# DISCUSSION PAPER SERIES

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**Ulf Rinne**
*IZA*

**Hendrik Sonnabend**
*University of Hagen*

**Leonie Wolters**
*University of Hagen*

# ABSTRACT

# Customer Discrimination and Ethnic Team Composition*

This paper examines the relationship between customer preferences and ethnic team composition in German professional soccer. Ethnic team composition is measured using facial recognition techniques, player names, and nationality. The study uses a difference-in-differences approach to show that after New Year's Eve 2015-16, third-division teams focusing on local and regional fans increased the share of native players by 6.4 to 12.2 percent compared to first- and second-division teams. Additionally, we find that in strongholds of the right-wing populist party AfD, a one-standard-deviation increase in the regional voting share for this party is associated with an increase in the share of native players by 3.1 to 3.6 percentage points. When examining the impacts of these changes in ethnic team composition on team productivity and economic success, we find that a higher share of (native) German players is neither associated with better performance outcomes nor higher attendance rates.

**Corresponding author:**
Ulf Rinne
IZA - Institute of Labor Economics
Schaumburg-Lippe-Straße 5–9
53113 Bonn
Germany
E-mail: rinne@iza.org

# 1  Introduction

In the labor market, customer discrimination results from a significant share of customers unwilling to interact with minority workers. This form of discrimination may arise even if the employers themselves are not prejudiced, i.e., if taste-based discrimination or ethnic discrimination on employers' behalf is absent. While theory predicts that discriminatory outcomes, if caused by taste-based or employer discrimination, should not be sustainable under perfect competition, this is not the case for outcomes based on customer discrimination as it is rooted in profit maximization (Becker, 1971; Combes et al., 2016). Customer discrimination may thus be sustained even in a competitive environment.

There are still very few empirical studies on customer discrimination in the labor market, especially compared to the vast literature on employer discrimination (see, e.g., Lippens et al., 2023, for a meta-analysis of many correspondence studies published between 2005 and 2020). This is the case because empirically identifying customer discrimination is not a straightforward task, and most studies are limited to documenting patterns in line with the Becker model. For example, Holzer and Ihlanfeldt (1998) use data from a survey conducted between 1992 and 1994 among 800 employers in four U.S. metropolitan areas. They find that the ethnic composition of customers affects hiring decisions and wages, and that the extent of customer contact moderates this relationship. Similarly, Combes et al. (2016) document higher unemployment rates of African immigrants in jobs that involve customer contact using 1990 French census data. In contrast, Giuliano et al. (2010), using data from 1996 to 1998 of a U.S. company with numerous retail outlets, find that a mismatch between customers and employees in terms of ethnicity has only low to moderate effects on sales. All of these studies, however, lack measures of customer preferences.

Most closely related to our paper, Bar and Zussman (2017) are the first to provide direct evidence for discriminatory attitudes of consumers as a source of discrimination in the labor market. In line with the Becker model, the authors show that the (stated) preferences of Jewish customers for services from Jewish workers (triggered, for exam-

ple, by safety concerns) are anticipated by employers, and that these preferences impact the hiring rates of Arab workers and prices of their services.

While Bar and Zussman (2017) exploit a wave of violence between Israelis and Palestinians when their survey data were collected in 2015 as a natural experiment, we focus on the 2015–16 New Year's Eve sexual assaults in Germany as an external shock to (revealed) consumer preferences. These events are considered to mark a tipping point of attitudes towards immigrants during the 2015 European migrant crisis in Germany, which is also reflected in the subsequent success of a right-wing populist party, the Alternative for Germany (AfD, founded in 2012), in the 2017 federal elections.

Although this natural experiment is a unique opportunity to study the causal effect of a change in xenophobic attitudes on worker composition, there are *de facto* no labor market data with the required information on the ethnicity and performance of workers (either at the individual or group level). This is very different in professional sports, where rich data on these domains are often publicly available. While this may come at the cost of limited external validity, the literature analyzing customer discrimination in professional sports, often professional team sports, is relatively large. Kahn (1991) summarizes early studies.[1] For instance, Kahn and Sherer (1988) study the phenomenon of underpaid Black players in U.S. sports and provide evidence that the share of white players in a team is positively associated with attendance rates.

More recent studies analyze customer discrimination in sports by focusing on economic outcomes. For example, Foley and Smith (2007) find that attendance rates in Major League Baseball games were lower in the 1990s when teams added Hispanic players to their rosters. Also, Watanabe and Cunningham (2020) analyze how race affects sports consumption and show that implicit bias predicts fluctuations in the National Football League's attendance rates. Kanazawa and Funk (2001) find higher television ratings of games of the National Basketball Association with more white players.[2]

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[1]The empirical studies on customer discrimination in professional team sports are complemented by a larger number of studies documenting the presence of ethnic discrimination in professional team sports over a longer period and across countries (e.g., Goddard and Wilson, 2008; Kalter, 1999; Medcalfe and Smith, 2018; Meier and Leinwather, 2013; Szymanski, 2000).

[2]Customer discrimination may also influence the course of the game. For example, the empirical

We add to this literature as we analyze customer discrimination as a potential source of heterogeneous ethnic team composition in German professional soccer. We thus focus on a very competitive environment. In fact, competition is at the very heart of professional team sports. This holds true for the players, who pursue a successful career in terms of sporting and monetary rewards, and for clubs or team owners, who are interested in the team's current and future performance but also revenue and profit maximization. The resulting pressure to perform makes it essential, for example, to put together a team solely based on factors such as physicality, technical skills, talent, motivation, and team skills. A selection based on other characteristics that are not performance-related should be disadvantageous and not sustainable.[3]

However, the preferences of the supporters of a team, as the primary customers of the "product" considered here, may actually be relevant for team composition. Concerns of the—possibly unbiased and unprejudiced—management about a negative response from the fan community may influence the team's (ethnic) composition. In particular, the concern could be that supporters may turn away from the team, i.e., they do not attend or watch games anymore if they can no longer identify with the players or refuse contact with players from other ethnic groups regardless of their productivity characteristics. Reduced attendance numbers and decreased revenue and profit streams (e.g., via less sponsorship income) would be the consequence.

This paper's approach is based on the assumption that individual customer preferences markedly changed after a series of events on New Year's Eve 2015-16 and are also reflected in subsequent voting behavior. More specifically, we assess whether right-wing or xenophobic attitudes of supporters influence the ethnic composition of teams in

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results in Magistro and Wack (2023) from elite Italian soccer support the notion that supporters may play a key role in inducing poor referee calls against players with darker skin color. Caselli et al. (2023) exploit soccer games in Italy without the attendance of supporters during the COVID-19 pandemic as a natural experiment to show that racist pressure can harm minority groups and lower the overall quality of the game.

[3]One possible explanation for why the discriminatory outcomes rooted in taste-based discrimination could still be empirically observed in professional team sports is that teammates may refuse to work with certain individuals. Especially if these ethnically or racially biased players are considered key players or team leaders or have exceptional skills and are thus not easy to substitute, they can use their preferences as leverage (if the pool of talents from which players are recruited is sufficiently large).

German professional soccer. We operationalize ethnic team composition based on players' external appearance using facial recognition techniques, based on players' names, and based on players' nationality. Utilizing a difference-in-differences approach, we analyze the impact of customer discrimination on the ethnic team composition in German professional soccer across three distinct league levels. We specifically focus on changes in the aftermath of significant events occurring on New Year's Eve 2015-16. With this exercise, we can delve into the influence exerted by diverse regional catchment areas, geographic distribution of fan communities, and the significance of ticket sale revenues relative to total revenues, thereby enhancing our understanding of the underlying mechanisms. In a complementary regression approach, xenophobic attitudes are operationalized by regional voting shares of a new right-wing populist party in the 2017 federal elections. This party had undergone a major programmatic change from Euroskepticism[4] to anti-immigration in reaction to the 2015 European migrant crisis.

Subsequently, we assess the impact of ethnic team composition on economic success and team productivity. By doing so, we shed light on the question of whether our previous findings could be driven by the management's strategy to adjust ethnic team composition to consumer preferences or instead reflect anticipated discrimination on behalf of non-native players. If based on a management's strategy and in line with profit maximization, we expect increased revenue streams via an increased identification of supporters with their team (measured by attendance rates). This may, however, come at the cost of reducing the team's productivity because of artificially placing recruiting constraints on specific players.

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[4]Euroskepticism is defined as a European political doctrine that advocates disengagement from the European Union (Encyclopedia Britannica, 2023). This policy position rather strongly opposes European integration.
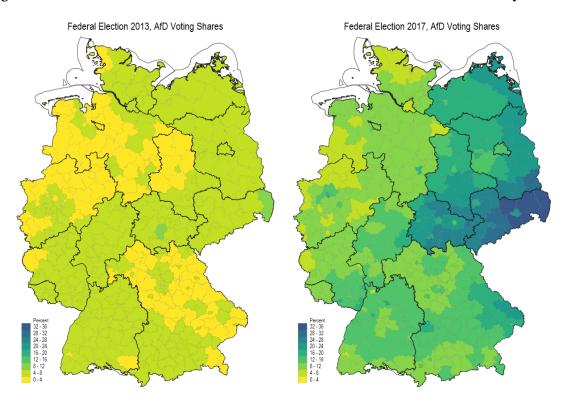
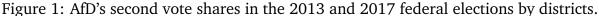# 2   Policy Context and Institutional Background

## 2.1   Right-Wing Attitudes in Germany and the Rise of the AfD

Key to our empirical strategy is a series of events on New Year's Eve 2015-16. As described in Albarosa and Elsner (2023) and Frey (2020), attitudes towards migrants and refugees drastically changed in Germany following these incidents, of which the most salient occurred in Cologne, where a substantial number of women were sexually assaulted. These events and subsequent nationwide protests also received worldwide attention (e.g., New York Times, 2016). New Year's Eve 2015-16 is therefore often viewed as a turning point in public opinion and attitudes towards immigration and migrants in Germany and as an accelerator for the growth of the far-right movement in Germany (Gedmin, 2019).

In this context, we can also exploit the change of a new political party, the Alternative for Germany (AfD, founded in 2012), whose focus turned from Euroskepticism to anti-immigration over time. This shift, marked by a split of economic liberals into a new party in 2015, can also be related to the refugee crisis culminating in 2015-16 (Gehrsitz and Ungerer, 2022), and to the recent rise of populism in many other countries (see Guriev and Papaioannou, 2022, for an overview). As a result, the AfD turned into a right-wing populist party and a "low-cost" option (associated with little social stigma) for right-wing voters to articulate their political preferences between the federal elections in 2013 and 2017 (Cantoni et al., 2019). The party's second vote share in these elections more than doubled from 4.7 percent in 2013 to 12.6 percent in 2017.

Figure 1 illustrates this substantial increase in the AfD's second vote share between the 2013 and 2017 federal elections. It also shows the strong regional variation in this share. While it ranged from 2.2 percent (in the district of Vechta) to 8.7 percent (in the Ilm district) in 2013, it ranged from 4.9 percent (in Münster) to 35.5 percent (in the district of Sächsische Schweiz-Osterzgebirge) in 2017.

Figure 1: AfD's second vote shares in the 2013 and 2017 federal elections by districts.



| Federal Election 2013, AfD Voting Shares | Federal Election 2017, AfD Voting Shares |
|---|---|

*Sources:* German Federal Statistical Office, own calculations.
*Notes:* Share of AfD's second votes across German districts in percent. The color scheme is the same for both federal elections.

Cantoni et al. (2019) argue that long-run cultural persistence can explain the recent rise in the share of right-wing populist parties. In the case of the AfD in Germany, it can also explain regional variation across municipalities. More specifically, they show that German municipalities with strong support for the Nazi party in 1933 were more likely to vote for the AfD in the federal election of 2017—but not in 2013, when the AfD was still a more moderate, fiscally conservative party focusing on Euroskepticism. Persistent latent preferences for right-wing ideology were only expressed and resulted in actions once the manifestation became less costly.

Similarly, Bursztyn et al. (2020) show that when social norms change, people may become more inclined to express views or take actions previously perceived as stigmatized and may judge others less negatively for doing so. They specifically refer to election outcomes as one possibility for new public information that may lead to such changes in social norms. The authors also document the presence of such a mechanism

for xenophobic views. However, even before the 2017 federal elections, the salient New Year's Eve 2015-16 incidents provided new public information, as evidenced by sparking public outrage and increased anti-immigrant hostility (Frey, 2020).

In our context, this means that the social environment as the basis for customer discrimination in German professional soccer markedly changed after New Year's Eve 2015-16, which is also reflected in the 2017 federal election results. Consequently, the expression of xenophobic attitudes became less stigmatized and was associated with lower social costs in the political domain and other domains of society. In the soccer domain, this is reflected, for example, in an increase in proceedings before sports courts against clubs and individuals for racist, right-wing extremist, and discriminatory incidents since season 2014-15, i.e., roughly since the start of the refugee crisis.[5] In addition, there are numerous reports across Germany of supporter organizations related to soccer teams participating in or even initiating anti-refugee demonstrations (Deutscher Bundestag, 2020).

Hence, with some extent of regional variation and differences in regional catchment areas of the fan community, the clubs were increasingly confronted with revealed xenophobic preferences among their supporters. We test the hypothesis that this has an impact on ethnic team composition.

## 2.2   German Professional Soccer: Importance and Structure

Soccer is the most popular sport both in Germany and worldwide. Every second person in the German population is interested in soccer (IfD Allensbach, 2021). Against this background, soccer is not only a significant recreational (active) sporting activity for many amateur players, but its societal relevance is also reflected in the vital role of professional soccer for many (passive) consumers during their leisure time. Therefore, soccer is also an important economic factor in Germany. For example, professional clubs in the top-two divisions (1. Bundesliga and 2. Bundesliga) generated record revenues

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[5]Statistics available for one of the five regional soccer associations in Germany, the Northeastern German Football Association (NOFV), support this increase over time (TAZ, 2018).

of about 4.8 billion Euros in the 2018-19 season (DFL, 2020).

German professional (male) soccer is organized in three league levels: first division (1. Bundesliga), second division (2. Bundesliga), and third division (3. Liga). More generally, the German soccer league system is organized as a pyramid. Including the amateur level, it is a hierarchical system of up to 13 divisions (depending on the region). Theoretically, any team can be promoted or relegated from the lowest to the highest division. The first division (1. Bundesliga), where the German soccer champion is determined, ranks alongside the English Premier League, the Spanish La Liga, the French Ligue 1, and the Italian Serie A, among the "Big Five" top-tier soccer leagues in Europe. Like the second division (2. Bundesliga), it consists of 18 clubs, whereas the third division (3. Liga) consists of 20 teams.

The competition between the clubs, also in economic terms as professional soccer clubs should be regarded as medium to large commercial enterprises, extends to the recruitment of players. Clubs compete for the best players in a globalized market on which they can recruit during two periods in a given season. Mobility is a key characteristic of the professional labor market in soccer. All players can be viewed as temporary workers in a club, with a contract duration of up to five years. The composition of a club's roster typically changes substantially between seasons. International teams are more the rule than the exception nowadays, although this possibility did not always exist in Germany.

As of 1995, the so-called "Bosman ruling" has fundamentally changed the transfer system in German and European professional soccer, with global implications. Since the ruling, the number of nationals of a UEFA member country who play at the same time has not been limited , whereas clubs could only field three "non-UEFA foreigners". At the start of season 2001-02, the limit on "non-UEFA foreigners" was raised to five players. As of season 2006-07, any restrictions on players of other nationalities were lifted entirely by an agreement between the German League Association (DFL) and the German Soccer Association (DFB). However, there is still a requirement from the DFL that each team in the first and second divisions must have at least twelve German players under contract, i.e., players with German nationality (DFL, 2022). In addition,

teams in the first and second divisions are also subject to the UEFA local player rule for promoting young talent, which has been applied in various forms since the 2006-07 season. Note that there are no such regulations in place for the third division. As a result, the proportion of foreign players in the first division has risen to 54.1 percent in season 2021-22 (second division: 28.8 percent; third division: 17.1 percent). In 1995, this share stood at 24.7 percent in the first division (Statista, 2021).

The increasing share of foreign players may also be related to the internationalization strategy of German professional soccer which the DFL initiated in 2017 (Manager Magazin, 2018). Growing discussions and efforts to increase revenues abroad culminated in the founding of "Bundesliga International", a full subsidiary of the DFL, on July 1, 2017. Among other things, it is responsible for the worldwide marketing of audiovisual and sponsorship (partnership) rights as well as brand and digital licenses through a global network of 80 partners (Bundesliga International, 2022). One way to increase the visibility and popularity of German professional soccer abroad, and thus the revenue generated by international marketing, is to recruit foreign players from target markets. However, DFL's internationalization strategy only affects clubs in the first division and, to a smaller extent, clubs in the second division. The third division is excluded as the DFL is only responsible for the organization, licensing, and marketing of German male soccer's top-two professional leagues.

Foreign players have a different ethnic background than German players, usually associated with a different appearance and a foreign-sounding name. Nevertheless, players with German citizenship can also give the impression of a foreign origin if they have a foreign-sounding name or a different appearance due to a family migration background or for other reasons. The increasing number of players with foreign citizenship, a foreign-sounding name, or a different appearance has brought discrimination issues to the fore. For example, racial discrimination in European soccer leagues has been repeatedly highlighted regarding fan behavior and institutionalized barriers (Bradbury,

2013; Cashmore and Cleland, 2014; Kassimeris, 2009).[6] In the German context, this development is paired with lower social costs attached to revealed xenophobic preferences.

# 3 Data

Our data include team-season information for seven full seasons, ranging from season 2013-2014 to season 2019-2020, for all clubs in the three divisions of German professional soccer. This implies a total number of 392 observations from 76 teams in our data set. Figure 2 shows where these teams are located within Germany. When separately considering the three divisions of German professional soccer in our data, it becomes clear that the teams' geographic locations are widely spread across Germany in each division.

Figure 2: Team locations across the three divisions of German professional soccer.



*Sources:* Own representation of the geographic location of 76 teams playing in the first, second, and third divisions in German professional soccer, seasons 2013-2014 to 2019-2020.
*Notes:* If multiple teams are located in the same district (i.e., in the same city), the corresponding location of one of the two teams is slightly shifted northeastwards for this representation.

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[6]Moreover, Caselli et al. (2023) document that racist pressure can harm minority groups during a match and lower the game's overall quality.

During our observation period, the teams in the first, second, and third divisions do not differ substantially in their roster size. However, there is a slightly higher fluctuation in the roster of teams in the second and third divisions. This is because fewer players remain on the same team's roster between seasons in these two lower divisions than in the first division. Likewise, the fluctuation of teams within divisions due to promotion and relegation is greater in the second and third divisions than in the first. To a large extent, however, this can be explained purely mechanically since first-division teams cannot be promoted by definition.

Our underlying data stem from two sources. First, information on regional election outcomes as well as on economic and social indicators was obtained from the Federal Statistical Office of Germany. These data refer to the district where the respective soccer team is located. There are 401 German districts in total.[7] Although districts vary considerably by geographic size, with larger districts in rural parts of Germany and smaller districts in German cities, these districts should, in any case, include the catchment area of the respective club's fan community. In some cases, however, these catchment areas may extend well beyond the district where the team is located. For example, we do not consider the characteristics of the rural hinterland of urban teams.[8] Second, data on soccer teams, such as market values, points, ranking positions, player age, citizenship, and the number of matches (per season), were collected from the *transfermarkt.de* website.

Our approach to categorizing players as "German" is twofold. First, we solely focus on nationality and code individuals with German citizenship as *German,* excluding those with dual citizenship. Second, as our first classification may not fully capture the group of players exposed to xenophobic attitudes, we define another variable: *native Ger-*

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[7]German districts are the primary administrative subdivision of the 16 federal states, one administrative level higher than municipalities (*Gemeinde*). There are two types of German districts: 294 rural districts (*Landkreis* or *Kreis*) and 107 urban districts (*kreisfreie Stadt* or *Stadtkreis*).

[8]We refrain from using, for example, functional urban areas or commuting zones for a broader definition of the catchment area of teams. This would have the major disadvantage of using identical information on regional election outcomes as well as on economic and social indicators for many different teams in our sample in urban areas such as the Ruhr. In these urban areas, however, the majority of supporters still come from a more local catchment area. For this reason, we focus only on the district in which the respective soccer team is located.

*man*. Besides citizenship, this variable also considers information on a player's appearance and name. More specifically, only players with German citizenship, a "European-German" sounding name, and a "white" appearance are classified as *native German* (i.e., these players need to fulfill all three criteria).

To classify ethnic appearance and to mitigate subjective bias, players' portraits presented on *transfermarkt.de* were fed into a deep-learning-driven facial recognition application programming interface (API) available at *kairos.com*.[9] The API predicts ethnicity probabilities based on facial features. An example output could be "black": 0.045, "white": 0.000, "Asian": 0.001, "Hispanic": 0.954, and "other": 0.000. We use a value of 0.95 for "white" as our threshold value to be classified as a "white" player.[10]

When classifying names, we use the *Name-Prism* tool, a software that has been trained using more than 74 million labeled names from 118 countries, according to the developers.[11] This name classification also results in ethnicity probabilities, where we use 0.5 for "European-German" name as our threshold value. We decided to use this relatively low threshold value for names as many popular first names in Germany, such as "Marco" and "Mats", resulted in relatively low scores. Nevertheless, scores for the large group of white German players with a Turkish background are clearly below this threshold (for example, the name "Emre Can" results in a score of 0.06). Note that the classification of *native German* players is not very sensitive to the threshold value for names. For example, while the mean share of *native German* players in our sample is 40.6 percent at a threshold value of 0.3, this share is at 37.2 percent at a threshold value of 0.5. Figure A.1 in the Appendix shows the distribution of probabilities resulting for both measures (ethnic appearance and names).[12]

Furthermore, since customer discrimination is based on the interaction between cus-

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[9]If the player's portrait from the *transfermarkt.de* website could not be used for this purpose or if a player's portrait was not available on this website, we switched to the *kicker.de* website or, as a third option, used Google's picture search.

[10]We refrain from using dimensions other than "white" of the API output to classify players as the given categories appear inappropriate in the German context.

[11]The API is available at `https://name-prism.com/`.

[12]We assess the sensitivity of our results to different threshold values of these measures in Section 5.

tomers and minority workers, and more specifically on the visibility of the latter group, we weight each player with the number of matches he was involved in. For example, if there are three *native German* players in team $i$ in season $t$ who are involved in 10, 15, and 38 matches (out of 38), then the weighted share of *native German* players is $s_{it} = 0.083$ when the total number of players is 20.[13]

Table 1 displays summary statistics for the 392 observations in our data. It shows that the raw share of *German* players in our sample is 53 percent. When we use the narrower definition and, next to citizenship, also incorporate information on names and appearances, the raw share of *native German* players is 37.2 percent in our sample. These shares are substantially lower when weighting the players according to their matches within a given season. The weighted share of *German* players in our sample is 28.2 percent, while the weighted share of *native German* players in our sample is 19.8 percent. Figure 3 also uses these weighted shares and shows that the lower the league level, the greater the proportion of *(native) German* players.

|  | Mean | Std. Dev. | Min. | Max. |
|---|---|---|---|---|
| Share of … | | | | |
| …German players | 0.530 | 0.170 | 0.130 | 0.897 |
| …native German players | 0.372 | 0.137 | 0.069 | 0.760 |
| | | | | |
| Weighted[a] share of … | | | | |
| …German players | 0.282 | 0.105 | 0.060 | 0.539 |
| …native German players | 0.198 | 0.084 | 0.019 | 0.459 |
| AfD voting share (federal election 2017) | 0.115 | 0.047 | 0.049 | 0.289 |
| Market value (in million EUR) | 70.029 | 127.608 | 4.380 | 811.850 |
| Stadium capacity (in thousands) | 29.517 | 18.765 | 5.000 | 81.365 |
| Audience per match (in thousands) | 21.558 | 18.544 | 0.999 | 81.365 |
| Mean player age (in years) | 25.452 | 1.093 | 0.049 | 28.355 |
| Population (in thousands) | 598.40 | 704.036 | 99.491 | 3,669.491 |
| GDP per capita (in thousands EUR) | 50.150 | 25.799 | 17.707 | 188.453 |

The data refer to 76 teams playing in the first, second, and third divisions in German professional soccer and to the German districts in which these teams are located. [a]: Players are weighted with the "matches played to total number of matches in a season" - ratio. Seasons 2013-14 to 2019-20, $N = 392$.

Table 1: Summary statistics

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[13]This is because $\frac{\frac{10}{38} + \frac{15}{38} + 1}{20} \approx 0.083$.

The voting shares of the AfD in the 2017 federal elections (second votes) range from 4.9 percent to 28.9 percent across the districts in which teams in our sample are located, with an average voting share of 11.5 percent. The highest AfD share in our sample was recorded in the Erzgebirgskreis, with 28.9 percent in the 2017 federal elections. This is the district in which the team of FC Erzgebirge Aue is located. We only consider the voting outcomes of the 2017 federal elections and do not consider voting outcomes of state elections at different points in time during our observation period to ensure comparability. State elections not only take place at different points in time in the German federal states, but their results are also likely influenced by heterogeneous programs of the state associations of the individual parties, heterogeneous election programs as well as by different priorities in election campaigns, by different candidates and many other regional factors. In contrast, the 2017 federal elections took place at the same time and individual parties ran their nationwide election campaign based on a program that did not differ between federal states.

Table 1 moreover shows that the average market value of teams in our sample amounts to 70 million Euros, with a sizeable standard deviation of 127.6 million Euros. The latter reflects a substantial gap between the top-ranked teams in the first division which are also regularly among the top-seated teams in European Cup competitions, and teams in the lower end of the third division which try to avoid being relegated from professional soccer. The stadium capacity, averaging 29,517 persons in our sample, also varies considerably between teams. The largest stadium, located in Dortmund, has a capacity that is more than 16 times larger than that of the smallest stadiums in the third division. Similarly, the population of the districts in which teams are located is rather heterogeneous, ranging from less than 100,000 inhabitants to more than 3.6 million inhabitants (Berlin). Finally, there is also substantial variation in GDP per capita across the districts where the teams in our sample are located.
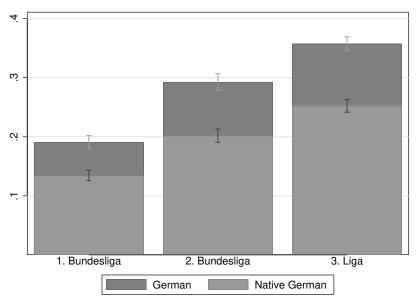
Figure 3: Share of (native) German players per league

# 4   Empirical Analysis

Our empirical analysis is conducted in four steps. In the first two steps, we analyze how ethnic team composition in German professional soccer is affected by an exogenous shock to xenophobic preferences among supporters caused by the 2015-16 New Year's Eve events. This shock subsequently manifests in the AfD voting shares in the 2017 federal elections.

This is the basis for two hypotheses: First, we expect the impact of changes in consumer preferences on ethnic team composition to be stronger for lower-division teams that rely more strongly on local markets compared to top-division teams whose catchment areas extend to the national or even global market. This mechanism may be reinforced as lower-division teams rely more strongly on revenue from ticket sales than top-division teams (whose major sources of revenue are audiovisual and sponsorship rights). Taking the 2015-16 New Year's Eve as a cut-off point and differentiating between teams in the third and top-two divisions, we assess this hypothesis in a difference-in-differences framework with different approximations of ethnic team composition as the outcome variable.

Second, the remarkable regional differences in AfD voting shares in the 2017 federal

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elections should have an impact on ethnic team composition if customer discrimination is indeed relevant. We analyze this hypothesis by estimating a regression model in which the regional voting share of the AfD is the main explanatory variable, and different approximations of ethnic team composition are again the outcome variable.

In two additional steps of our empirical analysis, we consider the link between ethnic team composition and outcome variables measuring team productivity and economic success. By doing so, we aim to empirically assess the potential trade-off that clubs face when the team's composition is more in line with the ideas of xenophobic supporters: On the one hand, greater identification of fans with players might translate into an increase in revenue streams and profits. On the other hand, this may come at the cost of reducing the team's productivity if there are recruiting constraints on specific players. Specifically, we approximate economic success by attendance rates and measure productivity by points won and the team's final ranking position in a given season.

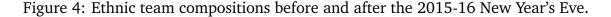## 4.1   Impact of Consumer Preferences by Market Size

To come close to estimating the causal effects of xenophobic views on ethnic team composition in German professional soccer, we require valid treatment and control groups. As explained in Section 2.2, lower division teams rely more strongly on local markets, whereas teams from the top divisions also focus on the national and international markets. For this reason, we compare clubs participating in the treatment league (third division) with clubs competing in the control group leagues (first and second division) in a difference-in-differences approach (DiD). We thus use a rather broad definition of treatment, which reflects that teams from the third division should be more strongly affected by the exogenous shock to xenophobic preferences among their supporters caused by the 2015-16 New Year's Eve events.
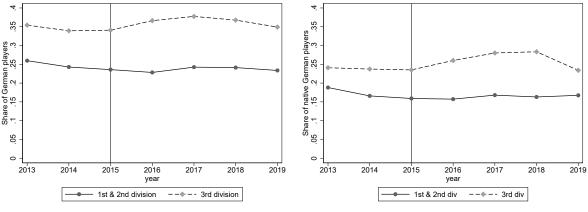
We fit the DiD model of (the share of) *native German* players in a team for repeated cross-sectional data given by

$$s_{ilt} = \alpha_l + \beta_t + \tau D_{lt} + X_{it}'\beta + \epsilon_{ilt} , \tag{1}$$

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where the subscripts $i$, $l$, and $t$ denote team, league (third division yes/no), and season, respectively. The dependent variable, $s_{ilt}$, is the team's share of *native German* players, $\alpha_l$ represents group fixed effects, and $\beta_t$ denotes season fixed effects. $D_{lt}$ is the treatment indicator (third-division, post-2015-16-New-Year's-Eve teams and years), and $X_{it}$ is a vector of control covariates including team market values as well as a district's per capita GDP which serve as proxies for talent and financial resources, respectively. Additionally, the stadium capacity to district population ratio serves as a proxy for the regional importance of team $i$.

Hence, estimates of $\tau$ will give us estimates of the average treatment effect on the treated (ATET). The key assumption for this analysis is that third-division and top-division teams would have had similar trends in the share of *native German* players before the 2015-16 New Year's Eve sexual assaults in Germany, which have negatively affected attitudes towards immigrants and refugees and given rise to the new right-wing populist party. Figure 4 shows that both the treatment and the control group experienced similar trends in ethnic team composition (weighted by a player's number of match appearances) before the season 2015-16 and that trends diverged after that.

Figure 4: Ethnic team compositions before and after the 2015-16 New Year's Eve.



*Notes:* Seasons 2013/14 to 2019/20, $N = 392$.

Table 2 shows the results of this difference-in-differences approach. Estimates of the average treatment effect on the treated (ATET) are 0.022 and 0.029 for the conditional effects (columns (2) and (4)). Evaluated at the pre-treatment sample mean for the

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third-division teams of 0.345 and 0.238, this means that, on average, teams have increased the (weighted) share of (native) German players after the 2015-16 New Year's Eve by 6.4 to 12.2 percent.

|  | German | | Native German | |
| --- | :---: | :---: | :---: | :---: |
|  | (1) | (2) | (3) | (4) |
| **ATET** | 0.030 | 0.022 | 0.034 | 0.029* |
|  | (0.027) | (0.016) | (0.020) | (0.015) |
| Controls | No | Yes | No | Yes |
| $N$ | 392 | 392 | 392 | 392 |
| Pre-treatment mean | 0.345 | | 0.238 | |

- Data from seasons 2013/14 through 2019/20.
- Standard errors are clustered on the league-season level in parentheses, * p<0.10, ** p<0.05, *** p<0.01.
- Controls: market value, a district's per capita GDP, and the stadium capacity to district population ratio.

Table 2: The 2015-16 New Year's Eve effect on team compositions of lower-tier teams

Figure A.2 in the Appendix plots coefficients from leads and lags of the treatment indicator according to specification (4) in Table 2. It shows that the treatment effect is the strongest and highly significant for the 2018-19 season. Existing player contracts may explain why we observe a delayed effect on ethnic team composition.

## 4.2   Impact of Consumer Preferences by Xenophobic Preferences

While we take the previous results as first evidence in favor of the effect of changes in xenophobic views on team compositions of lower-tier teams, the difference-in-differences approach has the drawback that it does not take advantage of regional variation in these changes. These changes subsequently manifested in the AfD voting shares in the 2017 federal elections across Germany, with large differences in these shares across regions.

As explained in Section 2.1, the New Year's Eve 2015-16 events are seen as a turning point in public opinion and attitudes towards immigration and migrants in Germany. However, the 2015 European migrant crisis also shifted the focus of a new political party, the AfD. This party turned into a right-wing populist party and was subsequently associated with lower social costs regarding stigmatization for its voters (compared to other right-wing parties) between the federal elections in 2013 and 2017 (Cantoni et al.,

2019). Therefore, variation in AfD voting shares at the regional level exhibits valuable information about the intensity of (revealed) xenophobic preferences.

For these reasons, we estimate a model that explains the ethnic composition of a third-division team conditional on the regional AfD success in the 2017 German federal election. That is, we estimate

$$s_{it} = \beta_0 + \beta_1 AfDsuccess_i + X'_{it}\delta + \rho_t + \epsilon_{it} , \tag{2}$$

where $s_{it}$ is team $i$'s share of (native) German players, and $X_{it}$ is a vector of covariates including the team market value, the district's per capita GDP, and the stadium capacity to district population ratio. Our primary variable of interest is $AfDsuccess_i$, which is the AfD's regional voting share (in standardized values) in the 2017 federal elections, measured at the district level. $\rho_t$ are season fixed effects.

In a variant of model (2), we add a *StrongLeft* indicator variable which is 1 if the regional voting share for two left-wing parties (*The Greens* and *The Left*) exceeds the sample median, and zero otherwise. Interacting this *StrongLeft* indicator with $AfDsuccess_i$ helps us to understand whether the local political environment moderates the effect. A priori, it is unclear whether supporters are more inclined to express xenophobic views in far-right strongholds or regions with a high degree of political polarization.

Table 3 presents estimates from model (2) for a sample reduced to the post-treatment seasons 2016-17 to 2019-20. As it becomes clear from columns (3) and (6), our results indicate that there is substantial nexus between ethnic team composition and right-wing extremist attitudes in areas without left-wing counterweights: In AfD strongholds, a one standard deviation increase in the regional AfD voting share (which equals 0.048) is associated with an increase in the share of (native) German players by 3.1 to 3.6 percentage points.

Do the 2015-16 New Year's Eve sexual assaults work as an exogenous shock to consumer preferences, or does the AfD's success in the 2017 federal elections (on the district level) just mirror latent and known (and anticipated) attitudes that may be already reflected in the ethnic composition of the local soccer team? To address this question,

|  | German | | | Native German | | |
|---|---|---|---|---|---|---|
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| *AfDsuccess* | 0.016* | 0.017* | 0.036*** | 0.015* | 0.018* | 0.031*** |
|  | (0.009) | (0.010) | (0.008) | (0.008) | (0.009) | (0.010) |
| *StrongLeft* |  |  | 0.011 |  |  | 0.014 |
|  |  |  | (0.017) |  |  | (0.018) |
| *AfDsuccess* |  |  | -0.043** |  |  | -0.030* |
| $\times$ *StrongLeft* |  |  | (0.016) |  |  | (0.017) |
| add. controls[a] | *no* | *yes* | *yes* | *no* | *yes* | *yes* |
| season dummies | *no* | *yes* | *yes* | *no* | *yes* | *yes* |
| Pre-treatment mean |  | 0.345 |  |  | 0.238 |  |
| $N$ |  | 80 |  |  | 80 |  |
| $R^2$ | 0.051 | 0.133 | 0.215 | 0.049 | 0.162 | 0.208 |

- Dependent variable: share of (native) German players in a team.
- *AfDsuccess* is the *AfD*'s regional voting share (in standardized values) in the 2017 federal elections, measured at the district level.
- *StrongLeft* is an indicator variable which is 1 if the regional voting share for the left-wing parties (*Greens* the *Left*) exceeds the sample median, and zero otherwise.
- Data from seasons 2016/17 through 2019/20.
- Robust standard errors in parentheses, * p<0.1, ** p<0.05, *** p<0.01.
- [a] controls: team market values, a district's per capita GDP, and the stadium capacity to district population ratio.
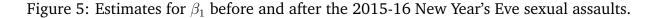
Table 3: A third-division team's share of white (German) players and *AfD*'s success in the 2017 German federal election.
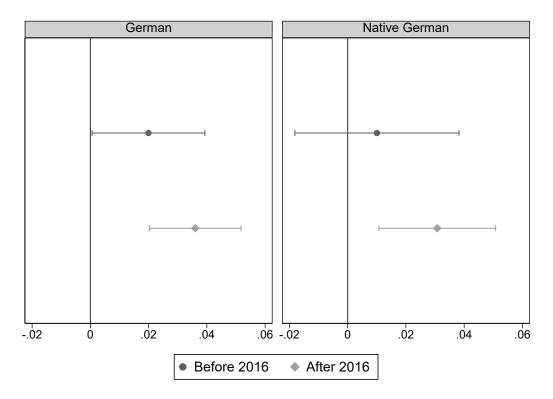
we estimate model (2) for the time before and after the event (i.e., for seasons 2013-14 to 2015-16 and seasons 2016-17 to 2019-20). Results depicted in Figure 5 suggest that the 2015-16 New Year's Eve sexual assaults had an activating effect on consumer preferences (captured in voting behavior). Estimates for $\hat{\beta}_1$ are substantially larger and significantly different from zero in the aftermath of the events.

## 4.3 Ethnic Team Composition and Team Productivity

In the next step, we examine the consequences of the previously identified change in ethnic team composition on team productivity, approximated by performance outcomes.

Hence, we estimate a team fixed effect model of a team's success measured by the average number of points per match and the final ranking position in a season. Our focus variable is $highersharePOST2016$ which is a post-2016 indicator variable for teams who have increased the share of native German players after the 2015-16 New Year's Eve events. Covariates such as the market value, the average age of players in the team, and the per capita GDP control for differences in talent and financial resources across teams. To address potential endogeneity issues related to some of these control vari-

Figure 5: Estimates for $\beta_1$ before and after the 2015-16 New Year's Eve sexual assaults.



*Notes:* This figure presents estimated coefficients on the *AfD*'s success in the 2017 German federal election (district level) before and after the 2015-16 New Year's Eve sexual assaults. $N = 60$ and $80$, respectively.

ables, we also present unconditional estimates including only team fixed effects and season dummies.

Table 4 indicates that a change in ethnic team composition is not associated with changes in team productivity for third-division teams. This also applies to teams from districts with above median support for the AfD, as results in columns (3) and (6) suggest. We conclude that the talent pool seems big enough to substitute players. Moreover, these findings may also indicate that the preferences of teammates are not a significant channel behind our findings. In other words, the mechanism that teammates may refuse to work with certain individuals (resulting in changes in ethnic team composition) thus appears to play only a minor role, if at all, in our context.

|  | Points | | | Ranking position | | |
|---|---|---|---|---|---|---|
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| *highersharePOST2016* | 0.053 | 0.036 | 0.111 | -1.359 | -1.084 | -1.008 |
|  | (0.130) | (0.118) | (0.142) | (2.307) | (2.194) | (2.531) |
| team fixed effects | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* |
| season dummies | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* |
| add. controls[a] | *no* | *yes* | *yes* | *no* | *yes* | *yes* |
| $N$ | 127 | 127 | 68 | 127 | 127 | 68 |
| $R^2$ | 0.417 | 0.503 | 0.669 | 0.444 | 0.500 | 0.670 |

- Dependent variable: Average number of points per match in a season.
- Data from seasons 2013/14 through 2019/20.
- Robust standard errors in parentheses, * p<0.1, ** p<0.05, *** p<0.01.
- *highersharePOST2016* is a post-2016 indicator variable for teams who have increased the share of (native) German players after the 2015-16 New Year's Eve events.
- Columns (3) and (6) present estimates for a sample restricted to teams located in districts where the regional *AfD* voting share exceeds the sample median.
- [a] controls: team market value, average player age & age$^2$, a district's per capita GDP.

Table 4: A third-division team's share of native German players and productivity.

## 4.4  Ethnic Team Composition and Economic Success

We also aim to explore whether increasing the share of (native) German players after the 2015–16 New Year's Eve event pays off for third-division teams in terms of economic success. This is particularly interesting as a result can tell us whether the previously identified effect can be attributed to customer or anticipated discrimination. In our case, anticipated discrimination would imply that minority players try to avoid teams where they expect a xenophobic atmosphere.

Therefore, we regress the average number of spectators per match in season $t$ on the $highersharePOST2016$ variable defined in the previous Section. Again, the model includes team fixed effects and time dummies. Controls are the team market value and the average number of points per match in season $t$. Since conditioning on team success is likely a "bad control", we add points in a separate specification. Note that we run the same regressions with stadium utilization, i.e., the number of spectators as a share of total stadium capacity, as the dependent variable to consider different stadium sizes and capacity limits that may be binding.

Table 5 suggests that increasing the share of (native) German players is not, on average, accompanied by higher attendance rates or utilization rates for third-division teams. Again, this is also the case when we restrict our sample to teams from districts

with above median support for the AfD (columns (4) and (8)). We, therefore, find no evidence of a relationship between adjustments in ethnic team composition and economic success in our setting.

|  | Attendance/1000 | | | | Stadium utilization | | | |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| *highershare* | 0.085 | 0.157 | 0.065 | 0.479 | -0.001 | 0.003 | -0.002 | 0.024 |
|  | (0.432) | (0.440) | (0.421) | (0.590) | (0.024) | (0.024) | (0.022) | (0.029) |
| team fixed effects | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* |
| season dummies | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* | *yes* |
| market value | *no* | *yes* | *yes* | *yes* | *no* | *yes* | *yes* | *yes* |
| points per season | *no* | *no* | *yes* | *yes* | *no* | *no* | *yes* | *yes* |
| mean dep. var. | 6.468 | | | | 0.361 | | | |
| $N$ | 127 | 127 | 127 | 68 | 127 | 127 | 127 | 68 |
| $R^2$ | 0.967 | 0.968 | 0.971 | 0.969 | 0.941 | 0.943 | 0.951 | 0.947 |

˗ Data from seasons 2016/17 through 2019/20.
˗ Robust standard errors in parentheses, * p<0.1, ** p<0.05, *** p<0.01.
˗ Dependent variable: Average attendance per match in season *t* (divided by 1000) or stadium utilization (share of stadium capacity).
˗ *highershare*: share of (native) German players in a team.
˗ Columns (4) and (8) present estimates for a sample restricted to teams located in districts where the regional *AfD* voting share exceeds the sample median.

Table 5: A team's share of native German players and attendance.

# 5   Robustness

We carry out additional analyses to assess the robustness of our main results. First, since identification in the difference-in-differences approach crucially depends on the assignment of treatment and control group, we re-estimate model (1) with the first-division (second-division) teams being the control (treatment) group. Third-division teams are excluded in this robustness check. By doing so, we can assess whether we observe any differences in outcomes in the treatment period between teams in the top divisions and, hence, whether it is reasonable to pool these teams in our main analysis. Results of this exercise indicate a zero treatment effect ($\hat{\tau} = 0.013$, SE $= 0.010$), therefore reinforcing the assignment of treatment and control group in our main analysis.

Second, we re-estimate model (1) with a control group of equal size to the treatment group, representing a random draw from first- and second-division teams on the season level. This exercise allows us to assess the sensitivity of our main results regarding the size and composition of teams in the control group. As estimates of $\tau$ for the full models

are very close to those presented in Table 2 (0.021 vs. 0.022 and 0.028 vs. 0.029), our main results appear robust to such changes in the control group.

Finally, Tables A.1 and A.2 show that our main results presented in Sections 4.1 and 4.2 are robust to changes in the threshold values we use when classifying players as having a *European-German* name and a *white* appearance.

# 6 Conclusions

In this paper, we leverage the 2015-16 New Year's Eve sexual assaults in Germany and subsequent voting outcomes as a natural experiment to study the link between (re-vealed) customer preferences and workers' ethnicity. We exploit the unique data fea-tures from German professional soccer for this purpose.

Our econometric analysis is based on a difference-in-differences approach applied to specific treatment and control group teams, which are categorized according to the mar-kets they predominantly focus on (local vs. national or international catchment areas and fan communities). Our findings indicate that the share of native German players in more locally-oriented third-division teams increased by 6.4 to 12.2 percent after the event compared to teams of the two top divisions. In addition, we exploit regional dif-ferences in the electoral success of a new right-wing populist party in the aftermath of the 2015-16 New Year's Eve events. Here, regression results suggest that in strongholds of the right-wing populist party AfD, a one-standard-deviation increase in the regional voting share for this party is associated with an increase in the share of native players by 3.1 to 3.6 percentage points.

To further assess whether changing the ethnic team composition in response to (re-vealed) xenophobic attitudes toward immigrants is a profit-maximizing strategy for more locally-oriented teams, we examine the impacts of ethnic team composition on team productivity and economic success in our given context. First, we show that a higher share of native players does not affect a season's points and final ranking posi-tions. This may suggest that the talent pool is large enough not to be constrained by

limiting recruitment activities to a smaller pool of players. Second, we find no evidence of a relationship between adjustments in ethnic team composition and economic performance, which we proxy be attendance rates in our setting. Therefore, teams from cities or regions with strong AfD support, measured by regional electoral outcomes, do not benefit from a change in ethnic team composition—neither in terms of performance nor economically.

Our results, therefore, do not allow us to take a strong position with respect to the underlying mechanism behind our findings. Results could be in line with the Becker model and a profit-maximizing motive if teams simply minimize the costs they would otherwise face. However, we also cannot rule out an alternative hypothesis of anticipated discrimination. That is, we cannot reject a scenario in which non-native players refrain from joining teams in regions where they expect a hostile atmosphere and a local (fan) community with (revealed) xenophobic attitudes.

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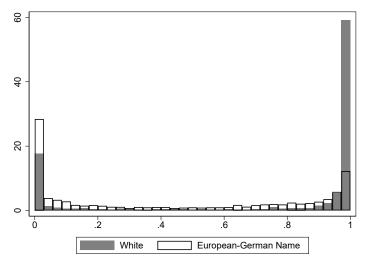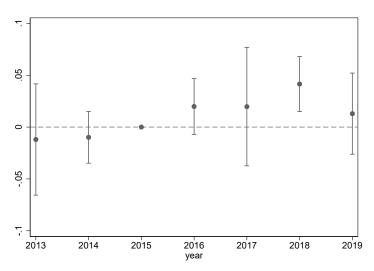
# A   Additional Figures

Figure A.1: Distribution of ethnicity probabilities.



*Notes:* Scores from the facial recognition software *kairos.com* ("White") and the name classifying software *Name-Prism* ('European-German Name"). Bar height is scaled so that the sum equals 100. $N = 3{,}472$ players.

Figure A.2: 2015-16 New Year's Eve effect on the share of native German players over time



*Notes:* Estimates of $\tau$ (defined by (1)) for leads and lags of the treatment indicator variable. Seasons 2013-14 to 2019-20. $N = 392$.

# B  Additional Tables

| | European-German Name | | | | "White" classification | |
| | 0.45 threshold | | 0.55 threshold | | 0.90 threshold | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **ATET** | 0.034 | 0.029* | 0.035* | 0.030** | 0.034 | 0.029* |
| | (0.021) | (0.015) | (0.020) | (0.013) | (0.020) | (0.014) |
| Controls | No | Yes | No | Yes | No | Yes |
| $N$ | | 392 | | | | 392 |
| Pre-treatment mean | 0.244 | | 0.228 | | 0.242 | |

- Data from seasons 2013/14 through 2019/20.
- Dependent variable: Team $i$'s share of native German players.
- Standard errors clustered on the league-season level in parentheses, * p<0.10, ** p<0.05, *** p<0.01.
- Controls: market value, a district's per capita GDP, and the stadium capacity to district population ratio.

Table A.1: The 2015-16 New Year's Eve effect on team compositions of lower-tier teams – Different threshold values

|  | European-German Name | | | | 'White' classification | |
|  | 0.45 threshold | | 0.55 threshold | | 0.90 threshold | |
|  | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| *AfDsuccess* | 0.015* | 0.032*** | 0.014* | 0.032*** | 0.015* | 0.031*** |
|  | (0.008) | (0.009) | (0.008) | (0.010) | (0.008) | (0.010) |
| *StrongLeft* |  | 0.017 |  | 0.017 |  | 0.014 |
|  |  | (0.018) |  | (0.017) |  | (0.017) |
| *AfDsuccess* |  | -0.030* |  | -0.036** |  | -0.030* |
|  |  | (0.017) |  | (0.016) |  | (0.017) |
| add. controls[a] | *no* | *yes* | *no* | *yes* | *no* | *yes* |
| season dummies | *no* | *yes* | *no* | *yes* | *no* | *yes* |
| Pre-treatment mean | 0.244 | | 0.228 | | 0.242 | |
| $N$ | 80 | | 80 | | 80 | |
| $R^2$ | 0.051 | 0.205 | 0.043 | 0.211 | 0.048 | 0.207 |

- Dependent variable: share of (native) German players in a team.
- *AfDsuccess* is the *AfD*'s regional voting share (in standardized values) in the 2017 federal elections, measured at the district level.
- *StrongLeft* is an indicator variable which is 1 if the regional voting share for the left-wing parties (*Greens* the *Left*) exceeds the sample median, and zero otherwise.
- Data from seasons 2016/17 through 2019/20.
- Robust standard errors in parentheses, * $p<0.1$, ** $p<0.05$, *** $p<0.01$.
- [a] controls: team market values, a district's per capita GDP, and the stadium capacity to district population ratio.

Table A.2: A third-division team's share of white (German) players and *AfD*'s success in the 2017 German federal election – Different threshold values