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Scoring on the Stock Exchange?

The Effect of Football Matches on Stock Market Returns: An Event Study

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Abstract:

We analyse the effect of results of football matches on the stock market performance of football teams. We analyse 1274 matches of eight teams in the national and European competition during 2000-2004. We find that the stock market response is significant and positive for victories and negative for defeats. The response is significantly stronger in the case of defeat. The response is stronger for matches in the European competition than for those in the national competition. Unexpected results have a stronger impact for European matches than expected ones but this is not the case in the national competition.

Scoring on the Stock Exchange?

The Effect of Football Matches on Stock Market Returns: An Event Study

Introduction

Money is key in football¹. For example, AC Milan, the winner of the 2006/2007 UEFA Champions League received € 40 million and all participants together got € 580 million in prize money alone.² But the role of money in this game is nothing new. The English Football League, with professional players, dates back already to 1888 and since then the role of money seems not to have decreased (Dobson and Goddard, 1998). The main income of the football industry results from merchandising, sponsoring, media contracts and receipts from matches (for an overview of football teams' finances, see the yearly reviews by Deloitte and Touche). Competition is enormous and that is one of the reasons why clubs have turned to the stock exchange (Mitchell and Stewart, 2007). The emission of shares gives them money that can be used to improve their financial position (Cooper and McHattie, 1997). Tottenham Hotspurs was in 1983 the first football club with a listing on the stock exchange. Since then, many clubs have followed. Good results during the matches may translate in financial rewards as success attracts media attention and the scope for sponsoring, etc. (Dobson and Goddard, 2001).

In efficient markets, market participants respond to new information or news that in some way or another might regard the firms they invest in. The investors response can have an impact on the valuation of the firm. Given the enormous and growing amounts of money that are involved in football, it seems a legitimate question to ask whether losing or winning a football match impacts on the market valuation of the football club. The stock market participants can interpret the result as information and integrate it in their revaluation of the firm. A market reaction can be induced by the expected imminent cash flow associated with new information. So far, little research has been done into the

¹ With football, we mean the game by which two teams of 11 players try to kick a round ball in the goal of the other team. In the USA, this game is called soccer.

² Source: UEFA direct 7.07 (www.uefa.com).

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3 association between sports results and financial performance. Stadtmann (2003) analyses
4 97 games of Borussia Dortmund, a German football club, during 2000-2002. He finds
5 that unexpected results on national and international games impact on the club's share
6 returns. There is no difference between the results on national or European games.
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8 Renneboog and Vanbrabant (2000) analyse 17 British teams during 1995-1998. They find
9 that a win results in a positive reaction on the stock market, whereas a loss or a draw has
10 a negative impact. The impact of losses is larger than that of wins. They do not detect
11 different responses to national or European games. Palomino et al. (2005) analyse 16
12 British teams for the period 1999-2002 and find statistically significant abnormal returns.
13 Zuber et al. (2005) consider the game-related performance of ten listed football teams in
14 the English Premier League and focus on fan behaviour. They find that there is no
15 abnormal return from (unexpected) results.
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27 We analyse the stock market reaction to the results in football matches of
28 international football teams with a finance model.³ We report results of 1247 matches of
29 eight international football teams in the period 2000-2004. New is that we analyse both
30 European and national matches for a group of international teams and conduct several
31 robustness tests with respect to our results. Also, our period of analysis is much more
32 recent than those of existing studies. Our research is complementary to Zuber et al.
33 (2005), as we investigate the actively traded football shares and, thus, concentrate on
34 investor behaviour rather than on fan behaviour. Furthermore, we restrict ourselves to
35 analysing the direct response of the football share and do not go into detail about the
36 response to (changes in) betting quotes (see Forrest et al., 2005; Palomino et al., 2005).
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46 **Method and Data**

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49 We use the event study methodology to analyse the effect of the results in the
50 football matches on the stock market return of the listed football team. This methodology
51 can be used to analyse the price reaction of a share from a specific event. Brown and
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56 ³ Alternative approaches to assess performance are the econometric model (for example, see
57 Koning, 2003) and data envelopment analysis (see Barros and Leach, 2006).
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Warner (1980, 1985) and Campbell et al. (1997) give a thorough overview of this methodology (see also Mills et al., 1996, and Mishra et al., 2007). The event in our case is the result of the football match. The outcome is either win, loss or draw. The normal return of the share R_{jt} is calculated as:

$$R_{jt} = \log[(P_{jt} + D_{jt}) / P_{jt-1}] \quad (1)$$

Where $P_{j,t}$ is the price of firm j at the end of period t ;
 $D_{j,t}$ is the dividend given to the shareholder during period t ;
 $P_{j,t-1}$ is the price of firm j at the end of period $t-1$.

To arrive at the abnormal return, we first must establish expected or normal returns. This is the return that is to be expected when the event would not have occurred. The difference between the actual and the normal return is the abnormal return. The estimation period is the period that precedes the event period, i.e. the period at or during which the event does occur. The estimation period is used to estimate the model's parameters. It must not overlap with the event period as this would imply that it includes returns that are affected by the event. As the football matches are our events and as the events occur on a very frequent basis, it is rather difficult to choose an estimation period that does not include events that may impact on the returns. We follow the approach suggested by Brown and Warner (1980, 1985) and Campbell et al. (1997) and use an estimation period of 250 trading days. This estimation period is used for each match.

We use the market model to arrive at normal returns (see Brown and Warner (1980, 1985), Beaver (1981), Dyckman et al. (1984)). This model is defined as:

$$R_{jt} = \hat{\alpha}_j - \hat{\beta}_j R_{mt} \quad (2)$$

Where R_{mt} is the return of the market index at day t . $\hat{\alpha}_j$ and $\hat{\beta}_j$ are estimated on the basis of the ordinary least squares of the returns during the estimation period. $\hat{\beta}_j$ is an

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3 indicator of risk of the share in relation to the stock market. As such, the market model
4 accounts for market and firm specific conditions in relation to the share. The market
5 model defines the following abnormal return (AR_{jt}):
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$$AR_{jt} = R_{jt} - \hat{\alpha}_j - \hat{\beta}_j R_{mt} \quad (3)$$

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15 The football matches are our events. Given that there are a large number of
16 matches, it is not possible to arrive at an estimation period that does not include event-
17 related returns of the football teams. Renneboog and Van Brabant (2000) nor the other
18 studies mentioned above do account for this problem and follow the approach suggested
19 by Brown and Warner (1980, 1985). Brown and Hartzell (2001) deviate from the
20 standard approach and use all return data to arrive at their estimation of the normal
21 return. We follow Brown and Warner and apply the Brown and Hartzell (2001) approach
22 of using the whole sample period as the estimation period as a robustness check.
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31 We use an event period of 1 single day, namely the first trading day after the
32 match took place. This is defined as 'day 0'. We assess the impact of the event (the result
33 of the football match) for this event period only. We take this extremely short event
34 period in order to avoid that event periods overlap, which could result in
35 misinterpretations of the outcome of the analysis. Short event periods - like ours of one
36 single day - are not uncommon. Dyckman et al. (1984) as well as Glascock et al. (1991)
37 advise to look for such a short period in order to be able to focus on the direct and
38 uncontaminated results of an event.
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47 As to our data, we depart from the 42 teams in Appendix 1 and apply the
48 following selection criteria:
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- 50 - The team must have played in the European competition between August 1st,
51 2000 and December 31st, 2004.
- 52 - The matches must have a betting quotation.
- 53 - The country where the teams play their matches has a reinvestment index that
54 reflects the development of the stock market return of the domestic market.
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3 - The football shares are not subject to so-called zero-return dates. This implies that
4 the share is not traded. No-trades will affect the results of our analysis.⁴ Zero
5 returns reflect market illiquidity, which is an important market inefficiency
6 (Junker and May, 2005). Alternatively, under the semi-efficient market
7 hypothesis, no price change means that no new information arrived at the market.
8 But we specifically investigate the impact of results from matches, i.e. news
9 about the teams.
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12 Given these criteria, we have eight teams from five countries: Ajax Amsterdam from the
13 Netherlands, Borussia Dortmund from Germany, Lazio Roma, AS Roma and Juventus
14 Turin from Italy, Manchester United from England and Porto and Sporting Lissabon
15 from Portugal. For these teams, we have results for 1274 matches. This regards 235
16 European and 1039 national matches.⁵ The eight teams won 721 matches, lost 256 and
17 297 times there was a draw. Stock market returns are derived from DataStream. This
18 database gives information about share prices from 1973 onwards. We use broad indices
19 and not sector indices as the benchmark in line with the suggestion by Brown and
20 Warner (1985). We use the following indices as a benchmark for the market: for England
21 the FTSE All-Share index, for Germany the Dow Jones Germany Index, for Italy the
22 Dow Jones Italy Index, for the Netherlands the Amsterdam All-Share index and for
23 Portugal the Dow Jones Portugal Index. All indices are value weighted indices; they
24 weight of the returns of a firm within the index is determined by the market value of the
25 index (see Krueger and Johnson, 1991). We require a stock market index for every
26 country that has firms in our sample. This index is a reinvestment index, taking account
27 of dividends and stock splits. MacKinlay (1997) shows that the event study methodology
28 is robust to cross-sectional dependence and clustering. It is suitable for tackling the
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49 ⁴ Zuber et al. (2005) exactly go into this issue as they are particularly interested in the investor
50 characteristics of the football fans. Therefore, they do include the zero-return dates.

51 ⁵ The design of the European competition differs significantly from that of the national
52 competition. Football teams play only two or a few matches before it is clear whether or not they
53 may proceed to the next round, whereas in the national competition the number of matches is
54 much larger before it is clear who ends as the champion and who is allowed to join the European
55 competition. Furthermore, in the European competition, the teams may earn a bonus from each
56 won match. In this paper we strictly focus on investor behaviour with respect to football stocks in
57 relation to match results.
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3 impact of the result of one team on the abnormal returns of other teams (see Campbell
4 and Wasley, 1993).
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9 We use information from bookmakers to arrive at the expectation about the result
10 (see Forrest et al., 2005; Palomino et al., 2005). As such, we do not account for the 'home
11 ground advantage' (Vergin and Sosik, 1999), but assume that this effect is incorporated
12 in betting quotes. Falter and Pérignon (2000) argue that the main 'football variables' have
13 only a tenuous explanatory power concerning the final outcome of a given match. Match
14 results are derived from <http://www.soccerbase.com>. Betting quotes for national games
15 are derived from <http://football-data.co.uk> and for European ones from TotoSelect B.V.,
16 the Netherlands.
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24 As to robustness, we will look into the impact of excluding outliers, we account
25 for nonnormality and we undertake an alternative approach to determine normal returns.
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29 30 **Results**

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33 Table 1 gives the average abnormal returns on the first trading day after the
34 football match. It reveals that a victory results in a mildly positive but very significant
35 response on the stock market (+0.36%). This suggests that the market value of listed
36 football teams increases by 0.36% after a victory. Defeat is punished (-1.41%), whereas a
37 draw also results in a significantly negative response (-1.10%). When we compare the
38 average abnormal return after a victory and that of a defeat, we find that the difference is
39 statistically significant at the 1%-confidence level.
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48 [Insert Table 1 about here]
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51 Table 2 gives the abnormal returns on the first trading day after a match in the
52 national leagues and relate these returns to whether or not the result was as expected. It
53 reveals that unexpected wins result in slightly smaller positive abnormal returns than
54 expected wins (namely +0.23 and +0.39% respectively). The difference is not
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3 statistically significant though. Apparently the stock market did not fully account for the
4 information revealed by the betting quotes. This is in line with the findings of Palomino
5 et al. (2005). Surprisingly too is that unexpected losses result in a negative return that is
6 smaller (in absolute terms) than the abnormal returns that accompany expected losses.
7 Again, we find that the stock market responds stronger to defeats in the national
8 competition than to victories (-1.14 versus +0.38%). The asymmetry is statistically
9 significant at the 1%-level. If there is a draw when victory was expected, we find a
10 significantly negative abnormal return. If there is a draw when defeat was expected, the
11 abnormal return is not significant.
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21 [Insert Table 2 about here]
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25 Table 3 gives the abnormal returns for matches in the European competition. It
26 reveals that an expected victory has no significant impact whereas an unexpected victory
27 has. Expected defeats in European football matches earn a significantly negative
28 abnormal return, suggesting that the stock market does not account for all available
29 information (see also Palomino et al., 2005). Unexpected defeats result in a significantly
30 stronger negative reaction from the stock market. The difference between an unexpected
31 victory in the national and an unexpected one in the European competition is not
32 significant. However, we find that the difference between victories and defeats is
33 significant at the 5%-level. We do not find a stronger response to expected than to
34 unexpected results. As in the national leagues, we find that (un)expected defeats result in
35 a stronger reaction than (un)expected victories. The stock market's reaction after a defeat
36 in European matches is larger than that in national ones (-2.14% versus -1.14% for losses
37 in national leagues). This may be related to the design of the European competition (see
38 footnote 3). Table 3 also reveals that a draw where a victory was expected results in a
39 significantly negative abnormal return. In contrast, when there is a draw when defeat was
40 expected, this does not result in a significant abnormal return. Apart from a purely
41 financial explanation we also may hold psychological factors responsible for our results:
42 There is both theoretical background and empirical evidence that people respond
43 emotionally stronger after defeats than after victories (Kahneman and Tversky, 1979;
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3 White, 1989; Trovato, 1998; Reilly and Gilbourne, 2003; Pain and Harwood, 2004). As
4 this is not the particular subject of this study, we will not go further into this issue.
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8 **Robustness**

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12 As to the robustness of our findings, we look into the impact of excluding outliers,
13 we account for nonnormality and we undertake an alternative approach to determine
14 normal returns.
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17 We find that the results are robust to outliers (robustness results are available
18 upon request). Only in the case of games unexpectedly won at the national level and a
19 draw in the national competition when defeat was expected do outliers impact on the
20 conclusion.
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24 The Student t-test and the Corrado rank test result in the same conclusions with
25 respect to the statistical significance of our findings. Only for one type of matches they
26 give different results: The average abnormal return after an unexpected victory is
27 significant according to the Corrado test, not to the Student test. But when we exclude
28 outliers they both point at significant abnormal returns. We are inclined to base our
29 conclusions on the Corrado test as, with a limited number of observations, abnormal
30 returns will depart more from the normal distribution than in the case of many
31 observations (Brown and Warner, 1985).
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39 We also use an alternative estimation procedure to arrive at the expected returns,
40 namely the one suggested by Brown and Hartzell (2001). They take the full observation
41 period to arrive at the normal returns. The results for the Brown and Hartzell approach
42 are not reported here for brevity sake but are available upon request. We find that the
43 Brown-Hartzell approach gives results that are fully in line with those reported in the text
44 above. Therefore, we conclude that our findings are robust to the estimation procedure.
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50 **Conclusion**

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55 Money is key in football. Losing or winning a match impacts on the expected
56 cash flows of the team and may affect its market value. In order to find out how investors
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3 respond to the results of football matches, we investigated whether results from 1247
4 national and European football matches lead to abnormal returns of the shares of eight
5 listed football teams. We conclude that the stock market responds positive to victories
6 and negative to defeats. Second is that the stock market responds asymmetrically, that is
7 the response to defeat is 'stronger' than that to victory. This may be related to the idea
8 that the public is more sensitive to losses. However, it also might result from asymmetric
9 results and returns. Furthermore, the stock market reacts stronger to the results in
10 European matches than to those in the national leagues. Fourth, unexpected results in
11 European matches do result in a stronger stock market response than expected results,
12 whereas this is not the case in the national competition. We assume that the third and
13 fourth conclusion can be related to the much larger importance of financial incentives in
14 the European competition. Our results are robust to outliers, to nonnormality in the
15 returns and to the estimation procedure.
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28 When we relate our results to previous research, our observations are in line with
29 Brown and Hartzell (2001) as we also found that matches indeed directly impact on the
30 stock return and that there is an asymmetric reaction with respect to won or lost matches.
31 Brown and Hartzell, however, do not find a significant effect of matches in the national
32 competition whereas we do find such an effect. This may result from the type of
33 competition analysed, namely basketball in the case of Brown and Hartzell and football
34 in our study. In line with Renneboog and Vanbrabant (2000) and Palomino et al. (2005),
35 we find that victories are positively rewarded by the stock market, whereas defeat and
36 draw are 'punished', i.e. earn negative returns. Also, we find that defeats result in higher
37 (absolute) negative returns than victories. Furthermore, our results are in line with the
38 analysis of Stadtmann (2003), and generalize his findings to an international setting. Our
39 results contrast those of Zuber et al. (2005) who did not find abnormal returns from
40 football teams' results. This difference can be explained by the fact that Zuber et al.
41 include nonzero return days to focus on fan-behaviour, whereas we focus on investor-
42 behaviour and exclude nonzeros. From this, we are inclined to conclude that football
43 stock investors differ from football fans.
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Table 1: Abnormal return for all matches (N = 1274)

	\overline{AR} %	Corrado t-value	Student t-value
Win	0,36%	2,372 ***	3,003 ***
Loss	-1,41%	-6,402 ***	-6,584 ***
Draw	-1,10%	-6,065 ***	-5,524 ***

***, **, * indicate statistical significance at the 1%, 5% en 10%-level respectively.

Table 2: Abnormal return for matches in the national league (N = 1039)

	\overline{AR} %	Corrado t-value	Student t-value	Mann-Whitney t-value
Win	0,38%	2,077 **	2,903 ***	
Win expected	0,39%	1,850 **	2,889 ***	0,343
Win unexpected	0,23%	1,843 **	0,468	
Loss	-1,14%	-5,218 ***	-4,501 ***	
Loss expected	-1,87%	-4,468 ***	-3,963 ***	1,980
Loss unexpected	-0,84%	-3,745 ***	-2,720 ***	**
Draw	-1,14%	-5,660 ***	-5,160 ***	
Draw: win expected	-1,40%	-5,802 ***	-5,831 ***	1,536
Draw: loss expected	-0,01%	-1,220	-0,014	*

Table 3**Abnormal return for matches in the European league (N = 235)**

	\overline{AR} %	Corrado t-value	Student t-value	Mann-Whitney t-value
Win	0,22%	0,724	1,337	
Win expected	-0,07%	0,023	0,307	1,950
Win unexpected	1,19%	2,009 **	2,061 **	**
Loss	-2,14%	-5,089 ***	4,447 ***	
Loss expected	-1,34%	-3,000 ***	-2,897 ***	-2,015
Loss unexpected	-3,07%	-4,244 ***	-3,376 ***	**
Draw	-0,94%	-3,279 ***	-3,171 ***	
Draw: win expected	-1,32%	-3,724 ***	-3,405 ***	1.711
Draw: loss expected	-0,27%	-0,499	-0,707	**

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For Peer Review

Appendix 1:
Football teams with a listing between August 1st, 2000
and December 31st, 2004

England:	<i>Listing</i>	<i>Delisting</i>
Arsenal	01-11-1995	
Aston Villa	06-05-1997	
Birmingham City	06-03-1997	
Bradford City	05-11-1998	11-08-2002
Bolton	01-01-1996	01-05-2003
Charlton Athletic	22-03-1997	
Chelsea	29-03-1996	26-08-2003
Leeds United	06-12-1989	28-04-2004
Leicester City	22-04-1997	25-11-2002
Manchester City	01-10-1995	
Manchester United	07-06-1991	22-6-2005
Millwall	13-10-1989	
Newcastle United	01-04-1997	
Nottingham Forrest	09-10-1997	16-04-2002
Preston North End	13-09-1995	
Queens Park Rangers	23-10-1996	02-04-2001
Sheffield United	26-01-2001	
Southampton	21-04-1994	
Sunderland	23-12-1996	05-08-2004
Tottenham Hotspurs	12-10-1983	
Watford	01-08-2001	
West Bromwich Albion	02-01-1997	11-01-2005
Denmark:		
Aalborg	14-09-1998	
AGF Kontrakfodbold	20-05-1988	
Akademisk Boldklub	03-12-1998	
Brøndby	05-04-1988	
FC København	13-11-1997	
Silkeborg	07-10-1991	
Scotland:		
Aberdeen	02-02-2000	04-08-2003
Celtic	28-09-1995	
Hearts of Midlothian	16-05-1997	
Glasgow Rangers	22-04-1988	

Appendix 1 - continued:

	Listing	Delisting
Italy:		
AS Roma	22-05-2000	
Juventus	19-12-2001	
Lazio Roma	06-05-1998	
Turkey:		
Besiktas	22-05-2000	
Fenerbache	19-12-2001	
Galatasaray	06-05-1998	
Portugal:		
FC Porto	01-06-1998	
Sporting Portugal	02-06-1998	
Germany:		
Borussia dortmund	30-10-2002	
Netherlands:		
Ajax	11-05-1998	