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Dyed in the Wool?¹ An Empirical Note on Fan Loyalty

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Abstract: This paper attempts to investigate empirically the strength of intra-city football club support and seeks to test the commonly held belief among the sports community that supporters will not switch allegiance between city rivals very readily. To test this phenomenon, data on the attendances of five English and two Italian city rival clubs is used to conduct a cointegration analysis. The results imply that a stable relationship does not exist between the attendance series which throws doubt on the proposition that supporters of a team are unlikely to switch their support to a rival club. To test the possibility that this result could be due to fickle supporters ceasing to attend, a sensitivity analysis is conducted between attendances and performance.

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¹ “Dyed in the wool” is an English idiom. If you describe someone as dyed-in-the-wool, you mean they have very strong opinions and will not change.

1. Introduction

The subject of fan loyalty and partisanship in sport has received attention from cultural historians (Russell, 1997), sociologists (Connor, 2007; Armstrong & Giulianotti, 2001) marketers (King, 1998) and economists (Morley & Thomas, 2007; Barajas & Crolley, 2005, Depken, 2000, 2001)². This is not surprising since team loyalty and partisanship are significant determinants of demand in professional sport. In North America, it is common for sports franchises to move from one city to another in response to a lack of demand³. It follows that the size and loyalty of a franchises fan base can dictate in which city professional sports franchises and clubs locate. In European leagues where promotion and relegation exist, a significant relationship between market size, or “fan base” and performance has been identified by Babatunde, Forrest and Simmons (2007). The loyalty of a team’s supporters will clearly be a factor in the size of the fan base and hence may affect performance and revenue. The subject of fan loyalty is, then, one of obvious importance for the sports industry, with implications for financial solvency and location of teams/franchises.

The general view of the characteristics of sports attendance is that there are a significant number of “core” supporters who will follow their clubs fortunes irrespective of the usual determinants of attendance such as price, opponents, etc. The sociology of football attendance supports this view. Dobson & Goddard (2001) provide case studies on FC Barcelona and the two Glasgow clubs, Rangers and Celtic which suggests that social, cultural, political and historical tradition strongly influence the support for clubs in a given city. However, these authors also suggest that these

² These latter papers make up part of the voluminous literature on the economics of sport. The fact that a recent special issue (Vol. 41, Issue 25) of this journal was devoted to this subject demonstrates it’s growing importance.

³ There are too many instances of this to list. A recent example is the move of the NFL’s Cleveland Browns to Baltimore in 1995 to become the Ravens.

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3 factors have been relatively unimportant in shaping the attendances of individual
4 English clubs (Dobson & Goddard (2001, p. 318). Conversely, in his survey of the
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6 historiography of football and culture, Russell (1997) demurs from this view; “*In*
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8 *general, it would appear that geographical and organisational factors rather than*
9
10 *social, political or cultural ones, structured patterns of club allegiances in cities and*
11
12 *large towns.*” (op.cit p. 66).

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17 Anecdotal evidence would suggest that team allegiance is formed early and is unlikely
18
19 to alter during a supporting career. This view is reinforced by Parker and Stuart
20
21 (1997) who, in their research on brand loyalty in football, strongly emphasise the
22
23 importance of parental influences on football support. Indeed, the subject of fan
24
25 loyalty has received considerable attention in the sociology and marketing literature.
26
27 Wakefield and Sloan (1995) investigate fan loyalty in US college football by means of
28
29 direct surveys to acquire self-revealed levels of fan loyalty. They conclude that a
30
31 greater degree of fan loyalty does increase the attendance to a college’s home football
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33 games. King (1998) suggests that key elements of both brand community and
34
35 consumption as subculture⁴ may be present in fan loyalty. Mahony et. al. (1999) adapt
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37 this idea and investigate the effects of “self-monitoring”⁵ on fan loyalty relating to
38
39 American football teams. This work is particularly relevant for this study since it
40
41 deals with the likelihood that supporters will switch their loyalties to make themselves
42
43 more socially attractive. They found that there was a negative relationship between
44
45 self-monitoring and number of years as a fan of the currently supported team and a
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47 positive relationship between self-monitoring and the total number of teams a fan has
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49 supported. The conclusion is that high self-monitors have a marked predisposition to
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58 ⁴ “Brand communities and consumption subcultures share common values, rituals and traditions, they
59 also typically have strong sense of who is an authentic user of a brand and who is not.” King, 1998 p.
60 36

⁵ The term “self-monitoring” refers to how individuals are motivated by what others think of them. See Mahony (1999) et. al. p44

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2
3 switching their support between teams. Richardson and O'Dwyer (2003) partially
4 replicate Mahony et al's study for the English Premiership using a survey of 161
5 soccer fans. They similarly find that self-monitoring is an important influence on fan
6 loyalty with reference to Premiership teams.
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15 In the economics of sport literature, the demand for attendance has been one of the
16 most-researched subjects, but few economists have investigated the issue of fan
17 loyalty explicitly. Depken (2000, 2001) is an exception. Using data from Major
18 League Baseball (MLB) he estimates an equation of attendance demand developed in
19 the stochastic frontier literature which incorporates "inputs" to the attendance
20 decision. The equation employs a half-normal error term which is decomposed into a
21 measure of inefficiency that is interpreted as a measure of fan loyalty. Rankings of fan
22 loyalty are then constructed for MLB franchises. This technique is then extended to
23 the National Football League (Depken, 2001).
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35 A distinction has been drawn between "core" and "floating" support. (Morley and
36 Thomas (2007); Peel and Thomas (1992); Kuypers (1996)). It is argued that attendees
37 are made up of a committed core who support the club whatever its results and
38 'floaters', or 'theatre-goers' (Borland, 1987), whose presence depends on the appeal
39 of the event. Most economists, however, have approached fan loyalty from the
40 perspective of habit persistence (Simmons, 2006) in which habit is treated as a
41 component of the demand function. Borland and Lye (1992) suggest that learning
42 about a game from previous visits increases the marginal utility of current and future
43 attendance. In an attempt to incorporate this idea in economic models Peel and
44 Thomas (1992, 1996) used attendance data for a team's previous game, and for
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3 similar games in the same season, whereas Kuypurs (1996) employed a clubs average
4 home attendance for the prior three seasons.
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8 A methodology that has been frequently employed by the small number of researchers
9 who include a variable to allow for a habit component in their models is to include a
10 lagged dependent variable in a dynamic adjustment model. This approach has its
11 critics however, (Dawson and Downward, 2000), who propose that there is a big
12 difference between partial adjustment and habit persistence.
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22 The main problem for researchers attempting to include “core” support, or “habit” in
23 any analysis of attendance is the difficulty of acquiring data containing information on
24 those spectators who pay at the gate separately from season tickets holders. Paton and
25 Cooke (2005), and Morley and Thomas (2007) do include such information for
26 English cricket, but we are not aware of any such studies pertaining to English
27 football.
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39 In an effort to obviate these difficulties a time-series method is used here which to
40 some extent by-passes the problems of modelling the demand for attendance
41 encountered by many economists⁶ (see Borland & Macdonald, (2003) for a wide-
42 ranging survey). Whilst it has been well established that the demand for attendance
43 in football is determined by many factors other than loyalty⁷, the assumption here is
44 that, in the long-run, many of these factors, such as income, social trends, competitive
45 balance, etc. will affect both teams in a single city in the same way. Hence the only
46 other factor left is the relative fortunes of each club. So if we consider attendance for
47 Team A and Team B in a city as two variables, and if loyalty, partisanship and habit
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⁶ Depken (2000) suggests that sales of merchandise could be used as an indicator of fan loyalty. But as he says this data is not readily available.

⁷ See Dobson and Goddard (2001) for a survey of attendance demand studies in football

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3 persistence were a significant factor, then if one club in the city was doing well we
4
5 would not expect to see supporters from that club switching allegiance to the other
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7 club, hence sending these two variables away from each other. In other words, we
8
9 would expect to observe a long-run equilibrium relationship between the variables.
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13 Attempting to test this possibility is somewhat complicated by the nature of sports
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15 attendance as discussed above. To reiterate, core supporters will attend their team's
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17 matches no matter what. Floaters are more fickle. They will attend more often during
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19 period of success, but may not attend when things are not going so well. This
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21 characteristic of the football fan means that if the attendance of Team A increases by
22
23 one, this does not necessarily mean that the attendee has switched from Team B. This
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25 fan could be a "floater". We attempt to incorporate this feature of football supporters
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27 by looking at the relationship between performance and attendance⁸.
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33 34 Methodology & Results

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38 This paper firstly investigates the stability of the relationship between the attendances
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40 of rival football clubs in several large English and two Italian cities. To do this we
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42 need to establish whether a long-run equilibrium relationship has existed between the
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44 attendances of clubs in a single market or city. If there has, it would provide some
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46 tentative long-run evidence that supporters do not switch allegiance for any length of
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48 time.
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56 ⁸ A well-known problem in the empirical literature is the fact that football attendance is made up of two
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58 types of ticket holders - season tickets and game-specific tickets bought sometimes on the day of the
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60 game. Clearly, the factors motivating these two groups will be different, given the "sunk cost" nature of
the season ticket (Dobson and Goddard (2001), pp. 317-318). Historical season ticket data is
notoriously difficult to obtain and was not available to us for this study. However, since we are using
seasonal average attendances we can assume that both types of ticket buyers will base their decision to
purchase to some extent on the previous season's league position.

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3 To test this version of fan loyalty, we investigate the relationship between the
4 attendances of ten football clubs in five large English cities - Manchester,
5 Birmingham, Liverpool, Sheffield and Nottingham; and four clubs in two large Italian
6 cities - Milan and Turin. Each pair of clubs are widely recognised as intense sporting
7 rivals⁹. If, therefore, loyalty and partisanship is a factor driving football attendances,
8 we would expect to see it exhibited in this context. We use seasonal average
9 attendance data. The English data is for seasons 1919-1999 and was collected from
10 Tabner (2002)¹⁰; the Italian data is for 1963-2006 and was collected from
11 www.european-football-statistics.co.uk
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24 These cities were selected because they contain two large clubs thereby making the
25 empirical analysis more straightforward¹¹. Although many other intra-city rivalries
26 exist in European football it was not possible to obtain a sufficient quantity of data to
27 undertake a meaningful time series analysis. The English clubs operated mainly in
28 the top two tiers of the English Football League during this period. The top tier
29 became the English Premier League in 1992. The Italian clubs played almost
30 exclusively in Serie A, the top tier of Italian football.
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(Figures 1 to 7 here please)

54 ⁹ Information on football rivalries was gathered from the following sources: Harvey and Strowger
55 (2004), Goodhead (2003), and www.footballderbies.com

56 ¹⁰ Due to the suspension of League football during the Second World War the attendance data ends
57 after the 1938-9 season and starts again in 1946-47.

58 ¹¹ Several of the selected cities host some smaller clubs although these are usually based in the suburbs.
59 For example, Tranmere Rover's stadium is technically in the Merseyside area along with Everton and
60 Liverpool but is actually in the town of Birkenhead not Liverpool. None of the London clubs are
included in the analysis due to the sheer number of them. At the time of writing no less than five clubs
from the English Premier League are based in London.

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Figures 1 to 7 show the attendances for the fourteen rival clubs plotted by city of location – Manchester, Birmingham, Liverpool, Sheffield, Nottingham, Milan and Turin respectively. Whilst there is evidence in the charts of a stable relationship between the attendances of these clubs at certain periods the patterns represented are inconclusive. A more robust statistical method is required. An obvious candidate is cointegration analysis which is designed to identify exactly the type of long-run relationship we are investigating here.

Before testing for cointegration, the integrational properties of each of the variables needs to be established. This is done by applying using the standard Dickey-Fuller tests and by applying the test from Kwiatkowski et al. (1992), hereafter KPSS. The KPSS test differs from the rest of unit-root testing procedures in that the data series is assumed to be stationary under the null hypothesis.

(Table 1 here please)

Table 1 presents the results of stationary tests for each of the club series expressed in logarithmic terms. The Dickey-Fuller tests suggest that a unit-root exists in all the series except that for Manchester City whilst the KPSS tests imply rejection of the null hypothesis of level and trend stationarity for only five of the fourteen series. However, when the series are differenced, the null hypothesis of stationarity cannot be rejected at the 10% level using the KPSS test. Overall, the combined results suggest that all the series are integrated of order one.

The most popular tests for cointegration are those proposed by Engle and Granger (1987) and Johansen (1988). When, as in this case, two variables are subject of

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3 investigation, the Engle and Granger technique is the simplest since it merely involves
4 testing for the stationarity of the residuals defined by the linear combination of non-
5 stationarity variables that comprise the regression. This is the method adopted here.
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12 (Table 2 here please)
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17 Table 2 shows the results of the Dickey-Fuller tests for cointegration between the
18 attendances of clubs in each of the seven cities. In each case the null hypothesis of no
19 cointegration between the series cannot be rejected at the five per cent level of
20 significance. The results of the above cointegration tests suggest that a long-run
21 equilibrium relationship between the attendances of these city rivals does not, in fact,
22 exist. This conclusion suggests that there are significant periods in which the
23 attendances of these city rivals drift away from each other¹².
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35 For clubs with greatly varying fortunes on the field over this period this is not a
36 surprising finding. The two Nottingham clubs are a good example. During our period
37 Nottingham Forest were far more successful in terms of league position than Notts
38 County in addition to being successful in European competitions during the 1970s.
39 Less committed supporters of Notts County would drift away and marginal and new
40 supporters would be attracted to Nottingham Forest. Even if Notts County supporters
41 did not migrate to Nottingham Forest, the two attendance variables would move away
42 from an equilibrium position. However, the fortunes of the clubs in the other four
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¹² To test the possibility of a structural break in the attendance data after the end of the Second World War, a dummy variable was included in the cointegrating regressions for the British clubs defined as zero up until 1939 and 1 afterwards. The dummy was not significant and therefore was not included in the main analysis.

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3 cities were broadly similar which makes it more surprising that a long-run equilibrium
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5 relationship is not evident.
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11 As mentioned above, the issue of “core” and “non-core” support is well established in
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13 the literature. The basis of this division is the belief that a proportion of a club’s
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15 supporters are fickle in the sense that they will only attend when the team are doing
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17 well. The possibility that supporters are not switching between city rivals but are, in
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19 fact, not attending the matches of their favourite team when they are performing
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21 poorly is difficult to establish empirically. However, one thing that can be
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23 investigated is the extent to which attendance depends on the performance of a team.
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25 Most studies of attendance demand in football find that performance; however this is
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27 defined, has a significant attendance effect on attendance¹³. Dobson and Goddard
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29 (1995, 1996), Simmons (1996) and Szymanski and Smith (1997) all include the
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31 team’s final league position in their multiple regression equations to control for team
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33 performance. All of them find this variable to be a highly significant determinant of
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35 annual attendance. However, for the reasons given above about the commonality of
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37 most of the independent variables for these clubs a sensitivity analysis is performed
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39 here between attendance and performance for the British clubs. We define seasonal
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41 performance here as the finishing league position of the club. The possibility that
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43 attendance in season t could be affected by performance in season $t-1$ because of
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45 behavioural lags is also incorporated in the analysis.
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(Table 3 here please)

¹³ See Dobson and Goddard (2001) Chapter 7 for a comprehensive review.

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3 Table 3 gives the results of the sensitivity analysis. The results suggest a significant
4 relationship between attendance and league position for all our ten clubs bar one,
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6 Everton. League position in the previous season also affects attendance in the current
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8 season for six of the ten clubs. However the explanatory power of these regressions is
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10 very poor with a maximum R^2 of 54 per cent and a minimum of 6 per cent. This
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12 suggests that, on average, attendances are not very well explained by league position.
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14 These findings are inconclusive in the sense that they do not provide any evidence on
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16 the fickleness of supporters one way or the other.
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22 **Conclusion**

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24 This paper has attempted to investigate the extent of fan loyalty by using time series
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26 techniques rather than the survey-based or multiple regression methods employed by
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28 previous researchers. The objective was to determine whether a long-term equilibrium
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30 relationship was present between the attendances of rival clubs in seven large
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32 English and Italian cities. Cointegration analysis was used with annual average
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34 attendance data for each team. The cointegration tests suggest that no such
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36 equilibrium relationship exists between the attendances of Manchester City and
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38 Manchester United; Liverpool and Everton; Aston Villa and Birmingham City;
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40 Sheffield United and Sheffield Wednesday; Nottingham Forest and Notts County; AC
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42 Milan and Inter Milan; and Juventus and Torino.
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48 These findings do not provide support for the view that supporters will stick by their
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50 team “through thick and thin”. The empirical work above implies that there were
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52 significant periods in which the attendance variables of these teams drifted apart.
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54 Moreover this occurred even when the performance of the clubs in terms of league
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56 position was similar. It is acknowledged that variations in attendance may not be due
57
58 to supporters switching from one team to another, but may be due to variations in
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3 non-core support. This was investigated by using a sensitivity analysis on attendance
4 and league position, which showed that this may indeed be what is happening, but
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6 were inconclusive. Further research possibly in the form of extensive survey work
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8 and match-by-match analysis is required before more authoritative judgements can be
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10 made on the nature of fan loyalty.
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For Peer Review

Figure 1: Manchester United and Manchester City attendances 1919-1999

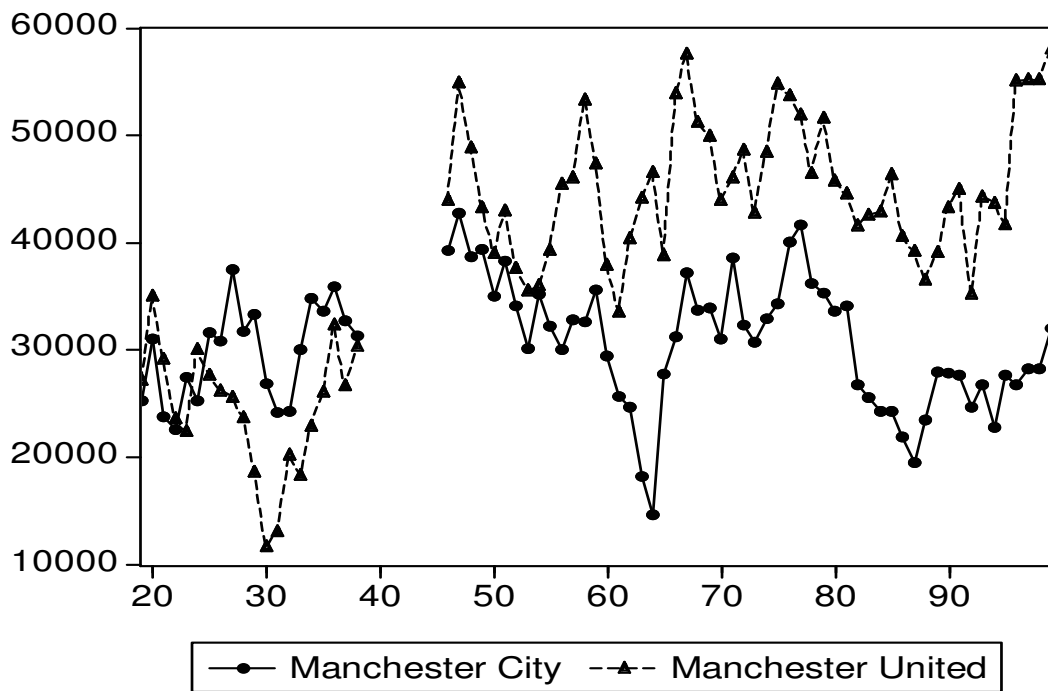


Figure 2: Aston Villa and Birmingham City attendances 1919-1999

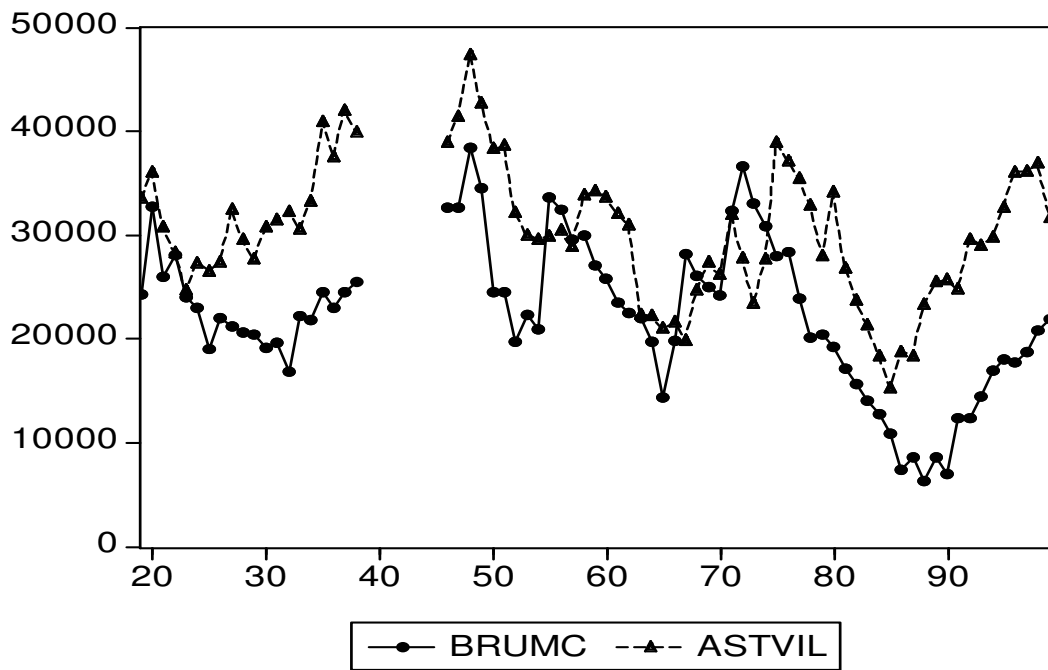


Figure 3: Liverpool and Everton attendances 1919-1999

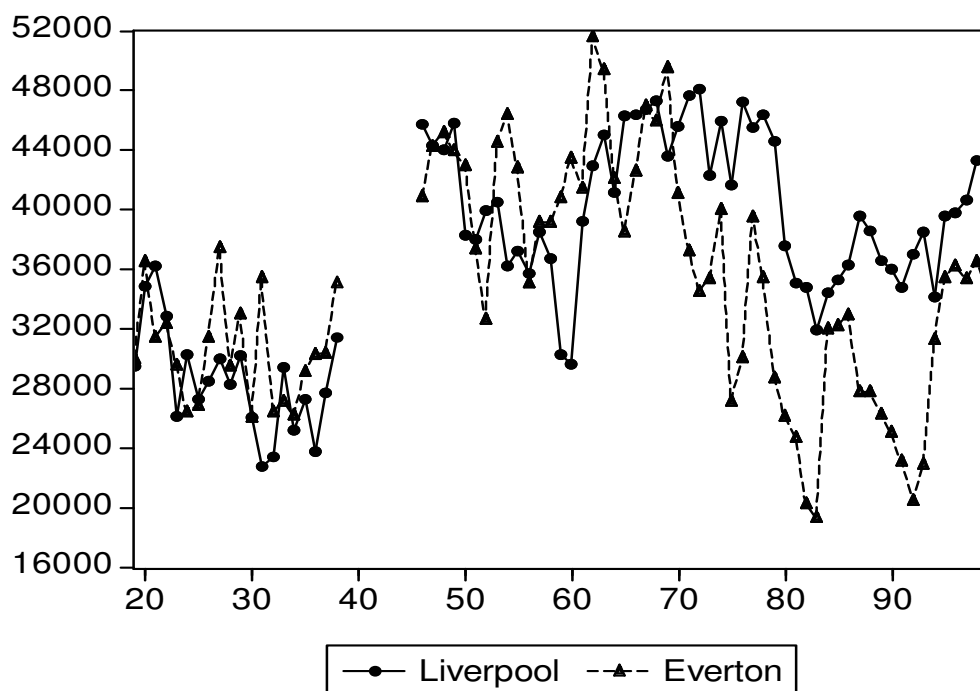


Figure 4: Sheffield Wednesday and Sheffield Wednesday attendances 1919-1999

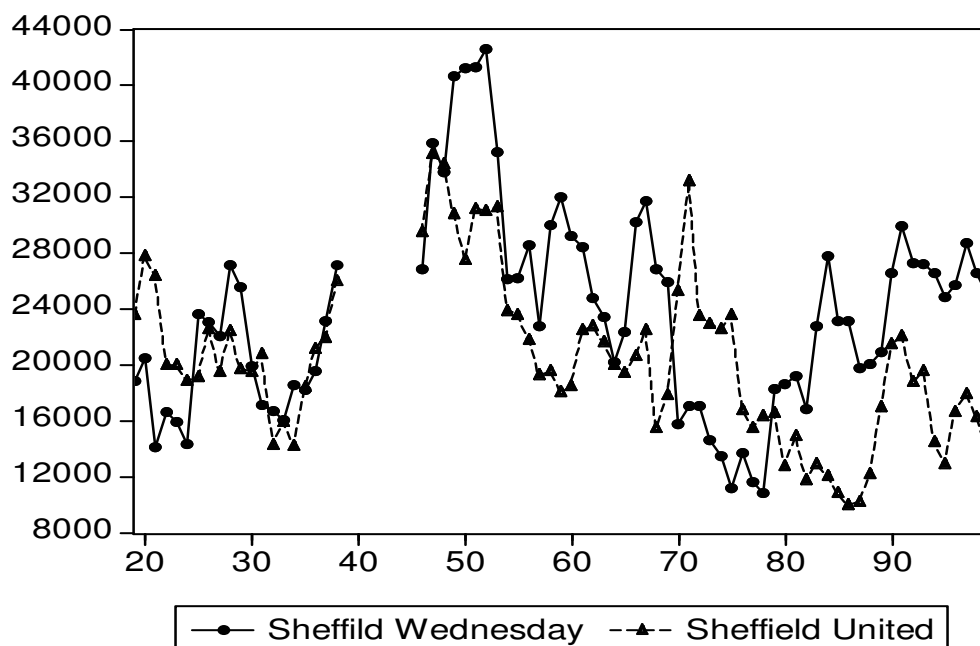
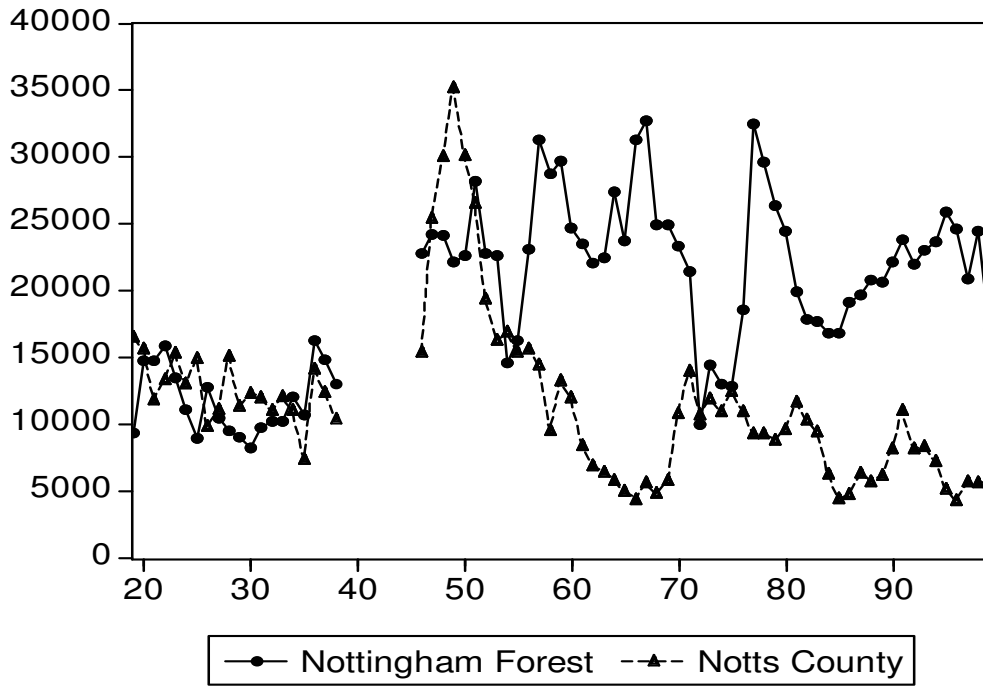


Figure 5: Nottingham Forest and Notts County attendances 1919-1999



review

Figure 6: AC Milan and Inter Milan attendances 1963-2006

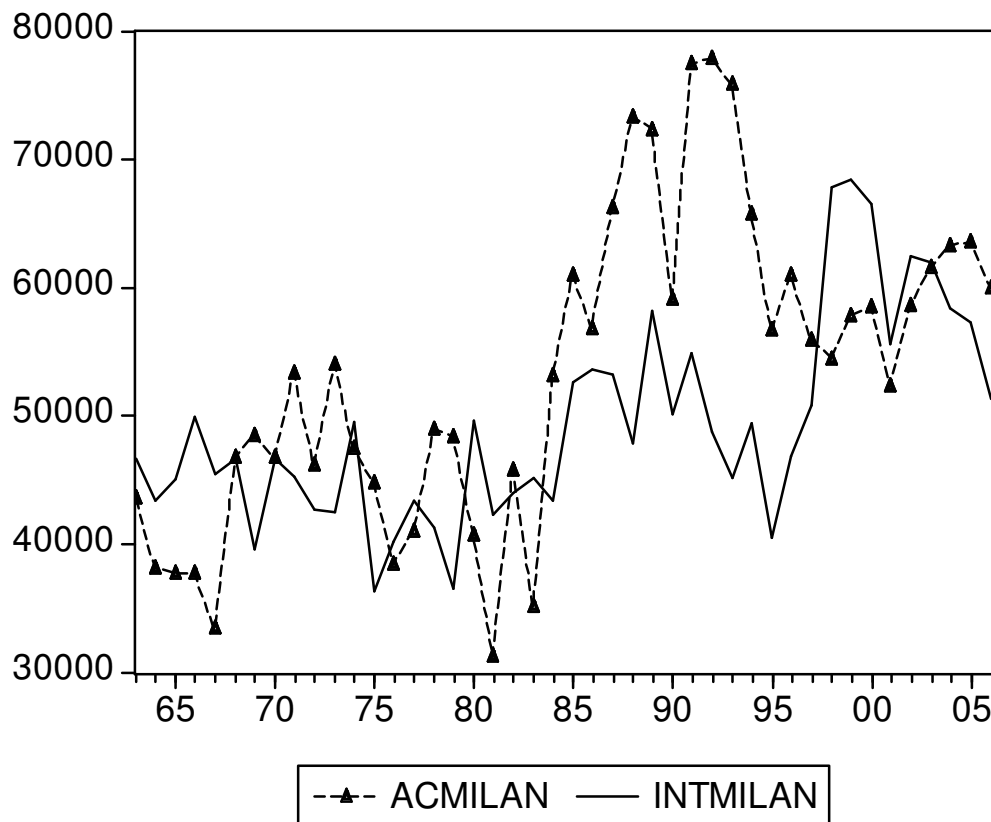
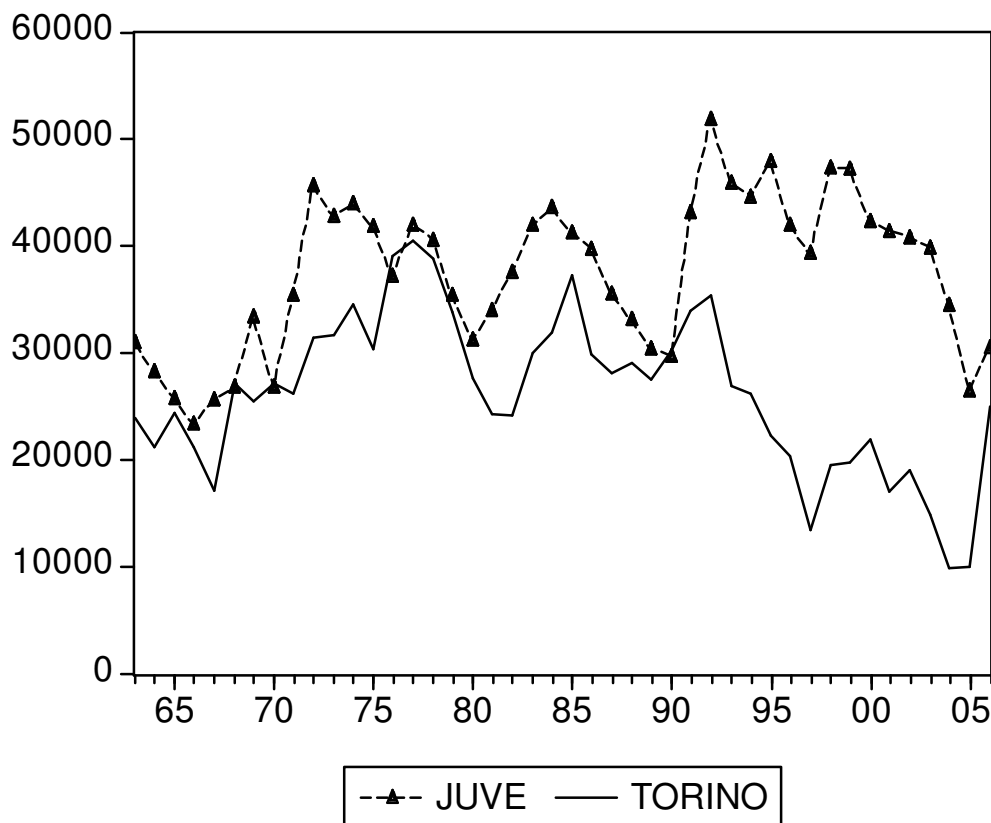


Figure 7: Juventus and Torino attendances 1963-2006



Review

Table 1: Unit root tests

/	ADF(1) no trend	ADF(1) with trend	KPSS no trend	KPSS with trend
Man Utd	-1.95	-2.77	0.71	0.15
Man City	-3.50	-3.58	0.17	0.09
Aston Villa	-2.50	-2.53	0.26	0.08
B'ham city	-2.00	-2.19	0.44	0.12
Everton	-3.01	-3.06	0.24	0.20
Liverpool	-2.41	-2.81	0.53	0.15
Sheff Utd	-2.37	-2.85	0.50	0.11
Sheff weds	-2.49	-2.47	0.11	0.11
Notts C	-2.08	-2.67	0.61	0.07
Notts F	-2.94	-3.04	0.54	0.17
AC Milan	-2.15	-2.84	0.52	0.09
Inter Milan	-2.77	-3.95	0.57	0.09
Juventus	-3.20	-2.91	0.33	0.11
Torino	-2.20	-2.53	0.34	0.20

Note: The ADF no trend critical values are -3.52 at the 1% level, -2.90 at the 5% level and -2.59 at the 10% level. The with trend values are -4.09 at the 1% level, -3.47 at the 5% level, and -3.16 at the 10% level. (According to MacKinnon (1996)).

The KPSS stationarity test was used both with intercept only and with intercept and time trend on first differences of the series. The critical values at the 10% level are, for the model with intercept and time trend 0.12, and for the model only with intercept 0.35 (Kwiatkowski et al., 1992, Table 1, p. 166).

Table 2: Cointegration tests

Regression of:	DF Test Stat on residuals	ADF Test Stat on residuals
Manchester United on Manchester City	-1.84	-1.69
Aston Villa on Birmingham City	-3.22	-2.89
Liverpool on Everton	-2.89	-2.47
Sheffield United on Sheffield Wednesday	-2.66	-2.72
Nottingham forest on Notts County	-2.23	-2.19
AC Milan on Inter Milan	-2.70	-2.33
Juventus on Torino	-2.35	-2.51

The 95% critical value for the Dickey-Fuller statistic is -3.49

Table 3: Attendance-League Position Sensitivity Estimates

	β	θ	R^2
Aston Villa	-141.78* (-2.01)	-64.34 (-0.89)	0.06
Birmingham City	-384.03* (-6.04)	-283.58* (-3.99)	0.34
Everton	-145.86 (-1.21)	51.92 (0.423)	0.02
Liverpool	-296.09* (-3.09)	-245.94* (-2.52)	0.12
Manchester Utd	-840.62* (-9.13)	-731.15* (-6.99)	0.54
Manchester City	-221.90* (-3.42)	-98.30 (-1.41)	0.15
Notts C	-110.88* (-2.88)	-78.21 (-1.97)	0.10
Notts F	-296.80* (-6.22)	-213.51* (-4.00)	0.33
Sheff Utd	-214.03* (-4.85)	-184.03* (-4.01)	0.25
Sheff Weds	-211.69* (-4.03)	-137.47* (-2.45)	0.18

Notes: Estimated equations: $ATT_{it} = \alpha + \beta POS_{it}$ and $ATT_{it} = \alpha + \theta POS_{it-1}$. ATT is average attendance in season t . POS is league position in season t defined as distance from 1st position in the Football League (including the Premier League). Estimated t -values are in parentheses. Significance at the 5% level is denoted by *. Number of

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3 observations for each club is 74. The R^2 value reported is for the equation $ATT_{it} = \alpha +$
4 βPOS_{it}
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For Peer Review

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