The role of social capital in national football team success

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Abstract

The article analyses the impact of country level social capital on national football team success. Football being a team sport appears to be a clear illustration of the collective actions problem, wherein the national team players' ability to interact on the pitch tends to be a cultural phenomenon predetermined at a national level. The regression analysis of data on 34 European countries in 2004-2016 demonstrates that national football team performance is positively affected by the social capital measured at country level. Moreover the analysis reveals the complementary effect of talent and social capital. The obtained results provide a deeper understanding of the nature of national sporting success in football, which in turn has a positive impact on the economic, political and social spheres of the society.

Introduction

When the team members work for a common result the moral hazard problem arises. "Moral hazard refers to the problem of inducing agents to supply proper amounts of productive inputs when their actions cannot be observed and contracted for directly" (Holmstrom, 1982). In terms of football the only precise observable indicator of inputs is the team performance, which is characterized by a high level of uncertainty ex ante. So it is impossible to identify the "free-rider" and as result noncooperative behavior of players always yields an inefficient outcome (Holmstrom, 1982). Thus an increase in a degree of cooperation expands the potential of a football team.

A significant over-expenditure of effort compared to the theory predictions was found almost in all existing studies of behavior in group contest (Sheremeta, 2015). One of the likely explanations to this phenomenon is altruistic motive. It is likely that football players also have such an altruistic motive to some extent. Football players often claim that they do not play for money, the bonuses paid for the achievements in the World Cup 2006 were shown to have no effect on performance and quality of playing of the national teams. Thus one can say that the direct or explicit incentives are weaker in football in comparison with other teams. However, the career is always important for football players, so we introduce the implicit incentives in the form of career concern together with a pro-social motivation in order to describe the players' behavior.

Social capital, understood as the capacity for collective action, is a key ingredient for team performance, as it sustains coordination, cooperation and prevents moral hazard in teams. However empirical testing of this conjecture remains scarce and patchy due to the paucity of data. Football is known to be a labour intensive industry, where the talent plays major role. Incentives to exploit this talent differ for a player and a team. In this study we propose to explore the

significance of such team feature as its collective capacity to work jointly for a common goal for the success of national football team.

The joint work of national football teams can be characterized as short-term project work, so the links inside a team are unlikely based on personal ties and the role of national cultural cooperative skills is likely to be high for national football teams. National social capital in particular can play an important role in the process of creation of the team result in this case.

For testing the hypothesis of positive and significant impact of social capital on national football team performance we use national level data on generalized trust and beliefs in propensity of other people to help as well as average personal readiness to help people (europeansocialsurvey.org). This choice is motivated by scarce personal social capital in national teams due to rare meetings of national teams and high degree of club heterogeneity inside the national team. We also check the difference in player and team incentives by looking at the link between change in market value of player (transfermarkt.co.uk) after the World Cup and the performance of national team at the World Cup. It is known that Word Cup triggers a large number of transfers as it serves an assessment for signing contracts with clubs in future. We have found no significant connection between these variables thus we get an argument in favor of the fact that there must be some additional motivation for players to act according to team's goal to win instead of increasing personal market value.

There is a number of articles aiming to determine the factors of national football team performance (Hoffmann et al., 2002; Macmillan, Smith, 2007; Leeds, Leeds, 2009), however there is no literature accounting for the role of social capital. In this paper we also propose a theoretical framework that captures a role of social capital in the mechanism of the interaction of player and team goals which finally affects the performance of national football team. This model relies on the mechanism described above and shows that social capital is an important factor of team success. Our empirical model uses data on European countries' FIFA rank as dependent variable and data on national level social capital described above as the independent variable of interest. We control for GDP, population size, climate and total market value of a team in different specifications to account for other factors of national team performance. We also include an interaction term of social capital and team market value as we expect that social capital influences conditionally on the team capacity, because players should not only be motivated to win, but also cooperate with team members effectively in order to rich common goal.

Our empirical results show that social capital measured as trust and beliefs in propensity of other people to help have a joint positive and significant effect on national football team performance, while including our third measure of social capital leads to opposite result. It can be explained through the specificity of this measure. The answer about the personal readiness to help people is influenced by social approval and people tend to distort reality in order to get this approval. Unlike this measure, other two variables of social capital reveal the opinion about other people behavior so these variables are less likely to be distorted.

Thus theoretical and empirical approach to the problem of revealing the role of social capital in national football team success provide a deeper understanding of the nature of national sporting success in football, which in turn has a positive impact on the economic, political and social spheres of the society.

Literature review

a. The factors of international football success

There is a growing literature examining the factors of international soccer team performance. This branch of literature originates from the investigations of the Olympic success determinants. High level of uncertainty caused by a traditionally greater number of knock-out stages makes the economists use new approaches to estimate the effects of interest. Although most of articles use aggregated data of FIFA scores and ranking on matches played during four years in order to overcome the problem of uncertainty, there are some articles aiming to explain the results of a single tournament (Paul, Mitra, 2008). This article focuses on explaining the national football success at the aggregated level, so does the following review of the existing literature.

All factors can be classified on economic, political, socio-cultural and physical factors. The latter three groups of factors are of the greatest interest for economists. Hoffman at al. (2002) claim that higher level of GNP per capita has positive and decreasing effect on international soccer team performance as measured by FIFA ranking scores. Another determinant of sporting success they mark out is quadratic deviation from the average temperature 14°C (57.2°F) which is conducive to outdoor activities. They also use dummy variable, latin, set to one for all Spanish and Portuguese speaking countries and dummy for the host nation for the World Cup (finals) competition to control for cultural factors that reflect a footballing tradition. The alternative measures for footballing tradition are the date of entering the FIFA organization, the number of appearances in a World Cup tournament (Houston, Wilson, 2002) and the date of the first international football match played by the national team (Macmillan, Smith, 2007). Macmillan and Smith (2007) complement the latter research by expanding the sample of counties and adding such factors as history of international soccer as measured by the year of the first international football match conducted by country and former Soviet republics dummy. They also try to avoid the possible distortion in measure for the performance by FIFA ranking using unofficial index Elephant in order to exclude the results of friendly matches.

Berlinschi at all. (2013) report that migration of national team players contributes to the international soccer performance, particularly for countries with lower quality soccer clubs. Leeds and Leeds (2009) explore the influence of institutions on international soccer performance and find that current communist regimes do not perform as well as noncommunist regimes, while former communist countries perform better due to the synergy between old support for soccer and new-found freedom, however, the degree of freedom alone has no direct impact on soccer performance. Also they find that oil production improves soccer performance as well as country's soccer club teams success, while the colonial heritage has no significant effect.

While these studies gradually increase the predictive power of empirical models, the latter still explain less than 50% of the variations in team performance, which is indicative of possibly omitted variables, and we conjecture that social capital is one of such variables.

b. Football players' incentives

The second branch of literature we are interested in gives us an evidence of the football players' non-monetary motivation for a team win. The payment system in football is individual, while the game result is common for all the team members. Thus player's incentive may deviate from a team win, there can be some personal gains independent from a team success for a football player. Thus in order to understand the mechanism of creating football team success it is important to determine to what extent the player's financial gain is affected by the individual and team performance and how is players' performance affected by remuneration.

The most often measures of individual player performance in the literature are goals, assists and tackles won. At first, we need to notice, that these measures are position-specific, so most investigations exclude goalkeepers from the sample and control for the position of a player. At

second, these actions require both talent and effort, however, they do not guarantee a team win. As for the team performance, sporting success measured as team ranking or number of points is the performance measure. Thus team sporting performance can be measured only relatively to the competitors, unlike the player individual performance which is measured in absolute terms, however, player's performance is determined by other 21 players on the pitch along with personal talent and effort. Finally this conditionality makes the main difficulty and interest of this research.

Age, experience, talent, position, country of origin, two-footedness, number of international appearances (Bryson, Frick, and Simmons, 2012), and especially average performance are the main factors which were found to explain the difference in players' market values (Deutscher, Buschemann, 2016). In addition, it was shown that consistency of payer's performance negatively impacts the market value of Bundesliga players (Deutscher, Buschemann, 2016). Thus it can be said that there is a salary premium for the individual performance measured as goals, assists and tackles. However, if we look at the influence of a pure effort, measured as distance covered and intensive runs, no effect was found for the Budesliga 2011/2012 season and the first half of the 2012/2013 season (Wicker et al., 2013). The effort was found to have significant effect on market value only conditionally on the tackles rate, i.e. player's talent, and could explain only the absolute value, but not the changes in pay. This fact can be treated as a kind of paradox, known in literature as "Moneyball phenomenon" (Lewis, 2003), as distance covered as well as number of intensive runs has positive and significant isolated effect on the team performance measured as win probability (Weimar and Wicker, 2014). The possible explanation to this phenomenon was suggested by Berri, Brook, and Schmidt (2007) arguing that the decision makers in professional sports leagues hardly look at data and do not behave in a rational manner. Thus, it seems to be even harder to explain the salary determinants in football. Frick (2006) states that poor teams seem to use bonus payments to motivate their players for a win, while rich teams succeed by paying a high fixed salary.

As noted above, the individual performance is affected by the player's teammates, so they can also influence his salary. Nevertheless, a lot of research on this issue ignore the team effects or use team dummies to capture it. The main result about the team effect on individual payment was found for National Hockey League by Idson and Kahane (2000). This article states that team attributes measured as management and co-worker productivity have both direct and indirect effect, with the latter coming through a change in valuation of individual player characteristics. Thus, ignoring the team effect is likely to bias the estimates of individual characteristics effects upwards.

Some of football players are included in the national football teams, being a member of two teams simultaneously. A number of research have found a positive effect of being a member of national team on a player's salary (Deutscher, Buschemann, 2016; Bryson, Frick, and Simmons, 2012; Wicker et al., 2013). Kiefer (2014) investigates the effect of national team performance measures as round of team exit and states a positive effect on player's market value. However, there is a question on the reverse causality, as it is reasonable to expect that higher market value of player increases the probability to be included in the national football team.

The next part of research is aimed to explain how does the players' behavior influenced by the relative and absolute payment levels along with team effects. Individual salary is deemed to serve as an extrinsic motivation for players. It is also assumed that players have financially independent intrinsic incentives to achieve personal and team success. The literature also argues that there is a harmful effect of excessive financial rewards which crowd out the intrinsic player's motivation (Holmstroem and Milgrom, 1990). Relative salary may stimulate players to work harder on the

one hand, when they can feel the difference in payment through the comparison themselves primarily with the teammates, and may decrease the motivation, as the team outcome is one for all the team members and it is not easy to determine the contribution of a specific player. And finally, teammates can affect player performance as it was noticed above.

It is a complicated problem to differentiate relative salary and relative talent as there is an obvious complexity in measuring player's and his teammates' talent. However, empirical literature tries to solve this question using the available data. For measuring the individual performance the authors also use goals and assists, the absolute value of lagged salary was shown to have positive and significant effect with diminishing return on individual performance (Torgler, Schmidt, 2007; Della Torre et al., 2014). Torgler and Schmidt add dummy for national team players and foreign players as instrumental variables in order to show the causality direction of the pay-performance relationship. Forrest and Simmons (2002) found that wage expenditures increase sporting success at the team level, however including the pay dispersion eliminates this effect (Franck, Nüesch, 2011).

The relative salary measured as the difference between individual and average salary of the teammates has negative effect on player's performance at the individual level in Bundesliga (Torgler, Schmidt, 2007). For the Italian Serie A the share the individual player had in in the total sum of salaries of all players within the same role positively affects the individual performance and crowds out the effect of absolute pay value (Della Torre et al.). At the team level of Bundesliga the results show that pay dispersion in the team measured as Gini index and coefficient of variation has a positive impact for very high and very low degree of income inequality, while teams with the medium rates perform poorly (Franck, Nüesch, 2011).

Thus we see the evidence of the positive link between pay and performance in football, however there are different argument in the literature in favor of the true causality direction. Dobson and Goddard (1998) use a sample of 77 football leagues from 1946 to 1994 and Granger causality tests to show that the effect of lagged income on current performance is stronger than the effect of lagged performance on current income. Nüesch (2009) argues that both pay and performance of players are driven mostly by the talent. The author uses the same instrumental variable approach as Torgler and Schmidt (2007) and shows that the influence of wage on player performance disappears when the player's players fixed effects are added in order to control for the time invariant ability of player. Thereby, he concludes, that salary buy talent rather than motivation. Hall et al. (2002) compare the Major League Baseball and English Premier League and conclude that at the team level the more restrictions on players spending is imposed the weaker is the influence of wage bill on the team performance. This is also an argument in favor of buying talent, as these restrictions do not prevent the changes in wages in order to stimulate players.

Frank and Neush (2010) investigate the influence of talent heterogeneity on football club success. They state that on the match level more homogenous team perform better as there is a high degree of complementarity for players actions on the field, while on the season perspective there is an educational effect and thus talent disparity leads to better result. However, the authors do not consider the incentives effects which can be driven by the talent disparity. If we assume that the players are strategic individuals, then accounting for the influence of their talent, effort and teammates effects on their performance may lead to changes in effort made by each player. Thus, if a high talented player does not expect for the appropriate assistance of his teammates, he may decrease his effort.

And if we speak about national football teams, the bonus system here suggests an equal payment for all players independent of their contribution to a team result. However, in fact we see no

evidence of the link between cumulative bonuses to players and the performance of the team on the World Cup or the subjective assessment of the quality of the game (Coupe, 2007). In addition, football players often argue that money does not matter when they play for their country. We supplement these arguments by testing the correlation between the change in players' market values after the World Cup 2014 and the performance of the teams. The correlation between the 50 greatest changes in market value and team performance measured as a number of points gained by a team during the World Cup (0 – lose, 1 – niche, 3 – win) is less than 1% and statistically insignificant.

We can conclude, that some of player performance measures, such as goals, assists and tackles have an impact on player's revenue, however the effort has no influence. The main driving force for payment as well as player's performance is talent. The membership in national football teams can measure talent, which explains performance through wage. There is evidence that players have primarily non-financial motivation in their career. This motivation can come from coach, the assistance of teammates and intrinsic values for achieving individual and team success.

Theoretical model

In the previous section we discussed the determinants of incentives of football players. We have found an evidence of the weakness of explicit incentives for football players as the main driving force of effort is likely to be talent, not the financial bonuses. However, the literature on economics of football ignores the alternative implicit incentives idea in football, which seems to be appropriate. Football players often argue that they do not care about money itself, moreover, many teams do not have a system of explicit incentives for players. At the same time it is obvious that players seek for popularity and acknowledgement during their career. For the case of national football teams the role of career concerns becomes even more important, as the national team is a project team with short-term immediate financial gain. Playing for national team is important for the career of players, but does not give the significant remuneration. Thus we use the approach of implicit incentive through career concern of Holmstrom (1982) to describe the process of generating the national football team performance. We also add an altruistic incentive for players. Football is a team game where a moral hazard problem arises due to the externalities influencing on each player through the actions of his teammates. So in order to overcome moral hazard problem players should trust their teammates and finally act cooperatively for a common goal. Moreover, national team players often want to appear as prosocial (public-spirited) and disinterested (not greedy) (Coupe, 2007). We use the method of Bénabou and Tirole (2006) to model pro-social behavior of national team players.

There are n players characterized by talent θ_i and effort a_i, where talent levels θ_i are independent and identically normally distributed random variables ($N(\bar{\theta}, \sigma_\theta^2)$). The effort of players is assumed to be unobservable, what seems to be reasonable assumption, as there is no clear measure of total effort isolated of player's talent. Team output is a team sporting success, which is observable and is formed by the total talent and effort:

$$y = \sum_{i=1}^{n} (\lambda\theta_i + \mu a_i + a_i\,\theta_i) + \varepsilon,$$

where effort and talent are both substitutes and complements: $\lambda, \mu > 0$. $\varepsilon \sim N(0, \sigma_\varepsilon^2)$ is a stochastic noise, which is independent from $\theta_1, \dots, \theta_n$. Let $f(\theta, y|a)$ denote the joint distribution of talent and output given the effort a. Let $\hat{f}(y|a) = \int f\,(\theta, y|a)d\theta$ denote the marginal density of output. The expected reward or the career concern of players is $E(\theta_i|y, a^*)$, where $a^* =$

$(a_1^*, \dots, a_n^*)$ is a vector of equilibrium levels of effort. Let $f(\theta|y,a) = f(\theta, y|a)/\hat{f}(y|a)$ denote conditional distribution of talent and $f_i(\theta_i|y,a) = \int f(\theta_i, \theta_{-i}|y,a)\, d\theta_{-i}$ denote conditional distribution of player *i*'s talent. Then $E(\theta_i|y,a) = \int \theta_i\, f_i(\theta_i|y,a) d\theta_i = \int \theta_i\, f(\theta|y,a) d\theta$.

The players bear the cost of effort $c(a_i)$, where $c(a_i)$ is a convex function. So the players need to solve the following problem:

$$\alpha Ey + E_y E_\theta(\theta_i|y,a) - c(a_i) \to \max_{a_i \geq 0}$$

Coefficient α here stands for the intrinsic pro-social motivation, in addition players have implicit incentive in the form of career concern.

Assuming an interior solution, the first order condition for a symmetric equilibrium is:

$$\alpha(\mu + \bar{\theta}) + \frac{\partial}{\partial a_i} E_y E_\theta(\theta_i|y,a) = c'(a_i)$$

Using the fact that (multidimensional) likelihood ratio has a zero mean, we can rewrite:

$$\frac{\partial}{\partial a_i} E_y E_\theta(\theta_i|y,a) = cov\left(\theta_i, \frac{\hat{f}_{a_i}(y|a)}{\hat{f}(y|a)}\right) = \frac{(\mu + \bar{\theta})(\lambda + a_i)\sigma_\theta^2}{\sigma_\theta^2 \sum_{j=1}^n (a_i + \lambda)^2 + \sigma_\varepsilon^2}$$

The vector $cov\left(\theta_i, \frac{\hat{f}_{a_i}(y|a)}{\hat{f}(y|a)}\right)$ describes the players' marginal incentives.

$Assumption$: $\lambda > \frac{\sigma_\varepsilon}{\sigma_\theta \sqrt{n}}$

(talent matters; large n; wide variation of talent in comparison with stochastic noise) => LHS monotonically decreasing in a_i

Proposition 1.

a^* increases in $\bar{\theta}$ (expected talent), α (social capital) and decreases in n (collective signaling problem).

Proof. The left-hand side of the first-order condition increases by the average level of talent $\bar{\theta}$ and decreases by the equilibrium level of effort e by virtue of our assumption of a single equilibrium. The right-hand side of the first order condition $c'(e)$ does not depend on $\bar{\theta}$ and increases by the equilibrium level of effort e. Therefore, the equilibrium level of effort e increases by $\bar{\theta}$. In other words, the more talented the average team player is, the greater the contribution of effort to the result, and the higher the equilibrium level of effort.

Similarly, the left-hand side of the first-order condition increases in the parameter of social capital α and decreases by the equilibrium level of effort e. Therefore, the equilibrium level of effort e increases by α. That is, the stronger the pro-social motivation of the player and his intangible interest in the success of the team is, the higher the efforts that he exerts to achieve the team result is, the ceteris paribus.

The left-hand side of the first-order condition also decreases by the number of team members *n* and decreases by by the equilibrium level of effort e. Therefore, the equilibrium level of effort

e decreases by n. That is, the more players in a team, the less the contribution of an individual player to the result of the team is, and the less sensitive the assessment of a player's talent by the market to his efforts is. ■

Proposition 2.

Ey increases in $\bar{\theta}$ (expected talent) and α (social capital).

Consider effort supply function $a = a(r)$ such that $c'\big(a(r)\big) = r \; or \; a(r) = (c')^{-1}$, and assume that reward elasticity of supply $\frac{ra'(r)}{a(r)}$ is non-decreasing.

Proposition 3.

For sufficiently large *n* one has $\frac{\partial^2}{\partial\alpha\partial\theta}\bar{y} > 0$.

Assumption of non-decreasing elasticity (which is met for a constant elasticity quadratic cost function $c(a) = a^2$) can be relaxed: proposition 3 holds as $\frac{c'(a)c'''(a)}{(c''(a))^2} < 2$.

Data and empirical model

In the empirical part or the paper, we test two hypotheses based on Propositions 2 and 3 presented in the theoretical part of the paper.

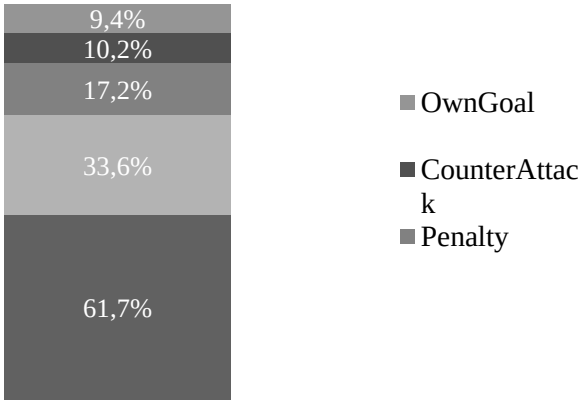
Hypothesis 1. National football team performance is positively associated with the level of social capital estimated at the national level.

Hypothesis 2. The effect of national social capital on national football team success increases with the level of team talent.

We test these two hypotheses in two different ways. The first is a placebo test which analyses the effect of talent and social capital on national football team performance in terms of different types of goals scored (open play, set piece, penalty). The intuition behind this approach suggests that set piece and penalty goals require more individual talent and effort while open play goals require more team talent and cooperative effort. Thus, we can expect that team talent and social capital will contribute positively to a team performance in terms of open play goals, but not to set piece and penalty goals. We use the final stage of the World Cup 2018 in Russia to test these hypotheses. The sample includes 128 team-game observations in 64 final stage games.

There are five different possible situations, when a goal can be scored: open play, set piece, penalty, counter attack and own goal. The average number of goals scored by one team in a game during the final stage of the World Cup 2018 amounted to 1.32. The structure of all goals by game situation is presented in Figure 1.

Figure 1. The structure of all goals by game situation



We use Hofstede individualism/collectivism score (IDV)[1] to measure national social capital. This index measures "degree to which people in a society are integrated into groups." Individualistic societies have loose ties that often only relate an individual to his/her immediate family. They emphasize the "I" versus the "we." Its counterpart, collectivism, describes a society in which tightly-integrated relationships tie extended families and others into in-groups. These in-groups are laced with undoubted loyalty and support each other when a conflict arises with another in-group. This index is available for the largest number of countries among all the existing international surveys on social values and norms, so it allows to extend our sample as much as possible. Games of Tunis (3 observation) and England (7 observation) teams are excluded from the sample as IDV index is not available for these World Cup 2018 contestants.

We use a national team market value (TMV)[2] to measure the team talent. Opponent's strength is measured using a ranking (Rating_opponent)[3] based on the results of teams demonstrated at the final stage of the 2018 World Cup. Thus, we account for both opponent team talent and ability to cooperate an effort (social capital). We finally estimate the following models:

$$Goals_{type_i} = \beta_0 + \beta_1 TMV + \beta_2 IDV + \beta_3 \text{Rating}_{\text{opponent}} + \beta_4 TMV * IDV + \varepsilon \quad (1)$$

We expect that β_4 will be negative, as IDV reflects the opposite to social capital value. We use Poisson regression to estimate the models' coefficients, as the dependent variable is restricted to integer positive (count) values.

Table 1. Descriptive statistics for the World Cup sample

Variable	Mean	Std. Dev.	Min	Max
Goals_total	1.320	1.157	0	6
Open_play	0.617	0.805	0	3
Set_piece	0.336	0.551	0	2
Counter_attack	0.102	0.303	0	1
Penalty	0.172	0.399	0	2
Own_goal	0.094	0.293	0	1
Rating	6.711	0.188	6.13	7.06
IDV	37.942	21.949	2	75
TMV	18.175	16.198	0.435	52.2

Table 2. Results of the Poisson regression for the World Cup sample

	Dependent variable:				
	Goals Total	Open play	Set piece	Penalty	Set piece or Penalty
	(1)	(2)	(3)	(4)	(5)
TMV	0.038***	0.078***	0.035	-0.023	0.018
	(2.72)	(3.86)	(1.20)	(0.48)	(0.73)
IDV	0.010	0.026***	0.003	-0.007	-0.000
	(1.53)	(2.67)	(0.26)	(0.43)	(0.03)
Rating_opponent	-1.480***	-1.902***	-0.330	-0.697	-0.444

[1] www.hofstede-insights.com
[2] transfermarkt.de
[3] whoscored.com

	(3.21)	(2.87)	(0.34)	(0.51)	(0.56)
TMV*IDV	-0.0005*	-0.001***	-0.000	0.000	-0.000
	(1.83)	(2.90)	(0.83)	(0.43)	(0.47)
const	9.499***	10.689***	0.702	3.133	2.089
	(3.07)	(2.58)	(0.11)	(0.34)	(0.39)
Prob > chi2	0.0001	0.000001	0.7275	0.9669	0.8741
N	120	120	120	120	120

Note: t-statistics in parenthesis; *** p<0.01, ** p<0.05, * p<0.1. Columns (1) - (5) present the coefficients' estimates of the of the model (1) for different types of goals.

For the total number of goals scored in normal time, the joint effect of talent and social capital is significant and positive (the interaction term coefficient estimate has a negative sign, column (1)). For open play goals scored (column (2)), the significance of the studied effect of social capital increases, while for penalty and set piece goals scored (columns (3) - (5)), the regression is generally insignificant. This result is in line with our expectations regarding the role of social capital, since it is the open play goals that mostly rely on team actions and cooperation of all the possible types of goals. Thus, such a placebo test supports the applicability of a national social capital measure to estimate the ability to act cooperatively for a common goal in case of national football teams.

The second stage of our empirical analysis studies the role of social capital in national football team performance aggregated on a four years level. The structure of data set is determined by a structure of the European Social Survey (ESS). ESS serves as source of national social capital measures, which stay for the kea explanatory variables in our models. We use the 7 latest waves (from 2004 to 2016) of the ESS, the sample includes 34 countries with 22 to 28 countries inside each wave and 169 observations in total, thus the data has an unbalanced panel structure. We chose 4 questions from the whole list of ESS questionnaire most closely related to the social capital determined as a collective effort aimed at a common goal. The corresponding variables names are TRUST, HELP, CARE and FAIR and the question formulations are presented in Table 1. Generalized trust (TRUST) is the most common measure in social capital studies (e.g. Newton, 2001; Sobel, 2002). Three additional social capital measures are introduced in the empirical analysis in order to study the robustness of results. TRUST, HELP and FAIR assess the attitude to other people, while CARE assesses an intrinsic social norm. The scale for these four survey questions varies from 6 to 11 degrees of agreement and the variables are constructed as the sum of population shares with the top-half degree of agreement chosen.

The dependent variable is a national football teams' performance measured as the FIFA ranking. We do not use the UEFA ranking, as it does not account for the importance of matches and the opponent strength. A lot of empirical papers, explaining the national football team use the FIFA ranking as a proxy (fifa.com; e.g. Houston, Wilson, 2002; Hoffman at al., 2002; Macmillan, Smith, 2007; Leeds, Leeds, 2009; Berlinschi at all., 2013), so this measure seems to be reliable. Fifapoints, fifasuccess

We follow the existing literature and control for real GDP PPP per capita[4] (INC_PC), population size[2] (POP), climate[5] (CLIM) and the international football experience (HIST)[6]. We also add the team market value[7] (TMV) as an estimate of talent. In our basic hypothesis social

[4] The World Economic Outlook (WEO)

[5] deviation of average annual temperature from 14C (www.weatherbase.com)

[6] "Fact Sheet - FIFA World Cup: All-time ranking". FIFA.

[7] transfermarkt.de

capital increases interaction of the team in field, however, football players need to be high talented in order to keep the ball, win tackles and make accurate passes to be able to interact effectively. We test this hypothesis in our model by adding an interaction term of talent measure and social capital proxies. To estimate the model we use negative binomial regression with robust standard errors, as we have s count dependent variable with differing mean and standard deviation. Thus, we have two models, first with linear independent effect of social capital variables, and second with linear conditional on talent level effect:

$$fifarank = \beta_1 tmv + \beta_2 inc + \beta_3 pop + \beta_4 clim + \beta_5 sc \quad (2)$$

$$fifarank = \beta_1 tmv + \beta_2 inc + \beta_3 pop + \beta_4 clim + \beta_5 sc + \beta_6 sc * tmv, \quad (3)$$

where *sc* is one of four social capital variables. We also use first principal component of four social capital proxies as an additional estimate of social capital. As we have time data, we correct all the variables in terms of money for inflation. According to data we transform tmv variable to the inverse term, as from the two way graph we see the inverse relation. It means that increasing talent of players can effectively improve the team result, while the team in on the tail of ranking, and is mostly ineffective for the leaders of ranking. This phenomenon is in line with the diminishing marginal return for investment.

Table 3. Variables description

Variable name	**Description**
Dependent variable	
FIFARANK	Rank of national team in FIFA ranking (fifa.com)
FIFASUCCESS	
Social capital	
TRUST	"Most people can be trusted or that you can't be too careful in dealing with people?"
HELP	"Most of the time people helpful or people mostly look out for themselves?"
CARE	"Important to help people and care for others well-being"
FAIR	"Most people try to take advantage of you, or try to be fair"
Controls	
INC_PC	Real GDP PPP per capita (IMF WEO 2016)
POP	Population size (IMF WEO 2016)
CLIM	Deviation of average annual temperature from 14C (www.weatherbase.com)
HIST	Number of years after the first Word Cup appearance ("Fact Sheet - FIFA World Cup: All-time ranking". FIFA.)
TMV	Cumulative market value (transfermarkt.de)

Table 4. Descriptive statistics for the ESS sample

Variable	Mean	Std. Dev.	Min	Max
FIFASUCCESS	0.761214	0.2	0	0.9935484
FIFARANK	37.01183	31	1	155
TMV	78.16509	77.10948	1.32	358.5849
INC_PC	28.30386	11.15606	6.079847	73.87692

POP	21.87067	30.54023	0.291	143.965
CLIM	47.27183	43.70776	0	213.16
HIST	53.21302	31.04896	0	105
TRUST	42.47101	17.28295	12.5	77.3
HELP	38.54142	15.27108	13.6	72.9
CARE	89.48994	6.215061	69.1	98.5
FAIR	51.10178	17.33137	17.8	82.4

Table 5. Spearman correlation matrix, *p<0.05

	FIFASUCCESS	TMV	INC_PC	POP	CLIM	HIST	TRUST	HELP	CARE
FIFASUCCESS	1.0000								
TMV	0.8446*	1.0000							
INC_PC	0.1237	0.1497	1.0000						
POP	0.6624*	0.7665*	-0.1304	1.0000					
CLIM	-0.4076*	-0.4194*	0.1814*	-0.3211*	1.0000				
HIST	0.2370*	0.2806*	0.3466*	0.4267*	0.0675	1.0000			
TRUST	-0.1233	-0.1228	0.7391*	-0.3002*	0.4725*	0.3297*	1.0000		
HELP	-0.1355	-0.1651*	0.7612*	-0.3316*	0.4752*	0.2571*	0.9234*	1.0000	
CARE	0.1569*	0.1089	0.3038*	-0.0413	-0.2200*	0.0355	0.1100	0.1143	1.0000
FAIR	0.0055	0.0473	0.8151*	-0.1723*	0.4287*	0.4140*	0.9253*	0.9013*	0.1054

Table 6. Pooled OLS fifasuccess dependent variable with year clustered standard errors additive effect

	(1)	(2)	(3)	(4)
	OLS1	OLS2	OLS3	OLS4
VARIABLES	fifasuccess	fifasuccess	fifasuccess	fifasuccess
TMV	0.00122***	0.00124***	0.00126***	0.00120***
	(8.878)	(7.422)	(5.102)	(10.53)
INC_PC	-0.000957	-0.00241	-0.000556	-0.00121
	(-0.287)	(-0.761)	(-0.252)	(-0.345)
POP	0.00157***	0.00161***	0.00123	0.00148***
	(4.513)	(4.177)	(1.881)	(4.362)
CLIM	-0.000894***	-0.00104***	-0.000493	-0.000874**
	(-5.325)	(-4.735)	(-1.090)	(-3.604)
HIST	0.000233	0.000341	0.000418	0.000203
	(0.634)	(0.818)	(1.133)	(0.545)
TRUST	0.00154			
	(0.925)			
HELP		0.00312		
		(1.863)		
CARE			0.00431**	
			(2.968)	
FAIR				0.00160
				(0.916)
Constant	0.623***	0.608***	0.267*	0.618***
	(14.41)	(13.00)	(2.218)	(13.16)
Observations	169	169	169	169
R-squared	0.441	0.454	0.450	0.441

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Table 7. Pooled negative binomial fifarank dep var additive effect

	(1)	(3)	(5)	(7)
	NBREG1	NBREG2	NBREG3	NBREG4

VARIABLES	fifarank	fifarank	fifarank	fifarank
TMV	-0.00968***	-0.00980***	-0.00999***	-0.00976***
	(-15.78)	(-18.37)	(-14.40)	(-14.86)
INC_PC	0.00324	0.00586	0.00177	0.00241
	(0.604)	(1.208)	(0.398)	(0.379)
POP	-0.00531**	-0.00501**	-0.00359	-0.00422*
	(-2.012)	(-2.141)	(-1.383)	(-1.673)
CLIM	0.00293***	0.00300**	0.000959	0.00222
	(2.597)	(2.546)	(0.601)	(1.354)
HIST	3.04e-05	-0.000466	-0.000802	-7.24e-05
	(0.0231)	(-0.346)	(-0.608)	(-0.0603)
TRUST	-0.00700***			
	(-2.727)			
HELP		-0.00993***		
		(-4.414)		
CARE			-0.0163***	
			(-4.017)	
FAIR				-0.00446
				(-1.076)
Constant	4.262***	4.297***	5.591***	4.239***
	(29.37)	(28.46)	(14.97)	(26.30)
Observations	169	169	169	169

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Table 8. Pooled OLS fifasuccess dependent variable with year clustered standard errors multiplicative effect

	(1)	(2)	(3)	(4)
	MOLS1	MOLS2	MOLS3	MOLS4
VARIABLES	fifasuccess	fifasuccess	fifasuccess	fifasuccess
FIFASUCCESS				
TMV	0.000483	0.000529**	0.00563***	0.000694*
	(1.403)	(2.484)	(5.502)	(2.374)
INC_PC	-0.000733	-0.00242	-0.000989	-0.00118
	(-0.213)	(-0.761)	(-0.471)	(-0.339)
POP	0.00143***	0.00141**	0.00112*	0.00133**
	(3.895)	(3.135)	(2.029)	(3.089)
CLIM	-0.000722***	-0.000892**	-0.000437	-0.000744**
	(-4.405)	(-3.634)	(-1.010)	(-2.843)
HIST	0.000261	0.000308	0.000575	0.000200
	(0.716)	(0.734)	(1.491)	(0.532)
TRUST	-1.06e-05			
	(-0.00518)			
C.TMV#C.TRUST	2.02e-05**			
	(2.753)			
HELP		0.00162		
		(1.159)		
C.TMV#C.HELP		2.33e-05*		
		(2.419)		
CARE			0.00832***	
			(3.944)	
C.TMV#C.CARE			-4.82e-05***	
			(-4.205)	
FAIR				0.000765
				(0.501)
C.TMV#C.FAIR				1.13e-05
				(1.397)

Constant	0.670***	0.656***	-0.0903	0.652***
	(12.44)	(10.65)	(-0.510)	(10.06)
Observations	169	169	169	169
R-squared	0.448	0.460	0.466	0.443

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Table 9. Pooled negative binomial fifarank dep var mult effect

	(1)	(3)	(5)	(7)
	MNBREG1	MNBREG2	MNBREG3	MNBREG4
VARIABLES	fifarank	fifarank	fifarank	fifarank
TMV	-0.00409**	-0.00290*	-0.00380	-0.00532**
	(-2.256)	(-1.713)	(-0.258)	(-2.287)
INC_PC	0.00284	0.00659	0.00142	0.00238
	(0.500)	(1.350)	(0.290)	(0.382)
POP	-0.00406	-0.00318	-0.00373	-0.00303
	(-1.523)	(-1.335)	(-1.334)	(-1.159)
CLIM	0.00148	0.00157	0.000991	0.00111
	(1.124)	(1.196)	(0.617)	(0.717)
HIST	-0.000330	-0.000387	-0.000593	-0.000150
	(-0.254)	(-0.282)	(-0.377)	(-0.123)
TRUST	0.00379			
	(1.039)			
C.TMV#C.TRUST	-0.000162***			
	(-3.275)			
HELP		0.00329		
		(1.060)		
C.TMV#C.HELP		-0.000231***		
		(-4.462)		
CARE			-0.0119	
			(-1.456)	
C.TMV#C.CARE			-6.94e-05	
			(-0.422)	
FAIR				0.00209
				(1.010)
C.TMV#C.FAIR				-9.96e-05**
				(-2.090)
Constant	3.935***	3.888***	5.194***	3.983***
	(23.88)	(19.53)	(7.359)	(19.83)
Observations	169	169	169	169

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Table 10. Sobel test regressions

	(1)	(2)	(3)
	Sobel1	Sobel2	Sobel3
VARIABLES	fifasuccess	fifasuccess	tmv
TMV		0.00129***	
		(5.338)	
INC_PC	0.00197	0.000218	1.355***
	(1.535)	(0.177)	(3.538)
POP	0.00329***	0.00115*	1.652***
	(7.018)	(1.959)	(11.80)
CLIM	-0.00188***	-0.000579	-1.006***
	(-6.121)	(-1.549)	(-10.98)

HIST	0.000923**	0.000316	0.470***
	(2.028)	(0.725)	(3.457)
Constant	0.673***	0.639***	26.20**
	(17.03)	(17.22)	(2.217)
Observations	169	169	169
R-squared	0.336	0.435	0.601

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Table 11. Sobel test results

	Effects			
	Indirect effect	Direct effect	Total effect	Proportion of total effect that is mediated
INC_PC	0.0017***	0.00021	0.0020	
	(2.95)	(0.18)	(1.54)	
POP	0.0021***	0.0012*	0.0033***	0.649
	(4.86)	(1.96)	(7.02)	
CLIM	-0.0012***	-0.00058	-0.0019***	0.691
	(-4.8)	(-1.55)	(-6.12)	
hist	0.000607***	0.000316	0.000923**	0.658
	(2.90)	(0.72)	(2.02)	

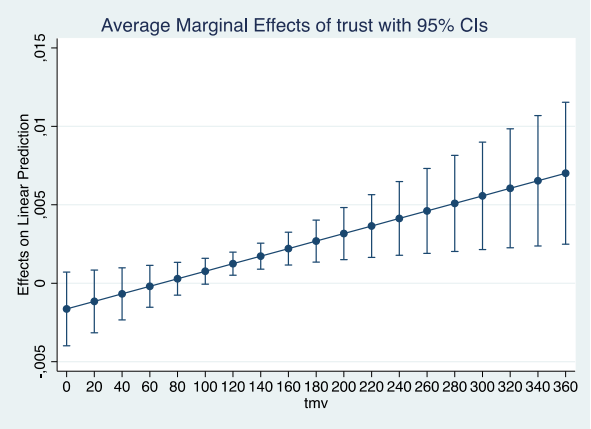
Примечание: в скобках указаны t-статистики; *** p<0.01, ** p<0.05, * p<0.1. В последнем столбце находится отношение косвенного к общему эффекту для переменных со значимым на 10% уровне косвенным эффектом.

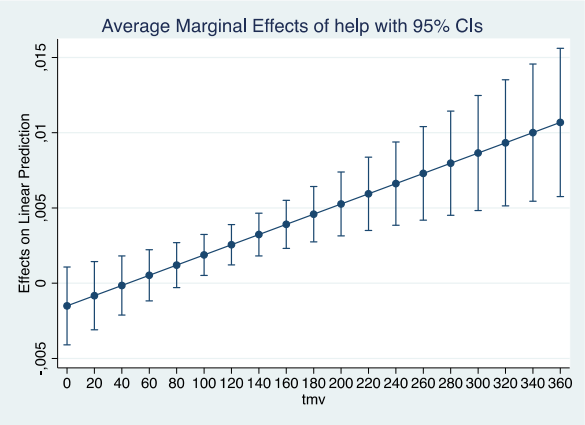
Table 12. Pooled OLS fifasuccess dependent variable with year clustered standard errors multiplicative effect short

	(1)	(2)	(3)	(4)
	MOLS1s	MOLS2s	MOLS3s	MOLS4s
VARIABLES	fifasuccess	fifasuccess	fifasuccess	fifasuccess
TMV	0.000745**	0.000558*	0.00568***	0.000664
	(2.543)	(2.225)	(5.101)	(1.846)
TRUST	-0.00164			
	(-1.707)			
C.TMV#C.TRUST	2.40e-05**			
	(3.163)			
HELP		-0.00151		
		(-1.425)		
C.TMV#C.HELP		3.39e-05***		
		(4.284)		
CARE			0.00667**	
			(3.512)	
C.TMV#C.CARE			-4.45e-05***	
			(-3.827)	
FAIR				-0.00132
				(-1.476)
C.TMV#C.FAIR				2.06e-05**
				(2.788)
Constant	0.697***	0.681***	0.0339	0.695***
	(13.09)	(12.92)	(0.196)	(12.29)
Observations	169	169	169	169
R-squared	0.430	0.433	0.441	0.426

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Figure 2. Average marginal effects of the social capital variable on fifasuccess variable for different values of TMV





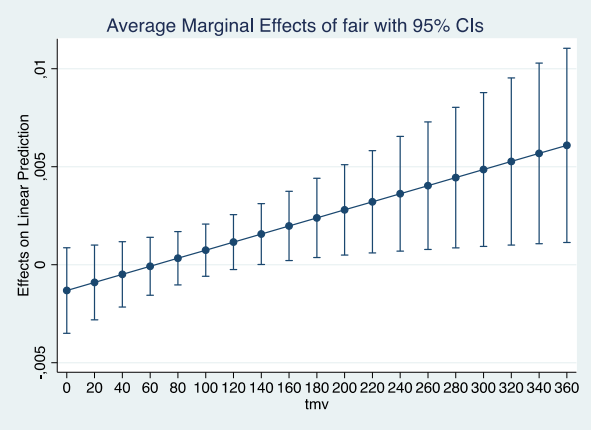


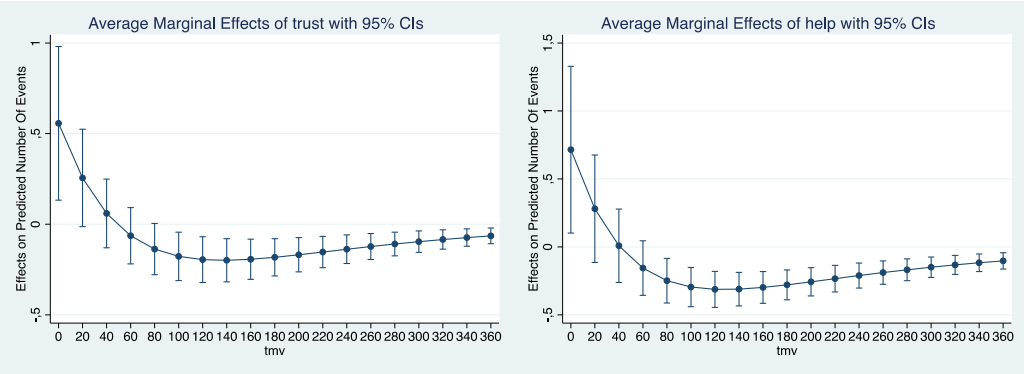
Table 13. Pooled negative binomial fifarank dependent variable with year clustered standard errors multiplicative effect short

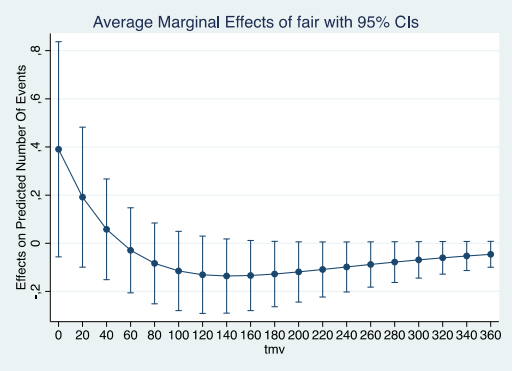
VARIABLES	(1) MNBREG1s fifarank	(3) MNBREG2s fifarank	(5) MNBREG3s fifarank	(7) MNBREG4s fifarank
FIFARANK				
TMV	-0.00499***	-0.00318**	-0.00515	-0.00564**
	(-3.033)	(-1.997)	(-0.398)	(-2.263)
TRUST	0.00807**			
	(2.406)			
C.TMV#C.TRUST	-0.000166***			
	(-3.543)			
HELP		0.0101**		
		(2.209)		
C.TMV#C.HELP		-0.000247***		
		(-5.100)		
CARE			-0.00851	
			(-1.174)	
C.TMV#C.CARE			-6.66e-05	
			(-0.458)	
FAIR				0.00579*
				(1.659)
C.TMV#C.FAIR				-0.000111**
				(-2.145)
Constant	3.881***	3.864***	4.952***	3.910***
	(21.24)	(18.52)	(7.684)	(18.71)

Observations	169	169	169	169

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Figure 3. Average marginal effects of the social capital variable on fifarank variable for different values of TMV





Results.

In the first specification we test linear effect of the chosen social capital variables on the national teams' performance (Table 1). For all of the five social capital proxies the effect is of the expected sign, however only four of them have significant effect on the dependent variable including the first principal component of the four social capital proxies. Overall the estimated model gives the evidence of the positive effect of national cooperative culture on the national football team success. All the control variables are significant and have the effects of expected direction. The second important result is the inverse relationship between Fifa rank and talent of the team. Together with an assumption, that social capital would be more useful for high talented teams this leads us to an implication that the country should firstly get more talented players and then switch to invest in social capital in order to be successful in national level football.

To justify this implication we test our next hypothesis of the conditional on talent effect of social capital. As it was mentioned above we use interaction terms of total market value and social capital variables to model the conditional influence (Table 2). The coefficients of the interaction terms are statistically significant and negative for the four social capital estimates, while the controls population and climate lose its' significance. Only specification with principal component doesn't support our hypothesis, however, it is difficult to interpret the exact meaning

of this variable, so this result does not contradict the hypothesis. For the mean values of social capital proxies and talent the effect of social capital on team performance is positive.

The marginal effects of total market value and social capital for OLS specification are:

$$\frac{\partial fifarank}{\partial tmv} = -\frac{\beta_1}{tmv^2} + \beta_6 sc < 0$$

$$\frac{\partial fifarank}{\partial sc} = \beta_5 + \beta_6 tmv$$

To invest in social capital we should have $\frac{\partial fifarank}{\partial tmv} > \frac{\partial fifarank}{\partial sc}$. Thus the threshold level of total market value can be found. When the country reaches this level, it becomes more important to invest in the social capital.

* p<0.1; ** p<0.05; *** p<0.01

Discussion and conclusion.

The empirical approach to the role of national cooperative culture estimated by average values of social capital for the population in national football team success shows that there is a positive effect, moreover, this positive effect increases with the increase in talent of the team, while the talent has the greatest effect for low-ranked teams, and the smallest for the leaders of the Fifa ranking. The marginal effect of social capital is linear with respect to talent, while talent has a decreasing marginal effect. Thus it would be reasonable for national teams to concentrate their effort on increasing team talent at first and after a certain level switch to investing in social capital.

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