Reflected Glory and Failure: International Sporting Success and the Stock Market

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Abstract

Motivated by psychology research showing that individual mood is affected by weather and daylight savings changes respectively, Saunders (1993) and Kamstra et al (2000) find that stock prices are systematically related to these economically-neutral events. Another large psychology literature documents a similarly-strong relationship between sporting team success and fan self-esteem, a finding which raises the possibility that stock prices also respond systematically to sports results, at least in markets where the majority of investors support the same team. However, applying this hypothesis to New Zealand - a small country with a single dominant sport whose primary contests are international in nature - we find that stock return behaviour is independent of the success of the premier national sports team. Thus, irrational investor responses to sporting contest results are transitory at best.

Reflected Glory and Failure: International Sporting Success and the Stock Market

1. Introduction

An integral part of standard finance theory is the concept of an efficient market, the notion that asset prices are rational in the sense that they properly reflect all information relevant to their future economic prospects (see Fama, 1991). By contrast, proponents of behavioural finance argue that investors routinely and systematically make cognitive errors, thereby resulting in prices that deviate from the pure rationality of an efficient market (see Statman, 1999; Thaler, 1999). One implication of this view is that events which alter the mood, temper, confidence, or physical, mental or emotional state of investors can have significant effects on asset prices regardless of their effect on asset fundamentals. Consistent with this idea, Saunders (1993) and Kamstra et al (2000) provide evidence that stock market prices are influenced by economically-neutral events that can affect the psychological state of investors. Saunders examines the relationship between New York weather and NYSE and AMEX prices and finds that daily returns are negatively correlated with the cloud cover percentage for that day. Kamstra et al investigate the impact of daylight saving changes on the stock price indexes of four countries and find that returns are significantly lower on days that follow the Spring and Fall time changes.

These results provide a significant challenge to conventional finance theory insofar as they imply that investor behaviour, and consequently market prices, respond to factors and events other than those indicated by economic fundamentals. Nevertheless, and despite the postulated chain of causation running from weather and time changes to stock prices (discussed below), it seems prudent to remain sceptical for at least two reasons. First, given the huge number of possible economically-neutral events, chance alone suggests that some such events will have a statistically significant, but spurious, association with stock prices in some markets. Second, weather and time changes may have a statistical association with some unknown economic factor.

An obvious extension of the Saunders (1993) and Kamstra et al (2000) work is to examine investor reaction to other economically-neutral events that, *a priori*, seem likely to have significant psychological effects. One such event is the outcome of a sporting contest. No doubt many of us have experienced elation following a winning performance by a team we support and despondency after a loss. Such reactions appear to be the norm; for example, Sloan (1979) describes the responses of US basketball and football fans to wins and losses:

> "When their team won, they were uplifted; when it lost they were discouraged, frustrated and sad." [p252]

Interestingly, and importantly, individuals seem to identify far more personally with sporting team success than they do with weather or daylight savings changes, even though their level of control and influence is about the same. For example, Archer (1976) cites the view of a Scottish soccer fan after an international match:

> "For a time before, throughout and after [the match] I have the feeling that my personal worth is bound up with Scotland's success or failure." [p76]

More generally, Hirt et al (1992) find that individuals' estimates of their *own* future abilities and performance are positively correlated with sporting team success and that this effect is primarily due to success- or failure-induced changes in self-esteem rather than in mood *per se*, in contrast to weather and daylight savings changes where the dominant impact is on general mood.

A crucial element in the work of both Saunders (1993) and Kamstra et al (2000) is the hypothesized direction of causality between the analyzed event and stock market returns. Saunders notes that the stock market cannot influence the weather, but argues for the reverse causality on the basis of psychology research documenting a negative relationship between cloud cover and mood (see, for example, Persinger, 1975; Cunningham, 1979). Although he does not explicitly specify how changes in mood might lead to changes in stock prices, this presumably operates through depressed mood having an adverse impact on investor sentiment. Similarly, daylight savings change dates are obviously independent of current stock market returns, but sleep researchers have shown that these dates are associated with disruptions to

circadian rhythms, resulting initially in disturbed sleep patterns and subsequently in impaired mood, judgement and performance (see Coren, 1996; Monk and Aplin, 1980).[1] Kamstra et al suggest that the anxiety caused by such disruptions may temporarily increase risk aversion and therefore trigger share sales, thereby leading to a fall in prices.

As with weather and time changes, there is no reason to believe that sports results have any effect on rational cashflow forecasts or discount rates, so investor behaviour and market prices should be impervious to such events. However, if, as suggested by the psychology literature discussed above, sporting event outcomes influence investor self-esteem, then they may also affect investor behaviour by changing personal beliefs about the ability to identify suitable investments. When an investor's team wins, self-confidence rises and so does the desire to undertake new investments, but a loss results in lower self-confidence and and a curtailment of new investment activity.

Financial economists are primarily interested in the market effects of individual decisions, so Kamstra et al (2000) and Saunders (1993) focus on the relationship between aggregate stockmarket returns and time and weather changes respectively. In the case of sporting contests, examination of the effect on stockmarket returns is not entirely straightforward; in contrast to weather and time changes, the psychological impact of sports team results is not necessarily uniform since one fan's elation is another fan's misery if they support opposing teams. Consequently, market prices may show no reaction to sports results due to offsetting individual responses to the outcome. Thus, in order to fairly examine the possibility that investors react to sports results, we require sporting events where the majority of market participants agree on the desired outcome. This implies a focus on international, rather than purely domestic, sporting contests, a requirement that rules out many of the obvious candidates for analysis. For example, although soccer is the world's most popular sport and, arguably, the sport that invokes the strongest fan reactions, club affiliation is generally more

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[1] This literature is ambiguous on the symmetry of the reaction to daylight savings changes. Some studies find negative effects of changes both to and from daylight savings time while others report that the latter change is associated with positive benefits.

important than national identity; Allison (1988) cites the example of a minor British club match drawing an attendance more than three times as great as that for a match between two major international teams at the same ground in the same month. Even in countries where the national team takes precedence, international soccer matches tend to be infrequent, irregular, and occur close to important club matches. Similar problems arise in the US where the primary sporting contests are internal, a phenomenon succinctly expressed by Spander (1985):

> "In the United States it is more important that the Red Sox beat the Yankees or the 49ers beat the Bears than the fact that some kid who was born in California is the best in the world at returning serve."

Although US citizens are not immune to patriotic sporting fervour (e.g., the 1980 Olympic ice hockey victory or Ryder Cup events of the last 15 years), none of these events is sufficiently regular, or isolated from other domestic sports events, to permit sensible analysis.

One example of an international sports team (i) that has played often and on a regular basis for a long period of time, (ii) that participates in the principal sport of its country and (iii) whose success or failure is vitally important to a considerable proportion of its country's population is the New Zealand (henceforth NZ) rugby team, more commonly known as the All Blacks (primarily because of the colour of their uniforms). The All Blacks (henceforth AB) first played in 1903 against Australia.[2] Since that time, they have played 336 international matches (to the end of 1999), won 241, and have been one of the two dominant teams in international rugby. Perhaps as a result, rugby is the national game of NZ. Although other sports such as cricket, netball, athletics, soccer, rugby league and yachting all have their avid supporters, none has the widespread following of rugby. Attendances at rugby matches (both international and domestic) dwarf those of other sports as does media exposure and public interest. All of this has resulted in an intense concern for, and passionate reaction to, AB success and failure. In one graphic example, Zavos (1979) describes the mood of the country prior to a 1956 tour by the Springboks, the national team of South Africa:

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[2] The term "All Blacks" did not enter common usage until the 1905 tour of Britain and France.

> "The atmosphere when [the Springboks] finally landed in New Zealand resembled that of France when the first German troops stepped foot on its soil in 1939. There was fear, loathing for past humiliations, anxiety, awe, a fierce desire for revenge and above all a determination to win at all costs." [p98]

Zavos also quotes the chairman of the AB selection panel in that year:

> "It was more serious than warfare, I can tell you that.... It was a time of great excitement, tension and social stress. People were ringing you all the time and often abusing you." [pp106-8]

If the vehement national reaction to an unexpected semi-final loss to France in the 1999 World Cup is any indication, passions are no cooler more than 40 years later. Wilson (2000) describes this reaction from the players' perspective:

> "Few criminals convicted of the most heinous crimes, few politicians whose deeds have a daily impact on the lives of all New Zealanders, have been villified as much as we were." [p187]

Even allowing for the hyperbole often associated with sports journalism, one thing seems clear from all this: many New Zealanders are vitally concerned with the fortunes of the AB rugby team and they personally associate with AB success and failure. We therefore examine the reaction of the NZ stockmarket to AB results in an attempt to determine whether strong psychological and emotional reactions to sporting success and failure are reflected in investor behavior, as behaviouralists would argue, or whether, as standard finance assumes, investors are capable of treating these "twin imposters" in an identical and rational manner.

In the next section, we describe our data and undertake an analysis of the bivariate relationship between NZ stockmarket returns and AB success. In section 3, we use multiple regression models to control for other variables that may affect this relationship. Section 4 examines the robustness of our results to alternative specifications and data and section 5 contains some concluding remarks.

2. Data and Preliminary Analysis

To investigate the existence and extent of any impact of AB results on the NZ stockmarket over as long a time period as possible, we initially use monthly data from January 1950 to November 1999.[3] NZ stockmarket returns for this period were provided by Frank Russell Ltd.[4] Using these data, we construct two measures of market activity, the first of which is the frequency of positive returns. With this measure, we investigate whether or not AB successes (failures) are associated with a greater (smaller) probability of positive market returns. The second measure we use is the mean return; this enables us to determine whether or not AB successes (failures) are associated with higher (lower) returns on average.[5]

To categorise AB success or failure, we use Palenski et al (2000) which contains the score and description of every AB match ever played against other national teams.[6] The first result categorisation we use treats all opponents as equals: a month is classified as Positive if the AB won more matches than they lost against all opponents in that month; it is classified as Negative if they lost more matches than they won; and it is classified as Neutral if either the

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3 Although daily data would be preferable, daily index returns are available for NZ only from 1986, resulting in a fairly small sample of AB matches for analysis. We therefore begin our analysis with the more extensive monthly dataset. In section 4, we examine the daily data.

4 The index used in generating these returns was constructed in a similar manner to that described in Chay et al (1993).

5 We also calculated median returns, but these were virtually identical to mean returns in the vast majority of cases and thus yielded similar results. To avoid repeating essentially the same findings, we do not report the median results here, but they are available from the authors. The same applies to all other unreported results discussed throughout the paper.

6 On tours abroad, the AB also frequently play matches against regional teams. However, these matches (i) are primarily used as preparation for the more important international events and (ii) typically involve considerable numbers of second-string AB players. For these reasons, these matches are followed with less intensity by AB supporters and their outcomes are therefore less likely to induce any strong emotional response. Consequently, we restrict our analysis to AB matches against other national teams.

AB did not play or they played only drawn matches or they had equal numbers of wins and losses.[7]

One objection to this simple categorisation is that AB supporters are likely to view some opponents as more important than others. For example, a win against a highly-ranked opponent will be seen in a more positive light, and may therefore induce a stronger emotional response, than one against lesser opposition. Similarly, a loss to a traditional foe may engender rather more angst among AB supporters than one to a less-feared opponent. To deal with this issue, we create two additional categorisations that recognise possible differences in the perceived importance of opponents. In the first, the only matches considered are those against opponents who have defeated the AB on at least one occasion and are generally considered by the rugby fraternity to be an ongoing threat; this group of major opponents consists of the national teams of Australia, England, France, South Africa, Wales, and the composite United Kingdom team known as the British Lions.[8] In the second, only matches against South Africa and either Wales (up to 1980) or Australia (after 1980) are considered. This group of principal opponents recognises the most important AB rivalries. From the time of their first meeting in 1921, South Africa have had the most success of any team against the AB (at the end of 1999 the AB held a 26-25 advantage), thereby making them the most feared opponent in the eyes of AB supporters. For most of the 20th century, Wales were held in similar regard, but the decline in their international rugby fortunes since around 1980 has led to a relative lessening of interest

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7 In assigning months to these three classes, we also tried classifying months with equal numbers of wins and losses according to (i) the first result in the month, (ii) the last result in the month, (iii) the win/loss ratio against major opponents only. We also experimented with simply eliminating these months from our dataset. None of these modifications had any effect on our results.

8 As a World XV defeated the ABs on one occasion in 1992, we also include the three matches against this team in the major opponent group. Exclusion of these three matches from this group (i.e., placement of the results in the Neutral category) has no effect on our results. Moreover, although the national teams of Ireland and Scotland have never defeated the AB, rugby followers might argue that they qualify as major opponents. Their inclusion in this group again makes no difference to our results.

in AB-Wales matches. At the same time, the emergence of Australia as an international rugby power has resulted in a new opponent that AB supporters view with trepidation and respect. These success/failure categorisations are summarised in Table 1.[9]

[Insert Table 1 about here]

In Table 2, we present the results of our initial analysis. For each result class (Positive, Negative, Neutral), we report in panel A the proportion of months with a positive stockmarket return. Only against principal opponents do Positive result months have the strongest association with positive returns. For example, in matches against major opponents, 64.0% of Positive months had positive returns versus 62.9% in Neutral months and 65.4% in Negative months. In all cases, these estimates are insignificantly different from each other at conventional levels. The story is similar in panel B where we report the mean return for each result class. Although market returns are generally higher in Positive result months than Neutral months, they are frequently even greater in Negative result months. For example, in matches against all opponents, the mean return in Positive months is 1.435% against 0.827% in Neutral months and 1.927% in Negative months, although the differences are insignificant. Only in matches against principal opponents is the pattern of results consistent with an AB-induced investor reaction, but there are again no significant differences between the result classes. Overall, there is no evidence of any AB effect on the NZ stockmarket.[10]

[Insert Table 2 about here]

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9 Distinguishing between Positive and Negative results is consistent with what Sloan (1979) calls the Achievement-Seeking hypothesis. An alternative is the Aggression-Frustration hypothesis which predicts that fans respond only to losses. However, as Sloan points out, the latter hypothesis can be subsumed within the former and this is the approach we adopt.

10 We also calculated these statistics for various sub-periods, but this revealed no significant differences.

Although these simple statistics suggest that the NZ stockmarket is impervious to the fate of the AB, they may be misleading due to the effects of other variables on NZ stock returns. In the next section, we therefore employ multiple regression analysis to try to isolate any AB effect from these other factors.

3. Regression Analysis

Broad economic factors that could potentially influence the NZ stock market include international investor sentiment, NZ country risk, and domestic economic conditions.[11] International asset pricing models (see, for example, Solnik, 1974, for an early demonstration) suggest that the most appropriate measure of the former is a world stock price index. Unfortunately, such an index is unavailable for most of our sample period, so we use Ibbotson Associates monthly United States (US) stock returns as a proxy. As a measure of country risk, we use the difference between the NZ long-term bond rate and the corresponding US rate; data for the former are available from the NZ Department of Statistics while those for the latter come from Ibbotson Associates. Finally, we proxy for NZ domestic real activity using the percentage change in the manufacturing employment index maintained by the NZ Department of Statistics.[12]

We estimate two regression models. First, we use a binary dependent variable, set equal to one if the NZ stockmarket return is positive and zero otherwise, and employ logistic regression. In the second, the dependent variable is the monthly stockmarket return.[13] Since

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[11] Our choice of independent variables is guided by Chen et al (1986). In contrast to their study of aggregate US stock returns, the small nature of the NZ market implies the existence of a world index factor. The data for some other variables they employ (e.g., term structure measure) are unavailable for NZ over the period we examine.

[12] The manufacturing employment index is only available on a quarterly basis, so conversion to a monthly series was undertaken by monthly interpolation.

[13] Our reported results use nominal returns and interest rates. We also estimated regressions using real and exchange rate-adjusted values, but the use of these alternative measures had no material effect on our findings.

preliminary analysis using OLS indicated significant error autocorrelation, we estimate this model by GLS. In both models, the independent variables are (i) the three macroeconomic variables described above, (ii) a series of monthly dummy variables to control for any possible seasonality in the data, and (iii) an AB result variable set equal to one (minus one) (zero) if that month is classified as Positive (Negative) (Neutral).

In Table 3, panel A reports the results from the logistic regressions while Panel B contains the results of the GLS regressions. Both tell a similar story. Neither the sign nor the size of the NZ market return bears any significant relationship to AB success. Indeed, except for matches against principal opponents, Positive result months are associated with a *lower* probability of a positive return, albeit insignificantly. As expected, both the sign and size of the NZ market return are positively related to the US market return and NZ domestic activity and negatively related to the interest rate differential, although only the US return coefficients are statistically significant.[14]

[Insert Table 3 about here]

We also consider two alternative specifications of the rugby-return relationship. First, in case only home games elicit a significant emotional response due to their greater hype and visibility, we set the rugby result variable equal to one (minus one) if and only if that month is classified as Positive (Negative) *and* all matches in that month are played at home, i.e., all offshore games are classified as Neutral.[15] Second, to allow for the possibility that AB results

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[14] Estimation of these regressions for various sub-periods revealed some differences. In particular, the US return variable increased in significance over the years (presumably reflecting the greater openness of NZ financial markets) while the reverse was true for the manufacturing employment index. However, the size and significance of the rugby result variable remained indistinguishable from zero for all sub-periods.

[15] Such an effect seems most likely to be present in the data prior to 1972 as all AB matches have been televised live in NZ since that date. However, analysis of the various sub-periods using this alternative AB result classification revealed no significant differences.

have a significant effect on the self-esteem of AB supporters only to the extent that these reinforce the prevailing economic mood, we set the rugby result variable equal to one (minus one) if and only if that month is classified as Positive (Negative) *and* the percentage change in manufacturing employment is more than one standard deviation above (below) the mean monthly change. However, neither of these specifications yields results any different to those appearing in Table 3, so we do not report them in tables.

To summarise, we find no evidence of an AB effect in NZ stock returns. If such an effect does exist, then it is being obscured either by our use of monthly data or by inaccuracies in our system for classifying results. In the next section, we consider both these possibilities.

4. Robustness Issues

A. Daily data

One possible reason for our failure to find a significant relationship between AB results and NZ stock market returns is that the frequency of our data is too low, i.e., any market reaction to an AB result is sufficiently short-lived to be unobservable in monthly data. To investigate this possibility, we calculate daily returns on the NZ All Ordinaries Gross Index, a broad-based value-weighted index which is available on a daily basis from 1 July 1986.[16] For each of the three opponent categories, we classify days following an AB match as Positive (Negative) (Neutral) if the AB won (lost) (drew) the previous day; all other days are classified as Neutral.

[Insert Table 4 about here]

The results from using these daily data are summarised in panel A of Table 4. As with monthly data, there are no significant differences in mean returns between the three result classes. One possible complicating factor is that most AB matches take place at weekends, so the associated market return is usually calculated for a Monday, a day which is sometimes

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16 These data were obtained from the Otago University NZ Share Price database.

associated with abnormal return behaviour. In panel B, we therefore compare the Monday returns following weekend AB wins and losses with returns from all other Mondays. Once again, there is no evidence of any significant differences.[17]

B. Yearly comparisons

Another possible problem with the frequency of our data is that daily and monthly observations fail to pick up any cumulative effect of AB success or failure. For example, responses to individual matches or months may be too small to overcome the noise in our data, but become apparent over a full season. This could be the case if, for example, AB supporters react strongly only to certain matches that effectively determine, or have a significant bearing on, the fate of the season. To examine this possibility, we analyse our data using annual returns and success measures. We define a year as running from March to February so that AB performance on Northern Hemisphere tours that take place after the end of the NZ domestic season (which ends in September/October) is included in that season's success calculation rather than in the following season. We then calculate annual returns by using our monthly data from March 1950 to February 1999. Due to the shortage of observations for analysing the major and principal opponent categories, we concentrate on matches against all opponents and classify a year as Positive (Negative) if the AB had a winning (losing) record for that year.

[Insert Table 5 about here]

Table 5 summarises the results of this classification. Although both mean annual returns and the proportion of positive annual returns are greater for winning seasons (by 13.5%

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[17] We also used these daily data to conduct other tests. For example, we calculated and compared the proportions of positive-return days for each of the three result classes. Although this revealed some weak evidence for positive returns being less likely on Negative days than on Neutral days, there was no significant difference between Negative days and Positive days. In daily data versions of the section 3 regressions, the rugby result variable was insignificant at conventional levels in all cases.

to 11.7% and by 0.77 to 0.6 respectively), neither difference is even close to being able to reject the null hypothesis of no difference between winning and losing seasons. We again estimated regression models of the type discussed in section 3, but since these also failed to detect any relationship between stock market returns and the annual AB record, we do not report them in a table.

C. Volatility

Another possible explanation of our results is that our results classification system is faulty. For example, if AB supporters expect the AB to win a particular match quite comfortably, then there may be little change in their self-esteem if the AB proceed to win as expected. In this case, a result we have classified as Positive might be more accurately classified as Neutral, thereby potentially creating a downwards bias in the Positive class returns. Similarly, if AB supporters are pessimistic about AB chances prior to a match which they subsequently draw or lose narrowly, then again there may be no adverse change in their self-esteem. In this case, a result we have classified as Negative might be more accurately classified as Neutral (or even Positive if it encourages greater optimism about future matches), thereby potentially creating an upwards bias in the Negative class returns.

It is difficult to directly test this possibility due to the impossiblity of observing fan expectations about the result of a given match.[18] Nevertheless, if an AB effect exists and our classification system errs in the manner described above, then the volatility of returns should be higher within the smaller Positive and Negative classes than in the larger Neutral class. For example, suppose there is an AB effect so that NZ investors respond positively (negatively) on true Positive (Negative) result dates. Then the placement of some results in the wrong class leads to both the estimated Positive and Negative classes containing a range of high and low returns and consequently high measured volatility. By contrast, the Neutral class is dominated by non-playing dates, so the inclusion in this group of a small number of misclassified dates

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[18] One way of inferring these expectations would be to use bookmaking odds. Unfortunately, legal sports betting has been available in NZ only since 1996, so few observations are currently available.

(that should actually be Positive or Negative) has little impact on its measured volatility. We therefore combine our Positive and Negative classes into a single group and compare the standard deviation of returns for this group with the standard deviation of returns for the Neutral class.[19] The results appear in Table 6. Panel A indicates that there is indeed greater volatility in the set of Positive/Negative monthly returns than in the returns associated with Neutral months, but that this difference is not statistically significant. Although the difference in standard deviations is significant at the 7% level for the Principal opponent categorisation, we have little confidence in this result as examination of the sub-periods 1950-69, 1970-89, 1990-1999 reveals no such difference. Turning to the daily data (reported in panel B), volatility is actually lower in the set of returns associated with AB successes or failures, although the difference is again insignificant. Thus, the absence of any systematic AB effect in NZ market returns does not appear to be due to result misclassification.

[Insert Table 6 about here]

5. Concluding Remarks

The principal result of this paper, using the example of the New Zealand national rugby team, is straightforward: we find no evidence of any relationship between sporting team success and stockmarket return behaviour, regardless of the time period analysed, the frequency of the data we use, or the classification of sporting success and failure. If any market reaction to sports contests exists, it must therefore be transitory at best. Although such an outcome is exactly what efficient market proponents would expect, it contrasts with the results of Saunders (1993) and Kamstra et al (2000) who show that other economically-neutral, but psychologically-important, events have a systematic effect on stock prices. This disparity is surprising insofar as psychology research indicates that the events considered by those authors

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19 We also tried comparing months (or days) in which AB matches were played with those where they were not. Not surprisingly, this yielded very similar results.

have a less personal, and therefore probably less pronounced, effect on individuals than does sports team success or failure.

Although the reasons for these contrasting results are not the primary focus of this paper, a possible explanation is that the personalisation of sports results has offsetting effects on investor behaviour. Because of the tendency to bask in the reflected glory, or wallow in the reflected failure, associated with sporting event outcomes, investors are also more likely to be aware of the source of their elation or misery when it is due to sports results than when it is due to weather conditions or time changes. This greater self-awareness of the cause of their emotional state potentially provides greater scope for investors to resist irrational impulses. Thus, while sporting event results can induce a stronger investor reaction than weather or time changes because of their direct effect on investor self-esteem and confidence, greater awareness of this effect also makes it easier to counter and therefore induce a weaker investor reaction. Our evidence, in conjunction with that of Saunders (1993) and Kamstra et al (2000), suggests that while investors are susceptible to impersonal events that have a general effect on mood, they appear able to rationally discount shocks to confidence and self-esteem when the source of these shocks is easily recognisable.

The reader who believes strongly in the importance of investor psychology for market prices might argue that investors do react to sports team success or failure, but that this effect is simply swamped by other factors in our data. For example, the presence of foreign investors in the NZ market, for whom AB results are largely a matter of indifference, might offset any domestic tendency to react to AB results. However, we are doubtful about this explanation, for two reasons. First, foreign interest in the small NZ market is confined largely to a few larger stocks and thus has relatively little impact on the broad-based stock price indexes considered here. Second, foreign investment in the NZ market was minor prior to the economic reforms of the mid-1980s, but we find no relationship between AB results and market returns in earlier periods as well as in more recent ones. Another possible objection to our conclusion might be that AB supporters and stock market investors are mutually exclusive groups, in which case it is no surprise that AB results have no effect on the NZ market. However, the proliferation and popularity of corporate boxes at the major NZ rugby stadiums, the presence of ex-AB players

on corporate boards (and of corporate executives on the NZ Rugby Union board), and the intense interest in rugby apparent in NZ securities dealing rooms suggest that those who are most likely to be active traders are at least as concerned about AB success as are other individuals. Finally, it might be argued that contrary to the assumption of our analysis, NZ investors do not have unambiguous preferences with regard to the fate of the AB, perhaps due to the ability to hedge their position by betting against the AB with the domestic bookmaking organisation. That is, any AB effect on fan self-esteem is offset by corresponding wins and losses on betting activity. But if this were the source of our results, then we would expect to see a difference between pre- and post-1996, the first year in which sports betting was legally available in NZ. However, a year-by-year analysis of our daily data reveals no such difference. In any event, such preference heterogeneity can also apply to other events that have been found to affect stock prices. For example, rain need not be uniformly depressing since it may signal the end of a drought, or afford the opportunity to postpone or cancel undesirable tasks such as mowing the lawns, weeding the garden, or going for a lunchtime run with an out-of-town visiting marathoner. Nevertheless, Saunders (1993) finds that such weather in New York is associated with lower stock returns; we have no reason to believe that the desire to see the AB lose is any greater in NZ than is the desire for rain in New York,

Further research in this area could concentrate on an extension of our analysis to other markets and other major sporting events. For example, changes in national pride are frequently associated with the awarding and staging of major international contests such as the Olympic Games and the soccer World Cup, so it would be interesting to see if there are any temporary market reactions to these events. It might also be useful to examine intra-day market data in case there is a short-lived effect that is not apparent in daily or monthly data.

References

Allison, L., 1988, Sport and communities. The World & I, 3.

Archer, I. (ed), 1976. We'll Support You Ever More. London: Hutchinson.

Chay, J., A. Marsden and R. Stubbs, 1993, Historical rates of return to equities, bonds, and the equity risk premium: New Zealand evidence. Pacific Accounting Review 5, 27-46.

Chen, N., R. Roll and S. Ross, 1986, Economic forces and the stock market. Journal of Business 59, 383-403.

Coren, S., 1996. Sleep Thieves. New York: Free Press.

Cunningham, M., 1979, Weather, mood and helping behavior: Quasi-experiments with the sunshine samaritan. Journal of Personality and Social Psychology 37, 1947-1956.

Fama, E., 1991, Efficient capital markets: II. Journal of Finance 46, 1575-1617.

Hirt, E., D. Zillman, G. Erikson and C. Kennedy, 1992. Costs and benefits of allegiance: Changes in fan's self-ascribed competencies after team victory versus defeat. Journal of Personality and Social Psychology 63, 724-738.

Kamstra, M., L. Kramer and M. Levi, 2000, Losing sleep at the market: The daylight saving anomaly. American Economic Review 90, 1005-1011.

Monk, T. and L. Aplin, 1980, Spring and autumn daylight saving time changes: Studies of adjustment in sleep timings, mood, and efficiency. Ergonomics 23, 167-178.

Palenski, R., R. Chester and N. McMillan, 2000. Men In Black. Auckland: Hodder Moa Beckett

Persinger, M.S., 1975, Lag responses in mood responses to changes in the weather matrix. International Journal of Biometerology 19, 108-114.

Saunders, E., 1993, Stock prices and Wall St weather. American Economic Review 83, 1337-1345.

Sloan, L., 1979, The function and impact of sports for fans: A review of theory and contemporary research. Sports, Games and Play, ed. J. Goldstein. Hillsdale, New Jersey: Erlbaum.

Solnik, B., 1974, An equilibrium model of the international capital market. Journal of Economic Theory 8, 500-504.

Spander A., 1995, Just enjoy the spectacle and stay off the tabloids. Daily Telegraph, 6 July.

Statman, M., 1999, Behavioral finance: Past battles and future engagements. Financial Analysts Journal 55, 18-27.

Thaler, R., 1999, The end of behavioral finance. Financial Analysts Journal 55, 12-17.

Wilson, J. with R. Palenski, 2000. Seasons Of Gold. Auckland: Hodder Moa Beckett.

Zavos, S., 1979. After The Final Whistle. Wellington: Fourth Estate Books Ltd.

Table 1

AB Success/Failure Classifications

This table summarises the system used for classifying each month between January 1950 and November 1999 in terms of All Blacks success.

Category	Matches against	Classification
All opponents	All other national teams	a month is classified as Positive (Negative) if the AB won (lost) more matches than they lost (won) against all opponents in that month; all other months are classified as Neutral
Major opponents	Australia, England, France, South Africa, Wales, Lions (Brit)	a month is classified as Positive (Negative) if the AB won (lost) more matches than they lost (won) against major opponents in that month; all other months are classified as Neutral
Principal opponents	South Africa Wales (up to 1980) Australia (after 1980)	a month is classified as Positive (Negative) if the AB won (lost) more matches than they lost (won) against principal opponents in that month; all other months are classified as Neutral

Table 2

All Blacks Results and NZ Stockmarket Returns: Monthly Data

This table examines the bivariate relationship between monthly NZ stockmarket returns and AB success for the period January 1950 to November 1999. The AB result classifications "Positive", "Negative" and "Neutral", and the opponent groups "All", "Major" and "Principal" are defined in Table 1. Panel A examines the relationship between the frequency of positive stockmarket returns and AB result classification; panel B examines the relationship between the mean monthly stockmarket return and AB result classification. The p-values in panel A are based on Z-tests of differences in proportions; those in panel B are based on t-tests of differences in means.

	Opponent Group								
	All			Major			Principal		
	Result Classification			Result Classification			Result Classification		
	Positive (N=101)	Negative (N=25)	Neutral (N=474)	Positive (N=89)	Negative (N=26)	Neutral (N=485)	Positive (N=31)	Negative (N=18)	Neutral (N=551)
				Panel A: Sign of market return					
Proportion of positive-return months	0.624	0.680	0.631	0.640	0.654	0.629	0.710	0.667	0.626
p-value for difference between Positive/ Negative months and Neutral months	0.89	0.61		0.83	0.79		0.32	0.72	
p-value for difference between Positive and Negative months	0.59			0.90			0.76		
				Panel B: Size of market return					
Mean monthly return (%)	1.435	1.927	0.827	1.580	1.669	0.827	2.248	1.537	0.885
p-value for difference between Positive/ Negative months and Neutral months	0.23	0.31		0.16	0.43		0.18	0.59	
p-value for difference between Positive and Negative months	0.67			0.94			0.64		

Table 3

Regression Results

Regression models of the relationship between monthly NZ stockmarket returns and All Black success between January 1950 and November 1999. The All Black result classifications "Positive", "Negative" and "Neutral", and the opponent groups "All", "Major" and "Principal" are defined in Table 1. In panel A, the dependent variable is set equal to one if the NZ stockmarket return is positive and zero otherwise and we employ logistic regression. In panel B, the dependent variable is the monthly stockmarket return and we use GLS. The AB result variable is set equal to one (minus one) (zero) if that month is classified as Positive (Negative) (Neutral). Figures in parentheses are p-values.

	Opponent Category		
Independent Variable	All	Major	Principal
	Panel A: Sign of market return		
Intercept	0.773 (0.02)	0.766 (0.02)	0.768 (0.02)
US stockmarket return	7.649 (0.01)	7.636 (0.01)	7.651 (0.01)
NZ-US long-term interest rate differential	-3.434 (0.39)	-3.369 (0.40)	-3.574 (0.39)
Percentage change in NZ manufacturing employment index	14.88 (0.22)	15.08 (0.21)	15.10 (0.21)
AB result variable	-0.096 (0.65)	-0.243 (0.59)	0.177 (0.65)
Model χ^2	31.10 (0.01)	30.89 (0.01)	31.21 (0.01)
	Panel B: Size of market return		
Intercept	0.007 (0.29)	0.007 (0.29)	0.007 (0.28)
US stockmarket return	0.233 (0.01)	0.232 (0.01)	0.234 (0.01)
NZ-US long-term interest rate differential	-0.018 (0.91)	-0.020 (0.90)	-0.020 (0.90)
Percentage change in NZ manufacturing employment index	0.226 (0.37)	0.229 (0.36)	0.226 (0.37)
AB result variable	0.001 (0.98)	0.002 (0.60)	0.006 (0.44)
Adjusted R^2	0.043	0.044	0.045
F-stat	2.80 (0.01)	2.82 (0.01)	2.86 (0.01)

Table 4

AB Results and NZ Stockmarket Returns: Daily Data

This table examines the bivariate relationship between daily NZ stockmarket returns and All Black success for the period 1 July 1986 to 30 November 2000. The All Black opponent categories "All", "Major" and "Principal" are defined in Table 1. For each of these opponent categories, we classify days following an AB match as Positive (Negative) (Neutral) if the ABs won (lost) (drew) the previous day; all other days are classified as Neutral. Panel A compares the mean daily stockmarket returns on days following AB wins and losses with the mean return on all other days; panel B examines compare the Monday returns from weekend AB wins and losses with returns from all other Mondays. p-values are based on t-tests of differences in means.

	Opponent Group								
	All			Major			Principal		
	Result Classification			Result Classification			Result Classification		
	Positive	Negative	Neutral	Positive	Negative	Neutral	Positive	Negative	Neutral
				Panel A: All Days					
Number of observations	88	25	3276	47	25	3317	29	17	3343
Mean daily return (%)	0.011	-0.272	0.008	0.112	-0.272	0.027	-0.146	-0.013	0.025
p-value for difference between Positive/ Negative months and Neutral months	0.87	0.31		0.27	0.31		0.28	0.63	
p-value for difference between Positive and Negative months	0.36			0.61			0.97		
				Panel B: Mondays only					
Number of observations	76	21	542	45	21	573	29	14	596
Mean daily return (%)	-0.020	-0.374	-0.048	-0.115	-0.374	-0.039	-0.146	-0.229	-0.047
p-value for difference between Positive/ Negative months and Neutral months	0.79	0.23		0.55	0.32		0.18	0.59	
p-value for difference between Positive and Negative months	0.31			0.46					

Table 5

Returns to AB Wins and Losses: Annual Data

This table examines bivariate relationships between annual NZ stockmarket returns and AB success between 1950 and 1999. A year runs from March to February and is classified as Positive (Negative) if the ABs had a winning (losing) record for that year against all opponents. The p-value in the second row is based on a Z-test of differences in proportions; the p-value in the fourth row is based on a t-test of differences in means.

	Result Classification	
	Positive (N=39)	Negative (N=10)
Proportion of positive-return years	0.769	0.600
p-value for difference between Positive and Negative years	0.30	
Mean annual return (%)	13.51	11.68
p-value for difference between Positive and Negative years	0.88	

Table 6

AB Results and NZ Stockmarket Volatility

Panel A compares (i) the standard deviation of NZ stockmarket returns for days following AB wins or losses (Positive/Negative) with (ii) the standard deviation across all other days (Neutral). Panel B makes the same comparison using monthly data and result classifications. The AB opponent groups "All", "Major" and "Principal" are defined in Table 1; p-values are based on an F-test for differences in variances.

	Opponent Group					
	All		Major		Principal	
	Result Classification		Result Classification		Result Classification	
	Positive/Negative	Neutral	Positive/Negative	Neutral	Positive/Negative	Neutral
			Panel A: Daily Data			
Number of observations	113	3276	72	3317	46	3343
Standard deviation of monthly returns	0.048	0.044	0.048	0.044	0.052	0.044
p-value for difference between Rugby months and Neutral months	0.24		0.17		0.07	
			Panel B: Monthly Data			
Number of observations	97	542	67	573	43	596
Standard deviation of daily returns	0.010	0.011	0.011	0.011	0.010	0.011
p-value for difference between Rugby months and Neutral months	0.24		0.90		0.64	