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Abstract

This paper tests for the existence of two types of selection biases in sports markets. First, better-educated players and players of higher socioeconomic background have better outside opportunities. If they decide to take the risks of a professional soccer career they must be truly good in order to compensate their higher opportunity costs. Second, if talent is distributed equally among the population, we should not find any difference in the performance evaluation of white and nonwhite players. This potential difference provides a "market test" for discrimination. Using data on the Uruguayan Soccer League in the 2000 and 2001 seasons we find evidence of these two types of selection biases. Our estimations show a positive relationship between education and performance, education and promotions, socioeconomic background and performance, socioeconomic background and promotions and discrimination against nonwhite players in the national league but not with respect to international soccer markets.

JEL codes: J63, L83

Keywords: sports economics, selection, education.

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1. Introduction

Successful players in most professional sports are considered to be stars and are paid accordingly. Many of us want to have their lifestyles…or at least their paycheck. Any father of young children knows that his kid wants to become the next (name-your-favorite-sport) star. Do most parents help their children to become this dream true? No, they do not. Why? Probably, because of the high risks involved in becoming a professional player and the existence of other less risky alternatives. This paper tests for the existence of two types of selection biases in sports markets. The first, that has not been stressed in the literature yet, is related to education and socioeconomic background. The second is a variation of racial discrimination.

Whoever chooses to become a professional player must be compensated for his outside opportunities. Assuming athletic talent is similarly distributed among the population, and since better-educated players and players of higher socioeconomic background have better outside opportunities, we should observe that those individuals with more education and from higher socioeconomic background that follow a career in professional sports are better players than those with less education and from lower socioeconomic backgrounds. This argument produces the first selection bias of this paper.

Assuming talent is similarly distributed among white and nonwhite players, a player's race should not explain differences in performance. Therefore, performance evaluation of players can be used to construct a "market test" for discrimination. If nonwhite players are better evaluated this must be because -other things equal- there are some not-so-good white players that manage to get a professional player contract that similarly talented nonwhite players do not get. This is the second type of selection bias.

In this paper we study the determinants of performance and of success in soccer in Uruguay in particular with respect to education, socioeconomic level and race. To the best of our knowledge this is the first empirical analysis that finds a positive relationship between education and players' performance. We interpret this result as a selection bias produced by the higher outside opportunities of better-educated players. This selection bias in soccer is one example of how occupational choice is endogenous to workers' attributes. This calls for a word of caution when interpreting the effect on

workers of "exogenous" determinants. We also find that nonwhite players are better evaluated than white players but that race is not a significant determinant of international transfers. These results are evidence of racial discrimination against nonwhite players in the national league but not with respect to international promotions.

The next section summarizes the relevant literature and presents a very simple framework to help interpret the results of the empirical section. Section three presents the Uruguayan Professional Soccer market and our data. In section four, we draw the empirical strategy, section five presents the results and finally, section six concludes.

2. General framework

Since Rottemberg (1956) the sports labor markets have been an area of intense research. Besides the intrinsic interests in sports per se, the professional sports labor market gives an outstanding opportunity for applied economics research. As stated in Kahn's (2000) literature review "there is no research setting other than sports where we know the name, face, and life history of every production worker and supervisor in the industry".

Since Mincer's (1974) seminal paper on workers' returns of education there has been a wide range of research on the area. The basic methodology consists on regressing income on education and other controls. Most studies find a positive and significant association between education and income. On the contrary, in professional sports Barros (2001) finds no evidence of such a relationship between education and income in soccer players in the Portuguese National League. In a closely related issue, Shmanske (1992) studies the formation of human capital in Golf. Besides these two papers the issue of education and human capital have not been studied in applied research to professional sports labor markets.

The study of discrimination in the labor market has motivated a large literature reviewed in Cain (1986) and Altonji and Blank (1999).[1] Evidence of race differentials in the labor markets has been found persistently. In the sports economics literature, Bellmore (2001) -studying the determinants of promotion and relegation in the American Baseball Mayor Leagues- finds evidence of racial discrimination against Blacks and Hispanics in the form of lower probabilities of being promoted from the

minor to the major leagues in American Baseball. There are several previous studies that find discrimination in baseball and basketball like Brown, Spiro and Keenan (1991), Jiobu (1988), Johnson and Marple (1973) and Kahn and Sherer (1988). For a survey of discrimination in professional sports see Kahn (1991).

In this paper, we stress two types of biases in professional sports. One of these biases is a natural extension -not made before- of higher opportunity costs of some individuals and the other is a somewhat different perspective on the issue of racial discrimination. First, although there may be some minor "true" effects of education and socioeconomic background on performance (e.g. better understanding of rules or better nourishing), the nature of soccer is such that physical ability is the main issue. Therefore, a positive relationship between education and socioeconomic background with performance and the probability of being transferred is probably the result of a self-selection process. Better-educated players are likely to have better outside opportunities. Players coming from higher socioeconomic background also have higher outside opportunities. Thus, if they choose to play soccer as a profession it must be that they expect to be compensated for their higher outside opportunities. Given the high risks involved in becoming a successful player those well-educated players of higher social background should only choose to become professional players if they are truly outstanding.

Second, we investigate what is the meaning of a positive (negative) correlation between nonwhite players and performance. If a positive correlation exists, this means that -all else equal- the typical black player is better evaluated than the typical white player. How can this be so? Why are there no mediocre black players? If we believe the distribution of talent within each population is similar, there must be some kind of selection bias, which prevents mediocre black players from obtaining jobs while mediocre white players do. This market test approach to race discrimination is similar in spirit to the one used by Szymanski (2000) for team performance and Ayres and Waldfogel (1994) in bail setting.

A simple framework

The main assumption of this paper is that, as with most physical attributes, athletic talent (t) is most likely distributed normally in the population. Players' performance (p)

[1] The latter includes a brief summary of discrimination in sports economics.

is a function of athletic talent, age, experience and other factors. We postulate that $p = P(t, X)$ where X represents all other factors and $P(\cdot, X)$ is an increasing function of t for all X. Without getting into the market structure of labor bargaining we will simple assume that a player's wage (w) is an increasing function of his performance which is itself a function of talent and other factors. Specifically, we allow for potential racial discrimination in the soccer market. Therefore we have that $w = W(t, race, X)$.

An individual will prefer to become a professional player if his wage is higher than his outside opportunities that are an increasing function of the educational level and the socioeconomic background. Formally, $o = O(educ, socioec)$.

This simple framework determines that there is a cut-off level of talent t^* above which an individual prefers to become a professional player. This level is determined by the following equation:

$$W(t^*, race, X) = O(educ, socioec)$$

If the wage and outside opportunity functions are continuous we can draw three implications:

a. The higher the educational level the higher the cut-off talent.
b. The higher the socioeconomic background the higher the cut-off talent.

These two implications mean that in order to find it profitable to become professional players, the more educated a player is or the higher socioeconomic background of a player, the more (sports)-talented he needs to be.

c. In the absence of discrimination the cutoff talent level should be equal for white and nonwhite players but if there is discrimination in the sports markets the cut-off level will be higher for nonwhite players, i.e. $t^*(whites) < t^*(nonwhites)$.[2]

As we will discuss later, professional success for a soccer player in Uruguay is associated with being transferred to a foreign league where salary and benefits are much

[2] In our estimations we use journalists evaluations. If there is journalist discrimination, nonwhite players will be worse evaluated than white players. Therefore, "journalists discrimination" may bias the result against finding evidence of discrimination in the local soccer market. In the same line, if there is discriminations in other labor markets this reduces the outside opportunities of nonwhites and therefore also bias against finding evidence of discrimination in the soccer market.

higher than in the national league. The probability of being transferred is naturally increasing in the players' performance.

Summing up, this simple model implies that the performance and the probability of success for better-educated players and players of higher socioeconomic background is higher than for less educated players and players of lower socioeconomic backgrounds. In the presence of local racial discrimination nonwhite players will have better performances and in the presence of discrimination in the international markets nonwhite players will have higher probabilities of being transferred.

3. Uruguayan Professional Soccer and our data

The Uruguayan soccer has a very rich history that includes wining two World Cups but a much poorer present in which Uruguay barely qualified to two of the last four World Championships. Nevertheless, Uruguayan players represent an out of proportion minority in foreign leagues. Given the salary and benefit differentials, success for an Uruguayan player is associated with being transferred to one of these foreign leagues. In this paper a player is considered to be professionally successful if he is transferred to a foreign league were wages and bonuses are substantially higher than in the Uruguayan League.

We consider all professional Uruguayan players that played at least two official games in the 2000 and 2001 championships of the First Division of the National League.

The National Championship was organized as follows. In the year 2000, eighteen clubs played against each other. Games were organized in two rounds (in each round, teams played against each other once). The winners of both rounds played to the best of three games for the National Championship. The three teams with the worst performance were relegated and had to play in the 2001 season in the Second Division. Similarly, the three best clubs from the Second Division in the 2000 played in the 2001 season in the First Division.

In the year 2001, the National Championship dispute mechanism changed. Eighteen clubs played against each other once in a classificatory round. The ten strongest teams classified to play for the National Championship and the eight weakest teams played for

their permanence in the First Division in the next year. Games of both groups were organized in two rounds (in each round each team played against all others once). The round-winners of the stronger group played to the best of three games for the National Championship.

After each game it is customary in the popular press to evaluate each player's performance individually. We use the average of these journalist evaluations as our proxy for performance.[3] Players' evaluations range from 1 to 10. The mean of the average performance evaluation is 4.8.

We also have other partial measures of performance: a positive one is the amount of goals scored and a negative one refers to the sanctions the player received. When a player commits a foul (or other "misconduct") he may receive a yellow card. After two yellow cards in the same game, he is shown the red card and has to leave the field leaving his team with one player less. If the foul committed is very severe the referee can show the red card without the yellow card warning. We construct a weighted sum of sanctions for each player (one red card equals two yellow cards). In order to be consistent, we only consider goals scored and the cards received for the games in which we had a journalist evaluation. Therefore we can construct average per appearance variables (*Goals*=goals per appearance and *Cards*=cards per appearance). The problem of these performance measures -and that is why we say they are partial measures of performance- is that they vary with the position in the field, e.g. attack players are more likely to score more goals and receive less cards than defense players. The journalist evaluation is a global, common-range performance evaluation for all players.

Our measure of professional success is obtaining a transfer to a foreign league. These transfers can be permanent or transitory. The foreign team can buy the right to enroll the player in its team and to sell it in the future, or it can agree to enroll the player for a specified amount of time after which, the rights over the player's enrollment return to the original team or to the player himself. The source for this information is the Uruguayan National Association (Asociación Uruguaya de Fútbol). Since it is natural to

[3] The database is constructed from the evaluations published in the sports section of one of the major national newspapers (El Observador). This newspaper evaluated 94% of all played games in the 2000 and 2001 seasons.

assume that the characteristics of players and teams in the 2000 and 2001 season's affected the transfers of the following periods, we consider the transfers that took place during the years 2001 and 2002.

We complemented our data set with a brief survey to the Directory Boards of the twenty-one clubs that played in the First Division of the Uruguayan Soccer League in the seasons 2000 and 2001. In the survey, we gathered information on each player's race, educational and socioeconomic background. We also asked whether each player was formed in the junior divisions of the team he is currently playing or if he was transferred from another team.

The variables *Educ* and *Socioec* take discrete values. After finishing primary school, the secondary school (high school) in Uruguay is divided in its lower and upper years (four and two years respectively). After that, high school graduates can continue further with university and other higher level studies. *Educ* takes the value of 1 if the maximum educational level attained was primary school (six years), 2 if the maximum educational level attained was the first four years of secondary school, and 3 if he was enrolled in the last two years of secondary school or at higher education levels. *Socioec* takes values 1, 2 or 3 whether the socioeconomic background of the player is low, medium or high. We also gather information on the precise number of years studied (*YearsSchooling*) by each player. This variable is a better proxy for actual educational level but unfortunately we have that information for only about half of the players in our database.[4]

Race and *Junior* Divisions are dummy variables. Race takes the value of 1 if the player is nonwhite and 0 otherwise. In our database there are 18% of nonwhite players. According to self-reports on race of the only survey ever conducted in Uruguay with such information (National Institute of Statistics 1996) 7% of the population is nonwhite. Nonwhites have lower educational level, lower income level and higher unemployment rates than whites. *Junior Divisions* takes the value of 1 if the player was trained since the junior divisions in the team he is currently playing. *Age*, field position (*Position*) and nationality of each player were obtained from the Tenfield web page[5].

[4] *Educ* is defined for 463 players while *YearsSchooling* is defined for 219 players.
[5] Tenfield is a private firm that owns the television rights of the Uruguayan soccer.

Age is measured at the 31st of December 2001. *Position* differentiates four types of players: goalkeepers, defense, midfield and attack players (*Position*=1,2,3 and 4 respectively). International exposure can naturally affect the probability of being transferred. We complemented our database with one extra variable *National Team* that takes the value 1 if the player was ever selected to represent the country in its national team.

In the two years covered by this research there were twenty-one teams in First Division and twenty of them answered to our questionnaire but not all of them did it in full. In total, in the 2000 and 2001 seasons there were 632 players that played at least 2 games. Of these players, 559 are Uruguayans. Table 1 presents summary information on the percentage of transferred and non-transferred players according to race, education and socioeconomic background. Tables 2 and 3 present other descriptive statistics.

Table 1. Distribution of transfers to international leagues

	No-transfer	Transfer			Total
		Temporary	Permanent	Subtotal	
Total	76,2%	8,8%	15,0%	23,8%	100,0%
Race					
White	75,8%	8,8%	15,4%	24,2%	100,0%
Nonwhite	78,0%	9,0%	13,0%	22,0%	100,0%
Education (maximum level attained)					
Primary school	73,5%	12,0%	14,5%	26,5%	100,0%
High School (first level)	77,8%	7,5%	14,7%	22,2%	100,0%
High School (second level) and higher	71,9%	10,5%	17,5%	28,1%	100,0%
Socioeconomic background					
Low	83,0%	7,1%	9,9%	17,0%	100,0%
Medium	74,8%	8,1%	17,2%	25,2%	100,0%
High	62,5%	17,5%	20,0%	37,5%	100,0%

Breaking the analysis of transfers according to race does not seem to show any conclusive pattern. There is a slightly higher percentage of nonwhite players that were not transferred. On the other hand, the percentage of permanent transfers is monotonically increasing with the education level. The percentages of temporary and permanent transfers are also positively correlated with the socioeconomic background of the players.

Table 2. Summary Statistics					
		Performance	Age	Educ (years)	Goals
Race					
	White	4,8	25,4	8,7	0,10
Mean	Nonwhite	4,8	25,7	6,8	0,09
	Total	4,8	25,4	8,4	0,10
Cases		554	553	219	554
Education (maximum level attained)					
	Primary school	4,8	24,9	6,0	0,11
Mean	High School (first level)	4,9	25,1	9,1	0,11
	High School (second level)	4,8	25,1	12,1	0,09
	Total	4,8	25,0	8,4	0,11
Cases		463	462	219	463
Socioeconomic background					
	Low	4,8	24,1	7,2	0,10
Mean	Medium	4,8	25,4	8,8	0,11
	High	4,9	26,7	10,9	0,13
	Total	4,8	25,1	8,4	0,11
Cases		490	489	219	490

Given that we have more information on players' educational level attained than the actual years of schooling it is useful to keep in mind the relationship between these two proxies of education. Players who only attained primary school, on average studied six years (finished primary school). Those players whose maximum level was high school (first level) on average studied three more years and those that continued over have on average a bit above twelve years (finishing high school but not even completing the first year towards a university degree). According to the years of formal schooling white players are more educated than nonwhite players.

There is no difference in the average performance of white and nonwhite players but this does not account for the possible joint effects with other variables. For instance since nonwhite players are less educated they should have lower outside opportunities and therefore there should be some not so talented nonwhite players that choose to become professional soccer players. We account for these types of joint effects in the econometric section.

As is natural to expect, the better the socioeconomic background the higher the investment in education but even the average level of those players with a better socioeconomic background is only eleven years (high school dropouts). On average a player studies eight years (primary school plus two more).

Players of better socioeconomic environment are on average two years and a half older than those with low socioeconomic background and more than one year older than those with a medium socioeconomic background. This suggests that the socioeconomic environment is associated with some factors that help to maintain competitive-level physical shape. Alternatively, this can also be the result of the self-selection process by which only those truly good players of higher socioeconomic backgrounds get into professional soccer.

Table 3. Summary Statistics by transfer

	No-transfer			Transfer									Total		
				Temporary			Permanent			Subtotal					
	Cases	Mean	St.Dev	Cases	Mean	St.Dev	Cases	Mean	St.Dev	Cases	Mean	St.Dev	Cases	Mean	St.Dev
Performance	430	4,77	0,43	49	4,88	0,43	83	4,93	0,43	129	4,91	0,43	559	4,80	0,43
Age	429	25,14	4,92	49	25,41	3,01	83	26,82	3,64	129	26,32	3,50	558	25,41	4,65
National Team	430	0,24	0,43	49	0,33	0,47	83	0,41	0,49	129	0,37	0,49	559	0,27	0,44
Junior Divisions	429	0,55	0,50	48	0,44	0,50	82	0,26	0,44	127	0,33	0,47	556	0,50	0,50
Goals	430	0,08	0,13	49	0,20	0,18	83	0,17	0,20	129	0,18	0,19	559	0,10	0,15
Cards	430	0,20	0,18	49	0,23	0,18	83	0,20	0,14	129	0,21	0,16	559	0,21	0,17
Education (years)	168	8,39	2,34	23	8,78	3,12	30	8,17	2,07	51	8,45	2,59	219	8,40	2,39
Race	425	0,18	0,39	49	0,18	0,39	83	0,16	0,37	129	0,17	0,38	554	0,18	0,38

Table 3 breaks the analysis according to the promotion success of players. As expected, the average performance of a player seems to be correlated with the probabilities of obtaining a promotion to a foreign league. Those players that were not transferred had average evaluations bellow those who had temporary transfers. Those with temporary transfers had lower evaluations than those with permanent transfers.

The average players' age is twenty-five. Those that had a temporary transfer are older than those that were not transferred and more than one year younger on average than those with a permanent transfer. Age can be interpreted as a proxy of experience and in this line higher experience seems to improve the probability of success in being promoted to a foreign league.

International exposure through the national team is also associated with higher probabilities of being transferred. Of those not transferred, 24% played for the national team, of those that obtained a temporary transfer 33% played for the national team and finally, of those with a permanent transfer 41% played for the national team.

With respect to the training and formation of players, about half of each team was formed in their team's junior divisions. It is striking that of those with a permanent transfer only 26% were playing in their original team. Attack players probably face higher probabilities of being transferred since the goals per appearance is more than the double for transferred players relative to non-transferred players. Finally, there is no significant difference in the amount of years of education or in the racial composition of transferred and non-transferred players.

4. The econometric strategy

There is a potential endogeneity problem for education if schooling is a complement to the development of sporting abilities. This can be the case as in football of basketball in the US where the top junior leagues are organized and managed under the auspice of academic institutions. On the other hand, schooling might also be a substitute to the development of sporting abilities as in the case of hockey in Canada. In this case, a very talented youngster might choose not to go to school in order to practice more effectively the sport. The typical econometric solution to this problem is the use of instrumental variables. Socioeconomic background is a natural instrument for education.

In line with the simple model introduced in Section 2, the effects of education, socioeconomic background and race on performance are estimated with simple linear models. We present OLS and IV estimations. *Transfer* is a binary variable that takes the value 1 if the player was transferred to an international league and 0 otherwise. Therefore, the determinants of international transfers have to be estimated with qualitative models where the treatment of endogenous variables is a bit more sophisticated than in linear models. Newey (1987) discuss the estimation of limited simultaneous equations systems with one structural equation that has a limited dependent variable. It shows that a two-stage Amemiya GLS estimator is asymptotically efficient and simple to compute. This technique is an extension of the two stage least squares procedure implied by the IV estimation of linear models.

In the performance model the independent variables are: age, a dummy variable to indicate if the player was formed in the junior divisions of the same team he is currently playing, race, education and socioeconomic environment. For education we explored

two alternatives. First we use two dummy variables that take the value of 1 if the player attained the first level of high school education and another dummy taking the value of 1 if the player was enrolled in a higher level and 0 otherwise. Second, we used the number of years of formal education completed. We control for several variables that may be associated with performance as: the average amount of goals scored per appearance and the average amount of penalty cards (red and yellow) received per appearance, the position in the field and team effects.

The basic model to be estimated is:

$$Perform_i = \beta_0 + \beta_1 Age_i + \beta_2 JuniorDivisions_i + \beta_3 Goals_i + \beta_4 Cards_i + \\ + \sum_{j=2}^{4} \beta_{3+j} \mathbf{I}_{[Position_i = j]} + \beta_8 Race_i + u_i \qquad (1)$$

where i indexes players, $\mathbf{I}_{[Z_i = j]}$ is an indicator function taking the value of one when $Z_i = j$.

Using players' socioeconomic background to instrument for education we will estimate the following two specifications:

$$Perform_i = \beta_0 + \beta_1 Age_i + \beta_2 JuniorDivisions_i + \beta_3 Goals_i + \beta_4 Cards_i + \\ + \sum_{j=2}^{4} \beta_{3+j} \mathbf{I}_{[Position_i = j]} + \beta_8 Race_i + \sum_{j=2}^{3} \beta_{7+j} \mathbf{I}_{[Educ_i = j]} + u_i \qquad (2)$$

and

$$Perform_i = \beta_0 + \beta_1 Age_i + \beta_2 JuniorDivisions_i + \beta_3 Goals_i + \beta_4 Cards_i + \\ + \sum_{j=2}^{4} \beta_{3+j} \mathbf{I}_{[Position_i = j]} + \beta_8 Race_i + \beta_9 YearsSchooling_i + \beta_{10} YearsSchooling_i^{\,2} + u_i \qquad (3)$$

Finally, with respect socioeconomic background we estimate a simple OLS model according to:

$$Perform_i = \beta_0 + \beta_1 Age_i + \beta_2 JuniorDivisions_i + \beta_3 Goals_i + \beta_4 Cards_i + \\ + \sum_{j=2}^{4} \beta_{3+j} \mathbf{I}_{[Position_i = j]} + \beta_8 Race_i + \sum_{j=2}^{3} \beta_{7+j} \mathbf{I}_{[Socio\_ec_i = j]} + u_i \qquad (4)$$

With respect to professional success (transfer) a linear approximation as the previous one is not appropriate. Since the dependent variable is binary, we postulate a qualitative response model and run simple probit regressions to estimate the effect of the basic

model and for the effect of socioeconomic background. To control for endogeneity in education we implement Newey (1987) methodology.

5. Results

5.1 Performance

Table 4 presents the results of the performance regressions. The dependent variable is the average player evaluation. In column A we present the basic framework where we only include age, a dummy for junior divisions, the per appearance average of goals, punishment cards and race. We control for the position in the field and for team effects (not reported). In columns B trough E we explore the effects of adding education. Finally, column F includes the effects of the socioeconomic environment.

Education, socioeconomic background and race

Columns B trough E in Table 4 report a very consistent view of the effects of education both in the OLS and in the IV estimates (we also report Hausman tests that show that the sets of instruments were adequate). Considering a larger sample but a cruder measure of education we found that attaining high school (first level) improves a player's performance compared to those players that where only enrolled in primary school. This effects is somewhat lower (but still significant) for players that achieved higher levels of formal education. This suggests the presence of non-linearities.

The second approximation to the effect of education uses the number of years of formal education approved. From equation (3) the marginal effect of years of schooling in performance is $\frac{\partial Performance}{\partial YearsSchooling} = \beta_9 + 2\beta_{10} YearsSchooling$. The "optimal" amount of schooling according to our estimates is ten years (9.8 according to the OLS estimation and 10.5 according to the IV estimation). This corresponds to the six years of primary school and the first four of high school. Extra schooling after this point has negative marginal performance returns. In this sense, schooling and the developing of sporting abilities are to be considered substitutes. Better-educated players have better outside opportunities and if they choose to pursue a soccer career it must be that they are really good players. Therefore our results with respect to education are pointing towards a self-selection bias in better-educated people with respect to becoming professional soccer players.

In columns B to E the coefficient of race ranges from 0.14 to 0.21. Given an average player evaluation of 4.8, nonwhite players have between 3% to 4% better performance than white players. This market test provides evidence of racial discrimination. At least, there are some "mediocre" nonwhite players are not able to obtain contracts to play soccer professionally that similar "mediocre" white players get.

According to column F players of medium socioeconomic background are better evaluated that players of low socioeconomic background. Given the correlation between education and socioeconomic level it is possible that the effects of education on performance produce this last result.

Other controls

The variable *Junior Divisions* is also statistically significant. Playing in the same team in which a player was formed in the junior divisions improves his performance a minimum of 5% (according to column D) and up to 15% (columns A, B and F). There are several reasons why a player formed in the Junior Divisions may perform better than other players. These reasons may rely on psychological aspects of a player behavior. Probably the player is not only a worker of the club but also he is a fan of it or at least he has a strong feeling for the club where he is playing. Thus, he may be willing to spend a higher effort. It is also often the case that clubs have a certain "philosophy" of the game (more defensive teams, more attack oriented, etc.). Therefore players that come from these junior divisions know other teammates and the way the team plays better.

Given the objective of the game, players that are able to score more goals are better evaluated. What is more surprising is that the sanctions imposed to players in the form of yellow and red cards have no statistically significant effect on the players' evaluations. Besides the weighted sum of cards we experimented with yellow and red cards separately but were not able to find any significantly robust result.

Table 4. Determinants of Player Performance						
	A OLS	B OLS	C IV	D OLS	E IV	F OLS
Age	0.141	0.137	0.110	0.045	0.063	0.142
	(0.003)***	(0.004)***	(0.015)***	(0.006)***	(0.017)***	(0.004)***
Junior Divisions	0.770	0.713	0.569	0.242	0.325	0.769
	(0.060)***	(0.063)***	(0.111)***	(0.058)***	(0.107)***	(0.063)***
Goals	1,645	1,568	1,346	1,308	1,391	1,544
	(0.245)***	(0.254)***	(0.348)***	(0.202)***	(0.221)***	(0.256)***
Cards	0.306	0.192	0.091	-0.030	0.052	0.287
	(0.195)	(0.219)	(0.288)	(0.188)	(0.201)	(0.209)
Position=Defense	0.580	0.406	0.183	-0.274	-0.118	0.454
	(0.114)***	(0.123)***	(0.194)	(0.112)**	(0.182)	(0.123)***
Position=Midfield	0.645	0.526	0.292	-0.194	-0.038	0.570
	(0.111)***	(0.121)***	(0.194)	(0.112)*	(0.181)	(0.120)***
Position=Attack	0.450	0.315	0.166	-0.385	-0.212	0.356
	(0.121)***	(0.130)**	(0.184)	(0.118)***	(0.188)	(0.130)***
Race	0.063	0.149	0.208	0.190	0.208	0.123
	(0.081)	(0.088)*	(0.129)*	(0.075)**	(0.098)**	(0.088)
Educ=2, First Level (high school)		0.417	1,836			
		(0.085)***	(0.714)**			
Educ=3, Higher Level		0.393	1,112			
		(0.099)***	(0.491)**			
Years of schooling				0.827	0.655	
				(0.044)***	(0.131)***	
Years of schooling squared				-0.042	-0.031	
				(0.002)***	(0.007)***	
Socioec=Medium						0.220
						(0.074)***
Socioec=High						-0.029
						(0.131)
Hausman Test		Chi^2=4.04, $Prob>Chi^2$ =0.94		Chi^2=3.31, $Prob>Chi^2$ =0.97		
Observations	548	462	462	219	219	488

Note: The dependent variable is players' journalist average evaluation for the 2000 and 2001 seasons. Age is measured in years. Junior Divisions is a dummy that values 1 if the player was formed in the Junior Divisions of the team were he is currently playing. Goals is the percentage of scored goals per appearance. Cards is computed as the ratio of the weighted sum of red and yellow cards (1 red = 2 yellows) received to the number of appearances. Position=Defense, Position=Midfield and Position=Attack are dummies taking the value of 1 whether the player is a defense, midfield or attack player. Educ=2 and Educ=3 takes the value of 1 if the player was enrolled in the first level of high school or if he attained higher levels respectively. Years of schooling measures education directly as the total years in formal schooling. Race values 1 if the player is nonwhite and finally Socioec=Medium and Socioec=High take the value of 1 if the player comes from a medium or high socioeconomic environment.

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

5.2 Promotions (probability of being transferred)

Table 5 reports the results for the estimation of the determinants of professional success. In column A we report the Probit estimation of the basic model in which besides age, junior divisions, goals, cards, race and position in the field we include *National Team* to

capture the effects of international exposure. Columns B, C and D explore the effects of education and socioeconomic background.

Education, socioeconomic background and race

The coefficient on race is not significant in any regression. In Table 4 we interpreted the positive coefficient of race as evidence of racial discrimination. This discrimination implies that only good nonwhite players are able to make it to the professional soccer. After controlling for the determinants of performance we find no significant differences for white and nonwhite players in obtaining a transfer to international leagues. Discrimination therefore is not an issue in the international markets, rather in the formative phases of Uruguayan soccer (before players become professionals).

Column C reports the coefficient and marginal effects for the model extended to include the effects of education on the probability of being transferred. In order to control for potential endogeneity problems we instrument the education level using the socioeconomic level and mean and standard deviation of players' performance (that are correlated with education according to the results of the previous section). The set of instruments was adequate according to a Hausman test also reported in Tables 5. We found that the higher the education level the higher the marginal effect produced by education on the probability of being transferred.

In column D we report effects of socioeconomic level. Medium socioeconomic background players have higher probabilities of being transferred than low socioeconomic background players. Players of higher socioeconomic background have even higher probabilities of being transferred.

Again these results suggest that there is a bias in families of higher socioeconomic background and of better-educated players with respect to participation in the professional soccer market.

Other controls

The probability of being transferred increases with age, until the player is $\frac{\beta_{Age}}{2\beta_{Age\,Squared}}$ years old. According to our estimates this happens at age twenty-eight. As before, given

that the objective of the game is to score more goals than the adversary it is not surprising that players with higher average of scored goals per appearance have higher probabilities of being transferred. Somewhat more surprising is that even after controlling for goals scored, attack players are preferred over midfield and defense players.

After all the controls, players who have been selected to integrate the national team have about double probability of being transferred than player who have not been selected. With all other variables at their sample averages a player who has not represented the country in the national team has a probability of being transferred of 18%. An average player that was part of the national team in the past has probabilities of being transferred of 32%. There are at least two reasons for this result. First, international exposure may facilitate the matching between foreign clubs and national players. Second, this variable may be capturing other players' attributes that are not captured by the other regressors.

Table 5. Determinants of the probability of being transferred (professional success)						
	A	B	C		D	
	Probit	Probit	Newey (1987) IV		Probit	
			Coeff.	Marginal effects	Coeff.	Marginal effects
Age	1.006	0.970	1.065	0,281	0.989	0.258
	(0.198)***	(0.227)***	(0.259)***		(0.217)***	
Age squared	-0.018	-0.017	-0.019		-0.018	
	(0.004)***	(0.004)***	(0.005)***		(0.004)***	
Junior Divisions	-0.224	-0.214	-0.207	-0.056	-0.254	-0.068
	(0.149)	(0.160)	(0.199)		(0.159)	
Goals	1.380	1.348	1.097	0.295	1.223	0.326
	(0.479)***	(0.512)***	(0.688)		(0.506)**	
Cards	0.434	0.076	-0.222	-0.060	-0.041	-0.011
	(0.408)	(0.500)	(0.635)		(0.474)	
Position=Defense	0.328	0.463	0.505	0.147	0.351	0.093
	(0.304)	(0.341)	(0.405)		(0.314)	
Position=Midfield	0.382	0.615	0.699	0.204	0.454	0.121
	(0.301)	(0.339)*	(0.406)*		(0.312)	
Position=Attack	0.820	0.916	1.158	0.370	0.810	0.216
	(0.317)***	(0.358)**	(0.443)***		(0.330)**	
National Team	0.486	0.451	0.370	0.106	0.451	0.130
	(0.147)***	(0.155)***	(0.198)*		(0.155)***	
Race	-0.032	0.086	0.429	0.129	0.137	0.036
	(0.173)	(0.196)	(0.295)		(0.194)	
Educ=2, First Level (high school)		-0.073	2,692	0.595		
		(0.190)	(1.595)*	(0.281)**		
Educ=3, Higher Level		0.215	2,485	0.771		
		(0.218)	(1.170)**	(0.253)***		
Socioec=Medium					0.287	0.076
					(0.166)*	
Socioec=High					0.520	0.138
					(0.272)*	
Hausman Test		Chi^2=3.95, $Prob>Chi^2$ =0.98				
Observations	548	462	462	462	488	488

Note: The dependent variable takes the value of 1 if the player is transferred permanently or temporarily and 0 otherwise. Performance is the players' journalist average evaluation. Age is measured in years. Junior Divisions is a dummy that values 1 if the player was formed in the Junior Divisions of the team were he is currently playing. Goals is the percentage of scored goals per appearance. Cards is computed as the ratio of the weighted sum of red and yellow cards (1 red = 2 yellows) received to the number of appearances. Position=Defense, Position=Midfield and Position=Attack are dummies taking the value of 1 whether the player is a defense, midfield or attack player. National Team is a dummy that takes the value of 1 whether the player ever represented the country in the National Team. Educ=2 and Educ=3 takes the value of 1 if the player was enrolled in the first level of high school or if he attained higher levels respectively. Years of schooling measures education directly as the total years in formal schooling. Race values 1 if the player is nonwhite and finally Socioec=Medium and Socioec=High take the value of 1 if the player comes from a medium or high socioeconomic environment.
Robust standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

6. Conclusions

The most important contribution of this paper to the literature is pointing to the selection biases produced by the education level and the socioeconomic background of players. Better educated players and players of higher socioeconomic background have

higher outside opportunities. If they decide to play soccer professionally they must be compensated for their higher outside opportunities. To the best of our knowledge this is the first empirical paper on sports economics to report positive significant effects of education (and socioeconomic background) on performance and the probability of being promoted.

This paper also points a second selection biased produced by racial discrimination. We found evidence of racial discrimination within the national market but not for international transfers. Although a players' race does not affect the probability of being transferred, nonwhite players' performance is better evaluated than white players' performance. If talent is equally distributed in the population and nonwhite players are marginally better evaluated, it must be that nonwhite players find it more difficult to obtain a professional contract than white players. Thus, our evidence points towards discrimination in the passage from the junior formative phases to the professional stage in the Uruguayan soccer market.

With respect to other determinants we found that age has a nonlinear relation with the probability of being transferred. The trade off between more experience and a worsening athletic condition starts producing negative marginal returns at age twenty-eight. Playing in the professional division of the team where the player was formed improves individual performance. Finally, international exposure (through the national team) and being an offensive player increase the probability of being promoted to a foreign league.

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