Civil War Exposure and Violence

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Abstract

In recent years scholars have begun to focus on the consequences of individuals' exposure to civil war, including its severe health and psychological consequences. Our innovation is to move beyond the survey methodology that is widespread in this literature to analyze the actual behavior of individuals with varying degrees of exposure to civil war in a common institutional setting. We exploit the presence of thousands of international soccer (football) players with different exposures to civil conflict in the European professional leagues, and find a strong relationship between the extent of civil conflict in a player's home country and his propensity to behave violently on the soccer field, as measured by yellow and red cards. This link is robust to region fixed effects, country characteristics (e.g., rule of law, per capita income), player characteristics (e.g., age, field position, quality), outliers, and team fixed effects. Reinforcing our claim that we isolate the effect of civil war exposure rather than simple rule-breaking or something else entirely, there is no meaningful correlation between our measure of exposure to civil war and soccer performance measures not closely related to violent conduct. The result is also robust to controlling for civil wars before a player's birth, suggesting that it is not driven by factors from the distant historical past.

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"The coarsening of human sensibilities that accompanied the [Nigerian] civil war, both on the battlefront and behind the lines, was being foisted on the general populace. Violence was palpable in the streets." -- Wole Soyinka, *You Must Set Forth at Dawn: A Memoir* (2006: 175).

1. Introduction

In recent years scholars have begun to focus on the consequences of individuals' exposure to civil war. Many scholars (for example Ghobharah et al. 2003) have demonstrated that civil war has severe health consequences, while others have demonstrated the adverse effects of war on psychological states of individuals (Barenbaum et al. 2004). These studies are largely based on survey responses. The shift from surveys to examining actual behavior is, however, a difficult one. For instance, a convincing examination of the effects of civil war exposure on violent behavior cannot be conducted simply by comparing violence levels across countries, since the relationship between conflict exposure and weak institutions makes it difficult to disentangle the independent effects of these variables on behavior. Additionally there is a shortage of reliable cross-country crime data, and the quality of data and reporting standards are also arguably endogenous to the level of violence in a society.

We attempt to surmount these problems by comparing the behavior of individuals with different degrees of exposure to civil war in a common institutional setting with rich and reliable data on violent conduct. Such an environment is offered by the major professional soccer (football) leagues in Europe. The six major European soccer leagues include players from 70 countries, ranging from countries that have experienced no recent civil wars to countries that have continuously been at war.[1] As for empirical measures of individual violent conduct, there is extensive data on the number of yellow and red cards earned by each player. According to soccer's official rules, players who commit exceptionally violent fouls warrant a disciplinary

[1] We do not consider the World Cup since data is limited to very few matches, in contrast to club play.

sanction in the form of a caution (indicated by a yellow card) or a dismissal from the match (a red card). Although yellow and red cards may also be granted for certain non-violent acts, the evidence indicates that an overwhelming majority is given for violent fouls.

Our proxy measure for exposure to civil war is the number of years that a player's country has been in a state of civil war between 1980 and 2005. This proxy provides a lower bound on our estimates of the effects of civil war exposure since many players from countries with civil wars were likely outside the country during the fighting, and were thus neither direct participants nor direct observers of the conflict. We obtain a striking empirical pattern: a strong correlation between the number of years of civil conflict in a player's native country and his likelihood of earning yellow and red cards in Europe. This main result is robust to extensive controls for player and country characteristics and team and continent fixed effects, where we effectively compare nearby countries (for example, African countries with different civil war histories). We also show that our result is robust to controlling for civil wars before a player's birth, suggesting that it is not driven by factors from the distant historical past.

In substance this paper relates most closely to Ghobarah et al. (2003), who identify the long-lasting adverse effects of civil conflict on public health. Barenbaum et al. (2004) provide a useful survey of the literature in psychology on the effects of war on mental health. Other studies by social scientists have used the sports playing field as a laboratory for studying individual decision-making under a clear set of common rules – e.g., Smith (1979a, 1979b), Weinstein et al. (1995), Chiappori, Levitt and Groseclose (2002), Duggan and Levitt (2002), Levitt (2002), Milanovic (2005), Witt (2005), Garicano and Palacios-Huerta (2006), and Price and Wolfers (2007), among others – but to our knowledge we are the first to apply this strategy

to examine the consequences of civil war. The next section describes the data and estimation, followed by the results and the conclusion.

2. Data and Estimation

We analyze the behavior of soccer players to create a revealed preference measure of individuals' proclivity to engage in violent conduct. We argue that the European soccer leagues offer a setting where individual behavior can be studied within a common institutional backdrop and where we can control for alternative explanations for violence, allowing us to isolate the effect of exposure to violence.

Soccer's official rules, the so-called "Laws of the Game," are provided centrally by the Fédération Internationale de Football Association (FIFA), the international governing body.[2] Every soccer game has one referee with the authority to apply disciplinary sanctions, and the rules establish clear penalties for different types of fouls, misconduct, and aggressive behavior. Most fouls are minor and occur within the natural flow of the game's action; these fouls do not earn the player any additional punishment. In contrast, when a more serious offense is committed, the rules stipulate a disciplinary sanction, in particular a caution or dismissal. A caution earns the player a "yellow card." In these cases, the referee stops the match, calls the player over, holds up the yellow card, and writes the player's name in his notebook. A player who receives a yellow card continues to play in the match, yet the yellow card serves as the first and last formal warning.

Yellow cards are a very good measure of violent conduct. Soccer yellow cards are granted for many things, including excessively violent fouls; swearing at an opponent;

[2] See http://www.fifa.com/mm/document/affederation/federation/lotg2006_e_1581.pdf. Referees have incentives to closely adhere to the guidelines: those not enforcing the rules may be assigned to minor games, or even fired.

humiliating the opponent after scoring a goal (with excessive celebration); "diving" to falsely pin a foul on an opponent; or disobeying the referee's instructions, among other behaviors (including time wasting). Yet the available evidence indicates that the vast majority of yellow cards are granted for violent acts.

< Figure 1 Here >

Figure 1 illustrates the causes of yellow cards in the Italian league during the 2005/2006, 2006/2007 and 2007/2008 seasons, and in the UEFA Champions League in 2004/2005 and 2005/2006.[3] In the Italian league, nearly three quarters of all yellow cards were awarded for violent fouls ("assault"), while in the UEFA data the proportion is close to two thirds. A large share of the non-violent fouls are for unsporting behavior, some of which is so aggressive as to seek to provoke a violent response (e.g., humiliating an opponent), and thus could also be interpreted as acts of violence.

While we also examine red card fouls as a measure violent conduct in this paper, the relatively low incidence of red cards means that we employ it as a secondary measure. A second yellow card in the same match leads to a red card dismissal, and in cases of egregious behavior a red card may be assigned without the yellow card warning.[4] When a player is expelled, no replacement is permitted, so his team must complete the match short one player. The UEFA Champions League data indicate that 35% of red cards were given without prior warnings. In another league where data are available, 40% of red cards were directly awarded for exceptionally violent fouls ("assault"), 19% for "professional fouls" (a deliberate act of foul

[3] The data were generously provided to us by Luca Galvan from the Research Department of the Lega Nazionale Professionisti (Italy), and Graham Peaker at UEFA.
[4] Beyond expulsion from the current match, a red card often leads to a suspension from future matches; players who accumulate multiple yellow cards in different matches in the same season may also receive later suspensions.

play, usually to prevent an opponent scoring and sometimes violent), with the rest for "other unsporting acts".[5]

Our main dataset contains information from the 2004/2005 and 2005/2006 soccer seasons in five national leagues (England, France, Germany, Italy, Spain) and one supra-national league (the UEFA Champions League), from ESPN Soccernet website.[6] Each of the national leagues is the top professional league within these countries, and the UEFA Champions League is the top professional league for the continent. We also have data on each individual player's quality as measured by his market value. We obtained this information from a soccer management simulation video game; the game features real players and real teams, including each player's transfer fees and salary.[7]

< Table 1 Here >

Our sample contains several of the world's most high-profile soccer leagues and a remarkably international collection of players, drawn to Europe by the world's highest player salaries (Dobson and Goddard 2001). The mean annual salary in our sample amounts to US$1,291,517, and the average player is worth US$6,323,515 (Table 1).[8] The main analysis sample includes 5,035 player-year observations for players from 70 different countries (see Appendix Table 1). To ensure at least a moderate amount of information per country, we only

[5] Source: *UEFA Disciplinary Statistics 2003/2004*, page 6: http://www.uefa.com/newsfiles/249438.pdf. These figures exclude "second yellow cards", since the underlying behavior that caused these yellow cards is not reported.

[6] The data was downloaded using a Perl script from: soccernet.espn.go.com/.

[7] The game is called *Worldwide Soccer Manager* in the U.S. and *Football Manager* elsewhere. We use the 2005 and 2006 releases. The game was developed by Sports Interactive, and the database is assembled by 2500 researchers worldwide. We searched for news stories regarding many players' transfer fees to confirm reliability.

[8] The values do not depend on the years when transfers are made; they reflect each player's market value at the beginning of the 2004/2005 and 2005/2006 soccer seasons.

consider countries with five or more player-seasons represented in our sample though results are nearly identical using other thresholds.

As mentioned, there are many more yellow cards (mean 2.43 per player per season, see Table 1) reported than red cards (mean 0.15 cards).[9] We have extensive information on players' place of birth as well as on-field statistics (field position, games played, goals scored, yellow and red cards). While most players in the European leagues are from wealthy OECD countries (mainly in Europe), large fractions are from Africa, Eastern Europe, and Latin America, with smaller numbers of Asians (Table 1).

For some players in our sample, the data source (the Soccernet site) did not provide information on their actual place of birth, or indicated a dual nationality. In such cases, we used their participation on a national team to determine nationality. Many players who are originally from less developed countries play for European national teams, and if anything, using this criterion plausibly leads us to underestimate the effect of home country civil war history on violent soccer conduct.[10] Since this coding rule is clearly not ideal (for example because players from civil war torn countries who are playing for France would be classified as not having been exposed to civil war) we also conducted robustness checks using the place of birth coding provided by an alternative source (playerhistory.com), which offers slightly narrower player coverage than Soccernet. Our results are unchanged when we use these data in place of those obtained from Soccernet.

[9] These figures are consistent with Witt (2005) and Garicano and Palacios-Huerta (2006).

[10] As a robustness check on the statistical findings presented below, we checked whether using this coding rule biased our results in a downward direction. We created a variable identifying those players for which we did not have information on their actual place of birth. We found that when this control variable is added to our core specifications the point estimate on our measure of violent norms increases, suggesting that our coding criteria tends to attenuate rather than amplify the effect of civil war on soccer violence.

We control for many of the soccer-related factors correlated with fouls and violence on the field, the most important being the player's field position – defenders and midfielders generally commit more fouls than forwards, who in turn commit more than goalkeepers – as well as the number of games played as a starter or substitute. A player's age may also correlate with violent conduct on the pitch and so is included as a further control. We also control for players' quality using two different indicators. The first one is his success as a goal scorer, measured by the number of goals scored. The second is a player's worth, as measured by his transfer fee (which is highly correlated with his salary).

We include league fixed effects to address any differences in the calling of cards or fouls across countries, and team fixed effects (in some specifications) to capture differences in team quality or playing style and tactics, as these represent a further possible source of variation in the incidence of yellow/red cards. The fact that referees have some discretion in calling fouls and awarding cards raises the possibility of bias, and one leading concern is discrimination against players of particular racial or ethnic backgrounds.[11] To control for any such bias, we include world region fixed effects – for players from Africa, Asia, Latin America, and Eastern Europe – in all specifications. These terms also capture any other factors, including regional styles of play ("dirty" or "clean") or region-wide cultures of violence, allowing us to isolate variation across countries within the same region.

Our analysis of violent behavior focuses on the correlation between individual conduct on the soccer field and civil war in the player's home country. Specifically, we employ the number of years a country suffered from civil war between 1956 and 1996 using the PRIO/Uppsala

[11] This is not an idle concern: there is evidence of racial bias among U.S. National Basketball Association referees (see Price and Wolfers 2007).

Armed Conflict Dataset.[12] Following their conflict classification, we include both "internal armed conflicts" and "internationalized internal armed conflicts", using the comprehensive 25 battle death annual threshold. The former are defined as "conflicts that occur between the government of a state and one or more internal opposition group(s) without intervention from other states", while the latter occur "with intervention from other states (secondary parties) on one or both sides."

We use the PRIO dataset rather than using other measures of violent crime (such as murders per capita) for two reasons. First, even the most extensive (to our knowledge) source of cross-national crime statistics, the U.N. Survey of Crime Trends and Operations of Criminal Justice Systems, has limited country coverage, especially for less developed countries. Second, as per their own disclaimer, their statistics are "better indicators of prevalence of law enforcement and willingness to report crime, than actual prevalence." Since our goal is to capture the specific effects of violent attitudes as opposed to other shared standards of appropriate behavior, we also control for the degree of rule of law using the Worldwide Governance Indicators (WGI) project dataset.[13]

When we analyze the soccer data, given that the dependent variables (yellow card fouls, red card fouls, and goals by player-season) do not take negative values, a count model is most appropriate. We focus on the negative binomial model (since the Poisson model is rejected at high levels of confidence).[14] Standard errors are robustly estimated and the disturbance terms for each country are allowed to be correlated.

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[12] We focus on the 1980-2005 period because it corresponds closely with the age of the players included in our sample. The results are robust when we look at longer periods, including 1960-2005 (see below).
[13] These data are available at: http://www.govindicators.org. Summary statistics are in Table 1.
[14] The "negative" denomination of the binomial model comes from applying the general form of the binomial theorem with a negative exponent. We find over-dispersion for yellow cards but not for red cards, but for consistency, we report negative binomial results for all outcomes.

Regarding the soccer data, there are three possible sample selection concerns. First, our sample consists exclusively of young men, and young men may differ in values from the general population of their own country. Second, the values and behavior of the talented young men who are in our sample may differ from other young men in the home country. Third, the countries represented in our sample, as well as the number of players from each country, could be correlated with the extent of civil war in the home country.

We find that none of these is a major cause for concern. On the first issue, we examined attitudes toward violence using survey data. Specifically, we analyzed the responses to the 1994-1999 wave of the World Values Survey (WVS 1995), using a question that captures justification for the use of violence.[15] We found that the mean responses of young men differ on average from the full sample of female and male adults by just 0.1 points on a four-point scale. On the second issue, we find a strong correlation between yellow and red cards acquired by the soccer players in our sample and the average survey response among all young men in the home country, as shown below. On the third issue, there is no statistically significant correlation between the number of years of civil war and the number of country player-years in our sample, or whether the country is represented in our sample at all (not shown).

Moreover, note that the sample selection rule is uniform across countries – the representatives of each nation in our sample are young men with exceptional athletic talent – which alleviates most concerns about internal validity. Besides, the fact that physically robust young men are the main perpetrators of violence in nearly all societies today (and historically) makes this a population of exceptional interest for the study of violence.

[15] Respondents were asked to react to the following statement: "Using violence to pursue political goals is never justified." The possible answers are "Agree Strongly" (1), "Agree" (2), "Disagree" (3), and "Disagree Strongly" (4). Thus higher scores denote a greater tolerance for the use of political violence. This sample includes 27,526 individual respondents from 38 counties in Africa, Asia, North/Latin America, and Western/Eastern Europe.

3. Empirical Results

Our main results are presented in Table 2 below. In all of our specifications, we include both country characteristics as well as individual traits. The inclusion of the latter is, once again, one of the main advantages of this paper, since it allows us to use individual-level data and observed behavior to identify the effects of exposure to violence.

The number of yellow cards earned in 2004-2006 is positively associated with the number of years of civil war in the player's home country between 1980 and 2005 at the 99% confidence level (Table 2, regression 1). Our proxy for civil war exposure clearly has a powerful association with violent conduct on the soccer field.

< Table 2 Here >

A reasonable way to judge the substantive magnitude is to compare it to the effects of soccer related determinants of yellow cards, such as age. The nonlinear nature of our estimator means there is no single marginal effect of greater civil war exposure, so we focus on particular subpopulations beginning with players from Africa, where civil war risk is highest. In particular, we consider an African midfielder in the French League (the league with the greatest number of Africans) and set civil war risk and other variables to the African average. The predicted number of yellow cards for such a player increases by 3.6 percent when civil conflict prevalence in his home country increases by one standard deviation, or 4 years. Player age is also positively correlated with yellow cards and can serve as a basis for comparison. If the age of the representative African player decreases by two years, his estimated number of yellow cards decreases by 3.0 percent, roughly offsetting the positive conflict effect. A similar calculation for a representative Latin American playing in the Spanish League (the league with the most Latin

Americans) also yields a predicted 3.6 percent increase in yellow cards when civil war increases by one standard deviation.

< Figure 2 Here >

Figure 2 presents a scatter-plot relating years of civil war for each country between 1980 and 2005 (on the horizontal axis) to the average number of yellow cards earned per player-season, both conditional on the control variables included in Table 2, regression 1; the area of the country circles is drawn proportional to the number of player-seasons of that nationality represented in the sample. The graphical relationship is visibly positively sloped. Colombia and Israel are the two sample countries that experienced civil war in every year since 1980, and their players are remarkably violent on the pitch. Inter Milan's Colombian defender Iván Ramiro Córdoba is a case in point: in 2004-5 and 2005-6 he collected a stunning 25 yellow cards.

This graphical representation raises the issue of robustness to excluding countries with exceptionally high civil war prevalence, but a series of checks indicate that the main relationship is stable when outliers are removed; these robustness checks are presented in Appendix Table 2. The first test calculates studentized residuals to identify outliers (following Belsley, Kuh, and Welch 1980). When the main model (analogous to Table 2, regression 1) is re-estimated omitting outliers, the point estimate on civil war remains large and statistically significant (Appendix Table 2, regression 1). The result is also robust to, respectively, dropping OECD countries (regression 2), OECD countries and Colombia (regression 3), just Colombia (regression 4), logging civil war years (regression 5), and running the regressions at the country level (regression 6). Figures 3 and 4 show that the regression line remains distinctly upward

sloping when we respectively drop OECD countries, and when we additionally drop Colombia, Israel, Iran, Peru, and Turkey.[16]

< Figure 3 and Figure 4 Here >

Moving back to Table 2, the main results are virtually identical when regional fixed effects are excluded (not shown), and are robust to the inclusion of country per capita income as an additional control (Table 2, regression 2).[17] The addition of home country democracy as a control also does not change the result (not shown). The association between home country civil war and yellow cards holds conditional on the country rule of law measure (regression 3).[18] The results are unchanged when both rule of law and per capita income are included in the same regression (not shown). It also remains unchanged when we control for team characteristics: the point estimate on the civil war measure is nearly identical at 0.0076 (z-score 2.24, not shown) when team fixed effects are included. The result is also robust to accounting for team quality, measured by their league standings in two variables: the first variable indicates if the team finished among the top five teams in its league, while the second indicates if they finished among the bottom five. Players on top-five teams are less likely to receive yellow cards (coefficient estimate -0.043, z-score 1.68) while players in lowly teams receive somewhat more cards (0.063, z-score 1.66), but most importantly, the point estimate on the civil war measure remains large and statistically significant (0.0072, z-score 2.48, not shown) when these team controls are included.

[16] Results are also unchanged when we control for player salary rather than the transfer fee. Another concern relates to referees' xenophobia (recall that racism is largely controlled with continent fixed effects), but anti-foreigner bias is not driving our results: the estimate on civil war history is unchanged when an indicator for being a foreigner is included (not shown).

[17] The per capita income data (in 2006 PPP U.S. dollars) are from the *2007 World Development Indicators* database.

[18] The correlation between our measures of per capita income and rule of law is 0.812.

Throughout Table 2 we control for the number of games played as a starter or a substitute, and these variables are likely to be strongly correlated with the amount of time spent on the field, an important determinant of cards. The exact amount of playing time is more difficult to capture since none of the existing data we are aware of – including websites used by fans, professionals, gamblers, and fantasy soccer league participants – reports minutes played. To make sure our results are not being driven by players with minimal playing time, we excluded players who did not participate in at least three games (as either a starter or substitute) in a given season, and find that the coefficient on country civil war remains large and statistically significant (0.0102, z-score 2.29, not shown).

Two additional yellow card findings are worth noting here. First, there appear to be different playing or refereeing styles across European country leagues. In particular, the results reported in columns 1-3 indicate that, relative to the English league, there are many more yellow cards in the French League), the German league, the Italian league, and especially the Spanish League. More importantly, the civil war effect subsists even when different playing or refereeing styles across the leagues are taken into account. Second, the findings reveal that, *ceteris paribus*, better-paid players are more likely to receive yellow cards. This is possibly the consequence of high-profile players being targeted for more violent fouls by the opposition and thus provoked into retaliation: fouls suffered is strongly positively correlated with the transfer fee (not shown).[19] In contrast, there are few substantive differences in the proclivity to receive

[19] We also explored the possibility that highly paid defenders, whose "job" is to be extra tough would be responsible for this finding. Specifically, we interacted each player's transfer fee with the defender dummy. Contrary to this expectation, the results indicate that better paid defenders are actually less likely to receive yellow cards (perhaps because the lower paid defenders are the ones hired for their brawn rather than their skill; for example Inter Milan's Argentine defender Javier Zanetti seems far less crude at getting opponents off the ball than Mariano Pernía, the Argentine-born Spanish footballer who currently plays for Atlético Madrid).

yellow cards across players' home region (Africa versus Latin America, etc.), conditional on the other individual and league controls.

Moving on to other findings, we also studied the relationship between civil war and red cards. This is of interest since many red cards are directly awarded for exceptionally violent fouls, yet it is also a harder test given the lower incidence of red cards. We find a large positive effect of home country civil war on red cards, and this effect is statistically significant at over 90% confidence (Table 2, regression 4). We also consider the number of goals scored as the dependent variable, and find no meaningful correlation with civil war (regression 5), indicating that civil war exposure predicts violence on the soccer pitch but not other aspects of play.

As an additional check, we also examine if our main result is robust to controlling for armed conflict that occurred in the more distant past. We do so by separating out the effects of civil conflict years that occurred before the player's birth from the effects of conflict after the player's birth. Surmounting such a robustness check increases our confidence that the result is not driven by time invariant determinants of violent conduct, such as historically inherited societal attitudes to violence. The number of years that a player's country experienced civil war after his birth continues to be positively correlated with yellow cards even after controlling for pre-birth yellow cards (regression 6). Results for red cards are similar (regression 7).

Another interesting question, though not central to this paper, is whether individual exposure is a more important determinant of violence than inherited historical factors. Unfortunately, relatively large standard errors make it difficult to reach a definitive conclusion. Although the point estimates indicate that own exposure appears more important, the result remains only suggestive since we cannot reject the hypothesis that the two coefficient estimates are equal (F-test p-value=0.36).

Finally, in a variety of specifications, we also tested whether the impact of civil war exposure diminishes over time for older players, or for those with more experience in the European professional leagues, but in no case are these interaction terms statistically significant at traditional levels (not shown). It is worth pointing out that this result is consistent with well known findings from the social psychology literature that childhood and adolescent experiences can have profound and persistent impacts on adult attitudes (Krosnick and Alwin 1989).

4. Conclusion

In this paper we attempt to examine the relationship between exposure to civil war and violence using behavioral measures of violent conduct. We do so by exploiting the presence of thousands of international soccer players all playing within a common institutional environment in the European soccer leagues. We find that the extent of a player's home country's recent record of civil conflict (our proxy for exposure) is strongly associated with violent behavior on the soccer pitch, as captured in yellow and red cards, but not other dimensions of play, such as goals scored. Of course, definitively confirming that we are indeed capturing the effects of own exposure to conflict events would require extensive individual survey data on the extent of players' personal exposure to violence, something that is beyond the scope of this study. Still we believe that our results are strongly suggestive of a causal link between exposure to civil conflict and subsequent violent behavior far away from the original conflict setting.

Could the results be driven by some underlying historically inherited tolerance for violence in some societies? This could be the case if these inherited attitudes cause civil war in the first place. We have addressed this concern by controlling for civil wars before each player's birth, which should absorb most effects of historically inherited attitudes. The data do not allow

us to definitively assert if individual exposure is more important than historically inherited attitudes (though patterns are suggestive) and we leave this as an area for future research.

We are acutely aware of the need to resist over-interpreting our results; the extrapolation of results from our setting (the soccer field) to wars or violent crime should be done with great caution. Yet to the extent that our results do generalize the findings suggest that policymakers need to address the behavioral effects of civil war exposure head on. The systematic impact evaluation of programs to offset the adverse impacts of exposure to violence constitutes a promising and novel research avenue for scholars studying civil war prone developing countries or high-crime communities within wealthy societies.

References

Barenbaum, Joshua, Vladislav Ruchkin, and Mary Schwab-Stone. 2004. The Psychosocial Aspects of Children Exposed to War: Practice and Policy Initiatives. *Journal of Child Psychology and Psychiatry* 45:1, 41-62.

Belsley, David A., Edwin Kuh and Roy E. Welch. 1980. *Regression Diagnostics*. Wiley.

Chiappori, P.-A., S. Levitt, and T. Groseclose. 2002. "Testing Mixed-Strategy Equilibria When Players Are Heterogeneous: The Case of Penalty Kicks in Soccer," *American Economic Review*, 92 (4), 1138-1151

Dobson, Stephen and John Goddard. 2001. *The Economics of Football*. Cambridge University Press.

Duggan M. and Levitt S.D. 2002. "Winning Isn't Everything: Corruption in Sumo Wrestling," *American Economic Review*, Volume 92, Number 5: 1594-1605.

Garicano, Luis, and Ignacio Palacios-Huerta. 2006. "Sabotage in Tournaments: Making the Beautiful Game a Bit Less Beautiful," mimeo, University of Chicago.

Krosnick, J.A. and Alwyn. D.F. 1989. "Aging and Susceptibility to Attitude Change. "*Journal of Personality and Social Psychology*," 57, 416-425.

Levitt, S. D. 2002. "Testing the economic model of crime: the National Hockey League's two-referee experiment," *The Berkeley Electronic Journals in Economic Analysis and Policy*, 1: 1-19.

Milanovic, Branco. 2005. "Globalization and goals: does soccer show the way?," *Review of International Political Economy*, vol:12 (5)

Price, Joe and Justin Wolfers, 2007, "Racial Discrimination among NBA Referees", NBER Working Paper #13206.

Smith, Michael D. 1979a. "Hockey Violence: A Test of the Violent Subculture Hypothesis," *Social Problems*, Vol. 27, No. 2: 235-247.

Smith, Michael D. 1979b. "Towards an Explanation of Hockey Violence: A Reference Other Approach," *Canadian Journal of Sociology*, Vol. 4, No. 2: 105-124.

Soyinka, Wole. 2006. *You Must Set Forth at Dawn: A Memoir*. Random House: New York.

Weinstein, Marc D., Michael D. Smith, and David L. Wiesenthal. 1995. "Masculinity and Hockey Violence," *Sex Roles*, Vol. 33, Nos. 11/12.

Witt, Robert. 2005. “Do Players React to Sanction Changes? Evidence from the English Premier League,” *Scottish Journal of Political Economy*, 52: 623-640.

World and European Values Surveys Four Wave Integrated Data File, 1981-2004, v.20060423, 2006. The World Values Survey Association (www.worldvaluessurvey.org) and European Values Study Foundation (www.europeanvalues.nl).

Table 1: Descriptive Statistics

Variable	Mean	Std. dev.	Min.	Max.	Obs.
Rule infractions					
Yellow cards per player-season	2.43	2.73	0	16	5035
Red cards per player-season	0.15	0.41	0	3	5035
Country characteristics					
Years of civil war (1980-2005)	2.74	4.74	0	26	5035
Rule of Law (2005-2006)	0.85	0.89	-1.76	2.10	5035
GNI per capita (2006)	26,203	10,923	720	44,260	4965
Player characteristics					
Age	26.0	4.40	17	41	5035
Weekly Salary (in '000 USD)	24.0	27.0	0	190.0	5034
Transfer Fee (in '000 USD)	6,323.5	8,189.5	3.0	78,000.0	5035
Games Started	13.80	11.48	0	40	5035
Substitute	3.13	3.89	0	29	5035
Goalie	0.08	0.27	0	1	5035
Defender	0.33	0.47	0	1	5035
Forward	0.23	0.42	0	1	5035
Midfield	0.36	0.48	0	1	5035
Goals Scored per player-season	1.65	3.12	0	31	5035
Player region of origin					
Africa	0.07	0.26	0	1	5035
Asia	0.004	0.06	0	1	5035
Latin America/Caribbean	0.12	0.33	0	1	5035
Eastern Europe	0.07	0.25	0	1	5035
OECD	0.72	0.45	0	1	5035
Soccer leagues					
English League	0.17	0.38	0	1	5035
European Champions League	0.19	0.39	0	1	5035
French League	0.15	0.36	0	1	5035
German League	0.14	0.35	0	1	5035
Italian League	0.17	0.38	0	1	5035
Spanish League	0.16	0.37	0	1	5035

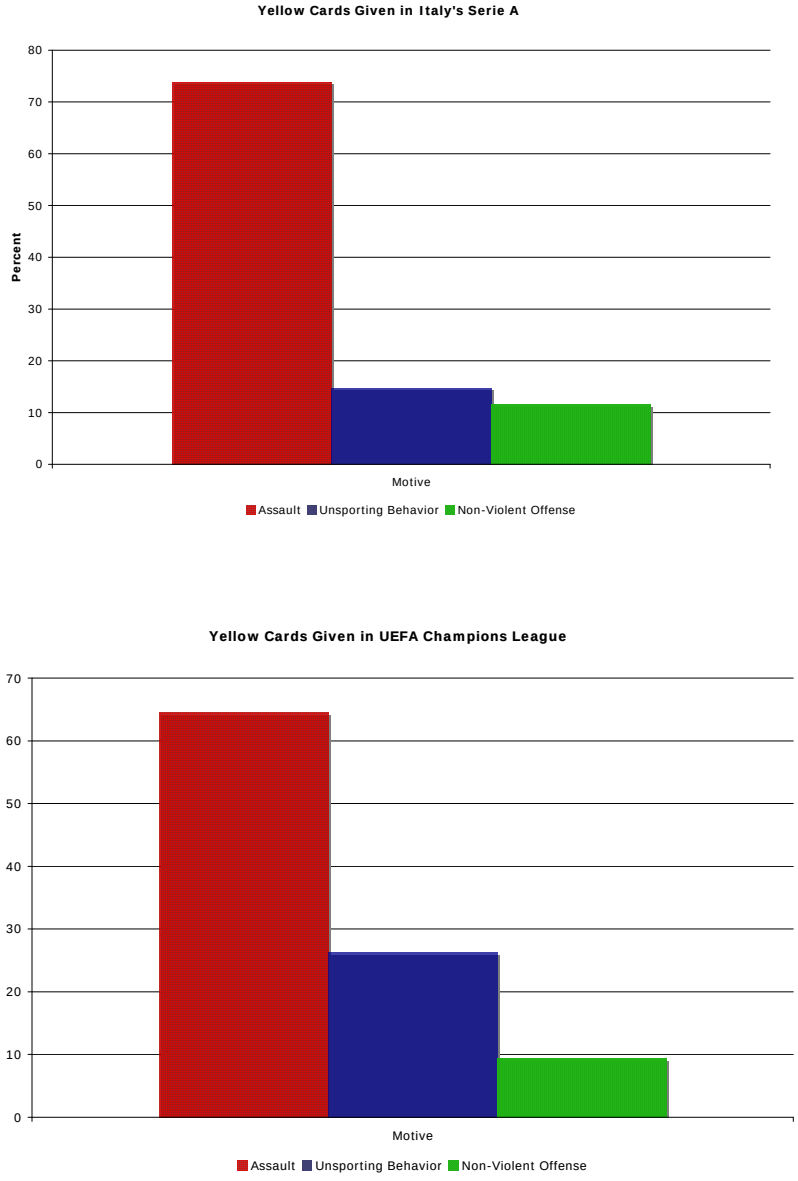
Notes: The source of the rule infraction, goals, player characteristics, player country of origin, and soccer leagues data is the ESPN *Soccernet* website. Weekly salaries and transfer fees are expressed in current US Dollars; source: *Football Manager 2005*, and *World Soccer Manager 2006*. The source of the civil war data is the PRIO/Uppsala *Armed Conflict Database*, and the source of the rule of law variable is the *Worldwide Governance Indicators* (WGI) project. Income per capita is measured in Purchasing Power Parities (2006 dollars); source: World Bank's *World Development Indicators* (2007).

Table 2: Empirical Results: Civil War

	Yellow Cards (1)	Yellow Cards (2)	Yellow Cards (3)	Red Cards (4)	Goals Scored (5)	Yellow Cards (6)	Red Cards (7)
Country characteristics							
Years of civil war	0.0076	0.0078	0.0075	0.0126	0.0001		
	(2.63)***	(2.51)**	(2.59)***	(1.92)*	(0.02)		
Civil war years post-birth						0.0052	0.014
						(1.86)*	(2.13)**
Civil war years pre-birth						0.0036	-0.004
						(0.73)	(0.41)
Log GNI per capita		0.046					
		(1.06)					
Rule of Law			-0.019	-0.143	0.0061		
			(0.40)	(1.46)	(0.15)		
Player characteristics							
Age	0.013	0.013	0.013	0.013	0.021	0.013	0.010
	(5.65)***	(5.40)***	(5.64)***	(1.74)*	(3.20)***	(5.77)***	(1.54)
Log transfer fee	0.032	0.031	0.032	0.063	0.322	0.032	0.062
	(2.33)**	(2.22)**	(2.33)**	(2.11)**	(11.88)***	(2.34)**	(2.08)**
Games Started	0.067	0.068	0.067	0.051	0.087	0.067	0.051
	(36.09)***	(37.78)***	(36.17)***	(18.30)***	(40.16)***	(36.08)***	(18.42)***
Substitute	0.041	0.041	0.041	0.011	0.069	0.041	0.011
	(10.93)***	(10.83)***	(10.89)***	(0.89)	(13.65)***	(10.99)***	(0.89)
Defender	1.715	1.713	1.714	1.113		1.714	1.119
	(14.73)***	(14.79)***	(14.71)***	(7.20)***		(14.70)***	(7.28)***
Forward	1.397	1.399	1.396	0.720	1.647	1.396	0.726
	(11.06)***	(11.13)***	(11.05)***	(4.00)***	(21.26)***	(11.01)***	(4.06)***
Midfield	1.729	1.728	1.728	0.889	0.679	1.728	0.892
	(12.67)***	(12.68)***	(12.66)***	(4.45)***	(11.31)***	(12.66)***	(4.50)***
Goalie					-18.216		
					(54.31)***		
Goals	-0.022	-0.022	-0.022	-0.028		-0.022	-0.028
	(5.81)***	(6.29)***	(5.83)***	(3.37)***		(5.84)***	(3.27)***
Soccer Leagues							
European Champions League	-0.031	-0.023	-0.036	-0.502	0.211	-0.028	-0.453
	(0.52)	(0.38)	(0.63)	(2.43)**	(2.45)**	(0.46)	(2.23)**
French League	0.264	0.266	0.259	0.297	0.078	0.263	0.334
	(4.45)***	(4.27)***	(4.21)***	(2.62)***	(1.24)	(4.15)***	(2.93)***
German League	0.313	0.321	0.317	0.098	0.244	0.319	0.112
	(6.37)***	(6.58)***	(6.58)***	(0.63)	(4.12)***	(6.33)***	(0.68)
Italian League	0.352	0.355	0.337	0.629	-0.012	0.353	0.749
	(6.46)***	(6.27)***	(5.11)***	(4.57)***	(0.22)	(6.28)***	(7.10)***
Spanish League	0.544	0.548	0.534	0.648	0.002	0.551	0.719
	(10.99)***	(10.75)***	(9.54)***	(6.15)***	(0.03)	(10.09)***	(6.70)***
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5035	4965	5035	5035	5035	5033	5033

Notes: The dependent variables are per player-season. Columns 1-7 contain the results of negative binomial specifications with disturbance terms clustered at the country level. The omitted categories in columns 1-4 and 6-7 are Goalie (for field position), OECD (for region), and the English Premier League (for league); in column 5, the baseline categories are Defender (for field position), OECD (for region), and the English Premier League (for league). The region fixed effect results are not shown. Z-statistics are in parentheses. Statistical significance at 90% (*), 95% (**), and 99% (***) confidence levels.

Figure 1: Yellow Cards according to Type of Offense



Sources: Top panel, Research Department of Lega Nazionale Professionisti (Italy); Bottom panel, UEFA.

Figure 2: **Yellow Cards and Civil War**
(conditional on control variables in Table 2, regression 2) – All Countries

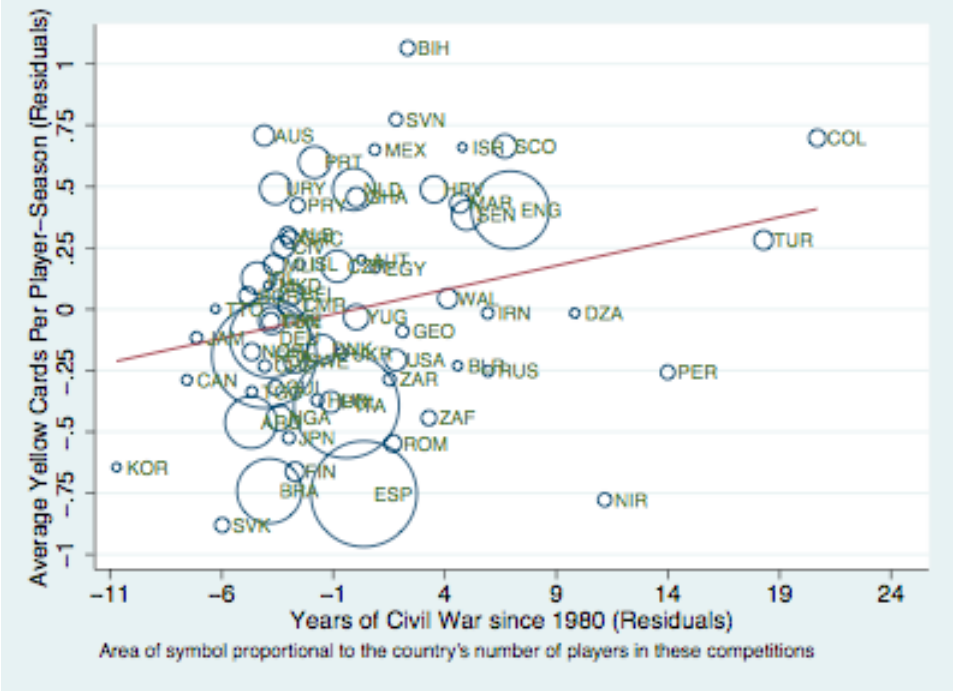
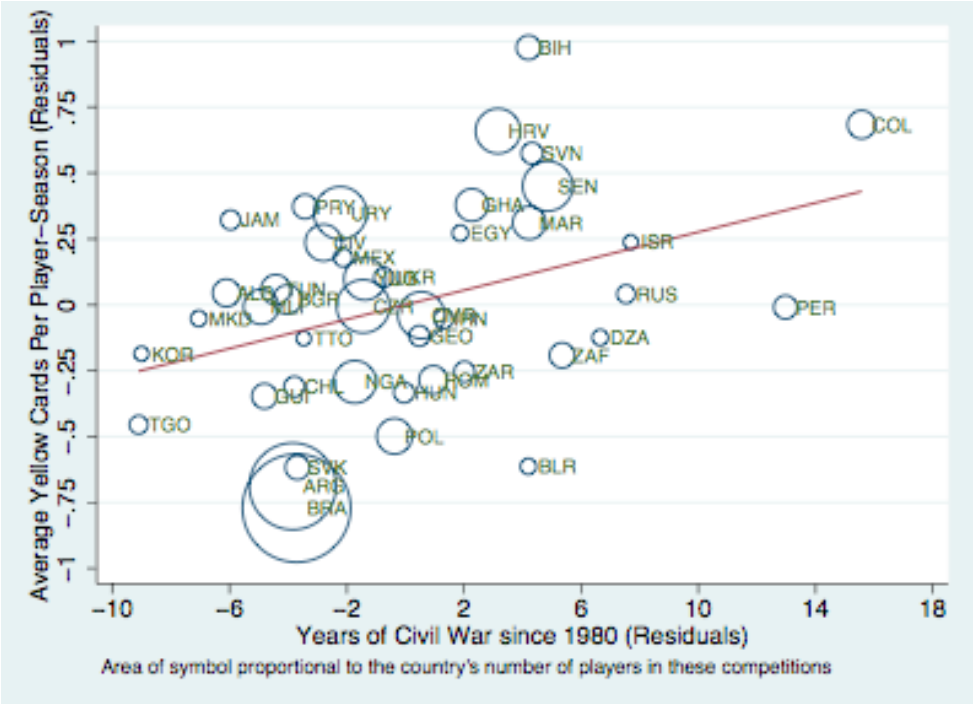
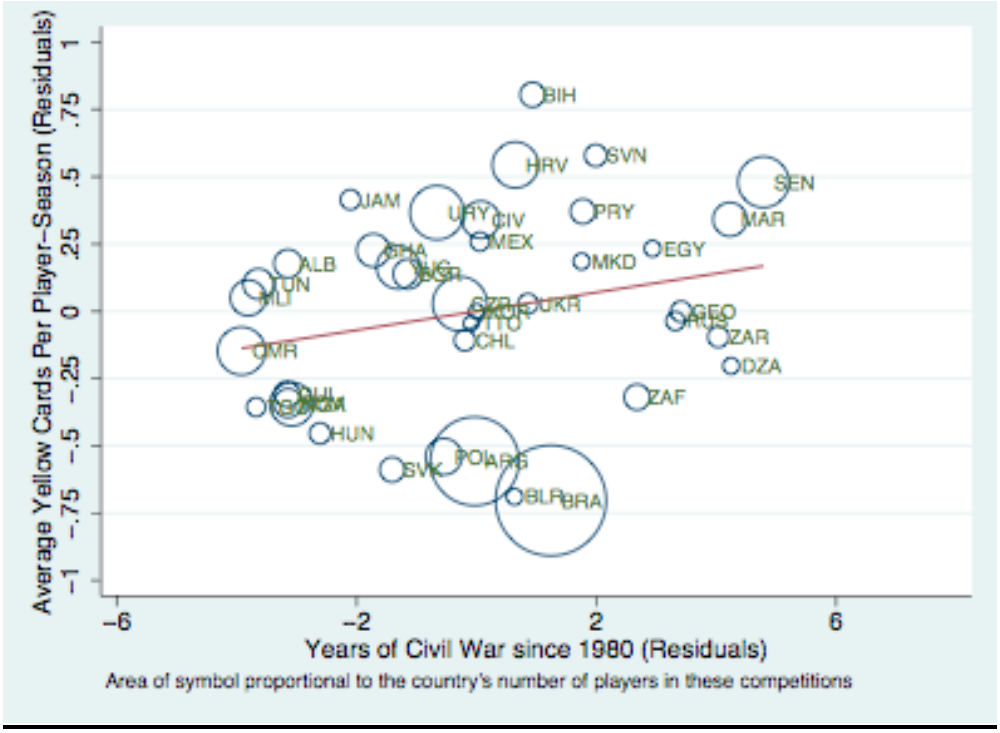


Figure 3: **Yellow Cards and Civil War**
(conditional on control variables in Table 2, regression 2) – Non-OECD Countries



<u>Figure 4:</u> Yellow Cards and Civil War
(conditional on control variables in Table 2, regression 2) – Non-OECD Countries, excluding Colombia, Iran, Israel, Peru, and Turkey.



Appendix Table 1: Countries and Players Represented in the Main Sample

Country	*Obs.*	*Yellow cards*	*Civil war years*	*Country*	*Obs.*	*Yellow cards*	*Civil war years*
Albania (ALB)	18	2.88	0	Macedonia (MKD)	6	4.16	1
Algeria (DZA)	6	1.50	15	Mali (MLI)	29	3.03	2
Argentina (ARG)	178	2.91	0	Mexico (MEX)	8	3.62	2
Australia (AUS)	28	2.57	0	Morocco (MAR)	26	3.15	10
Austria (AUT)	6	1.66	0	Netherlands (NLD)	118	2.06	0
Belarus (BLR)	6	1.50	0	Nigeria (NGA)	43	1.81	1
Belgium (BEL)	34	1.91	0	Northern Ireland (NIR)	12	1.00	13
Bosnia and Herzegovina (BIH)	14	2.92	4	Norway (NOR)	20	1.75	0
Brazil (BRA)	277	2.44	0	Paraguay (PRY)	14	2.42	1
Bulgaria (BGR)	20	2.55	0	Peru (PER)	13	1.38	19
Cameroon (CMR)	52	2.28	1	Poland (POL)	30	1.00	0
Canada (CAN)	7	3.71	0	Portugal (PRT)	68	3.02	0
Chile (CHL)	10	3.80	0	Romania (ROM)	19	1.21	1
Colombia (COL)	19	4.79	26	Russia (RUS)	8	1.75	13
Congo DR (ZAR)	10	2.50	6	Scotland (SCO)	37	2.16	13
Croatia (HRV)	48	2.37	3	Senegal (SEN)	59	2.25	10
Czech Republic (CZE)	67	2.24	0	Serbia (SRB)	8	1.75	3
Denmark (DNK)	58	1.84	0	Serbia and Montenegro (YUG)	48	2.83	3
Egypt (EGY)	6	1.00	6	Sierra Leone	5	2.00	10
England (GBR)	402	2.17	13	Slovak Republic (SVK)	14	0.92	0
Finland (FIN)	24	1.08	0	Slovenia (SVN)	11	1.63	0
France (FRA)	721	2.48	0	South Africa (ZAF)	15	1.06	9
Georgia (GEO)	10	3.20	4	South Korea (KOR)	5	1.00	0
Germany (DEU)	424	2.00	0	Spain (ESP)	742	2.91	5
Ghana (GHA)	25	2.40	2	Sweden (SWE)	35	1.77	0
Greece (GRC)	22	2.13	0	Switzerland (CHE)	49	2.40	0
Guinea (GIN)	15	2.33	2	Togo (TGO)	8	0.75	2
Hungary (HUN)	10	0.90	0	Trinidad and Tobago (TTO)	5	0.20	1
Iceland (ISL)	8	2.00	0	Tunisia (TUN)	21	2.33	1
Iran (IRN)	9	2.33	19	Turkey (TUR)	24	2.25	22
Ireland (IRL)	67	1.89	0	Ukraine (UKR)	9	1.44	0
Israel (ISR)	5	4.80	26	United States (USA)	30	0.96	4
Italy(ITA)	730	2.81	0	Uruguay (URY)	66	2.89	0
Ivory Coast (CIV)	49	3.26	3	Wales (WAL)	26	2.19	13
Jamaica (JAM)	9	1.77	0				
Japan (JPN)	10	1.50	0	TOTAL countries	70		
				TOTAL observations	5035		

Notes: The source of this data is the ESPN *Soccernet* website. We include all countries with at least five player-seasons represented in the leagues for which we have data. The *Yellow cards* column shows the average number of yellow cards per player/season by nationals of each respective country. The *Civil war years* column shows the number years of civil war since 1980 in the respective country.

Appendix Table 2: Addressing Outliers

	Yellow Cards – Belsley et al.	Yellow Cards – No OECD	Yellow Cards – No OECD, No Colombia	Yellow Cards – No Colombia	Yellow Cards – Log Civil War	Yellow Cards – Country level regressions
	(1)	(2)	(3)	(4)	(5)	(6)
Country characteristics						
Years of civil war	0.0093	0.0134	0.0169	0.0063		0.0081
	(3.47)***	(3.87)***	(2.25)**	(1.86)*		(2.31)**
Log years of civil war					0.0559	
					(2.30)**	
Player characteristics						
Age	0.011	0.002	0.019	0.013	0.013	0.012
	(5.64)***	(0.36)	(0.29)	(5.48)***	(5.57)***	(0.64)
Log transfer fee	0.023	0.018	0.019	0.032	0.032	-0.034
	(1.60)	(0.61)	(0.62)	(2.32)**	(2.33)**	(0.31)
Games Started	0.065	0.072	0.073	0.068	0.067	0.058
	(35.22)***	(27.41)***	(27.54)***	(36.08)***	(36.16)***	(5.44)***
Substitute	0.041	0.037	0.037	0.040	0.041	0.004
	(12.19)***	(5.89)***	(5.72)***	(10.76)***	(10.93)***	(0.13)
Defender	1.645	1.727	1.739	1.716	1.716	1.823
	(13.47)***	(11.30)***	(11.27)***	(14.73)***	(14.72)***	(3.30)***
Forward	1.313	1.476	1.491	1.401	1.398	1.193
	(9.95)***	(9.24)***	(9.24)***	(11.04)***	(11.05)***	(2.03)**
Midfield	1.639	1.771	1.775	1.729	1.729	1.535
	(11.88)***	(11.15)***	(10.96)***	(12.66)***	(12.67)***	(3.01)***
Goalie						
Goals	-0.018	-0.033	-0.033	-0.022	-0.022	0.004
	(5.15)***	(5.13)***	(5.19)***	(5.79)***	(5.81)***	(0.10)
Player region of origin						
Africa	0.046	-0.183	-0.035	0.579	0.082	-0.041
	(0.89)	(0.23)	(0.45)	(1.08)	(1.62)	(0.45)
Asia	-0.382	-0. 531	-0.595	-0.391	-0.371	-0.431
	(2.09)**	(3.23)***	(3.13)***	(1.93)*	(1.76)*	(2.50)**
Eastern Europe	-0.010			-0.027	-0.018	-0.088
	(0.18)			(0.43)	(0.28)	(1.19)
Latin America	0.028	0.020	0.024	-0.026	0.035	-0.042
	(0.51)	(0.25)	(0.29)	(0.34)	(0.47)	(0.44)
League fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4919	1333	1314	5016	5035	68

Notes: The dependent variables are per player-season. Columns 1-6 contain the results of negative binomial specifications with disturbance terms clustered at the country level. The omitted categories in columns 1 and 4-6 are Goalie (for field position), OECD (for region), and the English Premier League (for league); in columns 2-3, the baseline category for region is Eastern Europe. The league fixed effect results are not shown. Z-statistics are in parentheses. Statistical significance at 90% (*), 95% (**), and 99% (***) confidence levels.