Investment returns:
How cash beat property
(and a few other asset classes besides)

Erwin Rode[1]: July 2003

The below-par investment performance of most South African retirement funds over the past few years was recently again put under the media spotlight. Yet, some asset classes have done exceedingly well over this period. This begs the question whether fund managers have been prudently weighing up the weights of the various asset classes in their portfolio mixes, and whether these managers should have read the signs of the times better — not with hindsight but foresight.

With this as a background, the aim of this article is

- Firstly, to identify the theoretical return and risk-return characteristics of some of the important asset classes during three different inflation eras — with the emphasis on two property classes.
- Secondly, to arrive at a conclusion regarding the asset-allocation implications of these characteristics.
- Thirdly, to establish to what degree investor substitution among asset classes led to a convergence of total returns in the long run.
- Fourthly, to investigate empirically how property in South Africa did fare against other asset classes from 1980 to 2002, considering both risk and return, and how this agrees with our inflation-era construct.

1. Major trends

Before we review the historic returns of a few asset classes over the past 23 years, it will be instructive first to consider the defining trends in the South African economy and financial markets since 1980. This is necessary to explain some of the varying return performances of the various asset classes.

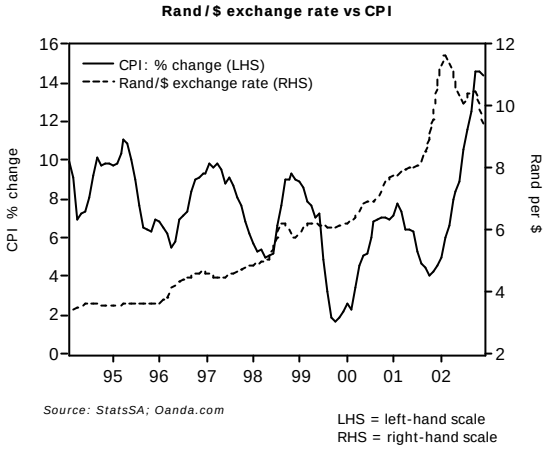
1.1 Inflation:

Accelerating inflation started rearing its head in the early 1970s in response to lax monetary policy, characterized by low real interest rates. Inflation peaked in the 1980s, and during the decade ended 1989, consumer inflation averaged 14,6% per annum. In that year, under new governor Chris Stals, the South African Reserve Bank made an about-turn and introduced a regime of high real interest rates. This resulted in a gradual secular decline in the rate of inflation, even though fiscal policy only joined the anti-inflation stance nearly a decade later. The delayed tightening of fiscal policy was no doubt a result of the political transition, starting in 1990, which brought about different priorities in the political economy, like the prevention before April 1994 of the country becoming ungovernable (threat from the left) or the avoidance of a putsch or voter revolt by the right. After 1994, the delay in immediately instituting fiscal discipline can best be ascribed to policy uncertainty in the ruling ANC party, given its inexperience in governance and its socialist background. The result of these delays was that the Bank had to wage the righteous war all on its own for nearly a decade, resulting in only a gradual downtrend in the rate of inflation.

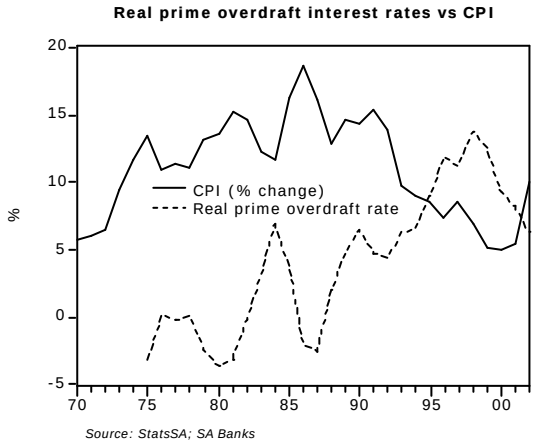
[1] *The author is indebted to Dirk De Vynck for the compilation of the return and risk-return tables and for doing the calculations.*

Table 1: Consumer inflation Means for the periods		
1998–2002	5 yrs	6,5%
1989–1998	10 yrs	10,8%
1980–1989	10 yrs	14,6%
Source of raw data: Stats SA		

Compared to a blitzkrieg on inflation, where monetary and fiscal policy work in unison, the result was thus less pain but over a much longer period.



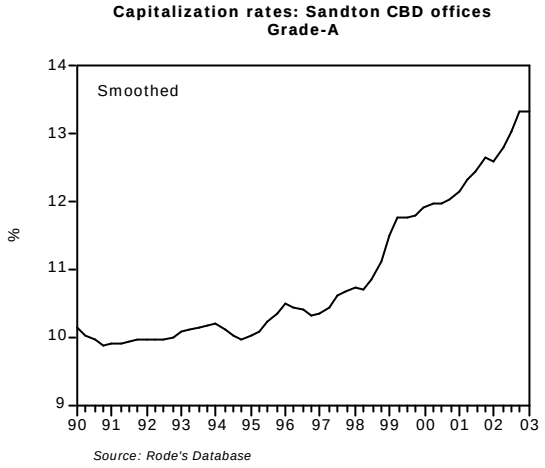
Over the past five years, and in spite of prudent fiscal and monetary policies, the downtrend in the rate of inflation was thrice interrupted by a crash of the rand's external value, viz. in 1996, 1998 and again at the end of 2001. However, it must be noted that these crash spikes were overlaid on the long-term weakening trend of the rand, which implies there isn't going to be an easy victory over inflation as long as the causes of the weakening rand are not addressed. However, it is an ill wind that blows no good, and the weakening SA currency continually boosted the rand earnings and, therefore, the prices of rand-hedge companies listed on the JSE. Since these rand-hedge companies make up a sizeable proportion of the JSE market capitalization, the net effect was a continual boost to the All-Share Index from 1996.

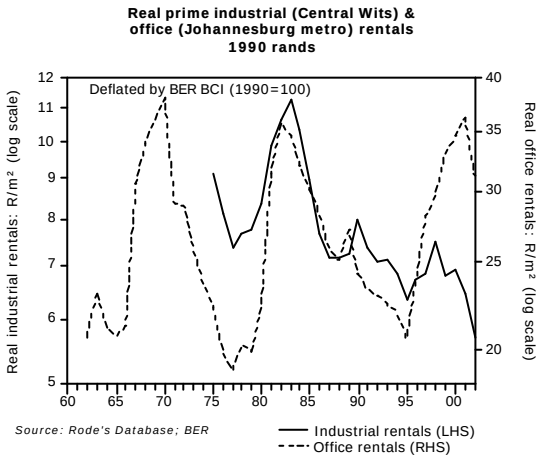


The weak rand notwithstanding, South Africa has been in a disinflation environment (declining inflation trend) since about 1990, caused in the main by a regime of high real interest rates. As we shall see below, this has an important implication for asset allocation.

1.2 Property the stench of the month:

In South Africa, real office and industrial rentals had been in the downswing phase of their normal, predictably long, rental cycles from about 1983, resulting in an extended period of under-par property performance.[2] Then, by the mid-1990s, institutions were for the first time in decades allowed to start investing abroad, and institutional portfolio managers — short of funds to invest off-shore — started casting around for assets to lighten up on. Thus, just as the office market's long real-rental cycle passed its trough in 1995, the order went out to sell or at least to stop investing in property.





This pro-cyclical strategy by South Africa's main property players is evident from the trend in capitalization rates of all property types, which went into a steep incline because there were now more sellers than buyers. This undermined capital values, and had it not been for strongly growing market rentals at the time (the beginning of the upswing phase of the long cycle), directly-held property would have suffered terrible market-value losses.

> Capitalization rates and property returns have an inverse relationship because lower capitalization rates cause higher capital values, which push up total returns — holding all other factors constant — and vice versa. An income yield is a similar concept to a capitalization rate, and for this reason the same principle applies.

On a more positive note, the rising capitalization rates were partially instrumental in bringing directly-held property values more in line with listed-property values. The other factor was sliding long-bond yields, and listed property's income yields starting to track these yields since

2 The author identified the long property cycle in 1978 and subscribers to Rode's SA Property Trends have been privy since the early 1990s to Rode's forecasts of this cycle. The cycle has an average duration of nearly 20 years.

1998. Thus on the one hand non-listed property values were reined and on the other, listed property values were boosted through a market re-rating.

1.3 Feeding frenzy at the bourses:

In the early 1990s, the American economy entered a low-inflation era, and started on its longest post-WWII business-cycle upswing, turning the 1990s into one long investor party. Possible boosters of the US economy were low inflation, partially causing impressive gains in productivity, partially brought about by the rise in information and communication technology. The seemingly never-ending upswing, and the concomitant speculative investment frenzy, resulted in US equity trading at ridiculously high P/E ratios towards the end of the decade. This spilled over to the rest of the developed world and these countries' bourses, including South Africa's JSE. However, like all "never-ending" stories, it had to end in tears. So did South Africa's equity investors.

These then are the major trends that influenced the returns generated by SA assets over the past 23 years.

2. Inflation-hedging characteristics

In this section we deal with the theoretical inflation-hedging characteristics of the more important asset classes with reference to three inflation phases. In South Africa, these phases can be dated as follows:

High inflation era: c. 1975 up to c. 1989.
Disinflation era: c. 1990 – present.
Stationary low-inflation era: some time in the future.

An era is, for our purposes, an extended period.

2.1 High-inflation era:

Inflation is mainly created by a policy of cheap money. Thus it stands to reason that fixed-interest investments – including cash – would do poorly during an era of low real interest rates, that is, during an era normally associated with high inflation. Not only is the real income-return low or negative to start off with, but in the case of instruments with a long term to maturity, every time interest rates rise further because of rising inflation, the holder of such an asset also suffers a further capital loss. Thus one would expect that long bonds would be one of the worst investment classes during a high-inflation era – especially so during a period of accelerating inflation.

Equity investments are, on the other hand, inflation hedgers par excellence. This is so because earnings tend to grow commensurate with inflation and, on top of that, as a rule of thumb, about half of these are reinvested in the company (often in creative new ventures), thereby potentially causing strong capital growth. However, the promise of strong capital growth comes at the expense of high risk (volatility of cash flows).

Thus, during an era of high inflation, a generation of fund managers will grow up blindly believing in equity's superiority as an investment class — a generation that refuses even to consider long bonds or cash, no matter the era.

Similar to equity, during an era of high inflation, property can also act as an inflation hedge because the rentals of an individual property's rentals tend to grow – albeit with a significant lag – in the wake of inflation (less a factor for ageing). However, an important difference here is that property-holding companies tend to distribute all earnings, which limits earnings growth. In addition, non-property enterprises can do innovative things like launching new products or services, or effecting dramatic cost savings through, for instance, mergers. In contrast, there is normally little opportunity to add value to a standard property by doing clever things like changing its use, repositioning it or by changing its tenant mix, and so on.

Hence the after-tax income yield of property-holding companies is typically much higher than the after-tax earnings yield of equity, in order to compensate the investor for the lower potential capital growth. Nevertheless, because of property's lower risk profile (moderate volatility of cash flows), the total return the market expects from property is in the long run lower than equity's. There's a risk-return trade-off here.

Total return = income return + capital growth

One important lesson flowing from this discussion is that it is incorrect to compare only the price movements of properties with equities because one would expect the prices of equities to grow at a much higher rate than those of properties. A better comparison is total returns.

2.2 Disinflation era:

Until now we have been expounding on the theory of what happens to the major asset classes in a high-inflation era. But what happens during a disinflation era — that is, when the inflation rate is on a secular declining trend?

The most important feature of a declining inflation trend is that the income yields of long bonds and — following in their wake — listed-properties, start to drop. The proviso is that the market believes in the resolve of the authorities to keep on pursuing an anti-inflation policy.

Income yields on these investment classes decline because the market now requires a lower nominal yield, holding constant its required real (after-inflation) yield. Declining income yields of long-dated bonds means of course rising capital values (since the income stays constant). So the shedding of capital values we saw during the inflation era is now put in reverse. On top of this, the cash flows from gilts (government-issued bonds) are fixed and certain because they are guaranteed by the state. Thus long bonds offer exceptional value during a disinflation era, viz. a high income-yield and a good prospect of some capital growth, combined with low risk.

Now why would listed properties react in a similar fashion to long bonds? The answer seems to be that the market is looking ahead and assumes that in a forthcoming low-inflation era property rental incomes will show little growth (especially when considering ageing), thereby giving listed property funds a similar profile to long bonds. This explains why, since 1998, listed property [property unit trust (PUT) and variable loan-stock (VLS)] yields have been tracking long-bond yields so religiously.

2.3 Stationary low-inflation era:

A stationary low-inflation era could be defined as an extended period during which consumer inflation is more or less stable at below, say, 3%. Furthermore, for our purposes, the financial and property markets must believe that such a low inflation rate is sustainable. This, of course, requires from the monetary and fiscal authorities that they pursue sustained, credible and consistent policies commensurate with low inflation.

Low inflation does not necessarily translate into poor returns from equity, as we saw during the 1990s in the US and the rest of the developed world. To the contrary, because of a better allocation of scarce resources, an economy under a low-inflation regime will tend to perform better, all other facts remaining constant. Thus one would normally expect equity markets to do well in this era.

As a generalisation, one would not expect the market rentals of property to grow by much under a stationary low-inflation regime, especially after having deducted an ageing factor. The reason for this is that in the long run[3] prime rentals will grow with building-construction

3 We qualified the above statement with the phrase "in the long run". This refers to the long property (and, in its wake, building-construction) cycle of nearly 20 years. During the upswing phase of this cycle (say the first ten years) building-construction costs tend to grow at a faster pace than consumer inflation because of higher building activity,

inflation (the cost of replacement), which in turn in the long run will grow with consumer inflation.

However, any individual property ages, and its market rental can, therefore, not be expected to keep up with prime rentals. For this reason, the financial markets in this era view listed property as being similar to gilts. For both asset classes there is now little further prospect of declining income yields (or capitalization rates), and the prospects for capital gains are, therefore, slimmer than during the disinflation era. In principle, the same applies to non-listed property.

Hence property, whether listed or not, now has to rely solely on its income return. Put differently, its income return is now close to its total return, and property becomes similar to a long bond – an unexciting, low-risk asset.

Another interesting feature of this era is that the cost of borrowed money to finance new developments (viz. interest rates) is now often below the initial income yield of prime property. This dramatically lowers the financial risk of new developments.

To sum up, during a stationary low-inflation era, equity could be expected to outperform long bonds and property, albeit at the cost of a higher risk. This in many respects is not dissimilar to the situation under a high-inflation regime. The main difference is that the risk of long bonds and property is now lower than during the high-inflation era.

3. Substitution theory

It stands to reason that investors would always be on the lookout for undervalued assets in order to maximise their profits. Hence, through arbitrage, the various asset classes would in the long run show similar total returns, after adjusting for differing risk. Put differently, if one asset class holds the promise of superior returns, and provided this information is transmitted efficiently to the markets, investors would substitute their currently-owned assets for such an asset, and in the long run this substitution would more or less equalise inter-asset total returns, after adjusting for the different risk profiles.

The non-listed institutional property market is without a doubt less efficient than the stock exchange or bond and money markets. Hence it would be interesting to verify to what degree the markets in SA nevertheless managed to equalise returns in the long run. We shall do this in §4.2 below.

4. Historic returns since 1980

The 23-year history in South Africa of the total returns of property and three other competing asset classes is shown in **Table 2**.

However, before we interpret this table, first a note on the robustness and representativeness of the historic return data, and the effect of taxation on returns.

4.1 Quality of the property data:

The return data of institutional property from 1995 onwards is taken from the IPD surveys, which, right from the start, were based on a large, and growing, sample of portfolios. Before this date, the returns are sourced from Rode's database and are based on the unweighted mean of only two (albeit large) institutional portfolios. This could create problems of representativeness when considering the mean return of any single year, but since we here examine the returns over long periods, we do not regard this as a serious concern.

However, and this also applies to the present day, in South Africa institutions by and large do their valuations in-house, which raises serious questions about the veracity of the returns

---

which allows building contractors to stretch their profit margins in the wake of lessened tendering competition. During the downswing of this long cycle, the opposite naturally applies.

when measured over short periods. Fortunately, in the long term (say, 20 years) the average returns become more reliable because fudging is in the long run unsustainable.

Before about 1996, the institutions had a so-called naïve buy-and-hold investment policy. Thus, since properties were seldom sold, there was no way of judging the fairness of the in-house valuations. We said "earlier years" above because there is considerable anecdotal evidence that over the past few years the institutions have gradually been bringing their valuations in line with reality ("taking them out of the hothouse"). There are three possible reasons for this:

Firstly, the decision by many institutions to start disposing of secondary properties from about 1996 onwards necessitated, as a preparatory step, realistic valuations of those properties on the "for sale" list. After all, it is unrealistic to expect that a board of directors would pass a resolution to sell a property at a value significantly below its own market valuation; neither is it realistic to expect that the property-asset manager concerned would willingly cast aspersions on his in-house valuations by recommending a sale at below his own valuation.
Secondly, in preparation for an eventual listing, values had to be brought more in line with the reality of the market. This is so because no promoter of a to-be-listed fund would buy properties from a vendor at inflated market values.
Thirdly, and this is probably a minor force at this stage, growing pressure from society and the marketplace for transparency.

A further reason for doubting the robustness of the earlier valuations is that the regular and consistent capitalization-rate surveys by Rode & Associates were only introduced in early 1988 — and hurdle- (viz. discount-) rate surveys even later in 1991. In addition, we suspect that it took some institutions a long time to start using these as an industry benchmark. To the degree that these surveys have now become the de facto benchmarks for the SA property market as a whole, it has become more difficult completely to ignore these industry-wide norms in the valuation process.

Hence, with reference to **Table 2**, those average returns of institutional properties that include data from before 1996, probably overstate reality. As a corollary, the returns after 1996 probably are excessively low as a result of phased-in corrections after this date. However, the average returns over the full period from 1980 to 2002 are probably a fair reflection of reality.

The PUT return data is based on the JSE-Actuaries PUT index. This sector was created in 1976, and initially it was very small and probably unrepresentative of the various property types, grades and geographic areas. To this day, the quality of the properties in this sector is generally regarded as second best. The prime-quality institutional properties have yet to be listed.

As for the other asset classes in **Table 2**, we have no reason to qualify the quality of the data on which their total return calculations are based.

4.2 Taxation:

A complicating factor that emerges when comparing total returns between various asset classes is the tax effect, which has changed considerably over the years, and which differs drastically between asset classes and the various categories of tax-payers. Hence, to keep things simple, we quote all returns in this article before tax. For more information on the tax problem, see Technical Notes at the end of this article.

4.3 Findings:

Our interpretation of **Table 2**, read together with the factors listed above, follows below:

In the long run (the full property cycle of nearly 20 years), the real total return from directly-held institutional property was between 4% and 5% per annum. However, as discussed above,

because of the special conditions prevailing throughout the period since 1980, no further deductions can be made relating to shorter periods.

It is noteworthy that over the longest period of 23 years, the total returns of unlisted institutional property, listed property (PUTs) and the All-Share Index were similar, with the latter doing slightly better, which is to be expected given its higher risk profile (for risk, see below). The two fixed-interest classes fared the worst over this period, but then their returns were in the early years of this period detrimentally affected by a cheap-money policy.

Before one gets too excited about the similar returns of the three inflation-hedging asset classes, and ascribe this to a vindication of the **substitution theory**, we must bear in mind that these results change drastically over different periods. An example is the slightly shorter 20-year period, during which listed property "falls out of bed" with a real total return of only 3,5% compared with non-listed institutional property's 4,4%.

But it is noteworthy that the inter-class returns tend to converge over the longer periods and diverge over the shorter periods. Thus some inter-class substitution might be taking place — albeit over the very long term. In the shorter term there seems to be wonderful opportunities for arbitrage.

As pointed out above, the total real returns from **property unit trusts (PUTs)** were, in the long run, similar to those from **institutional property**. The important difference is the divergence in latter years, brought on by the accelerating performance of PUTs compared with the decelerating returns of directly-held institutional property. The reasons underlying this divergence were discussed above. To sum up, these are:

Firstly, the accelerating performance of the listed property sector since 1998 is linked to disinflation and listed property values following in the footsteps of long bonds.
Secondly, portfolio managers ditching directly-held properties from about 1996, which set in motion a trend of rising capitalization rates.
Thirdly, directly-held institutional property values being managed down to market levels.

In looking for longer-lasting truths emanating from the divergent performance of listed versus non-listed property, we can conclude that reasons two and three were unique circumstances, probably not to be repeated in the future. However, reason one will probably repeat itself under similar circumstances – both in South Africa and in other countries with efficient financial markets. Thus the conclusion must be that listed properties are expected to produce excellent returns in a disinflation era.

For the period that started in 1988 (that is a period of 15 years, folks!), long-dated gilts showed the best returns of all asset classes. Considering that the SA Reserve Bank started with its anti-inflation campaign in 1989, this is what one would have expected, but to many an equity junky, this will come as an unpleasant surprise. Note too the similar returns achieved by long-dated gilts and PUTs since 1998.

Cash's returns were similarly good during the disinflation period, and during the 15-year period that started in 1988, cash's total return was second only to long-dated gilts. Thus one cannot but wonder why one had to employ expensive fund managers during this 15-year period, since any child can invest in money-market instruments.

However, **Table 2** also infers that during the high-inflation era, the returns of fixed-interest assets were poor relative to the competition, viz. inflation-hedgers like equity and property.

Thus fixed-interest instruments seem to be the asset class of choice during a disinflation era, in contrast to the situation during a high-inflation period. So the practise bears out the theory. Listed property also does well in a disinflation era, but on top of that it has inflation-hedging characteristics during a high-inflation period as well.

Table 2: Pre-tax total returns* (%) on property and other asset classes										
	Institutional property		All-Shares Index		PUTs		Long-dated gilts		Cash (BAs)	
	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real	Nominal	Real
2001-2002 1-yr ave.	9,5	-0,6	-8,1	-18,2	20,6	10,5	21,6	11,4	12,2	2,1
1998-2002 5-yr ave.	10,0	3,3	11,2	4,1	20,4	13,6	20,1	13,4	13,4	6,8
1993-2002 10-yr ave.	12,0	4,4	13,8	6,0	14,4	6,6	19,0	11,2	14,0	6,4
1988-2002 15-yr ave.	15,0	5,2	14,8	4,8	13,9	3,9	18,8	8,8	15,2	5,3
1983-2002 20-yr ave.	15,5	4,4	16,4	5,2	14,8	3,5	16,3	5,0	15,3	4,2
1980-2002 23-yr ave.	16,5	4,9	17,5	5,8	16,4	4,7	15,3	3,5	14,9	3,3

Sources of data: Rode's Database; IPD; StatsSA; Old Mutual Asset Management.
* The averages of the total returns for the different periods are calculated by using the geometric mean. See the technical notes at the end of this article for an explanation. The calculations were done on annual data, which, especially over the shorter term (5 years), could have had different results if, for example, the calculations were based on monthly data.

5. Risk-return relationships since 1980

Until now we have been examining the historic total returns disregarding risk. In this section we consider return and risk together. The reason for this is that, in theory, investors expect a trade-off between risk and return: the higher the risk (variability) of an investment's returns, the higher the expected return to compensate for the extra risk taken, and vice versa. Hence it can be argued that return should not be seen in isolation, but rather relative to the degree of risk incurred by the investor to achieve the return.

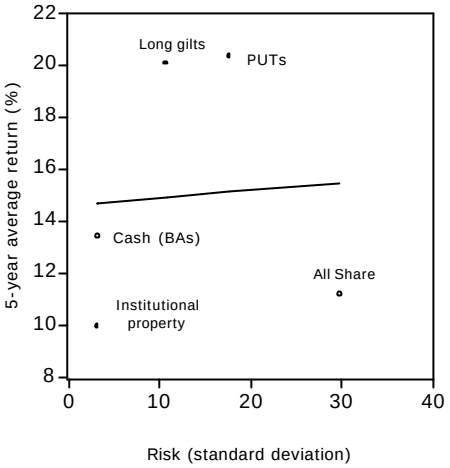
For our purposes, we define risk as the volatility or variability of total return, and we measure it by using the standard deviation: the higher the standard deviation of total returns, the higher the volatility or risk. Standard deviation is a statistical measure of the distance a quantity is likely to lie from its mean value. Also see the Glossary of terms and abbreviations in Annexure 1 for a further explanation.

As an orientation, we first give the reader a quick graphic overview in the form of the accompanying scatter diagrams. These diagrams show the relationship between risk (measured here using the standard deviation) and total return for the periods under review.

Because the relationship should be positive, we would expect the slope of the line of best fit to be rising, i.e. higher risk results in higher returns. Where the points on the scatter diagrams are not close to the regression line (line of best fit), one concludes the fit is poor (not tight). This means the risk-return trade-off for that period was poor. Put differently, it implies that some asset classes had achieved extraordinarily high or low returns relative to their risk.

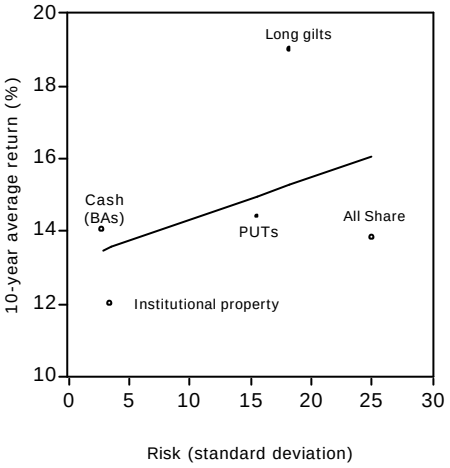
This mismatch of risk and return applied to all the periods covering the 15 years ended 2002 – the disinflation period. To the degree that history might repeat itself, this presents arbitrage possibilities. It is only for the very long 20- and 23-year periods that the risk-return relationship seems to approach normality.

Nominal asset returns (%) over 5 years vs risk (1998-2002)



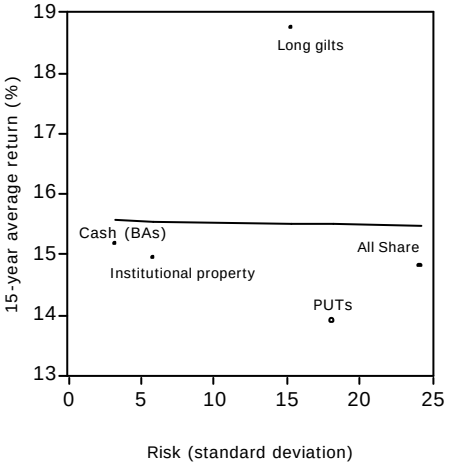
Source: Rode's Database; Investment Property Databank (IPD); StatsSA; Old Mutual Asset Management

Nominal asset returns (%) over 10 years vs risk (1993-2002)



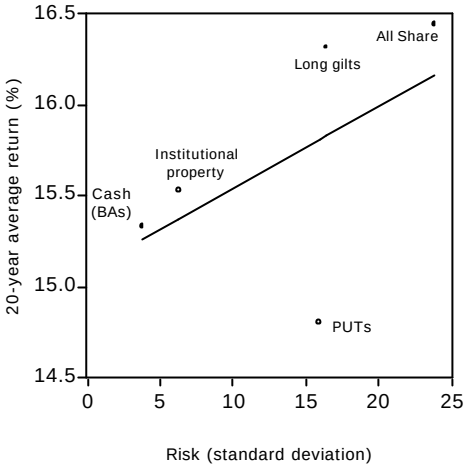
Source: Rode's Database; Investment Property Databank (IPD); StatsSA; Old Mutual Asset Management

Nominal asset returns (%) over 15 years vs risk (1988-2002)



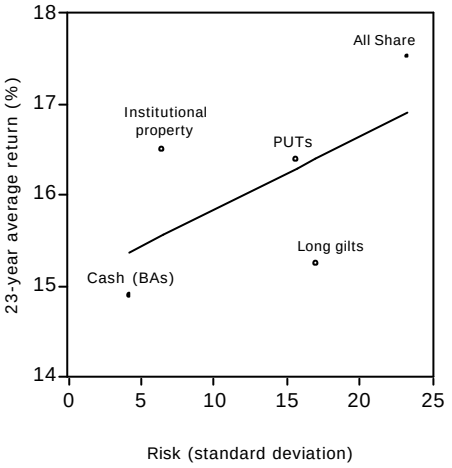
Source: Rode's Database; Investment Property Databank (IPD); StatsSA; Old Mutual Asset Management

Nominal asset returns (%) over 20 years vs risk (1983-2002)



Source: Rode's Database; Investment Property Databank (IPD); StatsSA; Old Mutual Asset Management

Nominal asset returns (%) over 23 years vs risk (1980-2002)



Source: Rode's Database; Investment Property Databank (IPD); StatsSA; Old Mutual Asset Management

We notice the following as well:

- As is to be expected, cash has the lowest risk.
- Non-listed institutional property's risk is low. There are two reasons for this. Firstly, the capitalization rates of property are stable relative to the earnings yields of listed shares because of property's relatively stable cash flow. Secondly, institutions' in-house valuers probably "smooth" — or, at least, used to "smooth" — their property values.
- PUTs' risk is certainly higher than that of unlisted institutional properties. The reason for this is of course the volatility added to the market values through the influence of the bourse. Institutions could argue that this is a reason not to list their property portfolios, in spite of the benefit of improved liquidity.
- However, PUTs' risk is definitely lower than that of the All-Share Index, which is the highest of all the asset classes under consideration. Put another way, listed property's beta is, therefore, <1, which makes PUTs a defensive investment.

From the scatter diagrams, it is evident that there is a need to somehow adjust returns for risk. This is achieved in Table 3, which ranks the risk-adjusted returns of the various asset classes by means of the Sharpe Ratio. The greater the Sharpe Ratio, the better the risk-

adjusted return of an asset. Thus the Sharpe Ratio should not be seen as an absolute number, but rather as a means of ranking more than one asset class. For more information on this ratio, see the explanation under Technical Notes at the end of this article.

Table 3:
Pre-tax risk-adjusted total returns*

	Institutional property	All-Shares Index	PUTs	Long-dated gilts	Cash (BAs)
5 yrs (1998-2002):					
Total return (%) (nominal)	10,0	11,2	20,4	20,1	13,4
Standard deviation (%)	3,2	29,8	17,7	10,8	3,3
Sharpe Ratio	-0,001**	-0,004**	0,443	0,614	2,604
Ranking using Sharpe Ratio	4	5	3	2	1
10 yrs (1993-2002):					
Total return (%) (nominal)	12,0	13,8	14,4	19,0	14,0
Standard deviation (%)	3,5	25,0	15,6	18,2	2,7
Sharpe Ratio	-0,0003**	0,028	0,093	0,331	3,201
Ranking using Sharpe Ratio	5	4	3	2	1
15 yrs (1988-2002):					
Total return (%) (nominal)	15,0	14,8	13,9	18,8	15,2
Standard deviation (%)	5,8	24,2	18,2	15,3	3,20
Sharpe Ratio	0,28	0,034	0,007	0,319	2,97
Ranking using Sharpe Ratio	3	4	5	2	1
20 yrs (1983-2002):					
Total return (%) (nominal)	15,5	16,4	14,8	16,3	15,3
Standard deviation (%)	6,3	23,8	15,9	16,4	3,8
Sharpe Ratio	0,307	0,099	0,059	0,133	2,464
Ranking using Sharpe Ratio	2	4	5	3	1
23 yrs (1980-2002):					
Total return (%) (nominal)	16,5	17,5	16,4	15,2	14,9
Standard deviation (%)	6,5	23,3	15,7	17,0	4,2
Sharpe Ratio	0,478	0,164	0,182	0,104	1,853
Ranking using Sharpe Ratio	2	4	3	5	1

Sources: Rode's Database; IPD; StatsSA; Old Mutual Asset Management.
* The averages of the total returns for the different periods are calculated by using the geometric mean. For an explanation, see the Technical Notes at the end of this article.
**Negative Sharpe Ratios have been modified.

The salient points emanating from **Table 3** are:

- Cash is king, because BAs showed over all periods since 1980 the best risk-adjusted return ranking. Also, long-dated gilts — with their relatively high risk — came in second in all periods since 1988. Thus the empirical evidence confirms the theory that fixed-interest assets perform well during disinflation — not only in absolute-return terms but also on a risk-adjusted basis.
- As we have seen in Table 2, over the full 23-year period starting 1980, which includes the high-inflation era, non-listed institutional property's annual real total return was nearly 5% per annum — the best after the All-Share Index. This is a handy rule of thumb to remember. Further, because of its low volatility, on a risk-adjusted basis its return also ranked second — after cash. Because of the length of the 23-year period, and the market-value adjustments made by the institutions over the past number of years, this ranking might be a fair reflection of reality.
- In the disinflation decade ended 2002, listed property's total return on a risk-adjusted basis was outclassed only by cash and long-dated gilts.
- It can be inferred that, on an absolute basis, the total returns on the JSE-Actuaries All-Share Index beat all competition in the high-inflation era. But because of its high volatility

of returns, it came only fourth out of five on a risk-adjusted basis during the period 1980-2002.

6. Conclusions

The salient findings of this study can be summarised as follows:

In deciding on an asset-allocation strategy, fund managers should not blindly follow recipes that were good in a high-inflation era. The reason for this is that asset-class performance is crucially dependent on the inflation era – whether high, declining or stable low. We have demonstrated this on the basis of a theoretical construct and actual returns in South Africa since 1980. **Table 4** reflects the author's proposed schema for asset allocation under various inflation eras:

Table 4
Ranking* of asset classes under three inflation scenarios

Era	Equity	Unlisted property	Listed property	Long bonds	Cash
Only selection criterion: absolute total returns					
High inflation	1	2	3	4	5
Disinflation	4	5	2	1	3
Stationary low inflation	1	2	3	4	5
Only selection criterion: risk-adjusted total returns					
High inflation	4	2	3	5	1
Disinflation	4	5	3	2	1
Stationary low inflation **	5	2	3	4	1

*1 = best; 5 = worst
** Our risk-adjusted total-return ranking under the stationary low-inflation scenario is not as robust as under the absolute total return approach. The reason for this is that we have not had a stationary low-inflation era in South Africa since the 1960s, and it is, therefore, difficult to predict the ranking. Be that as it may, we suspect the difference between the various asset classes would be small.

The proposed schema naively ignores other selection criteria that might be regarded as applicable, e.g. liquidity.

- The available empirical evidence on inter-asset total returns during the three inflation-eras largely supports the theoretical construct.
- There is some evidence that investment substitution does take place, resulting in a convergence of inter-asset total returns — albeit only in the very long term. In the shorter term no evidence exists, implying that there are many inter-asset arbitrage opportunities that are not being exploited. ■ 26 May 2003

Technical notes

The tax factor

A complicating factor that emerges when comparing total returns between various asset classes is the tax effect, which has changed considerably over the years, and which differs drastically between asset classes and the various categories of tax payers. For instance, at the moment dividends declared by companies are income-tax free, whereas income declared by listed property unit trusts (PUTs) (including interest from fixed-interest investments) are taxed at the marginal rate (max. of 40%) in an individual's hands, but only at 18% in the hands of retirement funds and insurance companies. Consider also that the (tax-free) dividend yield of an enterprise makes up a small portion of an equity investor's total return, whereas in the case of property and fixed interest the fully taxable income portion of the total return is high. However, with the introduction from 1 October 2001 of capital gains tax (CGT), the scale is now better balanced. The practical effect is that investors in equities (with their higher capital-gains portion) will pay relatively more CGT than investors in properties and fixed interest. Cash is another beneficiary of CGT — relatively speaking — in that cash does not deliver capital gains.

Calculation of geometric-mean returns

The geometric-mean return measures the compound rate of growth of the initial portfolio market value during the evaluation period, assuming that all cash distributions are reinvested in the portfolio. It multiplies all the sub-period returns, expressed as (1+r), where r is the percentage return, and takes the root corresponding to the number of sub-periods. In the example 1,6 x 1,3 x 1,2 x 1,2 x 1,1 equals 3,29472. The fifth root of 3,29472 is 1,269298. This corresponds to an increase of 26,9298%. In contrast, the arithmetic mean return is the average of the sub-period returns, calculated by summing the sub-period returns and dividing by the number of sub-periods. Hence, in the above example, the arithmetic mean would be (0,6 + 0,3 + 0,2 + 0,2 + 0,1)/5, which equals 28%. As this example shows, the geometric mean and the arithmetic mean are different, with the geometric mean providing a more meaningful description of how an investment would fare over multiple periods.

The Sharpe Ratio

The Sharp Ratio combines the standard deviation and excess return (over a risk-free investment) into one statistic that measures reward per unit of risk. The risk-free rate is a theoretical rate at which an investment may earn interest without incurring any risk. So, the return a fund produces in excess of the risk-free rate of return compensates the investor for incurring additional risk. For the purpose of our exercise, we used the SA Reserve Bank's 91-days Treasury Bill (TB) as the risk-free rate.

The formula for the Sharpe Ratio is: A-B/C, where A = the asset's return; B = the TB's return (risk-free return); and C = the standard deviation of the returns. A-B is also described as the excess return.

The greater the Sharpe Ratio, the better the risk-adjusted return. However, as with all statistical measures, the Sharpe Ratio has its shortcomings. For instance, the ratio is expressed as a raw number, which makes it difficult for an investor to evaluate the ratio of an individual asset. Hence one needs the ratio of at least two assets to get a feel of the risk-adjusted return. Furthermore, the Sharpe Ratio penalises upside volatility exactly the same as downside volatility. Lastly, negative Sharpe Ratios can lead to misleading deductions and therefore need to be modified. The problem lies with a negative numerator in the formula for the ratio. Take for instance the following example: Two assets, both with a negative excess return of 5%. Asset A has a standard deviation of 10% and Asset B 20%. According to the Sharpe Ratio, Asset A will have a value of –0,50, and Asset B –0,25, which gives the latter a superior rating (-0,25 is greater than –0,50). However, if Asset B had the same excess return but a higher standard deviation, one would have expected it to have an inferior rating. This would have been the case if the numerator were positive. Hence, if a higher standard deviation is bad if excess return is positive, it should also be bad if excess return is negative. To rectify this, the modified Sharpe Ratio formula adds an exponent to the denominator of the traditional Sharpe Ratio, which is excess return divided by the absolute value of excess return (Modified Sharpe Ratio=excess return/standard deviation(excess return/absolute excess return)). Hence, a negative excess return will be treated as a positive excess return (and a positive will remain positive). Furthermore, when the excess return is positive, the Sharpe Ratio and the Modified Sharpe Ratio will always be the same. An instance where the Modified Sharpe Ratio did influence the ranking as determined by the traditional Sharpe Ratio is in the case of institutional property and the all-shares index for the 5-year period to 2002. Before the modification, the Sharpe Ratio gave the All-Share Index a higher ranking (4th) than directly-held institutional property (5th). However, the modification saw institutional property take 4th place and the All-Share Index 5th.