

DOES NATIONAL SPORTING PERFORMANCE AFFECT STOCK MARKET RETURNS IN SOUTH AFRICA?

Ferdi Botha*

Rhodes University
f.botha@ru.ac.za

Carl de Beer+

Rhodes University
cdebeer86@gmail.com

September 2011

Abstract

This study explores whether South African national sporting performance can influence investors in such a way that it has the ability to impact on market returns. Using standard event study methodology, this study determines the constant mean return using the daily All-Share price index on the JSE for the period of 1 January 1990 to 31 December 2010. This study focuses on three of South Africa's most popular sports, namely soccer, cricket and rugby, and examines if these three sports have the ability to influence market returns. Although there is some evidence of a relationship between stock returns and sporting performance in the descriptive analysis, the regression results indicate that sporting performance in South Africa does not significantly explain abnormal market returns on the JSE. The study provides a number of possible reasons for this finding and concludes by suggesting areas for future research.

Keywords

Sporting performance, stock returns, JSE, event studies, South Africa

*Mr Ferdi Botha is a lecturer in the Department of Economics and Economic History, Rhodes University, Grahamstown, South Africa

+Mr Carl de Beer is a postgraduate student in the Department of Economics and Economic History, Rhodes University, Grahamstown, South Africa

1. INTRODUCTION

The Efficient Markets Hypothesis (EMH) considers asset prices as rational if prices properly reflect all available information relevant to their future economic prospects (Fama, 1998). It is becoming increasingly recognised, however, that non-economic events such as sport can have a significant impact, not only on an economy, but on asset prices as well (Ashton, Gerrard & Hudson, 2003; Edmans, Garcia & Norli, 2007). Based on the EMH, sport should have no influence on stock market returns, as the former is considered a non-economic event. In contrast, behavioural finance theory draws on psychological literature that examines the impact of investors' mood fluctuations on their decision-making processes (Mishra & Smyth, 2010). Investors routinely and systematically allow their mood to influence their decision-making process, causing prices to deviate from the rationale of an efficient market (Statman, 1999). One main implication of behavioural finance, moreover, is that events that are able to alter investors' moods, temper and confidence will have a significant effect on asset prices (Boyle & Walter, 2003). Behavioural finance theory therefore assumes that in certain instances financial markets can be informationally inefficient (Ritter, 2002; Shiller, 2003).

There is a large body of psychological research that illustrates how a person's mood, whether natural or induced, can influence an individual's state of mind, thereby affecting an individual's decision-making process and economic outcomes (Mischel, Ebbesen & Zeiss, 1976; Isen, Shalke, Clark & Karp, 1978; Alloy, Abramson & Viscusi, 1981; Isen & Patrick, 1983; Johnson & Tversky, 1983; Arkes, Herren & Isen, 1988; Crocker, Alloy & Kayne, 1988; Taylor, 1991; Dickhaut, McCabe, Nagode, Rustichini, Smith & Pardo, 2003). For instance, individuals tend to make judgements that are compatible with their current mood, even when the subject matter may be unrelated to the cause of the mood (Johnson & Tversky, 1983). Furthermore, Cialdini, Borden, Thorne, Walker, Freeman and Sloan (1976) first noted individuals' tendency to associate themselves with a team's positive performance, while disassociating themselves from teams when they are performing unsatisfactory (i.e. 'basking in reflected glory' (BIRG)). With BIRG, individuals delight in the glory of a successful individual or team, while they have in fact done nothing to contribute towards that success.

Research has also shown that results from sporting events have the ability to significantly influence individuals' mood states (Schwarz, Strack, Kommer & Wagner, 1987; Schweitzer, Zillman, Weaver & Luttrell, 1992; Wann, Dolan, McGeorge & Allison, 1994). For example, sports fans will exhibit increased positive mood changes following a win and negative mood changes following their team's loss (Wann et al., 1994). The extent of the increase in positive or negative mood changes is controlled by the subject's level of identification with that team (Hirt, Zillmann, Erickson & Kennedy, 1992; Wann et al., 1994). Such unintended mood disturbances could be particularly detrimental when risk assessment and financial analysis tasks are performed (Write & Bower, 1992).

Several studies have been conducted regarding the impact of sporting results on local stock exchanges in England (Ashton et al., 2003), New Zealand (Boyle & Walter, 2003), Australia (Worthington, 2007), and India (Mishra & Smith, 2010). Despite the extensive research in developed countries, however, little is still known about the impact that sporting results may have on a developing country's stock market. The only existing study similar to this one is that of Smith and Krige (2010), which examines stock return movements in response to South African cricket, rugby, and soccer results. This paper differs from Smith and Krige's (2010) study by using a longer sample period, with the additional aim of complementing Smith and Krige's

(2010) findings. This research is also of importance to practitioners since the ability, if any, of sporting performance to affect share returns may have implications for the forecasting and trading of various stocks. The principal aim of this study is therefore to examine whether national sporting performance in South Africa has the ability to influence investor mood in such a way that it results in abnormal market returns on the Johannesburg Securities Exchange (JSE).

2. STOCK MARKETS AND SPORTING PERFORMANCE

Various studies have attempted to identify a range of non-economic anomalies and how these may affect market prices. These non-economic events had no economic effect on the stocks themselves, but were able to impact on investor mood. Research has addressed the relationship between stock market returns and various non-economic events, such as the weather (Saunders, 1993; Trombley, 1997; Zhu, 2006; Gerlach, 2007; Jacobsen & Marquering, 2008; Saporoschenko, 2011), sleep patterns (Kamstra, Kramers & Levi, 2000), seasonal affective disorder (Molin, Mellenrup, Bolwig, Scheike & Dam, 1996; Dolvin, Pyles & Wu, 2009), and mega sporting events (Berman, Brooks & Davidson, 2000; Matheson & Baade, 2004; Veraros, Kasimati & Dawson, 2004; Dick & Wang, 2010; Floros, 2010; Mirman & Sharma, 2010). If non-economic events are able to affect an individual's mood and hence influence market prices, it can be deduced that sporting performance is able to influence both investor mood and market prices.

One of the first studies to investigate sporting performance and its ability to influence market returns was Krueger and Kennedy (1990), who set out to examine the accuracy of the Super Bowl Stock Market Predictor (SB SMP) in the United States. Krueger and Kennedy (1990) maintain that if any team represented by the old 'National Football League' wins the Super Bowl, this will cause stock markets to end the year higher than where they started. On the other hand, if a team represented by the old 'American Football League' wins the Super Bowl, stock markets will end the year lower than where they started. In order to test the accuracy of the SB SMP, Krueger and Kennedy (1990) selected five major stock market indices and monitored their performance from 1967 to 1988. The authors found that the SB SMP was able to predict the end-of-year sign (positive or negative) of annual market returns with an accuracy rate of 91%. According to Krueger and Kennedy (1990), these findings are inconsistent with the EMH, since no theoretical relationship should exist between stock market movements and the Super Bowl. Therefore, if a non-economic event such as winning the Super Bowl could affect market returns, it can be argued that markets are inefficient, thus contradicting the EMH.

Using event-study analysis, Ashton et al. (2003) examined the relationship between the English national soccer team's performances and the London Stock Exchange. Ashton et al. (2003) found a statistically significant relationship between the English national soccer team's performance and changes in share prices on the London Stock Exchange. Results showed that a victory from the national soccer team was followed by higher market returns, while the latter were lower after the national soccer team lost a game.

Boyle and Walter (2003) aimed to determine whether psychological and emotional responses to success or failure of the All Black rugby team had the ability to influence investor behaviour. Boyle and Walter (2003) argued that there was no reason why sporting results should have any impact on stock market prices in a rational market, and investors and market prices should remain unaffected by these events. When investors' teams win, their confidence and outlook improves and investors become more willing to undertake risky investments, whereas a loss lowers investor confidence and reduces investment activity (Boyle & Walter, 2003). Using

monthly data from the New Zealand stock exchange from January 1950 to December 1999, Boyle and Walter (2003) were unable to establish any significant relationship between the All Blacks' performance and stock market returns. One possible explanation for this outcome was ascribed to the number of foreign investors trading on the New Zealand Stock Exchange, who may be indifferent to the All Blacks' performance. Another possible reason put forward was that investors on the New Zealand Stock Exchange and All Blacks supporters could belong to mutually exclusive groups (Boyle & Walter, 2003).

Worthington (2007) examined the exuberance of Australians during the Melbourne Cup (Australia's premier horse race) and what effect this might have on the Australian stock markets. The Melbourne Cup has been held on the first Tuesday in November since 1861, and presently it is considered by many to be the world's leading handicap horse race. Worthington's hypothesis aimed to test whether there was a positive influence on market returns during the Melbourne Cup held on the first Tuesday of every November. Worthington's (2007) results strongly supported the 'Melbourne Cup Tuesday' effect: Melbourne Cup Tuesdays were associated with greater market returns when compared to all other Tuesdays or any other day of the week.

Edmans et al. (2007) noted that a number of studies had linked changes in mood to variations in stock market prices. Not only do sporting results have the ability to influence fans' mood or self-esteem, but they have also been linked to increased heart attacks, escalating crime statistics as well as suicides following losses (Douglas, Ebrahim, Tilling, Macleod & Smith, 2002). Edmans et al. (2007) list two possible explanations for the existence of such asymmetrical biases. Firstly, studies have shown that many supporters are subject to allegiance biases (Wann, Melnick, Russell & Pease, 2001; Markman & Hirt, 2002). These individuals become psychologically invested in the team and certain desired outcomes that cause them to generate biased results and predictions in their mind. Secondly, asymmetrical results may be caused by the asymmetrical format of the competition itself: While a winning team might advance to the next round of a tournament, a losing team is eliminated from the tournament; thus the particular country will no longer be participating in the competition.

To test the ability of international soccer results and general sporting performances to influence stock market prices, Edmans et al. (2007) analysed performances from international soccer, rugby, cricket, ice hockey and basketball games. Edmans et al. (2007) found that stock markets react negatively when national soccer teams lose matches, with excess negative returns exceeding 7%. Statistically significant results of excess negative returns when teams lost were also found for international rugby, cricket and basketball games. However, these results had a much smaller loss effect when compared to international soccer matches. In addition, the authors found no corresponding stock market reactions linked to positive results in any of the sporting codes.

Using event study analysis, Benkraiem, Louhichi and Marques (2009) investigated how sporting performances of European listed soccer clubs could affect stock markets. Benkraiem et al. (2009) found that markets had a significant reaction to sporting performance and that the match venue played an important role in the outcome. The authors found that when clubs won, investors responded positively, resulting in an increase in share prices. The authors also found that investors responded negatively when their clubs drew a game or lost, causing share prices to decrease. Share prices decreased significantly (by 1.9%) when clubs lost a game, and also decreased significantly (by 0.273%) when clubs drew. Despite the ability of victories to increase share prices, these increases were insignificant, confirming the existence of an asymmetrical relationship between victories and losses. In addition, markets respond far greater to losses at

home than to losses away from home: Home defeats caused share prices to decrease by 2.3%, while away games only resulted in a decrease of 1.68%. Benkraiem et al. (2009) also report that trading volume tends to increase one day prior to matches being played and in the days following matches, which supports the hypothesis that investors consider sporting performance when revising their portfolios around match dates.

Mishra and Smyth (2010) studied the impact of the Indian national cricket team's performance on Indian stock market returns. They also included a dummy variable that analyses the Indian national cricket teams' performance when highly rated cricketer Sachin Tendulkar played in a match. Mishra and Smyth's (2010) results revealed that the Indian national cricket teams' performance had a statistically significant effect on the Indian stock market. When the Indian national cricket team won, this resulted in a small positive impact on market prices, whereas a loss resulted in a large negative impact on market prices. Mishra and Smyth (2010) also found that the magnitude of the negative impact on market prices increased when the Indian national cricket team lost a match in which Tendulkar played. This further supports the theory that fans' emotions play an important role in investment decisions.

The association between stock returns and sporting performance is, however, not always straightforward. Gerlach (2011) analysed financial literature provided by Ashton et al. (2003) and Edmans et al. (2007) documenting how mood changes induced by sporting performances, in particular soccer, were able to influence market prices. Gerlach's (2011) study argued that although previous research had shown linkages between sporting performance and variations in stock prices in their home country, similar patterns in stock returns were documented in matching countries that did not play a match on that particular date. Considering that countries whose national teams did not play experienced similar patterns in stock price movements to countries who had played, Gerlach (2011) argues that changes in investor mood following losses could not be the cause of unusual stock returns in matching countries.

Directly contradicting Gerlach's (2011) assumption was Kaplanski and Levy (2010), who argue that international soccer matches have the ability to influence the stock markets of countries whose teams are not playing. The authors believed that investors who became disappointed with their own national team's performance could decide to adjust their portfolios by changing their holdings in foreign stock markets. This would result in changes to market returns in those countries. Kaplanski and Levy's (2010) research showed that returns on the US stock markets were significantly lower during the FIFA World Cup. They believed that this could be attributed to a large cumulative effect, caused when numerous foreign investors, invested in US stock markets, suffer from disappointment caused by their national teams losing matches, thus resulting in mood changes.

When analysing Edmans et al.'s (2007) results, Gerlach (2007) did away with the assumption that market-related information for both winning and losing countries has the same impact in both countries following matches. Gerlach replaces the global index as a benchmark and instead uses matching countries as a benchmark, thus controlling for regional differences in market performances. Gerlach (2007) found that when comparing the loss effect for all World Cup games, trading days following matches had a positive mean return of 0.02% after a win, while a loss resulted in a negative mean return of 0.41%. This difference of 43 basis points was found to be statistically significant. However, matching countries' mean returns following a win were 0.02%, while mean returns after a loss were -0.35%, resulting in a difference of 37 basis points, which was also significant. With only six basis points separating a World Cup-losing country and

a matching country that played no matches, it becomes difficult to explain how the mood of one country affects its neighbours' stock markets.

In addition, Edmans et al. (2007) found that the performances of national soccer teams have a significant influence on smaller stocks when compared to large stocks. Gerlach (2011) found that when using the same World Cup teams, following a loss, large stocks decreased by 0.18%, while smaller stocks decreased by 0.41%, resulting in a spread of 23 basis points. While Gerlach's (2011) results support the findings of Edmans et al. (2007), when the same study was performed on matching countries, there was a difference spread of 32 basis points. This meant that smaller stocks performed worse in matching countries than they did in World Cup countries that lost.

Finally, Edmans et al. (2007) found statistically significant results when comparing the performance of other sporting codes and their effect on local stock markets. Gerlach (2011), however, found that when comparing the same countries to results found in matching countries, rugby, cricket, ice hockey and basketball all lead to statistically significant negative returns after suffering a loss. However, these results were found in both the country that played the match and the matching country; hence, these changes in stock market prices cannot be interpreted as a result of changes in investor mood.

In the only available study of JSE returns and sporting results, Smith and Krige (2010) analysed data from September 1995 to February 2009 with the aim of investigating whether South African soccer, cricket, and rugby match results influence share returns on the JSE. The authors found some evidence of positive mean returns following a win. However, regression analysis revealed no significant changes in share returns for any of these sports. The evidence thus suggests that, in South Africa, sporting results have very little effect on stock returns.

3. THE DATA AND METHOD

3.1 Data

The stock market data used in this study originate from the JSE. The data comprise daily All-Share Index closing prices, obtained from Thompson's Datastream for the period of 1 January 1990 to 31 December 2010. These dates were selected due to the lack of the availability of information available prior to 1992 regarding sporting matches due to South Africa's isolation from international sport pre-1992. The All-Share Index is used to examine the effects of sporting performance on the market as a whole, as opposed to singling out main sponsors registered on the JSE. The choice of daily data is informed by the fact that international sporting contests have sporadic intervals. This is supported by previous research (Ashton et al., 2003; Edmans et al., 2007; Mishra & Smyth, 2010), which suggests that daily data is more accurate within the context of analysing the effects of sporting results on stock market returns.

South Africa's sporting industry is a multi-billion rand industry, with income generated from sport representing over 2% of the country's annual GDP (South Africa Web, 2010). It has also been stated that South Africa is a sport-crazy nation, where sport in general seems to be a religion in its own right (Safirinow, 2011). A 2004 survey, moreover, identifying the most popular team sports in South Africa, found that 78% of the South African adult population expressed the most interest in soccer. This was followed by rugby with 47% and cricket with 39% (participants in the survey could vote for more than one sport) (South Africa Web, 2010). For these reasons, this study has selected the three most popular sports in South Africa, namely soccer, cricket,

and rugby, to investigate the possibility that sporting performance in these sporting codes could affect market returns on the JSE. Of all the sports played in the country, South Africa has excelled mostly at cricket and rugby, and has performed at the highest level against the world's leading opposition for many years. Soccer, however, has gained the greatest popularity among South Africans, especially among the black population (South Africa, 2011).

In general, South African supporters widely celebrate a national team victory. In contrast, when South African national teams lose, supporters are usually temperamental and upset (South Africa, 2009). When it comes to rugby, moreover, South African fans are so competitive that a victory is considered a birth right (Safrinow, 2011). Pathak (2010) wrote after being in South Africa for just four days prior to the 2010 FIFA World Cup that the South African fans were without any doubt "the most exuberant, passionate and noisy supporters I've ever come across." Thus, from the available evidence, it is clear that sporting performance emotionally influences South Africans in general. Hence, it is plausible to assume that South African sporting performance may affect investor mood.

All results for the South African soccer team were obtained from the South African Football Association (SAFA, 2011) and 249 sample matches were played between 7 July 1992 and 31 December 2010. Results for the South African rugby team were obtained from the South African Rugby Union (SARU, 2011) (thanks to Andrew Lourens, statistician at SARU, for providing the relevant data). A total of 215 matches were played between 15 August 1992 and 31 December 2010. All results for the South African cricket team's matches were obtained directly from Cricket South Africa (thanks to Andrew Samson from Cricket South Africa for making the data available). In total, 447 sample matches were played between 10 November 1991 and 31 December 2010. From these matches, 12 matches were excluded due to stoppage of play, caused by unfavourable weather conditions, leaving a sample size of 435 matches.

Cricket traditionally consisted of only one-day internationals and five-day test matches. Recently, a new form of the game was introduced, known as Twenty-Twenty. However, consistent with Mishra and Smyth (2010), the focus of this study will be on one-day international cricket matches only. Due to the length of 5-day test matches, results can be ambiguous and Twenty-Twenty cricket matches have been popular only in the last few years (2007–2011); therefore there is not sufficient data to warrant their inclusion in this study. The focus on one-day internationals only also allows results to be easily compared to previous findings (Edmans et al., 2007; Mishra & Smyth, 2010; Gerlach, 2011).

Based on the preceding discussion and review of the literature, this study assumes that all three sports (soccer, cricket and rugby) satisfy the three key characteristics required for any sport to qualify as a mood variable (Edmans et al., 2007). First, the selected sporting codes are able to influence mood in a considerable and unambiguous way. Secondly, national squads are used to increase the impact of the mood variable on a significant majority of the population. Finally, the three sporting codes selected are correlated across a significant majority of individuals trading within South Africa. TABLE 1 presents the collective data for soccer, cricket and rugby.

TABLE 1: Summary of match outcomes according to sporting code

	<i>Matches</i>	<i>Win</i>	<i>Lose</i>	<i>Draw</i>
Soccer	249	47% (n=118)	31% (n=77)	22% (n=54)
Cricket	435	64% (n=280)	34% (n=150)	12% (n=5)
Rugby	216	62% (n=134)	36% (n=80)	2% (n=4)

Source: *Authors' calculations*

3.2 Method

This study applies event study methodology and regression analysis to All-Share Index movements on the JSE following international matches played by the South African national soccer, cricket and rugby teams. Each sport is examined separately in order to isolate the results from each match played on the following day's stock returns.

McWilliams and Siegel (1997) list three important assumptions when event studies are at issue. Firstly, event studies assume that markets are efficient, and that stock prices reflect all relevant information available to the public. Secondly, event studies deal with 'unanticipated events' and that the public prior to the event had no information about the outcome of the event. Abnormal returns are then calculated on the stock market's reaction to that information. Finally, it is assumed that the effect of an event has been isolated from the effects of any other event. Therefore, if results indicate that markets react to sporting performances, it can generally be concluded that markets are inefficient. According to MacKinlay (1997), moreover, event studies are useful because of their ability to measure an event's economic impact over a short period. This makes event studies ideal for determining the impact that any given sporting code may or may not have on stock market returns. The following steps were followed (Benkraiem et al., 2009):

- Firstly, the mean return was calculated during the control period, which starts on 1 January 1990 and ends on 31 December 2010. It is, however, important to exclude sample dates following matches to avoid double counting of event information.
- Secondly, the possibility of any irregular movements on days following a particular event was examined to determine whether actual returns differ significantly from the calculated mean returns. For this purpose, this study employs a basic *F*-test.
- Finally, regression models were estimated with the aim of examining whether sporting results explain any proportion of daily variations in the All-Share index.

In the first step of the analysis, the following procedures were taken into account (McWilliams & Siegel, 1997; Seiler, 2004):

- Firstly, an event date should be defined, which is the date when market participants first learn about the new information. In this study, the event dates are certain, since the dates of all international matches are known. This increases the power of testing and increases the accuracy of the measurement and its impact on market returns.
- Secondly, an event window needs to be defined, which is the number of trading periods before and after the event. As this study deals with sporting results, there is no need to

identify an event window, since nobody can predict the outcome of any international contest before the game is over.

- Thirdly, an estimation period should be defined. The estimation period is usually defined as the period of time in which no ‘event’ occurs, which allows researchers to establish how stocks should behave when no event is present. However, when performing an event study examining sporting matches as a variable, the method used in identifying the estimation period varies slightly. This study has identified an estimation period starting on 1 January 1990 and ending on 31 December 2010. International matches occur sporadically during this period, so trading days directly after any match are then excluded from the estimation period to prevent ‘double counting’. This leaves an estimation period in which no ‘event’ has occurred, allowing for the mean to be determined without any interference from sporting matches. Note that these specific trading days are excluded only when determining the significance of abnormal returns over mean returns, with the full estimation period included in the regression analysis.
- Fourthly, the sample of stocks should be selected and necessary selection criteria determined. According to MacKinlay (1997), the selection criteria may involve certain restrictions that are imposed by data availability of the stocks required or the exchange on which it is traded. This study aims to examine whether South African national sporting performance has the ability to influence the market as a whole, and has selected the JSE daily All-Share index. This prevents the problem of data mining or any result biases that may occur when selecting stocks associated with the given sport.
- Finally, with all the above measures in place, the normal returns are calculated. There are various possible methods for calculating normal returns, but the method used in this study is the mean return method, which implicitly assumes that the mean return of stocks during the event is the same as the mean return during the estimation period. MacKinlay (1997) explains that the mean return method assumes that any given security remains constant through time. The mean returns are thus calculated as:

$$R_{it} = \mu_i + v_{it} \qquad E(v_{it}) = 0, \text{var}(v_{it}) = \sigma_v^2 \qquad (1)$$

where R_{it} is the return of security i at time t and v_{it} is the disturbance term. Therefore, the abnormal returns are calculated as the difference between the actual return and the expected return. Although this approach is considered extremely simple to use, many researchers (McWilliams & Siegel, 1997; MacKinlay, 1997; Ashton et al., 2003; Boyle & Walter, 2003; Seiler, 2004; Edmans et al., 2007; Worthington, 2007; Mishra & Smyth, 2010) have found the mean return method to be accurate in determining normal returns.

After calculating the mean return, the second step is to calculate the significance of abnormal returns. This is done using a standard F -test. The final step is to employ a regression analysis. Mishra and Smyth (2010) describe the regression model as being a useful analytical tool in separating the effects of different events on the stock exchange. Based on the work conducted by MacKinlay (1997) on event studies, this study employs basic Ordinary Least Squares (OLS). The regression model is specified as:

$$R_t = \alpha + \sum_k \beta_{ik} D_i + \varepsilon_t \qquad (2)$$

where R_t is the return on day t , D_i is a vector of dummy variables, and ε_t is the error term. Equation (2) is estimated for each sport separately. In the case of soccer, the dummy is equal to

1 if the team won, and zero otherwise, while another dummy is included equalling 1 if the team lost, and zero otherwise. Hence, drawn matches are used as the comparison group. For both cricket and rugby, the dummy variable included equals 1 if the team won, and zero otherwise. All models are estimated with heteroscedasticity-robust standard errors.

4. RESULTS

The constant mean return for soccer was calculated as 0.000128, while for cricket it was 0.000152. The constant mean return for rugby is 0.000144. Abnormal returns on trading days following matches are significantly different from the constant mean returns for soccer ($F(1, 15338) = 183.81, p < .001$), cricket ($F(1, 15338) = 76.94, p < .001$) and rugby ($F(1, 15338) = 197.62, p < .001$). For all three sporting codes, therefore, the descriptive results suggest that sporting performance could exhibit a significant influence on stock market returns.

Prior to the regression estimations, stationarity of the stock return index was tested using the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), Dickey-Fuller GLS (DF-GLS), and KPSS unit root tests, with the results reported in TABLE 2. All test results strongly indicate that the daily stock return series is $I(0)$, thereby validating the use of the standard return series as the dependent variable in the OLS regressions.

TABLE 2: Unit root tests for stock return series

	<i>Level</i>	<i>Order</i>
<i>ADF</i>	-87.2018***	$I(0)$
<i>PP</i>	-87.3156***	$I(0)$
<i>DF-GLS</i>	-12.5643***	$I(0)$
<i>KPSS</i>	0.4275	$I(0)$

Source: Authors' calculations

Note:

Null hypothesis for the ADF, PP, and DF-GLS tests is that the returns series contains a unit root, while the alternative hypothesis holds that the series is stationary.

For the KPSS test, the null hypothesis is that of stationarity, while the alternative hypothesis implies non-stationarity.

All tests were conducted by including an intercept but no trend. $p < .001$ ***.

When compared to the descriptive results, the findings from the regression analysis suggest completely opposite conclusions (TABLE 3). The coefficients for all win and loss dummy variables are statistically insignificant for soccer, cricket and rugby at all levels of significance. Moreover, for soccer the difference between the win and lose dummies is not significant ($F = 0.147, p = 0.7013$). The R -squared statistics are also very low, suggesting that sporting performance, as a variable, does not explain price movements in market returns. In addition, the F -statistics show that, in all regressions, the explanatory variables are not jointly significant in explaining variations in stock market returns. Overall, there is no evidence from the regression analysis that sporting performance affects market returns.

TABLE 3: OLS regression results

	<i>Soccer</i>	<i>Cricket</i>		<i>Rugby</i>	
Constant	0.0104** [0.0049]	0.0093* [0.0049]	0.0103** [0.0049]	0.0109** [0.0049]	0.0095* [0.0049]
Win	-0.0060 [0.0588]	0.0422 [0.0336]			0.0454 [0.0470]
Lose	0.0224 [0.0452]		0.0135 [0.0371]	-0.0567 [0.0506]	
Adjusted R ²	0.0003	0.0003	0.0001	0.0001	0.0002
F-statistic	0.1155	2.2069	0.1309	1.3835	1.4642
Durbin-Watson	1.9925	1.9967	1.9961	1.9940	1.9933
LM (<i>p</i> -value)	0.8678	0.9030	0.9052	0.8761	0.8724

Source: Authors' calculations

Note: Robust standard errors are shown in brackets. Omitted category for soccer is "draw". $p < .05^{**}$, $p < .10^*$.

The results for cricket and rugby suggest that markets have a small but positive response following a victory, while only rugby causes markets to have a small but negative response following a loss. Despite the ability of victories and losses to increase or decrease, respectively, share prices, these increases and decreases are insignificant. For rugby, however, these results point to the possible existence of an asymmetrical relationship between victories and losses, supporting previous literature (Edmans et al., 2007; Benkraiem et al., 2009; Mishra & Smyth, 2010) on sporting performance and market returns. The regression results for soccer indicate that soccer performances have no influence on market returns and are statistically insignificant, which supports the earlier findings by Smith and Krige (2010). It is surprising, nevertheless, that stock returns seem to decline following a win as opposed to a draw, while the opposite is true when a soccer match is lost. Overall, these results are relatively surprising in light of psychological research reporting that economically neutral, but psychologically important events such as the New York weather and changes in sleep patterns could influence market returns (Saunders, 1993; Kamstra et al., 2000). Such research is less personal and probably has less influence on individuals when compared to the strong emotional impact that sporting performance has on individuals and the mood implications thereof, especially in a country such as South Africa, where sport is an important part of many citizens' lives.

Some of the possible reasons why sporting performance has no impact on South African market returns could be due to the frequency of the data employed. The large amount of daily data together with the limited amount of sporting results could have influenced the overall results. The reason for the limited number of sporting results partly has to do with South Africa's international sporting ban that was only revoked in 1992, limiting the timeline to 18 years of international competition. The frequency of the data may also imply substantial noise in the data, thereby failing to pick up the cumulative effect of sporting success or failure. Individuals' responses to the results may be too small to overcome the possible data noise, which in turn will limit the ability of sporting performance to explain variations in market returns.

Perhaps the insignificant results could be due to poor results classification, because of supporters' allegiance biases (Edmans et al., 2007). Boyle and Walter (2003) argue that if supporters expect their team to win, there may be very little or no mood improvements if their team ends up winning the game. In such an instance, a result classified as 'positive' is more accurately classified as neutral, resulting in a downward bias for positive returns. Again, if supporters are pessimistic and their team loses a game, this could result in little or no change in their mood. In this case, a result classified as negative would be more accurately classified as neutral, causing an upward bias in negative returns. It would be difficult to test such an assumption because of the impossibility of measuring any given fan's expected results for a particular match with the available data. However, given South Africa's perceived status in international sport, especially for cricket and rugby, the possibility of these biases cannot be excluded.

Other possible reasons for the insignificant regression results could be that the personalisation of sporting results has an offsetting effect on investor behaviour. According to Boyle and Walter (2003), supporters basking in reflected glory and wallowing in reflected failure after sporting performances could result in investors being more aware of the source of their emotion. South African investors could be more aware of their emotional state, providing them with the ability to resist such irrational impulses. It may also be the case that in South Africa, supporters and investors belong to mutually exclusive groups (Boyle & Walter, 2003). This is a plausible explanation at least for soccer. A study by Trevor Chandler and Associates (2011), for instance, found that the total percentage of black South African economic interest on the JSE is approximately 17%. With the majority of soccer supporters being black South Africans, this could possibly explain soccer's inability to affect market prices. This, however, is not a plausible assumption for cricket or rugby, which remain predominantly 'white'-supported (Safrinow, 2011). The remaining market share on the JSE available for South Africans after foreign investors and shares held by the treasury have been deducted is 54% (Trevor Chandler & Associates, 2007), and it is possible that this proportion may actually be somewhat lower. In this sense, it is perhaps not that surprising that share returns do not react to sporting results, given the large share of foreign investors and investment companies acting as investors (Smith & Krige, 2010). For any significant share movements to occur in response to sporting results, South African investors would need to change their investment behaviour substantially. Finally, it is possible that factors such as fluctuating currencies and political instability in South African markets overshadow sporting performances in the eyes of investors, thereby making sporting performance a small predictor of the movement of stock market returns.

5. CONCLUSION

The aim of this study was to determine whether national sporting performance in South Africa has the ability to influence investor mood to such an extent that it causes abnormal market returns on the JSE. The descriptive analysis indicated statistically significant differences between abnormal returns and constant returns for all three sporting codes, suggesting the possibility that sporting performance could influence stock returns. In contrast to the descriptive findings and to existing literature (Ashton et al., 2003; Edmans et al., 2007), however, the regression analysis indicated no significant relationships between sporting performance of either sporting code and stock return movements. These results are supported by those of Boyle and Walter (2003), for example, and the South African research of Smith and Krige (2010). While rugby was the only sport to show some evidence of an asymmetrical

relationship between positive and negative results and the only sport to cause market returns to increase after a win and decrease after a loss, the coefficients were not statistically significant.

From these results, it can be deduced that while abnormal market returns on trading days following sporting fixtures are statistically significant from the constant mean returns of all other days, sporting performance has very little to do with this outcome. This argument is further supported by the fact that sporting performance explains a very small proportion of market returns. Possible reasons for the inability of sporting performances to affect market returns in South Africa could be that the amount of noise in the data drowns out the cumulative effect of sporting success or failure due to the limited number of matches for each sport since 1992. Perhaps South African fans are more aware of the source of their emotions and better equipped to control irrational impulses.

Some limitations of this paper should be noted. This paper does not control for the possibility of a “Monday effect”, although there is not strong evidence in support of this anomaly in South Africa (Mbululu & Chipeta, 2012). This paper also does not account for any Securities Exchange News Service (SENS) announcements. As such, it is possible that these events are important predictors of stock return movements as opposed to sporting results only. In addition, since the JSE might take several days to react to news rather than immediately following such news (Morris, van Vuuren & Styger, 2009), the market may well have reacted to sporting events at a date after the possibility of such an effect was measured in this paper. The likelihood that the effect of sporting results on share returns may as a result be missed cannot be excluded entirely.

Future research could use alternative models for measuring normal performance instead of using the constant mean return. The ‘Market Model’ relates the returns of any given security to the return of the market portfolio, and represents a potential improvement on the constant mean return model. Further research could also consider alternative regressions techniques such as Generalised Method of Moments (GMM) instead of OLS, since the former is generally more suited for autocorrelated and heteroscedastic market data, provided the availability of appropriate instruments. Finally, another aspect for future research is refining and controlling for noise in the data. This would allow small cumulative changes in markets returns due to sporting performance to be more pronounced, thereby allowing regression-based analyses to determine stronger associations, if any, between market returns and sporting performance in South Africa.

Acknowledgement

The authors thank the editor and two anonymous referees for comments and suggestions that improved the paper.

LIST OF REFERENCES

- Alloy, L., Abramson, L. & Viscusi, D. (1981). Induced mood and the illusion of control. *Journal of Personality and Social Psychology*, 41(6), pp. 1129-1140.
- Arkes, H., Herren, L. & Isen, A. (1988). The role of potential loss in the influence of affect on risk-taking behaviour. *Organizational Behaviour and Human Decision Processes*, 42, pp. 181-193.
- Ashton, J.K., Gerrard, B. & Hudson, R. (2003). Economic impact of international sporting success: Evidence from the London stock exchange. *Applied Economics Letters*, 10, pp. 783-785.

- Benkraiem, R., Louhichi, W. & Marques, P. (2009). Market reaction to sporting results: The case of European listed football clubs. *Management Decision*, 47(1), pp. 100-109.
- Berman, G., Brooks, R. & Davidson, S. (2000). The Sydney Olympic Games announcement and Australian stock market reaction. *Applied Economics Letters*, 7, pp. 781-784.
- Boyle, G. & Walter, B. (2003). Reflected glory and failure: International sporting success and the stock market. *Applied Financial Economics*, 13, pp. 225-235.
- Cialdini, R., Borden, R., Thorne, A., Walker, M., Freeman, S. & Sloan, L. (1976). Basking in reflected glory: Three (football) field studies. *Journal of Personality and Social Psychology*, 34(3), pp. 366-375.
- Crocker, J., Alloy, L. & Kayne, N. (1988). Attributional style, depression, and perceptions of consensus for events. *Journal of Personality and Social Psychology*, 54(5), pp. 840-846.
- Dick, C.D. & Wang, Q. (2010). The economic impact of the Olympic Games: Evidence from stock markets. *Applied Economics Letters*, 17, pp. 861-864.
- Dickhaut, J., McCabe, K., Nagode, J., Rustichini, A., Smith, K. & Pardo, J. (2003). The impact of the certainty context on the process of choice. *Proceedings of the National Academy of Sciences*, 100(6), pp. 3536-3541.
- Dolvin, S.D., Pyles, M.K. & Wu, Q. (2009). Analysts get SAD too: The effect of seasonal affective disorder on stock analysts' earnings estimates. *Journal of Behavioural Finance*, 10, pp. 214-225.
- Douglas, C., Ebrahim, S., Tilling, K., Macleod, J. & Smith, G.D. (2002). Admissions for myocardial infarction and World Cup football: Database survey. *British Medical Journal*, 325, pp. 1439-1442.
- Edmans, A., Garcia, D. & Norli, O. (2007). Sports sentiment and stock returns. *Journal of Finance*, 62, pp. 1967-1998.
- Fama, E. (1998). Efficient capital markets. *Journal of Finance*, 46, pp. 1575-1617.
- Floros, C. (2010). The impact of the Athens Olympic Games on the Athens stock exchange. *Journal of Economic Studies*, 37(6), pp. 647-657.
- Gerlach, J. (2007). Macroeconomic news and stock market calendar and weather anomalies. *Journal of Financial Research*, 30, pp. 283-300.
- Gerlach, J. (2011). International sports and investor sentiment: Do national team matches really affect stock market returns? *Applied Financial Economics*, 21, pp. 863-880.
- Hirt, E., Zillmann, D., Erickson, G. & Kennedy, C. (1992). Costs and benefits of allegiance: Changes in fans' self-ascribed competencies after team victory versus defeat. *Journal of Personality and Social Psychology*, 63(5), pp. 724-738.
- Isen, A., Shalke, T., Clark, M. & Karp, L. (1978). Affect, accessibility of material in memory, and behaviour: A cognitive loop? *Journal of Personality and Social Psychology*, 36(1), pp. 1-12.
- Isen, A. & Patrick, R. (1983). The effect of positive feelings on risk taking: When the chips are down. *Organizational Behaviour and Human Performance*, 31, pp. 194-202.
- Jacobsen, B. & Marquering, W. (2008). Is it the weather? *Journal of Banking and Finance*, 32, pp. 526-540.
- Johnson, E. & Tversky, A. (1983). Affect, generalization, and the perception of risk. *Journal of Personality and Social Psychology*, 45(1), pp. 20-31.

- Kamstra, M., Kramers, L. & Levi, M. (2000). Losing sleep at the market: The daylight saving anomaly. *American Economic Review*, 90, pp. 1005-1011.
- Kaplanski, G. & Levy, H. (2010). Exploitable predictable irrationality: The FIFA World Cup effect on the US stock market. *Journal of Financial and Quantitative Analysis*, 45, pp. 535-553.
- Krueger, T. & Kennedy, W. (1990). An examination of the Super Bowl stock market predictor. *Journal of Finance*, 45(2), pp. 691-697.
- MacKinlay, C. (1997). Event studies in economics and finance. *Journal of Economic Literature*, 35(1), pp. 13-39.
- Markman, K. & Hirt, E. (2002). Social prediction and the "allegiance bias". *Social Cognition*, 20, pp. 58-86.
- Matheson, V.A. & Baade, R.A. (2004). Mega sporting events in developing nations: Playing the way to prosperity? *South African Journal of Economics*, 72(5), pp. 1085-1096.
- Mbululu, D. & Chipeta, C. (2012). Day-of-the-week effect: Evidence from the nine economic sectors of the JSE. *Investment Analysts Journal*, 75, pp. 55-65.
- McWilliams, A. & Siegel, D. (1997). Event studies in management research: Theoretical and empirical issues. *Academy of Management Journal*, 40(3), pp. 626-657.
- Mirman, M. & Sharma, R. (2010). Stock market reaction to Olympic Games announcement. *Applied Economics Letters*, 17, pp. 463-466.
- Mischel, W., Ebbesen, E. & Zeiss, A. (1976). Determinants of selective memory about the self. *Journal of Consulting and Clinical Psychology*, 44(1), pp. 92-103.
- Mishra, V. & Smyth, R. (2010). An examination of the impact of India's performance in one-day cricket internationals on the stock market. *Pacific-Basin Finance Journal*, 18, pp. 319-334.
- Molin, J., Mellenrup, E., Bolwig, T., Scheike, T. & Dam, H. (1996). The influence of climate on development of winter depression. *Journal of Affective Disorders*, 37, pp. 151-155.
- Morris, Q., van Vuuren, G. & Styger, P. (2009). Further evidence of long memory in the South African stock market. *South African Journal of Economics*, 77(1), pp. 81-101.
- Pathak, R. (2010). *South Africa fans show us how it's done*. [Online] Available: <http://blogs.aljazeera.net/africa/2010/06/07/south-africa-fans-show-us-how-its-done>. (Accessed 11 December 2011).
- Ritter, J. (2002). *Behavioural finance*. University of Florida, Mimeo.
- South Africa. (2009). *Sport in South Africa*. [Online] Available: <http://www.southafrica.info/about/sport/sportsa.htm>. (Accessed 17 November 2011).
- South African Rugby Union (SARU). (2011). [Online] Available: <http://www.gadgets.com/sarfu/text/archives/internat.htm>. (Accessed 16 August 2011).
- Safrinow. (2011). *Sport in South Africa: A Passion for Sports*. [Online] Available: <http://www.safrinow.com/cms/sport-in-south-africa/irie.aspx>. (Accessed 11 December 2011).
- South Africa Web. (2010). *Sport and Recreation in South Africa*. [Online] Available: <http://www.southafricaweb.co.za/page/sport-and-recreation-south-africa>. (Accessed 11 December 2011).

- Saunders, E. (1993). Stock prices and Wall Street weather. *American Economic Review*, 83, pp. 1337-1345.
- Saporoschenko, A. (2011). The effect of Santa Ana wind conditions and cloudiness on Southern California stock returns. *Applied Financial Economics*, 21, pp. 649-683.
- Seiler, M. (2004). *Performing financial studies: A methodological cookbook*. New Jersey: Pearson Education.
- Schwarz, N., Strack, F., Kommer, D. & Wagner, D. (1987). Soccer, rooms, and the quality of life: Mood effects on judgements of satisfaction with life in general and with specific domains. *European Journal of Social Psychology*, 17, pp. 69-79.
- Schweitzer, K., Zillman, D., Weaver, J.B. & Luttrell, E.S. (1992). Perception of threatening events in the emotional aftermath of a televised college football game. *Journal of Broadcasting and Electrical Media*, 36, pp. 75-81.
- Shiller, R. (2003). From efficient markets theory to behavioural finance. *Journal of Economic Perspectives*, 17(1), pp. 82-104.
- Smith, B.K. & Krige, J.D. (2010). Evaluating the economic impact of national sporting performance: Evidence from the Johannesburg Stock Exchange. *South African Journal of Business Management*, 41(3), pp. 1-11.
- South African Football Association (SAFA). (2011). *SAFA official website*. [Online] Available: <http://www.safa.net/index.php?page=bafana>. (Accessed 16 August 2011).
- Statman, M. (1999). Behavioural finance: Past battles and future engagements. *Financial Analysis Journal*, 55, pp. 18-27.
- Taylor, S. (1991). Asymmetrical effects of positive and negative events: The mobilization-minimization hypothesis. *Psychological Bulletin*, 110(1), pp. 67-85.
- Trevor Chandler & Associates. (2011). *JSE Black Ownership Analysis Presentation*. [Online] Available: http://www.jse.co.za/about-us/media/press-releases/full-story/11-10-05/jse_releases_second_study_on_black_ownership. (Accessed 23 August 2011).
- Trombley, M. (1997). Stock prices and Wall Street weather: Additional evidence. *Quarterly Journal of Business and Economics*, 36, pp. 11-21.
- Veraros, N., Kasimati, E. & Dawson, P. (2004). The 2004 Olympic Games announcement and its effect on the Athens and Milan stock exchanges. *Applied Economics Letters*, 11, pp. 749-753.
- Wann, D., Dolan, T., McGeorge, K. & Allison, J. (1994). Relationships between spectator identification and spectators' perceptions of influence, spectators' emotions, and competition outcome. *Journal of Sport and Exercise Psychology*, 16, pp. 347-364.
- Wann, D., Melnick, M., Russell, G. & Pease, D. (2001). *Sports fans: The psychology and social impact of spectators*. London: Routledge.
- Worthington, A. (2007). National exuberance: A note on the Melbourne Cup effect in Australian stock returns. *Economic Papers*, 26(2), pp. 170-179.
- Write, W. & Bower, G. (1992). Mood effects on subjective probability assessment. *Organizational Behaviour and Human Decision Processes*, 52, pp. 276-291.