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What Makes You 'Super-Rich'? New Evidence from an Analysis of Football Players' Earnings

#681

Imprint

Ruhr Economic Papers

Published by

Ruhr-Universität Bochum (RUB), Department of Economics
Universitätsstr. 150, 44801 Bochum, Germany

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Ruhr Economic Papers #681

Responsible Editor: Jochen Kluve

ISSN 1864-4872 (online) – ISBN 978-3-86788-789-2

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Bibliografische Informationen der Deutschen Nationalbibliothek

Die Deutsche Bibliothek verzeichnet diese Publikation in der deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über: *http://dnb.d-nb.de* abrufbar.

Das RWI wird vom Bund und vom Land Nordrhein-Westfalen gefördert.

http://dx.doi.org/10.4419/86788789
ISSN 1864-4872 (online)
ISBN 978-3-86788-789-2

Vincenzo Carrieri, Francesco Principe, and Michele Raitano[1]

What Makes You 'Super-Rich'? New Evidence from an Analysis of Football Players' Earnings

Abstract

This article investigates the influence of performance, popularity and power on "super-earnings" using a unique panel dataset of Italian football players built on various sources of data. Using OLS, Panel and Unconditional Quantile regression techniques, we find that detailed measures of these factors are all significantly associated with higher wages. Popularity dominates all the other factors at the right tail of earnings distribution and the agent's power contributes mostly to allocate players in richer teams. These new findings challenge the interpretations of super-earnings based only on very talented workers who "win and take all".

JEL Classification: J31, L83, J24, C23, D31

Keywords: Superstars; top incomes; football players' earnings; panel data; unconditional quantile regressions

March 2017

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1. Introduction

Since the middle of the 1970s, the share of gross personal income held by the top 1% or 0.1% of the population sharply increased in some developed countries, especially in the US and the UK, bringing the incomes of the top groups back to the levels they achieved at the beginning of the twentieth century (Atkinson et al. 2011). Furthermore, observing the composition of top incomes reveals a striking novelty. In fact, while in the past, the large majority of individuals belonging to the richest segment of the population included rentiers or entrepreneurs (Alvaredo et al. 2013), there has been a considerable increase in the number of the "working super-rich" accessing the top income bracket in recent decades. For instance, for the richest 1% of the population, earnings accounted for the 46.4% of the total in 1980 in Italy while they accounted for 70.9% of the total in 2008 and, similarly, among the 0.1% richest segment of the population, the share of earnings rose from 29.5% to 66.2% in the same period (Franzini et al. 2016). Hence, in contemporary economies, the labour market seems to be where extreme inequalities grow.

The economic literature has addressed the phenomenon of the working super-rich by offering explanations based essentially on individual talent or popularity and, more recently, on bargaining power (see Section 2 for more details). The seminal works of Rosen (1981) and Adler (1985) noted the role of individual talent and popularity, respectively, and they argue that super-earnings emerge from fierce competition among the best performers in sectors where technology magnifies the earnings of the winner by allowing joint consumption. On the other side, more recent interpretations of the extraordinary rising salaries of top managers in large companies refer to power exerted by them on shareholders in contexts characterised by asymmetric information (Bebchuck and Fried 2003). Moreover, some other contributions have also noted that the superstar status might not be always related to abilities crucial for the specific type of performance in which individuals are involved (i.e., Franzini et al., 2016). Rather, it might be assimilated to a rent because notoriety and conformist behaviours by consumers assign to some superstars the possibility of extracting rents unrelated to their talent or their effective current productivity.

Perhaps due to the difficulty of finding good proxies, no empirical studies – to our knowledge – have inquired on the joint influence of talent, popularity and power on "super-earnings". The primary goal of this paper is to fill this gap. We focus on a category of working super-rich – football players – who represent a consistent share of the universe of super-rich along with some heterogeneous professional categories, e.g., business lawyers, investment bankers, top managers working for large corporations, etc. (Atkinson et al. 2011). As noted by Kahn (2000), professional sport offers a unique opportunity for innovative labour market research, because several indicators about a player's characteristics and performance are widely available and salaries are regularly published by the dedicated press.

Moreover, the influence of talent, popularity and power on super-earnings can be easily discerned in professional team sports because teams also obtain returns by hiring players endowed by these characteristics. Indeed, a team's owners are willing to pay talented players in order to increase both revenues from TV rights, tickets and merchandising and – not least – to enhance team performance. They are also willing to pay famous players since they can exploit their popularity by selling more tickets or through merchandising. In contrast, both talented players and less talented but "famous" players might be able to bargain a higher salary when a club's owner exploits the threat to choose a different team. The influence of these factors on earnings might actually have been reinforced by the technological and institutional changes that occurred in Europe in recent years. On one hand, pay-TV

technology and the internet have allowed teams to be watched by a global audience and contributed to redistributing the largest share of the revenues towards the most popular teams and the most talented and famous players (Boeri and Severgnini 2012). On the other hand, institutional changes, such as the diffusion of free agency – i.e., the eligibility for a player to sign with any club even when under contract to a specific team[1] – and the Bosman ruling – which liberalised players' markets within the European Union by removing transfer fees when a player wanted to change clubs when the contract had expired – allowed players to strengthen their bargaining power, also relying upon professional agents in order to negotiate better deals with a team's owners (Blair 2007, Mason 2012).

We use a longitudinal dataset on football players[2] in the Italian Premier League (*Serie A*) built by merging information from various sources of data about players' characteristics, performance and wages. The Italian Premier League (*Serie A*) is one of the top five most followed football leagues in Europe, and football players represent an important share of the super rich, i.e., in 2003, they constituted approximately 1/5 of the top 0.01% earners in Italy (Franzini et al. 2016).

Additionally, due to the peculiarity of our dataset, our analysis allows us to make a number of contributions to the existing literature (reviewed in Section 2). First, unlike previous analyses that are essentially based on cross-sectional data, we can dispose of a panel dataset that allows us to investigate the returns of performance, popularity and power while controlling for players and team unobserved heterogeneity. This approach permits us to establish a more causal link between determinants and earnings. Second, we use the Unconditional Quantile Regression approach developed by Firpo, Fortin and Lemieux (2009) to estimate the impact of a marginal change in the determinants of earnings on their entire distribution. This is relevant because players' earnings exhibit a large dispersion around the mean and investigating the role of the determinants is especially interesting at the top of the earnings distribution, where superstar effects should more clearly manifest. Third, we use several performance indicators (goals, assists and average grades obtained during a season) as a proxy of talent, the number of yearly Google search queries made for each player as a proxy of popularity and the total market value of players who are represented by the same agent as a proxy of the bargaining power. In particular, unlike the previous literature, which usually makes use only of goals and assists as measures of performance, this allows us to properly evaluate the performance of all team members, including those who are not directly involved in goals or assists, such as midfielders or defenders. Moreover, the use of measures of power is new in the literature, and its role on determining player's earnings has been unexplored so far.

We find that all three aforementioned factors – i.e., performance, popularity and power – significantly affect players' earnings. These results are driven by both a pure compositional effect (i.e., the allocation of players endowed by a higher talent, popularity or power in better teams) and a pure direct effect, as the impact of these determinants on earnings is largely significant when players and team unobserved heterogeneity is taken into account. Moreover, analysis 'beyond the mean' reveals that the especially the role played by popularity increases at the top of earnings distribution, among those who, according to the terminology developed by Rosen (1981), can be named as "superstars". These results challenge the interpretations of extraordinary earnings based only on very talented workers who "win and take all".

[1] Zimbalist (1992) finds that players who are not eligible to become free agents suffer a higher monopsonistic exploitation (about 38%) by teams than their eligible colleagues (18%).

[2] Throughout this paper, we use the words "football" and "soccer".

The rest of the paper is structured as follows. In Section 2, we discuss the insights from the economic literature about possible explanations of super-earnings, briefly reviewing the contribution of sports economics to this literature. Section 3 presents our data and the main variables. Section 4 discusses the empirical methodology. In Section 5, we present the results of our empirical analysis. The last section summarises and concludes.

2. Determinants of super-earnings: insights from the literature

The evidence that a few individuals in selected professions – e.g., athletes, singers, artists, writers, CEOs, and lawyers – can enjoy huge salaries has been named in the economic literature as the "superstar" phenomenon (Rosen 1981). The economic literature has addressed this issue by offering few, and not always recent, explanations that can be classified according to the role they assign to an individual's talent (Rosen 1981), popularity (Adler 1985) or power (Bebchuck and Fried 2003). In this section, we offer a quick review of these contributions and discuss the main empirical findings of the literature by trying to test these theories.

The seminal theory of superstar formation was provided by Rosen (1981), who showed how a small differences in individual productivity/talent can be magnified into huge differences in earnings, focusing on three main assumptions. First, consumers are able to identify who are the best performers. Second, they prefer to be served by "the best", i.e., there is imperfect substitution among performers. Third, technology allows for joint consumption – i.e., there is no rivalry among consumers – and better performers can draw large audiences, for instance, in football stadiums, or via TV or selling their books or albums worldwide, with a cost of production largely independent of the size of the audience. According to Rosen (1981), super-earnings depend exclusively on talent: in sectors such as professional sports markets, show business and many entertainment services (Rosen and Sanderson 2001), the most talented individual wins fierce competition and, independent of the size of the difference in productivity with the losers (that can also be very small), the winner takes most of the pie (as in the "winner takes all" markets discussed by Frank and Cook,1995).

A second theory was proposed by Adler (1985), who argued that superstars might emerge among equally talented performers due to the positive network externalities of popularity. While on the supply side, Rosen (1981) and Adler (1985) agree on the necessity of technologies allowing large economies of scale, Rosen (1981) considers talent to be observable without cost by all consumers, while Adler (1985) notes that talent is a hidden characteristic that has to be discovered through personal and interpersonal learning processes. Actually, the appreciation of a particular performer (e.g., football player, singer, or artist) grows with the knowledge consumers have acquired about him through conversations with other people. In fact, as a performer's popularity increases, it becomes easier to find other fans, because, due to searching costs, consumers are better off patronising the most popular star as long as others are not perceived as clearly superior. According to Adler (1985), luck determines who among equally talented performers will snowball into a star, but talent is an essential prerequisite to becoming a superstar. However, Adler (2006) states that the likelihood of becoming a superstar could also be affected by the investments performers make in their popularity, through advertising or appearing on talk shows, in tabloids, in magazines and on social networks.

Similarly, Franzini et al. (2016) recently argued that superstar status might not always be related to abilities crucial for the specific type of performance in which individuals are involved and might be

assimilated to rent. Especially for sport and show business stars, very high earnings can be generated by providing services through activities in which one does not necessarily excel. The well-known phenomenon of celebrity endorsement, indeed, guarantees a star very high revenues from advertising. Furthermore, apart from mechanisms highlighted by Adler (1985), when information on individual abilities (e.g., of athletes, singers, managers and professionals) are largely imperfect, notoriety and conformist behaviours by consumers assign to some superstars the possibility of extracting rents unrelated to their talent or their effective current productivity. For instance, this may occur when, due to proven success in the past, popularity fails to provide information on current abilities, which can fade more quickly than fame[3]. Moreover, additional forms of rents can be gained by some superstars, influencing preferences and choices of consumers through advertising or exploiting popularity offered by the media. Thus, less talented individuals might also acquire popularity, challenging the view that superstars always emerge among the most talented.

As a third explanation, extraordinary earnings might be associated with the bargaining power exerted by superstars. For instance, managers and CEOs in large companies might be able to fix their own remuneration independent of productivity, exploiting asymmetric information with respect to shareholders (Bebchuck and Fried 2003, Bivens and Mishel 2013). Furthermore, players in team sports can achieve wage increases by threatening the club owner with acceptance of a better deal from another team (Blair 2012).

A number of empirical contributions have tried to investigate the determinants of super-earnings, and most of these contributions rely on sport statistics, as mentioned in the introduction (see, e.g., Frick 2007 and Deutscher and Buschemann 2016 for a survey). However, most studies focusing on sport economics issues investigate players' characteristics that are associated with higher wages (e.g., the player's position, the footedness, the age and the experience in the League, or performance indicators, such as tackles, assists or goals in soccer or points scored or rebounds in basketball), are based on cross-sectional data and use OLS Mincerian (Mincer 1974) regressions or quantile regressions (Koenker and Bassett 1978).

Fewer studies explicitly test theoretical predictions, i.e., try to investigate the role of performance and popularity in super-earnings. Lucifora and Simmons (2003), among others, found evidence to support Rosen's explanation of superstars in the Italian soccer league, as they find that talent, measured by performance indicators, exercises significant influence on the skewness of the earnings distribution. More recently, other authors have studied the role of either talent or popularity in shaping players' earnings in sports, finding controversial results. Treme and Allen (2009) focused on drafting of rosters in the US National Basketball Association (NBA) and found a significant effect of both performance before being drafted and the media exposure received by players on entry earnings. Franck and Nuesch (2012) found that both talent- and non-performance-related popularity increase the market value of soccer stars, especially at the top of the distribution; Lehmann and Schulze (2008) showed, instead, that neither performance nor popularity explains salaries of soccer superstars in the top quantiles[4].

3 Mullin and Dunn (2002) described the star's popularity of a baseball player as an intangible characteristic coming mainly from reputation based on past performance, which attracts fans who pay to see these stars, even when their playing performance is no better than mediocre.

4 Following a different empirical strategy, Brandes et al. (2008) compared talent- and popularity-based explanations; more specifically, they compared star attraction of national superstars and of so-called "local heroes" in the German soccer league – defined as the most valued players of teams in which no national superstars play – and find that superstars attract fans by outstanding field performances, whereas local heroes facilitate fan support by mere popularity.

To the best of our knowledge, no studies have tested the influence of an agent's power on earnings and none of the studies reviewed in this section has jointly analysed the role of performance (as a proxy of talent), popularity and power on superstar earnings. As mentioned in the introduction, the main goal of this paper is to fill this gap.

3. Data and main variables

Our empirical analysis is based on an original dataset recording earnings, performance and other characteristics of football players of the Italian Premier League (*Serie A*). The data come from various sources and record longitudinal information for players, teams and agents[5]. We considered 469 players who appeared in *Serie A* in the 2013-2014 season as the starting sample – excluding goalkeepers, thus following a common approach in the sport economics literature (e.g., Lucifora and Simmons 2003) – and followed these players from the 2010-2011 season to the 2014-2015 season. This leads to a panel dataset composed of 1,586 observations. The panel is unbalanced because, due to the system of clubs' promotion and relegation between *Serie A* and *Serie B* and players' transfers across national and international leagues, there is a large turnover of players in the league.[6]

We built the dataset in order to observe all factors that might influence players' earnings, controlling for club and player characteristics: i.e., talent, proxied by indicators of performance, popularity and bargaining power.

Data on players' yearly salaries – recorded net of taxes and excluding possible bonuses – are taken from the annual report published at the beginning of each season by the most-read Italian sport newspaper, *La Gazzetta dello Sport*. Data about players' characteristics (e.g., age, position in the pitch, and international caps) and performances (i.e., goals and assists – decisive passes leading to a goal – during a season) are extracted from the websites *transfermarkt.com* and *soccerways.com*. As a further performance variable, we also included the average seasonal grade assigned to players in each played match by the three most popular Italian sport newspapers – *La Gazzetta dello sport*, *Il corriere dello sport* and *Tuttosport* – where the grade varies between 1 (very poor performance) and 10 (excellent), even if, in most cases, journalists use a range between 4 and 8.[7] As mentioned in the introduction, this process allows us to measure the performance of players not directly involved in goals and assists, such as midfielders and defenders.

Concerning popularity, we use as a proxy the number of Google search queries made each year for each player.[8] As a proxy of players' bargaining power, we rely on information on the total market value of

[5] We also collected information on teams' economic performance, recorded in balance sheets, annually approved by the clubs' boards of directors and published on the official websites. However, we prefer to include team fixed effects rather than specific values for team variables in our baseline estimates, as these variables are rather time invariant. Results, available upon request by the authors, show that our main findings do not change at all if we replace team fixed effects with values for a set of team variables.

[6] The Italian Premier league is composed of 20 teams, and at the end of the season, the last three clubs in the table are relegated and substituted by the first three clubs in the second division (*Serie B*).

[7] Other recent papers in the sport economics literature use a player's grade as a proxy of performance, e.g., Bryson et al. (2012), Buraimo et al. (2015) and Deutscher and Buschemann (2016).

[8] To have a coherent value for each player, the data have been collected the same day for each one, typing "name-surname-team". We also collected data about the number of followers each player has on Twitter, but we did not rely on this indicator because only the most popular players are on Twitter. The few studies that have investigated the link between football players' popularity and earnings use proxies based on players' quotations in newspapers (Brandes et al. 2008, Lehmann and Schulze 2008) or press publicity (Franck and Nuesch 2012).

players who are represented by the same agent (provided by the website *transfermrkt.com*), assuming that an agent with a richer portfolio is better able to bargain a good deal with the club's owner.[9] According to Italian rules, football players can be represented by professional agents enrolled in a specific register or by a close relative. The relationship between the player and the agent is generally very stable over the time. Actually, an agent generally follows the player's interest over his entire career, with changes in agents being quite rare. Therefore, the proxy of agent bargaining power is, in fact, time invariant in our dataset.

The contract between the team and the player ensures the right for the team to enjoy the sports performance of the player and to involve him in public events related to the sponsors and the club's image. On the other hand, the player is generally paid with a fixed salary and, occasionally, a variable that depends on the team and individual results during the football season. In this paper, we consider only the fixed part of the salary. Contracts can last for 5 years at most. However, according to our data, approximately 60% of contracts are actually renegotiated each year.

In addition to the proxies of individual talent, popularity and power, we also included in our dataset several variables that are used as controls in our estimations (see Sections 4 and 5) and that are presented, along with some summary statistics of all variables, in the next section.

3.1 Descriptive statistics

The full list of variables included in our dataset along with mean values and standard deviations are presented in Table 1. On average, the net annual earnings of football players in the Italian Premier league amount to approximately 875,000 Euros, but the standard deviation is very high (912,000 Euros). In addition, proxies of popularity and power are characterised by a very high standard deviation that is much higher than the mean of the variable (Table 1). On average, players in our sample score 1.93 goals per year (standard deviation is 3.50) and 1.28 assists (standard deviation is 2.04), while the mean grade assigned by journalists to players' performances in each match is 5.77 (standard deviation is 0.41).

The large dispersion in players' annual net wages clearly emerges when values of percentiles of earnings distribution and ratios among percentiles are shown (Table 2). Even if almost the whole body of football players earns a very high wage (the 10^{th} percentile earns 200,000 Euros per year), a group of "superstars" clearly emerges: the top 10% earn at least 2 million Euros per year and the top 5% earn at least 5 times more than the median earner (Table 2). Therefore, the Gini index within the group of football players in our sample is very high: it is only slightly below 0.50.

Figure 1 shows the non-parametric estimate of the overall salary distribution for the pivotal 2013-2014 season. A very asymmetric distribution emerges, with a long right tail, which indicates the presence of a restricted number of players who earn very high salaries compared to the rest of the distribution. As mentioned, this is consistent with the "superstar" phenomenon discussed in Section 2.

Apart from players, a large heterogeneity also characterises the *Serie A* teams. As stated in the following sections, the achievement of higher salaries by talented, popular or powerful players can be mediated by purchases by the richest teams, which can afford higher wage bills. Indeed, total wage bills hugely differ among clubs who participate in the Italian football Premier League (Figure 2) and because economic

[9] Our results do not change if we replace the total market value of players' portfolios represented by a single agent with the mean value for each player of with the ranking of agents along the distribution of players' market value.

performances by teams and revenues from game tickets and TV rights are very unequally distributed across teams (Table 3).

4. Empirical strategy

Our empirical analysis relies on two main estimation techniques. We first assess the impact of main determinants of earnings 'at the mean' of the earnings distribution using both pooled OLS and panel estimators. Second, we test the impact of the determinants along the entire earnings distribution using unconditional quantile regressions.

4.1 OLS and panel analysis

Consistent with the empirical literature on athlete earnings, we estimate the following augmented Mincerian equation:

$$\boldsymbol{Ln(W_{it}) = \beta_0 + \beta_1 Perf_{it-1} + \beta_2 Pop_{it-1} + \beta_3 Power_{it-1} + \gamma X_{it-1} + \delta Season_t + \varepsilon_{it}} \quad \mathbf{(1)}$$

where the dependent variable is the log of yearly net player's earnings in season t, $\boldsymbol{Perf_{it-1}}$ is the vectors of proxy variables for players' performance in the previous season (i.e., goals, assists and average grades during the season), and $\boldsymbol{Pop_{it-1}}$ and $\boldsymbol{Power_{it-1}}$, respectively, refer to proxies of popularity and power, measured before the season starts. $\boldsymbol{X_{it-1}}$ represents a set of several lagged time-varying and time-invariant player's characteristics that we include as controls in our estimates, namely, age and age squared, the number of caps with the national team and with the under 21 national team during the previous season and on the whole during one's career, the number of minutes played during the previous season, dummies for the position in the pitch (distinguishing defenders, midfielders and forwards), dummies for citizenship (distinguishing Italian, EU and extra-EU players), a dummy for players who are captains of their teams and season dummies. All the regressors are in lagged values in order to rule out potential reverse causality issues.

As an additional model, we also estimate equation (1), adding team fixed effects to covariates (i.e., dummies for teams in season *t*), in order to capture possible heterogeneity in earnings related to the club's characteristics (e.g., prestige, wealth).

$$\boldsymbol{Ln(W_{it}) = \beta_0 + \beta_1 Perf_{it-1} + \beta_2 Pop_{it-1} + \beta_3 Power_{it-1} + \gamma X_{it-1} + \delta Season_t + \vartheta Team_t + \varepsilon_{it}} \quad \mathbf{(2)}$$

Equation (2) is useful to observe whether performance, popularity and power exert a "direct" influence on earnings or whether the influence of these three factors is merely compositional, or "indirect" – i.e., it is mediated by the likelihood of more talented, popular and powerful payers to belong to a richer team. For instance, popularity or an agent's power could allow players to achieve higher earnings, allowing them to be purchased by a better team, without then exerting a further "direct" effect within teams. Henceforth, estimates with team fixed effects can be interpreted as the estimate of a "within team" effect on earnings due to performance, popularity and power.

In order to depurate our estimates by the possible confounding factor due to the correlation between performances and the other two determinants of super-earnings (i.e., performance-related media

coverage and/or the capacity of most talented players to be represented by the most powerful agents), as suggested by Franck and Nuesch (2012), we also use additional specifications of equations (1) and (2) in which we replace indexes of popularity and power with the residuals of two OLS estimates where these two indexes are regressed on our indicators of performance (grades, goals and assists), plus age, age squared and season fixed effects.

We estimate equations (1) and (2) with OLS and panel estimators and considering random (RE) and fixed effects (FE) models. As known, fixed effect estimates allow us to take into account the effect of time-invariant players' unobservable characteristics (e.g., charisma, innate ability, and ability to interact with other players) that could otherwise bias the estimates of the effect of our main variables of interest on players' salaries. Importantly, fixed effect estimates do not rely on the rather strong assumption of no correlation between individual time-invariant characteristics and earnings. However, we cannot rely entirely on fixed effects estimates in our context, as bargaining power is essentially time invariant because players change agents very rarely during their careers (as mentioned in Section 3). For this reason, we will employ fixed effect estimates to assess the impact of time-varying determinants (i.e., popularity and performance), while we will use both pooled OLS estimates and random effect estimates (which rely on the assumption of no correlation between time-invariant player characteristics and earnings) to assess the role of time-unvarying determinants (agent's power). However, all techniques lead us to draw similar conclusions with respect to the impact of time-varying determinants, thus providing robustness to our empirical strategy (see Section 5 for more details).

4.2 Unconditional Quantile Regression

To assess how the influence of the main determinants of super-earnings change along the earnings distribution – and especially at the top of the distribution, where "superstars" should lie – we apply models (1) and (2) on the pooled sample of players using the Unconditional Quantile Regression (UQR) approach, also called the Recentered Influence Function (RIF) method, proposed by Firpo et al. (2009).

The key advantage of the UQR approach over other distributional methods (i.e., the conditional quantile regression proposed by Koenker and Bassett 1978)[10] is that it allows us to analyse the relationship between covariates and the unconditional distribution of earnings. This possibility occurs because the UQR method provides a linear approximation of the unconditional quantiles of the dependent variable. The law of iterated expectations can be applied to the quantile being approximated and used to estimate the marginal effect of a covariate through a simple regression of a function of the outcome variable, the Recentered Influence Function, on the covariates.

In our setting, the RIF of earnings is estimated directly from the data by first computing the sample quantile $\boldsymbol{q}$ and then estimating the density of the distribution of income at that quantile using kernel density methods. Then, for a given observed quantile $\boldsymbol{q_\tau}$, a RIF is generated, which can take one of two values depending on whether the observation's value of the outcome variable is less than or equal to the observed quantile:

[10] Determinants of super-earnings in professional soccer are estimated through conditional quantile regressions by Lehmann and Schulze (2008), Franck and Nuesch (2012) and Deutsher and Buschemann (2016), while Deutscher et al. (2016) make use of unconditional quantile regressions.

$$RIF\,(W;q_\tau) = q_\tau + \frac{\tau - \mathbf{1}[W \le q_\tau]}{f_w(q_\tau)} \qquad (3)$$

Where q_τ is the observed sample quantile of earnings, $\tau - \mathbf{1}[W \le q_\tau]$ is an indicator variable equal to one if the observation's value of earnings is less than or equal to the observed quantile and zero otherwise, while $f_w(q_\tau)$is the estimated kernel density of earnings at the τ_{th} quantile.

The RIF defined in equation (3) is then used as a dependent variable in an OLS regression on the covariates defined in equations (1) and (2). In practice, this amounts to estimate a rescaled linear probability model (Jones et al. 2015). Indeed, the unconditional quantile of earnings q_τ, may be obtained as follows:

$$q_\tau = E_x\left[E\left[\widehat{RIF}(W;q_\tau)|X\right]\right] \quad (4)$$

Where $\widehat{RIF}(W;q_\tau)|X$ is the estimate of RIF as defined in equation (3), conditional on covariates *X*. Thanks to this linear approximation, it is now possible to apply the law of iterated expectations. Thus, q_τ can be written as

$$q_\tau = E[X]\widehat{\delta_\tau} \quad (5)$$

Where $\widehat{\delta_\tau}$ is the coefficient of the unconditional quantile regression. This linearisation allows the estimation of the marginal effect of a change in distribution of covariates *X* on the unconditional quantile of earnings, measured by the parameter $\widehat{\delta_\tau}$.

5. Results

5.1 OLS estimates

In Table 4, we report OLS estimates of equations (1) and (2), respectively, i.e., without and with team fixed effects.[11] The two equations are estimated both including rough indicators of popularity and power (in the "baseline" model) and including indicators of popularity and power depurated by the correlation with performance, as explained in Section 4. All coefficients are expressed in terms of one standard deviation (S.D.) of the variable. Therefore, with the dependent variable expressed in logs, estimated coefficients indicate the percentage change in annual net wages associated to a one-standard-deviation increase in the independent variable.

Estimates of equation (1) (columns 1 and 3, Table 4) show that all indicators of performance, popularity and power exert a largely positive and highly statistically significant influence on earnings. In the baseline model (column 1, Table 4), for instance, a one-S.D. increase in goals, assists and mean grade during the previous season is associated with a wage increase of 11.4%, 3.4% and 6.3%, respectively. Likewise, a one-S.D. increase in proxies for popularity and bargaining power leads to a wage increase of 16% and 8.1%, respectively.

[11] Note that, for the sake of space, in this article, we show only estimated coefficients of our variables of interest (i.e., proxies of performance, popularity and power). Detailed estimates including all covariates are available upon request by the authors.

Interestingly, results are similar in magnitude and have the same level of statistical significance regardless of whether rough or performance-depurated indicators of popularity and power are used as determinants of earnings.[12]

The size of the estimated coefficients decreases when team fixed effects are controlled for (columns 2 and 4, Table 4), but all coefficients remain statistically significant in models where popularity and power are depurated from the correlation with performance. These results suggest that a pure compositional effect is at work – favouring players endowed by better talent, popularity or power to belong to a richer team – but all the determinants also have a direct effect on earnings (i.e., a "within team" effect). The largest drop in coefficients when team fixed effects are included refers to the proxy of bargaining power: the influence on annual net earnings of a one-S.D. increase in the player's portfolio owned by the agent drops from 8.1% to 2.1% when team fixed effects are added to the covariates. This is consistent with the role of the agent, which is essentially that of allocating the player to the team by guaranteeing the highest possible wage to the player.

5.2 Panel estimates

In table 5, we report random effects estimates according to all specifications discussed so far. The estimates basically confirm the results obtained through OLS, signalling that all three determinants of super-earnings also play a significant role when unobserved time-invariant individual characteristics (assumed to be independent with earnings, as in RE models) are taken into account (Columns 1 and 3 of Table 5). Moreover, the results are stable when "within team" estimates are carried out (Columns 2 and 4) and with both raw and performance-depurated indicators of popularity and power.

In Table 6, we report fixed effects estimates that do not include a time-invariant power variable, but do not rely on the assumption of no correlation between time-invariant individual characteristics and earnings, as discussed in Section 3. Fixed effect results differ with respect to the OLS and RE estimates in two ways. First, the size of all estimated coefficients decreases. Furthermore, among performance variables, both mean grade and goals are positively associated with earnings, but only goals remain statistically significant. Additionally, the proxy of popularity remains statistically significant and its size does not change when team fixed effects are added to the regression. For instance, according the specification in Column 3, we find that a one-S.D. increase in the proxy of popularity brings about a remarkable 2.7% increase in earnings, while a one-S.D. increase in scored goals leads to a 5.0% increase in annual wages.

Overall, these results suggest that unobserved time-invariant player characteristics have a significant effect on earnings, and the size of the determinants of earnings is actually smaller when these characteristics are taken into account. However, both within-individual changes over time in goals – among other performance variables – and popularity highly contribute to increasing earnings when unobserved heterogeneity at both individual and team levels is taken into account. This suggests a robust causal link between these determinants and earnings.

[12] The sample size of the regressions is lower than the total sample size because, using lagged covariates, we cannot include in the regressions those players who play for the first time in Italian *Serie A* in a certain season (for instance, foreign players have missing values for the first season they play in Italy).

5.3 UQR estimates

Table 7 and Figure 3 show the results of UQR according to the specification of equation (1), while Table 8 and Figure 4 show UQR estimates of the specification including team fixed effects (as in equation (2)). Tables 7 and 8 show estimated coefficients at the 10^{th}, 25^{th}, 50^{th}, 75^{th}, 90^{th} and 95^{th} percentiles of the earnings distribution, respectively, while figures 3 and 4 show coefficients at every 5 percentiles of the distribution. For the sake of brevity, we show only the results of models where popularity and power are depurated from the correlation with performance (alternative estimates are shown in Tables A1 and A2 in the Appendix and lead to similar results).

Table 7 and Figure 3 show that talent, popularity and power remain substantially positive and significant along the whole earnings distribution, and their size grows along the distribution. However, focusing on top percentiles, where superstar effects should more clearly manifest, the increasing pattern of popularity coefficients along the distribution must be emphasised. Popularity dominates all the other covariates in the top tail of the distribution and reaches its peak at the 95^{th} percentile, where a one-S.D. increase in popularity is associated with a 35.4% increase in annual earnings in the subsequent season. The effect of goals and grades on earnings is rather constant, and a one-S.D. increase in goals is associated with a 21.0% increase in annual earnings at the 95^{th} percentile of the earnings distribution. Conversely, power exerts a large and significant influence on earnings only up to the 75^{th} percentile of the distribution, and it is not significantly associated with earnings after this threshold.

Table 8 and Figure 4 show essentially the same pattern depicted in Table 7 and Figure 3, but with one important difference. Indeed, the inclusion of fixed effects greatly reduces the influence of the agent's power, whose effect turns to be not statistically significant just after the median of the earnings distribution. A similar pattern, only observed at the mean of the earnings distribution, was also found in OLS estimates (shown in Section 5.1). Conversely, the influence of popularity is also large and significant when team fixed effects are included in the regression and its influence on earnings grows along their distribution: a one-S.D. increase in popularity is associated with a 4.1% increase in earnings at the median of the earnings distribution and with a 31.9% increase at the 95^{th} percentile.

Overall, UQR estimates generally support the results obtained from the OLS and panel regressions when these are evaluated at the mean of the distribution. However, UQR regression results reveal that the relative weight of these factors changes along the distribution of earnings, especially at the top tail of this distribution, where the effect of popularity dominates all the others.

6. Conclusions

The economic literature has addressed the phenomenon of the working super-rich by offering explanations based on individuals' talent, popularity or power. However, due to the difficulty of finding good proxies, no empirical studies have inquired about the joint influence of these factors on "super-earnings". Following suggestions by Kahn (2000) to exploit sports data in order to carry out innovative labour market research, we use a unique panel dataset on earnings and several characteristics of all Italian *Serie A* football players to investigate the joint effect of performance, popularity and power on earnings. An original feature of our dataset is the use of new and detailed information on players' performance (based on the goals, assists and grades given by leading Italian newspapers), popularity (based on the yearly searches on Google) and power (based on an agent's client portfolio), while the longitudinal nature of our dataset allows us to investigate the determinants of earnings while

controlling for time-invariant players and club characteristics. Moreover, we use various estimation techniques to assess these relationships and, in particular, we employ Unconditional Quantile Regression to assess the role of the determinants along the entire distribution of players' earnings.

We find that proxies of talent, popularity and power are all significantly associated with higher earnings. However, we find that the relative weight of these factors on earnings greatly varies when considering a compositional vs a pure direct effect, and at different points along the earnings distribution. Our main findings can be summarised in greater detail as follows.

First, according to our OLS estimates, we find that the leading determinants of earnings are represented by performance and popularity. A S.D. increase in goals, assists and mean grade during the previous season is associated with a wage increase of 11.4%, 3.4% and 6.3%, respectively. Similarly, a one-S.D. increase in annual searches of the player on Google is associated with a yearly earnings premium of approximately 16%. As a third determinant, we find that a one-S.D. increase in the agent's client portfolio, as a proxy of higher bargaining power, leads to an increase in earnings of approximately 8%, on average.

Second, we find that these results are partly due to a compositional effect – i.e., allocation of players endowed with greater talent, popularity and power to better teams – and partly by a direct influence on earnings. In particular, we find that an agent's market power is important, especially in allocating players to teams guaranteeing higher wages – a compositional effect – while its effect is very small when team fixed characteristics are taken into account.

Third, panel fixed effect estimates suggest that time-invariant individual characteristics have a significant effect on earnings, while within-individual changes over time in goals – among other performance variables – and popularity also highly contribute to increasing earnings. This suggests a robust causal link between these determinants and earnings.

Finally, we find through UQR that the relative weight of these determinants on earnings highly varies along the distribution of earnings, while analysis only at the mean seems to underestimate the differences in the wage structure between 'normal' players and 'superstars'. In particular, we find that popularity dominates all the other covariates at the top tail of the earnings distribution and reaches its peak at the 95th percentile of this distribution. An increase in a player's popularity is magnified by an earning premium of approximately 35% of its maximum point, according to our estimates. Conversely, the role of bargaining power reaches its peak around the 75th percentile, generating an earnings premium of approximately 14%, but it is not statistically associated with the earnings of players above this threshold. The effect of performances is, instead, more constant and becomes relatively less important after the 75th percentile.

Overall, our findings suggest that the interpretations of extraordinary earnings based only on very talented workers who "win and take all" seems insufficient in order to wholly capture mechanisms behind top earners and that other mechanisms need to be taken into account. Our findings, for instance, suggest that bargaining power plays a non-negligible role, and in the case of players, an agent's market power is important in order to negotiate better deals with team owners. The importance of this factor has also been found for other high earners, i.e., CEOs, and this encourages further research on the mechanism linking power and earnings and for other categories of the super-rich. Our findings also suggest that popularity – above all – allows individuals to become super-rich, especially in a context – such as football – characterised by the large spread of pay-TV technology and the internet. This allows teams to be watched by a global audience and contributes to redistributing the largest share of revenues

towards the most popular players. With a few possible differences across sectors, this can be a factor explaining the earnings of other high earners, such as actors, musicians, and of virtually all workers in sectors characterised by a large audience.

Future lines of research might benefit from the approach followed in this article jointly analysing the role of performance, popularity and power in the earnings of workers in sectors different from professional team sports. Moreover, a focus on the role of these determinants along the entire distribution of earnings seems to represent a promising strategy to better understand why superstars are paid so much.

References

Adler, M. (1985), Stardom and talent, *American Economic Review,* 75: 208-212.

Adler, M. (2006), Stardom and talent, in Edited by Ginsburgh, V. A., Throsby, D. (eds), *Handbook of the Economics of Art and Culture, Volume 1*, Elsevier.

Alvaredo, F., Atkinson, A.B., Piketty, T., Saez, E. (2013), The top 1% in international and historical perspectives, *Journal of Economic Perspectives*, 27(3), pp. 3–20.

Atkinson, A.B., Piketty, T., Saez, E. (2011), Top incomes in the long run of history, *Journal of Economic Literature*, 49(1), pp. 3–71.

Bebchuck, L. A., Fried, J. M. (2003), Executive Compensation as an Agency Problem, *Journal of Economic Perspectives*, 17: 71-92.

Bivens, J., Mishel, L. (2013), The pay of corporate executives and financial professionals as evidence of rents in top 1 percent, *Journal of Economic Perspectives*, 27(3), pp. 57–78.

Blair, R.D. (2012), *Sports Economics*, Cambridge University Press.

Boeri, T., Severgnini, B. (2012), The Decline of Professional Football in Italy, *IZA Discussion Paper*, n. 7018.

Brandes, L., Franck, E., Nüesch, S. (2008), Local Heroes and Superstars An Empirical Analysis of Star Attraction in German Soccer, *Journal of Sports Economics*, 9, pp. 266-286.

Bryson, A., Frick, B., Simmons, R. (2012), The Returns to Scarce Talent Footedness and Player Remuneration in European Soccer, *Journal of Sports Economics*, 14(6), pp. 606-628.

Buraimo, B., Frick B., Hickfang, M., Simmons R. (2015), The economics of long-term contracts in the footballers' labour market, *Scottish Journal of Political Economy*, 62(1), pp. 8-24.

Deutscher, C., Buschemann, A. (2016), Does Performance Consistency Pay Off Financially for Players? Evidence From the Bundesliga, *Journal of Sports Economics*, 17(1), pp. 27-43.

Deutscher, C., Gürtler, O., Prinz, J., Weimar, D. (2016), The Payoff To Consistency In Performance, *Economic Inquiry*, doi: 10.1111/ecin.12415.

Firpo, S., Fortin, N., Lemieux, T., (2009), Unconditional Quantile Regressions, *Econometrica*, 77: 953-973.

Franck, E., Nüesch, S. (2012), Talent and/or Popularity - What Does it Take to Be a Superstar?, *Economic Inquiry*, 50: 202-216.

Frank, R.H., Cook, P.J. (1995), *The winner-take-all society*, Free Press, New York.

Franzini, M., Granaglia, E., Raitano, M. (2016), *Extreme Inequalities in Contemporary Capitalism: Should We Be Concerned About the Rich?*, Springer.

Frick, B. (2007), The football players' labor market: empirical evidence from the major european leagues, *Scottish Journal of Political Economy*, 54 (3), pp. 422-446.

Jones, A., Lomas, J., Rice, N. (2015), Healthcare Cost Regressions: Going Beyond the Mean to Estimate the Full Distribution, *Health Economics*, 24(9), pp. 1192-1212.

Kahn, L.M. (2000), The Sports Business as a Labor Market Laboratory, *Journal of Economic Perspectives*, 14(3), pp. 75-94.

Koenker, R., Basset, G. (1978), Regression quantiles, *Econometrica*, 46(1), 33–50.

Lehmann, E. E., Schulze, G. G. (2008), What does it take to be a star? The role of performance and the media for German soccer players, *Applied Economics Quarterly*, 54: 59-70.

Lucifora, C., Simmons, R. (2003), Superstar Effects in Sports: Evidence from Italian Soccer, *Journal of Sports Economics,* 15: 35-55.

Mason, D. (2012), Player agents, in Andreff, W., Szymanski, S. (eds.), *Handbook on the Economics of Sport*, Edward Elgar Publishing.

Mincer, J. (1974), *Schooling, Experience and Earnings*, New York, Columbia University Press.

Mullin, C. J., Dunn, L. F. (2002), Using baseball card prices to measure star quality and monopsony, *Economic Inquiry*, 40(4), pp. 620-632.

Rosen, S. (1981), Economics of superstars. *American Economic Review,* 71: 167-183.

Rosen, S., Sanderson, A. (2001), Labour Markets in Professional Sports, *The Economic Journal,* 111: F47-F68.

Treme, J., Allen, S. K. (2009), Widely Received: Payoffs to Player Attributes in the NFL. *Economics Bulletin,* 29: 1631-1643.

Zimbalist, A. (1992), *Baseball and Billions*, New York: Basic Books.

Tables and Figures

Table 1. Sample characteristics

Variable	Description	Mean (St. dev.)
Dependent variable		
Wage	Net earnings (pre-season values) in thousands/€	875.1 (911.7)
Log wage	Log of net earnings (pre-season values)	6.38 (0.87)
Individual controls		
Age	Age (years)	26.6 (4.2)
Age square	Age squared	725.8 (226.7)
Position	Dummies for defenders (40.2%), midfielder (39.9%) and forward (19.9%)	
Captain	Dummy for the team's captain	0.034 (0.181)
Minutes played	Minutes played during the season	1352.8 (1068.3)
Total international caps	Number of caps with the national team up to 2014-2015	15.75 (25.10)
Total Under-21 caps	Number of caps with the U21 national team up to 2014-2015	5.85 (8.68)
International caps	Number of caps with the national team during the season	2.01 (4.65)
Under-21 caps	Number of caps with the U21 national team during the season	0.37 (1.59)
Player's performance		
Grade	Mean grade by newspapers during the season	5.77 (0.41)
Goal	Goal scored during the season	1.93 (3.50)
Assist	Assist served during the season	1.28 (2.04)
Index of popularity		
Popularity	Google researches results (million)	4.21 (9.37)
Index of power		
Agent Market value	Market value of players represented by the same agent (in thousands/€)	446.2 (1021.8)

Table 2. Distributions of annual net wages: percentiles, percentile ratios and Gini coefficient

	2013-2014	All seasons
Mean	787.2	875.1
Standard Deviation	877.2	911.7
Minimum	30	30
P10	200	200
P25	300	300
P50	500	550
P75	900	1000
P90	1700	2000
P95	2500	3000
Maximum	6500	6500
P95/P90	1.5	1.5
P95/P75	2.8	3.0
P95/P50	5.0	5.5
P95/P25	8.3	10.0
P95/P10	12.5	15.0
Gini coefficient	0.490	0.474

[a] Expressed in thousands of Euros

Table 3. Distribution of team's characteristics in 2013-2014[a]

	Net Sales	Earnings before taxes	Revenues from TV rights	Revenues from games tickets
Mean	92,815	-8,263	54,808	10,494
S.D.	72,778	24,918	37,895	10,629
Minimum	34,348	-79,882	25,164	1,516
p10	42,318	-36,740	29,552	1,956
p25	44,724	-14,040	29,870	3,903
p50	56,215	-2,796	33,937	4,187
p75	116,446	1,441	66,014	15,134
p90	246,679	14,261	119,547	28,698
Maximum	272,404	44,124	163,478	38,051

[a] Only teams who also participated in the *Serie A* during the 2012-2013 season are considered

Table 4. Association between annual net (log) wages, performance, popularity and power. OLS estimates

	Baseline		Popularity and power depurated from performance[a]	
	No team fixed effects[b]	Team fixed effects[c]	No team fixed effects[b]	Team fixed effects[c]
grade	0.0630***	0.0308**	0.0792***	0.0392***
	0.0207	*0.0148*	*0.0206*	*0.0148*
goal	0.1144***	0.0637***	0.1231***	0.0690***
	0.0224	*0.0161*	*0.0224*	*0.0161*
assist	0.0339*	0.0184	0.0519***	0.0286**
	0.0185	*0.0131*	*0.0185*	*0.0131*
popularity	0.1599***	0.1000***		
	0.0198	*0.0143*		
power	0.0812***	0.0214*		
	0.0170	*0.0124*		
popularity dep.			0.1338***	0.0837***
			0.0166	*0.0120*
power dep.			0.0770***	0.0203*
			0.0161	*0.0117*
Obs.	1198	1198	1198	1198

[a] We replace among regressors popularity and power indexes with the residuals of OLS estimates on popularity and power, respectively, run including among regressors goal, assist, grade, age, age squared and season dummies. [b] The following control variables are included (all referred to the previous season): age and age squared; dummies on citizenship (Italian, EU, extra EU); dummies for the position on the pitch; dummy for team captain; number of played minutes; number of national team caps during the season and until 2014-2015 season; number of national under-21 team caps during the season and until 2014-2015 season; season fixed effects. [c] Team fixed effects are added to the control variables of the baseline model. Standard Errors in italics. *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Association between annual net (log) wages, performance, popularity and power. Random effects estimates

	Baseline		Popularity and power depurated from performance[a]	
	No team fixed effects[b]	Team fixed effects[c]	No team fixed effects[b]	Team fixed effects[c]
grade	0.0307**	0.0237*	0.0410***	0.0309**
	0.0145	*0.0128*	*0.0146*	*0.0128*
goal	0.0772***	0.0594***	0.0811***	0.0632***
	0.0181	*0.0156*	*0.0181*	*0.0156*
assist	0.0116	0.0105	0.0214	0.0184
	0.0141	*0.0122*	*0.0141*	*0.0122*
popularity	0.0684***	0.0692***		
	0.0153	*0.0132*		
power	0.0947***	0.0393**		
	0.0257	*0.0176*		
popularity dep.			0.0573***	0.0579***
			0.0128	*0.0111*
power dep.			0.0898***	0.0372**
			0.0244	*0.0167*
Obs.	1198	1198	1198	1198

[a] We replace among regressors popularity and power indexes with the residuals of OLS estimates on popularity and power, respectively, run including among regressors goal, assist, grade, age, age squared and season dummies. [b] The following control variables are included (all referred to the previous season): age and age squared; dummies on citizenship (Italian, EU, extra EU); dummies for the position on the pitch; dummy for team captain; number of played minutes; number of national team caps during the season and until 2014-2015 season; number of national under-21 team caps during the season and until 2014-2015 season; season fixed effects. [c] Team fixed effects are added to the control variables of the baseline model. Standard Errors in italics. *** p<0.01, ** p<0.05, * p<0.1.

Table 6. Association between annual net (log) wages, performance, popularity and power. Fixed effects estimates

	Baseline		Popularity and power depurated from performance[a]	
	No team fixed effects[b]	Team fixed effects[c]	No team fixed effects[b]	Team fixed effects[c]
grade	0.0192	0.0127	0.0216	0.0151
	0.0149	*0.0134*	*0.0149*	*0.0134*
goal	0.0481**	0.0351**	0.0498***	0.0369**
	0.0190	*0.0170*	*0.0191*	*0.0171*
assist	-0.0020	-0.0074	0.0011	-0.0043
	0.0145	*0.0129*	*0.0145*	*0.0129*
popularity	0.0323**	0.0334**		
	0.0160	*0.0142*		
popularity dep.			0.0271**	0.0280**
			0.0134	*0.0119*
Obs.	1198	1198	1198	1198

[a] We replace among regressors popularity and power indexes with the residuals of OLS estimates on popularity and power, respectively, run including among regressors goal, assist, grade, age, age squared and season dummies. [b] The following control variables are included (all referred to the previous season): age and age squared; dummies for the position on the pitch; dummy for team captain; number of played minutes; number of national team caps during the season; number of national under-21 team caps during the season; season fixed effects. [c] Team fixed effects are added to the control variables of the baseline model. Standard Errors in italics. *** p<0.01, ** p<0.05, * p<0.1.

Table 7. Association between annual net (log) wages, performance, popularity and power. UQR[ab]

	Q10	Q25	Q50	Q75	Q90	Q95
grade	0.0352	0.0631**	0.1073***	0.1220***	0.1175***	0.0979*
	0.0297	*0.0277*	*0.0302*	*0.0451*	*0.0445*	*0.0511*
goal	-0.0021	0.0120	0.1466***	0.3346***	0.2170**	0.2100**
	0.0178	*0.0202*	*0.0323*	*0.0555*	*0.0865*	*0.0994*
assist	-0.0203	0.0249	0.0684**	0.1245***	0.1086**	0.0975
	0.0151	*0.0178*	*0.0286*	*0.0477*	*0.0530*	*0.0711*
popularity dep.	0.0255**	0.0374**	0.0923***	0.2189***	0.2788***	0.3540***
	0.0107	*0.0169*	*0.0252*	*0.0489*	*0.0546*	*0.0875*
power dep.	0.0312**	0.0507***	0.1283***	0.1380***	-0.0539	0.0024
	0.0154	*0.0160*	*0.0209*	*0.0470*	*0.0498*	*0.0618*
Team Fixed Effects	No	No	No	No	No	No
Obs.	1198	1198	1198	1198	1198	1198

[a] We replace among regressors popularity and power indexes with the residuals of OLS estimates on popularity and power, respectively, run including among regressors goal, assist, grade, age, age squared and season dummies. [b] The following control variables are included (all referred to the previous season): age and age squared; dummies on citizenship (Italian, EU, extra EU); dummies for the position on the pitch; dummy for team captain; number of played minutes; number of national team caps during the season and until 2014-2015 season; number of national under-21 team caps during the season and until 2014-2015 season; season fixed effects. Standard Errors in italics. *** p<0.01, ** p<0.05, * p<0.1.

Table 8. Association between annual net (log) wages, performance, popularity and power. UQR[ab]

	Q10	Q25	Q50	Q75	Q90	Q95
grade	0.0215	0.0410*	0.0598**	0.0282	0.0625	0.0605
	0.0276	*0.0240*	*0.0269*	*0.0410*	*0.0432*	*0.0520*
goal	-0.0123	-0.0199	0.0807***	0.2185***	0.1567**	0.1651*
	0.0182	*0.0199*	*0.0283*	*0.0471*	*0.0742*	*0.0917*
assist	-0.0334**	0.0045	0.0336	0.0803**	0.0955*	0.1010
	0.0154	*0.0168*	*0.0249*	*0.0406*	*0.0509*	*0.0708*
popularity dep.	0.0137	0.0093	0.0409**	0.1054***	0.2070***	0.3189***
	0.0106	*0.0131*	*0.0196*	*0.0344*	*0.0485*	*0.0875*
power dep.	0.0131	0.0155	0.0463***	0.0259	-0.0957**	-0.0436
	0.0129	*0.0135*	*0.0176*	*0.0389*	*0.0483*	*0.0600*
Team Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1198	1198	1198	1198	1198	1198

[a] We replace among regressors popularity and power indexes with the residuals of OLS estimates on popularity and power, respectively, run including among regressors goal, assist, grade, age, age squared and season dummies. [b] The following control variables are included (all referred to the previous season): age and age squared; dummies on citizenship (Italian, EU, extra EU); dummies for the position on the pitch; dummy for team captain; number of played minutes; number of national team caps during the season and until 2014-2015 season; number of national under-21 team caps during the season and until 2014-2015 season; season fixed effects; team fixed effects. Standard Errors in italics. *** p<0.01, ** p<0.05, * p<0.1.

Figure 1. Kernel density estimate of annual net wages in 2013-2014

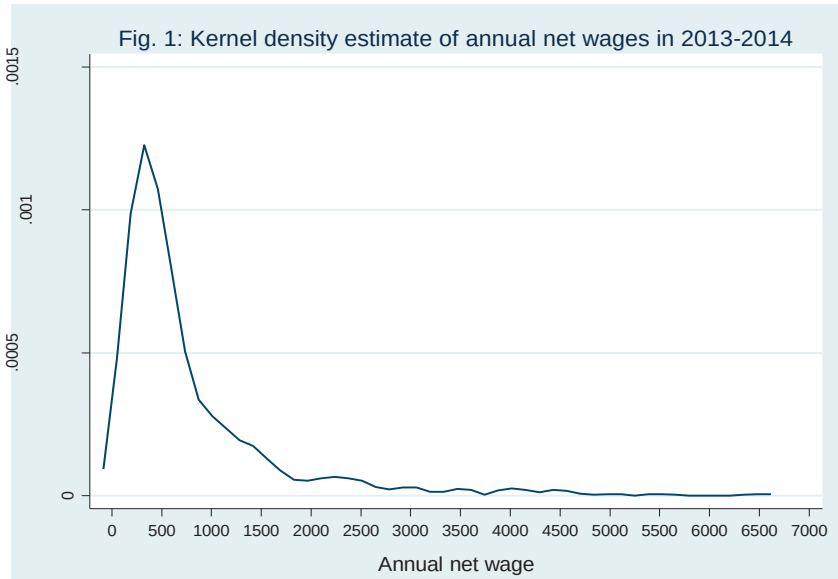
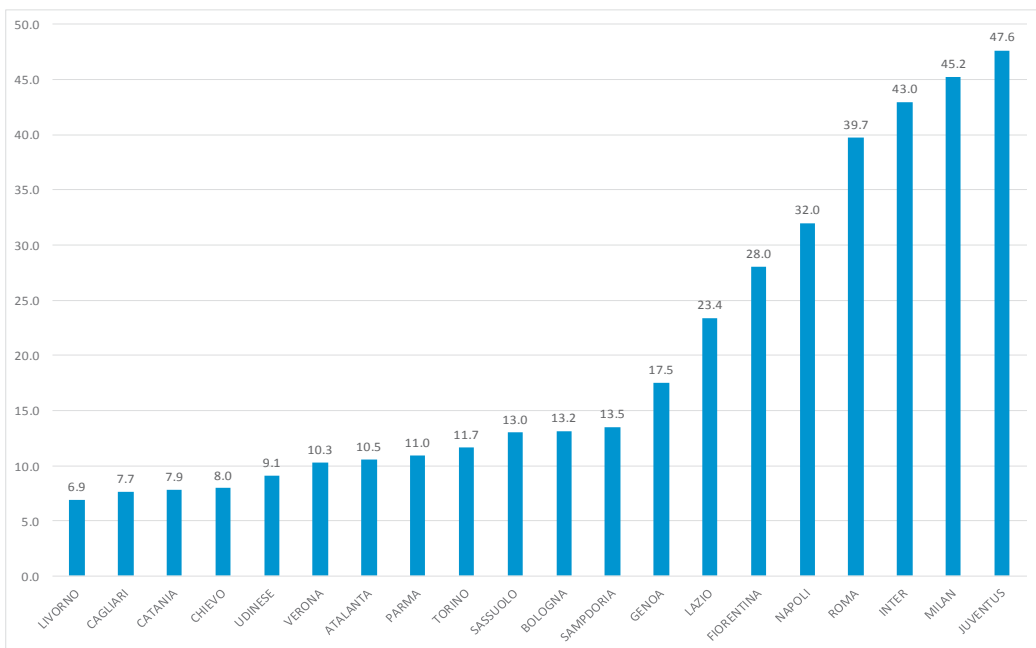
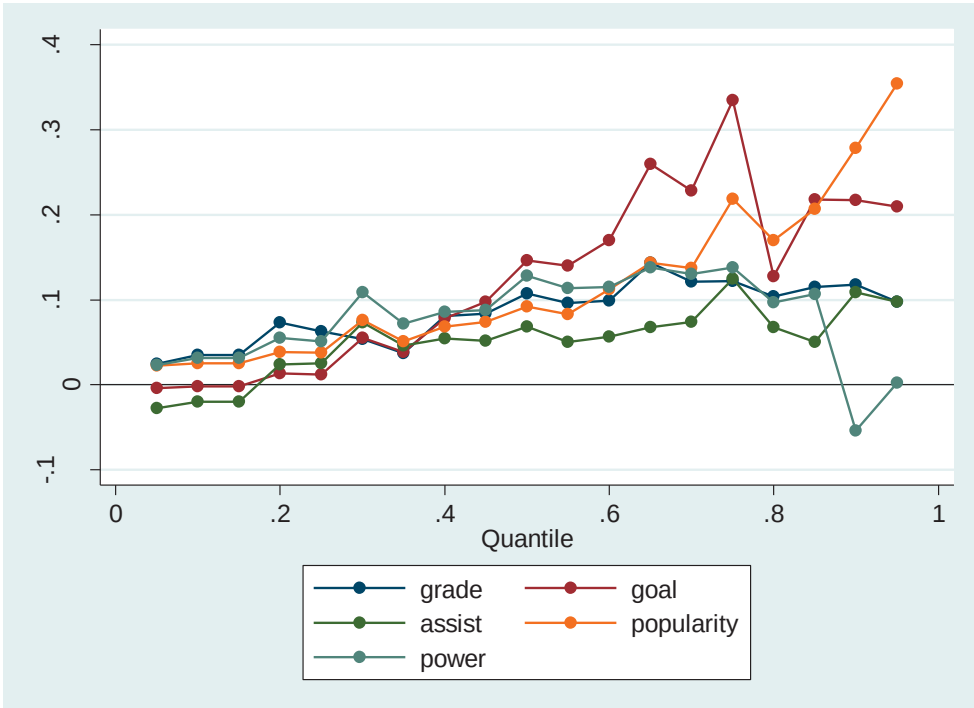


Figure 2. Total net wage bill paid to players by teams participating to the 2013-2014 season[a]



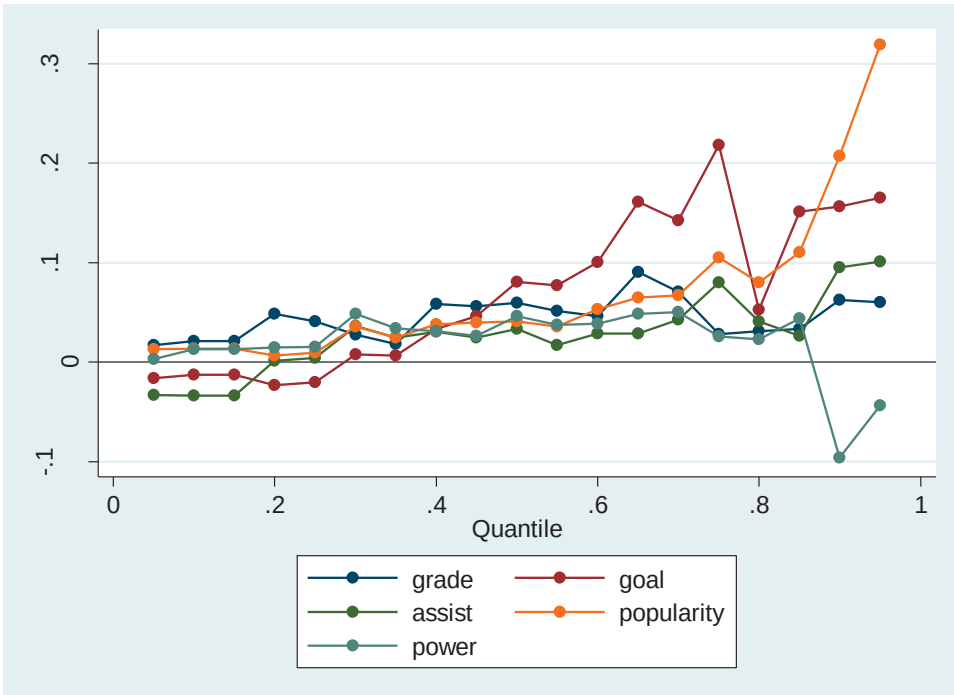
[a] Goalkeepers earnings are included in the computation

Figure 3. Estimated coefficients of the association between annual net (log) wages, performance, popularity and power along the earnings distribution[a]. UQR- No team fixed effects model



[a] Proxies of popularity and power are depurated from performance.

Figure 4. Estimated coefficients of the association between annual net (log) wages, performance, popularity and power along the earnings distribution[a]. UQR- Team fixed effects model



[a] Proxies of popularity and power are depurated from performance.

Appendix

Table A1. Association between annual net (log) wages, performance, popularity and power. RIF regressions.[a]

	Q10	Q25	Q50	Q75	Q90	Q95
grade	0.0312	0.0568**	0.0916***	0.0949**	0.0968**	0.0673
	0.0298	*0.0278*	*0.0304*	*0.0452*	*0.0443*	*0.0505*
goal	-0.0039	0.0094	0.1403***	0.3203***	0.1997**	0.1878*
	0.0178	*0.0201*	*0.0322*	*0.0554*	*0.0865*	*0.0995*
assist	-0.0243	0.0188	0.0534*	0.0947**	0.0789	0.0573
	0.0152	*0.0178*	*0.0285*	*0.0479*	*0.0536*	*0.0703*
popularity	0.0304**	0.0447**	0.1102***	0.2615***	0.3331***	0.4229***
	0.0128	*0.0202*	*0.0301*	*0.0585*	*0.0652*	*0.1045*
power	0.0329**	0.0535***	0.1353***	0.1456***	-0.0568	0.0025
	0.0163	*0.0169*	*0.0220*	*0.0496*	*0.0525*	*0.0651*
Team F.E.	No	No	No	No	No	No
Obs.	1198	1198	1198	1198	1198	1198

[a] The following control variables are included (all referred to the previous season): age and age squared; dummies on citizenship (Italian, EU, extra EU); dummies for the position on the pitch; dummy for team captain; number of played minutes; number of national team caps during the season and until 2014-2015 season; number of national under-21 team caps during the season and until 2014-2015 season; season fixed effects. Standard Errors in italics. *** p<0.01, ** p<0.05, * p<0.1.

Table A2. Association between annual net (log) wages, performance, popularity and power. RIF regressions.[a]

	Q10	Q25	Q50	Q75	Q90	Q95
grade	0.0195	0.0393	0.0535**	0.0176	0.0504	0.0357
	0.0276	*0.0241*	*0.0269*	*0.0409*	*0.0430*	*0.0516*
goal	-0.0132	-0.0205	0.0780***	0.2118***	0.1442*	0.1453
	0.0182	*0.0198*	*0.0282*	*0.0470*	*0.0741*	*0.0919*
assist	-0.0354**	0.0029	0.0273	0.0674*	0.0755	0.0664
	0.0153	*0.0168*	*0.0250*	*0.0406*	*0.0513*	*0.0698*
popularity	0.0164	0.0111	0.0489**	0.1259***	0.2473***	0.3810***
	0.0127	*0.0157*	*0.0234*	*0.0411*	*0.0579*	*0.1046*
power	0.0138	0.0164	0.0488***	0.0273	-0.1010**	-0.0460
	0.0136	*0.0142*	*0.0185*	*0.0410*	*0.0509*	*0.0633*
Team F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	1198	1198	1198	1198	1198	1198

[a] The following control variables are included (all referred to the previous season): age and age squared; dummies on citizenship (Italian, EU, extra EU); dummies for the position on the pitch; dummy for team captain; number of played minutes; number of national team caps during the season and until 2014-2015 season; number of national under-21 team caps during the season and until 2014-2015 season; season fixed effects; team fixed effects. Standard Errors in italics. *** p<0.01, ** p<0.05, * p<0.1.