

**Diversity and Performance in Teams:  
Evidence from 10 Seasons of German Soccer**

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*Comments welcome*

Abstract

This paper is concerned with the effects of diversity on individual and team performance, asking: (1) How does diversity in ethnic, national and linguistic background of workers affect individual and collective performance in a production environment characterized by high interdependence? (2) Do the effects of diversity vary with tasks? (3) Does common experience of workers – joint tenure on a team – alter the effects of diversity? Does this vary with tasks and workers' place of origin or majority/minority status? We analyze data for 28 teams and 1,723 players that played 6,120 in the Bundesliga during the decade 2000/1-2009/10, games, for a total of 77,406 player/game observations. We study game scores and player objective performance ratings. We control for players' place of origin, talent, position and demographics, team fixed effects, manager, opposing team, and other factors.

The overall effect of diversity on performance is small. Performance effects of diversity at the individual player and team level can be identified when teams are disaggregated into subgroups, by domestic versus foreign born players (German vs. non-German) and by task or position (defense, midfield and forward), and when the role of joint tenure or time spent together on the team is incorporated in individual games, when injuries, suspensions and other random factors affect the deployment of players and controlling for team fixed effects and talent. Longer tenure of German players in conjunction with team diversity contributes to team and individual performance whereas the opposite holds, and with greater strength, for non-German players. Diversity in the defense is good for all players' and team's performance, and this effect is enhanced by greater joint tenure of defenders, whereas the opposite is more or less true of the forward team.

## **Diversity and Performance in Teams: Evidence from 10 Seasons of German Soccer**

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*Soccer is different from American sports because it's based on your culture. Italians have a certain type of play because of their culture -- it's defensively oriented. Maybe that's from World War I or WWII. Or maybe that's a stretch. Brazilians are artistic, with lots of flair. They don't want to win by outmuscling people. The Norwegians are Vikings -- conquerors.* Tony DiCicco, former US soccer team coach in an interview with *USA Today*, October 3, 2003.

*Bayern should have been ahead inside two minutes when Robben, perhaps selfishly, chose to shoot and saw his effort blocked by visiting goalkeeper Victor Valdes with both Gomez and Franck Ribery pleading for the pass in perfect positions.* BBC Sports News Online, April 23, 2013.

### **1. Introduction**

In recent decades, there has been a massive movement of people across national boundaries. People are driven both by the pull of the target country and the push of their country of origin. For example, in 2010, almost 40 million people in the United States were born in a different country (total population 309 million); in Germany (total population just under 82 million), about 10.5 million were born in a different country, in the Netherlands (total population about 16.5 million) nearly 1.9 million, in the UK (total population about 62 million) 7.5 million, and France (total population about 63 million) a little over 7 million were born in another country ([www.OECD.StatExtracts](http://www.OECD.StatExtracts)). Internal migrants, often crossing ethnic, religious and cultural boundaries of less developed countries, count for many more millions of people. Consequently, workplaces around the world are becoming increasingly diverse. People of different ethnic, national, religious, cultural and linguistic backgrounds now work side-by-side. In this paper we concentrate on one aspect of workplace diversity: does it matter for performance? How do diverse workers perform together? Members of some groups don't like each other very well and some cannot communicate well with others; on the other hand, diverse workplaces may have access to a richer set of perspectives and skills that can generate more flexibility and imagination in complex environments. Does time spent together in the same workplace lessen the differences and therefore the effects of diversity?

Research on workplace diversity has grown rapidly in recent years. Much of the research relates diversity in a company to the annual performance of the company; less common is research at a lower-level unit such as a department or team, and the time frame considered is rarely less than a year. A common problem in this research area is that diversity may be affected by factors that also affect performance, such as a recruiting strategy that brings in the best workers from around the world; however, this issue is general not handled in the literature, and controls for worker skills are almost uniformly absent. Some research is experimental, hence not subject to endogeneity issues but limited in other respects, such as duration. The present paper differs from the rest of the literature in several important respects. First, it considers individual and team performance measured during discrete production periods over a ten year period. Second, performance is measured objectively and consistently across teams. Third, joint tenure of team members is measured. Fourth, we account for individual skills and team average skills, manager attributes, and team composition. Fifth, thanks to considerable random factors team composition in discrete production periods is less influenced by endogeneity than in other studies. Sixth, we account for differences across tasks of team members. Finally, we have ethnic, national and linguistic measures of team diversity.

The differences between the present paper and the rest of the literature on diversity are made possible by our use of the sports business as a laboratory (Kahn, 2000). We analyze the performance of all teams and their players in all the games played in the main German soccer league, the Bundesliga, during ten seasons in the 2000s. We consider diversity at the team and position level and along multiple dimensions (ethnicity, nationality and language), taking into consideration many factors that contribute to performance such as skill, tenure, age and manager. A small majority of the 1,723 players who played in the 6,120 games during this period were not born in Germany. We analyze in detail the association between diversity and more than 77,000 player performance ratings objectively assigned in these 6,120 games. For professional athletes, the game is their job; they have strong financial incentives and career concerns to perform, and they are required to work interdependently with others to perform well. Athletes' work performance can be directly observed and their multi-dimensional performance is routinely recorded with quantitative metrics. Phenomena that can be detected in the highly-scrutinized fishbowl of soccer games, where quantitative information is routinely collected and decisions are made by highly-skilled professionals, are likely to be more manifest in workplace situations that are less transparent and less monitored.

In some work situations diversity cannot have much impact on performance. For instance, in certain assembly lines the tasks of individual employees can be precisely prescribed and their results accurately measured, so employees must perform at the required level regardless of the social relationships or mutual likes and dislikes among them. And where work is carried out independently by individual workers there is obviously little scope for diversity effects, which operate through interaction among workers.

But in other work situations there is interdependence among workers and it is difficult to specify in advance what every worker should do under every contingency, particularly where the identification of what actual contingencies have materialized depends on local worker-specific information and interpretation. In such situations some decision-making is delegated to workers, and in order to align their decisions with organizational objectives managers offer workers incentives and monitor them (Prendergast, 2002). But incentives and monitoring do not eliminate all uncertainty about whether worker effort is always dedicated to the promotion of organizational objectives. This is where intentional or subconscious consideration of the identities of co-workers may affect the quality of a worker's collaboration with other workers.

A player who exhibits open favoritism or discriminatory attitudes towards his own team members, for example in passing the ball, will not last long in high-level professional teams. Why the Dutch Robben didn't pass the ball to the German Gomez or the French Ribery will never be known, perhaps not even to Robben (see the second epigraph). He might have been selfish, perhaps assessing that he has a 75% probability to score a goal but if he passed the ball to Gomez or Ribery the probability that either of them would score would be 90% (scoring a goal is more valuable than an assist). There is a large literature on social categorization (e.g., Tajfel and Turner, 1979) that suggests that ethnic, national, cultural and linguistic differences reduce the value of a goal scored by a player from an out-group as compared to the value of a goal scored by a player from one's own group (which itself may be lower than the value of a goal scored by the player himself due to selfish motives). Whatever the truth, the player would probably be able to defend his split-second decision made with the benefit of local information and assessment, himself, if challenged by the manager after the game. Another interpretation of the same situation is that, because of cultural differences, the player with possession of the ball has misunderstood the signals sent by the well-situated player. Such cultural differences in communication may be reduced by prolonged familiarity between the players as a consequence of playing together for a long time on the same team (so Robben doesn't have this excuse, having played alongside Gomez and Ribery for a few years).

The quality of collaboration among workers may be affected through additional important channels. Workers from different backgrounds may have skills, knowledge and approaches that may be complementary in the execution of certain tasks, or, *per contra*, they may have less compatible ways of working with each other than do workers from similar backgrounds, or may encounter linguistic and cultural barriers in communication. The first epigraph speaks of some differences in the style of playing in soccer. In some situations such differences may be advantageous, such as when a player initiates a move that can counteract an offense – and communicate this successfully to relevant players on the team. But in other situations such an attempt may be misunderstood.

This brings up to the importance of time, specifically time spent together training, playing and socializing on the same team. Joint tenure may help create a shared identity, familiarize with others' communication styles, strengths and weaknesses, and so on. Joint tenure may, on the other hand, exacerbate differences and animosities over time, like in a bad marriage. In a professional sports team managers will not let such situations go on for a long time and will resolve them through separations and new hires.

Our broad questions are these. (1) How does diversity in ethnic, national and linguistic background of workers affect individual and collective performance in a production environment characterized by high interdependence? (2) Do the effects of diversity vary with tasks? (3) Does common experience of workers – joint tenure on a team – alter the effects of diversity? Does this vary with tasks and workers' place of origin or majority/minority status?

There is a large body of empirical literature on the effects of diversity on performance in teams (including soccer), organizations, communities, regions and countries. Some of this literature will be reviewed in the next section, but at this point it suffices to state that the results are all over the place. Some of the conflicting results may arise from the use of different measures of diversity that have opposite effects on performance (Alesina and La Ferrara, 2005), and because diversity may be correlated with an organization's financial resources and ability or necessity to employ foreign workers, which are correlated with performance. We deal with these issues in several ways. We estimate the relationship between diversity and performance with team fixed effects, and control for team quality in terms of players' talent, age and tenure, as well as manager characteristics. We conduct a sensitivity analysis by excluding the fixed effects and various characteristics to assess the impact of their omission on parameter estimates. We analyze individual and team performance at the game level, where the line-up is constrained not only by the team's roster but is strongly influenced by injuries, illness, disciplinary suspensions by the soccer federation, international responsibilities of players who are members of national teams, and other factors beyond the control of the manager. We analyze individual players' game performance, separately for defenders, midfielders and forwards; team composition effects are likely to be most pronounced at this level and least confounded with other effects.

Our principal results are as follows. Annual performance (final points at the end of the season) bears no systematic relationship to ethnic, linguistic or national diversity of a team's roster. However, at the game level, focusing on the 11 starting players plus up to three substitutes that actually play in a game, team performance and player performance are negatively affected by diversity among offensive players and positively by diversity among defensive players; these effects are strengthened by longer tenure of the two groups of players. Furthermore, whereas overall diversity of the player line-up in a game has little association with performance when considered alone, the interaction between diversity and the tenure of domestic (German) and the tenure of foreign players has opposite effects on performance. The longer is the tenure of foreign players the more negative is the association between team diversity and performance, but the opposite is true of the tenure of domestic players.

The paper contributes to the substantive understanding of diversity and to the methodology of empirical study of diversity. (1) We estimate the relationship between diversity and multiple measures of performance. (2) We explore the role of diversity for different tasks. (3) We examine the role of tenure as a measure of team and subgroup ability to benefit from diversity. (4) We employ variables that reflect different aspects of diversity. (5) We control for several factors that may be associated with diversity, particularly team and individual worker quality. It turns out that diversity matters in subtle ways and must be identified carefully relative to tasks (positions) and tenure of different groups. The effects of diversity on performance at the game level are bifurcated relative to both position (positive for defense and negative for offense) and for the interaction with the tenure of domestic and foreign players (positive and negative, respectively).

## 2. Relevant Literature and Theoretical Framework

Diversity occurs when individuals with different identities, worldviews and experiences are in proximity and interact with each other. These identities and perspectives are associated with individuals' places of origin, age, education, tenure and more. Alesina and La Ferrara (2005) review the literature on the effects of ethnic, racial and religious diversity on economic policies and outcomes at national and local levels and on performance in organizations and identify harmful effects which occur through disagreements, poor communication and conflict, and beneficial effects that arise from heterogeneity of ideas and resources.

Alesina and La Ferrara (2005) review findings from cross-city studies in the United States that suggest negative effects of ethnic diversity and positive effects of language-based diversity on productivity, population growth, and public policy. They also analyze cross-country economic growth in relation to linguistic and ethnic diversity and find that their main effects are negative, but societies with greater resources and more democratic governments are more likely to experience positive diversity effects because of limited resource-scarcity induced conflict. Evidence also suggests positive economic effects from diversity of culture (Ottaviano & Peri, 2006) and place of birth (Alesina, Harnoss, and Rapoport, 2013) at an international level. However, it is difficult to infer the direction of causality at such high levels of analysis: it is possible that economic prosperity encourages immigration from a diverse pool of countries, that diverse citizens produce economic prosperity, or that the effect is the results of both effects.<sup>1</sup>

Sparber (2009) finds that US "creative" industries that employ racially more diverse workforces enjoy higher productivity, but the effect is negative in other industries, suggesting that diversity improves decision-making and problem solving but also imposes costs associated with collective action and public goods provision. Hamilton, Nickerson, and Owan (2003) find positive effects of the percentage of the majority race on team performance in a garment production facility, but these go away with the introduction of team fixed effects. Kurtulus (2011) analyzes the effects of group-level racial diversity on individual performance in a 10-year longitudinal dataset from a large U.S. firm, finding a negative effect; however, the effect becomes insignificant upon the inclusion of divisional and individual fixed effects.

A sizable literature in psychology and management examines the effects of diversity on organizational productivity and individual and team performance; both positive and negative effects have been found (Joshi and Roh, 2009; van Knippenberg & Schippers, 2007). At the team and workgroup levels, the positive effects of diversity are facilitated by multiple factors, including effective leadership and

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<sup>1</sup> Esteban and Ray (2011) and Esteban, Mayoral and Ray (2012) focus on *conflict* at the country level. They investigate the relationship between ethnic polarization and diversity (fractionalization) on the one hand and conflicts on the other hand, and find that polarization leads to greater conflict over public goods and fractionalization leads to more conflict over private goods.

workgroup social identification (Homan, van Knippenberg, Van Kleef, & De Dreu, 2007; Kearney & Gebert, 2009).

There is a small literature on diversity in team sports. In a multi-sport analysis at the season level, Timmerman (2000) found negative performance effects of racial and age diversity for basketball but none for baseball, where player interdependence is limited. Ninham (2009) found that high-school basketball players' passing decisions were affected by players' race, possibly because of preferential treatment and difficulty in communication. Kahane, Longley and Simmons (forthcoming) study seven seasons of the U.S. National Hockey League and find positive effect for a team's proportion of European players on season-level win percentage, total points and season-level goal difference (goals scored minus goals conceded), but find a negative effect of diversity on all of these outcomes. Kahane et al. find that European players were generally better performers than North American players and argue that this is the force driving better team performance. They explain the negative effect of player heterogeneity as a consequence of communication differences when too many different nationalities are represented on one team, and suggest that "... the gains from diversity may be greatest when the foreign component of the workforce has, within itself, a higher degree of homogeneity" (Kahane et al., forthcoming, p. 28).

In soccer, Haas and Nüesch (2011) analyzed the effects of national origin diversity on game level team outcomes in eight Bundesliga seasons with fixed effects for team/season, opposing team, and season; they found a negative relationship between nationality diversity and points per game, goal difference per game, and average subjective player evaluation per game. Nüesch (2009) focuses on the effect of nationality diversity on goal difference for 2001-2006 in the Bundesliga and finds insignificant results. Nüesch (2009) and Haas and Nüesch (2011) serve as the starting point for our own analyses, focusing on game outcomes. Brandes, Franck, and Theiler (2009) also find mostly insignificant results for season league standing in the Bundesliga for similar periods.<sup>2</sup>

Our own empirical study differs from the diversity literature in several respects, summarized in the Introduction. In particular, we emphasize the differential role of diversity in various tasks (positions in soccer), and highlight the effects of the tenure of its effect on domestic versus foreign workers/players on the impact of diversity on performance. We examine the effects of diversity not only on team game performance, but on objective ratings of players. We also control for quality of teams and the talent of individuals, which is often correlated with diversity.

Building on the existing literature, we identify two principal channels through which diversity may affect collaboration among team members, incentive and decision-making, and highlight the moderating role of tenure.

a) *Incentives for collaboration and exertion of effort.* Collaborative work is fraught with familiar free-rider and collective action problems. To mitigate these problems and ensure that a cooperative equilibrium results, team members must exhibit trusting and trustworthiness (or conditional cooperation and reciprocity) or attach a positive value to the benefits that accrue to other members and the team as a whole (altruism). Diversity may affect these factors (social preferences) through social categorization by team members and the associated inter-group biases. Such biases are manifested in more favorable action towards in-group members relative to out-group members (Tajfel & Turner, 1979). Ethnic, national and

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<sup>2</sup> Bucciol and Piovesan (2012) investigate the effects of pay disparity within teams in two seasons of the main Italian soccer league for two seasons and find positive effects at the season roster level but negative effects for pay disparity in a game. Bucciol and Piovesan suggest that season pay dispersion, which is much greater for top teams than weaker team, taps into greater skill and therefore has a positive effect on performance. Similar differences between season roster and game day effects were found with respect to talent disparity by Franck and Nüesch (2010) for Bundesliga.

linguistic characteristics are among the attributes over which individuals favor others who are similar to them over those who are different.<sup>3</sup> Hence team members of a less diverse team are likely to cooperate more successfully with each other than member of a more diverse team. For example, a more diverse team is likely to experience a higher incidence of selfish behavior in situations where an offensive player could pass the ball to a better situated player but will instead shoot on the goal himself.

Individuals who belong to a minority group may be driven to prove themselves in a diverse group, perhaps to dispel stereotypical preconceptions about them, by working harder and striving to succeed. In some tasks this may exacerbate the negative incentive effect (such as in the example of “to pass or try to score”), whereas in other tasks an individual’s opportunities to excel do not entail negative externalities (Pelled, Eisenhardt & Xin, 1999). For example, in contrast with the individual incentive that offensive players may have not to pass the ball, defense players have individual incentives to work hard to prevent the other team from scoring a goal for which they may be held personally responsible. There is an asymmetry between not scoring a goal and letting a goal being scored on one’s team, due to the familiar asymmetry between the value of gains and losses in prospect theory, and because collaboration unfolds differently in the two positions. This generates different individual incentives for players in the two positions.

*b) Decision-making in collaborative environments.* The ability to develop collaboratively imaginative, creative and innovative solutions may be enhanced by complementarities among different perspectives for assessing problems and finding solutions (Lazear, 1999; van Knippenberg, DeDreu, & Homan, 2004, Page, 2007). Diversity adds flexibility to a team: someone may come up with an idea that others did not have, relying on his or her particular experience or skills associated with the place of origin.

Communication is essential for successful collaboration, but it is likely to be impeded by differences in language, symbolic expression and other culture-bound elements of communication. For example, in soccer games one can notice obvious cases of miscommunication and misunderstanding, such as when a player sends a ball on the line expecting the forward to bypass a rival defender but instead the forward runs towards the center (although it is generally impossible to pin this down to diversity).

*c) The role of tenure.* Time spent together by members of a team may have multiple and conflicting effects on the role of diversity on the quality of their collaboration. Common goals and experiences may help forge a common identity that bridges over players’ place-of-origin identities (Allport, 1954; Chen & Chen, 2011; Chatman & Flynn, 2001). This will have a felicitous effect on the incentive dilemmas, differences among diverse members may be reduced thus weakening the negative effect of diversity on social preferences towards out-group members. From this perspective, collaboration will be improved over time. Furthermore, longer joint tenure improves communication as team members learn each other’s styles and reduce misunderstandings.<sup>4</sup>

However, unsettled initial dislikes among diverse members may grow and harden into animosities over time. In addition, members may discover deeper differences that are correlated with nationality or language, which were perhaps initially discounted as superficial differences. Factions may be formed and over longer joint tenure they may be consolidated, leading to less effective collaboration (Joshi & Roh,

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<sup>3</sup> Identity affects the strength of an individual’s social preferences towards other individuals (Chen & Li, 2009). Many experiments provide support for this idea; for example, Hargreaves & Zizzo (2009) and Ben-Ner, McCall, Stephane & Wang (2009) provide experimental evidence on how in-group members treat out-group members differentially in trust and dictator games, respectively.

<sup>4</sup> Harrison, Price, Gavin, & Florey (2002) provide evidence that visible aspects of diversity have less negative effects over time because individuals get to know one another and therefore rely less on relatively automatic social categorization processes, and deep-level diversity becomes more pronounced with more negative effects over time. Schippers et al. (2003) and Kurtulus (2011) find that team tenure enhances the beneficial effects of the diversity-performance relationship.

2009; Schippers et al., 2003). Minority and majority groups – foreign and domestic players – may react differently to common experiences they accumulate together (Tropp & Pettigrew, 2006). The former may grow resentful that their status does not improve much over time and continue to remain the “other,” whereas the latter, whose position becomes more consolidated over time, may feel more secure and better able to deal with challenges associated with diversity.

The strength of diversity’s effects varies with the nature of tasks: the degree of the incentive dilemmas they present, the extent of potential communication problems, and the scope for gain from creativity derived from differences. As noted earlier, offensive players’ opportunities to score goals at the expense of other players presents a stronger individual inducement and therefore a more powerful collective action dilemma than for defensive players. If offensive players have bad experiences with certain players, they may grow apprehensive over time so joint tenure may harm collaboration among diverse players and impact negatively on their individual performance. The opposite is true for positive experiences, so if defensive players accumulate positive experiences with their colleagues, the effect of diversity will be enhanced by joint tenure.

The strength of diversity’s effects depends of course on the managers’ ability to deal with these issues through various strategies such as fostering a common identity, affecting the tenure profile of the team, and putting in place training strategies that support desirable behaviors and undercut undesirable ones.<sup>56</sup>

As the foregoing discussion suggests, diversity of place of origin is likely to have conflicting effects on team collaboration and therefore mixed effects on performance. It is therefore not possible to predict its overall effect in general or in the specific context of soccer. However, our theoretical framework predicts that diversity effects will differ across tasks, specifically with positions on the soccer field, and that joint tenure on the team will amplify some of diversity’s positive and negative effects. In particular, we expect that tenure effects will vary across positions as well as between domestic and foreign players. In the remainder of the paper we implement an empirical strategy driven by the theoretical framework developed above.

### **3. Data and Empirical Strategy**

#### ***Data***

The top German men’s soccer league is commonly referred to as the Bundesliga (Federal League). It has the best attendance in the world (followed by English Premiership). It comprises 18 teams (clubs) owned by nonprofit associations. The goal of each team is to win as many games as possible in order to reach as

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<sup>5</sup> The strength of the effects of diversity will also depend on the details of the incentive schemes faced by players. We will not address this issue, but note that career concerns and fan approval introduce very strong individual incentives even where they are not formally emphasized. Team and manager controls in the empirical work mitigate the role of possible differences in incentive schemes employed by different teams and managers.

<sup>6</sup> Foer (2004, ch. 6) describes the Ukrainian Lviv Karpaty team’s addition of foreign players. “After Edward [a Nigerian] arrived, the team bought an eighteen-year-old Nigerian attacking midfielder with cornrows, named Samson Godwin. Because the old Ukrainian coach couldn’t speak English with the Nigerians, the club brought in a new Serbian manager, who had spent ten years playing for Southampton Football Club in England. The Serb, in turn, recruited four players from former Yugoslav countries. Suddenly, Yuri skippered a polyglot unit than included a coach and players whose languages he couldn’t himself speak.” Yuri says: “The big moments in Karpaty’s history happened when the team had local players and unity.” Foer comments: “With the arrival of the foreigners, the team had nothing resembling unity. It broke down into factions. You would walk into the team dining room and find the various nationalities eating at their own separate tables.” Yuri complains that “Edward and Sampson went to Dymynskyy [the president of the club] and told him that players weren’t giving passes to the Nigerians.”



high a standing as possible at the season's end.<sup>7</sup> The top six teams get to play in European competitions along with other top teams, whereas the bottom three teams in the final standing are relegated to a secondary league; the top teams from secondary leagues are promoted to the Bundesliga. Each team has a roster of 24 players who may rise from the team's youth academy, or transfer from other teams in Germany or from abroad. The number of foreign players on the roster is unlimited.<sup>8</sup>

Our dataset covers the ten Bundesliga seasons between 2000/2001 and 2009/2010. Most of the data were provided by IMPIRE AG, the official data provider for the Bundesliga and several media outlets. Information about players' position and birth place was collected from Wikipedia and other sources on the internet. Information about team age and stadium size was taken from their respective websites.

Each of the 18 Bundesliga teams plays 34 games (matches) per season, playing each of the other teams twice, once at home and once away, hence there have been 3,060 games during our sample period. Because of relegation and promotion of three teams each year, 28 different teams participated in the Bundesliga during our sample period. There were 1,723 unique players who played at least 15 minutes in at least one game. There were a total of 77,406 player-game observations (84,020 if we removed the 15 minute constraint). We describe the data below. Statistics are presented in various Appendix tables, referenced individually below.

### *Performance variables*

Appendix Table 1 reports the grand means for the performance measures. Annual performance, final standing at the end of the season, is determined by each team's final points from the 34 games. A team that wins all its games will have 102 points, 0 if it lost all, and 38 if it drew all games.

Different aspects of a team's performance in a game are captured by the number of goals it scored, reflecting the team's offensive success in the match, number of goals conceded (reflecting defensive success) and goal difference.

Player performance is rated on a 0 (worst) to 10 (best) scale based on several metrics: number and quality of passes, goals, saves, tackles and more, collected continuously in each game. The metrics are weighted on the basis of the player's position. The rating is calculated by IMPIRE AG, using a proprietary formula. For example, according to IMPIRE AG, scoring a goal is worth 100 points whereas an own goal is -50 points; for a defender it is very important to win many tackles whereas a midfielder has to play safe passes. The rating is an *objective* measure of player performance, using the same rating scheme across all games (so there is no rater bias of any kind). This is in contrast with individual performance measures used in the literature, which are based on the subjective assessment of different supervisors for studies in companies, and on sports writers' subjective score given at the end of a game. How well a player performs in a game is thus not subject to "halo effects" or impression management; it reflects how hard and well the player plays under the circumstances he and his colleagues have created, given the opposing team's play. The influence of other team members' collaboration with a player on his performance is affected in various ways, the most obvious of them is the number and quality of passes the player receives: if he receives few and poor passes, he will not be able to perform well, but if he receives many good passes, for the same effort level he will get a higher performance rating.

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<sup>7</sup> We are assuming that teams seek win maximization, which is a likely goal of a nonprofit club, although Spanish and English top league teams, most of which are for-profit, appear to seek win maximization as well (Garcia del Barrio & Szymanski, 2009).

<sup>8</sup> Hiring of foreign players was eased when work-visa requirements were dropped for citizens of the European Union as well as Switzerland, Liechtenstein, Norway and Iceland.

Our measure of a player’s talent is his average performance over all games he played in the Bundesliga (we do not have performance information for play outside Bundesliga). This measure turns out to be a very strong predictor of the player’s performance in an individual game, providing validation for this measure of individual performance. The average of the talent of players in a game is our indicator of team talent in that game; it turns out to be a very powerful predictor of team performance. We discuss the talent variable separately, below.

*Diversity measures*

We employ alternative measures of diversity based on players’ place of origin: nationality, ethnicity, language, region and German vs. non-German. (We were unable to obtain reliable race and religion information). We use a common diversity index defined as  $1 - \sum_{k=1}^K (p_k)^2$ , where  $p_k$  is the proportion of players in each category (e.g., nationality) on the team roster (or other units, such as players in game lineup or in a particular position, depending on the context). This index is known by various names: fractionalization (Alesina & La Ferrara, 2005; Ottaviano & Peri, 2006), heterogeneity (Blau, 1977), Gini-Simpson, Gibbs-Martin and more in different literatures and equals  $1 - \text{HHI}$ , the common Herfindahl-Hirschman Index of homogeneity or concentration.<sup>9</sup> The index equals 0 when all players are from the same category and grows as diversity rises, approaching 1 as the number of players increases and each player belongs to a different category.<sup>10</sup>

(1) *Nationality of birth.* There are 77 nationalities represented among the 1,723 players; 767 are German born (we do not distinguish between East and West Germans – the latter represent a large majority of German players).

(2) *Ethnicity.* A narrower measure of place of origin focuses on ethnicity, which is based on the ethnic categorizations presented by Levinson (1998), based on language and geographical/cultural trends throughout the world. For example, in this classification German includes Germans, Swiss-Germans, Luxembourgian-Germans and Austrians. There are 26 ethnicities represented in our sample. (For countries where region correlates highly with ethnicity and language, such as Switzerland, we used the place of birth and where available, biographic information, to assign ethnicity and language).

<sup>9</sup> The index is a commonly-used operationalization of diversity, including that which has utilized Bundesliga data. Other measures of diversity include polarization (Esteban & Ray, 1994), Teachman’s entropy index, standard deviations, and the coefficient of variation (Alesina & La Ferrara, 2005; Harrison & Klein, 2007).

<sup>10</sup> To illustrate how the index works in our context, imagine a team with 12 players that hail from four different place-of-origin categories, a position with four players and a position with three players. The table below provides examples of different diversity configurations and the resulting diversity indices.

Configu- ration	Group size=12					Group size=4					Group size=3				
	A	B	C	D	Div. index	A	B	C	D	Div. index	A	B	C	D	Div. index
1	3	3	3	3	0.755	1	1	1	1	0.75	1	1	1	0	0.75
2	4	4	4	0	0.667	2	1	1	0	0.687	2	1	0	0	0.444
3	12	0	0	0	0	4	0	0	0	0	3	0	0	0	0
4	10	1	1	0	0.292	3	1	0	0	0.375					
5	6	6	0	0	0.5	2	2	0	0	0.5					
6	5	3	2	1	0.729										

(3) *Language*. Language reflects on the ability to communicate among players, and is highly correlated with ethnicity and nationality. Although many foreign players do learn German to different degrees,<sup>11</sup> native language captures not only the words and vocabulary a player uses and understands more easily but it also reflects a way of thinking about many matters (Chen, 2013).<sup>12</sup>

(4) *Region*. Another measure that captures broad contours of similarities and differences concerns the part of the world from which a player hails, distinguishing among Germany, Western Europe, Eastern Europe, South America, Middle East, East Asia, Africa and US/Canada/Australia/New Zealand. (The latter group is a common agglomeration transcending geographical region).

(5) *German vs. non-German*. We use a dummy variable to distinguish between German-born players and all others. This distinction captures the domestic-foreign divide.

The diversity variables described above are applied to season roster (all the players who were on a team's roster at any point during the season),<sup>13</sup> to a team game line-up (including substitutes, no matter how long they played, up to three substitutes allowed per game), and to players in each position in the lineup of a game.

(6) *Players like oneself*. This is a count of players in a game who share the place of origin (in terms of nationality, ethnicity, language or region, depending on the analysis) with a particular player.

(7) *Manager like oneself*. This variable takes the value 1 if the manager shares the same place of origin with a particular player and 0 otherwise.

Appendix Table 2 presents diversity variable definitions and descriptive statistics based on individual players. Appendix Table 3 presents the alternative diversity measures for the 28 teams included in our sample (averages for the seasons that they were in the sample); the similarity among the indices is obvious upon inspection, but it is also clear that the indices capture diversity in somewhat different ways, so that, for example, for some teams linguistic diversity is greater than ethnic diversity and for other team it is the other way around. Appendix Table 4 presents season diversity indices. There are no detectable trends over time. Not surprisingly, the alternative representations of diversity are highly correlated. The correlation between the nationality index and the ethnicity index is 0.91 and with the language index is 0.78, and the correlation between ethnic index and language index is 0.83 (this is at the team-game level, with 6,120 observations). Throughout the main analyses we use ethnic diversity, and show a summary table for results based on other measures.

#### *Additional Variables*

In our analyses we employ a large number of variables that arguably may affect team and player performance, presented in Appendix Table 5. The variables, discussed in general terms below, are adjusted to the level and period of analysis: team or individual player and season or game.

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<sup>11</sup> For example, at Bayern Munich, Franck Ribery (born in France) and Arjen Robben (born in Holland) speak fluent German. David Alaba, a black player born in Vienna, is a native German speaker, as is Jerome Boateng. Anatoliy Tymoshchuk (born in Ukraine), speaks only basic German, Javi Martinez (born in Spain) does not speak German.

<sup>12</sup> Languages are related to each and there are different degrees of similarity among them. In the context of a study of polarization, Esteban, Mayoral and Ray (2012) exploited the degree of similarity among languages to create a weighted measure of polarization among speakers of different languages. We have not done that in this paper, opting instead for using different measures of place of origin.

<sup>13</sup> This definition of a roster, used by Bucciol and Piovesan (2012) and others, includes players that may have been traded away early in the season or who did not play due to injuries.

We include tenure on the team both by itself and interacted with diversity. There are several variables that capture tenure: average tenure of players in a game, average tenure of German players and average tenure of non-German players in a game, and median tenure of players in various positions (median is better indicator of joint tenure when the number of players is small). In individual player regressions we also control for the player's tenure on the team.

Players in soccer teams have specified play positions. We classify positions in two ways: (1) forward, midfield and defense (the latter including the goalkeeper), and (2) offensive players, including forwards and midfielders, and defensive players, including defenders and midfielders. The first classification emphasizes the separate role of the midfielders as connecting players between the forwards and defenders; the numbers of players in each position is small (see Appendix Table 5). The second classification emphasizes the collaborative role of midfielders in both offense and defense. Appendix Table 6 provides descriptive statistics on player talent by region of origin and by position. The average talent of forwards is slightly higher than that of defenders and midfielders (this may be of course a consequence of the performance rating formula), but the differences are very small. The German and non-German players have very similar mean talent, although regional differences are apparent, with South Africans at the high end and East Asians at the low end of the talent distribution. There are more non-Germans in forward positions than in other positions.

Age of players is included in analyses, as well as its squared value. We also include the standard deviation of age and of tenure on the team as dimensions of diversity. Older players contribute tried-out (and some tired-out) ideas and experience, whereas younger players have greater physical strength and training in more recent techniques but less experience. Longer tenured players may provide a link to a team's traditional style of play and a greater measure of loyalty to it, whereas newer players may bring fresher ideas. (We do not propose specific hypotheses on the direction of these diversity effects.)

In player performance regressions we also include the player's ethnicity (or other place of origin indicator, depending on the measure of diversity employed). As noted earlier, we include tenure on the team and age but not experience, which is very highly correlated with age.

Manager (coach) age, tenure, experience and nationality, the number of substitutions<sup>14</sup> and whether a game is played at home or away are also included. In some analyses we also include certain club characteristics (stadium size, club age and the population of the German state where they play).

Finally, as noted earlier, we also include player and team talent. We define a player's talent as his average performance rating in all the games he played in the Bundesliga. The use of "career" performance as an indicator of talent at different points in a player's career may be justified on grounds that realized performance provides the best estimate of talent. We use only Bundesliga information because we do not have performance information on players who played outside the Bundesliga. We experimented with an alternative to career performance as a measure of talent, using average performance up to the current game (hence a time-variant measure). The findings are very similar to those based on the career performance measure. Pay would be an alternative measure of talent, but the pay fluctuates considerably with market conditions and player circumstances and is unlikely to be a good measure of talent. Team talent is the average talent of the players in a game. The measure we use for individuals is very highly correlated with individual performance in a game, and the same holds for team talent and team performance, as we shall see in the results section, attesting to its validity as a measure of talent.

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<sup>14</sup> Substitutions are partly strategic and partly determined by injuries, yellow cards (players threatened with expulsion from the game), the energy level of players, and the need to rest players for future games.

### *Empirical strategy*

The first column of Table 1 presents a straightforward estimation of the relationship between the ethnic diversity of a team's seasonal roster and the final points at the end of the season, including interaction with the average tenure on the team. There are several controls for the characteristics of the team, including average age and tenure, as well as fixed effects for season, but no team talent and no team fixed effects. Adding team talent, in column 2, increases greatly the explained variance, and in this specification the estimate on ethnic diversity is positive and statistically significant.<sup>15</sup> Note the large and highly statistically significant effect of team talent on annual production, indicating that team talent as measured here (average of all players' performance ratings in all the games they played in the Bundesliga during our 10-year sample period) is, as it should be, highly correlated with performance.

If we add fixed team effects but no team talent (column 3), the estimate on diversity drops close to the size of the estimate in column 1, but much more of the total variance in season final points is explained. If add team fixed effects (column 4) the estimate on diversity is larger in size but is statistically insignificant. Columns 1 and 3 replicate the standard specification in the literature. Adding a control for talent – skills and ability – changes drastically the size of estimates. This exercise suggests that (1) the association between diversity and annual production (final points) may be affected by unobserved factors that may influence both the degree of diversity and team performance, and, relatedly, (2) the larger is the production unit and the longer is the production period, the larger will be the number of confounding factors that may obscure the true relationship between diversity and performance. Annual production is generated by a series of discrete production events in which only subsets of the organization's workforce participate, something that is obscured by the examination of the annual-level variables.

We deal with these issues in several ways. First, we concentrate our analyses on the game level, and include team fixed effects in all estimations. Second, we control for player talent, age and tenure. Third, we control for manager experience and nationality (and its relationship to that of players). Fourth, we include season fixed effects that capture unobservable factors that affect the performance of the particular teams playing in that season and round (in season) fixed effects to capture possible effects related to cyclicity in the season. Fifth, we conduct a sensitivity analysis by excluding the fixed effects and various characteristics to assess the impact of their omission on parameter estimates and overall fit. This allows for an examination of selection based on observed characteristics and serves as a guide to assess the extent of potential selection based on unobservable characteristics, although it is not a formal test of endogeneity (Altonji, Elder and Taber, 2005). An ideal approach would use an exogenous variation that affects the extent of diversity but not performance. However, finding such an instrumental variable is inherently difficult in this case. Sixth, our analysis of game level diversity is likely to expunge a lot of endogeneity because the line-up in a particular game is strongly influenced by injuries, illness, disciplinary suspensions by the soccer federation, international responsibilities of players who are members of national teams, and other factors beyond the control of the manager. This is all the more so of an analysis of player performance in different positions, as there are fewer degrees of freedom who precisely to play in a certain position given the exogenous factors noted above. Seventh, we explore the effects of team composition on individual performance. We carry out this analysis for players in different positions in order to identify the differential effects of diversity, which we predicted to vary with position on the field. We also conduct several robustness tests and extensions.

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<sup>15</sup> The point estimate implies that moving from an ethnic configuration with just one ethnic group to one with equal representation by four ethnic groups would be associated with a 20 final points increase on an average of 45, or a move from a configuration of two equally represented ethnicities to one with four equally represented would add 7 final points. (See footnote 10 for diversity configuration examples).

The theoretical framework suggested the joint tenure of domestic and foreign workers may have differential effects on the diversity-performance nexus, and that diversity effects will vary by task and the joint tenure of the incumbents. We explore these possibilities by interacting the average team tenure of German players and that of non-German players with team place-of-origin diversity, and by focusing on diversity separately for different positions and interacting that diversity with the joint tenure of players in each position.

#### 4. Results

Tables 2 and 3 present OLS regressions for team and player performance at the game level, with team, season and round fixed effects. In these analyses we use ethnic diversity as the measure of place-of-origin diversity. In Table 4 we replicate the main analyses for diversity based on nationality and language and for the proportion of German players in the line-up. We have experimented with possible nonlinear effects of diversity but the squared value was always very small and statistically insignificant so we left it out of the analyses presented in the paper. Before turning to matters of ethnic diversity, we note that in all specifications player talent is a strong determinant of performance, and so is playing at home.<sup>16</sup>

##### *Team game performance*

The goal of each team is to win by scoring more goals than conceding and thus earning three league points. Winning at a greater goal difference means greater success and helps with league standing when teams are tied in terms of number of points. All diversity variables and team characteristics listed in Table 2 vary from game to game, depending on the specific game line-up; manager variables change when manager changes, or are incremental (experience).

The benchmark regression in Column 1 of Table 2 suggests that team line-up ethnic diversity is not statistically significantly associated with goal difference, and average team tenure has no significant moderating effect on this relationship. (The net effect on goal difference, calculated using the point estimates evaluated at the average mean tenure, is -0.30 goals). However, the distinction between tenure of German and non-German players interacted with diversity in column 2 has a bifurcated association with performance, positive although not quite statistically significant for German players and negative and significant for non-German players. The net effect of ethnic diversity on goal difference, calculated using the point estimates evaluated at the average of the respective mean tenure of the two groups is -0.31 goals.

Disaggregation of the team into three groups by position reveals (in column 3) that greater diversity in the defense group (which includes the goal keeper) is positively and significantly associated with performance, but the opposite is true of diversity among forwards, with no effect for midfielders. When we include also interaction terms between position diversity and tenure by position in column 4, the significance of defense and forward diversity effects wanes and diversity of midfielders has a negative and statistically significant estimate, but now there is a significant positive interaction between midfield ethnic diversity and midfield tenure, suggesting that negative effects of midfield diversity are reduced as a team's midfielders accrue joint tenure. There is also a positive but statistically insignificant effect on the interaction for defenders but negative and insignificant for forwards. The effects of diversity in columns 3 and 4 are, despite differences in the estimates on the diversity variables alone, quite similar. Evaluated at the average of the median tenure of the respective positions, the net effect of defense diversity is 0.28

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<sup>16</sup> Substitutions also have consistently significantly positive association with team and player performance. Substitutions are often the result of injuries, warnings, and the need for "fresh legs" or replacing poor performers, or if clearly winning, giving other players a chance to play. The grand mean of substitutions is 2.27 (out of 3 allowed) and practically all teams substitute two players in all games.

goals, to be compared with the estimate of 0.29 in column 3; the net effect of midfield diversity is -0.02 as compared with -0.07 in column 3, and for forwards the diversity net effect is -0.56 as compared to -0.56 in column 3.

Considering game goals scored and goals conceded separately, Appendix Tables 7 and 8 show a similar picture to that discussed in the previous paragraph.

### *Player game performance*

How well a player performs in a game does not depend only on his own talent but also on his team members and his interactions with them, the team manager, fans and other factors beyond his control. Diversity affects the quality of interactions among players and their individual efforts, therefore the most effective means of identifying its effects on team performance is to examine how it impacts individual players' performance. Individual player game performance regressions are presented in Table 3, with 77,406 player-game observations. In addition to the diversity-related variables already included in Table 2 we add here a variable that counts the number of players in the game who have the same ethnicity as the player, and a variable that indicates whether the manager is of the same ethnicity as the player or not. (Exclusion of these two variables does not change materially the estimates on the other diversity variables). In the player regressions there are also several player characteristics: age, ethnicity, tenure on the team, talent and position. These variables are either incremental or fixed; we report estimations without player fixed effects because the inclusion of many player characteristics creates multicollinearity with individual fixed effects, affecting the estimates on player age and tenure but having very little impact on the diversity estimates.<sup>17</sup>

The benchmark model in column 1 reveals no statistically significant ethnic diversity effects on individual player performance. (The net effect in column 1 is -0.13 rating points; average rating is around 6). In column 2, the negative estimate on team diversity increases and approaches statistical significance, and the interactions with German and non-German player tenure are significant, positive and negative, respectively. The net effect of diversity, with the effect of tenure evaluated at the respective means of the two groups, is small (similar to that in column 1).

The position analysis in column 3 reveals that the tendencies that were detected in Table 2 are found also at the player level: diversity in defense is positively associated with player performance and negatively with the diversity of midfielders and especially that of forwards. Column 4 indicates that the positive effects of diversity on player performance are enhanced by tenure of defenders and midfielders but not forwards. (The net effects of position diversity are 0.21, -0.03 and -0.22 for defenders, midfielders and forwards, respectively). The presence on the field of more players of the same ethnicity like the player has a positive and statistically significant effect on player performance in columns 3 and 4.

The effects of position diversity on the performance of players in the three positions are presented in Appendix Tables 9-11; results are similar to those detected in Table 3. The effects of diversity are particularly strong for forward players' performance (Table 11, with net effect of -0.55 rating points in column 4, and with a spillover effect on midfielders' performance); ethnic similarity to the manager and

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<sup>17</sup> Here are some general observations on Table 2 that are not directly related to diversity. Team talent is strongly positively associated with individual player performance in a game. Position mean talent is also positively with player performance for forwards and defenders, but not so for midfielders, even in the midfield players' regression analysis in Appendix Table 10. This matter, not germane to our study, requires further understanding in order to gain a better understanding of the dynamics of the game. Performance rating does not vary systematically with position (see estimates on forward and midfield dummies, with defense as the omitted variable). Player age has a concave relationship with performance; tenure has a similar but not as pronounced tendency. Age diversity and tenure diversity have no association with performance.

larger numbers of other players on the team are positive and significant, reinforcing the importance of less diversity for good forward performance.

### *Alternative diversity measures*

The results presented above were based on ethnic diversity, focused on the 26 ethnic groups represented in our sample. We repeated the analyses based on ethnic diversity with national diversity, which is based on 77 groups, linguistic diversity, based on 32 languages, regional diversity, representing 8 regions, and the proportion of German players on a team. We replicated all the analyses discussed earlier to explore whether the results vary across different measures of diversity. For purposes of conciseness and visual effectiveness we summarize results based on alternative place-of-origin diversity measures only for models 2 and 4 in Tables 2 and 3, presenting parameter estimates only for diversity-related variables; we do not present results based on region diversity, which are similar to those based on other diversity measures. To facilitate comparisons, we reproduce in the first column the parameter estimates based on ethnic diversity presented in the earlier tables. The national and linguistic diversity indices have similar properties to the ethnic diversity index. The proportion of German players on the team is different in that the larger is the proportion the lesser the diversity of the team; consequently, the signs on estimates have the opposite interpretation than those on the same variables based on the other measures.

Table 4 replicates the game goal difference analyses in Table 2. Panel A shows that effects of the interaction of German and non-German tenure with team diversity has the same direction across all measures (language diversity has somewhat stronger effects than other measures). In Panel B, position analysis, similar effects are seen across all measures.

Table 5 replicates the player performance analyses in Table 3. In Panel A, the tenure and diversity interaction effects are very similar across the various measures. In Panel B there are minor differences, but the picture is similar.

Place-of-origin diversity, whether conceived of expansively as in nationality, or more narrowly, as in language or region or even a divide between domestic and foreign players, has similar effects on performance. Of course, this is not unexpected, since the different measures are derived from the same 77 nationalities represented in the sample, with classification criteria that overlap substantially.

### **Extensions and robustness checks**

We carried out a large number of robustness checks and a number of sensitivity analyses. In Appendix Table 12 we replicate Table 3 without team talent and player talent. The results show that omission of the talent-variables affects (generally increases) the size of the effects of diversity variables on performance (and halves the explained variance of player performance), but not the direction of the findings. This and other sensitivity tests suggest that at the game level there is little concern about the endogeneity of diversity and performance at the player level, and reaffirms the importance of controlling for talent in order to get at the true effects of diversity.

We dropped the variables “number of players sharing ethnicity” and “manager shares ethnicity,” which capture ethnic diversity along with the ethnic diversity index. The findings reported earlier are sustained, with minor variations.

### *Effects of diversity in combined defense-midfield and forward-midfield positions*



Soccer is a team sport of intense collaboration, and the role of midfielders in this collaboration is paramount. Midfielders connect the defense with the offense (in some languages midfielders are referred to as “connectors”), and it is therefore important to examine the role of diversity on collaboration between midfielders and defenders, and between midfielders and forwards. We constructed ethnic diversity and tenure variables for the combined midfielder and defender positions, which we term here backfield, and for the combined midfielder and forward positions, which we term offense. We replicated the analyses presented in columns 3 and 4 in Table 3 and Appendix Tables 9-11 with the two partly overlapping positions, backfield and offense. We present the results in Appendix Table 13. The findings discussed earlier are amplified here and brought out in clearer relief. The estimates essentially show that backfield ethnic diversity favors defenders’ and forwards’ performance and offensive ethnic diversity harms the performance of players in all positions. Tenure enhances these effects. Having a manager and players like oneself enhances forwards’ performance.

#### *Additional robustness checks*

We split the sample period into two periods of five years and replicated our analyses. Ethnic diversity has essentially the same effects in the two periods. We divided the sample of players at the median talent rating and repeated the analyses; ethnic diversity has similar effects on both groups. Finally, we divided the sample into sub-samples of German players and non-German players and repeated the analyses; with minor variations, the effects of diversity on player performance reported earlier apply to both groups.

### **5. Discussion and Conclusions**

Diversity matters. A multitude of factors affects how well individuals who are diverse in terms of their place of origin collaborate on various tasks. Diversity affects incentives – it is sometimes accompanied by different degrees of conscious favoritism displayed towards those considered in-group and discrimination against others, and sometimes only by subconscious preferences that nonetheless impact behavior. Diversity may result in difficulties in communication, but also in creativity arising from different ways of thinking. Diversity on a team may affect the incentives of members to act in the interest of the group versus their individual interest, and influences the quality of individual and collective decisions. In short, diversity is likely to affect performance. The literature on diversity has generated findings that show both positive and negative effects of diversity on performance.

Diversity matters, but at least in high-level professional soccer, diversity operates in subtle ways. One would not expect that in games with tens of thousands of spectators at the stadium and on TV, with high-earning players and professional managers, acts of vile or incompetent communication associated with the fact that players hail from different places will be regularly committed on the field in a game. Insufficient effort may be attributed to poor form or the effects of a lingering injury rather than to diversity, and a shot on the goal instead of a pass may be attributed to selfishness and vanity rather than to ethnic differences. A feat of creativity that may arise from diversity cannot be identified separately from what good players do. Any effects associated with diversity will be, in professional soccer and similar settings, subtle. Evident effects will be purged if bad and emulated if good, although bundling of conflicting effects of diversity as well as skill, temperament and other factors of players – and managers – make purging and emulation difficult. In order to identify subtle effects, if they exist, an exploration of detailed aspects of interactions in a game is necessary. Despite the fact that games unfold in full view there is important residual asymmetric information between players and onlookers, so identification of any effects requires many observations that originate from varied situations. This is what we attempted to do in this paper.

We found that diversity matters, although not a lot, and has both favorable and unfavorable effects. This bifurcated effect is contingent on the nature of tasks (player position), and tenure of domestic and foreign players. The place-of-origin diversity of the workforce (team roster) has little discernible association with aggregate outcomes such as annual production (season points or standing in the league). Such associations have to be identified at the micro level, focusing on the diversity of those workers who are involved on a particular day and what they produce on that day (or any time frame where the workforce and performance are measured consistently). We focused our analyses on players who were on the field in a particular game and outcomes in that game. It turns out that the effects of diversity are subtle and have to be uncovered carefully. Because of opposing effects, a simple correlation between team line-up in a game and game outcomes (controlling for player and team talent and other factors) may be statistically insignificant.

Performance effects of diversity at the individual player and team level can be identified when teams are disaggregated into subgroups, by domestic versus foreign born players (German vs. non-German) and by task or position (defense, midfield and forward), and when the role of joint tenure or time spent together on the team is incorporated in individual games, when injuries, suspensions and other random factors affect the deployment of players and controlling for team fixed effects and talent. Longer tenure of German players in conjunction with team diversity contributes to team and individual performance whereas the opposite holds, and with greater strength, for non-German players. Diversity in the defense is good for all players' and team's performance, and this effect is enhanced by greater joint tenure of defenders, whereas the opposite is more or less true of the forward team.

These bifurcated effects of diversity by task and the tenure of domestic and foreign players suggest the possibility of interesting relations that evolve over time. We offer an interpretation of our results based on the literature and our theoretical framework. The effect of the interaction of diversity with tenure of domestic vs. foreign, or German vs. non-German, players on performance, may arise from several related factors. The distinction between domestic and foreign players is equivalent to the distinction between members of the majority and minority groups. Not only that German-born players constitute the largest group on every team, but they operate in a German environment, including staff, fans and just about everything else. Furthermore, Germany has been a more prosperous economy and perhaps self-consciously superior society as compared to those of the places from which most foreign players in the Bundesliga hail. Tropp and Pettigrew (2006, p. 956) comment on the differential effect of tenure of majority and minority groups on relations between them: "...we suspect that for members of minority status groups, an ongoing recognition of their group's devaluation inhibits the potential for positive contact outcomes, whereas such an effect is unlikely to occur among members of majority status groups." For German players longer tenure may engender greater confidence and acceptance of non-German players, possibly leading to greater willingness to collaborate more effectively and be able to take advantage of the creativity-enhancing aspect of diversity. For non-German players the effect of longer tenure in association with diversity may generate a tendency to cooperate more among themselves and less with German players; it may result in minority player factionalism and contribute to oppositional identities, which may reduce collaboration both ways, from them with German players and by German players with them.<sup>18</sup>

Turning to diversity in different positions, it is important to observe that the opportunities to act on individual incentives vary across positions. A player's own utility is derived from the benefits that accrue directly to that player and the value of benefits that accrue to other players, which may be discounted as

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<sup>18</sup> Kuper (2011, p. 66) comments that the consolidation of a substantial group of Surinamese players on the national team of Holland generated less effective collaboration between the ethnic Dutch and the Surinamese Dutch.

the social identity distance between them increases. Whereas in offense passing the ball to someone else to score may be discounted in relation to the place-of-origin difference between the players and may result in too few beneficial passes (beneficial to the recipient of the pass and to the entire team), there are no such opportunities in defense. A defender will not gain from withholding a pass that may prevent a goal from being scored against his own team. If a defender does not exert optimal effort he will have to assume the responsibility for letting in a goal, so his social preferences towards out-group players matter little. A foreign player may want to prove himself and work harder than domestic players. In addition, there may well be a creativity and imagination effect associated with diversity both in defense and offense, but in offense the negative incentive effect overwhelms the creativity effect.

Because of the opposite effects of diversity by subgroup tenure and by position the net effects of diversity are rather small on average. But having the “wrong” diversity configuration in defense and forward positions can make a small but possibly decisive difference in a game.<sup>19</sup> Similarly, having an “incorrect” mix of team diversity and tenure profiles of domestic and foreign players can have an adverse effect on team’s success in a hard-fought game.

Our study has several implications for research on diversity. The principal findings highlight the importance of analyses at the level of subgroups, both according to the origin of their members and their tasks, an understudied aspect of diversity (Carton & Cummings, 2012). Specification of interactions between diversity and tenure turned out to be crucial for identifying the role of diversity. The role of time spent together on a work team has important and opposite effects on workers who carry out different tasks and on domestic versus foreign workers. In addition, it is necessary to control for the quality of inputs (e.g., talent).

Our study has several limitations. Whereas we obtained estimates of the net effect of diversity, we could not identify separately the relative effects of the various factors related to diversity. In particular, the possible role of diversity in promoting creativity remains a “residual,” perhaps combined with positive effects of desirable competition between domestic and foreign players. Research that compares the effects of diversity across processes that entail different degrees of creativity would contribute significantly to diversity research. And although we could identify separately the effects of diversity in different positions, a richer task analysis would benefit our understanding of how diversity operates in the workplace.<sup>20</sup>

The movement of people across and within countries has increased in recent decades. This has had felicitous effects on the fate of many individuals who enjoy better opportunities in the places to which they moved than they did in the places they left behind. This has also allowed for talent, knowledge and skill to be employed where they are most needed rather than when they happen to be initially located. Mobility of individuals improves the match between employees and employers and creates better outcomes than in its absence (although “brain drain” creates significant problems for countries that export skilled emigrants).

The findings of this paper suggest that statements about the universal benefit or drawback of workplace diversity are not particularly informative for theory or for policy advice. More nuanced interpretations are called for. For policy makers in organizations the broad lesson is this: diversity has to be handled with

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<sup>19</sup> For example, a modest switch of defense diversity configuration with four players from 1 to 4 in footnote 10 (middle panel) and from 4 to 1 for forwards can result in a loss of one third of a goal in goal difference in Table 2, using the point estimates in column 3.

<sup>20</sup> Pelled, Eisenhardt & Xin’s (1999) study of the role of task routineness provides a useful model for empirical studies of naturally-occurring data. Experiments where creativity and the nature of tasks are systematically manipulated would be an additional method for enhancing diversity research.

care to maximize its potential and minimize its downside. In highly competitive environments small differences are important; considering carefully the diversity of a team, diversity in various tasks and functions and tenure policies may yield substantial advantages.

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**Table 1. Season Final Points – Team Roster**

	<i>without team fixed effects</i>		<i>with team fixed effects</i>	
	(1)	(2)	(3)	(4)
<b>Ethnic diversity</b>	2.26 (20.00)	26.90** (12.22)	2.78 (19.87)	18.04 (15.08)
<b>Ethnic diversity X mean team tenure</b>	12.16 (11.05)	-7.34 (6.80)	5.91 (10.86)	-3.52 (8.25)
<b>Team Characteristics</b>				
age diversity	2.32 (1.74)	0.67 (1.06)	-1.30 (1.65)	-0.51 (1.25)
team tenure diversity	-6.86*** (1.65)	-1.28 (1.05)	-3.02* (1.68)	0.23 (1.30)
mean team tenure	4.95 (8.11)	8.00 (4.93)	-2.40 (8.16)	1.54 (6.18)
mean age	-3.31*** (0.78)	-0.65 (0.50)	0.43 (0.95)	0.35 (0.72)
team talent		34.03*** (1.98)		27.81*** (2.66)
Constant	114.33*** (26.35)	-156.68*** (22.48)	41.51 (28.55)	-133.44*** (27.31)
Observations	180	180	180	180
R <sup>2</sup>	0.37	0.77	0.68	0.82

*Notes:* Season effects are included in all models. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



**Table 2. Game Goal Difference**

	(1)	(2)	(3)	(4)
<b>Ethnic Diversity</b>				
Team	0.127 (0.532)	-0.096 (0.506)		
Defense players			0.29** (0.15)	0.12 (0.25)
Midfield players			-0.07 (0.13)	-0.45** (0.21)
Forward players			-0.54*** (0.13)	-0.39 (0.19)
<b>Ethnic diversity x tenure</b>				
Team	-0.208 (0.228)			
German players' tenure		0.245 (0.195)		
Non-German players' tenure		-0.411** (0.187)		
Defense players				0.12 (0.11)
Midfield players				0.19** (0.08)
Forward players				-0.09 (0.09)
<b>Team Characteristics</b>				
tenure diversity	-0.039 (0.051)	-0.035 (0.051)	-0.04 (0.05)	-0.05 (0.04)
age diversity	0.045 (0.038)	0.045 (0.038)	0.04 (0.04)	0.04 (0.04)
team tenure – mean	0.103 (0.162)		-0.03 (0.06)	
German tenure – mean		-0.184 (0.147)		
non-German tenure – mean		0.249** (0.119)		
defense tenure - median				-0.081 (0.066)
midfield tenure - median				-0.110** (0.047)
forward tenure - median				0.035 (0.050)
mean age	0.037 (0.028)	0.035 (0.029)	0.020 (0.029)	0.020 (0.028)
team talent	1.503*** (0.164)	1.490*** (0.164)		
defense talent			0.78*** (0.14)	0.78*** (0.14)
midfield talent			0.25*** (0.09)	0.25*** (0.09)
forward talent			0.66*** (0.07)	0.666*** (0.07)
substitutions	0.466***	0.465***	0.48***	0.48***

	(0.041)	(0.041)	(0.04)	(0.04)
home vs. away	0.685***	0.686***	0.70***	0.70***
	(0.044)	(0.044)	(0.04)	(0.04)
manager experience	-0.003	-0.003	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)
German manager	-0.124*	-0.128*	-0.13*	-0.13*
	(0.074)	(0.074)	(0.07)	(0.07)
Constant	-11.6***	-11.35***	-12.08***	-11.83***
	(1.263)	(1.264)	(1.26)	(1.26)
Observations	6,120	6,117	6,116	6,116
R <sup>2</sup>	0.155	0.155	0.16	0.17

*Notes:* Fixed effects for team, opponent, round and season are included in all models. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 3. Player Game Performance**

	(1)	(2)	(3)	(4)
<b>Ethnic Diversity</b>				
Team	-0.081 (0.124)	-0.190 (0.119)		
Defense players			0.164*** (0.037)	0.060 (0.057)
Midfield players			-0.053* (0.032)	-0.149*** (0.049)
Forward players			-0.207*** (0.030)	-0.189*** (0.044)
<b>Ethnic diversity x tenure</b>				
Team	-0.024 (0.051)			
German players' tenure		0.115*** (0.044)		
Non-German players' tenure		-0.102** (0.042)		
Defense players				0.065*** (0.025)
Midfield players				0.053*** (0.019)
Forward players				-0.014 (0.021)
<b>Player shares ethnicity with:</b>				
other players (number)	0.005 (0.004)	0.006 (0.004)	0.009** (0.004)	0.009** (0.004)
manager (dummy)	0.001 (0.025)	0.000 (0.025)	0.005 (0.025)	0.001 (0.025)
<b>Individual Characteristics</b>				
age	0.081*** (0.015)	0.081*** (0.015)	0.080*** (0.015)	0.080*** (0.015)
age <sup>2</sup>	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)
team tenure	0.010* (0.006)	0.009 (0.006)	0.013** (0.006)	0.012** (0.006)
team tenure <sup>2</sup>	-0.000** (0.000)	-0.000* (0.000)	-0.001** (0.001)	-0.001** (0.001)
talent	0.989*** (0.011)	0.989*** (0.011)	0.981*** (0.011)	0.981*** (0.011)
forward dummy	-0.014 (0.013)	-0.014 (0.013)	-0.005 (0.013)	-0.005 (0.013)
midfield dummy	-0.005 (0.012)	-0.005 (0.012)	-0.005 (0.012)	-0.005 (0.012)
<b>Team Characteristics</b>				
tenure diversity	-0.003 (0.012)	-0.006 (0.012)	-0.007 (0.008)	-0.008 (0.008)
age diversity	0.008 (0.009)	0.008 (0.009)	0.007 (0.009)	0.007 (0.009)
team tenure – mean	-0.007 (0.036)			
German tenure – mean		-0.092*** (0.033)		
non-German tenure – mean		0.067** (0.027)		
defense tenure - median			-0.007 (0.005)	-0.043*** (0.015)
midfield tenure - median			-0.010** (0.005)	-0.036*** (0.011)

forward tenure - median			-0.010**	-0.002
			(0.005)	(0.012)
mean age	0.008	0.007	0.002	0.001
	(0.006)	(0.006)	(0.006)	(0.006)
team mean talent	0.173***	0.167***		
	(0.037)	(0.037)		
defense mean talent			0.139***	0.137***
			(0.032)	(0.032)
midfield mean talent			-0.048**	-0.051**
			(0.021)	(0.021)
forward mean talent			0.187***	0.187***
			(0.017)	(0.017)
substitutions	0.054***	0.054***	0.059***	0.059***
	(0.010)	(0.010)	(0.010)	(0.010)
home vs. away	0.396***	0.396***	0.400***	0.400***
	(0.010)	(0.010)	(0.010)	(0.010)
manager experience	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	-2.52***	-2.395***	-2.99***	-2.832***
	(0.349)	(0.350)	(0.346)	(0.349)
Observations	77,406	77,406	77,354	77,354
R <sup>2</sup>	0.176	0.176	0.178	0.178

*Notes:* Fixed effects for team, opponent, round and season are included in all models. Dummy variables for player ethnicity. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4. Game Goal Difference with Ethnic, National and Linguistic Diversity, and German Player Proportion:  
Replication of columns 2 and 4 of Table 2  
Showing only diversity-related variables**

	Ethnicity	Nationality	Language	German proportion	Ethnicity	Nationality	Language	German proportion
	<i>Panel A: Column 2 in Table 2</i>				<i>Panel B: Column 4 in Table 2</i>			
	<b>Diversity</b>							
Team	-0.10 (0.51)	0.30 (0.53)	-0.03 (0.50)	-0.11 (0.44)				
Defense players					0.119 (0.247)	0.202 (0.259)	0.304 (0.270)	-0.056 (0.217)
Midfield players					-0.4458** (0.210)	-0.4919** (0.213)	-0.4280** (0.204)	0.3531** (0.174)
Forward players					-0.3893** (0.194)	-0.4921** (0.201)	-0.3670* (0.197)	0.111 (0.146)
	<b>Diversity X tenure</b>							
German players' tenure	0.25 (0.19)	0.10 (0.21)	0.40** (0.18)	-0.00 (0.00)				
Non-German players' tenure	-0.41** (0.19)	-0.42* (0.22)	-0.58*** (0.18)	0.00* (0.00)				
Defense players					0.116 (0.113)	0.063 (0.117)	0.004 (0.110)	-0.067 (0.091)
Midfield players					0.1937** (0.084)	0.2248*** (0.086)	0.133 (0.084)	-0.1379* (0.075)
Forward players					-0.095 (0.089)	-0.046 (0.092)	-0.080 (0.097)	0.084 (0.065)
Observations	6,117	6,117	6,117	6,117	6116	6116	6116	6116
R <sup>2</sup>	0.15	0.15	0.16	0.15	0.166	0.165	0.165	0.164

*Notes:* See notes to Table 2. The first ethnicity column in this table is extracted from column 2 in Table 2, and the second ethnicity column is extracted from column 4 of Table 2 (differences are due to rounding). The interpretation of signs in the German proportion columns is opposite to that of other columns.

**Table 5. Player Game Performance with Ethnic, National and Linguistic Diversity, and German Player Proportion:  
Replication of columns 2 and 4 of Table 3  
Showing only diversity-related variables**

	Ethnicity	Nationality	Language	German proportion	Ethnicity	Nationality	Language	German proportion
	<i>Panel A: Column 2 in Table 3</i>				<i>Panel B: Column 4 in Table 3</i>			
	<b>Diversity</b>							
Team	-0.190 (0.119)	-0.086 (0.127)	-0.161 (0.118)	0.187* (0.097)				
Defense players					0.060 (0.057)	0.142** (0.061)	0.162*** (0.062)	-0.003 (0.049)
Midfield players					-0.149*** (0.049)	-0.188*** (0.050)	-0.189*** (0.047)	0.140*** (0.039)
Forward players					-0.189*** (0.044)	-0.236*** (0.046)	-0.241*** (0.045)	0.025 (0.033)
	<b>Diversity X tenure</b>							
German players' tenure	0.115*** (0.044)	0.109** (0.047)	0.110*** (0.040)	-0.105*** (0.036)				
Non-German players' tenure	-0.102** (0.042)	-0.139*** (0.049)	-0.139*** (0.040)	0.090** (0.043)				
Defense players					0.065*** (0.025)	0.031 (0.026)	0.007 (0.025)	-0.039* (0.020)
Midfield players					0.053*** (0.019)	0.071*** (0.019)	0.030 (0.019)	-0.052*** (0.017)
Forward players					-0.014 (0.021)	0.023 (0.021)	0.012 (0.023)	0.036** (0.015)
	<b>Player shares place of origin with:</b>							
other players	0.006 (0.004)	0.007 (0.005)	-0.001 (0.004)	0.001 (0.003)	0.009** (0.004)	0.010** (0.005)	0.000 (0.004)	0.002 (0.003)
manager	0.000 (0.025)	-0.004 (0.021)	-0.014 (0.026)	-0.011 (0.022)	0.001 (0.025)	-0.006 (0.021)	-0.006 (0.026)	-0.007 (0.022)
Observations	77,406	77,406	77,406	77,406	77,354	77,354	77,354	77,354
R <sup>2</sup>	0.176	0.176	0.176	0.176	0.178	0.178	0.178	0.177

Notes: See notes to Table 3. The first ethnicity column in this table is extracted from column 2 in Table 3, and the second ethnicity column is extracted from column 4 of Table 3 (differences are due to rounding). The interpretation of signs in the German proportion columns is opposite to that of other columns.

## Appendix Tables

### Appendix Table 1. Performance Variables – Grand Means

<i>Variable</i>	<i>Mean (Std. Dev.)</i>	<i>Variable Description</i>
Final Points	46.73 (12.95)	Total points at end of season (3 points for win, 1 draw, 0 loss)
Goals Scored	1.43 (1.26)	The number of goals scored by the team
Goals Conceded	1.43 (1.26)	The number of goals conceded by the team
Goal Difference	0 (1.86)	Goals scored minus goals conceded
Player Performance	6.05 (1.50)	Rating is calculated based on game statistics (goals, tackles, saves, passes, etc.) by position, on a 0-10 scale

### Appendix Table 2. Diversity Variable Descriptions

<i>Variable</i>	<i>Number of Categories Mean (Std.Dev.)</i>	<i>Variable Description</i>
<b><i>Alternative measures of place-of-origin diversity</i></b>		
Nationality diversity	77 0.72 (0.12)	Diversity index for player nationality
Ethnic diversity	26 0.68 (0.12)	Diversity index for player ethnicity
Language diversity	32 0.69 (0.12)	Diversity index for player language
Region diversity	8 0.66, (0.10)	Diversity index for player region
Proportion German	2 0.45, (0.14)	proportion of German players
<b><i>Ethnic diversity by position</i></b>		
Defense ethnic diversity	0.57 (0.18)	Diversity index calculated for defense (including goal keeper) players
Midfield ethnic diversity	0.55 (0.20)	Diversity index calculated for midfield players
Forward ethnic diversity	0.55 (0.20)	Diversity index calculated for forward players
<b><i>Player shares ethnicity with</i></b>		
Number of other on the team	26 3.38 (3.15)	number of players sharing the player's ethnicity
Manager	0.45 (0.50)	categorical variable, 1 if yes

**Appendix Table 3. Alternative Measures of Place-of-Origin Diversity, by Team**

<i>Team</i>	<i>Ethnicity</i>	<i>Language</i>	<i>Nationality</i>	<i>Region</i>	<i>% German</i>
1860 Munchen	0.48	0.54	0.67	0.61	0.52
Aachen	0.50	0.52	0.50	0.49	0.68
Bielefeld	0.63	0.61	0.63	0.59	0.57
Bochum	0.74	0.77	0.77	0.70	0.41
Bremen	0.70	0.70	0.73	0.68	0.45
Cottbus	0.77	0.82	0.83	0.56	0.27
Dortmund	0.68	0.63	0.71	0.68	0.47
Duisburg	0.69	0.65	0.71	0.65	0.47
FC Bayern	0.73	0.72	0.75	0.68	0.43
Frankfurt	0.58	0.52	0.69	0.66	0.50
Freiburg	0.71	0.66	0.77	0.71	0.40
Hamburg	0.77	0.78	0.80	0.74	0.35
Hannover	0.73	0.76	0.76	0.70	0.43
Hertha BSC	0.74	0.72	0.77	0.69	0.38
Hoffenheim	0.69	0.75	0.76	0.73	0.40
Koln	0.68	0.66	0.73	0.67	0.46
K'lautern	0.51	0.50	0.56	0.55	0.64
Karlsruhe	0.53	0.63	0.56	0.53	0.58
Leverkusen	0.62	0.64	0.68	0.64	0.51
M'gladbach	0.72	0.79	0.78	0.70	0.38
Mainz	0.59	0.59	0.62	0.57	0.58
Nurnberg	0.69	0.76	0.74	0.65	0.44
Rostock	0.63	0.62	0.67	0.57	0.47
Schalke 04	0.76	0.76	0.78	0.71	0.37
St. Pauli	0.61	0.50	0.61	0.60	0.59
Stuttgart	0.62	0.68	0.67	0.62	0.53
Unterhaching	0.40	0.36	0.40	0.38	0.76
Wolfsburg	0.76	0.76	0.80	0.73	0.34

**Appendix Table 4. Alternative Measures of Place-of-Origin Diversity, by Season**

<i>Season</i>	<i>Ethnicity</i>	<i>Language</i>	<i>Nationality</i>	<i>% German</i>
2000/1	0.64	0.64	0.68	0.50
2001/2	0.67	0.67	0.70	0.47
2002/3	0.71	0.72	0.75	0.42
2003/4	0.69	0.70	0.73	0.43
2004/5	0.68	0.69	0.71	0.45
2005/6	0.67	0.66	0.71	0.46
2006/7	0.69	0.70	0.73	0.44
2007/8	0.69	0.71	0.74	0.43
2008/9	0.70	0.72	0.74	0.42
2009/10	0.69	0.70	0.74	0.44



**Appendix Table 5. Team and Individual Variables, by Game**

<i>Variable</i>	<i>Mean (Std. Dev.)</i>	<i>Variable Description</i>
Substitutions	2.27 (0.55)	number of substitutions in the game (irrespective of play time); maximum is 3
Home vs. Away	0.5	team is playing at home stadium or away
Team Talent	6.01 (0.28)	mean of all Bundesliga performance ratings for players in a game (average for 6,120 observations, the total number of games)
Manager Age	47.6 (7.12)	manager (coach) age
Manager Experience	13.58 (8.46)	number of years of manager experience
Stadium Size	48,219 (17294)	home stadium seats
Club Age	99.58 (25.54)	years since team was established
Age diversity	3.94 (0.71)	standard deviation of players' age (in years)
Team tenure diversity	2.04 (0.95)	standard deviation of player team tenure (in years)
Player Talent	6.02 (0.60)	player's average performance rating in Bundesliga 2000/01-2009/10 (average for 1,723 observations, the number of players)
Team Tenure	2.2 (2.36)	number of years since the player's first game with his current team
Defense Tenure	2.33 (1.21)	number of years since defensive players' first game with their current team
Midfield Tenure	2.28 (1.32)	number of years since midfielders' first game with their current team
Forward Tenure	1.86 (1.29)	number of years since the forwards' first game with their current team
Average German Tenure	2.48 (1.33)	number of years since German players' first game with their current team
Average non-German Tenure	1.97 (1.01)	number of years since non-German players' first game with their current team
Age	27.07 (4.04)	player's age in years
Forward	3.30 (1.01)	number of forward players in a game
Midfielder	4.72 (1.29)	number of midfielder players in a game
Defense (including goal keeper)	5.71 (1.15)	number of defense players in a game

**Appendix Table 6. Player Talent and Distribution of Positions, by Regions**

<i>Region</i>	<i>Mean (S.D.) Player Talent, by Region and Position</i>			<i>Percentage of Players from Each Region, by Position</i>		
	<i>Defender</i>	<i>Forward</i>	<i>Midfielder</i>	<i>Defender</i>	<i>Forward</i>	<i>Midfielder</i>
<i>German</i>	6.04 (1.51)	6.12 (1.47)	6.00 (1.49)	50%	31%	48%
<i>Non-German</i>	5.98 (1.51)	6.15 (1.48)	6.09 (1.49)	50%	69%	52%
West European	5.94 (1.48)	6.08 (1.51)	5.92 (1.50)	17%	17%	12%
East European	5.95 (1.51)	6.22 (1.50)	6.13 (1.52)	14%	23%	21%
South American	6.32 (1.56)	6.35 (1.47)	6.53 (1.57)	9%	12%	8%
African and Others	5.62 (1.44)	5.96 (1.43)	5.86 (1.45)	4%	7%	4%
Middle Eastern	5.92 (1.48)	5.97 (1.41)	5.93 (1.53)	3%	8%	4%
English Speaking	5.86 (1.48)	5.88 (1.30)	5.83 (1.46)	2%	1%	2%
East Asian	5.29 (1.26)	5.81 (1.32)	5.60 (1.29)	0%	1%	1%
				100	100	100

**Appendix Table 7. Game Goals Scored**

	(1)	(2)	(3)	(4)
<b>Ethnic Diversity</b>				
Team	-0.080 (0.367)	-0.202 (0.350)		
Defense players			0.02 (0.11)	0.01 (0.17)
Midfield players			-0.17* (0.09)	-0.27* (0.15)
Forward players			-0.26*** (0.09)	-0.16 (0.13)
<b>Ethnic diversity x tenure</b>				
Team	-0.196 (0.157)			
German players' tenure		0.034 (0.135)		
Non-German players' tenure		-0.187 (0.130)		
Defense players				0.01 (0.08)
Midfield players				0.19** (0.08)
Forward players				-0.05 (0.06)
<b>Team Characteristics</b>				
tenure diversity	0.006 (0.035)	0.009 (0.035)	0.00 (0.03)	-0.00 (0.03)
age diversity	-0.012 (0.026)	-0.012 (0.026)	-0.01 (0.03)	-0.01 (0.03)
team tenure – mean	0.094 (0.112)		-0.03 (0.04)	
German tenure – mean		-0.037 (0.102)		
non-German tenure - mean		0.091 (0.083)		
defense tenure – median				-0.03 (0.05)
midfield tenure – median				-0.03 (0.03)
forward tenure – median				0.02 (0.03)
mean age	0.036* (0.020)	0.036* (0.020)	0.02 (0.03)	0.02 (0.02)
team mean talent	0.704*** (0.114)	0.703*** (0.114)		
defense mean talent			0.08 (0.10)	0.09 (0.09)
midfield mean talent			0.17*** (0.06)	0.17*** (0.06)
forward mean talent			0.46*** (0.05)	0.46*** (0.05)
substitutions	0.336*** (0.028)	0.336*** (0.028)	0.35*** (0.03)	0.35*** (0.03)

home vs. away	0.349*** (0.031)	0.350*** (0.031)	0.36*** (0.03)	0.36*** (0.03)
manager experience	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)
German manager	0.054 (0.051)	0.052 (0.051)	0.05 (0.05)	0.06 (0.05)
Constant	-4.346*** (0.873)	-4.239*** (0.874)	-3.81*** (0.87)	-3.83*** (0.87)
Observations	6,120	6,117	6,116	6,116
R <sup>2</sup>	0.117	0.118	0.13	0.13

*Notes:* Fixed effects for team, opponent, round and season are included in all models. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix Table 8. Game Goals Conceded**

	(1)	(2)	(3)	(4)
<b>Ethnic Diversity</b>				
Team	-0.207 (0.373)	-0.106 (0.355)		
Defense players			-0.27** (0.11)	-0.11 (0.17)
Midfield players			-0.10 (0.09)	0.18 (0.15)
Forward players			0.28*** (0.09)	0.228 (0.14)
<b>Ethnic diversity x tenure</b>				
Team	0.012 (0.160)			
German players' tenure		-0.212 (0.137)		
Non-German players' tenure		0.224* (0.132)		
Defense players				-0.10 (0.08)
Midfield players				-0.15** (0.06)
Forward players				0.04 (0.06)
<b>Team Characteristics</b>				
tenure diversity	0.045 (0.035)	0.044 (0.036)	0.04 (0.04)	0.04* (0.03)
age diversity	-0.057** (0.027)	-0.057** (0.027)	-0.06** (0.03)	-0.05** (0.03)
team tenure – mean	-0.009 (0.113)		0.01 (0.04)	
German tenure – mean		0.147 (0.103)		
non-German tenure – mean		-0.157* (0.084)		
defense tenure - median				0.05 (0.05)
midfield tenure - median				0.09*** (0.03)
forward tenure - median				-0.02 (0.04)
mean age	-0.000 (0.020)	0.002 (0.020)	-0.002 (0.020)	-0.001 (0.020)
team mean talent	-0.799*** (0.115)	-0.787*** (0.115)		
defense mean talent			-0.70*** (0.10)	-0.69*** (0.10)
midfield mean talent			-0.08 (0.07)	-0.08 (0.07)
forward mean talent			-0.20*** (0.05)	-0.20*** (0.05)
substitutions	-0.131*** (0.029)	-0.129*** (0.029)	-0.14*** (0.029)	-0.14*** (0.029)
home vs. away	-0.336***	-0.335***	-0.34***	-0.34***

	(0.031)	(0.031)	(0.03)	(0.03)
manager experience	0.001	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
German manager	0.177***	0.180***	0.18***	0.18***
	(0.052)	(0.052)	(0.05)	(0.05)
Constant	7.265***	7.065***	8.28***	8.01***
	(0.887)	(0.887)	(0.89)	(0.89)
Observations	6,120	6,117	6,116	6,116
R <sup>2</sup>	0.089	0.090	0.10	0.10

*Notes:* Fixed effects for team, opponent, round and season are included in all models. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix Table 9. Defense Player Game Performance Rating**

	(1)	(2)	(3)	(4)
<b>Ethnic Diversity</b>				
Team	0.168 (0.194)	0.096 (0.185)		
Defense players			0.219*** (0.063)	0.121 (0.092)
Midfield players			0.008 (0.048)	-0.091 (0.073)
Forward players			-0.201*** (0.045)	-0.173*** (0.067)
<b>Ethnic diversity x tenure</b>				
Team	-0.112 (0.079)			
German players' tenure		0.085 (0.068)		
Non-German players' tenure		-0.190*** (0.064)		
Defense players				0.063 (0.040)
Midfield players				0.055* (0.028)
Forward players				-0.020 (0.032)
<b>Player shares ethnicity with</b>				
number of players	0.001 (0.007)	0.001 (0.007)	0.008 (0.006)	0.008 (0.006)
manager	-0.039 (0.038)	-0.040 (0.038)	-0.036 (0.038)	-0.040 (0.038)
<b>Individual Characteristics</b>				
Age	0.047** (0.023)	0.047** (0.023)	0.045** (0.023)	0.047** (0.023)
age <sup>2</sup>	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)
team tenure	0.002 (0.009)	0.001 (0.009)	0.003 (0.009)	0.002 (0.009)
team tenure <sup>2</sup>	-0.000 (0.000)	-0.000 (0.000)	-0.001 (0.001)	-0.001 (0.001)
Talent	0.974*** (0.018)	0.973*** (0.018)	0.962*** (0.019)	0.961*** (0.019)
<b>Team Characteristics</b>				
team tenure diversity	-0.004 (0.018)	-0.003 (0.018)	-0.003 (0.013)	-0.004 (0.013)
age diversity	0.015 (0.014)	0.015 (0.014)	0.017 (0.014)	0.017 (0.014)
team tenure – mean	0.067 (0.056)			
German tenure – mean		-0.064 (0.051)		
non-German tenure – mean		0.126*** (0.040)		
defense tenure - median			0.006 (0.008)	-0.029 (0.024)

midfield tenure - median			-0.019***	-0.046***
			(0.007)	(0.016)
forward tenure - median			-0.006	0.005
			(0.008)	(0.018)
mean age	0.011	0.010	0.009	0.007
	(0.010)	(0.010)	(0.010)	(0.010)
team mean talent	0.308***	0.303***		
	(0.057)	(0.057)		
defense mean talent			0.199***	0.196***
			(0.053)	(0.053)
midfield mean talent			0.044	0.042
			(0.032)	(0.032)
forward mean talent			0.180***	0.180***
			(0.026)	(0.026)
substitutions	0.076***	0.075***	0.079***	0.078***
	(0.015)	(0.015)	(0.015)	(0.015)
home vs. away	0.369***	0.369***	0.373***	0.373***
	(0.015)	(0.015)	(0.015)	(0.015)
manager experience	-0.001	-0.001	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	-3.335***	-3.239***	-3.829***	-3.700***
	(0.546)	(0.547)	(0.543)	(0.546)
Observations	33,284	33,284	33,256	33,256
R <sup>2</sup>	0.165	0.166	0.168	0.168

*Notes:* Fixed effects for team, opponent, round and season are included in all models. Dummy variables are included for the players' ethnicity. Standard errors in parentheses.  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



**Appendix Table 10. Midfield Player Game Performance Rating**

	(1)	(2)	(3)	(4)
<b>Ethnic Diversity</b>				
Team	-0.126 (0.215)	-0.294 (0.206)		
Defense players			0.127** (0.062)	0.010 (0.095)
Midfield players			-0.113* (0.063)	-0.196** (0.094)
Forward players			-0.075 (0.050)	-0.128* (0.073)
<b>Ethnic diversity x tenure</b>				
Team	-0.001 (0.088)			
German players' tenure		0.179** (0.076)		
Non-German players' tenure		-0.117 (0.074)		
Defense players				0.072* (0.043)
Midfield players				0.047 (0.036)
Forward players				0.032 (0.034)
<b>Player shares ethnicity with</b>				
number of players	0.005 (0.008)	0.005 (0.008)	0.006 (0.007)	0.007 (0.007)
manager	-0.008 (0.042)	-0.010 (0.042)	0.004 (0.042)	-0.001 (0.042)
<b>Individual Characteristics</b>				
Age	0.144*** (0.026)	0.145*** (0.026)	0.148*** (0.026)	0.148*** (0.026)
age <sup>2</sup>	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
team tenure	0.018* (0.010)	0.017* (0.010)	0.017* (0.010)	0.016* (0.010)
team tenure <sup>2</sup>	-0.000** (0.000)	-0.000* (0.000)	-0.002** (0.001)	-0.002** (0.001)
Talent	0.983*** (0.019)	0.983*** (0.019)	1.000*** (0.019)	1.000*** (0.019)
<b>Team Characteristics</b>				
team tenure diversity	-0.019 (0.020)	-0.020 (0.020)	-0.021 (0.014)	-0.024* (0.014)
age diversity	0.005 (0.015)	0.005 (0.015)	0.005 (0.015)	0.005 (0.015)
team tenure – mean	-0.029 (0.063)			
German tenure – mean		-0.145** (0.058)		
non-German tenure – mean		0.082* (0.047)		
defense tenure - median			-0.022*** (0.009)	-0.062** (0.025)
midfield tenure - median			0.003 (0.009)	-0.021 (0.021)
forward tenure - median			-0.013	-0.029

			(0.008)	(0.019)
mean age	-0.004	-0.005	-0.013	-0.014
	(0.011)	(0.011)	(0.011)	(0.011)
team mean talent	0.081	0.068		
	(0.065)	(0.065)		
defense mean talent			0.088	0.086
			(0.054)	(0.054)
midfield mean talent			-0.144***	-0.146***
			(0.040)	(0.040)
forward mean talent			0.210***	0.209***
			(0.028)	(0.028)
substitutions	0.034**	0.034**	0.038**	0.039**
	(0.016)	(0.016)	(0.017)	(0.017)
home vs. away	0.431***	0.431***	0.435***	0.435***
	(0.017)	(0.017)	(0.017)	(0.017)
manager experience	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Constant	-2.181***	-2.005***	-2.655***	-2.458***
	(0.596)	(0.596)	(0.587)	(0.593)
Observations	26,346	26,346	26,332	26,332
R <sup>2</sup>	0.195	0.195	0.198	0.198

*Notes:* Fixed effects for team, opponent, round and season are included in all models. Dummy variables are included for the players' ethnicity. Standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix Table 11. Forward Player Game Performance Rating**

	(1)	(2)	(3)	(4)
<b>Ethnic Diversity</b>				
Team	-0.390 (0.258)	-0.519** (0.247)		
Defense players			0.167** (0.073)	0.054 (0.116)
Midfield players			-0.099 (0.062)	-0.180* (0.096)
Forward players			-0.522*** (0.073)	-0.379*** (0.108)
<b>Ethnic diversity x tenure</b>				
Team	0.079 (0.105)			
German players' tenure		0.059 (0.089)		
Non-German players' tenure		0.096 (0.089)		
Defense players				0.067 (0.051)
Midfield players				0.043 (0.037)
Forward players				-0.090* (0.049)
<b>Player shares ethnicity with</b>				
number of players	0.024*** (0.009)	0.024*** (0.009)	0.015* (0.009)	0.014 (0.009)
manager	0.133** (0.059)	0.132** (0.059)	0.120** (0.059)	0.115** (0.059)
<b>Individual Characteristics</b>				
Age	0.182*** (0.040)	0.184*** (0.040)	0.187*** (0.040)	0.191*** (0.040)
age <sup>2</sup>	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.001)
team tenure	-0.000 (0.013)	-0.002 (0.013)	0.001 (0.014)	0.001 (0.014)
team tenure <sup>2</sup>	0.000 (0.000)	0.000 (0.000)	0.000 (0.001)	0.000 (0.001)
talent	1.032*** (0.024)	1.033*** (0.024)	0.992*** (0.026)	0.991*** (0.026)
<b>Team Characteristics</b>				
team tenure diversity	0.025 (0.024)	0.019 (0.024)	0.009 (0.017)	0.011 (0.018)
age diversity	-0.001 (0.018)	-0.001 (0.018)	-0.003 (0.018)	-0.003 (0.018)
team tenure – mean	-0.089 (0.075)			
German tenure – mean		-0.056 (0.067)		
non-German tenure – mean		-0.074 (0.057)		
defense tenure - median			-0.004 (0.010)	-0.041 (0.029)
midfield tenure - median			-0.008 (0.010)	-0.028 (0.020)
forward tenure - median			-0.006	0.044

			(0.012)	(0.029)
mean age	0.012	0.012	0.007	0.006
	(0.013)	(0.013)	(0.013)	(0.013)
team mean talent	0.030	0.028		
	(0.076)	(0.076)		
defense mean talent			0.118*	0.115*
			(0.066)	(0.066)
midfield mean talent			-0.121***	-0.124***
			(0.042)	(0.042)
forward mean talent			0.162***	0.160***
			(0.041)	(0.041)
substitutions	0.039**	0.039**	0.054***	0.053***
	(0.020)	(0.020)	(0.020)	(0.020)
home vs. away	0.394***	0.394***	0.399***	0.400***
	(0.020)	(0.020)	(0.020)	(0.020)
manager experience	-0.001	-0.001	-0.002	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Constant	-2.938***	-2.864***	-3.381***	-3.341***
	(0.794)	(0.795)	(0.788)	(0.796)
Observations	17,776	17,776	17,766	17,766
R <sup>2</sup>	0.184	0.184	0.188	0.188

*Notes:* Fixed effects for team, opponent, round and season are included in all models. Dummy variables are included for the players' ethnicity. Standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix Table 13. Player Game Performance  
without Control for Player Talent**  
*Replication of Table 3, omitting talent variables and showing only  
diversity-related variables*

	(1)	(2)	(3)	(4)
<b>Ethnic Diversity</b>				
Team	0.138 (0.125)	-0.001 (0.120)		
Defense players			0.198*** (0.038)	0.091 (0.059)
Midfield players			0.040 (0.033)	-0.101** (0.050)
Forward players			-0.280*** (0.031)	-0.225*** (0.047)
<b>Ethnic diversity x tenure</b>				
Team	-0.087* (0.052)			
German players' tenure		0.082* (0.045)		
Non-German players' tenure		-0.136*** (0.044)		
Defense players				0.071*** (0.027)
Midfield players				0.077*** (0.020)
Forward players				-0.037* (0.022)
<b>Player shares ethnicity with:</b>				
other players (number)	0.004 (0.004)	0.004 (0.004)	0.009** (0.004)	0.008* (0.004)
manager (dummy)	-0.054** (0.026)	-0.054** (0.026)	-0.061** (0.026)	-0.064** (0.026)
Constant	-2.52*** (0.349)	-2.395*** (0.350)	-2.99*** (0.346)	-2.832*** (0.349)
Observations	77,406	77,406	77,354	77,354
R <sup>2</sup>	0.084	0.084	0.085	0.085

*See notes to Table 3.*

**Appendix Table 12. Player Game Performance with Ethnic Diversity of Backfield and Offense**  
*Backfield combines defense and midfield, offense combines forward and midfield*

	<b>All players</b>		<b>Defenders</b>		<b>Midfielders</b>		<b>Forwards</b>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Diversity</b>								
backfield players	0.292*** (0.054)	0.133 (0.086)	0.412*** (0.088)	0.257* (0.135)	0.154 (0.097)	0.127 (0.152)	0.335*** (0.105)	0.009 (0.173)
offensive players	-0.370*** (0.053)	-0.186** (0.086)	-0.384*** (0.079)	-0.158 (0.129)	-0.257*** (0.094)	-0.209 (0.152)	-0.576*** (0.119)	-0.212 (0.190)
<b>Diversity x tenure</b>								
backfield players		0.092** (0.040)		0.091 (0.061)		0.016 (0.070)		0.181** (0.078)
offensive players		-0.109*** (0.041)		-0.136** (0.062)		-0.028 (0.070)		-0.215** (0.088)
<b>Player shares ethnicity with:</b>								
number of players	0.008* (0.004)	0.007* (0.004)	0.007 (0.006)	0.007 (0.006)	0.004 (0.008)	0.004 (0.008)	0.021** (0.009)	0.020** (0.009)
manager	0.011 (0.025)	0.009 (0.025)	-0.028 (0.038)	-0.031 (0.038)	0.005 (0.042)	0.004 (0.042)	0.129** (0.058)	0.130** (0.058)
<b>Individual Characteristics</b>								
age	0.081*** (0.015)	0.081*** (0.015)	0.047** (0.023)	0.047** (0.023)	0.149*** (0.026)	0.149*** (0.026)	0.186*** (0.040)	0.187*** (0.040)
age2	-0.002*** (0.000)	-0.002*** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.004*** (0.001)	-0.004*** (0.001)
team tenure	0.009* (0.006)	0.009* (0.006)	-0.002 (0.009)	-0.003 (0.009)	0.018* (0.010)	0.018* (0.010)	0.005 (0.013)	0.006 (0.013)
team tenure 2	-0.000** (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000** (0.000)	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)
talent	0.981*** (0.011)	0.981*** (0.011)	0.961*** (0.019)	0.962*** (0.019)	1.000*** (0.019)	1.000*** (0.019)	0.989*** (0.026)	0.989*** (0.026)
forward dummy	-0.010 (0.013)	-0.010 (0.013)						
midfield dummy	-0.006 (0.012)	-0.006 (0.012)						
<b>Team Characteristics</b>								
team tenure diversity	-0.012 (0.008)	-0.010 (0.008)	-0.005 (0.012)	-0.002 (0.013)	-0.033** (0.013)	-0.032** (0.013)	0.011 (0.017)	0.014 (0.017)
age diversity	0.007 (0.009)	0.007 (0.009)	0.017 (0.014)	0.015 (0.014)	0.004 (0.015)	0.004 (0.015)	-0.003 (0.018)	-0.004 (0.018)
backfield mean tenure	0.020*** (0.008)	-0.038 (0.026)	0.032*** (0.012)	-0.026 (0.039)	0.012 (0.013)	0.002 (0.046)	0.011 (0.016)	-0.102** (0.050)
offense mean tenure	-0.027*** (0.008)	0.046* (0.028)	-0.033*** (0.012)	0.057 (0.042)	-0.015 (0.013)	0.003 (0.048)	-0.033** (0.016)	0.112* (0.061)
mean age	-0.004 (0.006)	-0.003 (0.006)	-0.000 (0.010)	0.000 (0.010)	-0.016 (0.011)	-0.016 (0.011)	0.001 (0.013)	0.002 (0.013)
defense mean talent	0.110*** (0.032)	0.109*** (0.032)	0.180*** (0.053)	0.179*** (0.053)	0.052 (0.053)	0.052 (0.053)	0.092 (0.065)	0.090 (0.065)
midfield mean talent	-0.049** (0.021)	-0.050** (0.021)	0.036 (0.032)	0.035 (0.032)	-0.140*** (0.040)	-0.140*** (0.040)	-0.116*** (0.042)	-0.115*** (0.042)
forward mean talent	0.196*** (0.017)	0.195*** (0.017)	0.192*** (0.026)	0.190*** (0.026)	0.209*** (0.028)	0.208*** (0.028)	0.186*** (0.040)	0.185*** (0.040)
substitutions	0.058*** (0.010)	0.058*** (0.010)	0.077*** (0.015)	0.078*** (0.015)	0.039** (0.016)	0.039** (0.016)	0.044** (0.020)	0.045** (0.020)

home vs. away	0.398*** (0.010)	0.399*** (0.010)	0.372*** (0.015)	0.372*** (0.015)	0.433*** (0.017)	0.434*** (0.017)	0.397*** (0.020)	0.398*** (0.020)
manager experience	-0.000 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	-0.001 (0.002)	-0.001 (0.002)
Constant	-2.736*** (0.348)	-2.751*** (0.351)	-3.540*** (0.544)	-3.584*** (0.548)	-2.388*** (0.591)	-2.400*** (0.599)	-3.339*** (0.791)	-3.415*** (0.799)
Observations	77,354	77,354	33,255	33,255	26,332	26,332	17,767	17,767
R <sup>2</sup>	0.178	0.178	0.167	0.168	0.197	0.197	0.186	0.187
See notes to Table 3.								