# Introduction

## Problem Indication

Soccer is the most popular sport in the world with 265 million active soccer players around the globe (FIFA, 2007). In other words, roughly 4 percent of total world population regularly plays soccer. The amount of fans is even more staggering, with 3.5 billion people tuning in for the FIFA World Cup Final between France and Croatia in 2018 (FIFA, 2019). Many of these fans were left without their favorite pastime for a considerable time when the Covid-19 pandemic struck Europe and other parts of the world in March 2020. After a few months of lockdown, the Bundesliga was the first major league to restart on the 16th of May 2020. Other major European leagues such as the Premier League, Serie A and La Liga followed swiftly. Global social distancing measures during the Covid-19 pandemic introduced the phenomenon “Ghost Matches”; soccer matches without any spectators attending. Some surprising results in favor of away teams in the first few weeks following the restart renewed interest in the role of crowd support and team performance.

Analyzing team performance in soccer can be quite complicated since home team performance and away team performance are interrelated, Therefore, it is necessary to consider home team performance relative to away team performance or vice versa. An often used concept for analyzing team performance in soccer that incorporates both home and away team performance is the notion of home advantage. At first sight it seems reasonable to assume that on average, home and away teams should collect an equal amount of points and score an equal amount of goals. However, Goumas (2014) finds that home teams on average win more games, collect more points, and score more goals than away teams. And the authors findings resonate with results from earlier studies such as those conducted by Clarke and Norman (1995) and Pollard, (2006). Both studies found a continual advantage for teams playing at home across countries and time. Apparently, through some mechanism, home teams perform better than away teams. Finding the factors that enable the home advantage to materialize thus provides valuable insights into the factors that drive team performance.

The exact source of the discrepancy in performance between home and away teams that creates home advantage is widely studied. Crowd support is often mentioned but its exact role has not yet been unambiguously defined. Pollard & Polla[rd (2005](https://shapeamerica.tandfonline.com/doi/full/10.1080/02640410601038576?scroll=top&needAccess=true)) for example negate the role of crowd support in the formation of home advantage whereas Smith (2003) argues that the performance boost for home teams as a consequence of crowd support is the main driver of home advantage. These contrasting findings highlight the need for further analysis on the effect of crowd support.

It is likely that the effect of crowd support on team performance depends on several other factors as well. Extant research has been devoted to analyze factors closely as associated with crowd support. The It seems logical to assume that a bigger crowd will have a bigger effect compared to a smaller crowd (Goumas, 2013; Nevill, Newell and Gale, 1996). According to their findings home advantage increases with crowd size. However, Fischer & Haucap (2020) for example do not find a significant role for crowd size. Similar to the direct effect of crowd support, evidence on the relevance of crowd size is mixed. The contradiction in the general literature on crowd size indicates the importance of further investigation. Another factor that actually is conceptually similar to crowd size is the stadium occupancy rate. Surprisingly little research has been dedicated to occupancy rates however. One of the few studies that we found was conducted by Fischer & Haucap (2020), who find that crowd occupancy was the main driver of home advantage in the German Bundesliga.

In general, home advantage seems to be declining over time (Peeters & van Ours, 2021). Pollard (2006) and Smith (2003) propose that an increased distance in terms of relatability between fans and players is one of the major factors behind this decline With many players coming from all over the world there may presumably be less of a connection with the fans who are used to supporting their local heroes. This aspect of crowd support and team performance has not yet been formally studied and therefore require statistical analysis to be evaluated. Another influental factor for crowd support’s effect on team performance is team age (Van de Ven ,2016). He finds that teams with a higher average age perform slightly better in away games compared to teams with teams that have low average age. However, the small effects found and the limited number of studies examining the role of age signals the necessity to further investigate the moderating effect of team age.

Apart from a potential direct influence on team performance, crowd support is said to affect team performance through referees decisions. (Bokyo, 2007; Neville & Holder, 1999) find that crowds could influence referee decisions subconsciously in favor of the home team. This favoritism is often named the “referee bias”. Endrich & Gesche (2020) quantify the referee bias in their paper where they find that away teams on average receive 0.3 cards less and home teams 0.5 cards more per match when there are no spectators. These numbers by themselves are quite uninformative as we are more interested in the actual effect these decisions have on match outomce. Although the referee bias has been consistenly shown to exist, its actual influence on team performance has not yet been researched, leaving a gap for improved understanding of its magnitude.

In summary, opinions on how and to what extent home advantage is shaped by crowd support are mixed. Considering the indecisiveness regarding the effect of crowd support, the current extraordinary circumstances thus provide a special opportunity to increase our understanding of the relevance of crowd support. We also use this opportunity to research several moderating variables that have not yet been widely studied before.

## Problem Statement

We summarize the aim of this thesis in the following problem statement.

*What is the effect of crowd support on team performance, mediated by a referee bias towards the home team, and what is the moderating effect of team average age, share of foreign players within the team, crowd size and stadium occupancy rate on the relationship between crowd support and team performance?*

## Research Questions

Our central problem will be answered by addressing the following research questions.

* What is the effect of crowd support on team performance?
* To what extent is the effect of crowd support on team performance mediated by a referee bias?
* To what extent does the average age of teams moderate the relationship between crowd support and team performance?
* To what extent does the share of foreigners within a team moderate the relationship between crowd support and team performance?
* To what extend does the crowd size moderate the relationship between crowd support and team performance?
* To what extend does the stadium occupancy rate moderate the relationship between crowd support and team performance?

## Academic Relevance

Our research adds to the existant body of literature in several ways. Firstly, the matches without fans provides a unique opportunity to delve deeper in the impact of crowds on soccer matches since there is an abundance in new data for matches played without crowds. Past papers often required advanced econometric techniques, relying on various assumptions, to be able to discern the extent to which a crowd influences home team advantage. The difficulties in assessing drivers of home advantage lies in confounding variables effects (Pollard, 2008). This makes it unclear how much of home advantage can be attributed to what factors since most of the factors of home advantage are connected to each other. However, in the current situation, there are suddenly substantial amounts of data on “ghost games” which can be used to directly compare matches with and without spectators. Thus significantly reducing the number of needed assumptions.

As a second contribution, we extend the preliminary research already completed by using numerous other soccer leagues to obtain a comprehensive overview of the effect of crowd support on team performance. A few papers using the Covid-19 pandemic to assess the influence of crowd support on team performance have been published already, including the work of (Fischer & Haucap, 2020;Deutscher & Winkelmann, 2020; Endrich & Gesche, 2020). However, these papers focused on German leagues in their analysis, which render their results ungeneralizable.

Third, in our paper we use the extended availability of data for games played behind closed doors available in the 2020/21 season. The existing papers on team performance during the Covid-19 pandemic only use data from the 2019/2020 season which was partly played under normal circumstances and partly played behind closed doors. Incorporating data from 2020/21 into the analysis increases the sample size and decreases confounding effects resulting from possible biased schedules in partial seasons.

Finally, we extend existing research by constructing a comprehensive framework of the influence of crowd support on home advantage by using one mediating and several moderating variables to assess causal links between crowd support and team performance. To our knowledge, we are the first to use a mediation framework to assess the role of referee bias and also the first to scrutinize the possible moderating role of foreign players on the relationship between crowd support and team performance.

## Managerial Relevance

Our research is also relevant for soccer club management. Knowledge on the variables driving home advantage and team performance provides great insight for soccer clubs on how to optimize their clubs environment and team to improve the chances of performing well. Stadium occupancy and crowd size are, to a certain extent, under the control of soccer club executives. Wetzel, Hattula, Hammerschmidt & van Heerde (2018) show for example that soccer clubs possessing a stronger brand name can leverage this to increase attendance. An effect which increases over the length of time the brand exists. Taking this in mind, the results of our study could then inform marketing managers on the effectiveness of increasing the stadium occupancy and absolute attenance in improving their club’s performance.

The average age of the squad players and the composition of the squad in terms of local and foreign players are also under control of management and thus knowledge on these variables provide insight to managers how their activities influence their club’s performance. Club management can for example decide to focus on developing young talents in the youth system that can exemplify the bond between club and city. On the other side of the spectrum, management can buy old and experienced foreign players that immediately make an impact at the club. It could be that fans that lost connection with their team due to the influx of young unknown foreign players decide to stop coming to games and buying merchandise. Our results will help managers in deciding which strategy, if any, would result in the strongest positive influence of crowd support on team performance.

Another reason why our research is relevant for management is that the effect of team performance on the pitch translates to a soccer clubs’ performance off the pitch. Team results influence soccer clubs’ performance outside of the pitch in several ways. Samagaio, Couto & Caiado (2009) find a positive relationship between on pitch results and stock performance. Moreover, increased team performance leads to increased market value for players (Galariotis, Germain & Zopounidis, 2018 ; He, Cachucho & Knobbe, 2015; Müller, Simons & Weinmann, 2017). All studies find positive relationships between revenues and position in the league table as well as between revenues and individual performance. If management possesses more knowledge on which tools are effective for increasing team performance on the pitch, they can also improve off-the pitch performance of the club and bring in more revenue.

## Research Approach

Providing meaningful insights into the role of crowd support requires a combination of theoretical and empirical analysis. Firstly, we examine the current and historical literature to obtain a view on the current knowledge on the relationship between crowd attendance and team performance. This will serve as our basis on which we can conduct the right analytical approach to analyze our data. We decide to include the seasons 2018/19, 2019/20 and 2020/21 into our final analysis. Around 2018, the Video Assitant Referee(VAR) was introduced in most of the major leagues in Europe, possibly changing our results on referee bias and team performance. We then combine match data with a dataset from Fivethirtyeight to incorporate team strength and match importance, which we include as control variables into the analysis. We consult the Transfermarkt website (https://www.transfermarkt.com) for data on our 4 moderating variables. We use a structural equation model(SEM) in order to draw valid conclusions from the data

## Structure of the thesis

This thesis is divided into 5 chapters. The first chapter serves as a background chapter for the rest of the thesis. In the second chapter we construct the theoretical framework that will represent the basis of the empirical analysis in the later sections. In chapter 3 we meticulously describe the data set and provide model free evidence to examine trends in home and away team performance. In the fourth chapter we summarize the analysis and findings of our model to answer the empirical questions. Finally, in our last chapter, we generate recommendations based on our findings and discuss the limitations of this study in combination with possible future research possibilities.