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# Working Paper Series

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

Terry Robinson

Manchester Business School Working Paper No 571

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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 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 “invariant support” hypothesis. 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.

## **Keywords**

Football, Fan Loyalty

## **JEL Classification**

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# **Dyed in the Wool?<sup>1</sup> An Empirical Note on Fan Loyalty**

## **1. Introduction**

The subject of fan loyalty in sport has received attention from cultural historians (Russell, 1997), sociologists (Connor, 2007; Armstrong & Giulianotti, 2001) as well as economists (Morley & Thomas, 2007; Barajas & Crolley, 2005). The general conclusion 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. Indeed Sir John Smith, in a report for the English Football Association, suggested that the football fan probably supported a club ‘almost from the cradle to the grave.’ (FTF, 1999).

Sociologists tend to talk about the importance of ritual and a sense of belonging in shaping club support (Dimeo, 2001), however the argument is often heard nowadays that these factors are becoming less important in society and consequently less important as a reason for supporting a football club. This view is somewhat contradicted by a survey conducted by a popular British football magazine in which “local pride” was cited by almost 47% of over 3000 respondents as a reason for supporting their team (WSC 1991). However, local pride doesn’t explain the core support for clubs where there are two, or more, teams present in a single city. It is interesting that, in the above survey, “family influences” were cited as an important reason for supporting their team by 69.4% of Everton fans, 59.9% of Manchester City fans, 58.6% of Sheffield Wednesday fans, and 57.8% of Aston villa fans. These are all clubs from English cities containing two teams.

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<sup>1</sup> “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.

These responses would seem to support the hypothesis that team allegiance is formed early and is unlikely to alter during a supporting career. Moreover, this view is further reinforced by Parker and Stuart (1997) who, in their research on brand loyalty in football, strongly emphasise the importance of parental influences on football support. And distance does not seem to dilute the loyalty. It is common to meet a sports fan who has moved from a particular city, or country, but still supports the team from their hometown. It would also be expected that these factors of family loyalty and belonging would be more in evidence in a large city where commitment to one team or the other would be a badge of pride – you are either a “red” or a “blue”.

Given the above reasoning, we can put forward a hypothesis of “invariant support” in a city which contains two, or more teams. For a strong version of this hypothesis, in a city with teams A and B, we would not expect to see supporters of A migrating to B under any circumstances.

To test this hypothesis we use a time-series method which to some extent by-passes the problems of modelling the demand for attendance encountered by many economists (see Borland & Macdonald, (2003) for a wide-ranging survey). Whilst it has been well established that the demand for attendance in football is determined by many factors other than loyalty<sup>2</sup>, the assumption here is that, in the long-run, many of these factors, such as income, social trends, competitive balance, etc. will affect both teams in a city in the same way. Hence the only other factor left is the relative fortunes of each club. If we consider attendance for Team A and Team B in a city as two variables, and if our hypothesis of invariant loyalty is correct, then if one club in

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<sup>2</sup> See Dobson and Goddard (2001) for a survey of attendance demand studies in football

the city was doing well we would not expect to see supporters from that club switching allegiance to the other club, hence sending these two variables away from each other. In other words, we would expect to observe a long-run equilibrium relationship between the variables.

Attempting to test this hypothesis of invariant support is somewhat complicated by the nature of sports attendance. Several authors have identified a distinction between “core” and “floating” support. (Morley and Thomas (2007); Peel and Thomas (1992); Kuypers (1996)).

Core supporters will attend their team’s matches no matter what. Floaters are more fickle. They will attend more often during period of success, but may not attend when things are not going so well. This characteristic of the football fan means that if the attendance of Team A increases by one, this does not necessarily mean that the attendee has switched from Team B. This fan could be a “floater”. We attempt to incorporate this feature of football supporters by looking at the relationship between performance and attendance<sup>3</sup>.

### Methodology & Results

This paper firstly examines the hypothesis of invariant support by testing the stability of the relationship between the attendances of rival football clubs in several large English cities. To do this we need to establish whether a long-run equilibrium relationship has existed between the attendances of clubs in a single market or city. If

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<sup>3</sup> A well-known problem in the empirical literature is the fact that football attendance is made up of two types of ticket holders - season tickets and game-specific tickets bought sometimes on the day of the 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.

there has, it would provide some tentative long-run evidence that supporters do not switch allegiance for any length of time.

To test this invariant support hypothesis of fan loyalty, we investigate the relationship between the attendances of ten football clubs in five large English cities - Manchester, Birmingham, Liverpool, Sheffield and Nottingham, using seasonal average attendance data from 1919-1999 which are available in Tabner (2002)<sup>4</sup>. These cities were selected because they contain two large clubs thereby making the empirical analysis more straightforward<sup>5</sup>. All clubs played in various divisions of the English Football League during this period.

Figures 1 to 5 show the attendances for the ten rival clubs plotted by city of location – Manchester, Birmingham, Liverpool, Sheffield and Nottingham 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

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<sup>4</sup> Due to the suspension of League football during the Second World War the attendance data ends after the 1938-9 season and starts again in 1946-47.

<sup>5</sup> Several of the selected cities host some smaller clubs although these are usually based in the suburbs. For example, Tranmere Rover's stadium is technically in the Merseyside area along with Everton and 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.

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 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 Man.City, whilst the KPSS tests imply rejection of the null hypothesis of level and trend stationarity for only four of the ten 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 investigation, the Engle and Granger technique is the simplest since it merely involves testing for the stationarity of the residuals defined by the linear combination of non-stationarity variables that comprise the regression. This is the method adopted here.

Table 2 shows the results of the Dickey-Fuller tests for cointegration between the attendances of clubs in each of the five cities. In each case the null hypothesis of no cointegration between the series cannot be rejected at the 5 per cent level of significance. The results of the above cointegration tests suggest that a long-run equilibrium relationship between the attendances of these city rivals does not, in fact, exist. This conclusion does not lend support to the “strong” version of the invariant support hypothesis due to the fact that there are significant periods in which the attendances of these city rivals drift away from each other<sup>6</sup>.

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<sup>6</sup> 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 defined as zero up until 1939 and 1 afterwards. The dummy was not significant and therefore was not included in the main analysis.



For clubs with greatly varying fortunes over the period this is not a surprising finding. The two Nottingham clubs are a good example. During our period Nottingham Forest were far more successful in terms of league position than Notts County in addition to being successful in European competitions during the 1970s. Less committed supporters of Notts County would drift away and marginal and new supporters would be attracted to Nottingham Forest. Even if Notts County supporters did not migrate to Nottingham Forest, the two attendance variables would move away from an equilibrium position. However, the fortunes of the clubs in the other four cities were broadly similar which makes it more surprising that a long-run equilibrium relationship is not evident.

As mentioned above, the issue of “core” and “non-core” support is well established in the literature (Morley and Thomas (2007); Peel and Thomas (1992); Kuypers (1996)). The basis of this division is the belief that a proportion of a club’s supporters are fickle in the sense that they will only attend when the team are doing well. The possibility that supporters are not switching between city rivals but are, in fact, not attending the matches of their favourite team when they are performing poorly is difficult to establish empirically. However, one thing that can be investigated is the extent to which attendance depends on the performance of a team. Most studies of attendance demand in football find that performance; however this is defined, has a significant attendance effect on attendance<sup>7</sup>. Dobson and Goddard (1995, 1996), Simmons (1996) and Szymanski and Smith (1997) all include the team’s final league position in their multiple regression equations to control for team performance. All of

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<sup>7</sup> See Dobson and Goddard (2001) Chapter 7 for a comprehensive review.

them find this variable to be a highly significant determinant of annual attendance. However, for the reasons given above about the commonality of most of the independent variables for these clubs a sensitivity analysis is performed here between attendance and performance. We define seasonal performance here as the finishing league position of the club. The possibility that attendance in season  $t$  could be affected by performance in season  $t-1$  because of behavioural lags is also incorporated in the analysis. Table 4 gives the results of the sensitivity analysis. The results suggest a significant relationship between attendance and league position for all our ten clubs bar one, Everton. League position in the previous season also affects attendance in the current season for six of the ten clubs. However the explanatory power of these regressions is very poor with a maximum  $R^2$  of 54 per cent and a minimum of 6 per cent. This suggests that, on average, attendances are not very well explained by league position. These findings are inconclusive in the sense that they do not provide any evidence on the fickleness of supporters one way or the other.

## **Conclusion**

This paper has attempted to investigate the extent of fan loyalty by using time series techniques rather than the survey-based or multiple regression methods employed by previous researchers. The null hypothesis to be tested is that, in a city with teams A and B, supporters of team A in a city will not switch allegiance to team B. Using cointegration analysis, and annual average attendance data for teams in five large English cities from 1919 to 1999, this hypothesis was tested by determining whether a long-term equilibrium relationship was present between the attendances of these teams. The cointegration tests suggest that no such equilibrium relationship exists between the attendances of Manchester City and Manchester United; Liverpool and

Everton; Aston Villa and Birmingham City; Sheffield United and Sheffield Wednesday; and Nottingham Forest and Notts County.

These findings do not provide support for the view that supporters will stick by their team “through thick and thin”. The empirical work above implies that there were significant periods in which the attendance variables of these teams drifted apart. Moreover this occurred even when the performance of the clubs in terms of league position was similar. It is acknowledged that variations in attendance may not be due to supporters switching from one team to another, but may be due to variations in non-core support. This was investigated by using a sensitivity analysis on attendance and league position, which showed that this may indeed be what is happening, but were inconclusive. Further research possibly in the form of extensive survey work and match-by-match analysis is required before more authoritative judgements can be made on the nature of fan loyalty.

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

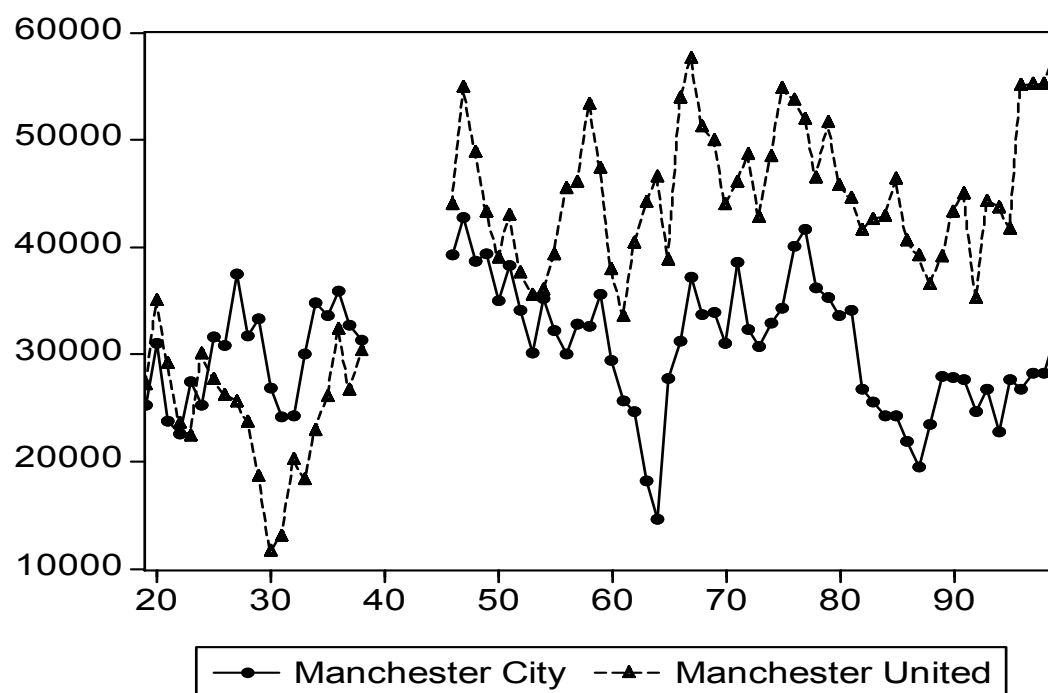


Figure 2: Aston Villa and Birmingham City attendances 1919-1999

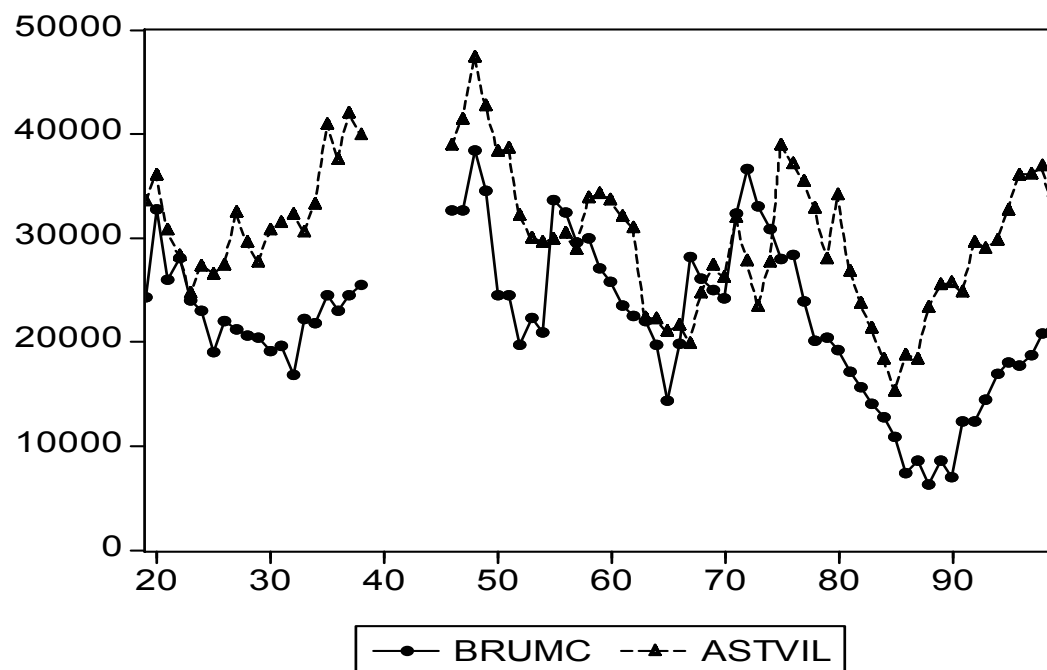


Figure 3: Liverpool and Everton attendances 1919-1999

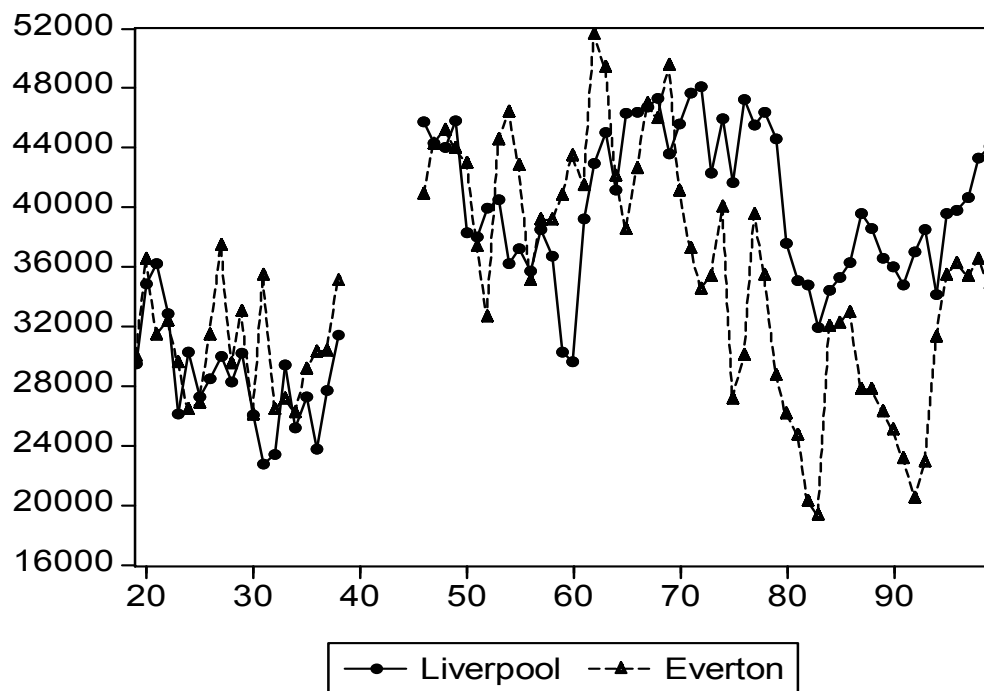


Figure 4: Sheffield United and Sheffield Wednesday attendances 1919-1999

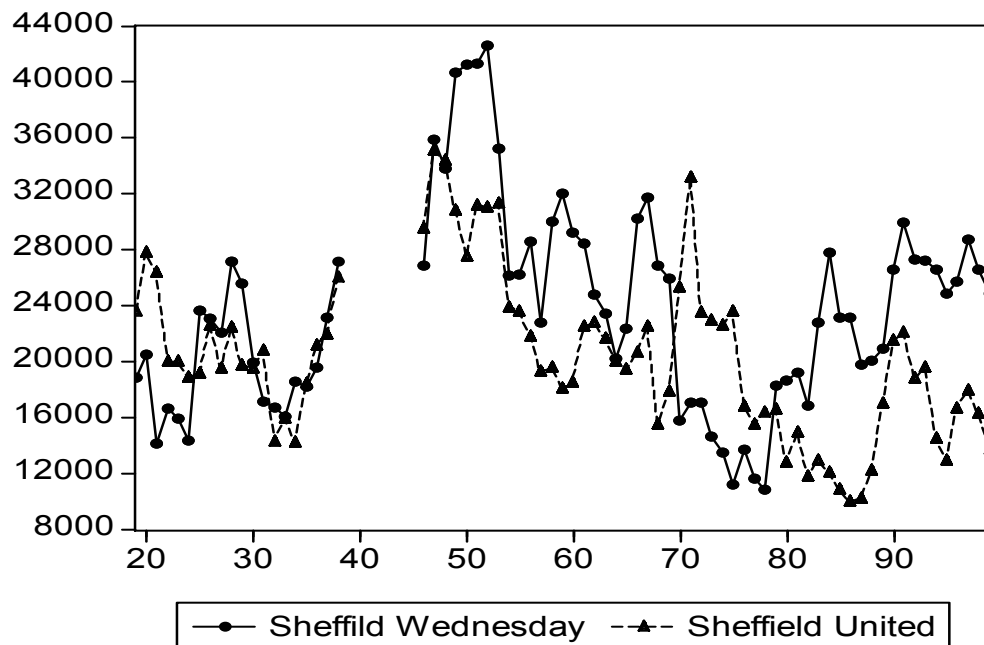


Figure 5: Nottingham Forest and Notts County attendances 1919-1999

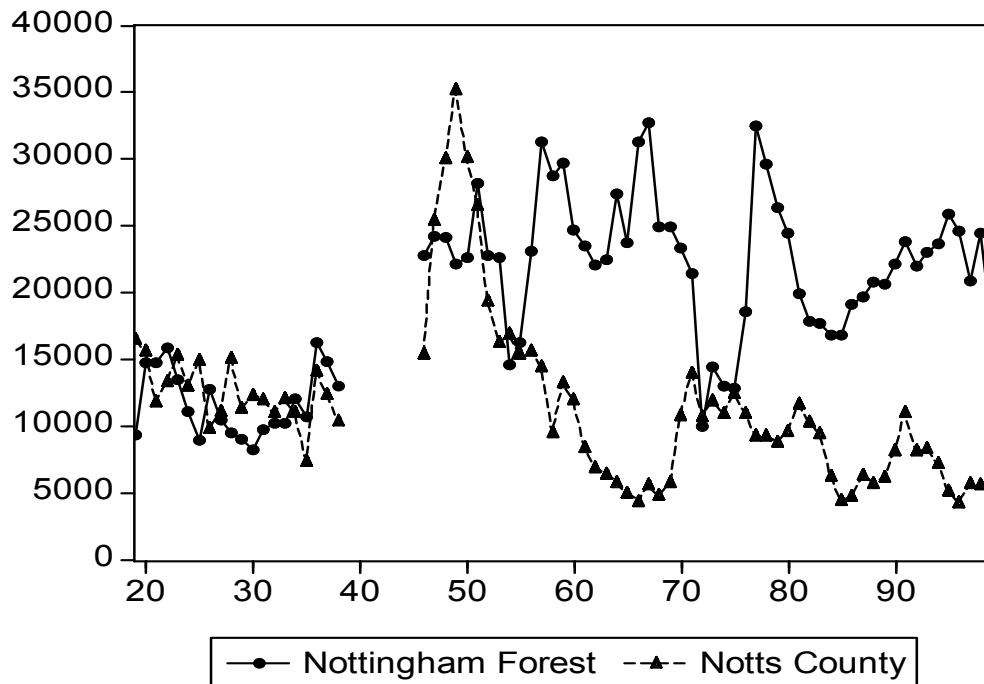


Table 1: Unit root tests

/	ADF(1) no trend	ADF(1) with trend	KPSS no trend	KPSS with trend
<b>Man Utd</b>	-1.95*	-2.77*	0.71	0.15
<b>Man City</b>	-3.50	-3.58	0.17*	0.09*
<b>Aston Villa</b>	-2.50*	-2.53*	0.26*	0.08*
<b>B'ham city</b>	-2.00*	-2.19*	0.44	0.12*
<b>Everton</b>	-3.01*	-3.06*	0.24*	0.20
<b>Liverpool</b>	-2.41*	-2.81*	0.53	0.15
<b>Sheff Utd</b>	-2.37*	-2.85*	0.50	0.11*
<b>Sheff weds</b>	-2.49*	-2.47*	0.11*	0.11*
<b>Notts C</b>	-2.08*	-2.67*	0.61	0.07*

<b>Notts F</b>	-2.94*	-3.04*	0.54	0.17
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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).

\* Indicates that the null of stationarity cannot be rejected at the 10% level

Table 2: Cointegration tests

Regression of:	DF Test Stat on residuals	ADF(1) Test Stat on residuals
Manchester United on Manchester City	-1.8433	-1.6965
Aston Villa on Birmingham City	-3.2215	-2.8964
Liverpool on Everton	-2.8964	-2.4794
Sheffield United on Sheffield Wednesday	-2.6637	-2.7227
Nottingham forest on Notts County	-2.2304	-2.1967

The 95% critical value for the Dickey-Fuller statistic is -3.4223.

Table 3: Attendance-League Position Sensitivity Estimates

	$\beta$	$\theta$	$R^2$
<b>Aston Villa</b>	-141.78* (-2.01)	-64.34 (-0.89)	0.06
<b>Birmingham City</b>	-384.03* (-6.04)	-283.58* (-3.99)	0.34
<b>Everton</b>	-145.86 (-1.21)	51.92 (0.423)	0.02
<b>Liverpool</b>	-296.09* (-3.09)	-245.94* (-2.52)	0.12
<b>Manchester Utd</b>	-840.62* (-9.13)	-731.15* (-6.99)	0.54
<b>Manchester City</b>	-221.90* (-3.42)	-98.30 (-1.41)	0.15
<b>Notts C</b>	-110.88* (-2.88)	-78.21 (-1.97)	0.10
<b>Notts F</b>	-296.80* (-6.22)	-213.51* (-4.00)	0.33
<b>Sheff Utd</b>	-214.03* (-4.85)	-184.03* (-4.01)	0.25
<b>Sheff Weds</b>	-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 1<sup>st</sup> 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 observations for each club is 74. The  $R^2$  value reported is for the equation  $ATT_{it} = \alpha + \beta POS_{it}$



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