustainable dividend payout ratios under inflation, using a model similar to the one used in the present analysis. Accounting for the difference between accounting profitability and true profitability as well as the difference between accounting profits and cash flow, the dividend payout ratio of a firm is (this can also be calculated from equations (5) and (7) above):

$$D_1/E_1 = \frac{A_{n,g} - A_{n,r}}{A_{n,g} - (A_{n,r}\,.\,A_{n,h})/n} \qquad (11)$$

The relationships in equation (11) have been analysed by De Villiers (1992, p. 16) who shows that inflation decreases the proportion of reported earnings that a firm can pay out while maintaining a specified growth rate. The decrease in the sustainable dividend payout ratio is more marked for firms employing assets with a short life than for firms employing long-lived assets.

The decrease in the sustainable dividend payout ratio explains the effect of inflation on the price-earnings ratio. With high rates of inflation a smaller portion of reported earnings is available to be distributed to shareholders. Since a firm's share price equals the discounted value of its future dividends, a decrease in the distributable portion of earnings results in a decline in the price-earnings ratio.

SIGNIFICANCE FOR SHARE ANALYSIS

The results show that the price-earnings ratio of firms can be expected to decrease with increased inflation. The effect is more marked for firms employing short-lived assets than for firms employing assets with a longer life. The results have the following important consequences for share analysis:

- In a high inflation environment, the shares of firms employing short-lived assets can be expected to trade at lower price-earnings ratios than the shares of firms employing long-lived assets.
- An increase in inflation can be expected to cause a decline price-earnings ratios (once steady state has been reached). Similarly, a decrease in inflation can be expected to lead to an increase in price-earnings ratios.
- Shares of firms from high inflation countries can be expected to trade at lower price-earnings ratios than shares from low inflation countries.

SIGNIFICANCE OF SIMPLIFYING ASSUMPTIONS

The present analysis is based on the number of simplifying assumptions. Although these do not detract from the generality of the conclusions, they should be borne in mind when interpreting actual price-earnings ratios.

The first important simplifying assumption is that of a firm in steady state. In this the model is no different from the conventional models used to analyse price-earnings ratios in the absence of inflation. The conventional price-earnings model outlined in, for instance, Brealey and Myers (1988, p. 57) is based on the well known Gordon dividend discount model which assumes a firm in steady state growth. Where the steady state assumption is important is in the interpretation of price-earnings ratios following changes in the rate of inflation. The model predicts the price-earnings ratios that will be attained once a new steady state has been reached, and cannot be used to predict short-term changes in price earnings ratios.

The model also assumes a marginal firm where the rate of return of all investments is equal to the market capitalisation rate (k). The net present value of all investment projects is therefore equal to zero. Had the firm been able to superior investments, their value would have been discounted into the share price. The share price will therefore increase by the present value of growth opportunities per share.

Another important simplifying assumption of the present analysis is the use of conventional historical cost accounting with straight line depreciation. A change in accounting procedure does not alter the actual cash flows (except for possible changes in tax payments, which are not considered here). It therefore has no influence on the share price. A different accounting convention will therefore result in a change in reported earnings but will leave the share price unchanged. This will alter the theoretical price-earnings ratio. An evaluation of different accounting conventions falls outside the scope of the present paper, although the method of analysis could provide a procedure against which different accounting conventions can be evaluated.

CONCLUSIONS

This paper shows that price-earnings ratios decline with increasing inflation. This is the result of a decrease in the proportion of reported earnings a firm can pay as dividends with increasing inflation. Since a firm's share price equals the discounted value of its future dividends, a decrease in distributable earnings results in a decline in the price-earnings ratio.

The lowering of the price-earnings ratio depends critically on the life of assets employed. It is more marked for firms employing short-lived assets than for firms employing long lived assets. The decline in price-earnings happens in the absence of corporate taxes. It is therefore not related to the peculiarities of the United States tax laws as described by Feldstein (1980).

The results show that under high inflation investors should expect lower price-earnings from firms employing short-lived assets. They should expect price-earnings ratios to decline when inflation increases. International investors should expect lower price-earnings ratios in economies with high rates of inflation.

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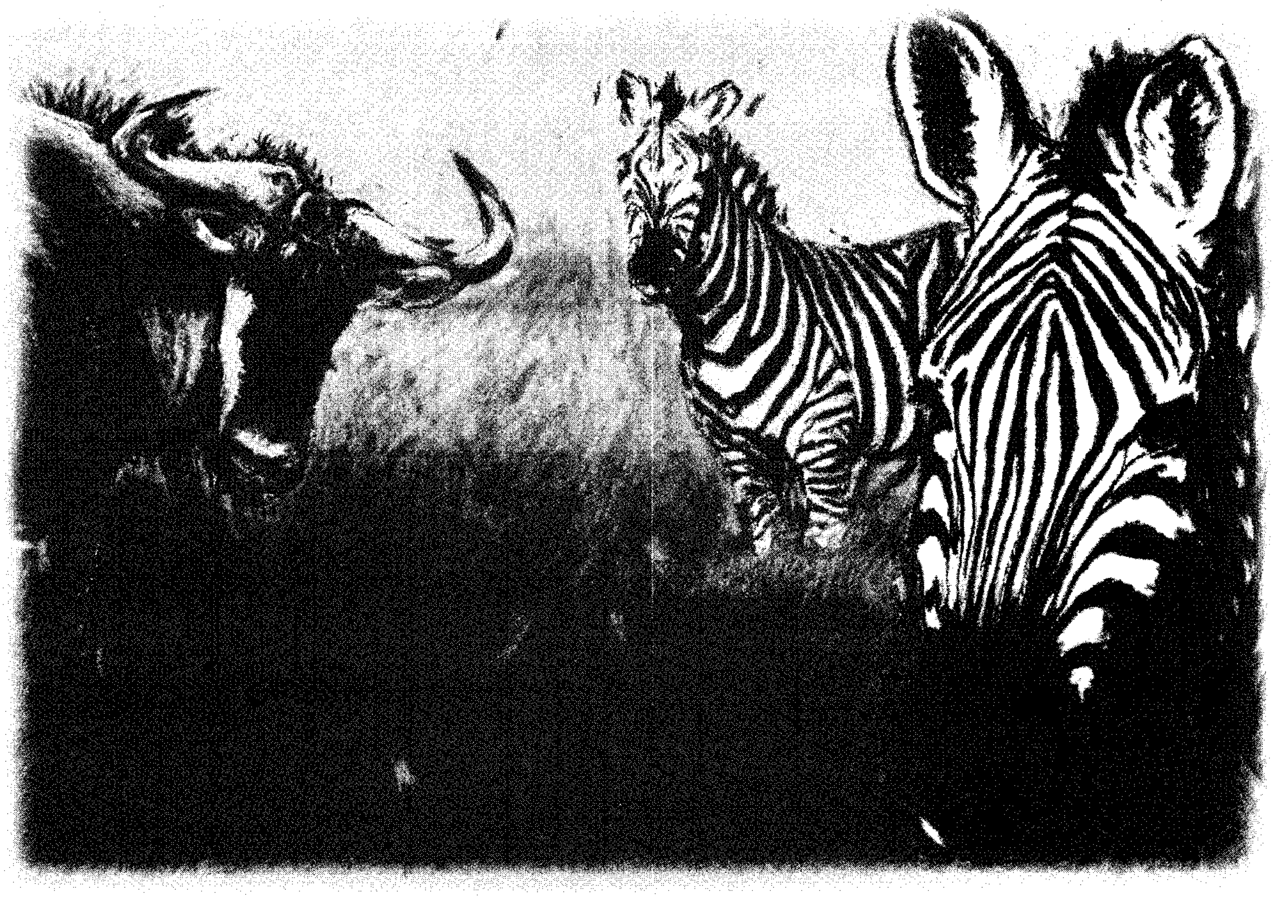

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Liberalising foreign trade: The interaction between the real & monetary sectors

The most important element in the external relations of less developed countries (LDCs) is the interaction between foreign trade and the domestic economy. The theoretical issues at stake have been reviewed by Krueger (1984). During recent years this particular aspect has become an important element in the debate regarding the opening up of LDCs and the emergence of the newly industrialising countries. The debate is closely related to the major policy options of import substitution and export promotion, also known as inward- versus outward-looking development options. It would appear that Adam Smith's approach in these matters can be a powerful analytical tool in explaining the issues regarding trade liberalisation. Trade liberalisation is a process which has serious implications for the interaction between the real and monetary sectors of an economy. A closer analysis of these issues appears to be helpful in understanding trade liberalisation and implementing the opening up of an economy to international trade successfully.

The interaction between the real and monetary sectors is not analysed in neoclassical economics. This was the reason for Keynes to criticise it for adhering to a dichotomy between the real and monetary sectors. Modern versions of this theory, either in the form of monetarism or new classical macroeconomics have been unseccessful in resolving the problem. Technically speaking they are subscribing to a so-called vertical aggregate supply curve (Crystal and Price, 1994). These theories would suggest trade liberalisation in terms of a "big bang" approach. We claim that such an approach is likely to be flawed because it is based on an analysis which overlooks the interaction between the real and monetary sectors. The purpose of this paper is to analyse the interaction by applying classical and Austrian economic theories. The outcome of our analysis is strongly in favour of trade liberalisation but in terms of a well managed process as opposed to a big bang supported by neoclassical as well as new classical economic theory.

1. THE NEO-CLASSICAL THEORY AND LDC'S

Although neoclassical trade theory has been extended to deal with dynamic aspects such as technological progress and shifting production frontiers, it is still to a large degree a static analytical framework based on the assumptions of perfect competition, constant returns to scale, and fixed factor supplies. Moreover, it is an equilibrium driven framework where the forces in facour of equilibrium constantly overrule disequilibrium forces to attain general equilibrium in factor and product markets simultaneously. Differentials between international and domestic price ratios encourage substitution processes in production and consumption until a new equilibrium is attained. This process of adjustment towards equilibrium is characterised by allocative effects in consumption and production and at equilibrium the optimum conditions of resource allocation are met. In the absence of monopoly, market imperfections and externalities in consumption and production, the equilibrium attained through free trade satisfies the necessary marginal conditions of a Pareto optimum, and each country enjoys a higher real income by specialising its production in terms of its comparative advantage.

The economic situation in LDCs differs markedly from the exposition above because in these countries markets are limited and unsophisticated. The allocative processes which are central to neoclassical trade theory are unlikely to play an important part in these economies. The efficient allocation of resources is hampered by extensive rigidities such as a lack of factor mobility, price rigidity, and restrictive practices within the countries and trade restrictions imposed on their exports by developed countries. Moreover, some LDCs could be described as declining economies, and in such instances neoclassical equilibrium theory would be an inappropriate analytical framework.

There is another fundamental aspect of neoclassical trade theory which requires attention, namely the existence of full employment prior to entering international trade. The opening up of an economy goes hand in hand with effective (instantaneous) allocative effects which enable each country to attain a higher level of real income, through international trade. A new equilibrium is attained through allocation effects while maintaining full employment. Such conditions are unlikely to be met in LDCs and our exposition is particularly concerned with countries which experience excess capacity in the sense of unemployed factors of production and or unutilized resources, as is evident in Southern Africa and certain Latin American countries. We shall argue below that under such circumstances Adam Smith's approach appears to be a far more appropriate analytical framework. The importance of Adam Smith's trade theory in explaining 19th century international trade, particularly in the colonial environment, has been argued convincingly by Myint (1958, 1977) and more recently by Johns (1985). Our exposition argues the relevance of this analytical framework to 20th century trade patterns in particular countries.

2. THE CLASSICAL MODEL

Although several versions of the vent for surplus model have been identified by Caves (1965) we are concerned with the general principles of the theory and therefore we do not elaborate on these different versions. The general principles which are important to our exposition are captured in the following quote from the *Wealth of Nations.*

"Between whatever places foreign trade is carried on, they all of them derive two distinct benefits from it. It carries out that surplus part of the produce of their land and labour for which there is no demand among them, and brings back in return for it something else for which there is a demand. It gives a value to their superfluities by exchanging them for something else, which may satisfy a part of their wants, and increase their enjoyments. By means of it, the narrowness of the home market does not hinder the division of labour in any particular branch of art or manufacture from being carried to the highest

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UNRAVELLING THE THREAD OF LIFE TOOK FOUR NOBEL PRIZES AND SEVERAL LIFETIMES.

When in the 1950s Jim Watson and Francis Crick began trying to solve the structure of DNA (the nucleic acid that carries the genetic code and is the key to biotechnology) they knew they were trying to unlock one of the most important secrets behind the miracle of life.

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perfection. By opening a more extensive market for whatever part of the produce of their labour may exceed the home consumption, it encourages them to improve its productive powers, and to augment its annual produce to the utmost and thereby to increase the real revenue and wealth of the society" (vol I, Book 4, Chapter 1, pp. 468-469).

As indicated by Myint (1958) there are two aspects in this exposition. The one is the vent for surplus theory in terms of which trade compensates for the limitations of the domestic market by providing an outlet for surplus product in excess of domestic requirements. Secondly, there is the productivity theory which maintains that international trade widens the extent of the market and improves the division of labour, therefore increasing the level of productivity within the country. As mentioned earlier we shall concentrate on the vent for surplus theory, but it suffices to comment in passing that the productivity theory is particularly supportive of the arguments in favour of opening up a developing country to international trade in order to enjoy the gains from trade. Most important are the indirect effects as identified by J S Mill as benefits of a high order (Myint, 1958).

As opposed to neoclassical theory, which assumes a full employment of resources in a country entering international trade, this theory accepts the existence of surplus capacity in terms of unutilised resources. Opening up such an economy to international trade means much more than a reallocation of resources. It means the reshaping of economic events by employing the excess capacity to produce for exports without changing the production for the domestic market. International trade is conducive to attaining a more balanced situation in an otherwise disequilibrium situation where the disequilibrating forces overrule the equilibrating process. The absence of equilibrium implies a totally different adjustment mechanism compared with that of neoclassical trade theory. In these circumstances we have a rough-and-ready adjustment process (Myint, 1958) which is unlikely to react effectively to differentials between the domestic and international price ratios. We are, therefore, not looking at an allocation driven system where equilibrium forces overrule disequilibrating forces but are dealing instead with an economy which is to be reshaped in order to employ surplus resources and which does not rely on effective allocative processes. Moreover, in this dynamic framework disequilibrating forces may, from time to time, overrule the equilibrating forces.

The presence of rigidities which preclude optimal solutions in terms of allocation and pricing has encouraged several authors such as Jones (1971) to pursue the effect of distortions on the outcome of the general equilibrium model. Non-optimal solutions were therefore evident as also discussed by Johnson (1965) and Bhagwati (1971). We shall not pursue these issues here but it suffices to stress that optimum equilibrium solutions in the neoclassical trade model may be contradicted, once the specail assumptions underlying the model are abandoned. Our exposition emphasises the importance of such an approach in terms of Adam Smith's analysis. Our departure from neoclassical analysis is more fundamental than merely addressing the impact of distortions on the general equilibrium framework, because Adam Smith's theory enables us to develop a different paradigm in terms of which we analyse an economic system with rough-and-ready adjustment processes, and which is not in equilibrium.

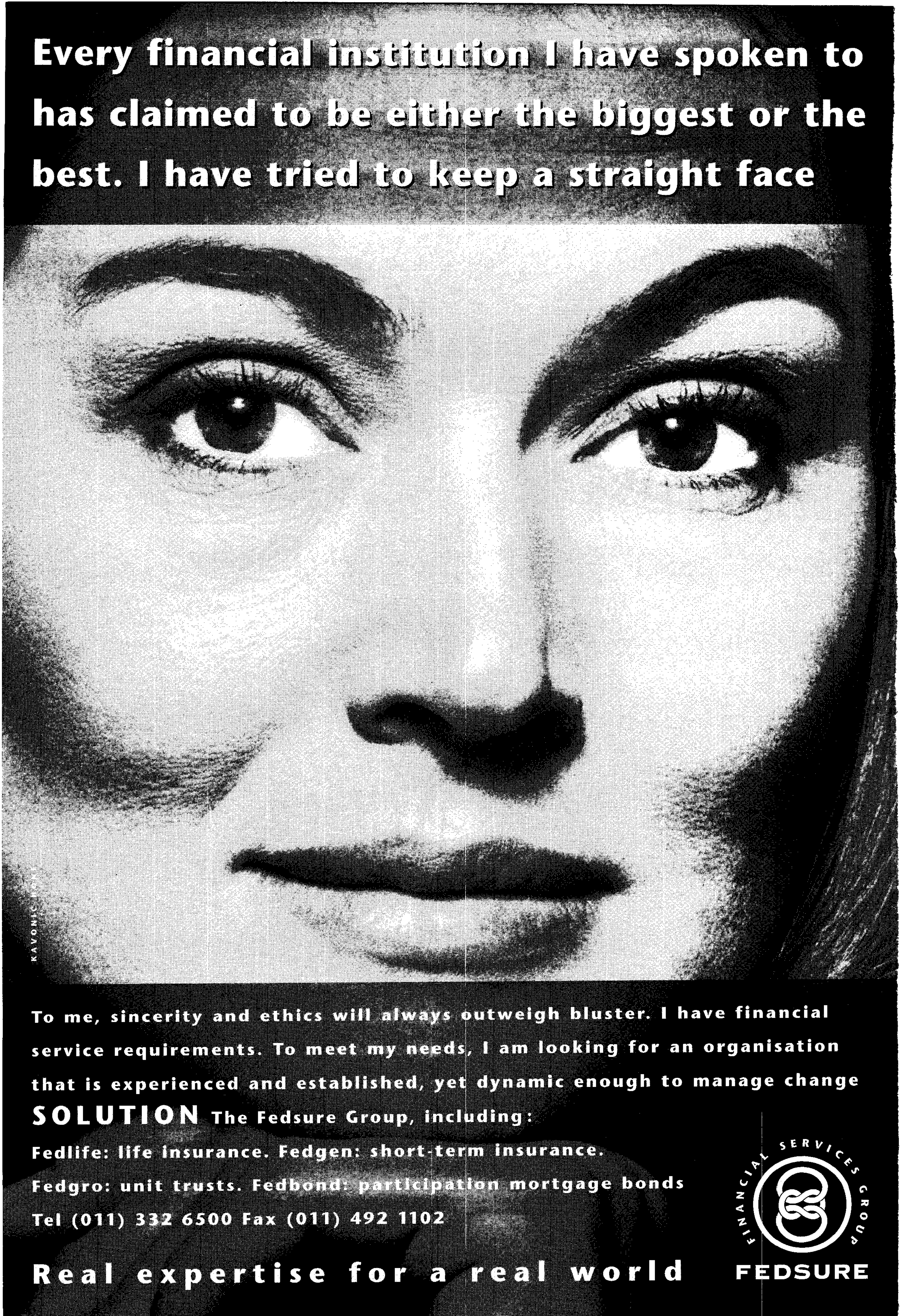
In sum, the vent for surplus theory assumes a lack of full employment and the existence of surplus production capacity expressed in unutilised resources. The economic system does not rely on allocative effects and the adjustment associated with the opening up of the economy to international trade is concerned with a reshaping of the economy. The presence of extensive rigidities implies that the adjustment process is ineffective and from time to time the disequilibrating forces could overrule the equilibrating forces. This is in sharp contrast with neoclassical trade theory where equilibrating forces always overrule disequilibrating forces.

3. THE INTERACTION BETWEEN TRADE AND LDCs

We have already mentioned above that the interaction between foreign trade and the domestic economy is probably the most important aspect of trade and development. The debate about the positive and negative effects of foreign trade on development falls outside the scope of our analysis. For our purpose it suffices to state that the recent experience in terms of empirical evidence supports the export oriented development strategy as opposed to import substitution. Earlier research, for instance by Balassa (1981), has been refined and updated by Bhattacharya and Linn (1988) and Balassa (1991) while the experience in certain Latin American countries has been discussed by Coes, Garcia and Nogues (1991). The major issues in this debate have been surveyed by Bhagwati (1987). In terms of these expositions as well as the supporting empirical evidence we stress the importance of international trade in promoting economic development. This is in accordance with Adam Smith's productivity theory, as indicated above. We, nevertheless, hasten to qualify that one should not overemphasise the importance of international trade as a growth factor, because there are instances where the empirical evidence regarding the growth effects from international trade are ambiguous, as discussed by Linnemann (1992). More recently Edwards (1993) has also been critical in accepting this stance without extensive qualifications.

In view of the fact that neoclassical trade theory with its emphasis on the optimal allocation of resources cannot favour an export oriented versus import substitution policy option, the practical policy stance was either empirically based or merely judgemental. Because of this lack of analytical backing we have experienced some *ad hoc* policy actions which favoured one of these development routes. We have also witnessed some confusion regarding the major issues. The so-called new orthodoxy associated export driven strategies with market oriented policies which, in some instances, were presented as *laissez-faire* approaches (Krueger 1980 and 1990). The *laissez-faire* approach of the new orthodoxy has been severely criticised by Smith (1991) in view of the fact that it could not claim empirical support. In his review of these issues Bhagwati (1987) took a more intermediate position by stating explicitly that export promoting policies do not exclude import substitution. In this regard it is interesting to note that the Latin American experience showed that import substitution policies normally discouraged exports (Coes, Garcia and Nogues, 1991), thereby, confirming the high degree of *ad hoc* policy making in this area. North (1992) demonstrated the anti-export bias of protectionist policies through higher input costs to exporters, inefficient production structures owing to exchange rate policies, tariffs and subsidies, and an ineffective infrastructure, particularly transport services which cannot serve exports efficiently. Many industries in Latin America and Africa had to restructure substantially following a policy switch from inward- towards outward-looking strategies discussed by North (1992). Holden (1992) estimated that, for South Africa, an increase in tariffs by 10 per cent is equivalent to a tax on exports ranging from 3,4 to 7,1 percent depending on whether exports exclude or include gold.

An export promotion strategy does not exclude government intervention as the *laissez-faire* proponents would suggest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(Bhagwati, 1987 and Smith, 1991). Moreover, Sachs (1987) demonstrated the importance of particular actions by government in order to support an export promotion strategy. It is precisely such support which has made the outward-oriented policy stance a success in the countries of South East Asia. Sachs (1987) correctly emphasised the importance of a highly educated and well trained bureaucracy in conducting such measures successfully.

Our exposition has revealed some of the disarray in the field of trade and development which encouraged *ad hoc* policy decisions. These emphasised either import substitution or export promotion while confusing the latter with a *laissez-faire* approach. The confusion could, to a large degree, be explained by the absence of a coherent analytical framework and the application of neoclassical theory which proved to be misleading since it emphasises allocation effects under conditions of full-employment while economic development and trade issues are concerned with surplus capacity coupled with unemployment. The interaction between foreign trade and the domestic economy is a process which reshapes the economy.

The various issues could be settled within the paradigm of the vent for surplus theory. This theoretical framework would support export promotion, particularly in the case of LDCs with excess capacity such as those in Southern Africa, Latin America and South East Asia. Adam Smith's position is probably less extreme than would appear at first sight. Although the importance of the export sector is emphasised in reshaping the economy by employing the excess production capacity in export production without competing with those resources employed in the production for domestic demand, Smith would not deny the importance of import substitution. Import substitution could be complementary to export promotion as has been argued by Myint (1977). This complementary role is explained in terms of Smith's emphasis on the importance of trade between towns and rural areas (vol 1, Book 3, Chapter 1). Moreover he maintained that:

"Those systems, therefore, which preferring agriculture to all other employments, in order to promote it, impose restraints upon manufacture and foreign trade, act contrary to the very end which they propose, and indirectly discourage that very species of industry which they mean to promote" (Vol 2, Book 4, Chapter 9, pp. 207-8).

It is therefore evident that foreign trade should be emphasised as opposed to protection oriented import substitution, without overlooking the complementary nature of the two strategies. Smith appears to be in favour of a balanced approach such as the development of towns as well as the country, but also with respect to different industries as is evident from the following statement:

"By raising up too hastily one species of industry, it would depress another more valuable species of industry" (Vol. 2, Book 4, Chapter 9, p. 193).

From this exposition it would appear that Adam Smith's framework is not conducive to a development strategy which supports import substitution behind high protective tariffs; it favours export promotion without overlooking the complementary nature of import substitution in attaining a balanced process of progress. Recently Linnemann (1992) argued against the one-sided and over optimistic approach which emphasises exports as a major engine of growth.

3.1 The transition process

The dynamic elements in the vent for surplus theory are evident in the rough-and-ready nature of the adjustment process. The absence of a smooth equilibrating process which characterises neoclassical theory is an interesting element which could explain the transition process in the opening up of an economy to international trade.

A policy of *laissez-faire* in opening up the economy is likely to fail because this policy framework relies on the smooth equilibrating adjustment processes of neoclassical trade theory which are absent under these special conditions of a rough-and-ready adjustment process. Adam Smith's classical theory suggests a particular process in terms of which liberalisation should be conducted. The process should be managed to follow a particular sequence. The sequencing in opening up, and thus liberalisation, is important since the systematisation of sequencing is imperative in supporting the rough-and-ready adjustment process. The process of liberalisation should start at the core of the dynamic process of transition namely the real sector, particularly exports. The process of change and liberalisation is a complicated one and goes hand in hand with spillover effects. The liberalisation of the domestic economy is a complementary process which should go hand in hand with the opening up to foreign trade. The implementation of a particular sequence in the liberalisation and opening up of the economy means that the rough-and-ready adjustment process becomes more diverse as more and higher stages of spillover effects from one market to the next are encouraged. As this process gains momentum and spillover effects follow a continuous pattern from one market to the other one has reached the stage where the transition could focus on the financial sector. Liberalising of the financial sector features late in the transition process. One could maintain that financial liberalisation is a function of the progress in the real sector, because as the real sector liberalisation gians momentum there will be a definite demand for financial sector support in bringing the total process of liberalisation to fruition. We have arrived at a point where we could attend to the interaction between the monetary and real sectors.

3.2 The opening up process

Our exposition can now be extended by applying the principles of the vent for surplus theory in analyzing the opening up process in LDCs where the economic process is characterised by unemployment, surplus productive capacity, and a rough-and-ready adjustment process.

The structuring of a successful opening up process is not only dependent on the Smithian analysis, because it also relies on the Austrian view of markets as, for instance, analysed by Lachmann (1986). In this approach markets are described as economic processes which are considered as a series of changes in individual plans which generate inter market but also intra market pressures. The latter are well-known as spill over effects from one market to the other and the effectiveness of markets in generating these effects is a function of the sophistication of the market. By staging the opening up process along Smithian lines we establish a framework which is conducive to generating spill over effects, and as these effects gain strength one would observe an evolutionary market process in the making.

We distinguish **three elements** in the opening up process. The first is the real sector, the second is stabilisation policies and the third is the monetary sector, or more precisely, financial markets. The elements are mentioned in this particular order because we would like to stress the importance of sequencing, i.e. the order in which these elements drive the opening up process. We emphasise the importance of starting with the real sector and ending with the financial sector because this

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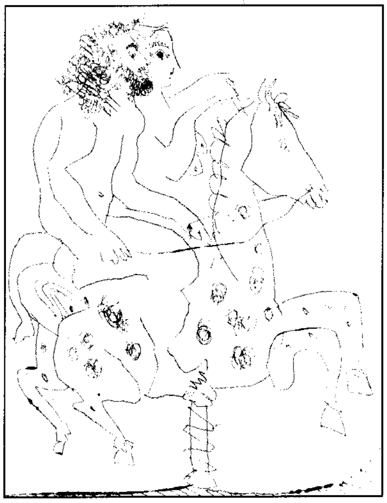

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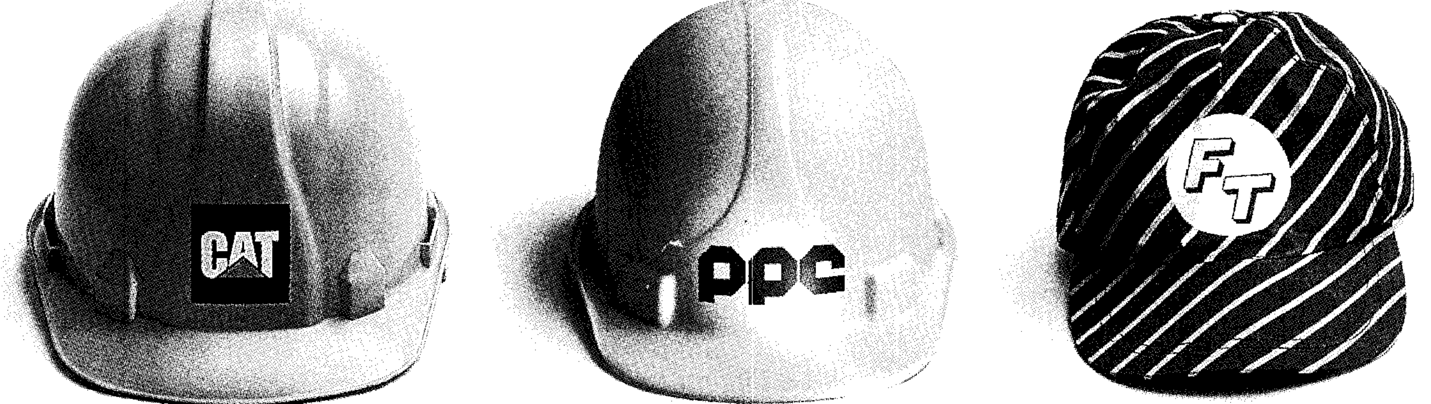

particular structuring of the opening up process is what the vent for surplus theory and the Austrian view of markets would suggest. This sequencing of events in the opening up of an economy is conducive to generating spill over effects between markets. In this way we create market processes through which information is disseminated to market participants who apply it in drawing up their private plans. The structuring of the opening up process in terms of this exposition is not an end in itself because the final goal is to establish an effective open economic system which is information driven through market processes.

We now turn to a more detailed exposition on the different elements of the opening up process and following our proposed sequencing of events we start with the real sector. The emphasis on the real sector as the first element in the sequence is directly evident from the vent for surplus theory. This sector adjusts slowly compared with the financial sector because the output is dependent on a lengthy process through which inputs, such as the factors of production, are combined in order to produce a particular output within a time dimension. This differs in length from industry to industry. As opposed to financial markets, the adjustment process in the sector is more in line with a Smithian rough-and-ready mechanism, particularly in LDCs.

The opening up process which could generate spill over effects as markets evolve starts with deregulation or liberalisation of economic activity in the sense that exports are promoted and imported inputs for the production of these exports are liberalised. These measures are likely to stimulate the development of foreign trade in accordance with the country's comparative advantage. Empirical evidence for Latin America shows that a regulatory environment, prior to opening up, could discourage exports (see Coes, Garcia and Noques, 1991). Following this route of opening up means that LDCs, particularly those in Southern Africa, and to a large degree also in Latin America, are likely to export industrial raw materials. Subsequent expansions in terms of liberalisation and the development of markets are likely to concentrate on the beneficiation of industrial raw materials which implies the beginning of manufacturing exports based on comparative advantage.

The opening up of the real sector and the gradual development of markets, following the spill over effects generated through the interaction of individual plans, brings us to the second element, viz stabilisation. The effecitve application of macroeconomic stabilisation policy has been a critical element in the transition to an open economy in Latin America as well as South Africa. In this respect two critical areas come to mind, namely the exchange rate and the rate of inflation.

Macroeconomic stabilisation policy should include an effective anti-inflationary policy as well as a stable exchange rate. The importance of these policy areas is evident if one follows an Austrian approach to markets because within this framework, markets disseminate information which is of crucial importance to market participants in order to draw up their individual plans. Inflationary pressures and foreign exhange rate instability distort prices which are important information signals generated by market processes. Distorted information signals are not helpful to individuals in finalising their plans, and therefore the purpose of establishing markets becomes frustrated and finally disrupted.

During the 1980s the lack of supportive stabilisation policies in South Africa created an environment where excessive speculative transactions disrupted a newly established foreign exchange market. The extent of the disruption was so devastating that the authorities had to abandon the process of liberalisation and extensive foreign exchange controls were reimposed. This demonstrates the importance of stable markets because only stable markets disseminate systematic information and it is this type of information which could be applied by market participants in finalising their individual plans.

The third element in our sequence of opening up an economy to international trade is the liberalisation of financial markets. In this respect the liberalisation of international capitals flows is the focal issue. The vent for surplus theory provides an important analytical framework in defending our position of putting financial markets at the end of the sequence of events in the opening up process. The Smithian rough-and-ready adjustment process is not typical of financial markets. Here assets are created and distroyed in a rapid way, by the stroke of a pen metaphorically speaking. Starting the opening up process with financial markets could be a futile exercise in terms of our analytical framework because we open up markets which adjust rapidly but are trapped within an overall economic framework of rough-and-ready adjustment processes which is so typical of LDCs. The distinction between financial and goods markets has also been emphasised by Frankel (1983) in the sense that their speed of adjustment is dissimilar. Financial markets, he claimed, are more sensitive to expectations which in turn influence individual plans regarding the future and these new plans disseminate information which is reflected rapidly in the prices of financial assets. The prices of goods and services are slower in reflecting these short-term phenomena. Because of this institutional difference between financial and goods markets, Frankel favoured a sequential approach in economic liberalisation, viz to start with the goods market and finally end up with liberalising financial markets. Put differently, the balance of trade should be liberalised first and as this process becomes established one moves on towards liberalising the capital account of the balance of payments.

It requires little argument to explain the failure of the South African liberalisation experiment of the 1980s which started the opening up process with the liberalisation of financial markets without prior actions in the real sector. The Smithian analytical framework suggests a different sequence, ie to start the opening up process in the real sector where the adjustment process is much slower and as we develop spill over effects and information disseminating processes we gradually create an environment in which financial markets could be opened up as the final step in a chain of opening up activities. In this sense we could establish a meaningful interaction between the monetary and real sectors. The monetary sector will in most instances lead adjustment processes because of the rapid speed at which it reacts. A liberalised real sector would therefore react effectively and probably follow the adjustment in the monetary sector. Had the real sector not been liberalised there would certainly be a contradicting situation in the sense that the liberalised monetary sector adjusts but the real sector is trapped in regulations and unable to respond. Surely this contradicts the working of a dynamic real world situation.

4. INTERNATIONAL EXPERIENCE

McKinnon (1982) emphasised the importance of the order in economic liberalisation in a similar way as has been suggested above, ie that the liberalisation of the goods markets should precede that of the financial markets. His analysis differs in one important respect from ours since he emphasises the importance of stabilisation policy prior to trade liberalisation. The fiscal deficit should first be brought under control before a liberalisation of the goods market is followed by the financial mar-

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ket. Our exposition emphasises the importance of introducing stabilisation and liberalisation measures simultaneously. They have to run parallel with each other, and this applies to the liberalisation of the goods as well as financial markets. McKinnon (1982) assessed the success of liberalisation policies in Chile and Argentina and came to the conclusion that Chile staged a successful stabilisation policy by liberating the trade account prior to the capital account of the balance of payments. The outcome of this particular ordering in the liberalisation policies coupled with stabilisation measures through fiscal policy was a successful opening up of the Chilean economy. Argentina failed in following a stabilisation policy and reversed the order of liberalisation. Consequently the opening up of the Argentinian economy failed and its foreign indebtedness increased markedly. A corollary to McKinnon's exposition is that domestic controls over foreign capital flows should be lifted after domestic financial markets have been reformed.

In his exposition on the experience of Cile, Argentina and Uruguay regarding the liberalisation and opening up of these economies, Edwards (1990) confirmed the importance of sequencing in attaining a successful opening up of an economy. Argentina and Uruguay reversed the order of libralisation suggested by the analytical framework above, viz they started opening up via the financial markets and the libralisation process failed or was never completed.

The importance of a correct sequencing has been emphasised in the empirical analysis of certain Latin American countries by Coes, Garcia and Nogues (1991). In terms of their exposition it would appear that trade liberalisation failed in Brazil because it was driven by a deregulation of foreign capital flows while overlooking the importance of the real sector. This created balance of payment constraints and Brazil incurred extensive foreign debt and the disruption of international commodity markets such as oil during the late 1970s and 1980s underlined the failure of the liberalisation proramme.

During the 1980s, South Africa introduced extensive reforms in its financial markets which went hand in hand with a liberalisation of foreign capital flows while the real sector was still heavily regulated. Initially, a dual exchange rate was introducted but it was abolished during 1983 in favour of a unitary exchange rate regime. Unstable capital flows coupled with political uncertainty created extensive balance of payments problems as the capital account deteriorated markedly. During 1985 this resulted in the foreign debt crisis and subsequent debt rescheduling. Measured by the poor balance of payments performance it would appear that the opening up process was unsuccessful in South Africa because the authorities did not adhere to the correct sequencing. We should add that there were also exogenous forces playing havoc with the South African balance payments situation during the 1980s. The drought was one trade sanctions another, while political instability also played a role. We do not disregard the importance of these factors. Our analysis suggests that the logical mistakes in opening up the economy coupled with the lack of effective stabilisation policies, as will be argued below, created a framework in which it was almost impossible to manage the impact of these exogenous factors on the economy. The economic performance declined rapidly and the financial ratios which guide international bank lending deteriorated markedly. Under these circumstances international banks, such as Chase Manhatten which lead the process of cancelling outstanding bank credit facilities, became extremely hesitant about the credit exposure to South Africa. Their sensitivity regarding their credit exposure was a result of the mismanagement of our opening up process. Therefore, the failure in opening up the economy induced a process whereby international bank credit facilities were suspended.

We have already emphasised the importance of introducing stabilisation policies parallel with trade liberalisation. The importance of this in securing a successful opening up process is evident in several countries. South Africa failed on both scores. It contradicted the sequencing in its economic liberalisation as indicated above and it failed to introduce effective monetary and fiscal policies as stabilisation measures. It relied heavily on exchange rate adjustments without monetary and fiscal policy support as discussed by Strydom (1986). The importance of stabilisation measures in supporting the liberalisation process and the opening up of the economy is evident in Latin American countries. As indicated by Coes, Garcia and Nogues (1991) Colombia did not support its economic liberalisation by effective stabilisation policies and the opening up process was retarded. Brazil on the other hand did follow stabilisation policies but failed in terms of the correct sequencing. The importance of supporting stabilisation policies in Africa has been discussed by North (1992) and his analysis emphasises the importance of introducing stabilisation policies simultaneously with the reforms in the goods and financial markets. In this respect fiscal policy appears to be important particularly in the sense of creating new sources of fiscal revenue to replace the loss of revenue through foreign trade liberalisation.

Effective macroeconomic stabilisation polices have played an important part in the success of the South East Asian countries in opening up their economies (North, 1992, OECD, 1988).

5. SUMMARY

Trade oriented policies in economic development has been propagated in an *ad hoc* nature while relying on the empirical evidence in favour of foreign trade oriented policies in South East Asia. Classical theory appears to be an interesting analytical framework in support of an export promotion development strategy but it does not overlook the complementary nature of import subsitution. The *ad hoc* nature of development policy could therefor be eliminated by applying this theory. Within this analytical framework we introduced the problem of sequencing by applying Austrian views. The exposition emphasises the fact that although Adam Smith's framework favours foreign trade as opposed to protectionist import substitution policies it does not support a *laissez-faire* export promotion approach since such a policy stance would contradict the rough-and-ready adjustment mechanism of the vent for suplus theory. The logical sequence of events in opening up an economy is to start with the real sector while financial markets are at the end of the chain. Empirical evidence on the opening up of the Latin American, Arican and South East Asian economies to international trade appears to support this sequential hypothesis. Our analysis suggests that the liberalisation of the foreign sector should be a well managed process. The evidence does not appear to support an instantaneous big bang approach.

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Earnings changes: A random walk? Some South African evidence

The article examines the concept of earnings changes as a random walk for industrial companies listed on the Johannesburg Stock Exchange. The results overwhelmingly support the hypothesis of higgledy piggledy growth using three different test procedures. There is some suggestion that investors can, on the average, identify companies with the highest growth potential.

1. INTRODUCTION

One well-established empirical regularity in the world of finance is the fact that earnings changes over time appear to be randomly distributed, a phenomenon known as higgledy piggledy growth. Companies reporting high earnings growth in a particular year are no more or no less likely to report high earnings growth in subsequent years. The implication is that forecasting models based on historical growth rates have little ability to produce acceptable earnings forecasts.

On the other hand, it is a well-known fact that shares do trade at different price/earnings ratios which, as standard theory will have it, reflect divergent expected earnings. Thus two empirical regularities exist side by side; the first being higgledy piggledy growth and the second the implied belief of investors that they are able to forecast earnings changes.

These issues are investigated in the South African context. The next section provides a literature survey and a crisper formulation of the relevant issues. Secton 3 outlines the data and research method, while the resuls are discussed in Section 4. These results are summarised in a final section.

2. LITERATURE SURVEY

The idea that earnings changes over time appear to be randomly distributed originated with the work of Little (1962) who examined the correlation between successive growth rates in the aggregate earnings of U.K. firms and concluded that the evidence suggested that the true relationship was rather random. This phenomenon he called "higgledy piggledy growth". A follow-up study with Rayner (Rayner and Little, 1966) corroborated the conclusions. Studying higgledy piggledy growth in the U.S.A., Lintner and Glauber (1967:611) concluded that: "There is indeed a great deal of randomness in the world; financial data, and specifically growth rates clearly provide no exception." Ball and Watts (1972), using three different tests, concluded that the same inference arose from each test; namely that net income and earnings per share time series could be described by a model closely resembling a random walk. Similar results were obtained in Australia (Whittred, 1978) and New Zealand (Caird and Emanuel, 1981). Foster (1986: 240) noted that the result that, on average anual reported earnings can be well described by a random walk model, is one of the most robust empirical findings in financial statement literature.

When earnings growth is studied on the level of the individual firm, two major conclusions emerge (Foster, 1986: 240-241). First, a large number of firms reject a random walk as being descriptive of earnings growth; and second, attempts to exploit these departures from randomness for forecasting purposes have met with limited success.

An alternative way to study earnings growth is to hypothesise instances where departures from a random walk are predicted and then to stratify the sample to focus on those instances. Brooks and Buckmaster (1980) stratified a sample of yearly earnings changes by relative absolute size and reported that periods with a large relative increase in income were generally, followed by at least two periods when the firm underperformed the average. In the case of a large relative decrease in income, the opposite generally held. Similar results were reported by Beaver, Lambert and Morse (1980) and Freeman, Ohlson and Penman (1982).

Ettredge and Fuller (1991) demonstrated that, on average, shares of companies reporting negative earnings in one year generated positive, abnormal returns in the subsequent year. The largest abnormal returns were experienced by repeat offenders. This negative earnings effect existed independently of any small-firm effect as reported by Zarowin (1989). De Bondt and Thaler (1990) have argued that investors overreact to earnings announcements, with the results that the share price of companies reporting unusually poor earnings are driven too low, and the prices of those reporting unusually good earnings, too high. The subsequent correction of the overreaction generates positive (negative) abnormal returns for the loser (winner) shares.

Revisiting higgledy piggledy growth, Fuller, Huberts and Levinson (1992) clarified some of the issues involved. First, they pointed out that the original studies defined earnings growth in terms of excess earnings growth, measured as earning changes in a given year minus the average earnings change across all companies for that year. Thus, it could happen that a firm reported a string of consecutive earnings increases and not report a string of consecutive excess earnings increases.

Second, the fact that earnings changes behave as if they are randomly distributed over time, hold a number of implications for investors, including that future earnings changes for individual companies cannot be predicted from past earnings changes; that earnings growth rates cannot be predicted from past earnings changes; that earnings growth rates cannot be predicted at all and the implication that, if that proposition is true, all shares should have the same expected growth rate, and all shares should sell at the same price/earnings ratio after controlling for risk. In reality, however, shares do sell at different price/earnings ratios and different expected earnings changes are a prime reason for this observation. Thus, higgledy piggledy growth notwithstanding, investors must have some faith in their ability to foresee earnings changes. They proceeded to show that investors actually did have the ability to forecast earnings changes on average. Low price-earnings shares tended to have considerable lower earnings changes, while high price/earnings shares tended to show considerably higher earnings changes. At the level of individual shares and within price/earnings groups, however, the variance in earnings changes are so great as to make it appear that higgledy piggledy holds. In a subsequent article the same authors (Fuller *et al.,* 1993) concluded that the price/earnings effect remained an enigma due to their inability to account for ab-

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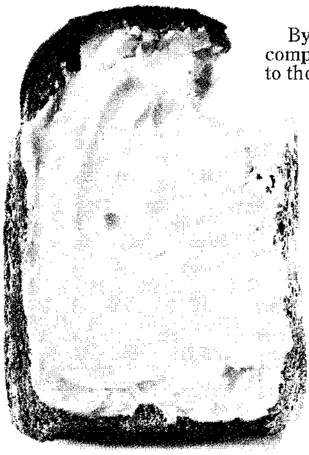
The authors would like the thank Prof. W Gevers for the share price data and messrs. R Brune and F Rix who assisted in the collection of the EPS-values.



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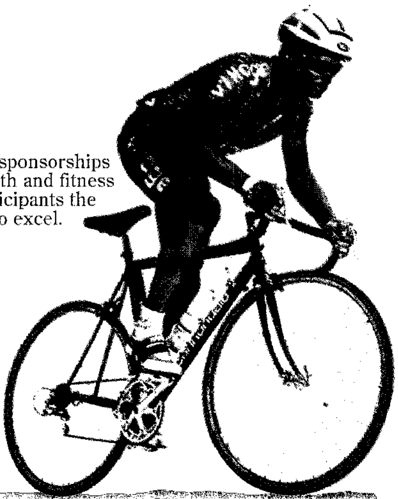

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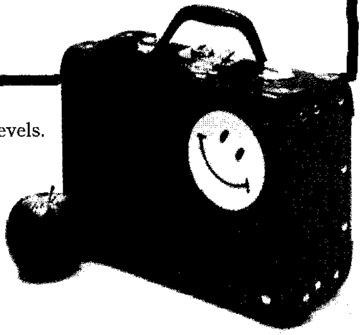

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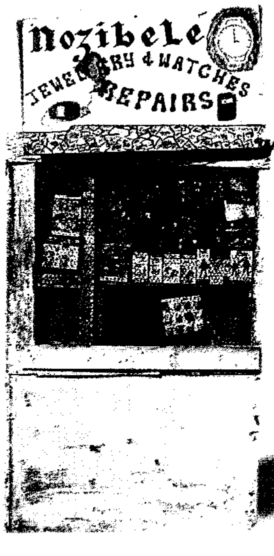

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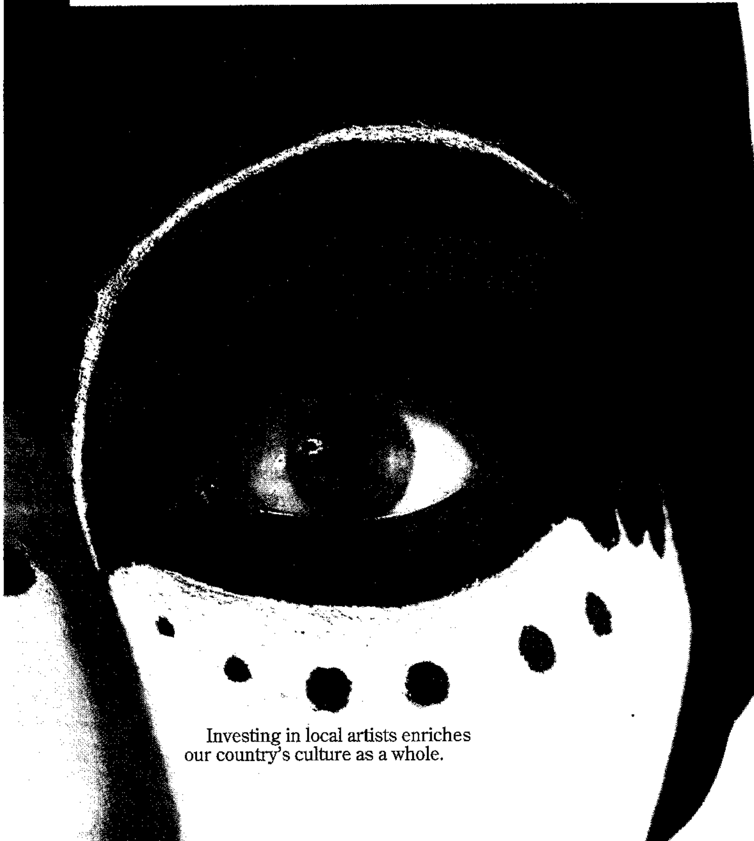

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normal returns by earnings growth subsequent to forming the price/earnings portfolios, analysts' forecast errors or omitted risk factors. In South Africa Hadassin (1976) concluded for a sample of thirty companies that there was a definite correlation between past and future earnings changes, but that the exact relationship between them was unknown. In more recent studies Ward and Stathoulis (1993) built a regression model with the purpose of forecasting price/earnings ratios and Firer (1993) related the price/earnings ratio to the cost of equity capital.

3. DATA AND RESEARCH METHOD

All South African industrial companies listed on the Johannesburg Stock Exchange between 1973 and 1992 have been included in the study. The number of companies analysed vary from 125 in 1973 to 371 in 1992. A survival bias is present because companies delisted over the period of analysis have been excluded from the analysis. The data of surviving companies are included from the year of listing to 1992. In some instances companies that have reported losses have been excluded from the calculations of earnings growth. This will be reported when the accompanying results are discussed.

Earnings per share (EPS_a) have been obtained from the reported financial statements. Care was taken to insure that extraordinary items were excluded and that all earnings were reported on an undiluted basis. Subsequently all EPS_a-values not based on a full accounting year were adjusted to a 12-month period using the formula:

EPS_b = 12*EPS_a/Accounting period

To ensure a fair comparison, the EPS_b-values were adjusted for the consolidation of shares, share splits and capitalisation issues (see e.g. De Bondt and Thaler, 1990). These adjusted earnings are denoted as EPS_c. Initially the December issues of the JSE Monthly Bulletin were used as basis for these adjustments. Due to data inaccuracies in this source, individual yearly reports were eventually utilised for this purpose.

Computation and interpretation problems arise when earnings growth is calculated for data points with negative denominators. For the purpose of this study it was decided to delete such observations (all data on that company) from the analysis. Instances where this approach had been adopted will be brought to the attention of the reader.

In an effort to compensate for look-ahead bias (Banz and Breen, 1986), share prices were recorded at year-end (t) and at year-end plus three months (t+3). The median is used as measure of central tendency to reduce the influence of outliers.

In a first stage of the analysis earnings growth time series for individual companies were subjected to tests for serial correlation using approximate 95% confidence limits at $-1/N \pm 2/\sqrt{N}$ where N is the number of observations (Chatfield, 1980:63). The data set was divided into companies that had never shown any losses and companies that had reported at least one year of negative earnings.

In the second stage of the analysis descriptive measures for the price/earnings ratios are provided for five quintiles. The observed and expected frequencies in the various quintiles are compared using a binomial test.

Finally, the growth rates in EPS_c are compared over time and over the different quintiles with the object to deduce the implications of high or low price/earnings ratios. The underlying hypothesis is that an appropriate stratification procedure will uncover a significant relationship between earnings growth and the price/earnings ratio (Huijgen and Plantinga, 1993).

4. RESULTS

In order to determine whether future earnings growth can be determined from historical observations, a total of 371 industrial companies were subjected to tests for serial correlation in percentage changes earnings growth using a two-sided test at the 5% level of significance with a maximum of five lag periods. The number of lags was reduced for very small sample sizes. The results are subdivided into two groups; the first consisting of the 257 companies that had never reported losses (Table 1) and the second made up of 114 companies that had reported losses in one or more years (Table 2).

TABLE 1
Number of significant serial correlation coefficients: companies reporting no losses (α=0,05)

Lag	1	2	3	4	5
Number of significant coefficients	1	1	8	7	0

TABLE 2
Number of significant serial correlation coefficients: companies reporting losses at least once (α=0,05)

Lag	1	2	3	4	5
Number of significant coefficients	1	0	3	0	0

The results overwhelmingly support the hypothesis of earnings growth as a random walk. The small number of significant serial correlation coefficients at lags 3 and 4 probably reflect a business cycle phenomenon. It must be admitted, however, that due to the brief data base, the sampling errors will be quite large, leading to lower discriminatory power of the tests. However, the finding that earnings growth for individual companies can be described by a random walk model is supportive of one of the most robust empirical findings in financial statement literature.

TABLE 3
Medians of price/earnings ratios (Price at year-end)

	All shares	Q_1	Q_2	Q_3	Q_4	Q_5
1973	9,06	4,55	6,76	9,06	11,80	17,86
1974	4,86	2,67	4,00	4,86	6,33	10,51
1975	4,49	2,20	3,60	4,49	5,69	8,23
1976	3,65	1,73	2,89	3,65	4,38	6,68
1977	3,72	1,15	2,75	3,72	4,85	7,72
1978	4,13	1,79	2,99	4,07	5,31	7,38
1979	4,64	2,26	3,47	4,64	6,29	8,97
1980	4,96	2,50	3,99	4,96	6,77	10,44
1981	4,27	2,12	3,12	4,23	5,83	9,34
1982	4,25	2,04	3,08	4,43	5,97	10,23
1983	6,19	3,43	4,75	6,23	8,00	13,04
1984	6,85	3,21	5,50	6,88	9,46	15,76
1985	8,14	-1,73	5,70	8,15	10,95	17,81
1986	8,64	2,50	6,58	8,70	12,32	18,66
1987	10,16	4,46	6,97	10,00	13,68	21,20
1988	6,23	3,14	4,88	6,23	8,18	11,61
1989	6,11	2,95	4,46	6,10	7,95	12,20
1990	5,79	2,01	4,42	5,80	8,11	12,88
1991	7,29	-0,68	4,65	7,30	10,32	17,83
1992	7,49	-1,43	4,84	7,33	11,18	20,26
Mean	6,05	2,04	4,47	6,04	8,17	12,93

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Tables 3 and 4 contain the median values of the price/earnings ratios over the different years, divided into quintiles for respectively prices measured at year-end t and year-end t plus 3 months. The first quintile represents the 20% of companies with the lowest price/earnings ratios and the fifth quintile the 20% of companies with the largest price/earnings ratios. The effect of the business cycle on the ratios is clearly visible.

TABLE 4
Medians of price/earnings ratios
(Price at year-end plus 3 months)

	All shares	Q_1	Q_2	Q_3	Q_4	Q_5
1973	9,06	4,65	6,59	9,06	11,29	17,97
1974	4,68	2,50	3,44	4,68	5,70	8,72
1975	4,58	2,33	3,38	4,60	5,72	9,21
1976	3,54	1,80	2,90	3,54	4,33	6,64
1977	3,83	1,36	3,05	3,83	5,01	7,66
1978	4,72	2,18	3,81	4,71	6,13	8,86
1979	5,12	2,50	4,03	5,12	6,65	10,29
1980	5,38	2,97	4,35	5,38	6,75	11,88
1981	4,74	2,37	3,50	4,72	5,99	9,82
1982	4,43	2,10	3,23	4,46	6,45	12,05
1983	6,97	4,08	5,34	7,00	9,25	15,10
1984	6,64	2,16	5,06	6,67	8,34	13,98
1985	9,41	-1,85	6,77	9,44	12,12	20,96
1986	10,40	2,60	7,80	10,38	12,85	18,97
1987	9,54	4,58	7,26	9,42	14,51	23,10
1988	6,52	3,31	5,02	6,51	8,65	12,28
1989	5,88	3,00	4,58	5,88	8,41	12,91
1990	6,02	2,16	4,29	5,89	8,01	13,51
1991	7,80	-0,16	5,03	7,86	11,02	19,01
1992	7,69	-1,10	4,89	7,69	11,60	20,67
Mean	6,35	2,18	4,72	6,34	8,44	13,68

TABLE 5
Number of observed and expected favourable years
(Price at year-end)

Favourable years	All companies	Q_1	Q_2	Q_3	Q_4	Q_5
0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
1	1 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)
2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
3	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
4	1 (1)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)
5	5 (2)	0 (0)	3 (1)	0 (1)	1 (0)	1 (0)
6	1 (4)	0 (0)	0 (2)	1 (1)	0 (1)	0 (0)
7	8 (8)	0 (0)	5 (3)	2 (3)	1 (2)	0 (0)
8	13 (12)	0 (0)	2 (4)	7 (4)	3 (3)	1 (1)
9	14 (14)	0 (0)	5 (5)	5 (5)	3 (3)	1 (1)
10	17 (14)	1 (0)	3 (5)	7 (5)	5 (3)	1 (1)
11	7 (12)	0 (0)	3 (4)	2 (4)	2 (3)	0 (1)
12	7 (8)	0 (0)	4 (3)	1 (3)	2 (2)	0 (0)
13	3 (4)	0 (0)	1 (1)	2 (1)	0 (1)	0 (0)
14	3 (2)	0 (0)	2 (0)	0 (1)	0 (0)	1 (1)
15	1 (1)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)
16	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
17	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
18	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
19	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	81 (82)	1 (0)	29 (30)	28 (28)	18 (18)	5 (4)

- Observed outcomes are reported with expected outcomes in brackets.
- Differences in totals are due to rounding errors.

A simple test by Brealey (1983) is also applied here. It comprises the use of the binomial distribution to compare observed favourable outcomes with expected favourable outcomes. An outcome is favourable if a company shows a higher earnings growth than the median value of all companies in a particular year. This implies a positive excess earnings growth. In a similar fashion, an outcome is unfavourable if the earnings growth of a particular company is less than the median value of all companies. For the purpose of this comparison, all companies reporting losses at least once have been excluded from the analysis, as well as companies that have not been listed for the full period 1973 to 1992.

TABLE 6
Number of observed and expected favourable years
(Price at year-end plus three months)

Favourable years	All companies	Q_1	Q_2	Q_3	Q_4	Q_5
0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
1	1 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)
2	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
3	1 (0)	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)
4	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
5	3 (2)	0 (0)	1 (1)	0 (1)	1 (0)	1 (0)
6	3 (4)	0 (0)	2 (2)	1 (1)	0 (1)	0 (0)
7	7 (8)	0 (0)	5 (3)	1 (2)	1 (2)	0 (1)
8	13 (12)	0 (0)	3 (4)	6 (4)	3 (2)	1 (1)
9	15 (14)	0 (0)	3 (5)	6 (5)	4 (3)	2 (1)
10	15 (14)	0 (0)	4 (5)	5 (5)	3 (3)	3 (1)
11	8 (12)	1 (0)	3 (4)	2 (4)	2 (2)	0 (1)
12	7 (8)	0 (0)	4 (3)	2 (2)	1 (2)	0 (1)
13	3 (4)	0 (0)	0 (2)	2 (1)	1 (1)	0 (0)
14	4 (2)	0 (0)	3 (1)	0 (1)	0 (0)	1 (0)
15	1 (1)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)
16	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
17	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
18	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
19	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	81 (82)	1 (0)	29 (30)	26 (26)	17 (16)	8 (6)

- Observed outcomes are reported with expected outcomes in brackets.
- Differences in totals are due to rounding errors.

Once more the results are reported in two-fold, namely price/earnings quintiles for prices at year-end (Table 5) and price-earnings quintiles for prices at year-end plus three months (Table 6). Should the price/earnings ratio provide evidence of earnings growth, one would expect companies in quintiles 4 and 5 to show more observed favourable years than the expected number under the binomial distribution with parameter p = 0,5. Accordingly, one would expect companies in quintiles 1 and 2 to show less observed favourable years than expected under the symmetric binomial distribution. No such trends are visible, leading to a rejection of the hypothesis that companies in higher quintiles reflect higher earnings growth and those in lower quintiles weaker earnings growth. Once more the evidence is in favour of the non-predictability of future earnings on the basis of historical evidence.

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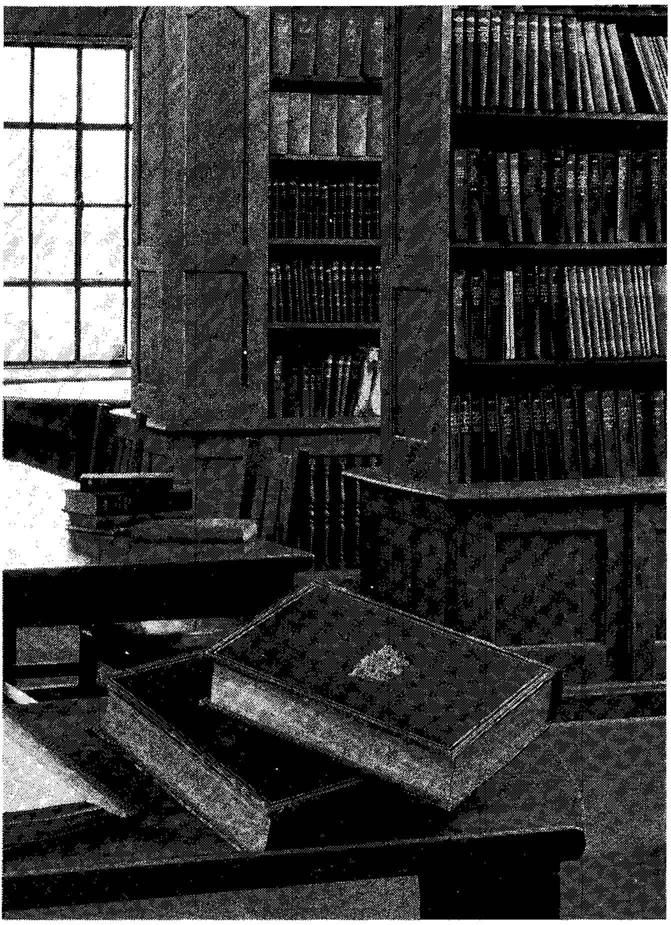

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Finally, in order to determine to which degree the rating of the companies (as reflected by the different price/earnings ratios in the five quintiles), is a function of the growth in earnings per share, the latter was calculated. If the future growth in earnings is truly random across companies, all shares should have the same rating and sell at the same price/earnings ratio after controlling for other factors such as risk. However, because shares trade at substantially different price/earnings ratios, it must be the case that investors believe they can forecast earnings growth. Stated differently, if price/earnings ratios embody forecasts of growth, high price/earnings ratios will be associated with shares for which the expected growth is high, and low price/earnings ratios will be associated with shares for which the expected growth is low. The growth in earnings per share was calculated by pooling the EPS_c-values per quintile per year. The yearly growth rates per pooled quintile were calculated over 1, 2, 4 and 8 years by solving g from the equation

$$TO_{j,\, i+t} = TO_{j,\, i}(1+g)^t$$

where j = 1, 2, 3, 4 or 5 represents a specific quintile;
i = the base year;
t = 1, 2, 4 or 8, the term involved; and
$TO_{j,\, i}$ = the pooled total EPS_c-values for quintile j in year i.

Growth rates were calculated over the period 1974 to 1992 and the median growth rates are reported in Tables 7 and 8 for, respectively, price/earnings calculated at year-end and price/earnings calculated at year-end plus 3 months.

TABLE 7
Medians of growth rates of pooled EPS_c-values (Price at year-end)

	Total	Q_1	Q_2	Q_3	Q_4	Q_5
1 year	10,7	12,6	-1,4	3,0	9,8	25,4
2 years	9,6	1,7	8,2	5,2	12,7	10,3
4 years	13,2	11,1	7,2	11,0	16,9	16,9
8 years	12,4	12,4	11,8	11,4	12,4	16,3

TABLE 8
Medians of growth rates of pooled EPS_c-values (Price at year-end plus 3 months)

	Total	Q_1	Q_2	Q_3	Q_4	Q_5
1 year	10,7	14,1	-1,2	5,9	10,4	25,8
2 years	9,6	4,5	10,2	2,4	10,4	15,8
4 years	13,2	10,6	10,6	13,6	15,3	20,6
8 years	12,4	12,8	11,4	11,2	12,7	16,8

If price/earnings ratios contain information about future growth in earnings, the expectation is that the fifth quintile will consistently show the highest growth rate and the first quintile will show the weakest growth. This is not in accordance with the outcomes in Tables 7 and 8. It is true that the fifth quintile contains the highest growth rates for all 4 periods considered in Table 8, and in 3 out of the 4 periods considered in Table 7. Against the expectation, however, are the relative high growth rates observed in the first quintile, which become more noticeable when the growth rates are ranked in Table 9.

TABLE 9
Rank order of earnings growth rates per quintile

	Q_1	Q_2	Q_3	Q_4	Q_5
Price at year-end					
1 year growth	2	5	4	3	1
2 years growth	5	3	4	1	2
4 years growth	3	5	4	1	1
8 years growth	2	4	5	2	1
Price at year-end plus 3 months					
1 year growth	2	5	4	3	1
2 years growth	4	3	5	2	1
4 years growth	4	4	3	2	1
8 years growth	2	4	5	3	1

Companies classified under the first quintile very clearly do better than expected. In four cases these companies are ranked second in terms of earnings growth. This may be attributable to the negative earnings effect reported by Ettredge and Fuller (1991) who argue that the potential for recovery of firms initially reporting losses, tends to be underestimated by the market. Apart from the fifth quintile, randomness seems to be maintained in the rest of the data.

5. CONCLUSIONS

In the presence of a possible survival bias due to the exclusion of delisted companies and acknowledging the absence of a filter test to eliminate small listed companies, the results overwhelmingly support the hypothesis of higgledy piggledy growth or earnings growth as a random walk.

In the first case this conclusion is borne out by tests for serial correlation at the level of the individual firm, which support the hypothesis that the serial correlation coefficients are equal to zero in the population. Second, these results are confirmed by the binomial tests which do not support the hypothesis that companies in higher quintiles achieve higher earnings growth.

In the third place, observed EPS_c-growth per quintile supports the hypothesis of random earnings growth, the only exception being the fifth quintile where the highest growth in earnings was observed in seven out of eight cases. This suggest that investors can, on the average, identify companies with the highest growth potential.

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Investment Basics: XXXI. Sustainable Growth Models

INTRODUCTION

Many firms state their financial objectives in terms of a growth target for a parameter such as earnings per share. Research on the sources firms use to raise new capital has shown that there is a reluctance to raise new equity capital (Ross, Westerfield and Jaffe, 1993, p409), and yet without the injection of new equity capital there are limits to growth for the firm. The rate at which a firm can grow, without resorting to external equity finance or altering its present financial structure, is consequently a parameter of great interest to management.

THE HIGGINS SUSTAINABLE GROWTH MODEL

Higgins (1977) showed that for a given dividend payout ratio, profit margin, sales to assets ratio and capital structure, the maximum (or sustainable) rate at which a firm can grow whilst maintaining its financial parameters is given by:

$$SG = RI/NPAT*NPAT/S*S/NA*NA/E$$

This can be expanded to give:

$$SG = RI/NPAT*PBIT/S*NPBT/PBIT*(1-T)*S/NA*NA/E \qquad (1)$$

where NPAT = net profit after tax
NPBT = net profit before tax
PBIT = operating profit before interest and tax
S = turnover
T = firm's tax rate
E = book value of equity
RI = retained income for the year
NA = net assets (i.e. total assets less interest bearing current liabilities)

Concelling like factors leads to the simplified version:

$$SG = RI/E$$

The correct formulation requires that the opening book value of the equity, not the closing book value should be used in the denominator of the ratio. It can be argued with some justification that the appropriate way to express the return on an investment ought to be as percentage of the opening investment for the period rather than the closing value. However, traditionally in financial analysis, returns such as ROE are expressed as a percentage of the closing equity. Using the value of closing equity in equation (1) will lead to an incorrect value for the sustainable growth rate.

Thus the sustainable growth equation (1) should be amended by the introduction of the factor E/E_0 (closing equity/opening equity). Thus

$$SG=RI/NPAT*PBIT/S*S/NA*(1-T)*NPBT/PBIT*NA/E*E/E_0$$

Combining NA/E and E/E_0 and using the opening value of NA gives the factor NA_0/E_0 where both variables are derived from the opening balance sheet. The expression for the sustainable growth equation can then be rewritten as:

$$SG=RI/NPAT*PBIT/S*S/NA_0*(1-T)*NA_0/E_0*NPBT/PBIT \qquad (2)$$

Factor one characterises the impact of reinvested funds on the growth rate. The next two factors identify the growth potential of the firm resulting from its operations. Factor four modifies the growth as a result of taxation. The impact of the addition of debt to the capital structure of the firm is shown by factors five and six, the former being related to the debt/eqity ratio and the latter to the interest cover ratio.

Now taxation rates are reasonably stable, as are interest rates, particularly if the firm is using fixed interest borrowings. There is obviously a limit to the extent to which debt may be used. This leaves only the operating variables, profit margin and asset turnover, and the retention ratio as sources of growth potential for the firm. In the long run a firm may achieve a high degree of efficiency in its operations, limiting improvements in these ratios. Thus the only truly long run source of growth potential for the firm, outside of the raising of new equity capital, is the income which it retains.

OTHER SUSTAINABLE GROWTH MODELS

A common form of the sustainable growth equation appearing in the literature is:

$$SG=RR*ROE \qquad (3)$$

which (if closing equity is used in the definition of ROE) is in fact an aproximation. The correct formulation can, with a little algebra, be shown to be

$$SG=(RR*ROE)/(1-RR*ROE) \qquad (4)$$

(For modest retention ratios in low inflation economies, the error made in assuming the denominator equals one would be small).

However if ROE is defined using opening equity (using the symbol ROE_0), equation (3) does correctly measures the sustainable growth rate.

The Boston Consulting Group presented the following formulation, which defined the sustainable growth rate in a firm's assets (Zakon, 1968):

$$SG=[D/E*(R-i)*p]+R*p \qquad (5)$$

where
R = return on assets after tax
i = interest rate after tax
p = retention ratio
D/E = debt to equity ratio (book values)

Although the model highlights the crucial term (R-i), – the difference between the operating returns of the firm and it scost of debt – the Higgins formulation does give better insight into the curcial variables which determine the sustainable growth rate of the firm.

SUSTAINABLE GROWTH MODELS IN FINANCE TEXTS

Twenty six modern finance texts were scanned to establish the way in which they dealt with the concept of sustainable growth. Five use the Higgins (1977) model (based on closing equity), two the BCG model, and six the retention ratio model. Of the latter, two provide the correct version (equation 4), the other four the approximate version. (Only two of these four mention that their model is an approximation). The remaining half of the texts make no mention of the concept.

AFFORDABLE GROWTH RATE

The sustainable growth rate is the maximum feasible growth rate of the firm when all the financial parameters are held constant. A related concept, which may be termed the affordable growth rate of the firm can be defined as the maximum feasible growth rate at a given target leverage, when all other financial parameters remain constant. In other words, the difference is that sustainable growth is determined at the existing leverage, whereas affordable growth is determined at the target leverage. Unless the firm's capital structure is at its target level, the affordable growth rate is the better indicator of the long term sustainable growth rate. Actual leverage is converted to target leverage by multiplying actual leverage by

$$\frac{100 - \frac{\text{actual debt}}{\text{capital}}}{100 - \frac{\text{target debt}}{\text{capital}}}$$

SUSTAINABLE GROWTH AND THE RAISING OF NEW EQUITY

If no new equity is sold, the only growth in book value comes from retained earnings, i.e. $E=E_0+RR^*NPAT$. However, if new equity is sold, Clarke, Wilson, Daines and Nadauld (1988, p227) show that the growth in book value per share is given by:

$$BV/BV_0=(1+g_s)=(1+SG)^*(1+\alpha^*g_s)/(1+g_s) \qquad (6)$$

where α = Share price/BV_0
g_s = proportional increase in the number of issued shares
= (Number of new shares issued)/(opening number of shares)

Thus if the new shares are not sold at book value, the growth in book value per share will differ from the sustainable growth rate. Therefore the magnitude of a firm's share price has an influence on its sustainable growth rate when new equity is to be sold i.e. for a given degree of dilution in issued shares, the greater the share price relative to the book value per share, the greater the firm's sustainable growth rate.

CONCLUSION

In conclusion it may be said that the concept of a sustainable growth rate is an important one which has been introduced into finance texts over the past decade. It addresses the strategically important question of whether or not the firm's proposed plans can be funded within its existing financial parameters. It is easily calculated and gives the analyst valuable insights into any potential funding problems the firm may experience in the future.

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