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Abstract:

In this paper, we study the relationship between corruption, as measured by the Corruption Perceptions Index (CPI), and the probability of determining the outcome of a contest in a real competitive setting, in which agents in different countries are faced with exactly the same task under fixed and known rules. To that end, we utilize data from sensitive soccer matches in 75 countries during the period 2001 and 2013. In these matches, one team was in immediate danger of being relegated to a lower division (Team A) and another team was not affected by the result (Team B). Using within-country variation, we find that the more corrupt the country, the higher the probability is for Team A to achieve the desired result to avoid relegation in the sensitive matches relative to achieving this result in other, non-sensitive matches against the same team. We also find that in the later stages of the following year, the probability of Team A to lose against Team B compared to losing against a similar team (usually better than Team B) is significantly higher in more corrupt countries than in less corrupt countries. This result serves as a suggestive evidence of a *quid pro quo* behavior. Our findings indicate that the virus of corruption, as measured by the CPI, may infect social activities that are not necessarily directly linked to governmental activities.

Keywords:

Corruption, cultural norms, soccer.

JEL Classification:

C91, C92, D20, Z20.

1. Introduction

There is growing recognition that corruption, which is defined as the misuse of public office for private gain (Treisman, 2000), is detrimental to economic growth and development (Gould & Amaro-Reyes, 1983; Mauro, 1995). It slows industrial competition (Ades & Di Tella, 1999; Mo, 2001; Clarke & Xu, 2004; Emerson, 2006), reduces economic efficiency (Shleifer & Vishny, 1993), harms cultural norms (Fisman & Miguel, 2008), and is associated with organized crime (Pinotti, 2015). However, despite the large body of literature on corruption, to the best of our knowledge there is no documentation of the empirical relationship in a cross-country sample between corruption and social activities that are not necessarily directly linked to governmental activities.

Demonstrating such a relationship between countries involves many difficulties. First of all, the ideal way to make such a comparison would be to observe the same social activity in different countries. Second, it has to be as clear as possible a priori as to what would be the outcome of such activity in the most transparent case. However, it is difficult to find such an example, since Nature rarely creates a situation that allows a clear view of the corruption in the same setting in different countries.

In this study, we overcome these obstacles by exploiting a unique opportunity to observe the same real-life situation with a clear outcome in many different countries. The situation, with no visible governmental involvement, is driven by a contest design, which may provoke a corrupt type of behavior. Duggan and Levitt (2002), who referred to corruption in the form of collusion to rig matches in professional sumo wrestling in Japan, noted that a player's ranking and profits rose markedly after their eighth victory. They showed that wrestlers approaching their eighth victory toward the end of the season coordinated the results of their fights to improve their rankings and profits. Such coordination consisted of bribery or promises to reciprocate in the future. Inspired by Duggan and Levitt (2002), we use sensitive soccer matches that took place on the last day of the season in different countries. The sensitivity of these matches stems from the fact that one team (denoted henceforth as Team *A*) was in immediate danger of relegation to a lower division, with considerable impact on club's prestige and cash flow. For the other team (denoted henceforth as Team *B*), however, the result in the respective match would not change anything.

As with Duggan and Levitt (2002), in our case, one of the two teams must achieve a victory or a draw in order to avoid relegation, with the other team unaffected by the result.[1] We have here an example where agents in many different countries around the world face exactly the same and familiar task, which allows us to use a large cross-country sample.[2] In addition, since FIFA, the governing body of world soccer, prohibits government interference with national soccer governing bodies, soccer matches may serve as an example of social activity that is not directly linked to governmental activities.[3] This setting provides us with a unique experiment where we ask: Will teams in more corrupt countries needing to attain points in order to avoid relegation to a lower division exhibit a higher probability to achieve the desired result than those competing in less corrupt countries?

By its very nature, corruption is concealed and, therefore, its rate is difficult to determine. However, several indexes are used to compare corruption levels of different countries. One of the most common measures is the Corruption Perceptions Index (CPI) published by Transparency International (TI), the global coalition against corruption. The CPI considers data sources from independent institutions specializing in governance and business climate analysis, relates solely to sources used for scoring a group of countries, and measures corruption as indicated by public data.[4]

According to TI, a low CPI score is probably "a sign of widespread bribery".[5] This bribery may serve as a practical solution for attaining desired goals in every area of society, from politics to sports. Consequently, individual behavior in real-life situations depends not only on the incentives, but also on the culture and surrounding moral environment. For example, Fisman and Miguel (2008) found that diplomats who represent governments from very corrupt countries accumulated significantly more unpaid parking violations than their counterparts from

[1] The association between soccer and corruption has already been recognized. Hill (2010) exposed several potentially explosive stories of match-fixing in professional soccer, from domestic professional soccer leagues to matches that were fixed in the 2006 FIFA World Cup. See also McLaren (2008) and Preston and Szymanski (2003) for additional examples of corruption in sports.

[2] Miguel et al. (2008) were the first to use soccer matches to explore cross-country cultural norms regarding violence. They investigated the relationship between the history of civil conflict in a player's home country and his propensity to behave violently on the soccer field.

[3] For example on 16/10/2015 FIFA suspended Kuwait's soccer association over government interference. From: http://www.theguardian.com/football/2015/oct/16/kuwait-fa-suspended-fifa (accessed January 28, 2016).

[4] Thirteen data sources were used to construct the CPI of countries for 2013: African Development Bank Governance Ratings, 2012; Bertelsmann Foundation Sustainable Governance Indicators, 2014; Bertelsmann Foundation Transformation Index, 2014; Economist Intelligence Unit Country Risk Ratings; Freedom House Nations in Transit, 2013; Global Insight Country Risk Ratings; International Institute for Management Development (IMD) World Competitiveness Yearbook, 2013; Political and Economic Risk Consultancy Asian Intelligence, 2013; Political Risk Services International Country Risk Guide; Transparency International Bribe Payers Survey, 2011; World Bank - Country Policy and Institutional Assessment, 2012; World Economic Forum Executive Opinion Survey (EOS), 2013; and World Justice Project Rule of Law Index, 2013.

[5] From: https://www.transparency.org/cpi2014/results (accessed January 28, 2016).

less corrupt countries. Therefore, our hypothesis is that the prospects that a team will attain a favorable result in order to avoid relegation intensify as the country becomes more corrupt.

In this paper, we compare matches between the same pair of teams in the last day of the tournament, which had an immediate effect on the identity of the relegated team and matches that took place earlier in the season, which were not that decisive. Based on 1,723 observations from 75 different countries from 2001 through 2013, our fixed effects estimation reveals that the lower the CPI score (indicating a more corrupt country), the higher the probability of a team (Team *A*) to achieve the desired result to avoid relegation to a lower division relative to achieving this result in non-decisive matches against the same team (Team *B*). This finding is robust to different specifications and to controlling for possible confounders such as differences in abilities, home advantage, and countries' specific economic, demographic, and political features.

In addition, we also try to deal with possible measurement error issue. As discussed, corruption is concealed and its rate can be difficult to measure through a single indicator. We show that our results are the same when using two other measures of corruption. These are: (1) the "Factor 2: Absence of Corruption" obtained from the Rule of Law Index published by the World Justice Project and (2) parking violations per diplomat in New York City between 11/2002 and 11/2005 reported by Fisman and Miguel (2008). These measures were obtained according to different methodologies and may also reflect different corruption types.

These results, however, are not on their own necessarily indicative of corrupt behavior. The literature has already shown that competitors are expected to improve their game in critical matches (Scarf & Shi, 2008). Szymanski (2003), for example, showed that profit maximization is the major motivation in American team sports. Athletes play for money and the financial incentive for winning is high. Therefore, one should consider the incentive for surviving in the league. The possible explanation for our results is that a team that struggles to avoid relegation may exert a higher effort since its reward for winning is much greater.

However, we offer evidence that our results are linked with *quid pro quo* behavior that might be treated as a type of corruption, as stated by the US Supreme Court (1976, p.27): "Of almost equal concern as the danger of actual *quid pro quo* arrangements is the impact of the appearance of corruption…" As described previously, this type of *quid pro quo* behavior was demonstrated by Duggan and Levitt (2002) and is considered as a corrupt type of behavior, especially in sports competitions, where teams are expected to exert efforts to win. Based on this study, we examine the results in the following year for pairs of teams *A* and *B* in which

Team *A* managed to achieve the desired result in the last round that, in retrospect, prevented relegation. Intriguingly, we find that in more corrupt countries, the probability of Team *A* to reciprocate by losing in the later stages of the following year to Team *B* is significantly higher than losing to a team that is on average better (stronger) than Team *B*. This result strengtnens the suspicion of corrupt norms, since in the absence of any unethical behavior, we would expect the opposite result as, naturally, the probability of losing increases with the strength of the opponent.

This same real-life setting in many different countries, with high incentives of rule-breaking, allowed us to make a cross-country analysis and show a robust evidence of such a strong effect of the CPI on the outcome of sensitive soccer matches. And, since little is known about the role of corruption in non-governmental activities, especially in real-life settings, this paper makes an important step in better understanding corruption that may appear in different contexts.

Finally, our study is related to the experimental literature on corruption, which is in its infancy. To the best of our knowledge, there are only several papers that tested behavioral differences across countries in a corruption experiment. For example, Cameron et al. (2009) investigated propensities to engage and punish corrupt behavior, based on experiments run in four countries (Australia, India, Indonesia and Singapore). In another paper, Barr and Serra (2010) conducted two experimental studies among students from the University of Oxford in two periods: 2005 (students from 34 countries) and 2007 (students from 22 countries). They found diverse results on corruption types of behavior in the graduate and undergraduate population. As suggested by the authors, selection issues may have driven their results. In another paper, Armantier and Boly (2013) compared corruption in laboratory and field experiments run in two countries (Canada and Burkina Faso). More recently, Salmon and Serra (2015) conducted a rule-breaking experiment, with a 90% American-born sample, although 50% culturally identified with a country other than (or in addition to) the USA. Very recently, Gächter and Schulz (2016) conducted an experiment among students from 23 countries and showed that intrinsic honesty is stronger in countries with strong institutions. Our study differs from these papers in two main ways. First, no cross-country experiment has investigated the empirical relationship between corruption and the outcome of a contest in general, let alone the outcome of the same design contest in real-tournament settings. Second, we offer evidence of corrupt behavior based on observations from 75 different countries, which is a large number of countries relative to the existing literature.

The rest of the paper is organized as follows: Section 2 describes the data. Section 3 presents the variables. In Section 4, we present the empirical evidence. Finally, Section 5 offers concluding remarks.

2. Data

2.1. Dataset T –Matches in Year *t*

To test the possible effect of the CPI on the outcome of the sensitive soccer games, all the matches of the final day in the domestic soccer season were scrutinized in the countries that had a CPI rating during at least one of the years in the period between 2001 and 2013. Data was extracted from the The Rec.Sport.Soccer Statistics Foundation website (www.rsssf.com). Some matches were important, while others were less important. Specifically, matches may have been important to both teams, unimportant to both teams, or important to one team and less important to the other team. We considered a match sensitive if its result was critical to one team in immediate danger of relegation to a lower division, while the other team was relatively indifferent regarding the result. The importance of the result was defined according to the position of the team before the last day of the season. We referred to the team for whom the result was important as Team *A* and to the team less affected by the result as Team *B* (if the result of the match cannot determine whether Team *B* will be the champion, neither Team *B* will be relegated).

In most of the European leagues, the last match was decisive for participation in the following year's UEFA Championship League or UEFA Europa League (formerly, UEFA Cup tournament). As such, in many games, both teams were affected by the result. Therefore, we analyzed the second division instead of the first division matches. In this case, we analyzed the matches in which Team *A* struggled against relegation to the third division and Team *B* was not influenced by the result of the match. We also excluded countries in which no promotion or relegation took place between the divisions (for example, USA Major League Soccer) or countries in which the relegated team was determined by the results obtained in the previous several seasons (for example, the Argentinian League). Eliminating these problematic cases left a total of 827 soccer matches from 75 different countries during the period 2001-2013 (see Appendix B for the full list of countries divided into divisions).

In Figure 1, we observe a negative slope that implies an inverse relationship between the CPI and Team *A*'s probability of achieving the desired result in order to avoid relegation. For

example, Table 1 shows that teams that struggled against relegation in Switzerland achieved the desired result in only 43.8% of the cases. However in Russia this result was achieved in 76.9% of the cases.

[Table 1 here] [Figure 1 here]

It is important to note that even if Team *A* won, which means that it achieved the desired result, it could still be relegated to a lower division because other teams that were likewise in danger of relegation also won their games. Panel T of Table 2 presents the detailed description of Dataset T and reveals that in the majority of the matches in the sample (61.9%), the desired result was obtained.

[Table 2 here]

In addition, according to the round-robin type of tournament used in soccer leagues, there are several rounds in which each team plays against an opponent in the pair-wise matches at home and away. This structure allows for comparison of matches between Teams *A* and *B* that were played at different stages of the tournament. Therefore, we also collected data on matches between these teams that took place in previous rounds of the season. In total, we have data on 1,723 matches. Panel T of Table 3 reveals that 47.9% of matches between teams *A* and *B* took place in the last round. This is because, in most of the cases, each pair competes twice a year against each other (once at its home field). In a minority of cases, teams compete three or four times per year. We can see that in 43.8% of all matches between Teams *A* and *B*, Team *A* achieved the result that was previously classified as the desired result. More interestingly, the probability of Team *A* to achieve the so-called desired result in the last round are more than twice as high (61.9% versus 27.1%) as compared to matches in other rounds against the same team.

[Table 3 here]

2.2. Dataset T+1 –*Quid pro Quo* Behavior in Year *t+1*

Previously, Duggan and Levitt (2002) argued that in Japanese sumo matches, wrestlers tend to reciprocate. Namely, in return for attaining the precious eighth victory, the winner promises to lose to his opponent in the next year. Based on this finding, we investigated matches in the following year (*t+1*) to find out whether such reciprocation exists in soccer. For this purpose, we considered all the pairs of Teams *A* and *B* in which Team *A* that struggled against relegation in the previous year (*t*), managed to achieve the desired result.

Although we are not aware of the existence of an implicit "contract of reciprocation" between the teams and its rules and conditions, there may be a difference between the cases in which Team *A* achieved the desired result in year *t*. In one case, this result was critical in retrospect for Team *A*. Namely, Team *A* would have been relegated to the lower division in the previous year without achieving this desired result. In another case, achieving the desired result was not critical in retrospect for Team *A*, meaning that Team *A* would have survived in the league even without achieving this result. This may happen because other teams that were involved in struggling against relegation were unable to achieve a result that would keep them in the league for another year. These two situations may differentially influence a team's willingness to reciprocate in the subsequent matches against Team *B* in the following year. Therefore, our aim is to investigate possible *quid pro quo* behavior only in the pairs in which Team *A* avoided relegation by actually achieving the desired result in the previous year, i.e., cases in which the result in the previous year was critical in retrospect.

Consequently, we investigate Team *A's* losing probability against Team *B* in the following year (*t+1*). It is important to note that unlike sumo, where each pair of fighters competes against each other only once per season, as already stated, in the case of soccer, pairs of teams can play against each other more than once. In addition, Hill (2009) showed that there is a much higher share of fixed matches in the third and fourth quadrants of the season. A possible reason for this is that the later matches in the season are more important with regard to the fact that each match may determine the final ranking and, consequently, there is less time to fix the mistakes. Therefore, we concentrated on the last matches between the teams in the following year. In total, we analyzed 161 such matches between Teams *B* and *A*. However, in one case Team *A* was dissolved in year *t+1* (FK Nov. Milenium from Macedonia in 2008-09 season), which leaves us with 160 observations. The last two columns of Table 1 describe the data collected for each country in the new dataset. The detailed information on this data is presented in Panel T+1 of Table 2.

Finally, there is a possible mechanical selection of data, according to which Team *A* might be one of the worst teams in the league in the year *t+1*, and this would be the reason that it will lose more frequently. Therefore, we also collected data on the matches between Team *A* and a team that is most similar to the Team *B*. We took a conservative approach and collected data on all the matches between Team *A* and *imitated* Team *B*, namely a team that was ranked one position higher (better) than the *actual* Team *B*. It is important to note that there were seven cases in which an *actual* Team *B* finished first in the league; therefore, teams that finished in the second position were used as *imitated* Teams *B*. Finally, since one match was abandoned

(CABB Arréridj versus ES Sétif in 2008-09 season in Algeria), our database consisted of 319 matches between Team *A* and *actual* and *imitated* Teams *B*.

3. Variables

3.1. Variables in Dataset T

Our dependent variable, *Desired Result*$_{ABit}$, is a dummy variable where the value 1 was assigned if the result in all the matches between Teams *A* and *B*, fits the requirements of Team *A* (a win or in some cases a draw) in the last match against Team *B* in country *i* of year *t*, and zero for all other outcomes (a loss or in some cases a draw).

Since we are interested in studying the effect of a country's corruption level on the probability of obtaining the desired result, we used an index that represents corruption levels of a country *i* during year *t*. As noted, one of the most common measures is the Corruption Perceptions Index (CPI) published by Transparency International (TI), the global coalition against corruption. The scores range from 0 (highly corrupt) to 100 (not corrupt at all), and the scores are assigned annually to every country. When a match was played in country *i* in year *t*, the CPI score of that country in the respective year was considered.

Table 1 (except for the two last columns) describes the data collected for each country in the sample and the CPI for each country. The table shows that the CPI was almost constant over the years, with median and average standard deviations of 2.8 and 3.0 respectively.

In addition, we also consider two other measures of corrupt and/or cultural norms. The first is "Factor 2: Absence of Corruption", obtained from the Rule of Law Index published by the World Justice Project. According to The World Justice Project (2016), this factor "Considers three forms of corruption: bribery, improper influence by public or private interests, and misappropriation of public funds or other resources. These three forms of corruption are examined with respect to government officers in the executive branch…, the judiciary…, the military and police…, and the legislature…, and encompass a wide range of possible situations in which corruption — from petty bribery to major kinds of fraud — can occur" (page 10).[6] Similar to the CPI score, lower index ranking is associated with higher corruption.

[6] We consider the 2016 edition of the index, since it contains the largest number of countries. From: https://worldjusticeproject.org/sites/default/files/documents/RoLI_Final-Digital_0.pdf (accessed April 21, 2017).

Our third measure of corrupt type of behavior was taken from Fisman and Miguel (2008), who reported parking violations per diplomat in New York during the enforcement period between 11/2002 and 11/2005 (see Column 4 of Table 1 in Fisman & Miguel, 2008). The authors found that diplomats who represented governments from very corrupt countries accumulated significantly more unpaid parking violations than their counterparts from less corrupt countries. Therefore, this measure may capture cultural norms that for some reasons may not be captured by the previous two indices. Unlike the previous two indices, higher number of parking violations is associated with more corrupt type of behavior.

As noted, our analysis focuses on the differential effect of corruption measures on the probability of attaining the desired result in the last round that was important for Team *A* compared to the probability of attaining a similar result in other, less decisive rounds. Therefore, we created a dummy variable $LastRound_{ABit}$ where the value 1 was assigned if the match was played in the last round and zero otherwise. As a result, to estimate the probability of achieving the desired result in the last match relative to a match in previous rounds and compare it between different countries with regard to their corruption measures, we created an interaction between each of the corruption measures and $LastRound_{ABit}$.

As mentioned, corruption is concealed and very difficult to measure. For example, Donchev and Ujhelyi (2014) demonstrated that corruption has a significant correlation with the log (GDP) per capita, percentage of Protestants in a country, if a country has a solid democratic regime, and if it has British legal origins (see Column 7 of Table 4 in Donchev and Ujhelyi, 2014). Therefore, we control for these variables as well in our regression analysis.

The $log\ GDP\ per\ capita_{it}$ variable is a natural log of the GDP value per capita for country i in year t.[7] The $percentage\ of\ Protestants_i$ is a variable that presents the percentage of Protestants in a particular country's population in 1980.[8] $A\ solid\ democracy_i$ is a dummy variable in which the value 1 is assigned for countries with continuous democratic regimes for all years between 1930 and 1995.[9] $British\ legal\ origins_i$ is a dummy variable in which the value 1 is assigned for countries with legal systems with British origins according to the Global

[7] Taken from the "GDP per capita (current US$)" indicator of the World Bank Database.
[8] According to La Porta et al. (1999), the data on this variable was downloaded from the Quality of Government Database at the Quality of Government Institute at Gothenburg University.
[9] By the classification of Beck et al. (2001), democracies are those with a score of 6 or higher on Executive Index of Electoral Competitiveness (EIEC).

Development Network Growth Database, NYU.[10] Using these variables, we created interaction terms between each one and $LastRound_{ABit}$.

Since our data include both home and away matches, we also control for the home advantage, which was found to be significant in previous studies (Terry et al., 1998; Sutter & Kocher, 2004; Garicano et al., 2005; Koning, 2011). Hence, we created a dummy variable that was assigned the value of 1 if a match was played on Team *A*'s home field and the value of 0 if a match was played on Team *B*'s home field. Panel T of Table 2 shows that Team *A* attained the desired result in 72.8% of the home matches as opposed to about 50.4% in away games.

We also control for ability differences between the teams. In line with Klaassen and Magnus (2001), we consider the final ranks of Teams *A* and *B*, and add a variable that reflects the difference in rankings, calculated as $log2(Rank\ of\ team\ A) - log2(Rank\ of\ team\ B)$. The main advantage of this measure is that the differences in team quality are not linear; instead, they grow at an increasing rate as we move up the table. That is, a difference of one position in the league's table corresponds to a smaller difference in quality if the teams are at the bottom of the table. However, it corresponds to a more substantial difference when we compare top tier teams. We can see that on average, Team *B* is stronger than Team *A* as represented by a positive value of $log2(Rank\ of\ team\ A) - log2(Rank\ of\ team\ B)$, presented in Panel T of Table 3.

It is reasonable to expect that the higher ranked team has a higher probability of success. Indeed, Panel T of Table 2 shows that in 79.0% of the cases in which Team *A* was ranked higher than Team *B*, Team *A* attained the desired result. However, when Team *B* had a better final rank than Team *A*, then only in about 58.5% of the cases did Team *A* attain the desired result.

Another factor we control for is the competitive balance of a league in the respective season. The intuition is that the lower ranked team has a higher probability to win a single game in a more balanced league. We use the *HHI* (Herfindahl-Hirschman Index) that examines inequalities between firms in an industry. In the case of the non-sports industry, the index is based on a calculation of the market share of every firm. These shares are then summed into a weighted average index for the industry using each firm's market share as its weight. In the case of soccer, the *HHI* captures inequalities between all the clubs that make up a league. We can translate this into an indicator of competitive balance for the soccer industry by looking at each

[10] The percentage of Protestants, data on democracies and data on whether or not the legal origins were British were drawn from Treisman's (2007) database.

club's share of points in a season and aggregating these into an index using each club's share of points as weights, to yield:

$$(1) \qquad HHI = \sum_{c=1}^{N} S_c^2$$

where S_c is club *c's* share of points in a season, and *N* is the number of clubs in the league. However, as a measure of competitive balance, the *HHI* always decreases as the number of firms in the market (clubs in the league) increases. Therefore, since the number of clubs varies between the leagues, it is necessary to control for the firm-number influence on the distribution of league points. Depken (1999) suggested the following formula:

$$(2) \quad dHHI_{it} = HHI_{it} - \frac{1}{N_{it}}$$

where HHI_{it} is the actual Herfindahl-Hirschman index in country *i* in year *t*, and $\frac{1}{N_{it}}$ is the Herfindahl-Hirschman index in the most possible balanced league in country *i* of year *t*. The higher the $dHHI_{it}$, the less balanced is the league. Since the number of teams vary in different countries, we also control for the number of clubs in the specific league. Panel T of Table 3 shows that on average there are about 15.2 clubs per league. Finally, we also control for the distance between the cities of the respective clubs.[11]

3.2. Variables in Dataset T+1

In this dataset, our dependent variable is $ALosses_{BAit+1}$, which is a dummy variable where the value of 1 is assigned if Team *A* lost the match in the following year (*t+1*) to the *actual* or *imitated* Team *B* and the value of 0 is assigned for all other outcomes. For reasons discussed above, we are interested in the last match of the following season between Team *A* and *actual* Team *B* and between Team *A* and *imitated* Team *B*.

As mentioned, Team *A* might have a different sense of obligation toward *actual* Team *B* in cases when the result of the match in the previous year was critical for Team *A* in retrospect, as opposed to cases when it was not critical for Team *A* in retrospect. Namely, Team *A* would have been relegated to the lower division in the previous year without achieving this desired result, as opposed to cases when achieving the desired result was not critical in retrospect for Team *A*. The latter case implies that Team *A* would have survived in the league even without achieving the desired result. In total, we have 161 matches from 57 different countries between Team A and *actual* Team *B*, where obtaining the desired result was retrospectively critical for Team *A*. Panel T+1 of Table 2 shows that *actual* Team *B* won in 40% of those matches.

[11] The distance was obtained from www.maps.google.com and www.aroundtheworld360.com.

For this dataset, our analysis focuses on the differential effect of the CPI on the probability of Team *A* losing against *actual* Team *B* compared to the probability of losing against *imitated* Team *B*. To that end, we created a dummy variable $ActualB_{ABit+1}$ where the value 1 is assigned if Team *A* competes against *actual* Team *B* and zero if it competes against an *imitated* Team *B*. To estimate the probability of losing to *actual* Team *B* compared to the odds of losing against an *imitated* Team *B* and compare it between different countries with regard to their CPI score, we created an interaction between the CPI and $ActualB_{ABit+1}$.

Panel T+1 of Table 3 reveals that the gap between an *actual* Team *B* and Team *A* is lower than the gap between an *imitated* Team *B* and Team *A*. In other words, this implies that on average, the *imitated* Team *B* is stronger than the actual Team *B*. This is not surprising, since in all but seven cases, we defined an *imitated* Team *B* as a team that finished in a better position than the *actual* Team *B*.

We also control for the home advantage, the ability differences between the teams and the competitive balance of the league. Therefore, we created a dummy variable assigned the value of 1 if the match was played at (*actual* or *imitated*) Team *B*'s home field and the value of 0 if the match was played at Team *A*'s home field. The ability differences measure between *actual* or *imitated* Team *B* and Team *A* was defined as *log2(Rank of Team B)- log2(Rank of Team A).* And the last control variable is the league $dHHI_{it+1}$ according to the final table of year *t+1*.

4. Empirical Evidence

4.1. Main Results for Year t

To analyze the extent to which a corrupt environment is associated with the results of sensitive soccer matches we include in all our estimations a set of country fixed effects in order to control for any unobserved factor that is fixed within a country, such as cultural, geographical, institutional and other possible features. Using a fixed effect linear probability model (LPM), our basic specification takes the following form:

$$\pi\left(Desired\ Result_{ABit}\right) = \alpha_1 \cdot CPI_{it} + \alpha_2 \cdot LastRound_{ABit} + \alpha_3 \cdot LastRound_{ABit} \cdot CPI_{it} + \\ + \beta \cdot X_{it} + \mu_i + \varepsilon_{it} \quad (3)$$

Where the dependent variable is the probability of Team *A* attaining the desired result in the match against Team *B* in country *i* of year *t*. The CPI_{it} is the Corruption Perceptions Index score

assigned to country *i* in the respective year *t*, $LastRound_{ABit}$ is a dummy variable indicating whether the match is played in the last round ($LastRound_{ABit} = 1$), μ_i is country *i*'s fixed effects, and X_{it} refers to a set of observed characteristics of the match (a dummy for whether a match was played on Team *A*'s home field, the difference between the logs of the rankings of the two teams, the respective league $dHHI_{it}$ score, the number of clubs in the league and distance between the cities).

This specification allows us to compare the probability of attaining the desired result in more corrupt countries relative to less corrupt countries in the last round, when the match is important for Team *A* versus other rounds. In other words, the interaction coefficient between $LastRound_{ABit}$ and CPI_{it} measures the differential effect of CPI between playing in the last, most decisive round, and other rounds. A negative value of α_3 implies that in more corrupt countries (lower *CPI*), there is a higher probability that Team *A* achieves the desired result in the last round relative to other rounds.

Column 1 of Table 4 presents the results from estimating equation (3) without a list of basic controls, where standard errors clustered at the country level are in the parentheses. The results show that the coefficient of the interaction term, α_3, is negative and significant at the 1% level. This implies that Team *A* has a significantly higher probability of attaining the desired result in more corrupt countries in the last round, when the match is the most important for Team *A*, relative to other rounds. This result implies that one standard deviation increase (29.5 CPI points) in the interaction term between a dummy variable $LastRound_{ABit}$ and the CPI_{it} is associated with a decreased probability of Team *A* to achieve the desired result by about 11.8 percentage points on average, which is about 25% of the sample mean (the mean value of Team *A* to achieve the desired result is 43.8%).

We can see that the results are not sensitive to the set of controls as presented in Column 2. One possible concern, however, is that familiarity between the clubs as expressed by a smaller distance between the cities may drive our results. Therefore, in Column 3, we also control for distance between the cities and interaction between the distance and the CPI. We can see that the interaction coefficient α_3 is robust to inclusion of these controls.

A common threat to the validity of any "difference-in-difference" analysis of this nature is underlying trends in the data. In other words, the interpretation of our findings rests on the identifying assumption that other than CPI there was no other factor that changed across

countries and affected them differently. We, therefore, use several specifications to support this assumption. In Columns 4 and 5 of Table 4 we control for any factor that changes smoothly across countries (such as possible police investigation of match fixing) by adding to our basic specification a linear year trend and a quadratic year trend, respectively. Additionally, in Column 6 we include year fixed effects. All these specifications yield very similar results relative to our basic specification. The coefficient of the interaction coefficient α_3 is always negative, very similar in size and significant at the 1% level.

As discussed previously, the corruption variable is based on subjective surveys and it was previously found that the CPI is highly correlated with several other variables related to a country such as log of GDP per capita, percentage of Protestants in the population, democratic solidity of its government, and its grounding in British legal origins. Therefore, our results may be driven by other social aspects that are highly correlated with the CPI and not by the CPI itself. Hence, in Column 7 we also control for the interaction of each of the closely related to CPI variables and the $LastRound_{ABit}$. Not surprisingly, we find that none of the interactions are significant. This is because each of them is reflected in the CPI, and, therefore, we expect a bias of the results toward zero when controlling for these variables. As Belloni et al. (2014) asserted: "We are faced with a tradeoff between controlling for very few variables which may leave us wondering whether we have included sufficient controls for the exogeneity of the treatment and controlling for so many variables that we are essentially mechanically unable to learn about the effect of the treatment" (p. 638). Nevertheless, even after controlling for so many endogenous variables, the coefficient of our interest is very close to significant levels with p-val=0.116. In fact, it is the most significant coefficient out of all interactions with the $LastRound_{ABit}$. Moreover, we can see that the R-squared measure is almost the same with and without interaction of each of the closely related to CPI variables and the $LastRound_{ABit}$ (Columns 6 and 7).

Finally, our findings suggest that, as expected, the home advantage increases Team *A*'s probability of achieving the desired result. Also, as expected, we find that the difference in abilities as well as the $dHHI_{it}$ are significantly associated with the probability of achieving the desired result. This result suggests that in a more balanced league, Team *A*, which is usually the lower ranked team, has a higher probability of achieving the desired result. Nevertheless, larger differences in abilities reduce Team *A*'s odds.

[Table 4 here]

4.2. Quartiles Approach

Previous studies found biases in reported perceptions (Olken, 2009; Beaman et al., 2009; Campbell, 2013). In this sub-section we intend to examine whether the relationship between the CPI and the probability of attaining the desired result is continuous throughout the scale of scores. For this purpose, we created four dummy variables with the same number of observations. The first dummy variable (*Q1*) is assigned a value of 1 if the CPI score is in the lower quartile of the observations (most corrupt countries with CPI less than 30); the second (*Q2*) is assigned a value of 1 if it is between one quarter and one half of the observations (CPI scores in the range of 30-43); the third (*Q3*) if it is between one half and three quarters of the observations (CPI scores in the range of 44-64); and the fourth (*Q4*) if it is higher than three quarters (scores of 65 and above). Then we interact these variables with $LastRound_{ABit}$. To avoid multicollinearity, we omit the first category and use it as a reference category.

The results, presented in Table 5, are consistent with our previous results. We can see that the coefficients of the third and the fourth quartiles are negative and the size of the coefficient decreases with the CPI score. In addition, the coefficient of $Q4 \cdot LastRound_{ABit}$ is always significant. This implies that relative to the most corrupt countries according to the CPI score, which are represented in *Q1*, the probability of Team *A* to attain the desired result in the last round relative to the previous rounds is significantly lower. The estimated effect is about 19 percentage points. Moreover, when we control jointly for all variables correlated with the CPI (see Column 7), then in most transparent countries (Q4), according to the CPI, the probability for team *A* to achieve the desired result in the last round relative to other rounds is significantly lower than in more corrupt countries. Furthermore, none of the variables correlated with the CPI remain significant, and, as previously, the R-squared measure is the same with and without interaction of each of the closely related to the CPI variables and the $LastRound_{ABit}$ (Columns 6 and 7).

[Table 5 here]

In addition, in all the cases, $Q2 \cdot LastRound_{ABit}$ is positive and not significant. Therefore, we conclude that there is no meaningful difference between the first and the second quartiles in terms of the prospects of Team *A* to achieve the desired result in the last round relative to the previous rounds. The intuition behind this result is that there is not much difference between countries with a low CPI. For example, regardless of whether the CPI score is 20 or 40, Team *A* will most probably attain the desired result in the most decisive match with

the same and significantly higher probability than in the previous rounds. However, as we climb the CPI scale, the differences between the countries become more conspicuous, and the values of transparency become more important. We found that $Q4 \cdot LastRound_{ABit}$ is significantly different from $Q2 \cdot LastRound_{ABit}$ in all the cases and significantly different from $Q3 \cdot LastRound_{ABit}$ in all the cases except for the last column. As well, we found that $Q3 \cdot LastRound_{ABit}$ is significantly different from $Q2 \cdot LastRound_{ABit}$ in all the cases (see p-val for these tests reported in Table 5).

To put this result into perspective, it might be concluded, for example, that the differences in effort that Team *A* needs to exert in order to achieve the desired result in a country with a CPI score of 90 compared to the effort in a country with a CPI score of 70 is greater than the differences in effort that Team *A* needs to invest in order to achieve the desired result in a country with a CPI score of 40 compared to the effort in a country with a CPI score of 20. This finding is in line with Treisman (2007), who found far greater variations in the frequency of bribes reported in countries that were perceived as more corrupt according to the World Bank index.

4.3. Other Measures of Corrupt Behavior

One may be concerned that, for whatever reason, the CPI index does not represent corrupt types of behavior, but rather other traits that are correlated with it. Therefore, we conducted the same analysis as presented in Table 4, but with two other measures that also intend to represent corrupt norms. The first is "Factor 2: Absence of Corruption", obtained from the 2016 Rule of Law Index published by the World Justice Project. And the second is parking violations per diplomat in the period between 11/2002 and 11/2005, obtained from Column 4 of Table 1 in Fisman and Miguel (2008).

In Columns 1-3 of Table 6, we present the results for the "Factor 2: Absence of Corruption" as a corruption index, whereas in Columns 4-6, similar analysis is conducted for the parking violations as a measure of corrupt type of behavior. We can see that in all the cases, the interaction of the corruption index with $LastRound_{ABit}$ is significant and with the correct sign (negative for "Factor 2: Absence of Corruption" and positive for the parking violations). These results imply that our findings are robust to different measures of corruption.

[Table 6 here]

4.4. *Quid pro Quo* Behavior

In previous sub-sections, we found that in more corrupt countries according to the CPI, there is a higher probability that Team *A* will achieve the desired result against Team *B* in the most decisive, last round, relative to other, less decisive rounds. Based on Duggan and Levitt's (2002) finding on reciprocation, our aim in this sub-section is to investigate matches in the following year (*t+1*) to find out whether such *quid pro quo* behavior, which may be treated as a type of corruption, exists in soccer.

For this test, we limited the database to 160 observations in which the result of the match in the last day of the season in year *t* was critical for Team *A* in retrospect. In other words, we only analyze pairs in which Team *A* avoided relegation by actually achieving the desired result in the previous year; i.e., cases in which the result in the previous year was critical in retrospect.

Figure 2 plots the percentage of times in which Team *A* lost to Team *B* in their last meeting of the following year *t+1* as a function of the country's weighted average CPI score that is shown in Table 1. We can see that the higher the CPI score, the lower is the probability that Team *A* loses in the following year.

[Figure 2 here]

To probe more deeply into possible *quid pro quo* behavior, as noted, we estimate the differential effect of the CPI on the probability of Team *A* losing against *actual* Team *B* compared to the probability of losing against *imitated* Team *B* in the following year. To that end, as described in the Sub-Section 2.2, we took a conservative approach and collected data on all the matches between Team *A* and an *actual* Team *B*, as well as data on all the matches between Team *A* and a team that was ranked one position higher (better) than the *actual* Team *B*, except for seven cases in which an *actual* Team *B* finished first in the league. Therefore, teams that finished in the second position were used as *imitated* Teams *B*. According to this approach, since an *imitated* Team *B* is on average better than the *actual* one, in the absence of any unethical behavior, we would expect that Team *A* loses more often to the *imitated* Team *B* than to the *actual* Team *B*. This dataset allows us to use the following estimation using a fixed effect linear probability model:

$$(4)\quad \begin{aligned}\pi\left(ALosses_{ABit+1}\right) &= \delta_1 \cdot CPI_{it+1} + \delta_2 \cdot ActualB_{ABit+1} + \delta_3 \cdot ActualB_{ABit+1} \cdot CPI_{it+1} + \\ &+ \beta \cdot X_{it+1} + \mu_i + \varepsilon_{it+1}\end{aligned}$$

Where the dependent variable is the probability that Team *A* loses against Team *B* (the *actual* or *imitated* one) in the following year (*t+1*) in country *i*. CPI_{it+1} is the CPI score assigned

to country *i* in the respective year *t+1*, $ActualB_{ABit+1}$ is a dummy variable indicating whether Team *A* competes against the *actual* Team *B* ($ActualB_{ABit+1}=1$), μ_i is country *i*'s fixed effects, and X_{it+1} refers to the set of observed characteristics of the match (a dummy for whether a match was played on Team *B*'s home field, the difference between the logs of the rankings of the two teams, the respective league $dHHI_{it+1}$ score and distance between the cities).

This specification allows us to compare the probability that Team *A* loses more often in more corrupt countries (lower CPI) to the *actual* Team *B* ($ActualB_{ABit+1}=1$), than to the *imitated* Team *B* compared to less corrupt countries (higher CPI). Such an outcome will be represented by a negative value of δ_3. Indeed, as presented in Table 7, the coefficient of the interaction between CPI_{it+1} and $ActualB_{ABit+1}$ is negative and significant at 10% level, implying that in more corrupt countries according to the CPI, Team *A* loses more often to the *actual* Team *B*, than to the *imitated* Team *B*.[12] This result implies that one standard deviation increase (27.6 CPI points) in the interaction term between CPI_{it+1} and $ActualB_{ABit+1}$ is associated with a decreased probability of Team *A* losing to the *actual* Team *B* compared to *imitated* Team *B* by about 11 percentage points. Similar to results presented in Table 4, it is about 25% of the sample mean (the mean value of Team *A* to lose against *actual* or *imitated* Team B is 42.3%).

[Table 7 here]

4.5. Interpretation of the Results

We found a significant association between the CPI and the probability of attaining the desired result in most decisive soccer matches. Our interpretation that this finding is driven by the corrupt norms, as reflected by the CPI, rests on several identifying assumptions. First, in our analysis, we included country fixed effects to control for any unobservable time-invariant country characteristics, such as popularity of soccer, the quality of institutions, cultural norms, legal enforcement, etc. In addition, it is unlikely that we have a two-way causation problem. Most importantly, using the same real-life setting, which provokes a corrupt type of behavior, allowed us to test a possible *quid pro quo* type of behavior in the following year. This type of behavior is considered corrupt, especially in sports settings, where teams are expected to exert efforts to win. The finding that in more corrupt countries, Team *A* loses more often to a weaker team than to a stronger team strongly supports the interpretation that the results of our study are

[12] The analysis that includes interactions between $ActualB_{ABit+1}$ and all correlated with the CPI variables yields insignificant results for all interactions, which is not surprising given the multicollinearity problem as well as significantly lower number of observations relative to Dataset T. The results are available upon request.

driven by corrupt norms, rather than by any other explanation. Finally, no other correlated with the CPI variables were significant, which also strengthens our interpretation.

It is, however, important to note that we, of course, have no tools to prove illegal actions that might have taken place, much less who exactly was involved (management of the teams, players or referees). Only the involvement of police may supply solid evidence of any illegal action. However, our findings raise serious questions about the fairness of the games in more corrupt countries between Teams *A* and *B* in seasons *t* and *t+1*, and should be treated with careful attention by the authorities.

5. Concluding Remarks

Governmental activities may be a trigger which results in a corrupt environment. However, very little is known about the existence of corruption in non-governmental activities. The first step would be to find the same non-governmental activity in different countries that may provoke a corrupt type of behavior and then to present the cross-country association between the measure of corruption and the outcome of such activity. However, Nature seldom creates conditions that make it possible to investigate such empirical relationships between a corrupt environment and the outcome of exactly the same task performed by different agents from dozens of countries around the world. In this study, we exploited a rare opportunity to investigate this relationship in high stakes situations in a real tournament setting with no visible governmental involvement.

Our work draws on Duggan and Levitt (2002), who showed how a contest may provoke a corrupt type of behavior, in which one contestant is extremely interested in the result of a respective match, while the other is relatively indifferent. We, therefore, examined soccer matches in 75 countries during the period between 2001 through 2013. In all these matches, one of the teams (Team *A*) had to achieve a desired result on the last day of the season in order to avoid relegation to a lower division, while the other team (Team *B*) was not affected by the result of the respective match. Our findings indicate that the prospects of Team *A* to attain such a result in the most decisive matches are significantly higher than in less important matches against the same Team *B* when a country is more corrupt, according to the Corruption Perceptions Index (CPI). This result was found to be robust to different specifications and while controlling for many possible confounders such as differences in the abilities, home advantage, and country's specific demographic and political features.

Our results can be attributed to several possible explanations. It may be due to the intervention of a third party that is interested in match fixing. It may also be due to the fact that in more corrupt countries Team *B*'s players have less incentive to "work hard". Although we cannot eliminate these possible reasons, we also find strong evidence of a significant association between the CPI and the *quid pro quo* behavior that appears in the pairs in which Team *A* achieved the desired result that actually helped to avoid relegation to the lower division. In these pairs, the more corrupt the country according to the CPI, the higher the probability that Team *A* would recipocate by losing in the later stages of the following year. More importantly, in more corrupt countries, this probability is significantly higher than in the matches in which Team *A* competes against a stronger opponent than Team *B*. This finding raises serious questions about possible illegal activities that could have taken place in the matches that involved teams *A* and *B*.

It is important to note that we are not able to identify with certainty the cause of such a robust and intriguing empirical relationship between the CPI and the odds to attain the desired result. Nevertheless, this paper is a first attempt to study the outcomes of the same design contest on a cross-country level in a corruption context, and it provides some evidence that the virus of corruption may affect social activities that are not necessarily directly linked to governmental activities. In addition, our results raise questions of the potential existence of corrupt norms in other non-governmental contest-related environments such as promotion races in labor markets or R&D competitions that may directly affect economic growth, let alone political races or public sector tenders.

Finally, it is clear that a more effective fight against corruption requires a better understanding of its mechanisms. Therefore, we call for additional cross-country experimental research on various types of corrupt behavior, such as nepotism, bribery, extortion and embezzlement.

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Table 1: Descriptive statistics per country on the matches between Teams A and B

	Represent data from Panel T in Table 2						Represent data from Panel T+1 in Table 2	
State	Years were covered/Years with CPI score	No. of Years with relevant data	No. of Relevant Matches	Percentage of matches in which Team *A* achieved the required result	Weighted average of CPI score	Stdv of CPI score	No. of matches between Teams *A* and *B* in the following year	Percentage of matches Team B won
Albania	11/12	5	18	88.9%	29.3	3.5	6	50.0%
Algeria	11/12	5	21	81.0%	29.9	1.8	7	57.1%
Austria	11/13	3	5	0.0%	83.4	4.0		
Azerbaijan	10/13	2	3	66.7%	21.4	0.4		
Bahrain	10/12	7	16	56.3%	55.4	4.3	3	0.0%
Belarus	9/12	3	8	50.0%	26.8	4.0	2	0.0%
Belgium	12/13	9	18	50.0%	72.3	2.8	4	25.0%
Bosnia and Herzegovina	11/11	5	11	81.8%	30.7	1.5	5	20.0%
Botswana	11/13	4	7	71.4%	57.8	1.7	2	100.0%
Bulgaria	9/13	3	5	60.0%	37.5	1.2	2	50.0%
Côte d´Ivoire	11/13	5	12	75.0%	22.2	2.3	4	75.0%
Czech Republic	11/13	6	15	60.0%	46.6	4.0	3	66.7%
Denmark	10/13	7	19	63.2%	92.8	1.6	3	0.0%
Djibouti	2/11	1	1	100.0%	36.0	0.0	1	0.0%
Estonia	10/13	3	5	60.0%	59.4	4.3		
Ethiopia	7/12	3	7	71.4%	31.4	4.1	3	0.0%
Finland	9/13	7	16	62.5%	95.3	3.3	4	0.0%
France	11/13	7	17	52.9%	70.8	2.4	3	66.7%
Gabon	9/12	3	5	40.0%	31.1	3.0		
Georgia	11/12	3	5	60.0%	34.7	4.4	1	100.0%
Germany	12/13	10	23	56.5%	79.1	2.5	1	0.0%
Ghana	10/13	10	24	66.7%	37.1	3.7	2	50.0%
Greece	9/13	3	5	80.0%	40.3	5.1		
Guatemala	11/13	1	3	66.7%	29.0	0.0		
Guinea	4/11	2	4	75.0%	24.0	0.0		
Hong Kong	11/13	1	3	100.0%	75.0	0.0		
Hungary	11/13	8	25	44.0%	50.8	1.7	4	50.0%
Iceland	10/13	4	8	25.0%	92.8	3.6		
India	11/13	4	12	58.3%	31.0	3.1	1	100.0%
Iran	11/12	5	9	77.8%	22.4	2.7	2	0.0%
Iraq	10/12	5	17	58.8%	19.4	3.5	1	100.0%
Ireland	10/13	1	3	0.0%	74.6	0.0		
Israel	10/13	7	16	68.8%	63.4	4.0	2	0.0%
Italy	11/13	6	27	77.8%	48.4	4.7	4	0.0%
Jordan	10/13	5	11	45.5%	49.1	4.2	2	100.0%
Kosovo	4/4	3	9	100.0%	31.4	2.4	3	66.7%
Kuwait	11/12	3	5	60.0%	45.1	2.7		
Latvia	10/13	2	3	0.0%	46.2	1.0		

	Represent data from Panel T in Table 2						Represent data from Panel T+1 in Table 2	
State	Years were covered/Years with CPI score	No. of Years with relevant data	No. of Relevant Matches	Percentage of matches in which Team *A* achieved the required result	Weighted average of CPI score	Stdv of CPI score	No. of matches between Teams *A* and *B* in the following year.	Percentage of matches Team B won
Lebanon	11/12	6	15	60.0%	27.9	2.2	3	66.7%
Lesotho	5/12	3	7	28.6%	42.4	8.2	1	100.0%
Luxembourg	13/13	6	13	38.5%	82.3	1.9		
Macedonia	11/12	6	11	72.7%	35.7	5.7	2	0.0%
Mali	10/12	5	11	36.4%	29.6	3.0	4	75.0%
Mauritania	8/12	2	2	50.0%	27.9	2.9		
Mauritius	11/13	1	1	100.0%	52.0	0.0		
Morocco	11/12	5	12	91.7%	33.8	2.0	4	50.0%
Namibia	11/13	5	11	63.6%	43.7	3.4	3	33.3%
Netherlands	12/13	2	5	0.0%	86.4	2.2		
Norway	10/13	7	19	47.4%	86.2	2.9	1	0.0%
Oman	11/12	7	14	78.6%	54.0	4.8	3	33.3%
Poland	9/13	6	11	54.5%	43.1	5.4	1	0.0%
Portugal	11/13	9	19	68.4%	64.0	2.4	6	33.3%
Qatar	11/12	1	3	0.0%	77.0	0.0		
Romania	11/13	5	12	66.7%	30.1	4.3	1	0.0%
Russia	12/13	7	13	76.9%	25.0	2.9	2	100.0%
Rwanda	8/12	5	12	75.0%	39.0	12.6	2	100.0%
Saudi Arabia	10/12	3	7	14.3%	38.3	5.4	1	0.0%
Senegal	9/13	5	13	84.6%	31.0	1.1	3	33.3%
Serbia	6/8	3	8	62.5%	33.5	2.4	6	33.3%
Slovakia	9/11	2	5	60.0%	45.8	5.5	2	50.0%
Slovenia	12/13	4	9	100.0%	63.5	2.7	1	0.0%
South Africa	13/13	9	18	44.4%	45.4	3.4	1	0.0%
Spain	11/13	4	18	83.3%	65.0	4.0	8	25.0%
Suriname	8/10	5	12	75.0%	33.7	2.9	1	100.0%
Swaziland	12/12	6	13	53.8%	37.2	9.5	2	50.0%
Sweden	8/13	5	12	50.0%	92.5	0.4	4	50.0%
Switzerland	11/13	7	16	43.8%	89.2	2.0	2	0.0%
Tanzania	7/13	5	14	78.6%	28.8	2.6	4	25.0%
Tunisia	13/13	4	13	46.2%	44.3	2.3	4	75.0%
Turkey	8/13	2	6	83.3%	44.0	0.0	2	100.0%
Uganda	3/13	2	3	100.0%	25.0	0.0	2	0.0%
Ukraine	13/13	7	14	57.1%	24.6	1.8	1	100.0%
United Arab Emirates	10/12	4	7	57.1%	63.2	5.0		
United Kingdom	10/13	6	14	57.1%	82.8	4.2	4	0.0%
Venezuela	11/13	4	13	61.5%	21.3	2.3	4	50.0%
Total/Average	**742/928**	**346**	**827**	**61.9%**	**48.2**	**3.0**	**160**	**40.0%**

Table 2: Detailed description of matches between Teams A and B
Panel T: Matches on the last day of season t between Teams A and B

Variable Name	Team *A* achieved the Desired Result				
	Yes	No	Total	Mean (rate of yes/ total)	Standard deviation
A has better final rank	109	29	138	0.790	0.409
B has better final rank	403	286	689	0.585	0.493
A home game	310	116	426	0.728	0.446
B home game	202	199	401	0.504	0.501
Total	512	315	827	0.619	0.486

Panel T+1: All the last matches in season t+1 between Teams A and B in which Team A achieved the desired result that in retrospect was critical in order to avoid relegation

Variable Name	Team *B* won				
	Yes	No	Total	Mean (rate of yes/ total)	Standard deviation
B has better final rank	52	59	111	0.468	0.501
A has better final rank	12	37	49	0.245	0.434
B home game	39	40	79	0.494	0.503
A home game	25	56	81	0.309	0.465
Total	64	96	160	0.400	0.491

Note: *A*- Team that needs to achieve a desired result in year *t* to avoid relegation. *B*- Team that indifferent to result in year *t.*

Table 3: Descriptive statistics
Panel T: Dataset T- All the matches between Teams A and B in the year t.

Variable Name	Mean	Standard deviation	Total	Min	Max
A achieved the Desired Result	0.438	0.496	1,723	0	1
A achieved the Desired Result in the Last Round	0.619	0.486	827	0	1
A achieved the Desired Result Not in the Last Round	0.271	0.445	896	0	1
Last round	0.480	0.500	1,723	0	1
CPI Score	50.388	22.506	1,723	15	99
CPI*Last Round	24.005	29.467	1,723	0	99
A home game	0.503	0.500	1,723	0	1
Relative Rank *A* to *B* ($Log_2(A)$-$Log_2(B)$)	0.975	1.042	1,723	-2.415	4.392
Number of Clubs in the League	15.193	3.538	1,723	8	24
dHHI	0.007	0.005	1,723	0.001	0.035
Distance	343.1	498.5	1,721	0	5,197
Rule of Law Index	0.603	0.193	1,243	0.25	0.96
Fisman and Miguel Index	0.365	0.431	1,584	0	1.85
Log GDP per capita	8.967	1.654	1,723	0	11.631
% of Protestants	17.045	28.116	1,723	0	97.8
Democratic	0.309	0.462	1,723	0	1
British Legal Origins	0.211	0.408	1,723	0	1
Number of countries	75				

Note: A- Team that needs to achieve a desired result in year t to avoid relegation. B- Team that indifferent to result in year t.

Panel T+1: Dataset T+1- Matches between Team A and actual Team B and between Team A and imitated Team B in the year t+1.

Variable Name	Mean	Standard deviation	Total	Min	Max
A Lost	0.423	0.495	319	0	1
A Lost to Actual B	0.400	0.491	160	0	1
A lost to imitated B	0.447	0.499	159	0	1
ActualB	0.502	0.501	319	0	1
CPI Score	46.112	21.400	319	15	99
CPI* *ActualB*	23.106	27.595	319	0	99
Relative Rank *B (actual* or *imitated*) to *A* ($Log_2(B)$-$Log_2(A)$)	-0.520	1.160	319	-4.000	3.585
Relative Rank *ActualB* to *A*	-0.423	1.155	160	-4.000	3.585
Relative Rank *ImitatedB* to *A*	-0.618	1.160	159	-3.585	3.459
Team*B* (*actual* or *imitated*) home game	0.505	0.501	319	0	1
ActualB home game	0.494	0.502	160	0	1
ImitatedB home game	0.516	0.501	159	0	1
dHHI	0.007	0.005	319	0.001	0.027
Distance	390.7	612.3	319	0	6,836
Number of countries	58				

Note: *A*- Team that needs to achieve a desired result in year *t* to avoid relegation. *ActualB*- Team that indifferent to result in year *t. ImitatedB*- Team that finished one position above team *ActualB* in the year *t+1*, except for seven cases in which the *ActualB* finished first in the league, therefore, teams that finished in the second position were used as *ImitatedB*.

Table 4: Fixed effect estimates of the effect of CPI on the probability of Team A attaining the desired result

Dependent variable: Team *A* achieved the desired result	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Last Round	0.533***	0.515***	0.517***	0.516***	0.516***	0.515***	0.408***
	(0.057)	(0.055)	(0.055)	(0.055)	(0.055)	(0.055)	(0.120)
CPI	0.001	0.002	0.003	0.003	0.003	0.003	0.003
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
CPI*Last Round	**-0.004*** **	**-0.003*** **	**-0.003*** **	**-0.003*** **	**-0.003*** **	**-0.003*** **	**-0.003**
	(0.001)	**(0.001)**	**(0.001)**	**(0.001)**	**(0.001)**	**(0.001)**	**(0.002)**
Team *A* home advantage		0.176***	0.177***	0.177***	0.177***	0.177***	0.178***
		(0.022)	(0.022)	(0.022)	(0.022)	(0.022)	(0.021)
Log_2rank(*A*) - Log_2rank(*B*)		-0.106***	-0.106***	-0.108***	-0.108***	-0.108***	-0.108***
		(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
dHHI		-11.465**	-11.904**	-13.308***	-13.307***	-13.892***	-13.914***
		(4.822)	(4.925)	(5.000)	(5.000)	(4.646)	(4.653)
Number of teams in the league		0.001	0.001	-0.000	-0.000	-0.000	0.000
		(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Distance (in 1,000 km)			0.062*	0.063*	0.063*	0.069*	0.069*
			(0.034)	(0.035)	(0.035)	(0.037)	(0.037)
CPI*Distance (in 1,000 km)			-0.001	-0.001	-0.001	-0.001	-0.001
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
logGDP * Last Round							0.014
							(0.015)
Democratic * Last Round							-0.107
							(0.073)
Protestants * Last Round							0.001
							(0.001)
British Legal * Last Round							-0.030
							(0.050)
Observations	1,723	1,723	1,721	1,721	1,721	1,721	1,721
R^2	0.132	0.218	0.216	0.216	0.216	0.222	0.223
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear year trend	No	No	No	Yes	No	No	No
Quadratic year trend	No	No	No	No	Yes	No	No
Year fixed effects	No	No	No	No	No	Yes	Yes
Number of Countries	75	75	75	75	75	75	75

*** p<0.01, ** p<0.05, * p<0.1

Note: All regressions include country fixed effects. Standard errors clustered at the country level are in parentheses.

Table 5: Fixed effect estimates of the effect of CPI's quartile on the probability of Team A attaining the desired result

Dependent variable: Team *A* achieved the desired result	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Last Round	0.407***	0.403***	0.403***	0.399***	0.399***	0.403***	0.294**
	(0.042)	(0.042)	(0.043)	(0.042)	(0.042)	(0.042)	(0.121)
Q2 * Last Round	0.046	0.034	0.034	0.041	0.041	0.033	0.032
	(0.052)	(0.050)	(0.050)	(0.050)	(0.050)	(0.048)	(0.052)
Q3* Last Round	-0.066	-0.074	-0.071	-0.064	-0.064	-0.068	-0.076
	(0.063)	(0.063)	(0.063)	(0.064)	(0.064)	(0.063)	(0.075)
Q4* Last Round	-0.204***	-0.192***	-0.191***	-0.189***	-0.189***	-0.194***	-0.200*
	(0.066)	(0.066)	(0.067)	(0.066)	(0.066)	(0.065)	(0.108)
logGDP * Last Round							0.015
							(0.015)
Democratic * Last Round							-0.080
							(0.076)
Protestants * Last Round							0.001
							(0.001)
British Legal * Last Round							-0.043
							(0.053)
Test of Q2-Q3=0 (p-val)	0.062	0.059	0.066	0.060	0.060	0.068	0.072
Test of Q2-Q4=0 (p-val)	0.000	0.000	0.000	0.000	0.000	0.000	0.013
Test of Q3-Q4=0 (p-val)	0.027	0.060	0.056	0.048	0.048	0.044	0.149
Observations	1,723	1,723	1,721	1,721	1,721	1,721	1,721
R^2	0.134	0.228	0.229	0.229	0.229	0.236	0.236
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Basic controls	No	Yes	Yes	Yes	Yes	Yes	Yes
Distance controls	No	No	Yes	Yes	Yes	Yes	Yes
Linear year trend	No	No	No	Yes	No	No	No
Quadratic year trend	No	No	No	No	Yes	No	No
Year fixed effects	No	No	No	Yes	No	Yes	Yes
Number of Countries	75	75	75	75	75	75	75

*** p<0.01, ** p<0.05, * p<0.1

Note: All regressions include country fixed effects. Standard errors clustered at the country level are in parentheses. Our list of basic controls includes the Team *A* home advantage, $Log_2rank(A)$ - $Log_2rank(B)$, *dHHI* and number of teams in the league. Distance controls include distance in 1,000km between the cities of the teams and the interaction between this distance and the CPI.

Table 6: Fixed effect estimates of the effect of other corruption related measures on the probability of Team A attaining the desired result

Dependent variable: Team *A* achieved the desired result	(1)	(2)	(3)	(4)	(5)	(6)
Last Round	0.599***	0.556***	0.556***	0.301***	0.301***	0.301***
	(0.083)	(0.080)	(0.080)	(0.030)	(0.029)	(0.029)
Rule Law * Last Round	**-0.370****	**-0.301****	**-0.301****			
	(0.142)	**(0.137)**	**(0.137)**			
Fisman and Miguel * Last Round				**0.141*****	**0.117*****	**0.121*****
				(0.034)	**(0.037)**	**(0.036)**
Observations	1,243	1,243	1,243	1,584	1,584	1,582
R^2	0.149	0.243	0.245	0.132	0.218	0.218
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Basic Controls	No	Yes	Yes	No	Yes	Yes
Distance controls	No	Yes	Yes	No	Yes	Yes
Year fixed effects	No	Yes	Yes	No	Yes	Yes
Number of Countries	49	49	49	68	68	68

*** p<0.01, ** p<0.05, * p<0.1

Note: All regressions include country fixed effects. Standard errors clustered at the country level are in parentheses. Our list of basic controls includes the Team *A* home advantage, $Log_2rank(A)$ - $Log_2rank(B)$, *dHHI* and number of teams in the league. Distance controls include distance in 1,000km between the cities of the teams and the interaction between this distance and each of the measures of corrupt norms in the respective analysis.

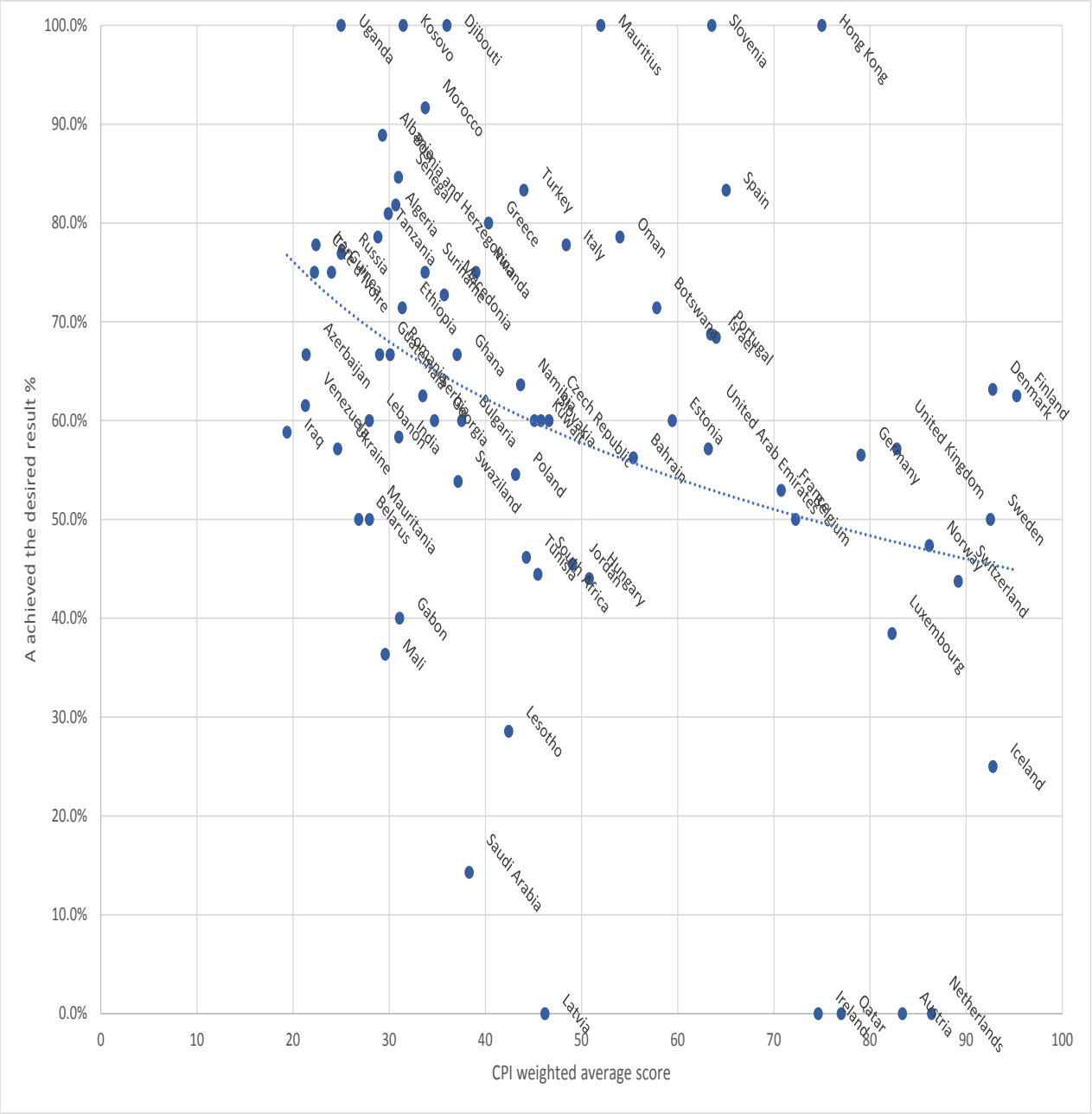
Table 7: Fixed effect estimates of the CPI on the probability of Team A to lose against Team B in the following year:

Dependent variable:							
Team *A* lost	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ActualB	0.155	0.155	0.176	0.178	0.176	0.176	0.173
	(0.149)	(0.132)	(0.132)	(0.135)	(0.135)	(0.135)	(0.137)
CPI	-0.023*	-0.019	-0.016	-0.014	-0.015	-0.015	-0.010
	(0.012)	(0.012)	(0.011)	(0.011)	(0.012)	(0.012)	(0.013)
CPI * *ActualB*	**-0.004***	**-0.004***	**-0.004***	**-0.004***	**-0.004***	**-0.004***	**-0.004***
	(0.002)	**(0.002)**	**(0.002)**	**(0.002)**	**(0.002)**	**(0.002)**	**(0.002)**
Team *B* home advantage		0.276*	0.271***	0.267***	0.262***	0.262***	0.265***
		(0.058)	(0.055)	(0.055)	(0.055)	(0.055)	(0.059)
dHHI		-4.726	-10.121	-10.681	-14.110	-14.113	-9.447
		(10.375)	(10.309)	(10.357)	(10.720)	(10.720)	(10.139)
Relative Rank *B* to *A*							
(*$Log_2(B)$-$Log_2(A)$*)			-0.138***	-0.138***	-0.145***	-0.145***	-0.141***
			(0.031)	(0.031)	(0.031)	(0.031)	(0.032)
Distance (in 1,000 km)				0.134	0.099	0.099	0.015
				(0.147)	(0.165)	(0.165)	(0.211)
CPI*Distance (in 1,000 km)				-0.003	-0.003	-0.003	-0.001
				(0.003)	(0.003)	(0.003)	(0.004)
Observations	319	319	319	319	319	319	319
R2	0.030	0.056	0.111	0.113	0.108	0.108	0.141
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear year trend	No	No	No	No	Yes	No	No
Quadratic year trend	No	No	No	No	No	Yes	No
Year fixed effects	No	No	No	No	No	No	Yes
Number of Countries	58	58	58	58	58	58	58

*** p<0.01, ** p<0.05, * p<0.1

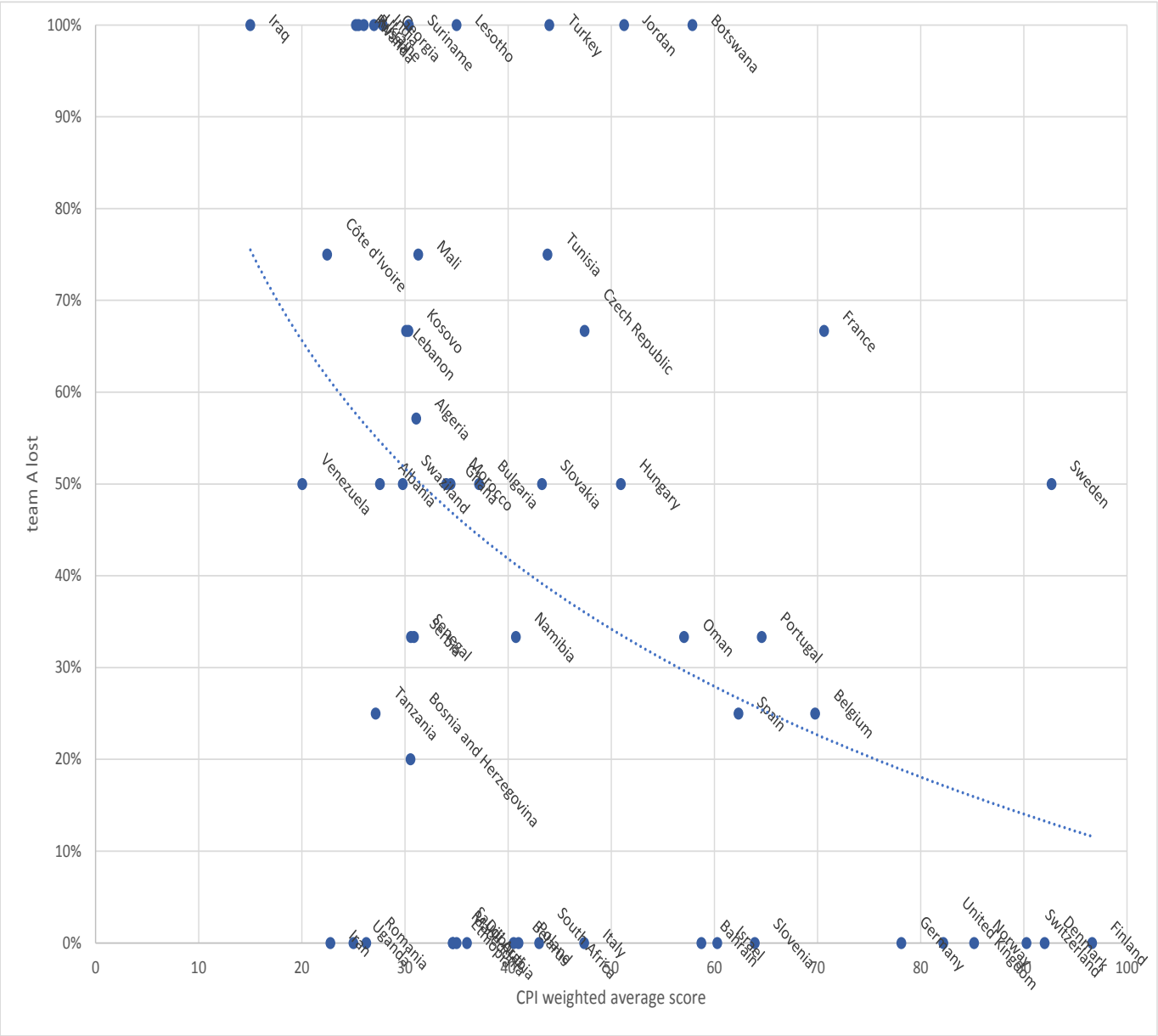
Note: All regressions include country fixed effects. Standard errors clustered at the country level are in parentheses.

Figure 1: Percentage of matches in which Team A achieved the desired result in the last round of year t.



Note: This figure presents the percentage of matches in which Team *A* achieved the desired result to avoid relegation as a function of the weighted average CPI score. The detailed data are presented in Table 1 and Panel T of Table 2.

Figure 2. Percentage of matches in which *actual* Team *B* won in the last match against Team *A* in the following year (*t+1*)



Note: This figure presents the percentage of matches in which Team *A* lost to the *actual* Team *B* in the year *t+1*, one year after Team *A* achieved the desired result that in retrospect was critical to avoid relegation. The detailed data are presented in Table 1 and Panel T+1 of Table 2.

Appendix A: List of Sources

www.rsssf.com
www.transparency.org
www.maps.google.com
www.aroundtheworld360.com

Appendix B: List of countries sampled by division:

1st Division Countries	2nd Division Countries
Albania	Austria
Algeria	Belarus
Azerbaijan	Belgium
Bahrain	Bosnia and Herzegovina
Botswana	Bulgaria
Côte d´Ivoire	Czech Republic
Djibouti	Denmark
Ethiopia	England as UK representative
Gabon	Estonia
Georgia	Finland
Ghana	France
Guatemala	Germany
Guinea	Greece
Hong Kong	Hungary
India	Iceland
Iran	Ireland
Iraq	Israel
Jordan	Italy
Kosovo	Latvia
Kuwait	Macedonia
Lebanon	Netherlands
Lesotho	Norway
Luxembourg	Poland
Mali	Portugal
Mauritania	Romania
Mauritius	Russia
Morocco	Serbia
Namibia	Slovakia
Oman	Slovenia
Qatar	Spain
Rwanda	Sweden
Saudi Arabia	Switzerland
Senegal	Turkey
South Africa	Ukraine
Suriname	
Swaziland	
Tanzania	
Tunisia	
Uganda	
United Arab Emirates	
Venezuela	