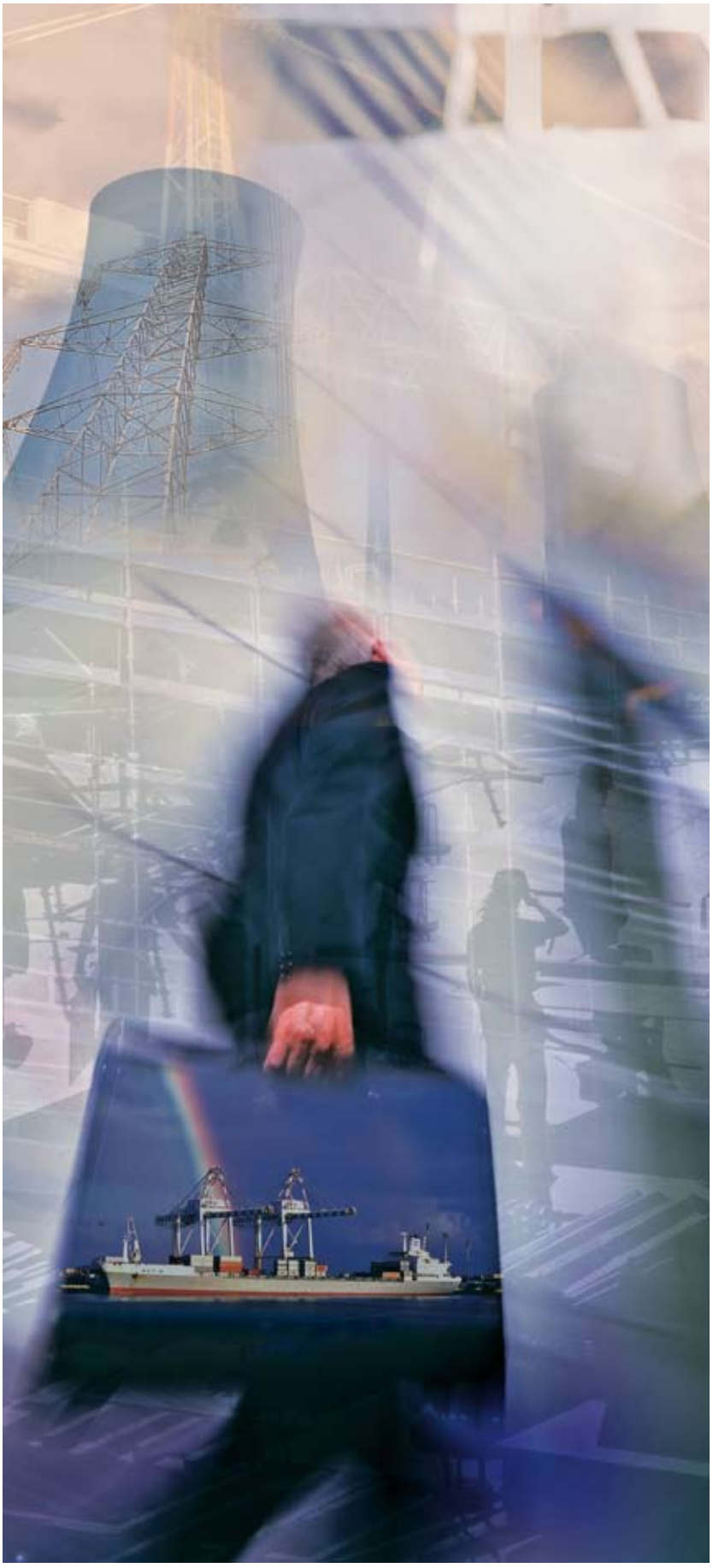

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Looking Awkward When Winning and Foolish When Losing:

Inequity Aversion and Performance in the Field

Benno Torgler, Markus Schaffner, Bruno S. Frey, and Sascha L. Schmidt*

Abstract: The experimental literature and studies using survey data 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. Individuals are concerned about social comparisons. However, behavioral evidence in the field is rare. This paper provides an empirical analysis, testing the model of inequity aversion using two unique panel data sets for basketball and soccer players. We find support that the concept of inequity aversion helps to understand how the relative income situation affects performance in a real competitive environment with real tasks and real incentives.

Keywords: Inequity aversion, relative income, positional concerns, envy, social comparison, performance, interdependent preferences

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

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I. INTRODUCTION

Economists have usually assumed that individuals evaluate their welfare in absolute terms. Traditionally, choices affect only the agents directly involved. However, individuals may judge their own situations in relation to other individuals' situations. The importance of social interactions has long been emphasized by important figures such as Adam Smith (1759/1976), Karl Marx (1849), Thorstein Veblen (1899) or James Duesenberry (1949). The experimental economics literature has explored *(pro-)social preferences* through designs that implement one's own and others' material payoffs. We observe models of reciprocity, inequity aversion, or altruism (see Rabin 1993, Charness and Rabin 2002, Fehr and Schmidt 1999, Bolton and Ockenfels 2000, Andreoni and Miller 2002). Research on happiness, using survey data (for example, Easterlin 1995, 2001, Clark and Oswald 1996, Ng 1997, McBride 2001, Frey and Stutzer 2002a,b, Layard 2003, Luttmer 2005, Ferrer-i-Carbonell 2005, Frey 2008), finds strong empirical support for the importance of relative position. Furthermore, as an alternative strategy, scholars have used hypothetical questions regarding choice between alternative states or outcomes representing relative positional concerns (Alpizar, Carlsson and Johansson-Stenman 2005, Johansson-Stenman, Carlsson and Daruvala 2002, Solnick and Hemenway 1998, Tversky and Griffin 1993, Zeckhauser 1991).

Social comparisons have also been found to be important in other areas. McAdams (1992) stresses that "economic explanations of a multitude of disparate behaviors – how much people save, what wages they will require, what risks they will take, how they respond to taxation, etc. – will be seriously incomplete unless they account for the relative effects of such decisions" (p. 5). Several experimental studies have found evidence that support the importance of social preferences. However, critics question the applicability of experimental results to a "real world" environment, where individuals are subject to actual incentives in a social setting. Many authors would like to see more evidence from field data. For example,

List (2005) emphasizes: “Despite these advances and the topic’s importance, it is fair to say that little is known about whether, and to what extent, social preferences influence economic outcomes in naturally occurring markets” (p. 2). Solnick and Hemenway (2005) point out that the literature on positional concerns remains largely theoretical rather than empirical (p. 147). Bandiera, Barankay and Rasul (2005) argue: “While extensive evidence from experimental economics indicates that individuals take account the effect of their actions on others in laboratory games, whether individuals exhibit social preferences in the workplace is largely unknown” (p. 917). Senik (2005), providing an overview of the literature, points out: “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).

These statements suggest that empirical evidence based on field data may be able to provide useful new evidence. We present evidence that suggests that people behave similarly in laboratory and non-laboratory environments. In particular, we analyze whether inequity aversion or the equity theory help to predict the behavior in a competitive environment, where employees within a team are subject to pay differences. We investigate how the performance of team members alters if their (dis)advantage in the relative income position changes. In addition, we empirically analyze if negative deviations from a reference outcome count as much as, or more than, positive deviations. This enables us to test theories of social preferences and, in particular, inequity aversion. In order to explore these questions, we have collected two unique panel data sets on basketball and soccer players. Using such data has several advantages compared to other (labor) data sources. The data has low variable errors. Performance is clearly observable and is free of discrepancies. Furthermore, the environment is comparable to field experiments, due to the fact that a game takes place in a controlled environment. All players are faced with the same rules and regulations. Thus, when investigating the connection between relative position and performance, many factors can be

controlled for. The job profile is similar and social comparisons are likely to happen. In addition, transparent salary information is available.

Due to the advantages outlined, a number of other studies have used sports data in the past. In order to test existing theories in promotion tournaments, disciplines like professional baseball (Hill and Spellman 1983; Scully 1974), basketball (Wallace 1988, Kahn and Sherer 1988), car racing (Becker and Huselid 1992, Bothner, Kang and Stuart 2007), golf (see Ehrenberg and Bognanno 1990a, 1990b; Melton and Zorn 2000; Orszag 1994), horse racing (Fernie and Metcalf 1999; Lynch and Zax 1998), running (Maloney and McCormick 2000; Lynch and Zax 2000), and tennis (Sunde 2003) have been investigated. However, our paper explores the relationship between individual pay and performance in an organization in a different manner. We investigate how relative compensation affects employee motivation and performance. We can assume that people compare their salaries with people close to themselves (Layard 2003). Thus, not only the absolute level, but also the relative income, might be a major determinant of their position. Accordingly, we expect that people care greatly about their relative position, since income comparisons are widespread in organizations. In this regard, 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)."

Pay distribution indeed has important behavioral consequences on the workforce (Harder 1992). Merit pay may be ineffective and even lead to disruptive behavior (Cropanzano, Bowen and Gilliland 2007, Pfeffer and Sutton 2006). When exploring the pay-performance relationship, many studies have been hindered in the past by the lack of available data. In this regard, 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].

The paper proceeds as follows. In Section II, we present a theoretical model. Based on this theoretical foundation, several hypotheses are developed. Section III describes the econometric methodology used. The empirical results are discussed in Section IV. Section V concludes.

II. PERFORMANCE UNDER SOCIAL PREFERENCES

For many years, economic models have disregarded the relevance of social interactions, while other social sciences, such as social psychology, sociology or anthropology, have placed considerable emphasis on the relevance of relative preferences as being 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 individual or group. A person feels deprived when his/her situation (e.g., individual earnings) falls relative to the reference group. If improvement of the situation is slower than expected, the experience of frustration can even lead to aggression (see, e.g., Walker and Pettigrew 1984).

In economics, the role of social interactions has been highlighted in the works of Veblen and Duesenberry. Veblen (1899) emphasizes the importance of one's own relative

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

position in society with one's concepts of conspicuous leisure and consumption. Contrary to standard utility theory, Duesenberry's (1949) utility concept is characterized by systematically interdependent utilities incorporating relative preferences into consumer theory. Early attempts include the attributes of others directly in the utility function (see Becker 1974 for a discussion). Several models have been developed in the last few years to describe non-selfish behavior, assuming that individuals seek to maximize well-defined preferences, permitting preferences to depend on the consumption and behavior of others (Bolton 1991, Fehr and Schmidt 1999, Bolton and Ockenfels 2000, Charness and Rabin 2002 and Sobel 2005 for an overview).

In our framework, we assume that an agent *i* maximizes his preferences, being constrained by his working environment. Consider the following simple formulation of worker *i*'s utility:

$$U_i(\mathbf{s}, e_i) = s_i - C_i(e_i) + R_i(\mathbf{s}, e_i) \qquad (1)$$

where **s** denotes a vector of wages for all the workers $i = [1,2,...,n]$, e_i is the effort level that worker *i* chooses, $C_i(e_i)$ is the cost function of e_i and $R_i(\mathbf{s}, e_i)$ is a cost or benefit function the worker experiences from social comparison in relation to **s** and e_i. The worker's payoff is s_i for this period. The assumption here is that the vector **s** is fixed for a certain period and that the worker has done everything he could to improve the situation with regard to $R_i(\mathbf{s}, e_i)$. He is now locked in a contract for a certain period, and the only option to change his outcome is to vary the level of effort he puts into his work. Note that our effort level does not define the number of hours worked (which are usually fixed), but the intensity of physical labor. The cost of effort e_i is given by:

$$C_i(e_i) = e_i^2 c_i - (e_i - e_i^*) r_i \qquad (2)$$

where c_i is the standard cost for the squared effort, which reflects the increasing cost of physical labor with effort, r_i is the reputational benefit or cost due to deviating from the expected level of effort e_i^*. This includes social benefits and costs as well as possible changes in future wages.

We divide the inequality factor $R_i(\mathbf{s}, e_i)$ into two separate factors to account for differences in disadvantageous $D_i(\mathbf{s}, e_i)$ and advantageous $A_i(\mathbf{s}, e_i)$ differences in wages.

$$D_i(\mathbf{s}, e_i) = \alpha_i \frac{1}{n-1} \sum_{j \neq i} \max\{s_j - s_i, 0\} \frac{e_i}{e_i^*} \qquad (3)$$

$$A_i(\mathbf{s}, e_i) = \beta_i \frac{1}{n-1} \sum_{j \neq i} \max\{s_i - s_j, 0\} \frac{e_i}{e_i^*} \qquad (4)$$

Both factors are defined in a similar way. There is an individual scaling factor α_i / β_i that shows the worker's preferences with regard to the wage inequality. The $\sum$ adds up all the differences in wages above (below) the worker's own wage. This model can be seen as a general model of interdependent preferences, where a positive ($\alpha_i + \beta_i$) reflects altruism and a negative ($\alpha_i + \beta_i$) reflects spite (Sobel 2005). According to Runciman (1966), the difference ($s_j - s_i$) is a measure of comparison: "the magnitude of a relative deprivation is the extent of the difference between the desired situation and that of the person desiring it" (p. 10).

The worker can adjust his effort level to reduce the effects of the wage inequality. Note that a percentage decrease in effort can either reduce or increase wage inequality by the

same amount, depending on the sign of the individual scaling factor α_i / β_i. By setting $e_i = e_i^*$ and $c_i = 0$, we can translate this model to the inequity model used by Schmidt and Fehr (1999), who examined inequality aversion in a payoff environment without efforts. Note that, despite this similarity, we don't restrict our coefficients to $0 \le \beta_i \le \alpha_i$ in order to allow more flexibility.

To get the optimal effort level, a worker maximizes his utility according to his effort, assuming that he is a wage-taker. Setting the first order condition $U_i^{"} = \frac{\partial U_i}{\partial e_i}$ equal to 0, we obtain the optimal effort:

$$e_i = \lambda_i \frac{1}{n-1} \sum_{j \neq i} \max\{s_j - s_i, 0\} + \kappa_i \frac{1}{n-1} \sum_{j \neq i} \max\{s_i - s_j, 0\} + \frac{r_i}{2c_i} \qquad (5)$$

where $\lambda_i = \frac{\alpha_i}{2c_i e_i^*}$ and $\kappa_i = \frac{\beta_i}{2c_i e_i^*}$ are the initial inequality factors, scaled by the constant individual cost and the expected effort variables. Thus, we can assume that, in this framework, $\lambda_i \approx \alpha_i$ and $\kappa_i \approx \beta_i$. Even if this is not true for the functional form, it certainly holds for the sign of the coefficients.

Fehr and Schmidt (1999) assume $0 \le \beta_i \le \alpha_i$ which, in our case, leads to $0 \le \kappa_i \le \lambda_i$. This means that the performance loss from disadvantageous inequality is equal or greater than the performance loss if worker *i* is better off than the reference group. Equation 5 then implies that the performance decreases due to both advantage and disadvantageous inequality. As a result, there is a general preference towards reducing inequity. Loewenstein, Bazerman, and Thompson (1989), for example, find that subjects exhibit a strong and robust aversion against disadvantageous inequality. Somewhat surprisingly, subjects also indicate an aversion to

advantageous inequality. However, this effect is significantly weaker than the aversion to disadvantageous inequality. These considerations lead to the following hypotheses:

Hypothesis 1: *A relative income disadvantage leads to a decrease in individual performance.*

Hypothesis 2 *A relative income advantage leads to a decrease in individual performance.*

Hypothesis 3 *The performance loss from disadvantageous inequality is equal or greater than the performance loss from advantageous inequality.*

Equity theory suggests that a lack of equity in an exchange relationship creates a sense of distress, especially for the victim (see Walster, Walster and Berscheid 1978). Homans (1961) argues that disadvantage is followed by anger, and advantage by guilt. A change in performance W may be seen as a reaction to restore equity. This theory was formulated by Adams (1965), but has a long history that can be traced back to Aristotle's Nicomachean Ethics. In this case, workers are motivated to balance the equation, and equity is attained when equilibrium is reached. When the ratios are not aligned, workers feel the need to adapt their behavior. Thus, in contrast, equity theory suggests that $\lambda_i < 0 < \kappa_i$. If worker *i*'s relative income position increases, he may increase his performance by a certain amount to restore an equitable situation. Greenberg (1988), for example, found that a relative advantage boosts performance, since managers who were moved to higher-status offices increased their performance. This would lead to a new hypothesis that competes with hypothesis 2.

Hypothesis 4: *A relative income advantage leads to an increase in individual performance.*

On the other hand, the equity theory also suggests that, if worker *i*'s relative income position decreases, he may reduce his performance in order to restore an equitable situation. This would be consistent with hypothesis 1. Greenberg (1988) also observed that managers who were moved to lower-status offices decreased their performance. Interestingly, once returned to their previous status offices, their performance increased again.

III. METHOD

3.1 Source of Comparison

3.1.1 Relative Income

People constantly compare themselves to others and care greatly about their relative position, which in turn influences individual behavior. The literature so far has explored income as the key variable for positional concerns. In addition to the absolute level of an individual's position (in particular income), the relative position is also important. The literature suggests that income is more positional than leisure (Solnick and Hemenway 2005, Frank 1985, 1997, Frank and Sunstein 2001, Neumark and Postlewaite 1998, Carlsson, Johansson-Stenman and Martinsson 2007). Frank and Sunstein (2001, p. 347) point out: "[…] 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)." Zeckhauser (1991, p. 9) notices: "In many workplaces, including most universities, salaries are not publicized. Many of us would find our welfare substantially diminished, even though our income

remained the same, if we discovered that our colleagues were earning more than we were. In part that is because the discovery would reveal the boss's view of us. In part our reaction would be merely envy." Surveys of employers and employees suggest that salaries depend on what employees think other people are paid. Furthermore, the perception of their relative position has a large effect on their morale (Frank and Sunstein 2001).

Using income as a reference, some researchers have used hypothetical questions regarding choice between alternative states or outcomes. Imagine a situation described by Frank and Sunstein (2001, p. 336) of two hypothetical worlds: world A, where you can earn $110,000 per year and others considerably more ($200,000); or world B, where you can earn $100,000 per year and others even less ($85,000). Following the standard economic approach, world A would be better, because it offers higher absolute consumption for its people. But the actual choices made reveal a different picture. A substantial number of people opt for world B. Similarly, Solnick and Hemenway (1998, p. 377) asked 257 faculty students and staff members at the Harvard School of Public Health which world they would prefer. World A is described as: "Your current annual income is $50,000; others earn $25,000". World B is described as: "Your current annual incomes is $100,000; others earn $200,000." The results indicate that approximately 50 percent of the respondents preferred world A, in which they had half the real purchasing power, but a higher relative income position. Zeckhauser (1991, p. 10) asked his American students whether they would prefer a per capita income of $25,000 in Japan and $24,000 in the United States, or $22,000 in Japan and $23,000 in the United States. Many chose the latter, suggesting feelings of envy.

Data on sport professionals' incomes is publicly available. This provides players with information as to what other teammates are paid. Using this data for empirical testing, we can expect income to be positional in our case.

3.1.2 Reference Group

Festinger (1954) emphasizes that people do not generally compare themselves with the rest of the world, but with a more specific group. Typically, they take others they see as being similar to themselves, or "close to one's own ability" (p. 121), as a reference group. Similarly, soldiers in World War II seem to have made comparisons primarily with members of their own military group (Stouffer 1949). In his *Rhetoric* (book II, chapter 10), Aristotle stresses that envy is felt only towards those who are our equals or our peers:

> "Potter against potter.
>
> We also envy those whose possession of or success in a thing is a reproach to us: these are our neighbours and equals; for it is clear that it is our own fault we have missed the good thing in question; this annoys us, and excites envy in us. We also envy those who have what we ought to have, or have got what we did have once. Hence old men envy younger men, and those who have spent much envy those who have spent little on the same thing. And men who have not got a thing, or not got it yet, envy those who have got it quickly".

Similarly, Francis Bacon writes in his *Essays of Counsels, Civil and Moral* that proximity defines the reference group:

> "… near kinsfolks, and fellows in office, and those that have been bred together, are more apt to envy their equals when they are raised. For it doth upbraid unto them their own fortunes, and pointeth at them and cometh oftener into their remembrance, and incurreth likewise more into the note of others."

Studies have used such factors as similar age, community, country of residence, education, gender, income, region, or a person's cohort (see, e.g., Vendrik and Woltjer 2007, Ferrer-i-Carbonell 2005, Luttmer 2005, Stutzer 2004, Easterlin 1995). Co-workers can be taken to be a natural comparison group. However, co-workers have rarely been analyzed empirically due to the lack of data. Our study serves to reduce this shortcoming. Our basic presumption is that soccer and basketball players, like in other team sports, compare themselves with their teammates.

3.2 Data

This paper uses a unique data set of professional basketball and soccer players. We explore both leagues separately, using the same investigation period (seasons 1995/1996 till 2003/2004)[2]. Empirical studies on 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 sports, such as soccer and basketball, individual and team performance is well defined and can be readily observed.

3.2.1 Basketball

The data used refer to the most prestigious American league, namely the National Basketball Association (NBA). There are 29 teams in the NBA, divided into two conferences (Eastern and Western). The Eastern Conference is composed of the Atlantic Division and the Central Division, while the Western Conference is composed of the Midwest Division and the Pacific Division. Three Divisions each have seven teams, and the Central Division has eight teams. Since 1969, each NBA team has to play an 82-game regular season schedule, playing 41 games at home and 41 away. In general, each team plays four games (two home and two away) against every team in its Conference, and two games (one home and one away) against

every team in the other Conference. Each team is allowed a maximum of 12 active players on its roster. Sixteen of the NBA's 29 teams qualify for the NBA playoffs. To obtain adequate comparison, our analysis focuses only on the regular season.

3.2.1.1 Measuring Players' Pay

Basketball games allow us to generate a broad data set, including players' salaries. A large part of the data has been collected through the website usatoday.com. Additional sources were used to cover the nine seasons between 1995/1996 and 2003/2004. The data set covers not only the contract salary but also additional salary components, such as bonuses.

3.2.1.2 Measuring Players' Performance

It is useful to develop a composite index for the individual performance of a basketball player (see, e.g., Harder 1992). A widely used method is shown in equation (6). The basic idea is to add together all the "good things" that a player does, such as points scored (*PTS)*, total rebounds (*TREB)*, steals (*STL)*, blocks (*BLK)*, and assists (*AST)*, and then subtract the "bad things", namely turnovers (*TO)*, field goals missed (*FGMS)* and free throws missed (*FTMS*). The result is a performance index, which is then divided by the number of games. This is done because less skilled players, with relatively low salaries play in fewer games.

$$PERF_{Basketball} = \frac{(PTS + TREB + STL + BLK + AST) - (TO + FGMS + FTMS)}{GP} \qquad (6)$$

Although this proxy gives an in-depth picture of players' performance, it is not free of potential biases. For example, the equal weight can be criticized. But even if it is not a perfect measurement of a player's productivity, it provides a good indicator for *changes* in performance.

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[2] It was impossible to include 1997 in the soccer data set, because player salary information was unavailable.

3.2.1.3 Soccer

The rising commercialization of soccer led to improved data sets. For example, in England, publicly listed clubs are required to publish annual reports. For some national leagues, such as the German premier soccer league, salary data for individual players, or at least good proxies thereof, is available. This paper uses a unique data set of professional soccer players in the German premier soccer league *Bundesliga*[3], taken from IMP, the official data provider of the *Bundesliga*, and several broadcasting networks, as well as *Kicker Sportmagazin*, the most prominent soccer magazine in Germany. This data includes soccer players' personal background and individual performance data over a period of eight seasons between 1995/1996 and 2003/2004. During the eight seasons, 28 different clubs participated in the league, due to annual promotion and relegation.

The *Bundesliga* is one of Europe's "big five" soccer leagues (for an overview, see Dobson and Goddard 2001). Interestingly, between 1995 and 2004, the *Bundesliga* consistently had the highest goal per game ratios of all five European soccer leagues. Dobson and Goddard (2001, p. 31) report that, in 1999, Germany was the most "cosmopolitan" league, with 42 percent foreign players. Finally, the *Bundesliga* has the most modern stadiums and the highest average home attendances of all soccer leagues in Europe, profiting from having hosted the 2006 world championship.

The league structure is similar to that in other European countries, but differs from US sports leagues in several key aspects (for a detailed overview, see Hoehn and Szymanski 1999). First, the teams compete in many hierarchical competitions simultaneously. In each season of the 18 teams that now make up the *Bundesliga*, three are relegated to, and three are promoted from, the *2. Bundesliga*. Furthermore, in contrast to US sports markets, applying a

[3] Summary statistics are provided in *Table A2* in the Appendix.

rookie draft system, longer player contracts and salary caps in order to maintain a competitive balance, there is an active transfer market between *Bundesliga* clubs.

In the past, some German clubs were owned by industrial enterprises (e.g., Bayer Leverkusen), but the majority had the legal structure of a private social club. However, over the last few decades, more clubs have been professionally commercialized and started to interact increasingly with financial markets.

3.2.2.1 Measuring Players' Pay

Although the *Bundesliga* do not officially reveal the soccer professionals' salaries, there is substantial transparency. *Kicker Sportmagazin* develops players' market value estimates on an annual basis, providing a good proxy for actual salaries being paid by the clubs[4]. Before a new season starts, the editorial staff of *Kicker Sportmagazin* develops an estimation of players' market values. This data is likely to be consistent, since it has been collected in a consistent and systematic manner for several years by an almost identical editorial team. In order to check the extent to which the market value estimations used in this paper correctly reflect actual salaries, the correlation between players' effective reported salaries, as provided by another reliable data source called *Transfermarkt.de* and our salary proxies, is investigated. It may be argued that salary estimates are more precise for high-profile players and high-profile teams, leading 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 measurement errors do not seem to be a major problem since the correlation

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

between these two data sources is high (r=0.754)[5]. As outlined in the empirical section, the results obtained are robust when dealing with outliers. Moreover, the proxies for salaries are even more satisfactory when analyzing the relative position of *Bundesliga* 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. Finally, we look at the effect of future and past salaries on current performance.

3.2.2.2 Measuring Players' Performance

In line with our basketball performance proxy, we develop a composite measure of performance:

$$PERF_{Soccer} = \frac{GO + AS + DW - CF + OF}{GP} \qquad (7)$$

with number of goals (GO), number of assists (AS), duels won (DW), and obtained fouls (OF) entering positively, and committed fouls (CF) entering negatively. The result is a value, which is then divided by the number of games played (GP). The performance index allows us to take into account defensive and offensive aspects, as well as the level of successful and unsuccessful aggression. The index measures the active involvement and success per game[6].

3.3. Estimations and Controls

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

[6] It should be noted that the results remain robust when exploring single factors instead of an index.

Investigating the pay-for-performance relationship requires a model that takes the incentive effects of absolute and relative pay into account. Our resulting model captures whether future pay affects a player's current performance, assuming that his current performance is not affected by the amount of money he has already been paid. Future pay is a major factor influencing current performance. An individual's performance is motivated by what he expects to receive in the future. Such an expectation determines his level of motivation and performance in the present (Harder 1992, Vroom and Deci 1992). As data on individual perception is not available, we assume that the best available proxy for individual perception is actual future pay. Thus, our specification has the following structure:

$$PERF_{it} = \beta_0 + \beta_1 CTRL_{it} + \beta_2 RELDISADV_{i(t+1)} + \beta_3 RELADV_{i(t+1)} + \beta_4 ABSAL_{i(t+1)} + TEAMD_i + TD_t + \mu_i + \varepsilon_{it} \qquad (8)$$

where $PERF_{it}$ is the performance of player i at time t. To measure the relevance of inequity aversion, equation (5) is used as a starting point. A relative income disadvantage $RELDISADV_i$ is measured in line with the theoretical approach as $\frac{1}{n-1}\sum_{j \neq i} \max\{s_j - s_i, 0\}$. A relative income advantage $RELADV_i$ is defined as $\frac{1}{n-1}\sum_{j \neq i} \max\{s_i - s_j, 0\}$. Moreover, $ABSAL_{i(t+1)}$ is the future salary of a player. The regression also contains control variables $CTRL_{it,}$ such as AGE and AGE SQUARED. Team dummy variables are included, as it can be argued that the results are driven by unobserved team characteristics 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. In that way, we control for ability, since player fixed effects pick up any omitted variables (player characteristics) that do not change over time.

A model using future pay assumes that a player is able to predict his own 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 Donoghue and Rabin 2003). We therefore check the robustness of the results, using present 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 they are currently receiving. On the other hand, we may still observe incentive effects, as we investigate the relative income position of a player. Thus, our second baseline specification has the following form:

$$PERF_{it} = \beta_0 + \beta_1 CTRL_{it} + \beta_2 RELDISADV_{it} + \beta_3 RELADV_{it} + \beta_4 ABSAL_{it} + TEAMD_i + TD_t + \mu_i + \varepsilon_{it} \quad (9)$$

IV. EMPIRICAL RESULTS

Tables 1 and *2* present the results. *Table 1* focuses on basketball, and *Table 2* on soccer. We differentiate between the future model (*first six specifications*) and the present model (*last six specifications*). A first group of regressions report the *beta* or *standardized* regression coefficients of an OLS regression with time fixed effects (seasons). The results reveal the relative importance of the variables used. To obtain robust standard errors in these estimations, the Huber/White/Sandwich estimators of standard errors are used. In a second group of specifications, standard errors by players are clustered, since clustering picks up any player-specific characteristics that change over time. Using eight soccer and nine basketball

seasons, ability can be taken to have a fixed and a variable portion. For example, a player's ability initially peaks and then declines prior to retirement, but throughout this cycle the player's ability stays above a player-specific threshold. Clustering allows us to control for the part changing over time. Such an effect is partly controlled by variable age. However, it makes sense to cluster the standard errors by player, since clustering will pick up any player-specific characteristics that change over time. Similarly, ability is controlled for in the third group of specifications by using fixed effects regressions. It is useful to present specifications without team fixed effects to go beyond a "within team findings" focus.

The results strongly suggest that social preferences and inequity aversion matter. Both coefficients referring to the *relative income position (above and below)* are (with few exceptions) *negative* and statistically significant. On the other hand, the coefficients for absolute income are *positive* and (with only two exceptions) statistically significant. This allows us to conclude that hypotheses 1 and 2 cannot be rejected. Players care about the salary distribution within the team (reference group) and not just about their own salary. We also find support that inequity aversion affects performance. There is a general preference towards reducing inequity. On the other hand, equity theory can only provide a partial answer to how players respond to income differences. As the performance of players declines if their advantage in the relative income position increases, hypothesis 4 is rejected. The soccer market also comes closest to the situation described in the Fehr and Schmidt (1999) model, which assumes that the performance loss from disadvantageous inequality is equal or larger than the performance loss if player *i* is better off than the reference group *j*. On the other hand, the results obtained with basketball data also indicate the tendency of a stronger performance decrease for players having a relative income advantage. This finding is also consistent with theories of personal motivation that stress the relevance of crowding-out effects (Frey 1997, Frey and Oberholzer-Gee 1997). Having a relative income advantage may affect performance in a negative way, reducing the intrinsic motivation to perform. Gneezy and Rustichini

(2000), for example, found experimental support that the effect of monetary compensation on performance was not monotonic. Subjects who were offered monetary incentives performed more poorly than those who were offered no compensation. Pokorny (2004) finds an inverted U shape between incentives and performance. Performance begins to rise with an incentive increase, but after a certain point decreases with further incentives. Our findings complement this literature by noting that a crowding-out effect may also appear at the relative and not just the absolute compensation level.

We now explore the effect on players' behavior of a substantial change in the relative income position. In case I, we focus on players that move from a relative income disadvantage in *t-1* to a relative income advantage in *t*. In case II, we explore the opposite situation, where players move from a relative advantage to a relative disadvantage. The results are presented in *Table 3*, covering two seasons/periods (before and after the event). We focus only on basketball data, as we have a substantially larger sample size of such cases. The results suggest that, when a player moves from a relative advantage to a relative disadvantage in his income, his performance decreases in a statistically significant way. On the other hand, no substantial changes are observable when someone moves from a relative income disadvantage to a relative income advantage. This is consistent with the result that a relative disadvantage has a significant negative impact on performance.

V. CONCLUSIONS

This paper presents novel empirical evidence that social comparisons matter in competitive environments, such as sports markets. Our two unique data sets, focusing on basketball and soccer, explore players' pay and performance relationship in a controlled environment. It offers the possibility of exploring the relevance of interdependent preferences in an incentive and performance context. We find support that inequity aversion matters. Performance is reduced as a reaction to disadvantageous and advantageous inequality, while absolute

incentives affect performance positively. Negative deviations from the reference outcome count more than positive deviations. This reaction is clearly visible in the soccer market and when considering moving from a relative advantage to a relative disadvantage, or from a relative disadvantage to a relative advantage. The regression results also support theories of personal motivation, stressing the relevance of a performance crowding-out effect at the upper income level. Our results show that such a crowding-out effect appears not only at the *absolute* income level, but also at the *relative* income level, complementing previous studies.

The paper provides empirical support for the relevance of interdependent preferences in a non-artificial environment, focusing on "real people" performing "real tasks" with "real incentives". Our results are consistent with previous experimental results, finding that individuals care about the outcomes achieved by persons in the reference group, in addition to their own outcomes.

Using data from professional sports, of course, has its limitations. First, the average salaries that are paid in professional basketball and soccer are obviously much higher than in most other occupations. Second, our results may not necessarily be transferred to situations in which pay and performance are less visible or less easily measured. In only a few cases can co-workers observe each other's performance and compensation levels. However, there is a growing literature successfully demonstrating the advantages of working with sports data (see, e.g., Goff and Tollison 1990, Rosen and Sanderson 2001, or Szymanski 2003).

In general, the results are relevant for employees in corporations, as they often work in teams, which are to some extent similar to sports teams. Lessons can be learned for the design of incentive and reward mechanisms. Especially in sales driven organizations, positional concerns are important, since measured performance is directly linked to salary (pay-for-performance). Assuming that employee motivation is viewed as a quest for personal economic gain, individual merit pay is presumed to be effective in this environment. Salesmen, like financial advisors or insurance agents, are paid according to key sales

performance indicators, such as net new money, return on assets, and the number and mix of products or policies sold within a certain period. Sales commissions often make up a large part of their total salary. In order to stimulate internal competition and to push individual performance, transparency is increased by comparative performance rankings among the sales force. Moreover, the results might also be relevant in areas where relative income and rank ordering are especially important, such as consulting, law partnerships, and academia (Gill and Stone 2006).

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Table 1: Inequality Aversion among Basketball Players

Dep. V.: Performance Index	Future Reference Group: Teammates			Future Reference Group: Teammates			Present Reference Group: Teammates			Present Reference Group: Teammates		
Independent Variables	OLS	CLUST	FE	OLS	CLUST	FE	OLS	CLUST	FE	OLS	CLUST	FE
	(1)[a]	(2)	(3)	(4) [a]	(5)	(6)	(7) [a]	(8)	(9)	(10) [a]	(11)	(12)
SALARY												
RELATIVE SALARY ABOVE (*RELADV*)	-.281**	-.579*	-.357*	-.431***	-.889***	-.499***	-.309***	-.741**	.369*	-.423***	-1.01***	.219
	(-3.23)	(-2.48)	(-2.52)	(-4.78)	(-3.97)	(-3.49)	(-3.99)	(-3.18)	(2.57)	(-5.19)	(-4.41)	(1.42)
RELATIVE SALARY BELOW (*RELDISADV*)	-.131***	-.663***	-.386***	-.096***	-.487***	-.328***	-.184***	-.954***	-.653***	-.178***	-.921***	-.481***
	(-6.47)	(-5.10)	(-4.10)	(-4.44)	(-3.79)	(-3.47)	(-9.59)	(-7.16)	(-7.44)	(-7.32)	(-5.68)	(-4.84)
ABSOLUTE SALARY (ABSAL)	.896***	1.49***	.39**	1.08***	1.8***	.526***	.857***	1.62***	-.35**	.98***	1.86***	-.192
	(9.92)	(7.44)	(3.07)	(11.43)	(9.63)	(4.10)	(10.50)	(8.36)	(-2.72)	(10.91)	(9.46)	(-1.38)
PLAYER'S CHARACTER												
AGE	-.235	-.337	4.33***	-.298	-.426	4.3***	-.0917	-.129	4.99***	-.1	-.141	4.99***
	(-1.37)	(-1.00)	(14.45)	(-1.76)	(-1.34)	(14.28)	(-0.62)	(-0.43)	(20.93)	(-0.69)	(-0.50)	(20.63)
AGE SQ	.184	.005	-.082***	.246	.006	-.082***	-.031	-.001	-.093***	-.031	-.001	-.093***
	(1.08)	(0.79)	(-15.84)	(1.46)	(1.11)	(-15.70)	(-0.21)	(-0.15)	(-22.76)	(-0.22)	(-0.16)	(-22.57)
TEAM	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	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.)	613.54***	258.48***	17.88***	50.76***	30.73***	16.46***	700.79***	297.39***	21.00***	736.17***	323.13***	10.32***
R-Squared	0.458	0.458	0.221	0.470	0.470	0.252	0.414	0.414	0.275	0.423	0.423	0.287
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)	696	696	696	696	696	696	916	916	916	916	916	916
Number of Observations	2693	2693	2693	2693	2693	2693	3485	3485	3485	3485	3485	3485

Notes: *,** and *** denote statistical significance at the 5%, 1% and the 0.1% level. *t*-statistics in parentheses. [a] *beta* or *standardized* regression coefficients.

Table 2: Inequality Aversion among Soccer Players

Dep. V.: Performance Index	Future Reference Group: Teammates			Future Reference Group: Teammates			Present Reference Group: Teammates			Present Reference Group: Teammates		
Independent Variables	OLS	CLUST	FE	OLS	CLUST	FE	OLS	CLUST	FE	OLS	CLUST	FE
	(13)[a]	(14)	(15)	(16)[a]	(17)	(18)	(19)[a]	(20)	(21)	(22)[a]	(23)	(24)
SALARY												
RELATIVE SALARY ABOVE (*RELADV*)	-.162*	-.3	-.32*	-.147***	-.506***	-.483***	-.033	-.074	.395**	-.048	-.106	.087
	(-2.17)	(-1.88)	(-1.96)	(-3.71)	(-3.88)	(-3.77)	(-0.65)	(-0.53)	(3.08)	(-0.66)	(-0.62)	(0.55)
RELATIVE SALARY BELOW (*RELDISADV*)	-.262***	-.902***	-.662***	-.428***	-.792***	-.48**	-.214***	-.778***	-.86***	-.234***	-.852***	-.482***
	(-8.61)	(-8.22)	(-5.45)	(-4.72)	(-4.78)	(-2.92)	(-9.78)	(-9.31)	(-9.44)	(-6.09)	(-6.36)	(-3.68)
ABSOLUTE SALARY (ABSAL)	.478***	.559***	.531***	.897***	1.05***	.707***	.296***	.406***	-.319***	.292**	.4**	-.003
	(6.69)	(5.02)	(4.25)	(8.14)	(8.22)	(5.49)	(5.86)	(4.41)	(-3.43)	(2.92)	(2.88)	(-0.02)
PLAYER'S CHARACTER												
AGE	.284	.242	1.14	.312	.265	1.36*	.448*	.39	2.04***	.45*	.392	2.13***
	(1.01)	(0.77)	(1.75)	(1.11)	(0.85)	(2.09)	(2.02)	(1.58)	(5.94)	(2.00)	(1.60)	(6.18)
AGE SQ	-.254	-.004	-.016*	-.26	-.004	-.012**	-.488*	-.008	-.036***	-.482*	-.009	-.039***
	(-0.92)	(-0.68)	(-2.18)	(-0.94)	(-0.71)	(-2.63)	(-2.22)	(-1.73)	(-7.73)	(-2.17)	(-1.73)	(-8.12)
TEAM	No	No	No	Yes	Yes	Yes	No	No	No	Yes	Yes	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.)	95.60***	58.00***	33.46***	105.36***	68.59***	34.82***	120.86***	73.23***	36.78***	121.95***	76.63***	10.80***
R-Squared	0.223	0.223	0.163	0.265	0.265	0.232	0.154	0.154	0.145	0.166	0.166	0.168
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)	634	634	634	634	634	634	1040	1040	1040	1040	1040	1040
Number of Observations	1415	1415	1415	1415	1415	1415	2784	2784	2784	2784	2784	2784

Notes: *,** and *** denote statistical significance at the 5%, 1% and the 0.1% level. *t*-statistics in parentheses. [a] *beta* or *standardized* regression coefficients.

Table 3: Moving from one situation to the other (two periods)

Paired t test		
Case I: Moving from a relative advantage to a relative disadvantage		
	Observations	Mean
Performance Before (t-1)	313	10.586
Performance After (t)	313	8.812
Difference		1.774
Ho: Mean (Performance Before (t-1) - Performance After t) =0		
t= 9.16		
Case II: Moving from a relative disadvantage to a relative advantage		
	Observations	Mean
Performance Before (t-1)	390	12.280
Performance After (t)	390	12.443
Difference		-0.160
Ho: Mean (Performance Before (t-1) - Performance After t) =0		
t= -0.87		

Table A1

Summary Statistics

Table A1: Summary Statistics Basketball

	Mean	**Std. Dev.**	**Min.**	**Max.**
POINTS SCORED	516.418	473.074	0	2491
TOTAL REBOUNDS	225.609	202.183	0	1201
STEALS	43.054	37.908	0	231
BLOCKS	27.506	38.599	0	332
ASSISTS	117.531	136.715	0	916
TURNOVERS	78.206	65.672	0	337
FIELD GOALS MISSED	238.598	208.423	0	1153
FREE THROWS MISSED	34.417	36.396	0	392
AGE	27.381	4.404	18	43
GAMES PLAYED	53.277	24.741	1	83
ABSOLUTE SALARY (t)	2.737	3.259	0.001	33.1
ABSOLUTE SALARY (t+1)	3.481	3.62	0.001	33.1

Table A2: Summary Statistics Soccer

	Mean	**Std. Dev.**	**Min.**	**Max.**
GOALS	2.026	3.239	0.00	28.00
ASSISTS	2.002	2.576	0.00	19.00
DUELS WON	317.008	230.543	0.00	1236.00
COMMITTED FOULS	26.045	22.157	0.00	119.00
OBTAINED FOULS (BEING FOULED)	26.020	24.941	0.00	169.00
AGE	26.557	4.154	17.00	40.00
GAMES PLAYED	18.333	10.055	1.00	34.00
ABSOLUTE SALARY (t)	2.809	2.528	0.05	25
ABSOLUTE SALARY (t+1)	2.929	2.572	0.05	25