

THE IMPACT OF THE RAND ON THE VALUE OF THE JOHANNESBURG STOCK EXCHANGE

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Abstract

The relationship between the foreign exchange value of the rand and the Johannesburg Stock Exchange (JSE) was put to a particularly interesting test over the period 2000 to 2003 when the rand first collapsed and then recovered. In this paper, we look at the effects of the nominal and real exchange rate changes on the nominal and real value of the overall JSE market and then in more detail at particular counters that exhibit common characteristics with respect to the rand exchange rate. These we define as either: *rand hedge stocks*, that is, those companies with mostly US dollar revenues and US dollar costs; *rand leverage stocks*, that is, those companies with predominantly US dollar revenues and rand costs; or *randplays*, that is, those companies that earn almost all of their profits by generating rand revenues and incurring rand costs. We report on the impact of the rand on the value of the largest 40 stocks on the JSE and classify these stocks according to the criteria mentioned above. In addition, we explain how rand plays can be expected to lose rand value as the rand weakens, despite higher inflation and an increase in the rand value of the JSE All Share index. We also note that, counter-intuitively, the foreign currency value of Richemont, a pure rand hedge company, can be influenced by the foreign exchange value of the rand, a phenomenon we attribute to an investor constituency that includes a large SA component.

Introduction

The period between 2000 and 2003 has been one of extreme movements in the nominal and real value of the rand and we trace the nominal and real effects of these exchange rate changes on the JSE over this period. In this paper we examine the relationship between the value of the JSE as represented by its All Share index and its Top 40 companies and the exchange value of the rand. In addition, we examine the impact of the rand exchange rate on the foreign currency value of two JSE listed companies: Harmony, a gold mine, and Richemont, with its interests in the manufacturing and distribution of luxury goods (as well as tobacco, through a large holding in British-American Tobacco) as well as the responses of the JSE Banks index to changes in the value of the rand.²

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² In the study, we use monthly data from Bloomberg Financial Markets, I-Net Bridge, and the South African Reserve Bank.

1. The History Of Exchange Rate Changes In South Africa

In Figure 1, we demonstrate and compare the behaviour of the trade-weighted real rand, the nominal trade weighted rand, and the real rand-dollar exchange rate over the period 1980-2003.³ In August 1985, it is seen that the rand was subject to a severe real and nominal shock when the government of the time failed to cross the “Rubicon” to democratic rule in South Africa and severely disappointed financial markets. As a result foreign capital was withdrawn on a very large scale, putting immense pressure on the exchange rate. An exchange rate shock of equivalent magnitude to that experienced in 1985 occurred in November and December of 2001 when the rand fell sharply but in this case the explanation for the shock was much less obvious and has largely defeated official attempts to explain it.⁴

We also show the volatility of the nominal and the real rand in the period 1998-2003 when the nominal rand collapsed and then recovered, taking the real rand with it (Figure 2). Since rates of inflation have generally been below 10% in South Africa since 1996, and inflation with our trading partners has generally been lower than 5%, the difference in inflation rates between SA and its trading partners has been quite small in magnitude since the mid-1990s. Purchasing power parity (PPP) would, of course, dictate that the expected depreciation of the rand was equal to the difference in expected inflation rates. However, if one decomposes nominal exchange rate movements into a difference in inflation component plus a real shock component, it becomes clear that most of the movement in the nominal exchange rate would be classified as real shock movements and, by definition, constitute unexpected movements in the exchange rate. This is indicated in Figure 3 where the real shock component is calculated as the percentage change in the nominal trade-weighted exchange rate minus the difference between percentage changes in local prices and a trade-weighted percentage change in foreign prices. When the shock component dominates, the real and nominal exchange rates will exhibit a similar pattern of movement as is evident in Figure 2.⁵

³ The trade-weighted rand is calculated by the South African Reserve Bank; see, for instance, Quarterly Bulletin (June 2003), S105. The formula for the real exchange rate is: $\text{real R/\$} = (1/\text{ZAR}_t) * (\text{SACPI}_t / \text{USCPI}_t)$, where ZAR_t is the nominal or market exchange rate, and SACPI_t and USCPI_t represent the South African and U.S. consumer price indices with a common base (e.g. January 1995=100).

⁴ See the Myburgh Commission of Enquiry into the collapse of the rand in 2001. (The commission’s report is available at <http://www.polity.org.za/html/govdocs/reports/>). We have ascribed the rand’s collapse to a panic demand for foreign exchange from wealthy individuals with newly found access to hard-currency assets made available through the asset swap mechanism. Effectively the only limits imposed on these demands for US dollars were the rands individuals could muster for the purpose. We describe this panic demand for US dollars as one of the unintended effects of partial exchange control reform (see Kantor and Marchetti (2003)).

⁵ For an explanation of the real rand exchange rate see (MacDonald and Ricci 2003) For an overview of alternative exchange rate regimes for emerging markets see (Calvo and Mishkin 2003) also (Ho and McCauley 2003)

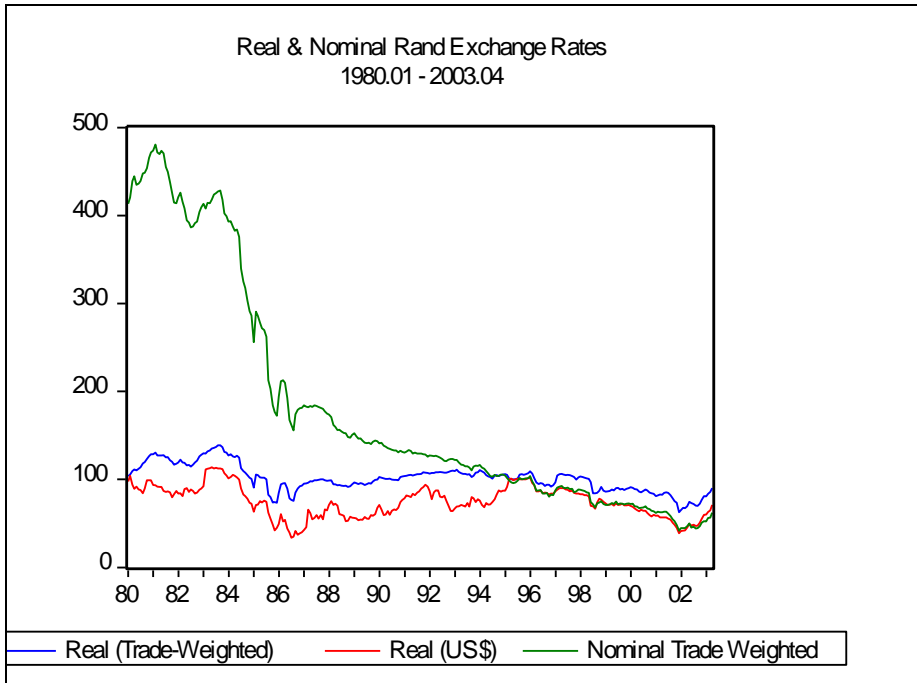


Figure 1.
Source: South African Reserve Bank

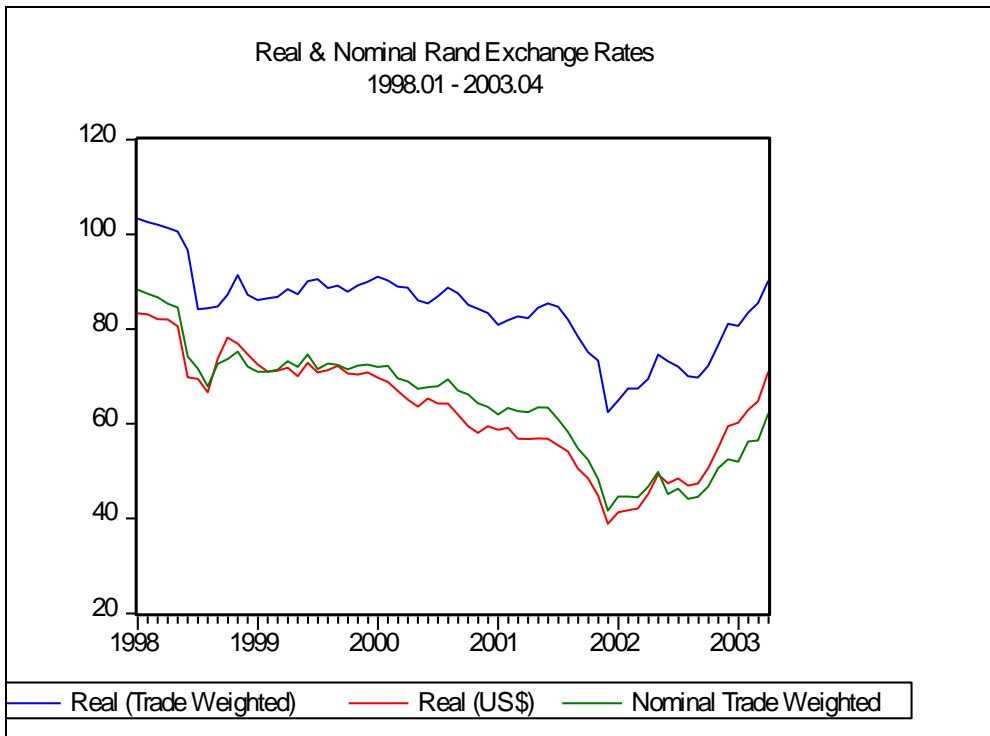


Figure 2.
Source: South African Reserve Bank

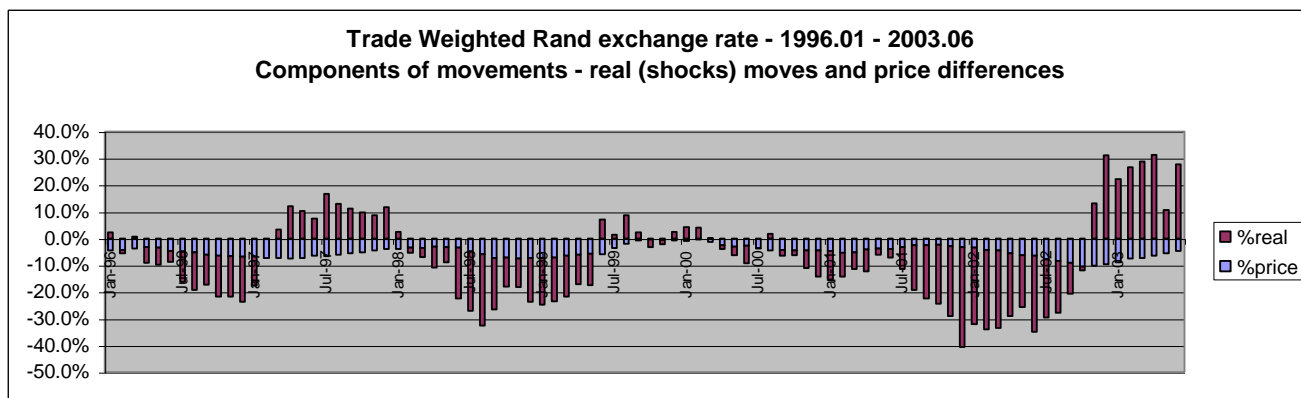


Figure 3.
Source: South African Reserve Bank

2. Causes and Effects of Exchange Rate Changes

It is worth noting that when exchange rates simply follow differences in price trends, that is when PPP holds, there will be no real exchange rate effects on firms engaging in foreign trade since any gain or loss incurred by traders on the exchange rate leg will be lost or gained through differential prices charged in the home or foreign market. Of course, a market determined exchange rate may well deviate significantly from its PPP, and so affect real profits earned through international trade. We will identify these real effects on the operating profits of firms made by real exchange rate changes in some detail below. Movements of exchange rates away from PPP, and the effect such movements have on international competitiveness may, in turn, have effects on prices or exchange rates that tend to bring the exchange rate back to its PPP value. For example, a shock to the capital account of the balance of payments that causes a sudden depreciation of the real exchange rate will be followed by higher prices for goods and services including labour services. These higher prices will increase the value of the real exchange rate and move the nominal exchange rate back towards its PPP equivalent. Any recovery in the nominal exchange rate from its post-shock level that may accompany the higher domestic prices will have an offsetting effect on the real exchange rate. Provided the nominal exchange rate, subsequent to the shock, depreciates by less than the post-shock differences in inflation, the real exchange will recover the ground it has lost. Similarly, any increase in the supply of foreign capital that shocks an exchange rate to move above its PPP level will be accompanied by downward pressure on prices, with the resulting lower inflation rate mitigating against any rise in the real exchange rate.

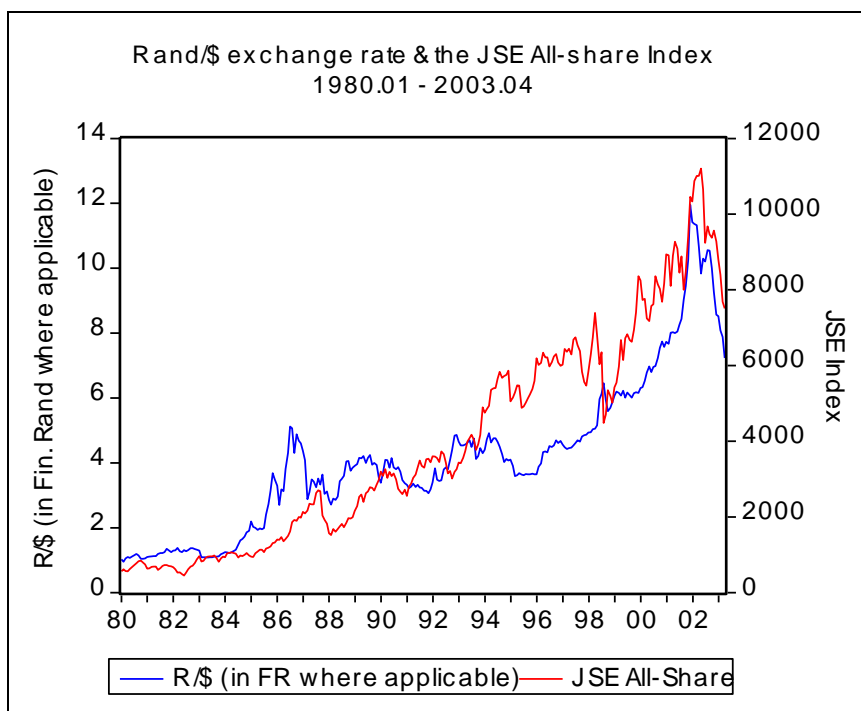
Exchange rates movements have causes. Usually the root of these causes are monetary, and influence prices more generally rather than specifically on the price of a unit of foreign exchange. If the causes of movements in the nominal exchange rate are the purely monetary ones responsible for excess domestic demand, then exchange rates will approximate PPP fairly closely. It is, however, the non-monetary forces on the supply and demand for foreign exchange such as capital account shocks or productivity shocks, following, for example, the discovery and exploitation of valuable mineral deposits, that can cause the exchange rate to deviate from PPP. Exchange rate movements after such a shock will then have an effect on prices that will move exchange rates towards PPP. After an exchange rate shock, competitive forces will tend, with a lag, to directly increase or decrease the domestic prices of imports and exports whereas the prices of goods and services that are less directly involved in foreign trade will also in turn be affected by competition from the tradable goods sectors. Of course, further events and exchange

rate shocks may interrupt any smooth progress back to a PPP equilibrium, but the impact of an exchange rate shock on prices and profits will often be quite clear and predictable.

3. The Rand Exchange Rate and the JSE

We now turn to the exchange rate effects on the value of the JSE. We begin with a description of the value of the JSE since 1980. The relationship between the level of the JSE expressed in current prices and the foreign exchange value of the rand is obviously a close one since both are simultaneously affected by SA inflation. In fact, the JSE has tracked the R/US\$ exchange rate quite closely over the entire period implying a fairly long-run constant value of the JSE measured in US dollars over the 23 year period examined. At year end 2002 the JSE was about 20% higher in dollars than in the early eighties. Since the real exchange rate in dollars has declined about 20% over the same period this means that the JSE has barely kept up with inflation over the period examined. In comparison, the US market has shown spectacular real growth over the same long run period.

Figure 4.



Source: South African Reserve Bank

Since 2001, when the rand first weakened dramatically and then recovered, the rand value of the JSE All Share index has responded very directly to changes in the exchange rate rising with rand weakness and falling with rand strength (see Figure 4). However, not all sectors of the JSE responded in this general way and individual companies were clearly affected in line with the market's perceptions on how these real exchange rate changes would impact on company operating profits and dividend flows. We now examine in detail how the individual operating characteristics of listed companies would determine the way in which their profitability, and hence their share price, would be affected by exchange rate changes.

3(a) Share Prices And Leverage On The JSE: A Formal Treatment

Share prices on the JSE clearly reflect the market's best attempt to find the present value of the expected benefits from owning a share of the company. These benefits will be derived from expected future earnings and dividends or from the sale or liquidation of the company.

These earnings and dividend flows from JSE listed companies may be generated from:

- a) company operations that are almost completely SA-based. We define these companies listed on the JSE as *rand plays*, e.g. retailers (such as Pick 'n Pay) or banks (such as Absa) with almost all their revenues generated and costs incurred in South Africa in rands;
- b) companies listed on the JSE that are almost completely foreign based, generating only foreign 'hard' currency income and incurring only foreign costs and known as *rand hedge* stocks, e.g. Liberty International, a UK property owner and developer, or Richemont;
- c) companies that are SA-based and incur costs in SA but sell their products in hard currency, e.g. resource stocks such as Harmony, which we describe as *rand leverage* stocks.

We consider the dividend at time t (expressed in rands) and denoted Div_t for each of the cases above:

- a) *Rand play*: Div_t is proportional to profit at time t ,

$$(R)Rev_t - (R)Cost_t$$

- b) *Rand hedge*: Div_t is proportional to profit at time t denominated in, say, US dollars and then converted into rand to give,

$$R/\$, * (\$Rev_t - \$Cost_t)$$

hence the profits of a rand hedge company in dollars will be directly impacted upon by the rand/US\$ exchange rate; a weaker exchange rate will increase the dividend flow in rands for any given profit in dollars.

- c) *Rand leverage*: in the third group (typically resource companies), the rand price of their shares reacts to the dollar prices of their traded resources as well as to the rand/US\$ exchange rate. A weaker rand increases the rand price of commodities and lowers the dollar-denominated costs of inputs, mainly labour. This effect would, primarily, be a short-term effect. Prices and particularly labour costs would be expected to rise as a PPP equilibrium was re-established and the real rand depreciation eliminated. Thus, a weaker rand would result in an increase in dollar earnings for as long as dollar costs were below their PPP value; as PPP is re-established, dollar prices of labour would rise.

In this case, as in (b) above, Div_t is proportional to dollar profit at time t denominated in dollars and then converted into rands. Although revenues are earned in dollars, costs are denominated in rands to give dollar profit at time t :

$$R/\$, * \left(\$Rev_t - (R)Cost_t * \left(\frac{1}{R/\$,} \right) \right)$$

However, rand costs rise in line with the consumer price index. Thus, dollar costs will be linked to the relative movement of the CPI and the exchange rate. At time $t+n$, dollar profit will be:

$$R/\$_{t+n} * \left(\$Rev_{t+n} - (R)Cost_t * \left(\frac{CPI_{t+n}}{CPI_t} \right) * \left(\frac{1}{R/\$_{t+n}} \right) \right)$$

Thus, assuming dollar revenues are fairly stable, dollar profits n periods in the future are determined by the relative movement of the CPI to the rand/US\$ exchange rate over the n periods. For example, rand depreciation will lower dollar costs and create a leveraged effect on dollar profits. But, as CPI catches up over time with any depreciation in the rand (or vice versa) and PPP is re-established, the leverage effect dissipates and the short-term improvement in dollar profits due to the real rand depreciation disappears. In other words, leverage effects measured in dollars which stem from an exchange rate depreciation are merely short-term effects and do not fundamentally affect long term value.

In rand terms, prices should reflect these leveraged dollar effects values but, assuming PPP will hold, the long term value should primarily be determined by expectations of dollar-denominated resource prices and expectations of rand/US\$ exchange rates.

In order to test the sensitivity of the major companies listed on JSE to changes in the value of the rand over the period of rand turbulence of 2001 to 2003, we tested the following models. (All data are in weekly form.)

$$\%ALSI_i = \alpha + \beta_1 \%R/\$ + \beta_2 \%ALSI_{40}$$

where: $\%ALSI_i$ is the continuously compounded percentage change of the i -th component of the ALSI40;
 $\%R/\$$ is the continuously compounded percentage change of the rand/US\$ exchange rate;
 $\%ALSI_{40}$ is the continuously compounded percentage change of the ALSI40.

The model attempts to capture a market-wide effect through the ALSI40 variable and an exchange rate-specific effect. Although the overall movement of the market as reflected by the ALSI40 will be related to the exchange rate, when expressed in percentage change form the correlation is a low 0.23 reflecting a tolerable degree of multicollinearity.

The betas are calculated for this model over the period from January 2001 to August 2003, and listed in the table below. The larger the estimated exchange rate beta, the greater the degree of responsiveness of the share price returns to changes in the value of the rand (in the same direction if the beta is positive, and in the opposite direction if beta is negative). In the table below, we rank the estimated betas for shares in each of the three *a priori* group classifications (rand leverage stocks, rand hedges and rand plays). These betas give an empirical estimate of the degree of rand sensitivity the companies exhibited over the period January 2001 to August 2003.

It is seen that the degree of fit for each ALSI40 component model and the significance of the estimated coefficients vary substantially across the different ALSI40 components, reflecting for each share the amount of company-specific variation *vis-à-vis* exchange rate and market variation over the period. However, the exercise is primarily intended as a broad means of classifying the shares into groups rather than a close analysis of the reliability of the individual coefficients. As such, it is seen immediately that the empirical estimates for reflect the *a priori* categorisation

closely and thus the calculated beta coefficients for the exchange rate variable ($\hat{\beta}_1$) serve as strong empirical support for categorising the status of the ALSI 40 as either rand leverage stocks, rand hedges or rand plays.

According to our classification, it may be seen that those companies classified as rand leverage companies had positive estimated rand/US\$ betas (with the exception of Gold Fields). These rand leverage companies are all resource producers with US\$ based revenues (with the exception is Steinhoff, a large vertically-integrated furniture manufacturer with plants in South Africa and elsewhere and with a large proportion of its sales made outside South Africa). Those companies in the rand plays category, by contrast, turned out to all have negative R/\$ betas. This means that such shares have tended, as expected, to appreciate with rand strength against the dollar and depreciate with rand weakness and are generally companies with a very large proportion of their revenues and operating profits generated in South Africa. Some locally based companies, which we have classified as rand plays, such as Barloworld and the large banks, still have significant proportions of their assets invested offshore but, despite this, their rand values do not seem to have benefited much from rand weakness. Old Mutual, with a very large proportion of its assets held offshore is generally considered as a rand hedge and we have classified it along with SAB Miller, Richemont, and Liberty International in the rand hedge group but has exhibited a negative estimated R/\$ beta.⁶ While Richemont and Liberty International are pure rand hedges with all their revenues and costs incurred outside of South Africa, both Old Mutual and SAB Miller still manage a significant proportion of SA-domiciled assets and earn a disproportionate share of their profits from local operations. Significantly, unlike Old Mutual, SAB Miller has a positive R/\$ beta and clearly offers protection against rand weakness. It is thus seen that although several companies do not neatly fit into one of the three categorisations we consider because of their mix of local and foreign assets, the categorisation remains a very useful one with strong empirical support.

⁶ All the companies classified as rand hedges are listed on the JSE but have their primary listing on other exchanges and are legally domiciled in the United Kingdom or Switzerland while two of the rand leverage companies, Anglo American and BHP Billiton, have dual listings (Johannesburg and London stock exchanges) and are foreign-registered companies.

Table 1. Beta Estimates for Rand Hedge, Rand Leverage and Rand Plays

	JSE Code	$\hat{\beta}_1$ (R/\$ Beta)	$t(\hat{\beta}_1)$	$\hat{\beta}_2$ (ALSI 40 Beta)	$t(\hat{\beta}_2)$	R ²
RAND HEDGE						
Liberty International	LBT	0.64	6.46	0.34	4.85	0.42
SABMiller	SAB	0.45	3.80	0.53	6.49	0.38
Richemont	RCH	0.27	1.78	1.07	9.89	0.49
Old Mutual	OML	-0.22	-1.61	1.00	10.47	0.46
RAND LEVERAGE						
Iscor	ISC	0.64	2.30	0.94	4.79	0.23
Impala	IMP	0.49	2.56	1.16	8.59	0.45
Sasol	SOL	0.43	2.48	0.61	4.98	0.25
BHP Billiton	BIL	0.32	2.69	1.19	14.12	0.66
Harmony	HAR	0.24	0.75	0.77	3.42	0.11
Steinhoff	SHF	0.22	1.41	0.57	5.23	0.23
Anglo Platinum	AMS	0.17	0.88	1.21	9.01	0.43
Anglo American	AGL	0.12	1.07	1.54	19.80	0.78
Sappi	SAP	0.06	0.35	1.16	10.19	0.47
Anglo Gold	ANG	0.05	0.20	0.68	4.14	0.13
Kumba	KMB*	0.03	0.12	1.30	5.30	0.31
Avgold	AVG	0.02	0.09	0.57	3.83	0.11
Remgro	REM	0.00	0.04	0.40	5.14	0.18
Gold Fields	GFI	-0.04	-0.14	0.77	3.85	0.11
RAND PLAY						
Telkom	TKG*	-0.78	0.64	-1.74	1.73	0.15
Firststrand	FSR	-0.67	-5.19	0.72	7.87	0.34
Naspers	NPN	-0.65	-2.58	1.13	6.38	0.24
RMB	RMH	-0.63	-4.63	0.70	7.26	0.30
Imperial	IPL	-0.60	-4.50	0.57	6.09	0.25
Sanlam	SLM	-0.55	-3.71	0.76	7.30	0.29
MTN	MTN	-0.55	-2.66	0.82	5.65	0.20
Standard Bank	SBK	-0.53	-4.01	0.65	6.99	0.28
Nedcor	NED	-0.50	-3.38	0.54	5.22	0.18
Pick 'n Pay	PIK	-0.50	-3.34	0.40	3.83	0.13
Liberty Group	LGL	-0.45	-3.30	0.67	7.09	0.28
Absa	ASA	-0.44	-2.48	0.65	5.26	0.18
Bidvest	BVT	-0.42	-3.38	0.49	5.58	0.20
Barloworld	BAW	-0.40	-2.98	0.83	8.88	0.37
Woolworths	WHL	-0.40	-2.42	0.51	4.43	0.13
Investec Plc	INP*	-0.35	-0.15	0.86	0.46	0.01
Nampak	NPK	-0.32	-2.30	0.54	5.50	0.19
Investec Ltd	INL	-0.26	-1.39	0.80	6.21	0.23
Amalgamated Beverages	ABI	-0.25	-1.97	0.31	3.51	0.09
Network Healthcare	NTC	-0.21	-1.37	0.46	4.28	0.12
Tiger Brands	TBS	-0.20	0.31	-1.71	3.75	0.10
Venfin	VNF	-0.14	-1.25	0.61	7.90	0.33

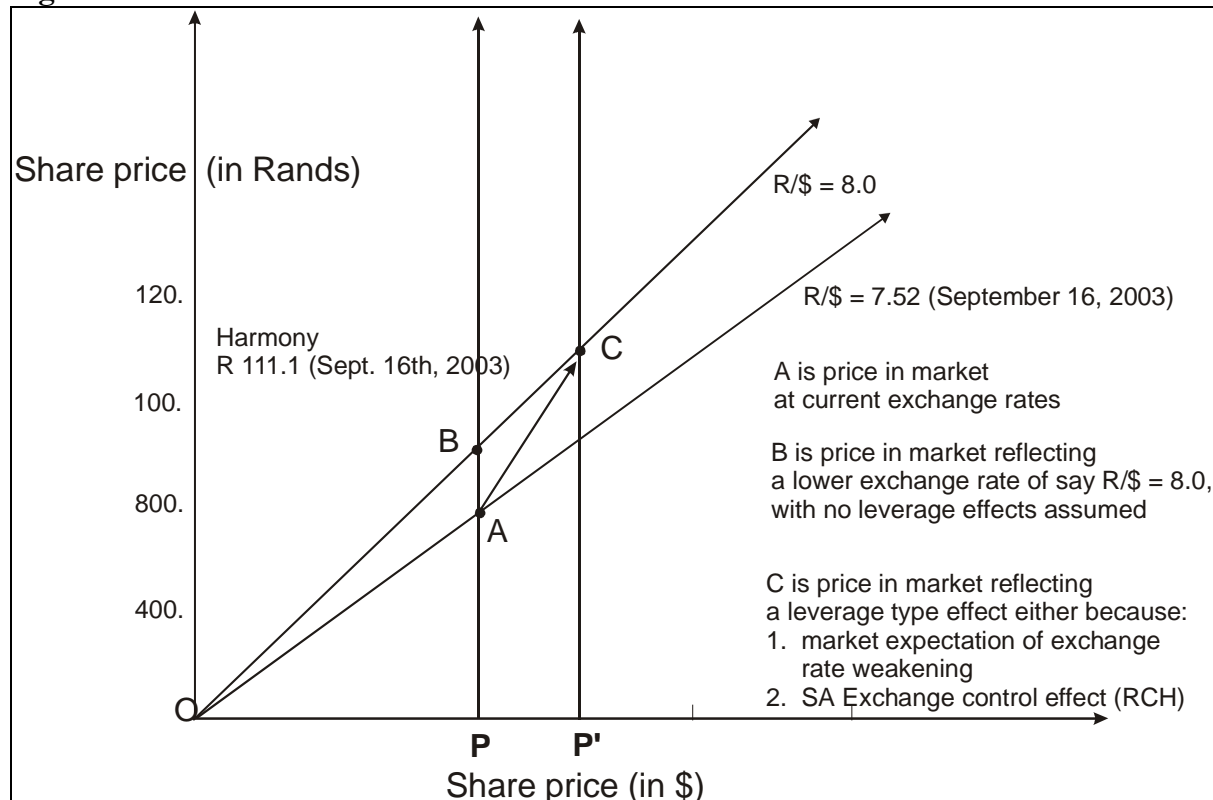
* Kumba (7 December 2001 to 8 August 2003), Investec plc (2 August 2002 to 8 August 2003) and Telkom (14 March 2003 to 8 August 2003).

3(b) Finding the Best Hedging Strategy ?

We now turn our attention to the problem of determining which of the two (rand leverage or rand hedge) is expected to provide the best protection against rand weakness. Based on the results generated by these models, for JSE-based investors, leverage stocks offer more effective protection against rand weakness than rand hedge stocks. As mentioned above, any relative disadvantage to pure rand hedge stocks in comparison to rand leverage stocks would be expected to be a short-term effect only, as foreign currency input costs are forced down below their PPP equilibrium level in the short-term. In the longer-term, both classes of stock are simply affected by the dollar price of what they sell (rand leverage stocks) or on the profitability of their overseas operations (rand hedge stocks).

We examine two large market capitalisation stocks: Harmony (a rand leverage stock) and Richemont (a rand hedge stock), and demonstrate empirically that short-term changes in the real value of the rand are transmitted to prices of these stocks. We also show that these stocks, when denominated in foreign currencies (US dollar and Swiss franc), vary in ways not suggested by standard theoretical analysis. Specifically, the foreign currency-denominated value of rand hedge shares is independent of the rand/US\$ exchange rate itself. We show that, with market- and sector-wide effects removed, the short-run link between Richemont and the rand is significantly positive, whereas for Harmony it is significantly negative. In the case of Harmony, we will demonstrate a curious but previously documented feature (Barr(1982)): there is an exchange rate effect on the *US dollar* value of Harmony, but one operating with a lag of about nine months. This indicates that the gold market and the exchange rate market are operating somewhat differently from the gold share market in determining value.

Figure 5.



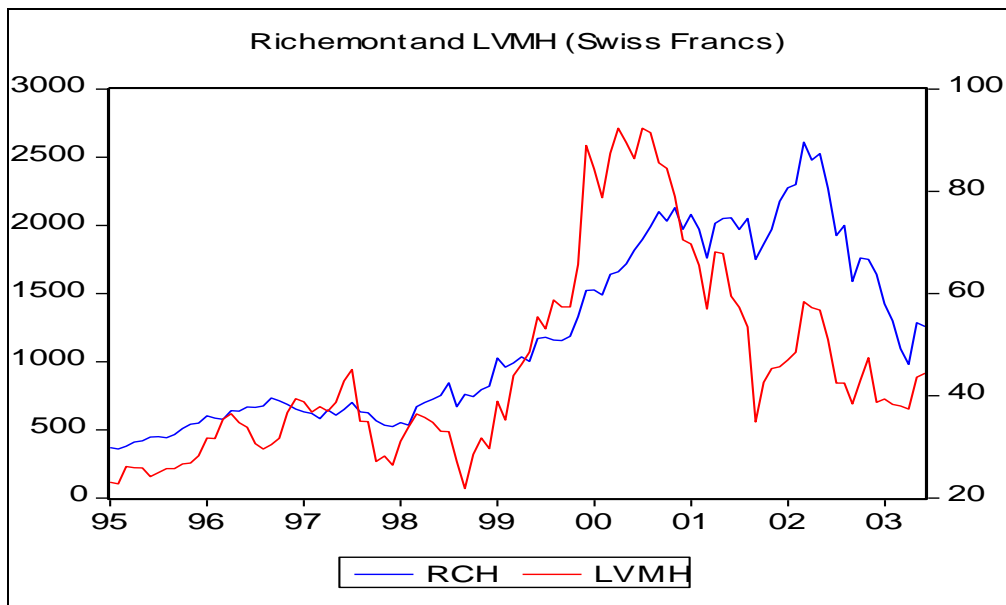
The essence of our observations is captured in Figure 5, which presents a snap-shot of the Harmony share prices' exchange rate responsiveness as at 16 September 2003. If the share is

valued at P in US dollars in the short-term, and the rand/US\$ exchange rate is expected to weaken from, say, R7.43 to R8.00 per US dollar, you would expect the US\$ value of Harmony to weaken along the line P from A to B. In the case of Richemont it has tended to move to C, reflecting a type of leverage effect. In the case of Harmony, the share may move beyond C and tends to be linked to averages of gold prices and exchange rates over the previous year.

Case Study 1: Richemont, An Unleveraged Pure Rand Hedge

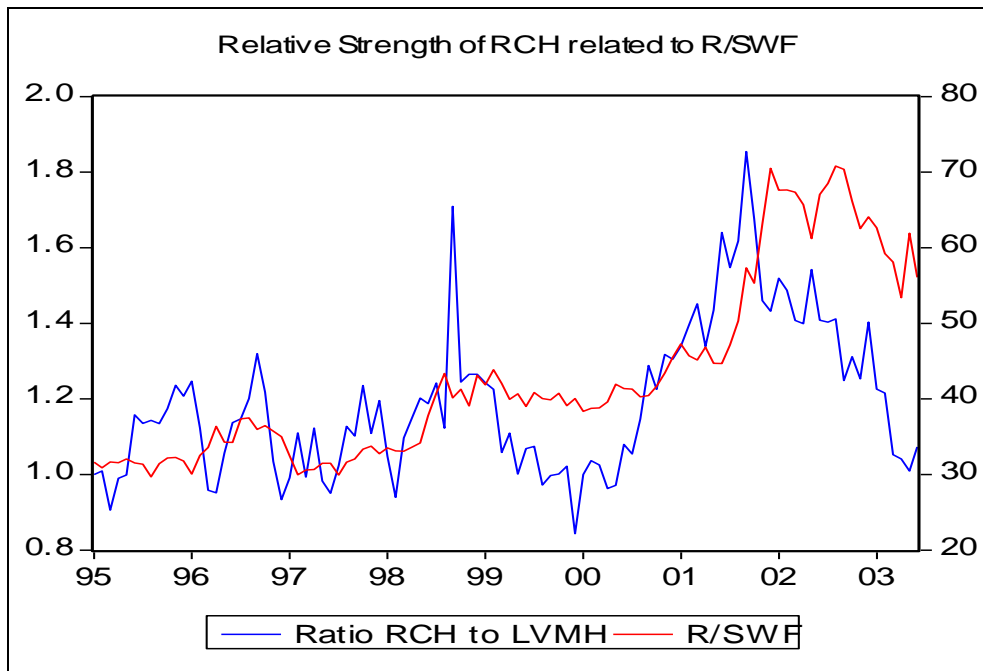
Richemont grew out of South Africa's Rembrandt Group and, as such, is a dual-listed stock quoted on the Johannesburg and Zurich bourses. It is the largest (non-resource) stock on the JSE. As a pure rand hedge, one would not expect the foreign currency (Swiss franc or CHF) value of Richemont to be linked to the ZAR/CHF exchange rate when the sector and market specific components are stripped out of the share. We remove these effects by considering the ratio of Richemont to Louis Vuitton Moët-Hennessy (LVMH), the world's largest luxury goods group, over the period January 2000 to June 2003.

Figure 6.



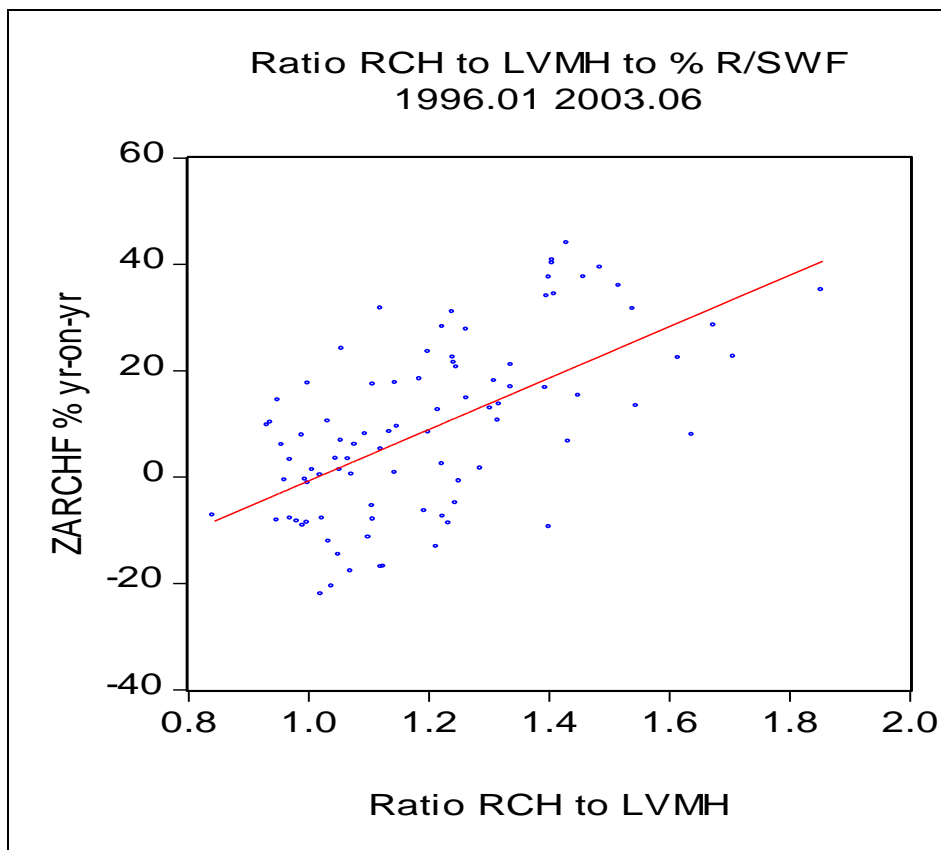
If we remove the market and sector effects, that is, consider the ratio of Richemont to LVMH and relate it to percentage changes in the ZAR/CHF exchange rate we get the following:

Figure 7.



It can be seen that when the Rand weakened sharply during the emerging market crisis in September 1998, and again in the latter half of 2001, Richemont has strengthened relative to its peer LVMH. This pattern is made particularly clear in a cross-section plot of the ratio of Richemont to LVMH and the year-on-year percentage change in the ZAR/CHF exchange rate.

Figure 8.



These two variables are clearly positively correlated ($r = .604$ between January 1996 and June 2003, rising to $r = .706$ over the period January 2000 to June 2003). This contradicts our *a priori* reasoning, namely, that the CHF price of Richemont (a pure hedge stock) would not be related to the ZAR/CHF exchange rate. The consistent explanation is that, so long as exchange control remains in South Africa, Richemont will serve that cohort of investors seeking a foreign currency hedge. As this cohort of South Africans is an important component of shareholders in the case of Richemont, they will tend to push the price up in times of exchange rate volatility, particularly when there has been sharp exchange rate depreciation and fear of further exchange rate weakness rise.

In Figure 5, therefore, rather than move up and down line P as the exchange rate changes, investors push the price up to C. This may be understood as imputing an exchange rate to the share than is weaker than the ruling market exchange rate at the time.

Case Study 2 – Harmony, A Leveraged Rand Hedge Stock

As mentioned previously Harmony is classified as a leveraged rand hedge stock, in the sense that its costs are rand-denominated and its income stream is foreign currency-denominated. Certainly, in the short term, a weaker rand is associated with falling dollar input costs and hence, for any given dollar gold price, higher dollar profits. Depending therefore on investors' time horizon, weakness in the rand/US\$ exchange rate will have a positive effect on Harmony's dollar value, but this effect will weaken as PPP re-establishes itself.

As with Richemont, we consider the prices of Harmony relative to Newmont, a US gold mining company, which we use to remove market- and sector-wide effects from the share price.

Figure 9.

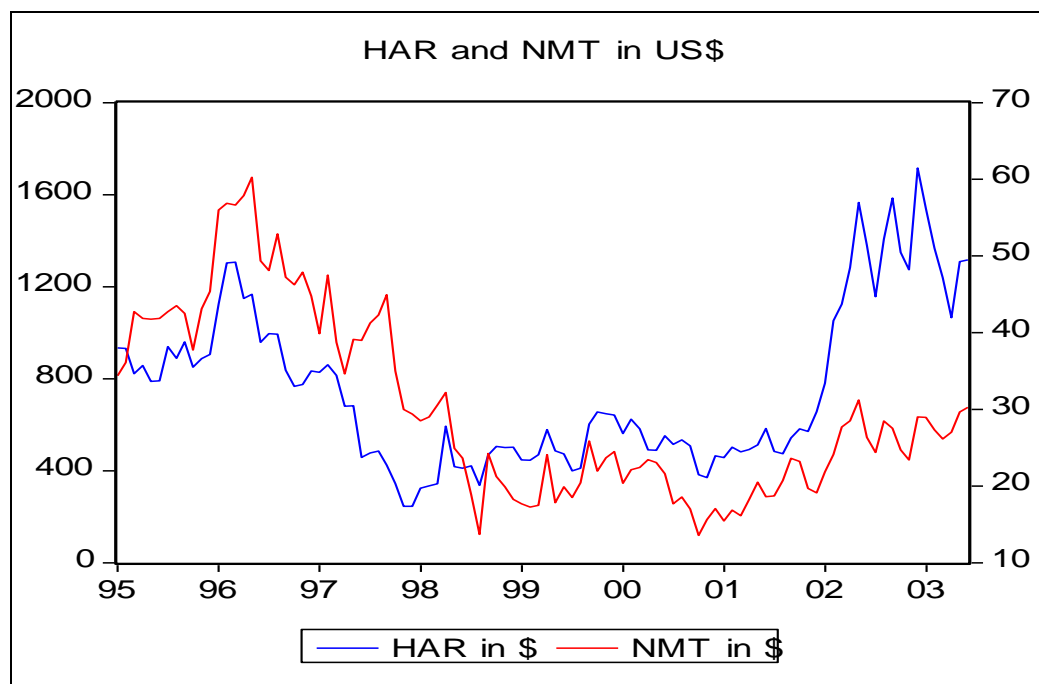
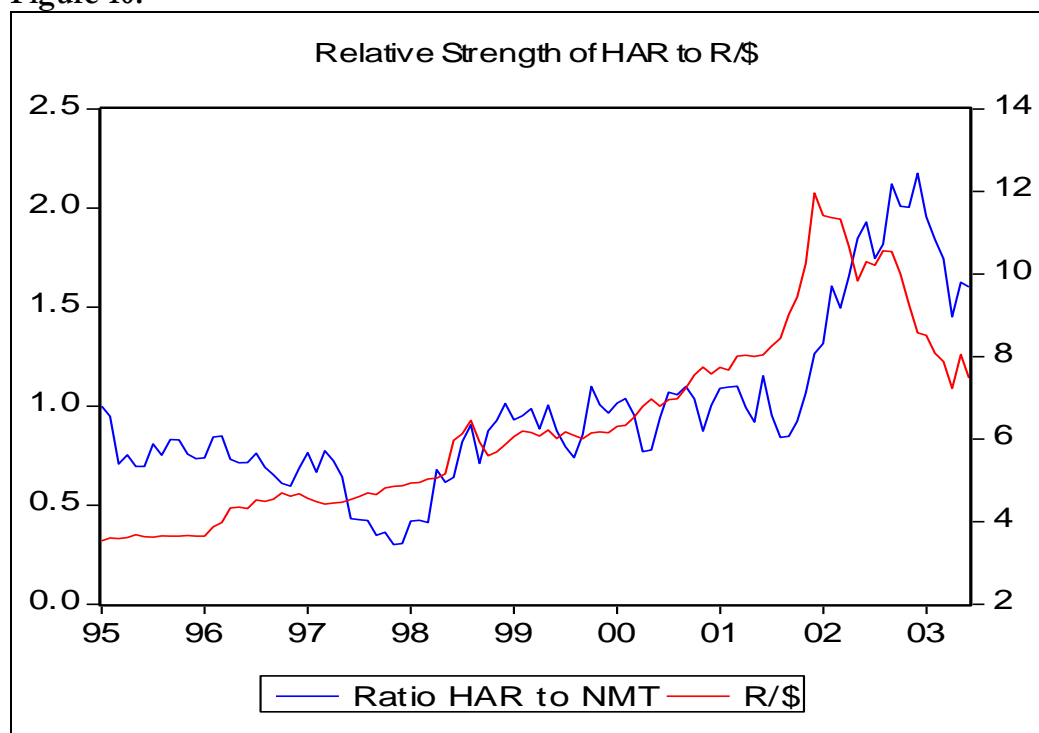


Figure 10.

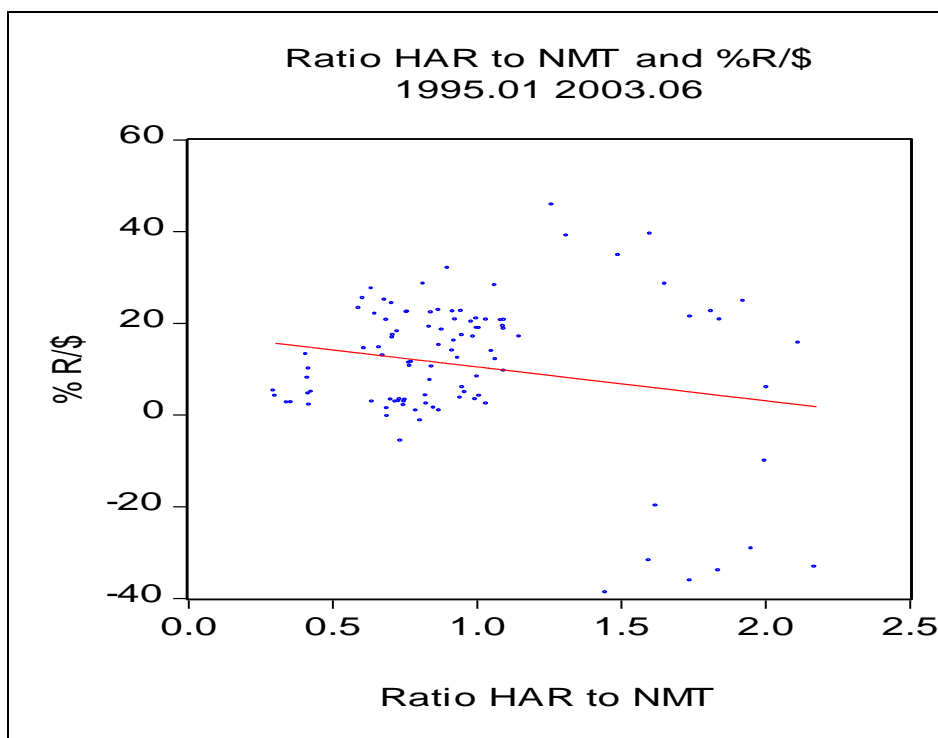


A lagged exchange rate effect is apparent in Figure 9: the price of Harmony (relative to Newmont) is positively linked to the rand/US\$ exchange rate, but a weaker exchange rate translates into a stronger share price only after a lag of around nine months. Shareholders in

Harmony do not appear to re-rate the share immediately, on the basis of a contemporaneous exchange rate effect, but appear to wait for an extended period of rand weakness before they re-rate Harmony .in relation to, for instance, Newmont. A similar effect was observed during the gold price's sharp upward adjustment in January 1980: the higher gold price was not immediately imputed into gold share values; the share market seemed to require a longer period of sustained higher gold prices before it re-rate gold shares. The present study lends further support to these conclusions, and indicates that gold shares are influenced a great deal more by a moving average of past gold prices than the contemporaneous price.

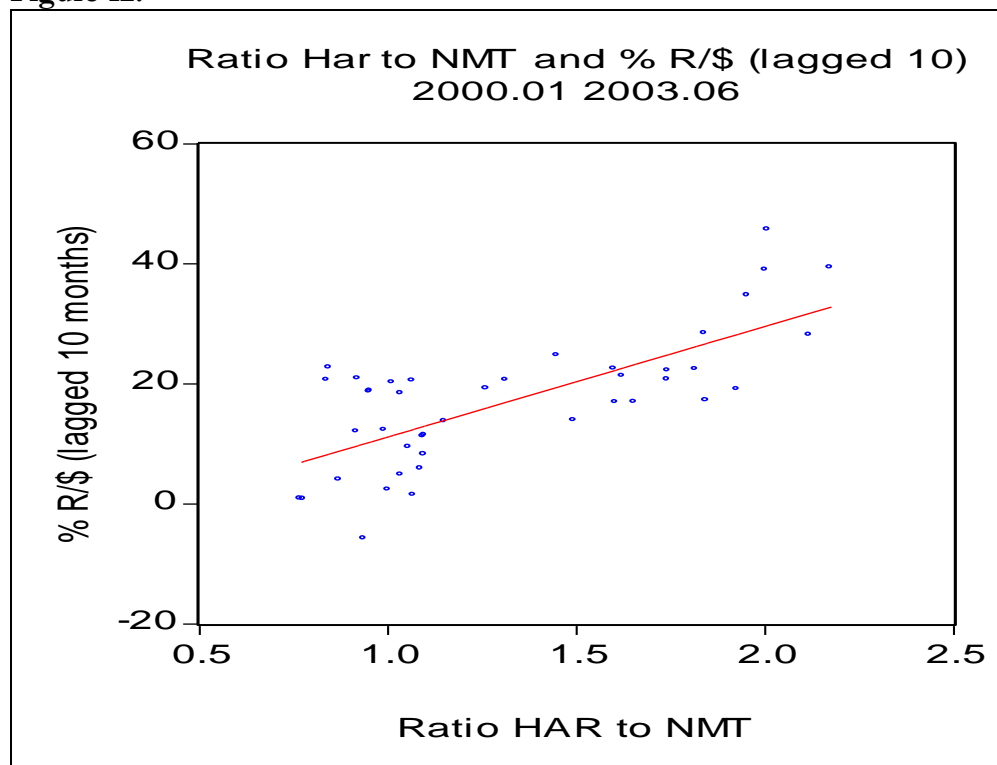
In fact, a contemporaneous scatter plot of Harmony (with market- and sector-wide effects removed) against percentage changes in the R/US\$ yields a weak negative relationship ($r = -0.204$ from January 1995 to June 2003, and $r = -0.389$ from January 2000 to June 2003). There is certainly no evidence of the Richemont effect; South African investors do not appear to use Harmony as an exchange rate hedge.

Figure 11.



The more recent period (January 2000 to June 2003) indicates that, as we correlate Harmony (stripped of market and sector effects) with lagged exchange rate movements, the correlation increases, reaching a peak positive correlation of $r = 0.332$ with a 10-month lag. Thus, investors in Harmony are more concerned with movements in the R/US\$ exchange rate over the past year and a half or so than they are with contemporaneous exchange rate movements. In many cases, the focus is on attempting to price a longer term exchange rate equilibrium value alone, knowing that it is this that may be the major determinant of earnings; near-term gold production may well have been sold forward at a price known to the market.

Figure 12.

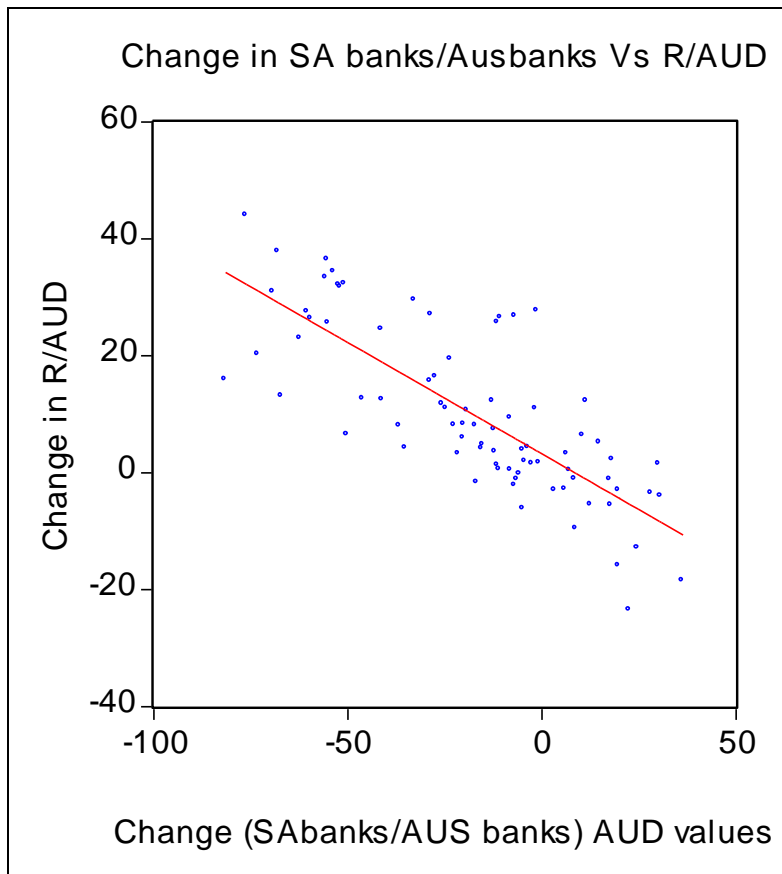


Case Study 3 — Pure Rand Plays

In the case of pure rand plays, there are no obvious benefits for share prices from nominal or real rand weakness. Clearly, with only rand revenues and rand costs a weakening exchange will imply, *ceteris paribus*, that the foreign exchange value of the earnings or dividends generated by the rand play will fall or rise in proportion to the exchange rate. However, a weaker rand is followed by higher inflation in South Africa with associated higher rand revenues and higher rand costs as the movement back to PPP gets under way. Thus, the short-term effect on dollar dividends might be seen as only temporarily negative. However, exchange rate shocks in themselves imply a more unstable exchange rate environment for the future and more perceived risk for the foreign holder of rand play shares. It might be expected that the foreign currency value of a rand play deteriorates in immediate response to rand weakness, while rand strength should bring immediate improvement in the foreign currency value of a rand play.

The evidence strongly supports this contention. We calculate the ratio of the JSE Banks index (expressed in Australian dollars) to the associated ASE Banks index between 1996 and 2002. When changes in this ratio are associated with changes in the rand/AU\$ exchange rate, we get a large negative estimated correlation of -0.78 (see Figure 13). Clearly, rand weakness causes the real or relative value of South African banks to decline. Furthermore, over the same period, there is also a negative correlation between changes in the rand value of the JSE Banks index and changes in the R/AU\$ exchange rate of -0.45. In other words, despite the higher inflation associated with rand weakness, a weak rand not only negatively affects the relative foreign currency value of SA banks; it also impacts negatively on their current rand values. This is because a significant proportion of the shares in the JSE Banks index are held by foreign shareholders for whom rand weakness is immediately very bad news in the form of immediately diminished earnings and dividends. The equilibrating tendency for exchange rates to move back to PPP seems to provide no short-term consolation for these shareholders.

Figure 13.



Conclusions

The JSE lists a mixture of rand leverage stocks, rand hedge stocks and rand plays. However, for a number of reasons, few listed companies represent pure examples of one or the other category. For example, the large South African industrial conglomerates have a mix of local and foreign assets, and the large South African banks have significant proportions of their assets invested off-shore. Nonetheless, the classification is strongly supported by the empirical evidence and is, furthermore, useful as a framework for analysing companies' exchange rate sensitivities. We have also shown how the sharp changes in nominal and real rand exchange rates between 2001 and 2003 proved a mixed blessing for JSE shareholders. Over this turbulent period, the lagged impact of exchange rate changes on rand leverage stocks, and the more immediate impact on rand hedges and rand plays, have tended to offset one other in the market; the aggregate effect of exchange rate changes on the JSE has been moderate. Short-term movements in the JSE will, however, continue to be dominated by the direction taken by the rand, on account of the preponderance of rand leverage stocks on the JSE.

The rand, however, will not always be as variable as it has been recently. When the currency stabilises, real valuations on the JSE will continue to reflect the real performance of the companies listed on it. But this reality will be more a function of real economic developments in the markets for goods and services in which these companies operate than of changes in the nominal and real exchange rate.

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