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**International hostility and aggressiveness on the soccer pitch
Evidence from European Championships and World Cups for the
period 2000-2012**

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Abstract

Some Researchers consider soccer matches as the stylization of a war in other battlefields. Such approach was largely used to interpret the violent phenomena related to the soccer environment, while less attention has been paid to the «potential» role of political and economic interactions between countries in determining the aggressive attitude of players on the pitch. In our paper we empirically investigate if and how political hostility among countries reverberates on a soccer pitch by influencing players' aggressiveness. The analysis focuses on official matches played by national teams in the final phases of the European and World Cup tournaments since 2000. We estimate a Negative Binomial regression including both political and sport variables, and we find that (a) commercial hostility; (b) the level of diplomatic relationships, (c) power asymmetry and (d) education gap between countries are positively and significantly associated with aggressiveness of the players on the pitch, approximated by the number of yellow and red cards. That is, briefly stated, international hostility reverberates into the pitch. Moreover, sport covariates present the expected signs, namely results show that the closeness of the teams, their ranking and the stage of the game (knockout stages with respect to the group phases) are also crucial in determining the cautions.

Keywords: international hostility, diplomacy, aggressiveness on the pitch, soccer, football.

Introduction

International soccer matches have been often related to political relations. If we consider Korea, in September 10, 2008, the national soccer teams of Korea Democratic Popular Republic and Korea Republic were to play their match for the 2nd stage group qualification of the World Cup 2010 at the Shanghai Hongkou Stadium in China. The match was to be played on neutral site. The choice was determined due to political reasons: North Koreans are not willing to play the South Korean anthem and to display its flag on their own territory. A more striking political accident occurred between El Salvador and Honduras in 1969 and it has been popularized by Kapuściński (1991). It ended up in the so called “*Soccer War*”. Moreover, in 1986 at the World Cup, when the English national soccer team had been eliminated at the quarter-final stage by Argentina, many observers recalled the political hostility between the two nations because of the Malvinas-Falkland war.

Briefly, the importance of soccer appears to go beyond the sport competition. In many cases, nationalism emerges when national teams take part into major soccer international competitions.

Moreover, some sociological approaches consider a soccer match has the stylization of a war in other battlefields (Elias and Dunning, 1986). That kind of approach was largely used to interpret the violent phenomena related to soccer, as hooliganism (Caruso and Di Domizio, 2012; Leeson et al., 2012). Less attention has been paid to the «potential» role of political and economic interactions in determining the aggressive attitude of players on the pitch.

Our paper investigates if and how diplomatic and trade relations among countries reverberate on the soccer pitch. The empirical analysis focuses on matches played by national teams in the final phases of the European and World Cup since 2000. In order to study the emergence of aggressiveness, as dependent variable, we use the number of yellow and red cards (namely the pitch penalties) received by players as a proxy of their aggressiveness. Then, we estimate a regression equation including political and economic variables. Since the dependent variable is a count, the empirical models are estimated by means of Negative Binomial Regressions with Maximum Likelihood techniques. Once the sport control variables were added in the regression, results show that diplomatic and trade relations, together with power and education asymmetry are significantly associated

with players' aggressiveness on the pitch. Moreover, sport covariates show the expected signs, such as the closeness of the teams, their ranking and the stage of the game (knockout stages) are also crucial in determining the penalties on the pitch.

The paper is organized as follows: section 1 describes the role of violence in sport contexts and particularly in the football environment; section 2 discusses data set composition and the variables used in the empirical investigation. Section 3 describes the empirical strategy and discusses the results; section 4 concludes.

1. Soccer-related violence: an overview

The relationship between sport and violence has been widely debated in judicial, sociological and economic literature, particularly for soccer (Giulianotti et al., 1994; Dunning, 1999). Many factors contribute to make soccer a stage for violent episodes: it mimics a conflict, it is a team sport and it is also associated with a shared sense of community. This is why Elias and Dunning (1986) claim that soccer matches stylize and miniaturize the war. This approach evidently takes into account the idea according to which violence cannot be removed from the sport environment. Different interpretations have been produced to explain such a relevant presence of violence in a sport/soccer context. For example Bandura (1973) considers the violence as a consequence of the frustration generated by a defeat, while Dunning (1999) explains that aggressiveness associated to soccer matches is basically masculinity, territorial struggle and excitement. Following the latter idea, the attention was mainly devoted to the analysis of the hooliganism phenomenon, originated in modern time from the United Kingdom and spread in almost all of European countries (Spaaij, 2008). Other contributions incorporate actions of hooligans in a framework of rational behaviour also in order to identify the optimal counter strategy implemented by governments (Poutvaara and Priks, 2009; Marie, 2011).

The presence of violence in a sport context is also consistent with the multi-shaped interpretation of sport as expounded by Caruso (2008; 2011), who extends the definition presented by Downward and Riordan (2007) and builds on Boulding's contributions (1973; 1978). More precisely drawing from Caruso (2011) we espouse the following definition of sport: *«a joint indivisible good, which is produced and consumed by different agents at a certain place and time. It can have multiple shapes. In fact, it is a*

combination of: (i) a market good, (ii) a relational good and (iii) an expression of threat, power and coercion. All components differ in intensity, but differently from (i) and (iii) the relational component must be necessarily positive». Agents have utility functions which incorporate market goods, relational goods, and eventually hatred against other persons. Agents are not only committed to consumption but they are also producing units.

That is, sport has a multiple nature so implying that the social outcome emerging from sport would depend on intensity of the different elements. Particularly, when the relational nature of sport dominates the other components, the relationship with violence may be reversed and a beneficial effect of sport participation can be envisioned. Caruso (2011) tested this idea by studying the negative relationship between sport and crime. This could support the idea of the appropriate role of sport to prevent violent behaviour and promote individual and community development. In spite of this potential benefit, the multi-shaped definition mentioned above, takes into account some violent and aggressive components of sport. Sport can involve threat, coercion, aggressive behaviour and extreme competition. This is not a novelty. Consider some examples drawn from history. Since the end of World War II, the Soviet bloc organized their sport system through security and armed forces. Most sport heroes were soldiers or police officers. Sport was designed to control the society (Howell, 1975; Cooper, 1989; Riordan, 1993). Needless to say, sport was also interpreted as ancillary to foreign policy. In fact, success in sport was intended to support USSR and other socialist countries to gain international prestige (Riordan, 1974).

Recently, researchers began to use sport to empirically disentangle the effect of culture, institutions and poverty in determining violent behaviour inside the pitch. For example Miguel et al. (2008) analysed the relationship between violent behaviour of the single player on the football pitch and the history of civil conflict in the player's provenance, using data from the major six professional European football leagues. They used the number of yellow and red cards attributed by referees to the players and, after the introduction of sport, economic and geographical control variables, they included the number of years passed after a civil war between 1980 and 2005. They found a strong relationship between the latter explanatory variable and the number of yellow and red cards, supporting the idea that the national culture and identity influence the violent attitude of players on the pitch. Different results are presented by Cuesta and Bohórquez (2012) in their empirical investigation on Copa Libertadores.¹ Taking into account a

broader concept of national culture, they contested the number of years passed after a civil war as a measure of violence in a country. Adding other variables in order to approximate the violent attitude of each country, such as the years of dictatorship, the homicides rate, the number of years of armed conflict within each country and the related homicides rate, have shown that the violent behaviour of players depends exclusively on soccer characteristics, and that their nationality is not significant as far as their violent behaviour on the pitch is concerned.

In what follows, we focus on the aggressive behaviour emerging on the pitch at the match level. In particular, we contribute to the existing literature by empirically investigating the relevance of political, diplomatic, education and economic linkages between countries involved in the match under investigation, on the sanctions attributed by the referee on the soccer pitch, namely yellow and red cards.

2. The variables

The empirical analysis covers the period 2000-2012, and focuses on matches of World Cups and Euro Championships. We concentrate on the final phases instead of qualifying rounds in order to avoid any potential bias on the dependent variable determined by the home field influence on referees (Nevill et al., 2002). The matches under investigation are 316, 192 of World Cup and 124 of Euro Championship. We consider group stage matches (240) and knockout stage matches (76), namely tie-matches and finals. The competitions involved 62 European and Extra-European nations considering the team Yugoslavia (at the Euro Championship 2000) differently with respect to Serbia and Montenegro. Details about the competitions under investigation are in the table 1.

Competition	Year	Hosting Country	Group matches	Knockout matches
Euro Championship	2000	Belgium/Netherlands	24	7
World Cup	2002	Japan/South Korea	48	16
Euro Championship	2004	Portugal	24	7
World Cup	2006	Germany	48	16
Euro Championship	2008	Austria/Switzerland	24	7

World Cup	2010	South Africa	48	16
Euro Championship	2012	Poland/Ukraine	24	7

The dependent variable is labelled *Aggressiveness* and it denotes the number of sanctions attributed by the referee to the players during the match.² It is computed as follows:

$$\text{Aggressiveness} = \text{Yellow cards} \cdot 1 + \text{Second yellow cards} \cdot 2 + \text{Direct red cards} \cdot 3.$$

The dependent variable needs some explanation. First, we pay our attention on referees' sanctions instead of fouls committed because the latter are not homogeneous and available for all matches. At the same time, needless to say, there is a strong positive correlation between the actual number of fouls committed and the number of yellow and red cards. Briefly, the number of cards may be considered a good approximation of the aggressiveness on the field. Secondly, we prefer to weigh the referee cautions in order to take into account that the second yellow card, usually, is rewarded for some more serious foul than those which have determined the first sanction. Anyway, it is less serious than those that determined a single direct red card. In fact, this is confirmed by the fact that the second yellow card does not imply a disqualification of the player for one or more of future matches.³ Note that we have not made distinctions between yellow and red card received because of violent behaviour and those received for other irregular conducts. For example it is possible that one player receives yellow/red card because of verbal protest or for excess of elation, but that distinction is not included in our dependent variable identification.

The list of independent explanatory variables includes economic, political, education and sports data. One group focuses on the relationship between countries. In particular, we take into account some measure of hostility both in terms of commercial and political-diplomatic relations. Hereafter, commercial hostility is defined as the attitude of the economy of country *A* to penetrate in the economy of country *B*. Such idea is drawn from that explained by Hirschmann (1945/1980) according to which trade can be interpreted as a source of power and influence between countries. Then, we calculated, for each dyad of countries, two penetration indexes able to capture that attitude; the penetration index for the country *A* is computed as the ratio between exports from country *A* to *B*, divided by the total

imports of country *B*. The same we do for the penetration index of country *B* (exports from country *B* to country *A* divided by total imports of country *A*).⁴ At the end, we select the highest index among the two as the proxy of our measure of *Commercial Hostility* variable. It is bounded between 0 and 1, and we expect a positive sign of the associated coefficient.

In addition, we introduce a dummy variable, *Diplomatic Hostility*, to capture the level of diplomatic relations between the countries. This dummy is constructed on information drawn from the Correlates of War (COW) Diplomatic Exchange data set.⁵ The dyadic data set describes the level of diplomatic exchange between members in the COW system at the level of *chargé d'affaires*, minister, and ambassador between members of the interstate system.⁶ The dummy equals 1 when the level of diplomatic exchange in the period considered is above 3 (the maximum diplomatic representation in the other country), indicating potential tensions between countries, and 0 otherwise). We use the diplomatic relations recorded for the period 1995-2005. We also introduce a variable to evaluate power gap among countries by means of the National Material Capability data set.⁷ The Composite Index of National Capability (CINC) summarizes the power of each country using data on total and urban population, iron and steel production, energy consumption, military personnel and military expenditure.⁸ The variable included in the regression is the absolute value of difference of CINC for the countries involved (*CINC Difference*). We expect a positive sign of the coefficient because we can suppose that the football match may be seen as an opportunity of revenge for countries with less power. Put differently, such redemption chance could be instilled into the national football teams forcing the players to a more aggressive behavior on the pitch.

Eventually, we introduce a control variable approximating the education gap between countries. The variable is calculated as the ratio between the enrolments in secondary education expressed as a percentage of the population of official secondary education age.⁹ The expectation is for a positive sign of the associated coefficient, and the explanation may be based on the same ground of the previous hostility variables.

A second group includes sport variables. First, we consider the closeness of the game since it should influence the level of aggressiveness and, as a consequence, the number of fouls and referees' sanctions. To capture that, we introduce the variable *Ranking Difference*, that is, the absolute value of the difference between the FIFA World Ranking of each

team.¹⁰ We do not formulate unidirectional expectation on the sign of the coefficient. On one hand, if a match is balanced, it could be harsher. On the other hand, when the ranking difference increases, the underdog team may behave more aggressively to reduce the distance in sport talent. A possible alternative measure of the closeness of the game may be introduced using the points attributed by the FIFA in order to list its official ranking. Then, the variable *Points Difference* measures the absolute value of the difference in points achieved by each team in the FIFA World Ranking.¹¹ Moreover, we introduce a dummy (*World Cup*) to denote whether the match has been played in the World Cup tournament. The dummy *Knockout Stage* denotes whether the match is a tie-match or not. The expectation is for a positive sign of associated coefficients to both variables. Another dummy variable (*Hosting Country*) is added to the data set to highlight matches played by the national team of the country hosting the competition. This has been made in order to take into account the potential home field bias determined by the referee subjection in distributing sanctions (Dawson et al., 2007) and secondly to catch the likely agonistic over-fierceness of the national teams players of the hosting country inflamed by local supporters. To take into account referees' attitudes, we introduce a dummy (*Peripheral*) which is 1 if the referee do not come from major federations, namely UEFA and CONMEBOL.¹² This variable tries to catch the potential bias in the yellow and red cards distribution determined by the lower opportunity of referees coming from peripheral federations (such as AFC, CAF, CONCACAF and OFC) to face with high level matches during the regular season.¹³

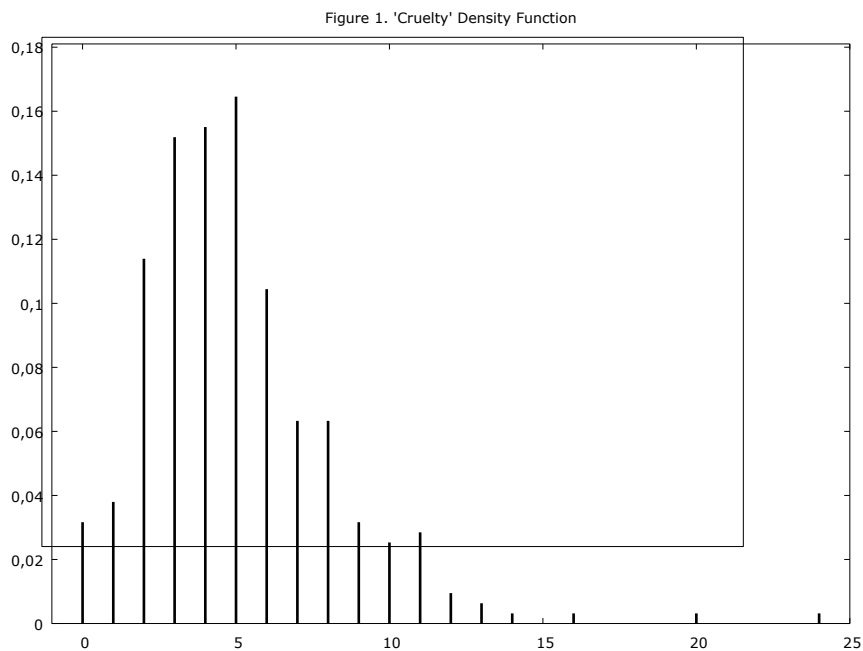
Eventually, we introduce other dummy variables: (1) the first (*Overtime*) captures matches ended up in overtime; (2) some geographical dummies (*Africa*, *Asia* and *Oceania*) that indicate matches involving teams from Africa, Asia and Oceania, respectively. These dummies are introduced to consider the different approach that teams from peripheral areas, on the soccer perspective, may have respect to those coming from the core of football dominance located in the South America and Europe. Descriptive statistics of variables are presented in table 2.

Table 2. Descriptive statistics for dependent and explanatory variables

Variables	Obs	Avg	Min	Max	SD	Source
<i>Aggressiveness</i>	316	5.022	0	24	3.11	<i>Our elaboration on data FIFA and UEFA</i>
<i>Ranking Difference</i>	316	18.56	1	104	16.8	<i>FIFA World</i>

<i>Points Difference</i>	316	166.83	1	1326	191.22	<i>Ranking</i>
<i>Commercial Hostility</i>	316	0.047	0	0.526	0.069	<i>IMF Direction of Trade</i>
<i>Power gap (CINC Difference)</i>	316	0.0184	1.4 e-005	0.167	0.029	<i>Correlates of War</i>
<i>Education gap</i>	308	1.416	1	8	0.872	<i>World Bank</i>
Dummies	Obs	0	1			
<i>Diplomatic Hostility:</i>						
<i>1970-2005</i>	316	183		133		<i>Correlates of War</i>
<i>1990-2005</i>	316	223		93		
<i>1995-2005</i>	316	230		86		
<i>Knockout Stage</i>	316	240		76		
<i>World Cup</i>	316	124		192		
<i>Hosting Country</i>	316	269		47		
<i>Over Time</i>	316	292		24		<i>FIFA and UEFA</i>
<i>African</i>	316	270		50		
<i>Asia</i>	316	277		39		
<i>Oceania</i>	316	306		10		
<i>Peripheral</i>	316	246		70		

Figure 1 illustrates the density function of the dependent variable *Aggressiveness*.



As showed by figure 1 the dependent variable is far to be considered normally distributed, and the same is for the hypothesis of a log-normal distribution. To confirm, tests on the hypothesis of the normality distribution on *Aggressiveness* and on its logarithm were performed. Results are shown in table 3.

	<i>Aggressiveness</i> (316 obs.)	<i>Log of Aggressiveness</i> (306 obs)
Skewness	1.589	-0.352
Kurtosis	5.524	0.256
Doornik-Hansen test	86.02 (2.08e-019)	6.271 (0.043)
Shapiro-Wilk test	0.896 (6.87e-014)	0.968 (2.51e-006)
Lilliefors test	0.158 (~=0)	0.117 (~=0)
Jarque-Bera test	535.046 (6.55e-117)	7.16 (0.028)

P-value of normal and log-normal distribution test in parenthesis

The density function of *Aggressiveness* best fits with a Poisson distribution for count data. To verify, table 4 shows the observed *Aggressiveness* distribution among matches and that expected according to a Poisson distribution of the variable *Aggressiveness*. It was calculated using the average of *Aggressiveness* as the fixed parameter of the Poisson probability distribution.

<i>Aggressiveness</i>	Observed matches	Expected matches
0	10	2.08
1	12	10.46
2	36	26.26
3	48	43.97
4	49	55.20
5	52	55.44
6	33	46.41
7	20	33.30
8	20	20.91
9	10	11.67
≥10	26	10.24

Total	316	316
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4. The empirical strategy

Considering the characteristics of the dependent variable as specified in the tables 3 and 4, we use a Negative Binomial Regression (Verbeek, 2004; Green, 2008). We use negative binomial rather than Poisson models because of over-dispersion between mean and variance of dependent variable. We prefer to estimate and represent the Negative Binomial I and II regressions, whose results are described in table 5.¹⁴

Table 5. Maximum Likelihood Estimation – Negative Binomial Regression I and II Robust Standard Errors. 308 observations for the period 2000-2012 Dependent variable: <i>Aggressiveness</i>		
Explanatory variables	NEG BIN I Coefficient	NEG BIN II Coefficient
<i>Commercial Hostility</i>	1.228** (0.539)	1.401* (0.737)
<i>Diplomatic Hostility</i>	0.381*** (0.116)	0.302** (0.120)
<i>Power gap (CINC Difference)</i>	5.346*** (1.062)	5.204*** (1.378)
<i>Education gap</i>	0.226*** (0.069)	0.538*** (0.122)
<i>Ranking Difference</i>	0.011*** (0.003)	0.010*** (0.004)
<i>Knockout Stage Matches</i>	0.383*** (0.122)	0.311** (0.132)
<i>World Cup Matches</i>	0.726*** (0.138)	0.500*** (0.127)
<i>Hosting Country</i>	0.495*** (0.129)	0.394*** (0.113)
<i>Over Time</i>	-0.041 (0.206)	0.062 (0.170)
<i>Africa</i>	-0.564*** (0.199)	-0.597*** (0.159)
<i>Asia</i>	-0.263** (0.130)	-0.265* (0.142)
<i>Oceania</i>	0.123 (0.238)	0.150 (0.196)
<i>Periphery</i>	0.008 (0.113)	-0.059 (0.126)
δ^2	1.447*** (0.192)	

a^2		0.405*** (0.050)
<i>Log-likelihood</i>	-848.42	-831.28
<i>LR Test</i> (χ^2_4)	126.1	184.6
<i>Wald Test</i>		
<i>Robust F</i> (4, 294)	16.38	28.58
Standard errors in parenthesis. Statistical significance:***>99%, **>95%, *>90%.		

Note that we follow the previous econometric literature leaving out the constant from the regression equation. LR and Wald tests confirm the joint statistical significance of the (first group) variables associated to commercial hostility, diplomatic relationships, international leadership recognition and education gap. The log-likelihood values suggest preferring the NEG BIN II model to the NEG BIN I; for this reason, we comment only the first.

Considering the variables of the first group we note that they have all a positive impact on *Aggressiveness*. First, being a continue variable ranged between 0 and 1, we can calculate that an increase of one percentage point in the *Commercial Hostility* implies an increase by 1.4 percentage points in the conditional average of *Aggressiveness*. It is the same for the variable *CINC Difference* and for the *Education gap* for which each increase in one point determines an increase of conditional average of *Aggressiveness* of 5.2 and 0.54 percentage points respectively. Considering the *Diplomatic Hostility*, when political tensions between countries are registered by our dummy variable, the conditional average of *Aggressiveness* increases of 35% respect to matches played between countries with regular relations.

As expected, the sport-related variables are significant in determining the level of aggressiveness on the pitch. In particular, for knockout matches and for those of the World Cup, the expected level of aggressiveness increases, on average (*ceteris paribus*), of about 36.5% and 64.9% respectively. A negative correlation appears between the closeness of the match and the expected *Aggressiveness*, supporting the idea that the underdog team exhibits more aggressive attitude on the pitch even if the marginal effect is not so strong. The magnitude of the coefficient of regression associated to the *Ranking Difference* means that a one unit rise in the absolute difference in the FIFA World Ranking between teams produces an increase in the conditional average of *Aggressiveness* of 0.01. According to the dummy variable, *Hosting Country*, its related coefficient is

significant and has the expected sign. From our regression it emerges that, when the national team of the hosting country is involved in the match, the conditional average of *Aggressiveness* increases about 48.3%. Statistical significance emerges from the dummies associated to football peripheral with the exclusion of *Oceania*; according to our econometric investigation when teams from *Asia* and *Africa* play, the aggressiveness on the pitch reduces about 23.2 and 44.9, respectively. At the end no statistical effect on aggressiveness may be attributed to the matches ended in over- time and those referred by referees from peripheral federations.

Conclusion

The main result we would claim for this paper is that political hostility between countries affect and shape behaviour of players on soccer pitch. In particular, the empirical findings show that the players' aggressiveness is positively related to some political variables. In fact, we considered as dependent variable the number of yellow and red cards (the pitch penalties) as a proxy of the players' aggressiveness and estimated a regression equation including political, education and sport variables. The analysis focused on international matches played by national teams in the Euro Championships and World Cup tournaments for the period 2000-2012. Since the dependent variable is an event count, we used a Negative Binomial regression. Results show that the coefficient associated to the variable approximating the commercial hostility between countries is of statistical significance and positive. The same is for variable capturing the diplomatic tension and the education gap. A significant association is also shown for a variable constructed to capture the different level of power among countries. To summarize, we find that (a) the commercial hostility, (b) the level of diplomatic relationships, (c) the power gap between countries, and (d) education gap are positively and significantly associated to players' aggressiveness on the soccer pitch. That is, briefly stated, international hostility reverberates into the pitch. These results enrich the evidence provided by Miguel et al. (2008) and Cuesta and Bohórquez (2012). Differently from these papers, our work in particular, focuses more on international relations rather than internal conflict or violence. In this way, we capture how soccer can be interpreted as a way for revenge of national pride with respect to other countries.

Finally, our result may be appraised in both political and sport perspectives. First of all, we confirm that the approaches which consider football matches as a battle are not so far from the truth, in particular for national teams playing in the major football competitions. Secondly, we can hypothesize a possible reduction of the aggressiveness on the pitch in the future international competitions since the process of football globalization is going to reduce the inequalities in the skills of football players all over the world (Milanovic, 2005). To conclude, we can formulate a suggestion for international football associations to well consider both football and political factors when the soccer agenda is going to be filled in, especially for the organization of international competitions and the scheduling of qualifying matches, in order to reduce the potential aggressiveness on the pitch.

Notes

- 1 This is the Latin America equivalent to Europe's Champions League made up by teams of South America countries and Mexico.
- 2 Data on sanctions for Euro Championships are retrieved on UEFA official web site in the statistic section, and for World Cup matches on <http://livescore.football-data.co.uk/> in the section World Cup.
- 3 Alternative estimations were performed using the number of yellow and red card without weights or considering a red card as a double yellow card, and no relevant differences emerged in terms of statistical significance and magnitude of the coefficients associated to the explanatory variables.
- 4 Data on commercial flows are provided by the International Monetary Fund - Direction of Trade - data set (May, 2013). All data are expressed in current US dollars; imports are those including cost, insurance and freight. Note that exports and imports of Serbia are that of Republic of Serbia with the exemption of 2000 when data refers to Serbia and Montenegro.
- 5 Data are available in the COW official web site (www.correlatesofwar.org/) in the section «Diplomatic Exchange, 1871-2005» (version 2006.1).
- 6 Details about data set and its use in the literature on international diplomatic relations in Small and Singer (1966; 1973) and Small (1977).
- 7 The data set is provided by the Correlates of War organization on its official web site (NMC version 4) and refers to the pioneering contribution of Singer et al. (1972) and Singer (1987).
- 8 For details about the computation of CINC and the change in the CINC structure of version 4.0 see the section «National Material Capabilities» in the COW official web site. Note that CINC version 4.0 extended data to 2007, while data for the period 2008-2012 are not available. For this reason we use the contemporary CINC data for the period 2000-2006 and for the following period 2008-2012 we use data 2007.
- 9 The *Education gap* is calculated taking the maximum value of the two percentages as the numerator. For this reason the index has the minimum value of 1 and is

increasing in the school enrolment distance between countries. Data are from UNESCO - Institute for Statistics - and are retrieved from the Catalog Sources of World Development Indicators – World Bank. For some countries we were forced to use the closest (yearly) data available respect to the referring year. Data on Côte d'Ivoire and North Korea are not available. We are grateful to an anonymous referee who suggested the inclusion of the educational variable in the econometric investigation.

- 10 Ranking data are released by the FIFA at the start of the competition under investigation on the following dates: Euro Championship 2000 (7 June 2000), World Cup 2002 (15 My 2002), Euro Championship 2004 (9 June 2004), World Cup 2006 (17 May 2006), Euro Championship 2008 (4 June 2008), World Cup 2010 (26 May 2010), Euro Championship 2012 (6 June 2012). Data are promptly retrievable at the following link: www.fifa.com/worldranking/rankingtable/index.html (May 2013). We prefer to use FIFA World Ranking rather than that presented in Torgler (2006), based on the historical performances of national teams, to catch the current features of matches.
- 11 The procedure for calculating the points and related ranking is available on the FIFA official site at the link: http://www.fifa.com/mm/document/fifafacts/r&a-wr/52/00/97/fs-590_10e_wrpoints.pdf (May 2013). In the regression we prefer to use the *Ranking Difference* instead of *Points Difference* even if no relevant differences emerge.
- 12 As noted FIFA delegates the organization of football activities to six Confederations/Associations placed all over the world: Asian Football Confederation (AFC), Confédération Africaine de Football (CAF) in Africa, Confederation of North, Central and Caribbean Association Football (CONCACAF) in Northern and Central America, Confederacion Sudamericana de Fútbol (CONMEBOL) in South America, Oceania Football Confederation (OFC) in Oceania and Union of European Football Association (UEFA) in Europe. The activities also include the selection, training and monitoring of referees' performance which depend on each single federation.
- 13 Respect to the potential bias of the referees use of cautions, determined by their nationality, useful and precious suggestions are due to an anonymous referee.
- 14 Data of Diplomatic Hostility refers to the period 1995-2005.

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