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Abstract: Many studies have established that people care a great deal about their relative economic position and not solely, as standard economic theory assumes, about their absolute economic position. However, behavioral evidence is rare. This paper provides an empirical analysis on how individuals' relative income position affects their performance. Using a unique data set for 1040 soccer players over a period of eight seasons, our analysis suggests that the larger the income differences within a team, the worse the performance of the soccer players is. The more the players are integrated in a particular social environment (their team), the more evident this negative effect is. Moreover, we find that positional effects lowering performance are stronger among high performing teams.

Keywords: Relative income, positional concerns, envy, performance, social integration

JEL classification: D000, D600, 8222, 9210, L830

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I. INTRODUCTION

Standard economics assumes that individuals evaluate their welfare in absolute terms. Choices only affect the agents directly involved. However, individuals may judge their own situations in relation to other individuals' situations. Leading economists, such as Adam Smith, Karl Marx, Thorstein Veblen or James Duesenberry, have long expressed the importance of the relative position and social concerns. Nevertheless, standard economics pays little attention to the consequences of relative position. Accordingly, Senik (2005), providing an overview of the literature, points out that "it is surprising that in spite of the large theoretical literature on relative income and comparison effects […] empirical validation of this conjecture is still scarce" (p. 47).

Research on happiness (for example, Easterlin 1974, 1995, 2001, Clark and Oswald 1996, Watson et al. 1996, Oswald 1997, Ng 1997, 2003, Groot and van den Brink 1999, Tsou and Liu 2001, McBride 2001, Lyubomirsky 2001, Frey and Stutzer 2002a,b, Stutzer 2004, Kingdon and Knight 2004, Layard 2003, Luttmer 2005, Ferrer-i-Carbonell 2005, Dorn et al. 2005) has stressed and found strong empirical support for the importance of the relative position. Also, laboratory experiments, using the ultimatum game, indicate that subjects are concerned with their relative position (Frank and Sunstein 2001, Kirchsteiger 1994). Furthermore, as an alternative strategy, some researchers have used hypothetical questions regarding choice between alternative states or outcomes, where the choices allow for checking out relative positional concerns (Alpizar et al. 2005, Johansson-Stenman et al. 2002, Solnick and Hemenway 1998, Tversky and Griffin 1993, Zeckhauser 1991). Nevertheless, many economists are still skeptical of the importance of positional concerns, because empirical evidence about its behavioral relevance remains scarce.

This paper links positional concerns to observable behavior in the field by looking at an individual's work performance. Relative income is certainly a major determinant of people's position. Thus, Frank and Sunstein (2001, p. 347) point out that "[…] positional

concerns typically loom larger with income than with the goods that regulation attempts to provide (safety, leisure time, leave to take care of children and ailing relatives)." This paper also contributes to the growing literature that investigates the link between pay and performance. However, contrary to previous studies, we also investigate the relevance of the relative income position. Lazear (2000, p. 1346) points out that: "Much of the theory in personnel economics relates to effects of monetary incentives on output, but the theory was untested because appropriate data were unavailable"[1].

A key compensation policy discussed in the literature is that of the promotion tournament. Lazear and Rosen (1981) started to theoretically investigate the behavior of players in response to the incentives created by a tournament[2]. The effect of positional differences on performance is theoretically open. Some theories suggest that the resulting frustration (of those with a low position) leads to resignation and poorer performance. Other theories suggest that a larger positional difference induces individuals to try to achieve a higher position, and hence raises performance. This paper argues that various factors systematically influence which of the two effects is likely to prevail. The more individuals are integrated into a particular social environment, the more differences in relative position lead to frustration and poorer performance. The individuals concerned may feel that they have little possibility of changing their social position, so that they tend to resign themselves, thus lowering their performance. In contrast, less well-integrated individuals are less burdened by positional concerns, and a given income difference therefore has little or no effect on their performance.

Empirical analysis of the behavioral impact of positional concerns is hindered by the lack of useful income data. The opportunity of using sports data has led to a growing

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1 See, for example, Abowd (1990), Jensen and Murphy (1990), and Gibbons and Murphy (1990) for studies that investigate the relationship between pay and managerial performance or corporate returns, or Asch (1990) for Navy recruiters' reactions to different incentive plans.

2 See also, for example, Nalebuff and Stiglitz (1983), Green and Stokey (1983), O'Keefe, Viscusi and Zeckhauser (1984), Rosen (1988), McLaughlin (1988), Rees (1992), Prendergast (1999).

empirical literature, testing existing theory with sports data[3] (see Ehrenberg and Bognanno 1990a, 1990b, Becker and Huselid 1992, Orszag 1994, Lynch and Zax 1998, 2000, Fernie and Metcalf 1999, Maloney and McCormick 2000, Melton and Zorn 2000, Sunde 2003). This paper uses sports data to investigate the impact of soccer players' relative income position on their performances. The broad sample covers eight seasons of the German premier soccer league (*Bundesliga*) between 1995/1996 and 2003/2004[4], and includes 1040 players, a salary proxy and several performance variables. The empirical data has low variable errors. Performance is clearly observable and is free of discrepancies, compared to frequently used performance variables, such as GDP. Furthermore, soccer games are comparable to field experiments, due to the fact that a match takes place in a controlled environment. Soccer players are faced with the same rules and restrictions. Thus, when investigating the connection between relative concern and performance, many factors can be controlled for. The paper analyzes to what extent the relative income position of a player affects his sport performance, holding the absolute income level constant. The relative income position is proxied by the difference between teammates' average salaries and players' individual salaries, as well as the difference between league players' average salaries and players' individual salaries. Thus, we investigate two different reference groups. Moreover we look at the effect of future or past salaries on current performance. The empirical results are robust[5] and consistent with the general hypothesis that the relative income position has a strong impact on players' individual performance. The larger the income differences are in a team or league, the worse the performance of the players. The econometric estimates are also consistent with the more specific hypothesis that social integration strengthens this negative

[3] There are also some studies that test the theory of tournaments outside the context of sport (see, e.g., Knoeber and Thurman 1994, Eriksson 1999, Rees 1992).

[4] It was not possible to consider the year 1997 because no proxy for players' salaries is available.

[5] We also used the ratio, instead of the differences, and the results remain robust.

effect on performance and that positional effects lowering performance are stronger among high performing teams.

Section II provides a short overview of the relevant literature. Section III develops our theoretical approach. Section IV presents the empirical results and Section V discusses implications for business practice and offers concluding remarks.

II. POSITIONAL CONCERNS: AN OVERVIEW

Positional concerns due to relative judgments are common. People constantly compare themselves with their environment and care greatly about their relative position, which influences individual choices. Thus, not only is the absolute level of an individual's situation important (e.g., income), but also the relative position, and Frank (1999) emphasizes that research provides "compelling evidence that concern about relative position is a deep-rooted and ineradicable element in human nature" (p. 145).

Marx (1849) stresses that we measure our wants and pleasures in relation to society. Similarly, Galbraith (1958) points out that consumer demands are largely influenced by society. Veblen (1899) emphasizes the importance of one's relative position in society with his concepts of conspicuous leisure and consumption. Contrary to standard utility theory, Duesenberry's (1949) utility concept is characterized by systematically interdependent utilities. Thus, he explicitly incorporated relative preferences into consumer theory. Marshall (1961), the creator of the modern demand theory, "recognized the power and prevalence of the human desire for 'distinction'" (p. 12). Even Friedman (1962), whose theory of savings did not rely on relative wants, referred to the following example: "The college professor whose colleague wins a sweepstake will envy him but is unlikely to bear him any malice or to feel unjustly treated. Let the colleague receive a trivial raise that makes his salary higher than the professor's own, and the professor is far more likely to feel aggrieved. After all, the

goddess of chance, as of justice, is blind. The salary raise was deliberate judgment of relative merit" (p. 166, cited in McAdams, 1992, p. 103).

More recently, several economists have included the concept of interdependent preferences to allow for social comparisons, and have also stressed the relevance of the relative position (e.g., Becker 1974, Easterlin 1974, Scitovsky 1976, Schelling 1978, Pollak 1976, Boskin and Sheshinski 1978, Frank 1985, Ng 1987, Akerlof and Yellen 1990). Other social sciences, such as social psychology, sociology or anthropology, have placed considerable emphasis on the relevance of relative preferences as fundamental to human motivation. The psychological theory of social comparison (see Festinger 1954) and the sociological theory of relative deprivation (Stouffer 1949) show that comparisons with others are an important phenomenon. Relative deprivation theory investigates interpersonal and inter-group relations and comparisons. It stresses that a lower perception of one's own (group) status or one's own welfare in relation to another person (group) can be the source of hostility towards the other individuals or groups. A person may get frustrated when his/her situation (e.g., individual earnings) falls relative to the reference group. The person feels deprived. If improvement of the situation is slower than expected, the experience of frustration can even lead to aggression (see, e.g., Walker et al. 1984). However, Clark and Oswald (1996) point out that "the lack of empirical evidence, except of what most economists view as of a circumstantial nature, has kept relative deprivation theory on the periphery of research in economics" (p. 360). Clark and Oswald (1996) show that people's reference groups are individuals with similar personal characteristics, such as gender, job etc.

As mentioned in the introduction, happiness research has found strong evidence for the importance of relative position. Some empirical studies found behavioral evidence for the extent to which positional concerns matter. For example, Neumark and Postlewaite (1998) queried whether women's decisions to seek paid employment depend on the employment or incomes of other women. Thus, they investigated the question of whether relative income

comparisons could affect their employment decision. As a reference group, they focused on women's close relatives, but instead of making comparisons between sisters, they investigated whether women's employment is affected by the employment of their sisters-in-law, and whether women's employment is affected by the income of their husbands relative to the income of their sisters' husbands. Their results strongly support the relevance of positional concerns.

III. THEORETICAL CONSIDERATIONS

Empirical research on the link between pay and managerial performance has been hindered by the lack of available data in the past (see Lazear 2000). Therefore, a number of researchers use sports data – where performance can be relatively well measured – from disciplines like golfing (see Ehrenberg and Bognanno 1990a, 1990b; Melton and Zorn 2000; Orszag 1994), horse racing (Fernie and Metcalf 1999; Lynch and Zax 1998), tennis (Sunde 2003), car racing (Becker and Huselid 1992) and running (Maloney and McCormick 2000) in order to test existing theories in promotion tournaments.

The majority of empirical evidence using sports data supports the positive impact of monetary incentives on sportive performance. Using golf data from the US Senior PGA Tour in 1984, Ehrenberg and Bognanno (1990a) found that the amount of prize money has a positive influence on players' performance. The observed effect occurs primarily in the later rounds of a tournament, due to the marginal returns on efforts. Players with larger marginal returns achieve better scores. Ehrenberg and Bognanno (1990b) were able to confirm most of these results, using European PGA Tour data from the year 1987. Only their previous finding, that exempt players are more responsive to financial incentives, was not clearly supported by the European data.

Although Orszag (1994) found no statistically significant link between the amount of total prize money and golfers' performance using data from the US Senior PGA Tour of 1992, further studies confirmed Ehrenberg's and Bognanno's (1990a, b) initial findings. For instance, using 1994 and 1995 data, and trying to eliminate any possible survival biases, Melton and Zorn (2000) found support for their theory that the amount of prize money in Senior PGA tournaments affects players' performance. Further empirical support for a positive relationship between pay and performance results from research on tennis tournaments and horse races. Sunde (2003) uses data from the final two rounds of the most important tennis tournaments for professionals – from the men's ATP tour. The results indicate that the amount of prize money positively affects a player's performance, if you count the number of games won and the total number of games played.

Lynch and Zax (1998) examine the role that prizes play in Arabian horse races in the US and Canada between 1991-1995 and find support for a positive relationship between the prize spread and the absolute level of performance. Along the same lines, Fernie and Metcalf (1999) investigate the relationship between pay and performance in an unbalanced panel of 50 individuals over eight years. They find that a hard working jockey receives higher extra pay. Interestingly, the results also demonstrate that reputation lags behind performance or, in other words, that it takes a certain time for good performance to be recognized.

Evidence from sports data supports the proposition that the overall level of performance in a tournament is affected by the amount of prize money paid. Becker and Huselid (1992) use the National Association for Stock Car Auto Racing (NASCAR) 1990 circuit and the International Motor Sports Association (IMSA) data for the years 1989 and 1990. They find that increased variation in the absolute spread between higher ranked and lower ranked finishers has a statistically significant positive impact on participant performance, but at a diminishing rate. But little evidence has been found that the actual tournament structure affects performance. Maloney and McCormick (2000) work with data

from 115 foot races held in the southeastern United States from 1987 to 1991. The results indicate that higher prizes are associated with faster times for individuals already in the race and that the higher prizes also attract a faster field. A higher concentration of the prize money leads to higher effort levels. On the other hand, using road races on certified courses in the United States and abroad in 1994, Lynch and Zax (2000) couldn't find a robust impact of a positive prize effect. After controlling for runners' ability through individual fixed effects or world-ranking points, the incentive effect mostly disappears (it remains only statistically significant for the marathon). The results suggest that races with larger prizes lead to faster times, due to the fact that they attract faster runners rather than encourage runners to run faster.

Focusing on team sports, this study goes beyond investigating the performance impact of *absolute income* by studying the performance impact of *relative income*. However, the theoretical predictions are countervailing. It is therefore not possible to predict whether larger income differences raise or lower individual performance.

Our *first hypothesis* therefore leaves open *whether positional income concerns in general have a positive or a negative impact on individuals' performance.*

An individual's income is a key factor in comparisons. When people compare their salaries, it is generally with people close to themselves (Layard 2003). Positional concerns are extremely widespread in the workplace. Layard (2003) points out: "In organisations, calm can often be maintained only by keeping peoples' salaries secret" (p. 8). Elster (1991) reports that, in China, model workers spend their bonus on a good meal for everybody to avoid harassment by their colleagues. A manager keeps bonuses low because he fears the other workers and because he wants to avoid the envy of other executive officers. Frank and Sunstein (2001) report that surveys of employers and employees suggest that salaries depend on what employees think other people are paid. Furthermore, the perception of the relative position has a large effect on their morale.

Festinger (1954) emphasizes that people do not generally compare themselves with the rest of the world, but with a much more specific group, typically with others they see as being similar to themselves or, in his words, “close to one’s own ability” (p. 121). Thus, soccer players, like in other team sports, compare themselves with other soccer players, such as teammates or league players in general, due to the same work profile. Similarly, soldiers in World War II seem to have made comparisons primarily with members of their own military group (Stouffer 1949). Thus, it seems reasonable to assume that a soccer player’s income position, relative to other teammates’ and league players’ income position, has an impact on his own behavior.

There are two countervailing theories about how income differences influence performance. One stream of literature stresses the negative consequences of envy (see, e.g., Schoeck 1966). An envious person may “prefer that others have less, and he might even sacrifice a little of his own wealth to achieve that end” (Zeckhauser 1991, p. 10), behavior that has been found in experiments (see, e.g., Kirchsteiger 1994). An envious person increases his utility by destroying some of the others’ assets, even if such an action carries its own costs (*cutting off one’s nose to spite one’s face*). Thus a negative sum interaction is started. The performance of those with lower income may decrease due to frustration (“it *could* have or it *should* have been me”). They feel it impossible to “keep up with the Joneses” – in the case of soccer, with the team superstars. As a consequence, performance is lowered.

Relative income effects may include negative aspects that go beyond envy per se. Players dislike being in a lower income position, because the relative position may signal that they and their future prospects are lowly evaluated by others. Such perceptions and signals harm their relationship with others, and affect their self-conception and performance.

A contrasting theory argues that large income differences lead to better performance, as they raise the incentive to achieve a similar status. A positional arms race is provoked through the process of rivalry (see Landers et al. 1996).

The *second hypothesis* suggests that *newcomers in a team are less influenced by positional concerns. Their performance is less, if at all, affected by the income differences existing in the team.*

The effect of positional concerns is influenced by the pressure to conform. The established members expect new members to adjust to the mores existing in their group or team. Failure to conform is punished, mainly by social sanctions, but sometimes also in other ways (Schoeck 1966). In the case of a soccer team, a newcomer has quite high transaction and adaptation costs. He has to find his place in a team that consists of many players who already know each other well. A player has to gain the acceptance of his colleagues in order to become effective in the team.

The *third hypothesis* suggests that *positional effects lowering performance are stronger among high performing teams.*

High performing teams tend to be more vulnerable to positional concerns than low performing teams. In an extraordinarily successful team, each team member tends to associate superior performance with his or her individual performance rather than with other team members. Differences in income negatively affect performance and are therefore less acceptable, while frustration and performance deterioration can be explained using relative deprivation theory. A relatively rapid average promotion rate for the group as a whole tends to lead to frustration about individual promotion rates. The rapid promotion of colleagues in the U.S. Air Corps during World War II inflated soldiers' expectations and resulted in disappointment (Stouffer 1949). In the sports industry, a winner-take-all market exists in many situations. A small number of people get enormous amounts of money compared to other athletes (see Rosen 1981, Frank and Cook 1995). Top teams often have several superstars. For example, *Table A1* in the Appendix indicates that five of the best paid soccer players in Europe are playing for the same team (Real Madrid). Players in successful teams, who are paid less than other teammates, may be frustrated, which negatively affects their

performance. Relative deprivation theory suggests that soccer players feel angry when they lack something they desire, but which other teammates, such as superstars, have. Players feel worse off when they have less fame and money than their teammates with similar attributes, with whom they most frequently compare themselves. Moreover, superstars profit from the success of their team outside of the soccer field. For example, David Beckham, best paid soccer star in 2004 (see Appendix A1) signed a five year 50 million EURO contract with Gillette in September 2004, in addition to multi-million EURO contracts with other companies, such as Adidas, Pepsi or Vodafone (see soccer-europe.com). His teammates may well believe that they deserve similar rewards, according to their contribution to the success of the team.

IV. EMPIRICAL RESULTS

1. Data

Empirical studies of the effects of income differences on managerial behavior have been hindered by the lack of data on individual performance and the lack of publicly available income data. In contrast, in certain sports, individual and team performance is well defined and can be readily observed. This applies to professional soccer. As a side effect, the rising commercialization of soccer led to better data sets. For example, in England, publicly listed clubs must publish their annual reports (Kern and Süssmuth 2003). In some cases (as in the case of the German *Bundesliga*), even salary data for individual players, or at least good proxies thereof, are available.

This paper uses a unique data set of professional soccer players in the German premier soccer league *Bundesliga,* which is one of the most important soccer leagues in the world. IMP, the official data provider of the *Bundesliga* and several broadcasting networks, provided the data. This data includes soccer players' individual performance (e.g. goals, assists, duels

won) and personal background data (e.g. age, nationality, position) over a period of eight seasons between 1995/1996 and 2003/2004. We investigate an unbalanced panel of 1040 players covering more than 2000 observations. During the eight seasons, 28 different clubs participated in the league due to annual promotion and relegation.

Although the salaries of soccer professionals are not officially revealed by the *Bundesliga*, there is substantial transparency. The most prominent soccer magazine in Germany, the *Kicker Sportmagazin*, develops players' market value estimates on an annual basis. They provide a good proxy for actual salaries being paid by the clubs[6]. Before a new season starts, the editorial staff develops an estimation of players' market values. This data has been collected in a consistent and systematic manner for several years by almost the same editorial team, and is therefore likely to be consistent. To check the extent to which the market value estimations used in our paper correctly reflect actual salaries, we investigate the correlation between players' effective reported salaries, as provided by another data source called *Transfermarkt.de*, and our salary proxies. For example, it may be argued that salary estimates are more precise for high-profile players and high-profile teams. This could lead to measurement errors. The *Transfermarkt.de* data has the advantage of covering salary information for high- and low-profile players, as well as high- and low-profile teams. The correlation between these two data sources is high ($r=0.754$)[7]. Thus, measurement errors do not seem to be a major problem. The empirical section will also indicate that the results obtained are robust when dealing with outliers. Moreover, the proxies for salaries are even more satisfactory when analyzing the relative position of soccer players, compared to their teammates and their opponents. In addition, our data set includes individual transfer prices, as well as earnings from ticket sales, merchandizing, and sponsoring revenues at the team level.

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[6] Information from the *Kicker Sportmagazin* has been used for empirical research studies in the past (see for instance Eschweiler and Vieth (2004), Huebl and Swieter (2002), Lehmann and Weigand (1998, 1999) and Lehmann and Schulze (2005)).

2. Empirical Model

In the quantitative analysis, four different models are investigated. Investigating the pay-for-performance relationship requires a model that takes into account the incentive effects of absolute and relative pay. A model studies whether a player's current performance is affected by his future pay. Such an approach is similar to the one done by Luttmer (2005), who investigates the relationship between relative earnings and well-being. In his paper, he uses a *predicted* measure of local earnings instead of the actual local income. The first model has the following baseline equation:

$$PERF_{it} = \beta_0 + \beta_1 CTRL_{it} + \beta_2 ABSAL_{i(t+1)} + \beta_3 RELSAL_{i(t+1)} + TEAMD_i + TD_t + \mu_i + \varepsilon_{it} \qquad (1)$$

where $PERF_{it}$ is the performance of player i at time t. Several performance variables, such as goals, assists, shots, ball contacts, duels and duels won are used. These dependent variables refer to active involvement and success in the game. $ABSAL_{i(t+1)}$ is the future salary of a player. To check for non-linearity, the squared value of the salary level is also considered. $RELSAL_{i(t+1)}$ is the future relative salary of player i, measured by the difference between teammates' average salaries and players' individual salaries[8]. The regression also contains several control variables $CTRL_{it}$ such as AGE, AGE SQUARED, players' position in the game (ATTACK, MIDFIELD, DEFENSE) and team dummy variables ($TEAMD_i$), as many players change their position in the field and in their team over time. Team dummy variables are included, as it can be argued that the results are driven by unobserved team characteristics

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[7] The publicly available data from *Transfermarkt.de* was only available for the season 2003/2004. Historical data was not available, as the Internet site just started to collect this information in 2005. Furthermore, *Transfermarkt.de* covers only a limited number of players in the German *Bundesliga*.

[8] Experts' estimations of players' salaries after the previous season. As mentioned previously, we check the robustness of the results using the ratio instead of the difference to measure the relative income position.

that are correlated with income and performance. Team fixed effects allow us to control for such possible omitted variable bias. However, estimates without team effects are also reported in order to go beyond a within team focus. Similarly, the estimates include a set of time dummies (TD_t) to control for possible differences in the players' environment; μ_i is the individual effect of player i, and ε_{it} denotes the error term.

A model using future pay assumes that a player is able to predict his and other players' future income situation, and therefore his relative income position. However, experimental studies suggest that individuals have difficulty in predicting their future utility and tastes (for an overview, see, for example, Loewenstein et al. 2003). To avoid such criticism, we check the robustness of the results, using past rather than future earnings as a reference point, as it can be argued that players' performance is less likely to be affected by the amount of money already paid out. On the other hand, we may still observe incentive effects, as we investigate the relative income position of a player. Positional concerns due to the past income position may affect current performance. Thus, our second baseline specification has the following form:

$$PERF_{it} = \beta_0 + \beta_1 CTRL_{it} + \beta_2 ABSAL_{i(t-1)} + \beta_3 RELSAL_{i(t-1)} + TEAMD_i + TD_t + \mu_i + \varepsilon_{it} \qquad (2)$$

where $ABSAL_{i(t-1)}$ is the player's lagged absolute salary and $RELSAL_{i(t-1)}$ is the player's lagged relative salary.

The two previous models take into account that teammates serve as the reference group. We also consider a player's salary relative to the entire league, rather than the player's team. The pay of superstars and players in high profile teams might be even more salient to players and the general public than the pay of members of one's own team. Publicly available

data on incomes increase transparency and therefore provide players with information as to what other league players get paid. Moreover, as the soccer player market is quite homogenous in the sense of an equal job profile, players tend to compare themselves with other players in other teams. The third and fourth baseline specifications take the following form:

$$PERF_{it} = \beta_0 + \beta_1 CTRL_{it} + \beta_2 ABSAL_{i(t+1)} + \beta_3 RELSALL_{i(t+1)} + TEAMD_i + \mu_i + \varepsilon_{it} \quad (3)$$

and

$$PERF_{it} = \beta_0 + \beta_1 CTRL_{it} + \beta_2 ABSAL_{i(t-1)} + \beta_3 RELSALL_{i(t-1)} + TEAMD_i + \mu_i + \varepsilon_{it} \quad (4)$$

where $RELSAL_{i(t+1)}$ *and* $RELSAL_{i(t-1)}$ are defined as the future or past relative salary position of player *i*, measured as the difference between the leagues' average salaries and the player's individual salary.

3. Pay and Performance: Basic Results

We first apply three different methodologies (pooling regression, random effect model and fixed model) to all available performance measures. To identify which empirical method is most suitable, we performed two statistical tests: the Lagrangian Multiplier (LM) test (see Breusch and Pagan 1980) of the random effect model and the Hausman specification test (Hausman 1978) in order to compare the fixed effect and the random effect models. The LM test indicates that the null hypothesis of the individual effect μ_i being 0 is rejected in all cases at the 1% significance level. Thus, the results suggest that the cohort effect is not zero, which means that the pooling regression is not suitable. In all cases, the Hausman specification test rejects the null hypothesis that the individual-level effects are adequately modeled by a

random effect model at the 1% significance level. Thus, individual effects are not uncorrelated with the independent variables, which support the use of individual fixed effect models. However, it should be noted that the results we obtain remain robust with all three methodologies.

Table 1 presents the basic estimation results of our first model, using the entire set of six dependent variables, representing various aspects of players' performance: goals, assists, shots, ball contacts, duels and duels won. In all regressions, we observe that the relative income has a strong *negative* impact on all types of performance, suggesting that the results are robust. The bigger the difference is between future teammates' average incomes and players' individual incomes, the lower the performance. The respective coefficients are highly statistically significant for all six dependent variables, controlling for the absolute level of the salary. This finding is consistent with the *first hypothesis* that the relative income level has an impact on performance, and the theories proposing that larger income differences worsen performance. The coefficient of absolute income indicates a statistically significant positive impact on individual performance, and the squared term, which is statistically significant with a negative sign, indicates a non-linear relationship between salary and performance. Thus, an increase in the salary beyond the turning point can lead to a harmful reduction in individual performance. We also perform estimates without team fixed effects to counter the argument that the "within team findings" indicate that teams get it more or less right, or that those who are paid worse relative to their teammates also perform worse relative to their teammates. However, the coefficient of the relative income variable remains highly statistically significant in all 6 estimates, excluding team fixed effects. We also test the joint hypothesis that the absolute and the relative income as a group have a coefficient that differs from zero. The results in *Table 1* indicate a clear rejection of this hypothesis, which supports the importance of the income variables as a group. Looking at the control variables, we can also

observe that age tends to influence performances, such as duels and shots, having a concave performance profile – that is, rising with age but decreasing as physical condition worsens.

[TABLE 1 ABOUT HERE]

In *Table 2,* we run the same 12 regressions, but instead of using future salary, we take past salary. We also differentiate between estimates with and without team fixed effects. The importance of the relative income position is supported in *Table 2*. All coefficients are statistically significant. Moreover, based on an *F*-test for the joint significance of the relative and absolute income, it can be argued that, as a group, they significantly influence individual performance. *Table 2* also indicates that player characteristics are important.

The next step investigates the impact of positional concerns when changing the reference group. We therefore look at a player's salary relative to the entire league rather than the player's teammates. The first part of *Table 3* provides the results of these 24 regressions. For simplicity, only the income coefficients are reported. As can be seen, there is still a strong relative income effect. A reduction in relative income reduces performance. Moreover, the joint significance of the relative and absolute income variable suggests that these two variables together play a significant role in the determination of performance.

[TABLE 2 ABOUT HERE]

4. Robustness Tests

This subsection presents several robustness tests. We first investigate whether the results react sensitively to outliers. Therefore, we also run specifications that resist the pull of outliers,

using iteratively reweighted least squares with Huber and biweight functions tuned for 95% "Gaussian efficiency" (see Hamilton 2004, pp. 239-240). As a consequence, more extreme outliers are less heavily weighted in the regression calculations, or even dropped altogether in very extreme cases. We present estimations using all four models. The results of the 24 regressions are presented in the second part of *Table 3*. The previous findings remain robust. In all 24 cases, the coefficient of the relative income variable is statistically significant at the 1 percent level, with a negative sign. There is also support for a positive non-linear relationship between absolute income and performance. Moreover, in line with previous results, we observe that, as a group, the relative and absolute income variables are jointly significant in all estimates.

[TABLE 3 ABOUT HERE]

Existing studies on the relative income position normally calculate how far apart a person's situation is from the respective reference group. As a further robustness test, the *ratio* of teammates' income to players' own income is used as proxy for the relative income position (the higher the value, the stronger the disadvantage in the relative income position). This calculation may be relevant in the following situation: A player has an average annual income of $100'000 in a soccer team, where his teammates earn on average $200'000 per year. The team management decides to double the salaries of all the team members. In the new constellation, the player now receives $200'000, while his teammates get $400'000 on average. The ratio remains constant (value 2), but the difference has changed from $100'000 to $200'000. The regression results support the previous findings.

We also perform pooled estimations with team and time dummy variables, using the number of minutes played as weight units. Additionally, we take into account unobservable players' specific characteristics, with standard error adjusted for the clustering on individuals.

Also in these estimates, the previous results remain robust. Furthermore, instead of pooling the different years together, each year is investigated in a cross-sectional analysis. Likewise in these cases, the results obtained previously are supported.

Finally, we also take a closer look at possible team effects. Previously, possible effects were controlled for using, in the majority of cases, team fixed effects. The regression can be extended, using proxies for teammates' strength. Player performance varies in different settings, as co-workers offer different levels of assistance (Idson and Kahane, 2000, Torgler 2006). Team composition has a strong impact on team productivity (Hamilton, Nickerson and Owan 2003). Complementarities in production, and gains from specialization in the form of accumulated task-specific human capital, are valuable to other team members (see Lazear 1998). Three aspects are included: teammates' age, exchanges and sending-offs in a game per season. Teammates' impact on a player *i* is measured by calculating the average values for the teammates (excluding the values for player *i*). More exchanges may be correlated with higher individual performance, because of an increase in the teammates' average physical strength. Similarly, higher exchange values may also be an indicator of good second line players. On the other hand, expulsions have a strong negative impact on the probability of winning a game, because losing a teammate reduces the team's strength (for empirical evidence, see Torgler 2004). Specifically, the team structure must be reorganized, which, because soccer skills are highly specialized, tends to reduce players' and team-mates' comparative advantage. The results indicate that the coefficients of the relative income variable remain statistically highly significant. Moreover, the joint hypothesis that none of the salary variables (absolute and relative income position) has a coefficient that differs from zero can clearly be rejected. The results also indicate that teammates are important. Based on an *F*-test for joint significance, teammate factors play a significant role in the determination of individual performances. Particularly strong effects are observed for the variable exchanges (positive)

and sending-offs (negative). The impact of teammates' age (negative) is less robust and not always statistically significant.

5. Causality

In general, the direction of the link between income and performance is unclear and has rarely been investigated in detail in the literature. It may be argued that lower-paid players might perform worse because they are not such good athletes; which means that poor performance results in lower pay, not the other way around. Hall et al. (2002) point out that such a link "plays a central role in the theory of team sports but is seldom investigated empirically" (p. 149). In general, looking at the empirical research available today, most soccer studies investigate players' income or teams' income as the dependent variable and search for factors that affect it (Eschweiler and Vieth 2004, Garcia-del-Barrio and Pujol 2004, Huebl and Swieter 2002, Lehmann and Weigand 1999, Lucifora and Simmons 2003, Lehmann and Schulze 2005). For the German soccer league, Eschweiler and Vieth (2004), Huebl and Swieter (2002), Lehmann and Schulze (2005), as well as Lehmann and Weigand (1999), confirm a positive pay-performance relationship. Only a couple of studies take *team* performance as the dependent variable (see Forrest and Simmons 2002, Szymanski and Kuypers 1999). Investigating whether club expenditures have a positive impact on the team's success within the English soccer league, Szymanski and Kuypers (1999) find a significant correlation between a team's pay and a team's performance. Using data from Italian, English, and German soccer leagues, Forrest and Simmons (2002) find a strong team pay-performance relationship for the leagues in Italy and England. On the other hand, only a marginally significant wage-performance relationship has been found for the German *Bundesliga*. However, as mentioned by Hall et al. (2002), the causality has seldom been investigated. Do teams really get what they pay for? Some studies focusing on baseball doubt whether this is the case, suggesting that payrolls are not useful in explaining the won-lost records in baseball

(Quirk and Fort 1999, Zimbalist 1992). On the other hand, Hall et al. (2002) show with their data that, while there is no evidence that causality runs from pay to performance over the period 1980 to 2000, the cross-section correlation between pay and performance increased significantly in the 1990s. They also found support for the relationship running from payroll to performance, and not vice versa, when investigating the relationship between a team's pay and a team's performance for English soccer data using the Granger causality test. Such differences can be explained by institutional differences affecting causality between different sports or sport periods. In English soccer, players are hired on relatively short-term contracts, ranging from one to five years, and players' trading and mobility are key parts of the league. The mobility costs are also lower, due to the relative geographic proximity to each other. Moreover, young stars at the beginning of their career are more mobile, which is comparable to the stars of the league, where trade clauses are "virtually unheard of in English soccer" and "leading teams regularly trade their top stars in search of a better lineup, whereas players frequently express their ambition to play for a variety of clubs in a variety of leagues during their career" (p. 158). These factors are also visible in the German *Bundesliga*. Our data indicates that the number of active seasons in the league per player varies between one and eight, with an average of 2.7 seasons per player. A change of team has been observed in 12.7% of the cases. Similarly, Carmichael, Forrest and Simmons (1999) report that, in the English league, 12.3% of the players changed teams in the seasons 1993-1994. Moreover, Dobson and Goddard (1998), using a data set covering 77 football leagues between 1946 and 1994, find evidence of reverse causality; specifically, that the influence of lagged revenue on current performance is greater than the influence of lagged performance on current revenue. Davies et al. (1995), who focus on professional rugby league matches between 1964 and 1993, use attendance rather than revenues, but find similar results for the direction of causality.

In addition to institutional factors, suggesting that pay affects the performance of a player, experts' salary estimates of future or past income are included to deal with causality. Furthermore, experts' evaluations attempt to measure the market value of a player rather than the contract salary, which might remain constant for more than one year. We also test for endogeneity, performing a Hausman specification test (see Hausman 1978). The test identifies whether there is sufficient difference between the coefficients of the instrumental variables regression and those of the standard regression. The Prob>chi2 statistics indicate that we cannot reject the hypothesis that the standard regression is an inconsistent estimator for our equation, which supports the argument that there is no endogeneity problem with our estimates. However, the test depends on the quality of the instruments. Therefore, in *Table 4,* we report 36 different 2SLS estimations, together with several diagnostic tests using all four different models. For simplicity, we only report the coefficient for the relative income position, together with some diagnostic tests. Estimates with different instruments are presented. First, pooled estimates are considered that control only for team effects, using the number of exchanges (replacements) in a game (going out of the game) per season as an instrument for the relative income position, and a dummy that measures whether a player played for the national team or is a foreigner as an instrument for the absolute income position[9]. The positional concern effect is still visible and *F*-test for joint significance of the relative and absolute income position is in almost all 24 regressions statistically significant at the 1 percent level. Instead of replacements, the number of times per season that a player enters the game as a substitute is taken as an instrument of the relative income position. The results remain robust. The second part of *Table 4* provides results, using lagged values of the income variables as instruments. Again, the relative income position matters and the income variables are jointly statistically significant.

[9] It should be noted that, in future income models, the instruments are fixed at time t (lagged values compared to the income variable).

[TABLE 4 ABOUT HERE]

Table 4 reports several diagnostic tests. The Anderson canonical correlations LR test has been done to analyze the relevance of the instruments (checking the relevance of the excluded instruments). In almost all cases (except for one performance variable), the null hypothesis is rejected, indicating that the model is identified and that the instruments are relevant (see Hall, Rudebusch and Wilcox 1996). The equations estimated are exactly identified, as the number of instruments does not exceed the number of endogenous regressors. *Table 4* also reports the three first-stage regression results of the instrumental variables. The F-tests of the exclusion of the instrument set in the first-stage regression are statistically significant at the 1% level in almost all cases. The Anderson-Rubin test suggests that the endogenous variables are jointly statistically significant. Such a test is robust to the presence of weak instruments. The partial R2 is checked to take into account that there is more than one endogenous variable (Shea 1997). The Shea's partial R-squared is a test of the individual explanatory power, accounting for correlation among the instruments. These results are not reported in *Table 4*, but the findings (closeness of the Shea's R-squares) indicate that there is enough separate variation in the instruments.

The next step performs a Granger-causality test to investigate the link between pay and performance (see Granger 1967). The notion of Granger causality suggests that, if lagged values of players' income helps predict current performance values in a forecast (formed from lagged income and lagged performance values), then income Granger causes performance. On the other hand, if the same lagged values help to predict current income, we argue that performance Granger causes players' pay (similar arguments apply for the future income model). A unidirectional causality from one to the other must be identified. To perform the Granger causality test, symmetric regression tests for the future and past income model are

applied. They include the six performance variables and the relative and absolute income position independently. *Table 5* presents the results of 24 Granger causality tests. The future income model shows that non-causality between income and performance can be rejected. At the same time, it fails to reject the non-causality between performance and income (relative or absolute). Thus, the test results indicate a rejection of the hypothesis that income does not Granger cause performance. On the one hand, they provide no such rejection of the hypothesis that performance does not Granger cause income. Therefore, it is possible to conclude that income "comes first". On the other hand, the results using the past income model are less strong. The noncausality of performance on pay cannot generally be rejected, nor can the noncausality of pay on performance (and vice versa). The test results indicate a clear rejection of the hypothesis that the relative and the absolute income position do not Granger cause players' performance. We also observe a rejection of the hypothesis that players' performances do not Granger cause players' absolute income and positional concerns. Thus, these results show that both depend on each other.

[TABLE 5 ABOUT HERE]

6. Newcomers and Top Teams

Table 6 summarizes the findings of 72 estimates, referring to the behavioral consequences of positional concerns of newcomers in a team compared to players already integrated into the team (for at least one season). The sample of players is split between newcomers and integrated players. Due to many team changes in our data set, this issue can be empirically investigated. All four models are taken into consideration. The first part focuses on models with teammates as a reference group, using future and past incomes. The second part uses league players as a reference group. The regressions clearly show the tendency that, in line with *hypothesis 2,* newcomers are less driven by positional concerns. In only a few

regressions is the relative income coefficient statistically significant for newcomers. In contrast, in the sub-sample of integrated players, the coefficients are mostly statistically significant, with a negative sign. This result is consistent with the hypothesis that integrated players resent differences in income more intensely than newcomers, diminishing their performance accordingly. The question remains whether changing teams is correlated with ability or, in other words, whether stayers are worse off compared to movers, as they may not have received very tempting offers from other teams. Thus, it is checked whether transferring to another team is correlated with ability. The proxy for ability is taken to be a selection for the national team or the performance in the past season before changing teams. The results suggest that changing teams is not correlated with ability.

[TABLE 6 ABOUT HERE]

Table 7 finally reports the results referring to *hypothesis 3*, proposing that high performing teams experience stronger relative income concerns than low performing teams. In order to split the sample, the mean team performance over the investigated period (the rank at the end of each season) was calculated. The teams ranked above average were placed in one group labeled “top team”, and the remaining teams were placed in the other group. The results suggest that players in top teams are indeed more vulnerable to the negative consequences of income differences than players in less successful teams. *Table 7* summarizes the results of 72 regressions. In most of the cases, the respective coefficient is statistically significant, with a negative sign, so that the performance of the players declines. On the other hand, players’ performance in teams with lower performance levels is less affected by their relative income position. The question arises as to whether salaries are a better predictor of actual ability in better teams. Results for future earnings are also presented.

[TABLE 7 ABOUT HERE]

V. CONCLUSIONS

The empirical results presented suggest that not only the absolute, but also the *relative income position,* has an impact on individuals' performance: the larger the income difference, the *lower* the performance. *More integrated members* of a team react *more negatively* than newcomers, resulting in diminished performance. Moreover, players in *top teams* also react *more negatively* than players in other teams.

To what extent can these findings on soccer players' behavior be transferred to business practice? What can managers learn from them? First of all, the results are relevant for the design of incentive mechanisms. Positional concerns are important in areas where measurable performance is directly linked to salary (pay-for-performance). For instance, in many sales organizations, it is common practice that sales commissions make up a large part of the total salary. Thus, insurance agents or financial advisors are paid according to key sales performance indicators, such as net new money, return on assets, and the number of products or policies sold within a certain period. In order to stimulate internal competition among the sales force, and to push individual performance, transparency is increased by comparative performance rankings among the sales force. Given that performance directly translates into personal income, such rankings run the risk of diminishing, rather than improving, performance. The example of soccer suggests that the higher the differences are between teammates' average salaries, the lower the overall performance. The most successful sellers, who dominate the rankings and earn much more than their colleagues, may well weaken the performance of the entire sales team.

Pay-for-performance schemes are usually linked to output measures neglecting process- or context-specific factors. Accordingly, sales people at the lower end of the ranking may see that higher ranked colleagues are not performing better, but simply benefit from

lucky punches or advantageous context factors (e.g., the districts they cover have a higher number of potential clients). Although pay-for-performance schemes are helpful to identify low performers, they tend to lower the average performance of the team. A positional arms race may be provoked through the process of rivalry (Landers et al. 1996). This downside risk is even bigger for top performing teams, just as individuals playing in top soccer teams are more vulnerable to the negative consequences of a relative income disadvantage. Top performing sales teams may already have ambitious and self-motivated team members so that further stimulation of internal team competition leads to negative motivational effects. Thus, management is faced with the difficult task of finding the right amount of 'healthy competition' within a team.

Pay-for-performance schemes address extrinsic motivation, and leave intrinsic motivation aside. According to Frey and Osterloh (2005), such schemes tend to reinforce selfish extrinsic motivation, crowding out intrinsic motivation. Managers need to consider the motivational aspects of the transparency of relative income positions in terms of corresponding benefits and downside risks. Negative effects of output-oriented financial incentives, such as pay-for-performance schemes, should be complemented with process-oriented non-financial incentives, such as awards for the best team player, best rookie, or most innovative team member of the year. This takes into account the individual's need for social distinction, using a non-material extrinsic reward (see Frey 2005). The empirical results are also relevant for the treatment of new employees joining an established team. The findings suggest that newcomers are less driven by positional concerns than existing team members. Newcomers' performance is less affected by a disadvantage in the relative position. Conformism, adaptation, adjustment and short-time satisfaction due to the change (which is often connected with an absolute salary improvement) may account for these differences. In business practice, managers often switch jobs in order to increase their salary (e.g., in investment banking). Employees joining a new firm are therefore less affected by a

disadvantage in their relative income position. However, over time, newcomers get used to their new situation and start comparing their performance/income relation with the new reference group. Management needs to take into consideration that, after an initial adaptation period, newcomers base their income expectations on their relative position in the team. As a result, a perceived disadvantage in the performance/income relationship tends to lead to behavioral changes.

Table 1: The Effect of Positional Concerns within the Team on Performance (Future Earnings)

	Dep. V.: Goals FE		Dep. V.: Assists FE		Dep. V.: Shots FE		Dep. V.: Ball Contacts FE		Dep. V.: Duels FE		Dep. V.: Duels Won FE	
Independent Variables												
SALARY												
RELATIVE VALUE(t+1)	-0.377***	-0.256***	-0.232***	-0.128	-3.943***	-3.093***	-64.999***	-32.780	-42.514***	-24.140***	-19.459***	-9.670***
	(-6.00)	(-2.70)	(-3.98)	(-1.45)	(-9.37)	(-4.94)	(-4.31)	(-1.50)	(-9.19)	(-3.48)	(-8.38)	(-2.78)
ABSOLUTE VALUE(t+1)	0.663***	0.776***	0.641***	0.740	3.450***	4.276***	109.682***	134.766***	45.353***	62.414***	23.364***	32.393***
	(7.24)	(6.92)	(7.54)	(7.10)	(5.63)	(5.75)	(5.08)	(5.30)	(6.73)	(7.60)	(6.91)	(7.85)
SQ ABSOLUTE VALUE(t+1)	-0.020***	-0.020***	-0.028***	-0.028	-0.220***	-0.219***	-6.316***	-6.043***	-3.234***	-3.187***	-1.570***	-1.544***
	(-4.68)	(-4.59)	(-7.05)	(-6.94)	(-7.63)	(-7.65)	(-6.93)	(-6.62)	(-10.20)	(-10.06)	(-9.86)	(-9.69)
PLAYER'S CHARACTER												
AGE	-0.201	-0.167	0.028	0.112	5.801**	6.272***	113.429	140.402	62.155**	68.440***	34.717***	37.626***
	(-0.58)	(-0.48)	(0.09)	(0.35)	(2.52)	(2.72)	(1.22)	(1.50)	(2.45)	(2.68)	(2.73)	(2.94)
AGE SQ	0.005	0.005	-0.001	-0.002	-0.092***	-0.094***	-2.135	-2.753*	-1.012***	-1.106***	-0.604***	-0.651
	(1.07)	(0.99)	(-0.14)	(-0.37)	(-2.70)	(-2.74)	(-1.32)	(-1.68)	(-2.70)	(-2.91)	(-3.21)	(-3.41)
POSITION	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TEAM	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
SEASON	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PLAYER	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-Test joint significance (REL. & ABOLUTE INC.)[a]	151.62***	101.37***	81.49***	82.63***	151.23***	122.27***	61.79***	49.60***	168.73***	133.67***	154.95***	124.34***
R-Squared	0.280	0.296	0.178	0.196	0.289	0.318	0.177		0.274	0.297	0.269	0.291
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Groups (Players)	768	768	768	768	768	768	562	562	768	768	768	768
Number of Observations	2143	2143	2143	2143	2143	2143	1387	1387	2143	2143	2143	2143

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% level. *t*-statistics in parentheses.[a] Without including SQ ABSOLUTE VALUE.

Table 2: The Effect of Positional Concerns within the Team on Performance (Past Earnings)

	Dep. V.: Goals		Dep. V.: Assists		Dep. V.: Shots		Dep. V.: Ball Contacts		Dep. V.: Duels		Dep. V.: Duels Won	
	FE		FE		FE		FE		FE		FE	
Independent Variables												
SALARY												
RELATIVE VALUE$_{(t-1)}$	-0.366***	-0.326***	-0.344***	-0.397***	-4.628***	-3.753***	-116.115***	-73.858***	-55.079***	-36.166***	-26.652***	-17.768***
	(-5.64)	(-2.99)	(-5.89)	(-4.03)	(-10.87)	(-5.26)	(-7.57)	(-2.85)	(-11.42)	(-4.47)	(-11.00)	(-4.37)
ABSOLUTE VALUE$_{(t-1)}$	-0.174**	-0.112	-0.196**	-0.247**	-2.288***	-1.330*	-61.219***	-19.929	-21.779***	-2.432	-9.810***	-0.877
	(-2.03)	(-0.92)	(-2.54)	(-2.25)	(-4.07)	(-1.67)	(-3.07)	(-0.71)	(-3.42)	(-0.27)	(-3.07)	(-0.19)
SQ ABSOLUTE VALUE$_{(t-1)}$	-0.010**	-0.011**	-0.006	-0.005	-0.059**	-0.062**	-1.634*	-1.592*	-1.248***	-1.276***	-0.645***	-0.653***
	(-2.19)	(-2.46)	(-1.40)	(-1.35)	(-2.05)	(-2.16)	(-1.89)	(-1.83)	(-3.82)	(-3.91)	(-3.93)	(-3.98)
PLAYER'S CHARACTER												
AGE	1.298***	1.283***	1.167***	1.154***	12.256***	12.318***	369.180***	380.978***	122.728***	124.833***	60.019***	61.427***
	(4.01)	(3.93)	(4.01)	(3.92)	(5.77)	(5.78)	(4.54)	(4.68)	(5.10)	(5.17)	(4.97)	(5.07)
AGE SQ	-0.024***	-0.024***	-0.022***	-0.022***	-0.215***	-0.218***	-6.942***	-7.370***	-2.074***	-2.162***	-1.066***	-1.116***
	(-5.52)	(-5.44)	(-5.53)	(-5.37)	(-7.44)	(-7.45)	(-5.21)	(-5.49)	(-6.32)	(-6.52)	(-6.47)	(-6.70)
POSITION	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
TEAM	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
SEASON	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PLAYER	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-Test joint significance (REL. & ABOLUTE INC.)[a]	17.09***	7.81***	17.93***	9.65***	62.87***	23.79***	31.34***	8.75***	72.89***	26.67***	68.76***	26.17***
R-Squared	0.080	0.098	0.070	0.083	0.188	0.21	0.112	0.142	0.169	0.193	0.168	0.19
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Groups (Players)	1040	1040	1040	1040	1040	1040	774	774	1040	1040	1040	1040
Number of Observations	2833	2833	2833	2833	2833	2833	1869	1869	2833	2833	2833	2833

Notes: *,** and *** denote statistical significance at the 10%, 5% and 1% level. *t*-statistics in parentheses. [a] Without including SQ ABSOLUTE VALUE.

Table 3: League Players as the Reference Group and Robustness Analysis

REFERENCE GROUP: AVERAGE INCOME OF ALL THE LEAGUE PLAYERS (PER SEASON)										
Dependent Variable	**Model: FE Future Income**			**RELATIVE INCOME (t+1)**		**ABSOLUTE INCOME (t+1)**		**SQ. ABS. INCOME (t+1)**		
	Player	**Time**	**Team**	**Coeff.**	**t-value**	**Coeff.**	**t-value**	**Coeff.**	**t-value**	**F-test**
Goals	Yes	No	No	-1.017***	-6.19	-0.044	-0.26	-0.019***	-4.41	106.89***
Goals	Yes	No	Yes	-0.996***	-6.03	-0.013	-0.08	-0.018***	-4.32	109.98***
Assists	Yes	No	No	-0.661***	-4.37	0.188	1.21	-0.028***	-7.10	91.46***
Assists	Yes	No	Yes	-0.685***	-4.48	0.176	1.12	-0.028***	-7.03	94.40***
Shots	Yes	No	No	-5.872***	-5.23	1.562	1.36	-0.235***	-8.02	127.45***
Shots	Yes	No	Yes	-5.983***	-5.42	1.572	1.38	-0.231***	-8.13	139.73***
Ball Contacts	Yes	No	No	-50.682	-1.51	124.069***	3.57	-6.474***	-7.14	59.18***
Ball Contacts	Yes	No	Yes	-67.648**	-2.01	104.260***	2.98	-6.260***	-6.97	57.76***
Duels	Yes	No	No	-45.693***	-3.69	41.084***	3.24	-3.294***	-10.18	138.64***
Duels	Yes	No	Yes	-49.607***	-4.07	38.432***	3.06	-3.234***	-10.29	151.34***
Duels Won	Yes	No	No	-22.629***	-3.66	20.142***	3.17	-1.608***	-9.94	134.89***
Duels Won	Yes	No	Yes	-24.835***	-4.06	18.484***	2.94	-1.578***	-10.00	145.65***
Dep. Variable	**Model: FE Past Income**			**REL. INCOME (t-1)**		**ABS. INCOME (t-1)**		**SQ. ABS. INC. (t-1)**		
Goals	Yes	No	Yes	-0.649***	-2.81	-0.343	-1.46	-0.014***	-3.21	13.16***
Goals	Yes	No	No	-0.571**	-2.47	-0.341	-1.45	-0.012***	-2.72	8.32***
Assists	Yes	No	Yes	-0.534**	-2.56	-0.311	-1.46	-0.008**	-2.05	9.17***
Assists	Yes	No	No	-0.507**	-2.44	-0.329	-1.55	-0.008*	-1.92	6.83**
Shots	Yes	No	Yes	-4.961***	-3.24	-1.796	-1.15	-0.089***	-3.08	28.22***
Shots	Yes	No	No	-4.075***	-2.60	-1.711	-1.07	-0.074**	-2.51	15.93***
Ball Contacts	Yes	No	Yes	-43.906	-0.96	27.772	0.60	-2.208**	-2.54	11.43***
Ball Contacts	Yes	No	No	-34.197	-0.74	23.522	0.50	-1.897**	-2.16	7.36***
Duels	Yes	No	Yes	-26.987	-1.56	14.613	0.83	-1.591***	-4.88	33.85***
Duels	Yes	No	No	-16.124	-0.91	15.670	0.86	-1.408***	-4.19	18.99***
Duels Won	Yes	No	Yes	-12.298	-1.42	8.806	1.00	-0.822***	-5.01	34.33***
Duels Won	Yes	No	No	-7.196	-0.81	9.304	1.02	-0.738***	-4.38	20.30***
Dep. Variable	**Model: Outlier Analysis**			**REL. INCOME (t+1)**		**ABS. INCOME (t+1)**		**SQ. ABS. INC. (t+1)**		
Goals	Yes	No	Yes	-0.530***	-8.15	0.162**	2.40	-0.530***	-8.15	180.34***
Assists	Yes	No	Yes	-0.479***	-6.93	0.217***	3.03	-0.479***	-6.93	158.98***
Shots	Yes	No	Yes	-6.972***	-11.85	1.664***	2.72	-0.302***	-12.93	347.46***
Ball Contacts	Yes	No	Yes	-83.224***	-2.75	208.468***	6.74	-13.310***	-18.94	356.15***
Duels	Yes	No	Yes	-60.191***	-8.97	42.712***	6.12	-4.186***	-15.68	361.31***
Duels Won	Yes	No	Yes	-31.626***	-9.08	20.159***	5.57	-2.068***	-14.94	341.42***
Dep. Variable	**Model: Outlier Analysis**			**REL. INCOME (t-1)**		**ABS. INCOME (t-1)**		**SQ. ABS. INC. (t-1)**		
Goals	Yes	No	Yes	-0.417***	-8.47	0.086*	1.73	-0.017***	-7.68	143.53***
Assists	Yes	No	Yes	-0.443***	-7.80	0.061	1.07	-0.013***	-5.06	110.10***
Shots	Yes	No	Yes	-6.334***	-12.23	0.685	1.31	-0.246***	-10.73	258.29***
Ball Contacts	Yes	No	Yes	-0.530***	-8.15	0.162**	2.40	-8.303***	-10.80	180.34***
Duels	Yes	No	Yes	-58.102***	-8.70	29.922***	4.45	-3.400***	-11.49	230.53***
Duels Won	Yes	No	Yes	-108.492***	-3.78	114.480***	3.91	-1.708***	-11.24	192.19***
REFERENCE GROUP: TEAMMATES										
Dep. Variable	**Model: Outlier Analysis**			**REL. INCOME (t+1)**		**ABS. INCOME (t+1)**		**SQ. ABS. INC. (t+1)**		
Goals	Yes	Yes	Yes	-0.270***	-4.43	0.457***	6.48	-0.017***	-7.75	42.87***
Assists	Yes	Yes	Yes	-0.151**	-2.30	0.556***	7.31	-0.013***	-5.16	158.60***
Shots	Yes	Yes	Yes	-3.638***	-6.62	5.105***	8.02	-0.263***	-11.45	360.35***
Ball Contacts	Yes	Yes	Yes	-62.963***	-3.19	229.632***	10.19	-81.414***	-3.12	363.03***
Duels	Yes	Yes	Yes	-32.133***	-5.10	73.929***	10.12	-3.508***	-11.85	392.97***
Duels Won	Yes	Yes	Yes	-14.037***	-4.27	38.849***	10.21	-1.758***	-11.55	357.64***
Dep. Variable	**Model: Outlier Analysis**			**REL. INCOME (t-1)**		**ABS. INCOME (t-1)**		**SQ. ABS. INC. (t-1)**		
Goals	Yes	Yes	Yes	-0.193***	-3.42	0.315***	5.04	-0.017***	-7.75	142.37***
Assists	Yes	Yes	Yes	-0.167**	-2.55	0.346***	4.77	-0.013***	-5.16	106.89***
Shots	Yes	Yes	Yes	-4.272***	-7.2	3.040***	4.62	-0.263***	-11.45	278.30***
Ball Contacts	Yes	Yes	Yes	-81.414***	-3.12	142.602***	5.09	-81.414***	-3.12	195.27***
Duels	Yes	Yes	Yes	-46.818***	-6.12	43.462***	5.12	-3.508***	-11.85	251.05***
Duels Won	Yes	Yes	Yes	-22.777***	-5.79	22.521***	5.16	-1.758***	-11.55	238.06***

Notes: All other variables included. F-test: Joint significance of the two variables RELATIVE INCOME and ABSOLUTE INCOME, *,** and *** denote statistical significance at the 10%, 5% and 1% level.

Table 4: 2SLS Estimations

2SLS	**Salary RELATIVE VALUE**	**Joint significance**	**Test of excluded instruments: RELATIVE VALUE**	**ABSOLUTE VALUE)**	**Anderson canon. corr. likel. ratio**	**Anderson-Rubin test**
TEAMMATES						
MODEL: INCOME (t-1)						
Instrumental Approach 1 [a]						
Goals	-9.926***	45.52***	512.29***	175.80***	20.85***	191.30***
Assists	-11.200***	37.24***	512.29***	175.80***	20.85***	292.39***
Shots	-92.482***	42.28***	512.29***	175.80***	20.85***	304.14***
Ball Contacts	-10332***	2.79***	85.97***	104.34***	0.48	235.12***
Duels	-931.614***	51.60***	512.29***	175.80***	20.85***	343.27***
Duels Won	-371.890***	61.94***	512.29***	175.80***	20.85***	243.81***
MODEL: INCOME (t+1)						
Instrumental Approach 1[a]						
Goals	-12.445*	13.42***	66.04***	81.69***	3.60*	84.58***
Assists	-16.970*	7.38**	66.04***	81.69***	3.60*	128.46***
Shots	-113.681*	10.33***	66.04***	81.69***	3.60*	117.31***
Ball Contacts	-12459	0.71	60.92***	59.44***	0.05	115.41***
Duels	-889.387*	18.81***	66.04***	81.69***	3.60*	128.55***
Duels Won	-270.365*	36.15***	66.04***	81.69***	3.60*	91.01***
LEAGUE PLAYERS						
MODEL: INCOME (t-1)						
Instrumental Approach 1[a]						
Goals	-12.104***	47.95***	100.10***	175.80***	24.13***	191.30***
Assists	-13.656***	40.20***	100.10***	175.80***	24.13***	292.39***
Shots	-112.771***	45.40***	100.10***	175.80***	24.13***	615.90***
Ball Contacts	-12989	3.80	88.10***	104.34***	0.40	235.12***
Duels	-1135.985***	68.75***	100.10***	175.80***	24.13***	343.27***
Duels Won	-453.472***	63.65***	100.10***	175.80***	24.13***	243.81***
MODEL: INCOME (t+1)						
Instrumental Approach 1[a]						
Goals	-11.516***	26.20***	63.71***	81.21***	7.84	83.75***
Assists	-15.769***	15.11***	63.71***	81.21***	7.84	127.81***
Shots	-105.344***	20.76***	63.71***	81.21***	7.84	116.49***
Ball Contacts	33078	0.32	57.93***	59.48***	0.03	115.70***
Duels	-826.689**	33.83***	63.71***	81.21***	7.84	127.88***
Duels Won	-250.388**	56.94***	63.71***	81.21***	7.84	90.14***
TEAMMATES						
MODEL: INCOME (t-1)						
Instrumental Approach 2[b]						
Goals	-0.432*	11.83***	324.14***	346.46***	81.29***	42.75***
Assists	-0.092	2.24	324.14***	346.46***	81.29***	43.34***
Shots	-6.459***	35.98***	324.14***	346.46***	81.29***	58.65***
Ball Contacts	60.609	33.90***	255.01***	241.26***	28.87***	42.18***
Duels	-31.973*	25.14***	324.14***	346.46***	81.29***	37.22***
Duels Won	-17.527*	24.17***	324.14***	346.46***	81.29***	37.09***
MODEL: INCOME (t+1)						
Instrumental Approach 2[b]						
Goals	-0.869***	51.24***	456.36	413.20***	141.52***	72.18***
Assists	-0.615***	39.04***	456.36	413.20***	141.52***	70.88***
Shots	-9.144***	121.93***	456.36	413.20***	141.52***	139.33***
Ball Contacts	-325.232*	74.09***	258.48***	27.78***	9.15***	105.40***
Duels	-71.688***	115.06***	258.48***	27.78***	9.15***	112.83***
Duels Won	-36.966***	111.45***	258.48***	27.78***	9.15***	112.87***

Notes: All other variables included. Team and position fixed effects. Joint significance of the two variables RELATIVE INCOME and ABSOLUTE INCOME. *,** and *** denote statistical significance at the 10%, 5% and 1% level. [a] Number of exchanges (replacements) during a game throughout a season as a proxy for the relative income position. Dummy played for the German national team in a specific season or being a foreigner as an instrument for the absolute income position. [b] Lagged income variables as instruments for all income variables. INCOME (t-1) MODEL: past earnings, INCOME (t+1) MODEL: future earnings.

Table 5: Granger Causality Test

Granger Causality	**INCOME (t+1) Model**				**INCOME (t-1) Model**			
	relative income		**absolute income**		**relative income**		**absolute income**	
	Beta	**t-value**	**Beta**	**t-value**	**Beta**	**t-value**	**Beta**	**t-value**
Did the Performance Come First? H0: Performance does not Granger cause the position concerns/salary								
Dependent Variable: Income								
Independent Variables								
Lagged Goals	-0.061*	-1.74	0.056*	1.71	-0.349***	-12.98	0.283***	11.85
Lagged Income	0.641***	14.06	0.692***	16.88	0.468***	13.95	0.633**	19.4
Did the Positional Concerns or Salary Come First? H0: Positional concerns or salary do not Granger cause the performance								
Dependent Variable: Goals								
Independent Variables								
Lagged Goals	0.540***	15.68	0.559***	16.43	0.573***	17.69	0.572***	14.56
Lagged Income	-0.131***	-5.19	0.099***	4.14	-0.111***	5.51	0.131***	5.76
Dependent Variable: Relative or Absolute Income Position								
Independent Variables								
Lagged Assists	-0.022	-0.85	0.028	1.13	-0.255***	-9.95	0.225***	9.85
Lagged Income	0.664***	15.92	0.708***	18.35	0.513***	14.38	0.657***	19.34
Dependent Variable: Assists								
Independent Variables								
Lagged Assists	0.327***	12.89	0.336***	13.07	0.395***	14.4	0.394***	14.56
Lagged Income	-0.249***	-9.13	0.224***	8.46	-0.166***	-4.85	0.186***	5.76
Dependent Variable: Income								
Independent Variables								
Lagged Shots	-0.076**	-2.20	0.075**	2.42	-0.320***	-11.54	0.247***	10.33
Lagged Income	0.634***	13.54	0.683***	16.34	0.455***	12.4	0.638***	18.4
Dependent Variable: Shots								
Independent Variables								
Lagged Shots	0.487***	17.67	0.531***	20.15	0.615***	22.71	0.613***	23.73
Lagged Income	-0.249***	-9.19	0.178***	7.58	-0.067***	-2.82	0.087***	3.87
Dependent Variable: Income								
Independent Variables								
Lagged Ball Contacts	0.006	0.23	-0.007	-0.28	-0.129***	-5.67	0.348***	12.46
Lagged Income	0.671***	15.02	0.714***	16.36	0.560***	14.57	0.119***	4.56
Dependent Variable: Ball Contacts								
Lagged Ball Contacts	0.289***	11.42	0.280***	10.53	0.356***	13.09	0.135***	6.61
Lagged Income	-0.280***	-11.04	0.240***	9.57	-0.108***	-4.18	0.672***	17.84
Dependent Variable: Income								
Independent Variables								
Lagged Duels	-0.044	-1.59	0.030	1.22	-0.285***	-12.93	0.234***	13.26
Lagged Income	0.653***	15.08	0.707***	17.98	0.497***	13.92	0.666***	19.68
Dependent Variable: Duels								
Independent Variables								
Lagged Duels	0.318***	13.50	0.362***	15.86	0.447***	18.33	0.447***	19.24
Lagged Income	-0.275***	-11.58	0.198***	9.53	-0.058**	-2.59	0.079***	3.83
Dependent Variable: Income								
Independent Variables								
Lagged Duels Won	-0.044*	-1.70	0.037	1.56	-0.257***	-12.03	0.223***	12.78
Lagged Income	0.655***	15.70	0.705***	18.29	0.519***	14.63	0.674***	19.96
Dependent Variable: Duels Won								
Independent Variables								
Lagged Duels Won	0.391***	17.81	0.418***	19.35	0.492***	21.73	0.486***	22.21
Lagged Income	-0.217***	-10.34	0.165***	8.30	-0.035*	-1.65	0.065***	3.24

Notes: Robust standard errors. *,** and *** denote statistical significance at the 10%, 5% and 1% level.

Table 6: Newcomers and Positional Concerns

FE	Coefficient	t-value	N	FE	Coefficient	t-value	N
TEAMMATES							
INCOME (t-1) Model[a]							
Not Changed Teams				**Changed Teams**			
Dep. Variables				**Dep. Variables**			
Goals	-0.361***	-3.01	2448	Goals	-1.191	-1.60	385
Assists	-0.357***	-3.21	2448	Assists	-1.125	-1.65	385
Shots	-3.212***	-4.15	2448	Shots	-8.741	-1.57	385
Ball Contacts	-63.125**	-2.20	1591	Ball Contacts	-280.877	-1.34	278
Duels	-28.105***	-3.18	2448	Duels	-51.586	-0.85	385
Duels Won	-13.536***	-3.03	2448	Duels Won	-26.033	-0.92	385
INCOME (t+1) Model[a]							
Not Changed Teams				**Changed Teams**			
Dep. Variables				**Dep. Variables**			
Goals	-0.204*	-1.96	1842	Goals	-1.491**	-2.31	301
Assists	-0.095	-0.98	1842	Assists	-0.737	-1.16	301
Shots	-2.672***	-3.99	1842	Shots	-10.491*	-1.99	301
Ball Contacts	-25.523	-1.08	1171	Ball Contacts	-14.125	-0.05	216
Duels	-23.292***	-3.13	1842	Duels	-54.299	-0.92	301
Duels Won	-9.042**	-2.41	1842	Duels Won	-17.175	-0.62	301
INCOME (t-1) Model[b]							
Not Changed Teams				**Changed Teams**			
Dep. Variables				**Dep. Variables**			
Goals	-0.406***	-3.77	2448	Goals	-0.755	-1.12	385
Assists	-0.379***	-3.81	2448	Assists	-1.110*	-1.84	385
Shots	-3.472***	-4.99	2448	Shots	-8.632*	-1.76	385
Ball Contacts	-57.953**	-2.33	1591	Ball Contacts	-359.850**	-2.08	278
Duels	-28.147***	-3.54	2448	Duels	-68.301	-1.28	385
Duels Won	-13.465***	-3.35	2448	Duels Won	-33.770	-1.36	385
INCOME (t+1) Model[b]							
Not Changed Teams				**Changed Teams**			
Dep. Variables				**Dep. Variables**			
Goals	-0.397***	-4.39	1842	Goals	-1.098*	-2.00	301
Assists	-0.222***	-2.64	1842	Assists	-0.721	-1.33	301
Shots	-3.360***	-5.83	1842	Shots	-8.493*	-1.96	301
Ball Contacts	-43.793**	-2.22	1171	Ball Contacts	41.141	0.18	216
Duels	-28.123***	-4.37	1842	Duels	-40.691	-0.85	301
Duels Won	-12.080***	-3.72	1842	Duels Won	-13.716	-0.61	301
LEAGUE PLAYERS							
INCOME (t-1) Model[c]							
Not Changed Teams				**Changed Teams**			
Dep. Variables				**Dep. Variables**			
Goals	-0.606**	-2.48	2448	Goals	1.988	1.17	385
Assists	-0.460**	-2.03	2448	Assists	-2.103	-1.37	385
Shots	-4.320***	-2.73	2448	Shots	-1.510	-0.12	385
Ball Contacts	-24.440	-0.49	1591	Ball Contacts	-82.542	-0.23	278
Duels	-19.254	-1.07	2448	Duels	-73.472	-0.54	385
Duels Won	-7.524	-0.82	2448	Duels Won	-37.963	-0.60	385
INCOME (t+1) Model							
Not Changed Teams				**Changed Teams**			
Dep. Variables				**Dep. Variables**			
Goals	-1.006***	-5.53	1842	Goals	-0.298	-0.24	301
Assists	-0.643***	-3.80	1842	Assists	-1.106	-0.92	301
Shots	-5.606***	-4.79	1842	Shots	0.926	0.09	301
Ball Contacts	-76.927**	-2.07	1171	Ball Contacts	367.631	1.17	216
Duels	-45.470***	-3.49	1842	Duels	83.814	0.79	301
Duels Won	-22.373***	-3.41	1842	Duels Won	43.037	0.86	301

Notes: All other factors controlled for. Robust standard errors. *,** and *** denote statistical significance at the 10%, 5% and 1% level. [a] Reference group teammates, player, team and time fixed effects. [b] Reference group teammates, player and team fixed effects. [c] Reference group league players, player and team fixed effects.

Table 7: Top Teams and Positional Concern

FE	Coefficient	t-value	N	FE	Coefficient	t-value	N
TEAMMATES							
INCOME (t-1) Model[a]							
Top Team				**Not a Top Team**			
Dep. Variables				**Dep. Variables**			
Goals	-0.271*	-1.87	1568	Goals	-0.17	-0.79	1265
Assists	-0.500***	-3.80	1568	Assists	-0.011	-0.05	1265
Shots	-3.333***	-3.58	1568	Shots	-3.193**	-2.14	1265
Ball Contacts	-77.032**	-2.46	1047	Ball Contacts	-52.403	-0.99	822
Duels	-34.781***	-3.56	1568	Duels	-16.739	-0.87	1265
Duels Won	-17.487***	-3.52	1568	Duels Won	-8.448	-0.89	1265
INCOME (t+1) Model[a]							
Top Team				**Not a Top Team**			
Dep. Variables				**Dep. Variables**			
Goals	-0.193*	-1.66	1379	Goals	0.003	0.01	764
Assists	-0.105	-0.96	1379	Assists	0.031	0.13	764
Shots	-34.695	-1.42	904	Shots	-28.561	-0.47	483
Ball Contacts	-2.561***	-3.39	1379	Ball Contacts	-5.530***	-3.19	764
Duels	-19.676**	-2.39	1379	Duels	-38.396*	-1.84	764
Duels Won	-7.605*	-1.83	1379	Duels Won	-19.577*	-1.88	764
INCOME (t-1) Model[b]							
Top Team				**Not a Top Team**			
Dep. Variables				**Dep. Variables**			
Goals	-0.312***	-3.15	1568	Goals	-0.296	-1.52	1265
Assists	-0.370***	-4.12	1568	Assists	-0.044	-0.24	1265
Shots	-3.871***	-6.07	1568	Shots	-3.867***	-2.88	1265
Ball Contacts	-123.603***	-5.77	1047	Ball Contacts	-102.930**	-2.05	822
Duels	-48.842***	-7.30	1568	Duels	-35.811**	-2.07	1265
Duels Won	-23.674***	-6.98	1568	Duels Won	-18.225**	-2.12	1265
INCOME (t+1) Model[b]							
Top Team				**Not a Top Team**			
Dep. Variables				**Dep. Variables**			
Goals	-0.313***	-3.64	1379	Goals	0.119	0.52	764
Assists	-0.238***	-2.95	1379	Assists	0.111	0.50	764
Shots	-3.518***	-6.25	904	Shots	-4.135***	-2.62	483
Ball Contacts	-74.053***	-3.80	1379	Ball Contacts	-32.206	-0.58	764
Duels	-39.823***	-6.54	1379	Duels	-32.660*	-1.71	764
Duels Won	-17.879***	-5.81	1379	Duels Won	-16.932*	-1.77	764
LEAGUE PLAYERS							
INCOME (t-1) Model[c]							
Top Team				**Not a Top Team**			
Dep. Variables				**Dep. Variables**			
Goals	-0.597*	-1.95	1568	Goals	-0.157	-0.46	1265
Assists	-0.376	-1.35	1568	Assists	-0.441	-1.35	1265
Shots	-4.572**	-2.31	1568	Shots	-2.402	-1.02	1265
Ball Contacts	-23.100	-0.41	1047	Ball Contacts	-2.125	-0.03	822
Duels	-20.755	-1.00	1568	Duels	-8.229	-0.27	1265
Duels Won	-8.051	-0.76	1568	Duels Won	-5.859	-0.39	1265
INCOME (t+1) Model[c]							
Top Team				**Not a Top Team**			
Dep. Variables				**Dep. Variables**			
Goals	-0.426***	-4.39	1379	Goals	-0.315	-1.64	764
Assists	-0.274***	-3.01	1379	Assists	-0.102	-0.55	764
Shots	-3.694***	-5.92	904	Shots	-3.094**	-2.38	483
Ball Contacts	-52.350**	-2.58	1379	Ball Contacts	-16.462	-0.37	764
Duels	-28.104***	-4.13	1379	Duels	-27.034*	-1.73	764
Duels Won	-12.035***	-3.49	1379	Duels Won	-14.718*	-1.90	764

Notes: All other factors controlled for. Robust standard errors. *,** and *** denote statistical significance at the 10%, 5% and 1% level. [a] Reference group teammates, player, team and time fixed effects. [b] Reference group teammates, player and time fixed effects. [c] Reference group league players, player and team fixed effects.

APPENDIX

Table A1

Football's Richest Players (March 2004)

Player	Club	€ Millions Per Year
Beckham	Real Madrid	22.2
Zidane	Real Madrid	14.05
Nakata	Bologna	11.8
Ronaldo	Real Madrid	11.09
Raul	Real Madrid	11.09
Vieri	Inter	10.35
Owen	Liverpool	9.6
Keane	Manchester United	8.87
Figo	Real Madrid	8.87
Del Piero	Juventus	7.4

Source: www.soccer-europe.com

REFERENCES

Abowd, J. M. (1990). Does Performance-Based Managerial Compensation Affect Corporate Performance? *Industrial and Labor Relations Review*. 43: 52S-73S.

Akerlof, G. A. and J. L. Yellen (1990). The Fair Wage-Effort Hypothesis and Unemployment, Quarterly Journal of Economics. 105: 255-284.

Alpizar, F. F. Carlsson and O. Johansson-Stenman (2005). How Much Do We Care About Absolute Versus Relative Income and Consumption? *Journal of Economic Behavior and Organization*. 56: 405-421.

Asch, B. J. (1990). Do Incentives Matter? The Case of the Navy Recruiters, *Industrial and Labor Relations Review*. 43: 89S-105S.

Becker, B. E. and M. A. Huselid (1992). The Incentive Effects of Tournament Compensation Systems, *Administrative Science Quarterly*. 37: 336-350.

Becker, G. S. (1974). A Theory of Social Interaction, *Journal of Political Economy*. 82: 1063-1093.

Boskin M. and E. Sheshinski (1978). Optimal Redistribution Taxation When Individual Welfare Depends Upon Relative Income, *Quarterly Journal of Economics*. 92: 589-601.

Breusch, T. and A. Pagan (1980). The Lagrange Multiplier Test and Its Applications to Model Specification in Econometrics, *Review of Economic Studies*. 47: 239-253.

Carmichael, F., D. Forrest and R. Simmons (1999). The Labour Market in Associate Football: Who Gets Transferred and for How Much? *Bulletin of Economics Research*. 51: 1-26.

Clark, A. and A. Oswald (1996). Satisfaction and Comparison Income, *Journal of Public Economics*. 61: 359-81.

Davies, B., P. Downward and I. Jackson (1995). The Demand for Rugby League: Evidence from Causality Tests, *Applied Economics*. 27: 1003–1007.

Dobson, S. M. and J. A. Goddard (1998). Performance and Revenue in Professional League Football: Evidence from Granger Causality Tests, *Applied Economics*. 30: 1641–1651.

Dorn, D., J. A. V. Fischer, G. Kirchgässner and A. Sousa-Poza (2005). *Is It Culture or Democracy? The Impact of Democracy, Income, and Culture on Happiness, University of St. Gallen*, Department of Economics Working Paper Series 2005-12, St. Gallen, Switzerland.

Dufour, M. (2003). Identification, Weak Instruments and Statistical Inference in Econometrics, *Canadian Journal of Economics*. 36: 767-808.

Duesenberry, J. S. (1949). *Income, Saving and the Theory of Consumer Behavior*. Harvard: University of Harvard Press.

Easterlin, R. (1974). Does Economic Growth Improve the Human Lot? Some Empirical Evidence, in: P. A. David and M. W. Reder (eds.), *Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz*. New York: Academic Press: 89-125.

Easterlin, R. (1995). Will Raising the Incomes of All Increase the Happiness of All? *Journal of Economic Behavior and Organization*. 27: 35-47.

Easterlin, R. A. (2001). Income and Happiness: Towards a Unified Theory, *Economic Journal.* 111: 465-484.

Ehrenberg, R. G. and M. L. Bognanno (1990a). Do Tournaments Have Incentive Effects? *Journal of Political Economy*. 98: 1307-1324.

Ehrenberg, R. G. and M. L. Bognanno (1990b). The Incentive Effects of Tournaments Revisited: Evidence from the European PGA Tour, *Industrial and Labor Relations Review*. 43: 74S-88S.

Elster, J. (1991). Envy in Social Life, in: R. J. Zeckhauser (ed.), *Strategy and Choice*. Cambridge, Mass.: The MIT Press: 49-82.

Eschweiler, M. and M. Vieth (2004). Preisdeterminanten bei Spielertransfers in der Fußball-Bundesliga. *Zeitschrift für Betriebswirtschaft*. 64: 671-692.

Fernie, S. and D. Metcalf (1999). It's Not What You Pay It's the Way that You Pay It and that's What Gets Results: Jockeys' Pay and Performance, *Labour*. 13: 385-411.

Ferrer-i-Carbonell, A. (2005). Income and Well-Being: An Empirical Analysis of the Comparison Income Effect, *Journal of Public Economics*. 89: 997-1019.

Festinger, L. (1954). A Theory of Social Comparison Processes, *Human Relations*. 7: 117-140.

Forrest, D. and R. Simmons (2002). Team Salaries and Playing Success in Sports: A Comparative Perspective, *Zeitschrift für Betriebswirtschaft*. 62: 221-237.

Frank, R. (1985). *Choosing the Right Pond: Human Behaviour and the Quest for Status*. Oxford: Oxford University Press.

Frank, R. H. (1991). Positional Externalities, in: R. J. Zeckhauser (ed.), *Strategy and Choice*. Cambridge, Mass.: The MIT Press: 25-47.

Frank, R. H. (1999). *Luxury Fever: Why Money Fails to Satisfy in an Era of Excess.* New York: The Free Press.

Frank, R. H. and P. J. Cook (1995). *The Winner-Take-All Society*. New York: Free Press.

Frank, R. H. and C. R. Sunstein (2001). Cost-Benefit Analysis and Relative Position, *University of Chicago Law Review*. 68: 323–374.

Frey, B. S. (2005). Knight Fever: Towards an Economics of Awards. CREMA Working Paper 2005-12, Basel, Center for Research in Economics, Management and the Arts.

Frey, B. S. and S. Meier (2004). Pro-Social Behavior in a Natural Setting**,** *Journal of Economic Behavior and Organization*. 54: 65-88.

Frey, B. S. and M. Osterloh (2005). Yes Managers Should be Paid Like Bureaucrats, *Journal for Management Inquiry*. 14: 96-111.

Frey, B. S. and A. Stutzer (2002a). *Happiness and Economics*. Princeton: Princeton University Press.

Frey, B. S. and A. Stutzer (2002b). What Can Economists Learn from Happiness Research? *Journal of Economic Literature*. 40: 402-435.

Frey, B. S. and B. Torgler (2004). Taxation and Conditional Cooperation. CREMA Working Paper 2004-20, Basel, Center for Research in Economics, Management and the Arts.

Friedman, M. (1962). *Capitalism and Freedom*. Chicago: University of Chicago Press.

Galbraith, J. K. (1958). *The Affluent Society*. Boston: Houghton-Mifflin.

Garcia-del-Barrio, P. and F. Pujol (2004). Pay and Performance in the Spanish Soccer League: Who Gets the Expected Monopsony Rents? Working Paper No. 05/04, Universidad de Navarra.

Gibbons, R. and K. Murphy (1990). Relative Performance Evaluation for Chief Executive Officers, *Industrial and Labor Relations Review*. 43: 30S-51S.

Granger, C. W. (1969). Investigating Causal Relations by Econometric Models and Cross-Spectral Methods, *Econometrica*. 37: 424-438.

Greene, J. R. and N. L. Stokey (1983). A Comparison of Tournaments and Contracts, *Journal of Political Economy*. 91: 349-365.

Groot, W. and H. M. van den Brink (1999). Overpayment and Earnings Satisfaction: An Application of an Ordered Response Tobit Model, *Applied Economics Letters*. 6: 235-238.

Hall, A., G. Rudebusch and D. Wilcox (1996). Judging Instrument Relevance in Instrumental Variable Estimation, *International Economic Review*. 37: 283-298.

Hall, S., S. Szymanski and A. Zimbalist (2002). Testing Causality Between Team Performance and Payroll: The Cases of Major League Baseball and English Soccer, J*ournal of Sports Economics*. 3: 149-168.

Hamilton, B. H., J. A. Nickerson and H. Owan (2003) Team Incentives and Worker Heterogeneity: An Empirical Analysis of the Impact of Teams on Productivity and Participation, *Journal of Political Economy*. 3: 465–98.

Hausman, J. A. (1978). Specification Tests in Econometrics, *Econometrica*. 46: 1251-1271.

Hübl, L. and D. Swieter (2002). Der Spielemarkt in der Fußball-Bundesliga. *Zeitschrift für Betriebswirtschaft*. Special Issue 72: 105-123.

Idson, T. L. and L. H. Kahane (2000). Team Effects on Compensation: An Application to Salary Determinants in the National Hockey League, *Economic Inquiry*. 38: 345–357.

Jensen, M. C. and K. J. Murphy (1990). *Performance Pay and Top-Management Incentives, Journal of Political Economy*. 98: 225-264.

Johansson-Stenman, O., F. Carlsson and D. Daruvala (2005). Measuring Future Grandparents' Preferences for Equality and Relative Standing, *Economic Journal*. 112: 362-383.

Kern, M. and B. Süssmuth (2003). Managerial Efficiency in German Top League Soccer, Discussion Paper No. 5, University of Munich, Germany.

Kingdon, G. and J. Knight (2004). Community, Comparisons and Subjective Well-being in a Divided Society, June 2004 CSAE WPS/2004-21, Oxford.

Kirchsteiger, G. (1994). The Role of Envy in Ultimatum Games, *Journal of Economic Behavior and Organization.* 25: 373-389.

Landers, R. M., J. B. Rebitzer and L. J. Taylor (1996). Rat Race Redux: Adverse Selection in the Determination of Work Hours in Law Firms, *American Economic Review*. 86: 329-348.

Layard, R. (2003). Income and Happiness: Rethinking Economic Policy, Lecture 2, London School of Economics, London (see cep.lse.ac.uk/events/lectures/layard/RL040303.pdf).

Lazear, E. P. (1998) *Personnel Economics for Managers.* New York: Wiley.

Lazear, E. P. (2000). Performance Pay and Productivity, *American Economic Review*. 90: 1346-1361.

Lazear, E. P. and S. Rosen (1981). Rank-Order Tournaments as Optimum Labor Contracts, *Journal of Political Economy*. 89: 841-864.

Lehmann, E. E. and G. G. Schulze (2005). What Does it Take to Be a Star? The Role of Performance and the Media for German Soccer Players, unpublished manuscript.

Lehmann, E. E. and J. Weigand (1998). Wieviel Phantasie braucht die Fußballaktie? *Zeitschrift für Betriebswirtschaft*, Ergänzungsheft. 68: 101-119.

Lehmann, E. E. and J. Weigand (1999). Determinanten der Entlohnung von Profifußballspielern – Eine empirische Analyse für die deutsche Bundesliga, *Betriebswirtschaftliche Forschung und Praxis*. 51: 124-135.

Loewenstein, G., T. O' Donoghue and M. Rabin (2003). Projection Bias in Predicting Future Utility, Quarterly Journal of Economics. 118: 1209-1248.

Lucifora, C. and R. Simmons (2003). Superstar Effects in Sport: Evidence From Italian Soccer, *Journal of Sports Economics*. 4: 35-55.

Luttmer, E. F. P. (2005). Neighbors As Negatives: Relative Earnings and Well-Being, *Quarterly Journal of Economics*. 120: 963-1002.

Lynch, J. G. and J. S. Zax (1998). Prizes, Selection and Performance in Arabian Horse Racing, Working Paper No. 98-26, University of Colorado at Boulder.

Lynch, J. G. and J. S. Zax (2000). The Rewards to Running: Prize Structure and Performance in Professional Road Racing, *Journal of Sports Economics*. 1: 323-340.

Lyubomirsky, S. (2001). Why Are Some People Happier Than Others? The Role of Cognitive and Motivational Processes in Well-Being, *American Psychologist*. 56: 239-249.

Maloney, M. and R. E. McCormick (2000). The Response of Workers to Wages in Tournaments: Evidence from Foot Races, *Journal of Sports Economics*. 1: 99-123.

Marshall, A. (1961). *Principles of Economics*. London: Macmillan.

Marx, K. (1849). Wage Labour and Capital, in: K. Marx and F. Engel, *Selected Works*. Vol.1, Moscow: Progress Publishers.

McAdams, R. H. (1992). Relative Preferences, *The Yale Law Journal*. 102: 1-104.

McBride, M. (2001). Relative-Income Effects on Subjective Well-Being in the Cross-Section, *Journal of Economic Behavior and Organization*. 45: 251-278.

McLaughlin, K. J. (1988). Aspects of Tournament Models: A Survey, in R. G. Ehrenberg (ed.), *Research in Labor Economics* Vol. 9. Greenwich, CT: JAI: PP. 225-256.

Melton, M. and T. S. Zorn (2000). An Empirical Test of Tournament Theory: The Senior PGA Tour, *Managerial Finance*. 26: 16-32.

Nalebuff, B. J. and J. E. Stiglitz (1983). Prizes and Incentives: Towards a General Theory of Compensation and Competition, *RAND Journal of Economics*. 14: 21-43.

Neumark, D. and A. Postlewaite (1998). Relative Income Concerns and the Rise in Married Women's Employment, *Journal of Public Economics*. 70: 157-183.

Ng, Y.-K. (1987). Relative-Income Effects and the Appropriate Level of Public Expenditure, *Oxford Economic Papers*. 39: 293-300.

Ng, Y.-K. (1997). A Case for Happiness, Cardinalism, and Interpersonal Comparison, *Economic Journal*. 107:1848-1858.

Ng, Y.-K. (2003). From Preference to Happiness: Towards a More Complete Welfare Economics, *Social Choice and Welfare*. 20: 307-350.

O'Keefe, M., W. K. Viscusi and R. J. Zeckhauser (1984). Economic Contests: Comparative Reward Schemes, *Journal of Labor Economics*. 2: 27-56.

Orszag, J. M. (1994). A New Look at Incentive Effects and Golf Tournaments, *Economics Letters*. 46: 77-88.

Oswald, A. J. (1997). Happiness and Economic Performance, *Economic Journal*. 107: 1815-1831.

Pollak, R. A. (1976). Interdependent Preferences, *American Economic Review*. 66: 309-320.

Prendergast, C. (1999). The Provision of Incentives in Firms, *Journal of Economic Literature*. 42: 7-63.

Rees, A. (1992). The Tournament as a Model for Executive Compensation, *Journal of Post Keynesian Economics*. 14: 567-571.

Rosen, S. (1981). The Economics of Superstars, *Journal of Political Economy*. 79: 1302-1319.

Rosen, S. (1988). Promotion, Elections, and Other Contests, *Journal of Institutional and Theoretical Economics*. 144: 73-90.

Schelling, T. C. (1978). *Micromotives and Macrobehavior*. New York: W. W. Norton.

Schoeck, H. (1966). *Envy*: *A Theory of Social Behavior*. Indianapolis: Liberty Fund.

Scitovsky, T. (1976). *The Joyless Economy: An Inquiry Into Human Satisfaction and Consumer Dissatisfaction*. Oxford: Oxford University Press.

Senik, C. (2004). Revitalizing Relativizing Income, Delta Working Paper 2004-17, Paris.

Shea, J. (1997). Instrument Relevance in Multivariate Linear Models: A Simple Measure, *Review of Economics & Statistics*. 79: 348-352.

Smith, A. (1759/1976). *Theory of Moral Sentiments*. Oxford: Clarendon Press.

Solnick, S. J. and D. Hemenway (1998). Is More Always Better?: A Survey on Positional Concerns, *Journal of Economic Behavior and Organization*. 37: 373-383.

Stouffer, S. A. (1949). *The American Soldier*. Princeton: Princeton University Press.

Stutzer, A. (2004). The Role of Income Aspirations in Individual Happiness, *Journal of Economic Behavior and Organization*. 54: 89-109.

Sunde, U. (2003). Potential, Prizes and Performance: Testing Tournament Theory with Professional Tennis Data. IZA Discussion Paper Series, No. 947, Bonn, Germany.

Szymanski, S. and T. Kuypers (1999). The English Football Industry: Profit, Performance and Industrial Structure, *International Review of Applied Economics*. 11: 135-153.

Torgler, B. (2004). The Economics of the FIFA Football Worldcup, *KYKLOS*. 2: 287–300.

Torgler, B. (2006). 'La Grande Boucle': Determinants of Success at the Tour de France, forthcoming in: *Journal of Sports Economics*.

Tsou, M. W. and J. T. Liu (2001). Happiness and Domain Satisfaction in Taiwan, *Journal of Happiness Studies.* 2: 269-88.

Tversky, A. and D. Griffin (1991). Endowment and Contrast in Judgments of Well-Being, in R. J. Zeckhauser (ed.), *Strategy and Choice*. Cambridge, Mass.: The MIT Press: 297-318.

Veblen, T. (1899). *The Theory of the Leisure Class*. New York: MacMillan.

Walker, I. and T. F. Pettigrew (1984). Relative Deprivation Theory: An Overview and Conceptual Critique, *British Journal of Social Psychology*. 23: 301-310.

Watson, R., D. Storey, P. Wynarczyk, K. Keasey and H. Short (1996). The Relationship Between Job Satisfaction and Managerial Remuneration in Small and Medium-Sized Enterprises: An Empirical Test of 'Comparison Income' and 'Equity Theory' Hypotheses, *Applied Economics*. 28: 567-76.

Zeckhauser, R. J. (ed.) (1991). *Strategy and Choice*. Cambridge: The MIT Press.