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Outcomes with asymmetric payoffs: The case of the Soviet Football League

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Abstract

Economists are interested in outcomes — the results of decisions made regarding scarce resources by agents acting within environments that they must take as given. Sport, and football in particular, offers insight into a wide range of measurable outcomes, and provides vast amounts of data on the decision making that surrounded such outcomes.

Usually in the context of individual footballing contexts, the immediate rewards are symmetric in that they apply equally to each team: a team that wins will progress in a competition, or in a league structure will gain three points, and a single point if the match is drawn.

Despite this, there have been variations over the years in terms of the rewards on offer, usually as an attempt to encourage more exciting play, to discourage attempts at cheating, and thus to attract more spectator demand. Indeed, it is only since the 1980s that three points for a win became commonplace across football, and before that a range of different incentive systems have been experimented with. In France in the 1970s, bonus points were offered for teams scoring three or more goals. In other sports, bonus points are regularly awarded for attacking play.

In this paper we investigate a particular experiment in Soviet football in the late 1970s and 1980s. In response to an increasing number of drawn outcomes, and concerns regarding corruption, a draw limit was introduced. Teams that had already drawn a particular number of matches in a given season would not gain a point for drawing any further matches. This led to an asymmetry in rewards, in particular if a team that had reached the draw limit faced a team that had not.

We investigate whether this system had any impact on match outcomes. We find some evidence that it reduced the number of goals, and that as teams neared and exceeded the draw limit, they draw fewer matches. The experiment was, nonetheless, abandoned in 1988.

JEL Classification: O1, C20, L83.

Keywords: Tournament design, contests, sport.

1   Introduction

Economists are interested in outcomes — the results of decisions made regarding scarce resources by agents acting within environments that they must take as given. Sport, and football in particular, offers

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insight into a wide range of measurable outcomes, and provides vast amounts of data on the decision making that surrounded such outcomes.

Usually in the context of individual contests, immediate rewards are either symmetric or diametrically opposed: a team that wins will progress in a competition while the loser is eliminated, in a league structure the winner gains points, the loser zero, or points are shared if the match is drawn.

Despite this, there have been variations over the years in terms of the rewards on offer, usually as an attempt to encourage more exciting play, to discourage attempts at cheating, and thus to attract more spectator demand. Indeed, it is only since the 1980s that three points for a win became commonplace across football, and before that a range of different incentive systems have been experimented with. In France in the 1970s, bonus points were offered for teams scoring three or more goals. In other sports, bonus points are regularly awarded for attacking play.

In this paper we investigate a particular experiment in Soviet football in the late 1970s and 1980s. In response to an increasing number of drawn outcomes, and concerns regarding corruption, a draw limit was introduced. Teams that had already drawn a particular number of matches in a given season would not gain a point for drawing any further matches. This led to an asymmetry in rewards, in particular if a team that had reached the draw limit faced a team that had not. We investigate whether this system, which was altered during its existence through to 1988, had any impact on match outcomes.

In Section 2 the relevant previous literature is reviewed, in Section 3 the modelling methodology adopted is set out, in Section 4 our dataset and sources are introduced, in Section 5 results from the econometric estimations are presented, and Section 6 concludes.

2   Literature

Rewards in sporting competition are offered to elicit effort by participants. Part of the spectacle of organised sport is observing high levels of skill and effort in pursuit of some goal.

Such rewards for effort in competition, and changes to them, have frequently attracted the attention of economists. Szymanski (2003) provides an overview of economic interest in the design of contests.

Equally, however, examples of suboptimal design of rewards and incentives abound. Some of the more eggregious examples have occurred at major showpiece events like football's World Cup, or the Olympics. Such events have led to changes in how such tournaments are organised.

A prominent example of a change in rewards is the change in football from two to three points for a win. Garicano and Palacios-Huerta (2005) found that while there was evidence for increased offensive play, there was offsetting evidence for defensive play, as defending a lead became more important under the new rule.

Rules changes are often proposed in response to cases of perceived corruption, or cheating. Preston and Szymanski (2003) provide a framework for evaluating cheating in contests from an economic perspective.

3   Methodology

We employ a linear regression method to investigate the impact of this change. Specifically, we consider our approach to be a difference-in-differences method, since we consider teams which are treated by the limit on draws imposed.

We estimate, for a range of outcomes in a match between team i and team j at time t:

$$outcome_{ijt} = \alpha_i + \beta_j + \gamma_1 HomeElo_{it} + \gamma_2 AwayElo_{jt}$$
$$+ \theta_1 limitexists_t + \theta_{2i} limitbinds_{it} + \theta_{2j} limitbinds_{jt} + d_t + \varepsilon_{ijt} \ . \tag{1}$$

We include a variable $limitexists_t$ which is 1 for the seasons where a draw limit was in place, and we also include two $limitbinds$ binds variables, which take the value 1 if a team has reached its maximum permitted number of draws in a season.

As controls, we include the league position of each team in a match and its square, the Elo prediction and squared prediction, and the number of draws a team has achieved. Month of the season, season, home and away team fixed effects are included.

For the seasons 1978 and 1979, the maximum number of draws was 8, and for seasons 1980 to 1988, the limit was 10. After a team had recorded the maximum permitted number of draws, any extra draw would yield zero points, rather than one point as per normal. We insert a dummy variable that is 1 for these seasons, in order to determine whether the simple existence of a draw limit had an impact. We further add a dummy variable that is 1 for matches where either the home or the away team has reached the draw limit, and hence if that match finishes as a draw that team will not gain a point.

4   Data

We collect data on match results for the Soviet Top League from worldfootball.net. The basic characteristics of the data are presented in Figure 1. The first year of observations is 1936, when two leagues seasons were played in the Spring and then in the Autumn. Annual seasons were played from 1937 to 1941, with a break until 1945 for the Second World War. The league then ran until the fall of the Soviet Union in 1991. The league regularly changed format over this time, as the vertical bars indicate in Figure 1, which represent the number of matches per year.

The red circles indicate the proportion of matches finishing as home wins, the black circles those finishing as draws, and the green circles those finishing as away wins. Contrary to the pattern often observed in other countries, over time the extent of home advantage appears to have been increasing, since around the Second World War between 40 and 50% of matches finished as home wins, but by the end of the 1980s this was getting closer to 60%. The proportion of away wins fell from as much as 40% in the early years down to 20% by the end of the 1980s.

Also contrary to patterns observed elsewhere, the proportion of draws is significantly higher than of away wins, and indeed into the 1970s around 40% of matches finished as draws. The 1977 season was the season that provoked a rule change limiting draws, as in this season there were more draws (44.6%) than home wins (41%). In subsequent seasons the number of draws was lower, although not necessarily any lower than it has been before 1977.

Another prominent outcome of matches is the number of goals scored; in Figure 2 the average goals per game by home teams and away teams is plotted. For both home and away teams, the number of goals shifted down in the 1950s and early 1960s. After this home goals has trended up slightly, while away goals have remained fairly consistent over the period.

In Table 1 we present summary statistics of our dataset. The dataset contains 12,510 matches, of which 135 did not play, 30 were annulled, and five more were declared a result. We ignore these observations and focus on the remaining 12,340 match uoutcomes, of which 48.4% ended as home wins,

28.4% as draws, and 23.2% as away wins.

The variable *draw.limit*1 is 1 for all seasons where an eight-game draw limit was in place, and hence around 4% of all observations had such a limit in place. The variable *draw.limit*2 is 1 for all seasons where a 10-game draw limit was in place, which equates to around 20% of all matches.

The variable *draw.limit*1.*exceeded*1 is 1 if a team has drawn more than or equal to the limit in an eight-game limit season, and 0.7% of our observations, or 92 occasions. For the longer ten-game limit, there are 276 matches where the home team had reached or exceeded it, and 256 where the away team had. In 82 matches, both teams had.

Table 1: Summary Statistics of Data

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
Home win	12,340	0.484	0.500	0.000	0.000	1.000	1.000
Draw	12,340	0.284	0.451	0.000	0.000	1.000	1.000
Away win	12,340	0.232	0.422	0.000	0.000	0.000	1.000
Home team league position	12,510	8.858	5.001	1	5	13	26
Away team league position	12,510	8.685	4.979	1	5	12	26
Home team number of draws in season	12,510	4.045	3.259	0	1	6	20
Away team number of draws in season	12,510	4.072	3.253	0	1	6	19
Elo match prediction	12,510	0.496	0.162	0.060	0.379	0.615	0.938
Draw limit 1 in existence (1978–1979)	12,510	0.044	0.204	0	0	0	1
Home team reached or exceeded Draw limit 1	12,510	0.007	0.085	0	0	0	1
Home team one draw from Draw limit 1	12,510	0.003	0.056	0	0	0	1
Away team reached or exceeded Draw limit 1	12,510	0.007	0.085	0	0	0	1
Away team one draw from Draw limit 1	12,510	0.004	0.061	0	0	0	1
Draw limit 2 in existence (1980–1988)	12,510	0.204	0.403	0	0	0	1
Home team reached or exceeded Draw limit 2	12,510	0.022	0.147	0	0	0	1
Home team one draw from Draw limit 2	12,510	0.016	0.124	0	0	0	1
Away team reached or exceeded Draw limit 2	12,510	0.020	0.142	0	0	0	1
Away team one draw from Draw limit 2	12,510	0.018	0.131	0	0	0	1

5   Results

We present results in Table 2. Elo predictions are the strongest predictor of match outcomes, and goals.

In the draw limit seasons, there were fewer away wins. An away win was about 20 percentage points less likely. Home teams scored around half a goal less, on average, and away teams a goal less. There was no other significant impact of a draw limit simply being in place.

If the home team was near, at or above its draw limit in the 10-match limit seasons, a home win was about 8 percentage points higher. If the away team was near, at or above its draw limit in the 10-match limit seasons, a draw was about 10 percentage points less likely, and an away win about 8 percentage points more likely.

If either team had exceeded its draw limit in 10-match limit seasons, the home team scored about 0.2 more goals, and if the away team was near or exceeded the limit, it scored about 0.14 more goals.

Table 2: Regression results

	Dependent variable:				
	home	draw	away	goals1	goals2
	(1)	(2)	(3)	(4)	(5)
Constant	0.098	0.118	0.784***	1.717***	2.985***
	(0.160)	(0.151)	(0.135)	(0.434)	(0.360)
Home team league position	−0.011***	0.008**	0.003	−0.020**	0.0001
	(0.004)	(0.004)	(0.003)	(0.010)	(0.008)
Away team league position	0.005	−0.003	−0.002	0.010	−0.004
	(0.004)	(0.003)	(0.003)	(0.010)	(0.008)
Home team league position squared	0.001***	−0.001***	−0.0001	0.001*	−0.0002
	(0.0002)	(0.0002)	(0.0002)	(0.001)	(0.0004)
Away team league position squared	−0.0002	0.0001	0.0001	−0.0004	0.0002
	(0.0002)	(0.0002)	(0.0002)	(0.001)	(0.0004)
Home team number of draws in season	0.002	−0.004*	0.002	−0.004	−0.007
	(0.003)	(0.002)	(0.002)	(0.007)	(0.006)
Away team number of draws in season	−0.002	0.0001	0.002	−0.011	0.0003
	(0.003)	(0.002)	(0.002)	(0.007)	(0.006)
Elo predicted outcome	0.564***	0.292*	−0.856***	−0.414	−2.330***
	(0.162)	(0.153)	(0.137)	(0.439)	(0.364)
Elo predicted outcome squared	−0.068	−0.449***	0.517***	1.670***	1.348***
	(0.156)	(0.147)	(0.132)	(0.423)	(0.350)
Draw limit 1 in existence (1978–1979)	0.101	0.082	−0.183**	−0.640**	−1.048***
	(0.102)	(0.096)	(0.086)	(0.275)	(0.228)
Home team reached or exceeded Draw limit 1	−0.033	0.020	0.013	−0.171	−0.061
	(0.072)	(0.068)	(0.061)	(0.196)	(0.162)
Home team one draw from draw limit 1	−0.075	0.066	0.009	0.012	0.181
	(0.091)	(0.086)	(0.077)	(0.246)	(0.204)
Away team reached or exceeded Draw limit 1	0.021	0.065	−0.086	0.313	0.074
	(0.074)	(0.070)	(0.062)	(0.200)	(0.166)
Away team one draw from draw limit	−0.014	0.114	−0.100	0.117	−0.219
	(0.085)	(0.080)	(0.072)	(0.230)	(0.191)
Draw limit 2 in existence (1980–1988)	0.125	0.085	−0.210**	−0.594**	−1.191***
	(0.101)	(0.095)	(0.085)	(0.273)	(0.226)
Home team reached or exceeded Draw limit 2	0.083**	−0.031	−0.051	0.183*	−0.097
	(0.040)	(0.038)	(0.034)	(0.109)	(0.090)
Home team one draw from draw limit 2	0.084**	−0.040	−0.044	0.071	−0.033
	(0.042)	(0.040)	(0.035)	(0.114)	(0.094)
Away team reached or exceeded Draw limit 2	0.046	−0.124***	0.078**	0.209*	0.140
	(0.042)	(0.040)	(0.035)	(0.114)	(0.094)
Away team one draw from draw limit 2	0.006	−0.084**	0.077**	−0.038	0.148*
	(0.040)	(0.037)	(0.034)	(0.108)	(0.089)
Observations	12,340	12,340	12,340	12,340	12,340
R^2	0.118	0.035	0.116	0.140	0.140
Adjusted R^2	0.098	0.014	0.096	0.122	0.121
Residual Std. Error (df = 12075)	0.475	0.448	0.401	1.286	1.065
F Statistic (df = 264; 12075)	6.101***	1.665***	5.976***	7.465***	7.440***

Note: *p<0.1; **p<0.05; ***p<0.01

6 Conclusions

In this paper we consider a novel experiment in footballing history, a cap on the number of draws for which points were awarded. It appears that the limit did influence behaviour for those teams for whom the limit nearly bound, or bound.

Overall, though, the simple existence of the limit appears to have led to fewer goals, and fewer away wins.

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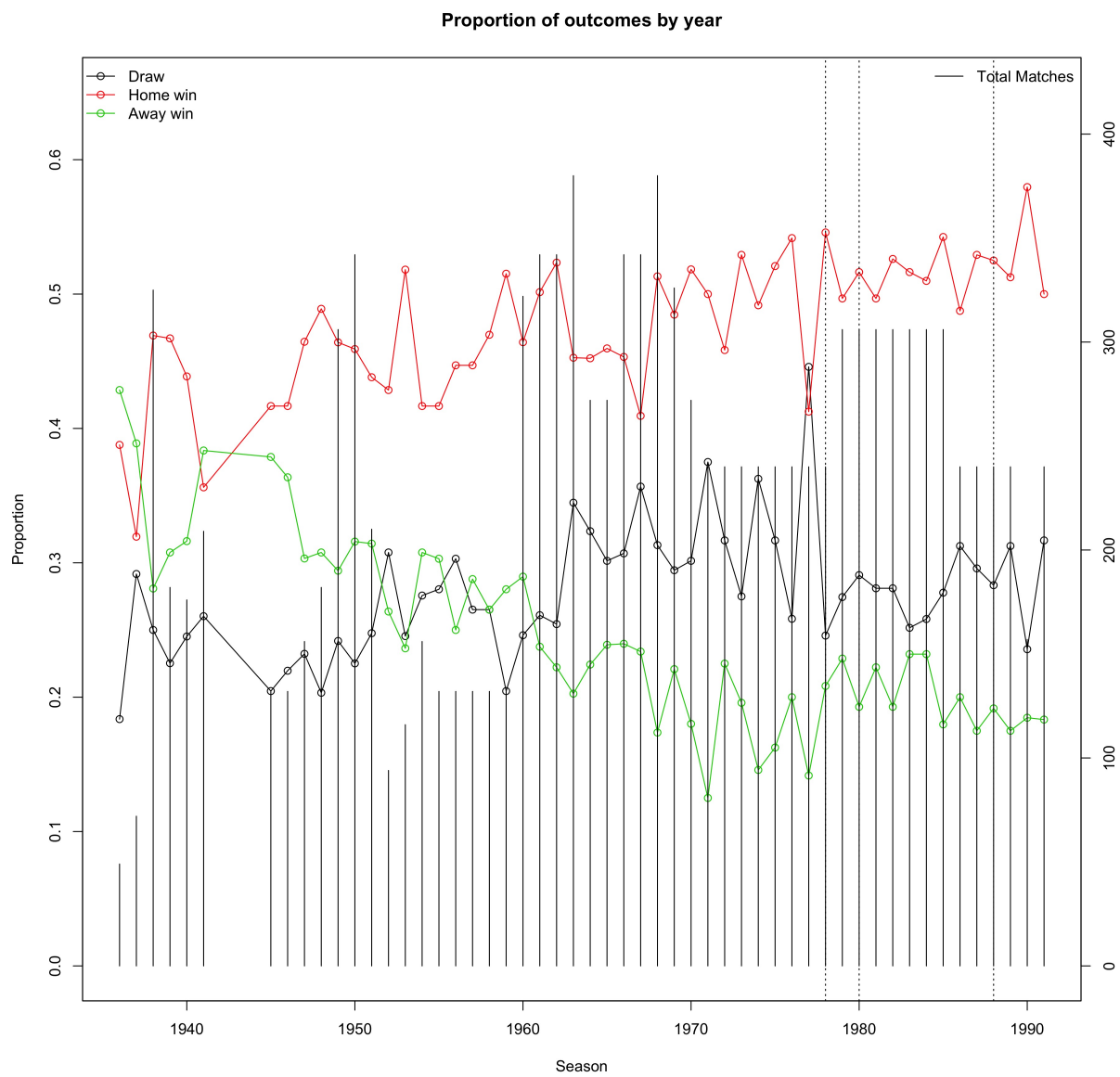S. Szymanski. The economic design of sporting contests. *Journal of economic literature*, 41(4):1137–1187, 2003.

Figure 1: Proportion of matches finishing as home wins, draws or away wins, and number of matches.

Goals per game by year

Figure 2: Average goals per year.