ERASMUS UNIVERSITEIT ROTTERDAM

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The influence of on pitch performance on hooliganism in English professional football

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Abstract

This paper examines the effect of a football club's performance on the quantity of hooliganism among supporters from England and Wales. This is done by executing quantitative research. Seasonal data from the top four leagues in the United Kingdom have been retrieved from "The Home Office". This included data regarding the amount of arrests and imposed banning orders for clubs' supporters from 2003 to 2017. The quantitative research consisted of Ordinary Least Squares regressions with club, league and season fixed effects over the panel dataset. Based on these regressions it can be concluded that there is a significant effect of violence, in particular, the number of arrests, on a club's performance. However, the effect on different performance measures remains ambiguous. An increase of a club's number of lost derby's increases the quantity of arrests during a season. Contradictory, an improvement in the final standings of the competition has an increasing effect on the number of arrests as well. Finishing in the top 3 or bottom 3 of the competition does not have a significant effect on the volume of hooliganism. This implies that the effect of the final finishing position is not concentrated in the extremes of the ranking distribution.

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1   Introduction

Football is the most popular sport in England. In 2017, on average 500,000 people attend to the highest and second highest division matches in the United Kingdom on a weekly basis (*Premier League Attendance - Average Attendance Figures*, 2018; *Championship Attendance - Average Attendance Figures, 2018*). Way more supporters watch the matches of their favorite club at home. Forty percent of the UK population watched live Premier League coverage in the 2020/21 season, which is the highest football league in the United Kingdom. This comes down to 26.8 million people (*A Record-Breaking Season*, 2022). Moreover, football in England attracts numerous tourists. According to Visit Britain (2019), 1.5 million foreign people attended a professional football game in England. They spend on average €1083 during their visit to the United Kingdom, which comes down to an annual amount of around €1.6 billion spent. 23% of these inbound visitors came specifically for the football match. This is of course beneficial for the country's economy. The KNVB Media (2021) emphasized the societal importance of professional football in the Netherlands. They stated that football connects 8.2 million fans from all walks of life, which comes down to half of the Dutch population.

This all sounds positive, although, there is a flip side of the coin. A relatively small group of supporters uses football matches to behave disorderly. This misbehavior of the so-called hooligans, such as violent or aggressive behavior in the context of sports, exist in different forms. For instance, using physical violence against supporters of opponents and their surroundings, using verbal aggression or demolish properties or objects in and around the stadium. The Cambridge University defines hooliganism as the behavior of a violent person who fights or causes damage in public places (Cambridge University Press, n.d.). Due to disorderly behavior of sport 'fans', most supporters, who behave following the standards, see the misbehavior as harmful for their matchday experience.

Moreover, hooliganism is costly to deal with and diverts scarce police resources from other important uses. According to Fabel and Rainer (2022), the violent assaults on police officers increase by 97 percent on match-days and a home game increases the rate of violent assault by on average 21.5 percent. These statistics have been derived from German data. This is the most generalizable country for England regarding this case, because the average attendances to professional football matches are practically equal. Other European countries are lacking in the attendance numbers. Furthermore, the estimated costs for the violent behavior of fans is also substantial. According to Dubourg and Hamed (2005), the average cost for a common assault in 2003 was £1440 (2680 euro in 2022 when controlling for inflation). A common assault is when a person inflicts violence on someone else or makes them think they are going to be attacked. It does not necessarily have to involve physical violence. When assuming the relative costs of a common assault is constant over the time, it comes down to an

estimated cost of almost €7 million per year, averaged between 2003 and 2018[1]. This only included emotional and physical victim costs and criminal justice system costs, and is therefore just a small part of the total involved costs. For instance, damaged properties, police costs and social and psychological costs from bystanders are not taken into the estimation. The actual costs will therefore be even higher.

Despite these costs, there is not a clear solution regarding reducing the supporters' violent behavior. There has been exhibited various researches about the causes of hooliganism in sport, and in particular football. The crafting of successful anti-hooligan policies will obviously depend on the factors motivating such behavior. However, not all possible causes have been researched. The emphasis was mainly on the impact of socioeconomic, environmental and personal factors, while the effect of the performance of a football team itself lacks evidence.

A couple researches regarding the effect of a club's performance on the volume of hooliganism have been exhibited. Wann et al. (1994) found that a high feeling of identification with a club increased negative emotions when a game has been lost. The English research from Crisp et al. (2007) complemented this by showing that a high identification causes anger as a consequence of a lost match. Marie (2016) and Braun and Vliegenthart (2008) both found in a quantitative study, that matches between two rivals caused more infringements on matchdays. An intuitively unexpected outcome occurred during the research of Sivarajasingam et al. (2005). They found that the supporters of the winning side are caught up in more infringements compared to the losing side. Finally, a Malaysian research from Nur & Sundramoorthy (2015) showed a negative link between a club's performance and hooliganism. However, due to the cultural differences and a lack of insight about the used methods, it is not possible to generalize the results to the western world. All of these papers will be discussed in more detail in the theoretical framework section.

The negative externalities and costs of hooliganism combined with the lack of contemporary evidence on the effect of performance on violent disorder, highlight the necessity to expand the currently available literature. There are only a couple qualitatively high and semi-recent papers around this topic, which makes it interesting to look at the effect of a football club's results on the amount of violent disorder in and around the stadiums during matches. Thus, the central research question of this thesis is:

To what extent does the performance of a football club impact the volume of hooliganism around football matches in England and Wales between 2003 and 2018?

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[1] The quantity of common assaults is derived by looking at the amount of arrests, in the top four leagues in England, measured by The Home Office between 2003 and 2018 (The Home Office, 2018). In total 39,523 arrests around football matches took place, which comes down to an average of 2,635 arrests per season. Multiplying the average number of arrests with the average cost per arrest comes down to 2,635 * €2,680=€7,061,800.

The research about the impact of the performance from a football club on the misbehavior of supporters is socially relevant, because it could lead to important insights in the cause of hooliganism. This expansion of knowledge about the source of hooliganism could be useful to help prevent this aggressive behavior from football fans in the near future. Consequently, the costs of hooliganism on society will reduce, and the matchday experience of the well-behaving fans will improve. Based on the inconsistency, contradiction and scarcity of the findings in the existing literature, it is impossible to state a well-substantiated hypothesis. Therefore, no hypothesis will be stated during this research.

When it turns out that there is no relation between the performance from a team on the pitch and the amount of hooliganism around football games, it could be a sign that people are just attending matches to create agitation, behave violently or demolish objects in and around the stadium. In this case it is useful to try to get to the source of hooliganism and adapt policy regarding the standards and values of a matchday experience and general manners. If this is contradicted by a significant effect of performance on hooliganism, it could be a sign that the results from a football club influence the behavior of the supporters. When this is the case, it could be appropriate to adjust the amount of security and police, depending on the data of past matches against a particular opponent, regarding the amount of hooliganism and the results. It obviously is hard to predict the outcome of a game and therefore the behavior of the fans as well. The exact policy response will also depend on several other factors which motivate disorderly behavior.

Based on multiple Ordinary Least Squares regressions with club, league and season fixed effects, it can be concluded that there is an effect of a team's performance on the supporters' violent behavior. Losing a rivalry match showed a significant effect for causing an increase of the number of arrests. Contrary to this result is the effect of a club's final ranking in the main competition on hooliganism. An improvement in ranking showed a significant effect for causing an increase in the number of arrests.

The structure of this paper to answer the research question is as follows: firstly, the current literature regarding hooliganism will be discussed. This includes the researches about the impact of performance on hooliganism, the causes of hooliganism and the effect of the restrictive policy measures. In the next section data will be elaborated by explaining several determinants. These determinants can serve as performance or hooliganism measure. This is followed by the descriptive statistics of the data to give a clear view on the nature of the data. Thirdly, the methods to answer the research question are shown. Fourthly, the results of the empirical analysis will be presented and the results will be explained. The paper will be finalized by providing a conclusion and discussion to answer the research question.

2   Literature review

2.1   Introduction

In the theoretical framework various subtopics related to hooliganism will be discussed. First of all, the focus will be on the current available literature regarding the impact of the performance of a football team on the detected amount of hooliganism. In this case, performance is seen as the success of the team in terms of wins and losses. This will be followed by a detailed look at the existing literature about the other societal and individual characteristic causes of hooliganism. This is important to get a broader view on the source of the aggressive behavior of fans. Finally, the different policy measures used to reduce violent behavior during and around football matches is discussed. In this subsection, the effect of the policy measures is also taken into account.

2.2   Impact of performance on hooliganism

As mentioned in the introduction only a couple researches have been executed regarding the effect of the performance of a football team on the amount of violent behavior in and around the stadium. The first interesting research is from Cialdini et al. (1976). They found that students who went to university are ashamed of the football team of their university after losing a game. The students wanted to distance themselves from the school. Contradictory, more students showed their affiliation with their university after their university team won a football game. This is supported by Hirt et al. (1992). They stated that the poor performance of a team worsens the self-evaluations and mood of their supporters, which is in line with creating distance with the team which they are supporting. This provides evidence that the result of a football match influences the fans' emotions.

Wann, Dolan, McGeorge & Allison (1994), researched the impact of the supporters' degree of connectedness with their favorite college basketball club. This degree of connectedness is seen as the fans' high- or low-identification with the team. By handing out questionnaires to 104 students, they conclude that the volatility of the emotions of the highly identified fans is larger compared to the less identified fans. They found that following a loss, high-identifiers showed a greater increase in negative mood and a greater decrease in positive mood than low-identifiers. Wann et al. also found that the spectators' behavior can influence the results of competitions for a variety of sports, including football. They concluded that fans with a high level of identification with the team were having a greater influence on the outcome of the game. However, this relation is particular strong at the college level and there cannot be generalized to the professional level, due to the fact that the attendances are way smaller at the college leagues compared to the professional ones. Individuals' shouting could therefore rise above the crowd relatively easy and impact sporters.

The previous research is expanded by Wann, Carlson, & Schrader (1999). They execute a field experiment for students in the American basketball environment. They found, just like the previous paper, that supporters with a high degree of identification, show greater volatility in mood (higher ups and higher downs) when reacting to performance. This is done by handing out questionnaires pre-game and post-game to 196 students. The pre-game questions are about their feeling of identification with their team. After the game the second questionnaire evaluated their behavior. This research expands the previous paper by not only detecting negative mood, but also by including verbal aggression towards referees, opponents and supporters of the opponents. However, there was no physical aggression measured during the research.

All these findings only show that the level of identification had a broad impact on negative or positive emotions for individuals. Crisp, Farr, Heuston and Turner (2007) executed a qualitative research as well. Sixty football supporters were handed a questionnaire in which they had to rank their feeling of various emotions on a scale from one till seven. Just as previous mentioned research, they found the same results regarding the emotional switch for different identification levels of supporters. They explored another noticeable insight as well. When losing a match, supporters with a low level of identification felt sad but not angry, whereas higher identified supporters felt angry but not sad. According to Schreiner (2013), anger and sadness are both reactions to a negative experience. However, the two are very different regarding their expression. Anger is seen as active. It gets individuals fired up, ready to defend themselves or go on attack and makes individuals feel invincible. Whereas, sadness is seen as passive and leaves individuals exposed and vulnerable. Another difference is that sadness accepts the situation for what it is, while anger rallies you to do something to change it. You can say that anger leads to more confrontation-seeking behavior. Schreiner (2016) also stated that anger gets caused by frustration and that frustration stems from the inability to manipulate variables in your environment to your preference (Schreiner, 2014). This inability is comparable to football fans, who cannot do anything about the result, but still try to have an influence in some sort of way. High-identified supporters are therefore more likely to get caught up in infringements compared to low-identified fans.

According to Braun and Vliegenthart (2008), the number of violent infringements in the Netherlands increased when risky matches were being played. Those matches were characterized by increased interests of the opposing teams caused by geographical proximity, sportive prestige or a shared violent history. This increase in violence has been found by using various multiple regressions with club fixed effects from 2001 to 2005. Marie (2016) found comparable conclusions as Braun and Vliegenthart (2008) regarding rivalries, by executing a similar quantitative study located in London with data between 1994 and 1997. A large and statistically significant increase in violence has been found around

and inside the stadium, when a football match between two rivals (a derby match) was being played. Van der Meij et al. (2015) also researched the effect of rival matches on violence. He found relatively high levels of anger and aggression by fans after watching their favorite team lose from their fiercest rival. However, the findings of the research should be interpreted with caution as they were conducted in a controlled environment, away from the numerous other important factors.

Furthermore, Sivarajasingam et al. (2005) found that the influence of the outcome of a match on the violent behavior of fans, has an unexpected outcome to what one might assume. The supporters of the winning side are caught up in more infringements compared to fans of the losing side. Possible explanations which they stated, might be the created feelings of pride, confidence and celebration. This study has been executed between 1995 and 2002 in Cardiff. A multiple linear regression is used to obtain the results. More recently, in a Malaysian context, the paper from Nur & Sundramoorthy (2015) has shown that hooliganism can be influenced by the performance of the favorite football club of the supporters. The feeling of disappointment was visible when an unpleasant result occurred. Because of the context of this research, a whole different environment and culture is analyzed and therefore it may not be possible to generalize this finding to the western world. Moreover, the findings are based on interviews among football supporters and little information about the econometric analysis was provided, which makes the results highly doubtful.

In summary, the published literature about the performance of a football club is limited and outdated. New policy measures and changes in scale and infrastructure have changed the situation around football matches. Moreover, only the research regarding the rival matches used appropriate quantitative methodologies in order to obtain conclusions. Most other studies rely on questionnaires and are field experiments. In addition, these dialogue-based studies target one single club or town and in most of the cases on an amateur level. This is disadvantageous regarding the external validity. Only Braun and Vliegenthart (2008), accomplished to create a high quality research on a country-level. Therefore, more recent and data-driven research is necessary to obtain more insights in the causal relationship between football hooliganism and team performance.

2.3   Causes of hooliganism

In the previous subsection we have seen that there has not been done much high quality research regarding the effect of performance on hooliganism. It does not seem that there is no effect between the two, but it lacks recent dropped evidence. To see if there are any other explanations for the disorderly behavior of football fans, we take a deeper look into the question why people behave violently and hooliganistic.

According to Collins (2009), there are different kinds of violence, like domestic violence, police violence and war, which get triggered by different components. These components can be individual characteristics or environmental factors. Also Braun and Vliegenthart (2008) stated that the disorderly behavior by fans is caused by various factors and motives, including economic motives. According to them, media coverage of football riots, both in newspapers and online, leads to more hooliganism in subsequent time periods. They also stated that the unemployment of adolescents seems to have a significant effect on the amount of incidents around a football match as well. This economic disadvantage of unemployment leads to dissatisfaction, which causes some individuals to decide to act hooliganistic if the political structure allows them to. The research of Piotrowski (2006) is in line with these findings. He found that a greater number of disadvantageous variables and personal characteristics caused an increase in the chance of behaving violently. These characteristics and disadvantageous variables, to which an individual has been exposed in the past, were for instance a slow learning progress, low self-esteem and dysfunctional family.

Armstrong (1998) stated that involvement in hooliganism can be explained by looking at the individuals' circumstances of their environment. When groups of friends are together, some want to show off their abilities and look tough for their friends. This creates a domino-effect for the violent behavior within a group. Controversially, the group-effect can also work the other way around. When the norm of behavior in a group of friends or family is to behave normally, an aggressive individual is more likely to get corrected by the others. This indicates that the gap between violent and non-violent groups expands.

When looking at the cause of hooliganism, it is also important to address who the offenders are that act violently. If there is a particular group overrepresented, it could be useful to go to the source by asking why they act this way. Dunning, Murphy and Williams (1986) stated that male adolescents from the lower working-class seem to be the most central and persistent perpetrators. Marsh and Frosdick (2005) describe the cause of hooliganism by looking at the psychological and social components. They agree with Dunning et al. (1986) that the youth is a problem in the scene because of the significant part in which they occur in football related incidents. However, they do not blame the youth, but the factors which influence them. For instance, their parents, media, police and school teachers. They blame these groups for not taking them serious and in some way ignoring them. As a consequence, young supporters behaved disorderly which was, according to them, in line with their social identities. According to Marsh and Frosdick, the solution to narrow the gap, which was created between the youth and the other groups, is to show more tolerance to the youth fans and try to better understand their behavior. The English Association of Chief Police officers (ACPO) confirmed that young people were increasingly involved in incidents around the stadium. In 2010, 47% of the them involved youth.

Andy Holt, an ACPO representative, confirmed that it was "a worrying trend that the younger element are starting to pick up on this sort of behavior". (Bridge, 2010).

Conclusively, there are various possible explanations for hooliganism. Various socio-economic, individual characteristics and other individuals in their social circle are all influencing the violent behavior. There is not a factor that solely causes this behavior, but a combination of multiple factors forms the cause of the violent behavior. This combination of factors does not form a general explanation which is applicable for every club or individual, due to the differences between clubs and between individuals. In the next section multiple policy measures will be mentioned to solve the hooliganism issue. Moreover, the consequences of the measures will be discussed.

2.4   Policy measures

In the last decades, various governments have implemented and adapted their legislation regarding trying to counteract hooliganism. Also clubs can change their policy, for instance regarding alcohol sales, the quantity of security and police forces and identity verification at the entrance of the stadium.

In 2000, an adaption to the previous legislation in the United Kingdom from 1989 was made. This was about the Football Banning Orders (FBO). These banning orders prohibit individuals to come near all football grounds during a certain amount of time, dependent on the seriousness of the infringement. Banned individuals can also be prohibited to use public transport or entering city centers on match-days. The changes in legislation contains "*the court to be able to make a banning order on a complaint (as well as on conviction of an offence), where the court believes that such an order would help to prevent violence or disorder at or in connection with certain association football matches*" (Football (Disorder) Act 2000, 2000 c. 25). This facilitation for the court helps them to give out FBO's with less legislative restrictions and a quicker implementation.

However, FBO's have proven to be controversial. Stott and Pearson (2006) stated that the human and civil rights are being impacted by the banning orders, because of the prohibition to come near a public place. Moreover, the infringements of the human and civil rights of suspected 'hooligans' who got a FBO on complaint, can hardly be justified when looking at proportionality, which is supported by James and Pearson (2016). Stott and Pearson also implied that travel restrictions for convicted hooligans may not have an impact on the amount of disorder. Additionally, they stated that there are various other ways of applying policy, which ensure the human and civil rights and are more effective as well. According to Stott and Pearson, FBO's serve as a short term solution. This is due to the time constraint of the banning order. After the banning order expires, the individual is free to visit matches and behave disorderly again. An infinite stadium prohibition is not possible due to the current legislation. The long term solution is way more interesting and can be obtained by creating internationally developed police

strategies. In Italy the same issue regarding the disproportionality of several measures goes against the civil liberties. Testa (2013) stated that not only Italian football fans have criticized the government's preventive measure to control violence disproportionate, but also national political groups such as the liberal democrat radical party.

Above this, there is no evidence that the FBO's are effective. Hopkins and Hamilton-Smith (2014) found no quantitative evidence regarding the effectiveness of FBO's. However, in an online survey among supporters they found that 59 percent of the respondents believed that hooligans had become more selective in deciding when to behave disorderly in order to avoid undesired police attention, after the introduction of FBO's. 12 percent even opined that the policy measure effectively wiped out the hooligan firms from their favorite football club and the remaining 29 percent did not notice a significant difference. This implies that most of the supporters think that FBO's work properly. However, Hopkins (2014), stated that the number of football-related arrests in the United Kingdom had been decreasing following a linear pattern in the decade before FBO's were adapted and continued to fall at a similar pace after their adjustments in 2000. The big change in legislation did not change the velocity of the decrease in hooliganism, which implies that the effectiveness of the adjustment is not proven.

There have been introduced various other possible solutions to reduce violent behavior. For instance, the alcohol bans in the stadium. According to Nepomuceno et al. (2017), the implementation of the prohibition of consuming alcoholic beverages during football matches does not reduce violent behavior. In a seven years research exhibited in Brazil, they concluded that alcoholic consumptions barely influence hooliganism and that the disorderly behavior of the fans is probably more related to other factors, such as competitiveness, supporter pride levels and league phase. Ostrowski (2014) agrees with the misfunctioning of prohibiting alcohol. However, he implied that multiple variables, which are closely related to alcohol consumption and/or violent behavior, have been overlooked in many researches. Some of these variables are impulsivity, anger and team identification. He stated that researches without those variables are inconclusive. Research in the Netherlands by Postma et al. (2015), found that an alcohol prohibition inside the stadium causes disturbances outside the stadium and did not have a significant effect on the degree of violence inside the stadium. However, there is an increase in offences outside the stadium, due to the knowledge of the fans that no alcoholic beverages would be sold inside the stadium. As a consequence, individuals decided to begin drinking alcohol beverages earlier. An alcohol prohibition seems to work counterproductive.

Another finding by Postma et al. (2015) is that the risk of incidents, both inside and outside the stadium, is higher when matches are played at a later time of the day. Individuals have more time to

get drunk or high compared to early kick-offs. Moreover, matches during hours of darkness were found to be related to an increased likelihood of incidents occurring inside the stadium. The number of infringements outside the stadium did not show a difference. More matches in the afternoon could therefore be a part of the solution. They also researched that the so called mandatory match-cards are not effective. These cards include your identity and is used to prevent well-known hooligans to attend the matches. However, these policy measures are not effective in preventing offences. This can be due to the fact that this measure does not succeed in keeping those disorderly behaving people outside the stadium, or because of the fact that many troublemakers are not known. Moreover, around the stadium they will still have free rein.

According to Poutvaara and Priks (2009), an increase in looking at certain characteristics of spectators (i.e. age, gender and … group size), , also known as discriminative policing, leads to a decrease in offences. However, indiscriminative policing, such as random jailing of potential law breakers and the use of teargas, could be counterproductive and result in small but more aggressive groups. They also show the need to study violent supporter or youth groups in more detail to make sure counterproductive policy responses are avoided. Radmann (2014) emphasizes this by displaying how hooligans see themselves. Most of them do not see themselves as hooligans, but as gentleman who fight clashes between equals and have respect for other violent groups with who they collide. They also said to never harass innocent people. The hooligan described in the media and the hooligans' view of himself are the complete opposite. This makes it very important to understand these groups perfectly and study those in detail. Their self-image has to be taken into account to increase the odds of creating effective policies.

An important factor in counteracting hooliganism is the presence of the police. Cleland and Cashmore (2013) researched the fluctuation of the experience of football spectators over time. They looked especially at the causes of the decline in hooliganism from the 2000's. The most given reason for the decline was the improvement in police intelligence, surveillance and security and how this has driven the violence away from the stadium. These improvements were beneficial for the experience of the spectators. Stott and Pearson (2006) researched that utilizing a low-profile police presence is more likely to prevent violent behavior rather than deploying a highly visible police presence. However, according to Radmann (2014), police officers are not always acting professionally. They affect innocent people when harassing disorderly behaving individuals and therefore, influence the matchday experience of innocent spectators in a negative way. Frosdick (2005) stated that the approach of police outside the ground has a direct influence on the behavior of fans inside the ground. Stott et al. (2012) agreed with Frosdick. They conducted a one club research for three seasons and found more evidence regarding the impact of the police on supporter behavior. When approaching supporters on a less

dominant way and a more dialogue-based manner, fans are more likely to apply self-regulation and avoid infringements. Moreover, Laursen (2019) researched the effects of different ways of acting by the police in Denmark. He found that when the police were generally seen as being unfair, a converse reaction from the well-behaving supporters is witnessed. These 'good' supporters are backing the hooligans and help them turning against the police. Marsh and Frosdick (2005) discussed the 'friendly but firm' policing used during the European Championship in 2000 in the Netherlands and Belgium. This contains unobtrusive presence of the police, who are friendly, but firm if needed. This was combined with serving low-alcoholic beer, removement of throwable objects and using an extreme sound system, which hinder hooligans to argue. This carefully planned approach resulted in no reports of serious problems.

All in all, there are various possible interventions, which tend to reduce violence in and around the stadium. However, there is not one particular golden rule to reduce violent behavior for every situation and maximize the matchday experience for the innocent spectator. A combination of various policy measures have to be implemented, depending largely on the highly variable characteristics of the supporters from the club and their standards and values. However, the police's reputation and the way in which the police act and present themselves, seems to have a significant effect on the fans' behavior. The literature highlighted that when implementing new measures, human and civil laws have to be guaranteed and cannot be played with.

3   Data

3.1   Data sources

In order to examine the research question, data from all clubs from the top 4 football competitions from England and Wales are taken into account. The highest league is the Premier League, followed by the Championship, League One and League Two. The Premier League has 20 football clubs in their competition. The three other leagues each do have 24 football clubs. When accumulating all these clubs, it comes down to 92 researched teams per season. The football clubs are being researched during fifteen consequent seasons between 2003 and 2017. The seasons are used as the time series of the model and will be run from approximately August till May. In this research the season will be noted as the year in which a season begins. So for example, the season 2004-05 will be noted as 2004. The fifteen seasons combined with the 92 football clubs in the four competitions accumulated, leads to 1,380 datapoints over the period.

This data is retrieved from "The Home Office" (The Home Office, 2018). This government body produce and publish timely, accurate and objective statistics in the form of commentary, tables and data about various subjects and are located in the United Kingdom. From this data source the quantity of imposed banning orders and the number of arrests during football matches are retrieved from the database. These two variables are used as hooliganism measures. The Home Office sort their data for each team for every season separately. Another source is used for this research, which is "www.transfermarkt.com". This website is the largest platform for football statistics in the United Kingdom. From this website the final ranking of the football clubs are picked. The same site is also used to assign all football clubs to their complementary league for each season. Furthermore, data from the website "www.11v11.com" is being used (11v11.com, 2018). This site contains a detailed football related data platform, which includes all match results between all clubs who play in the top five leagues English leagues from 2002 till present. The data was obtained to collect the amount of lost derby's per season. The average attendance per club per season, together with the stadium capacity of clubs, is also retrieved from this website. This is used to get a visual representation of the difference in average stadium attendance and average attendance density per league. Last of all, "www.wikipedia.com" is used to get information regarding which derby matches exist in the top four competitions in England and Wales ('List of association football rivalries in the United Kingdom', 2022).

3.2   Variables

In order to use the retrieved data for the econometric analysis properly, multiple variables have been created. First of all the competition in which clubs participate is divided into four dummy variables. Each dummy represents one league. When a football club is competing in the league of the dummy variable in that season, it will be noted as "1". Vice versa, if a football club is not competing in the league of the dummy in that season, it will be recognized as "0".

The variables which display the amount of violence are the quantity of imposed banning orders and the number of arrests. The variable *imposed bans* exhibits the number of new assigned banning orders for fans who are supporting a specific club. A banning order is a prohibition to enter the stadium to attend a football match for a certain amount of time, depending on the type of offence that caused the banning order. This could be due to various reasons, such as pitch incursion, throwing missiles, public disorder or alcohol offences. Looking at the number of new generated banning orders at the end of a season is a way to measure the behaviour of the fans. The number of imposed banning orders resets to zero at the start of every season, which is around the crossover between August and September. Due to this reset the performance of a club during a season can be directly compared to the quantity of banning orders of the equivalent season. One person could get more banning orders during a season. If this is the case, the total amount of times someone gets a banning order will be

accumulated. The other violence measure is the number of *arrests*. This variable gives the number of fans who are arrested by the police before, during and after a football match of the fans' favorite club. This variable is given separately for each team and season. The number of arrests during a season says something about the degree of violence from the spectators. Therefore, it is an appropriate measurement of the rate of hooliganism.

Obviously, various performance measures are also necessary for this research. The first variable to indicate the success of a club is the *final ranking*. The final ranking describes the clubs' position at the end of the season in the main league in which the club participates. When finishing first in the competition, the club becomes champion and promotes to a higher league or qualify for prestigious European tournaments. When finishing last the club relegates to a lower league in which it has to compete next season. A lower numerical final ranking is therefore better than a higher numerical ranking. The final ranking is logically an appropriate variable for performance, because getting to a better place on the league table means you have gained more points, and therefore performed better compared to clubs who finished on a worse spot. For the premier League a value from one to twenty can be assigned and for the other three leagues a value between one and 24 can be allocated. The second performance measure is the *top 3* variable. This is derived from the final ranking. It is a dummy variable, which will be noted as "1" if a club ends up in one of the first three places in the league in a specific season. Obviously, the value will be "0" if the club finishes lower than third in the competition. Ending up in the top 3 in the standings has promotion as a consequence, just as finishing first in the league. When competing in the Premier League, finishing in the top 3 means direct qualification for European football when competing in the highest league. For a lot of teams these objectives are the main goal of the season and therefore highly important. The third variable is the *bottom 3*. This is the opposite from the top 3 variable and is also a dummy. The variable will take the value "1" if a club ends up in one of the last three places in the league in a specific season and "0" otherwise. Finishing in the bottom 3 has direct relegation as consequence, which makes clubs do everything to avoid these positions. The fourth and final performance measure is the *derby losses*. Every football club has opponents were the rivalry is more excessive compared to other opponents. In football terms we talk about derby's when speaking about those rivalry matches. The variable indicates the number of lost derby's for each club per season. This extraordinary rivalry between two clubs may lead spectators to become more emotional. This could impact the amount of arrests and imposed banning orders during a season. Quantitative research already found an increase in infringements at derby matches compared to non-derby matches in London and the Netherlands (Marie, 2016; Braun and Vliegenthart, 2008).

3.3 Descriptive statistics

Table 3.1 provides an overview of the descriptive statistics of the variables which will be used in the regressions. The dataset as a whole will be examined, but in the descriptive statistics every league is also separately evaluated for every variable. This will be done to visualize the difference between the leagues and show the importance of using fixed effects. The descriptive statistics contain the number of observations, the means, the standard deviations, the minimum values and the maximum values of the variables used in the regressions.

Table 3.1: Descriptive statistics

Variable	Observations	Mean	St. dev.	Min.	Max.
Imposed bans					
Premier League	300	12.24	11.570	0	95
Championship	360	10.067	11.058	0	63
League One	360	5.85	8.114	0	66
League Two	360	3.986	5.656	0	45
Total	1380	7.853	9.836	0	95
Arrests					
Premier League	300	55.693	43.809	3	276
Championship	360	34.742	26.656	0	173
League One	360	17.714	19.262	0	156
League Two	360	10.919	12.272	0	97
Total	1380	28.640	31.922	0	276
Final ranking					
Premier League	300	10.5	5.776	1	20
Championship	360	12.5	6.932	1	24
League One	360	12.5	6.932	1	24
League Two	360	12.5	6.932	1	24
Total	1380	12.067	6.741	1	24
Derby losses					
Premier League	300	1.5867	1.630	0	7
Championship	360	0.881	1.107	0	6
League One	360	0.775	0.971	0	4
League Two	360	0.75	0.961	0	4
Total	1380	0.972	1.220	0	7
Top 3 / Bottom 3					
Premier League	300	0.15	0.358	0	1
Championship	360	0.125	0.331	0	1
League One	360	0.125	0.331	0	1
League Two	360	0.125	0.331	0	1
Total	1380	0.130	0.337	0	1

Table 3.1 is used to give a quick overview of the dataset. First of all, it is visible that the quantity of observations is not equal for all leagues. As mentioned in the data section, the Premier League has less datapoints compared to the other leagues, due to the size of the competition. Therefore, the Premier League contains 300 datapoints in total and the other leagues have got 360 datapoints.

The first real notable insight is about the average number of imposed banning orders. For the Premier League this average amount of imposed bans is the highest and this average number is descending when looking at lower leagues. This pattern is also visible for the average quantity of arrests. This phenomenon can be explained by the amount of supporters who are visiting the games. Obviously, when the average number of supporters attending the matches increases, the number of arrests and imposed banning orders do also show an increase on average. The higher level competitions have a way larger stadium capacity compared to the lower leagues. This leads to a larger amount of supporters who attend the games. The higher quantity of attendances in the top leagues gets strengthened due to the quality of the players on the pitch, which attracts even more football fans. Figure 3.1 displays a clear overview of the differences in attendances per league and in the density in the stadium. The average attendance density is the rate of the average attendances per club and the clubs' total stadium capacity. The means of the clubs is used to obtain the leagues averages. The figures confirm that the stadium capacity has a significant role in the spectators gap, but also that the stadium capacity is not the limiting factor in every league, except for the Premier League. Moreover, the average density in the League one and the League Two is below 50%, which means that on average more than half of the stadium is empty.
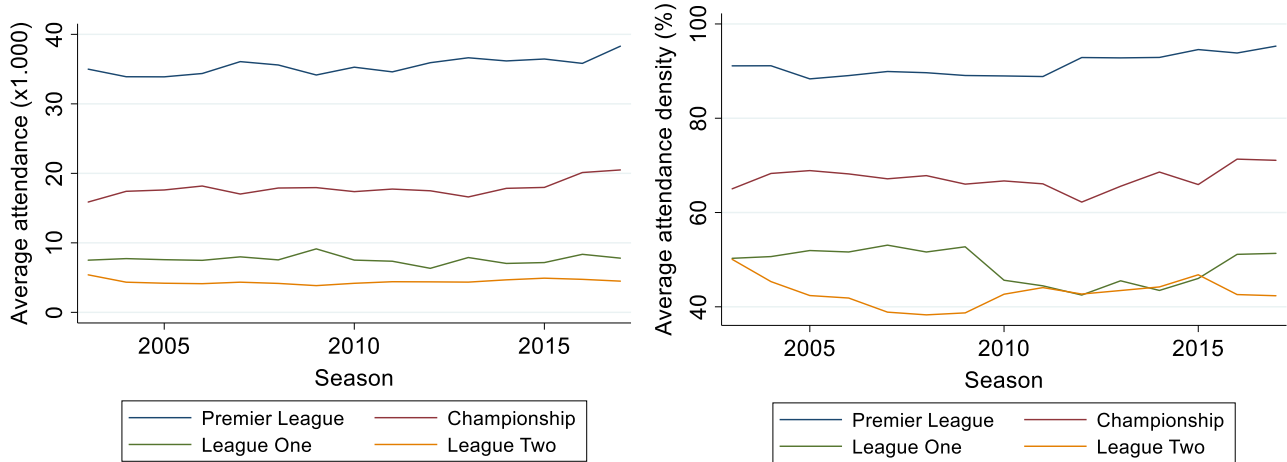

Figure 3.1. The average attendance per match (1) and average attendance density (2) per league between 2003 and 2017

The large standard deviations for the imposed bans and arrests are interesting statistics as well. This means that the amount of imposed bans and arrests differ a lot across clubs in England and Wales. This can be explained by the nature of the supporters of the football clubs. Some clubs have supporters who are more passionate compared to the fans of other clubs. which could lead to a higher chance of extraordinary and undesirable behavior by the fans. These differences between clubs gets even more emphasized by the enormous difference between the minimum and the maximum values of the imposed banning orders and the arrests. The standard deviation of the derby losses during a season is also large and there is a descending pattern when looking at the average amount of derby losses for the leagues. A lot of clubs, especially clubs from the two lower leagues, do not have any specific rivalries and do therefore never lose a derby. Larger scaled clubs often have created more rivalries in the past, due to the fact that they have a higher interest by a good performance and therefore get more competitive. They moreover have a greater fanbase to please. These bigger clubs generally play in the higher leagues, which could be a reason for the higher average amount of derby losses during a season for the better competitions compared to the lower ones.

All of these differences within and between the competitions shown in the descriptive statistics, emphasizes the importance of executing the econometric analysis with the club and league fixed effects included. In Figure 3.2 the development of the total amount of imposed banning orders and arrests per league over time is given. This shows a decrease from 2003 till 2017, with a slight increase for the Premier League arrests between 2006 and 2009. The evolution of the average imposed banning orders over time is not as clear as the average amount of arrests, although in general there is a general declining trend visible in both graphs. It is also remarkable that the average amount of arrests and imposed banning orders per league during a season is narrowing over time. This is mainly because of the huge decline from the Premier League and the Championship. The League one and League Two show a smaller decline, which helps narrowing the distribution between the highest and lowest league. The graphs highlight the importance of not only using club and league fixed effects, but season fixed effects as well. The fluctuation over time, especially at the imposed banning orders graph, is very volatile and may therefore be influenced by external effects.
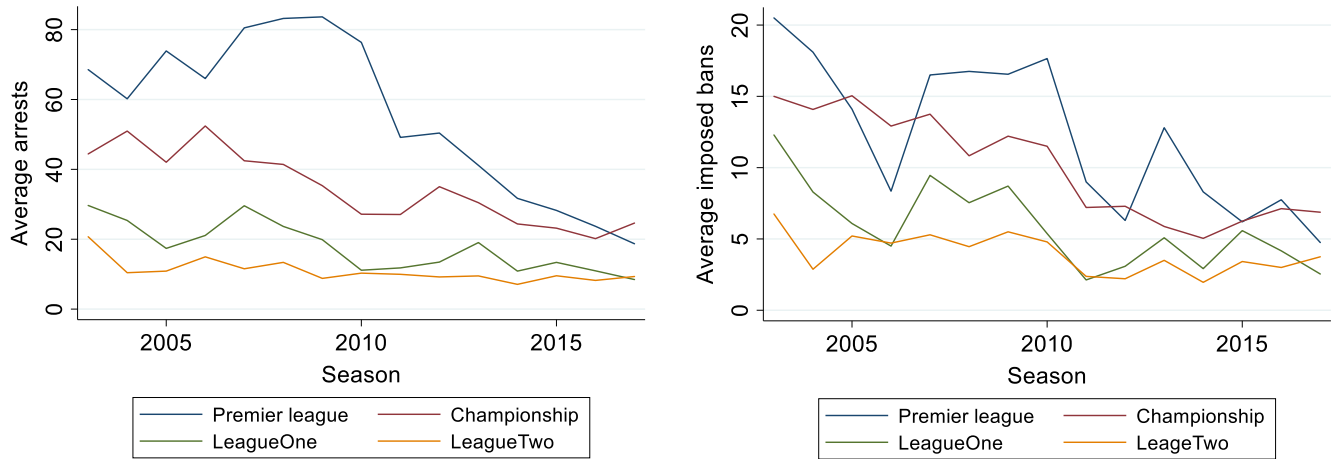
Figure 3.2. The average number of arrests (1) and imposed banning orders (2) per league between 2003 and 2017

4   Methodology

With the variables mentioned in the previous section, multiple analysis will be executed. Due to the availability of panel data, it is possible to include fixed effects for clubs, leagues and seasons for all the Ordinary Least Squares regressions. For this research, it is necessary to control for club, league and season fixed effects, because there could be a lot of club, league and season specific (un)observed factors that do not vary across time. This makes the fixed effect regression a suitable method in this case. The model would almost certainly contain omitted variable bias when these fixed factors are ignored. When adding the club, season and league fixed effects, this risk of omitted variable bias diminishes and a more certain conclusion can be drawn from the analysis. For instance, club fixed effects account for the fact that clubs that tend to have more (or less) violent fans may also have systematically different performances. League and season fixed effects are also necessary, because there could be a type of spectator regulation by policy makers for a specific league, or a specific season, which could impact the level of violence. During the analysis the full sample will be taken into account. This means that there will be no distinction between the four leagues. The leagues are not scrutinized separately due to the presence of league fixed effects. In order to examine the effect of team performance on fan hooliganism behaviour, regressions of the following form will be run:

$$FanHooligansim_{tsl} = \alpha + \beta_1 * PerformanceMeasure_{tsl} + Team_t + Season_s + Leauge_l + \varepsilon_{tsl}$$

The variable $FanHooligansim_{tsl}$ refers to some measure of fan hooliganism, which in this research comes down to the quantity of *imposed banning orders* or *arrests* of team *t*, in season *s*, in league *l*. The variable $PerformanceMeasure_{tsl}$ refers to some measure of a team's performance. These

measures are their *final ranking*, the amount of *derby losses*, if they finish in the *top 3* and equally for the *bottom 3*. The regression also includes team ($Team_t$), season ($Season_s$), and league ($Leauge_l$) fixed effects.

In the first section, the *final ranking* and the amount of *derby losses* will be used as performance measure. Six regressions will be run. This consists of two regressions with only *final ranking* as independent variable, two regressions with only *derby losses* as independent variable, and finally two regressions with both performance measures included. Logically, there are two different regressions for each performance measure, due to the two different fan hooliganism measures who have to be measured apart from each other. The second section is built up the same way. However, alternative team performance measures will be considered in this section. The *top 3* and *bottom 3* variables will replace the performance measure *final ranking*. The *top 3* and *bottom 3* are directly derived from the *final ranking* and therefore have a strong correlation. Consequently, the two performance measures cannot serve as independent variables in the same regression. The two regressions which provide the effect of the amount of *derby losses* on the two fan hooliganism measures are executed in both sections and will therefore be equal. However, these two regressions will be added in the first and second section to make sure a clear table is obtained in both of the sections. In total, ten unique regressions will be run.

It is useful to look at the second section of the results to control if the results from the regressions with final ranking as independent variable have a linear pattern. When looking at the regressions with *final ranking* as independent variable (section 1) and there speculatively appears to be a significant effect on the hooliganism measures, there can only be said something about what happens with the fan hooliganism measures when a team gains one place in the standings. The coefficient is equal for all changes in position. For instance, an increase in ranking from third to second has the same effect as an improvement from sixteenth to fifteenth. When there is a significant effect as well for the *top 3* and *bottom 3* variables (section 2), it could be a sign that supporters are reacting heavily on promotion, relegation or qualifying for European tournaments, which are results of getting into the top 3 or bottom 3. Consequently, it is plausible that the reaction of the finishing position is non-linear for the standings of the league and that finishing in the top 3 or bottom 3 has a greater effect compared to finishing in the less noticeable spots.

5   Results

5.1   Graphical results

In this subsection of the results, an intuitive and graphical presentation of the relationship between the performance and violence measures is displayed. Figure 5.1 presents a scatterplot, complemented with a line graph, which serves as an interpretational overview of the relationship between the different violence measures and performance measures. There is a clear negative relationship between the two violence measures and the final ranking. However, when looking at the distance from the dots of the scatterplots to the line graph, there is a difference between the two figures. The distance of the dots to the graph line is larger when looking at the graph with the Imposed bans in a season on the y-axis (2), compared to the graph with arrests in a season on the y-axis (1), which could imply a less clear effect of the final ranking on the number of imposed bans. Figure 5.2 also includes a scatterplot with a line graph to provide an insight regarding the relationship between the number of lost derby's in a season and the two violence measures. The graphs display a positive effect. This is contradictory to Figure 5.1 were a negative relationship between performance and violence is shown. Figure 5.2 also shows a sharp increase in the violence measures when looking at six and seven derby losses in a season. This is due to the fact that only in the higher competitions this amount of lost rivalries occurred, which is shown in Table 3.1. From the descriptive statistics can also be derived that the number of arrests and imposed banning orders are way higher in the higher leagues. This causes the quantity of arrests and imposed bans to increase sharply when looking at six and seven lost derby's by a team in a season. When ignoring the datapoints which represent the six and seven derby losses per season, there is still a positive trend between the derby losses and the violence measures.
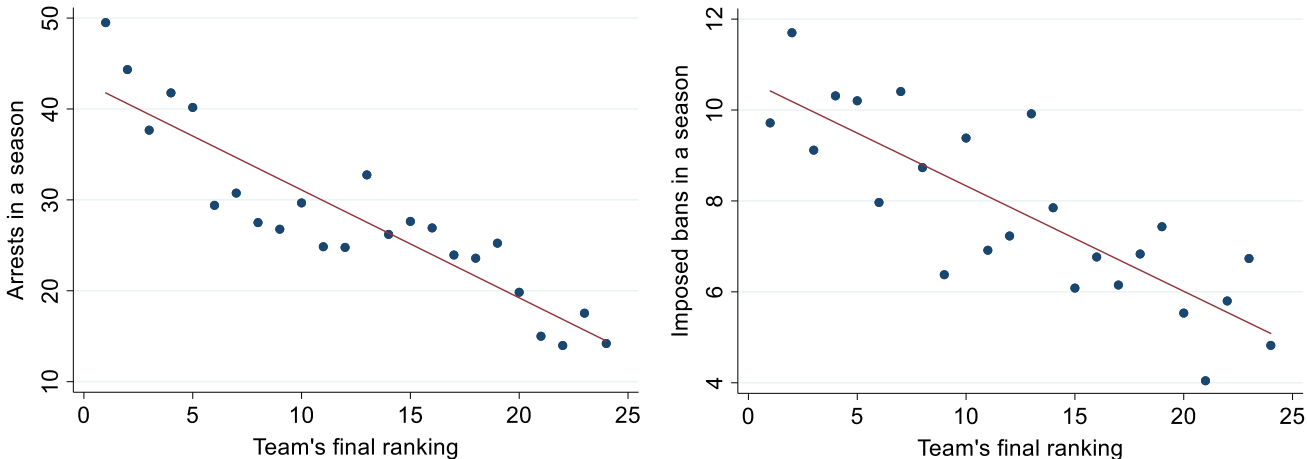

Figure 5.1. Correlation between a team's final ranking and the number of arrests (1) and imposed banning orders (2) in a season
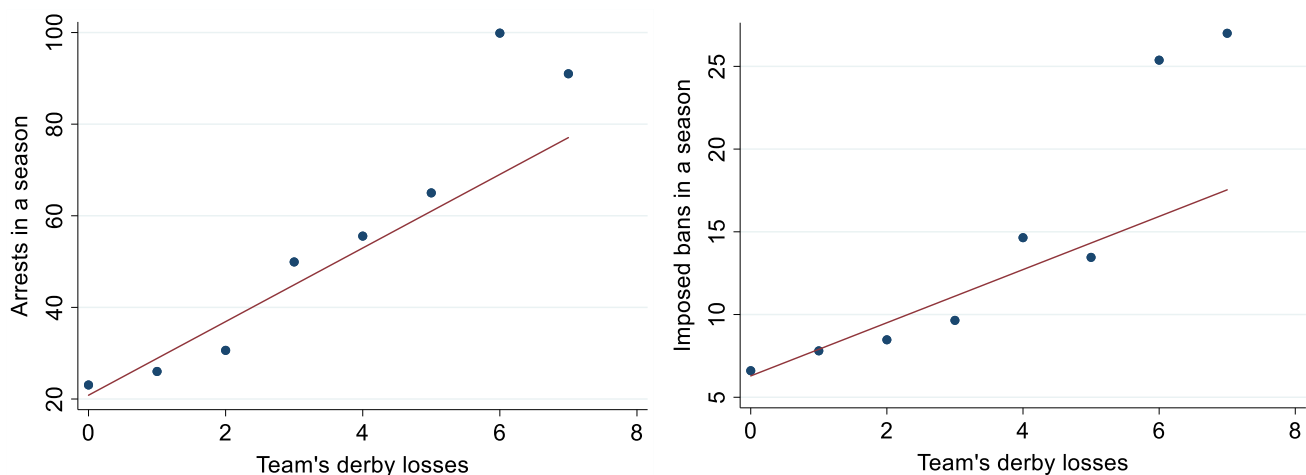
Figure 5.2. Correlation between the number of lost derby's and the number of arrests (1) and imposed banning orders (2) in a season

5.2   Effect of final ranking

In the subsection of the results, the effect of *final ranking* and the amount of *derby losses* on the two fan hooliganism measures, *arrests* and *imposed bans*, will be investigated. The results of the fixed effects regressions are presented in Table 5.1. Each column shows the results of a separate regression, with the corresponding dependent variable given in the first row of the table.

Table 5.1 Linear regression results for the relationship of final ranking and derby losses on fan hooliganism measures

Variable	(1) Arrests	(2) Imposed bans	(3) Arrests	(4) Imposed bans	(5) Arrests	(6) Imposed bans
Final ranking	-0.179**	-0.0356			-0.205**	-0.0472
	(0.0871)	(0.0357)			(0.0901)	(0.0368)
Derby losses			1.375**	0.639*	1.516**	0.671*
			(0.675)	(0.333)	(0.701)	(0.342)
N	1380	1380	1380	1380	1380	1380
R-Squared	0.727	0.475	0.727	0.478	0.728	0.478

Note. Standard errors are in parentheses; The coefficients of the club, league and season fixed effects are not presented in the table. However, they are used in the regressions; $*p < 0.10$, $**p < 0.05$, $***p < 0.01$.

In the first regression the effect of *final ranking* on the amount of *arrests* is shown. This effect is significant at a 5% significance level. The effect is -0.179, which means that if a team drops a place in the final standings at the end of the season, and the *final ranking* therefore increases, the amount of arrests decrease on average with 0.179. Intuitively, when adding a position to the *final ranking* means that a club gets a worse ranking. In the second regression the effect of *final ranking* on the other fan

hooliganism measure, which is the number of *imposed bans* during a season, is being evaluated. The *final ranking* has a small negative effect of -0.0356 on the quantity of *imposed bans*. However, the effect is not significant, which means that it cannot be assumed that the coefficient is significantly different from zero.

In the third and fourth regression, the *final ranking* gets replaced by the *derby losses*. In the third column the effect of *derby losses* on *arrests* is being displayed. There is a significant effect at a 5% significance level. the effect is 1.375, which means that losing an extra derby during a season has as a consequence that the *arrests* on average increase by 1.375 during a season. This is in line with the literature, because an additional loss against a rival could generate more negative emotions to fans. These negative emotions could cause an increase in disorderly behavior with arrests as a consequence. In the fourth column, the effect of *derby losses* on the amount of *imposed bans* is being researched. The result is significant at a 10% significance level. This is generally seen as a marginally significant coefficient and is not overly convincing. Speaking of a clear causal effect is therefore too optimistic. The effect is 0.639, which implies that the losing an extra derby match increases the number of imposed banning orders by 0.639. this is in line with the past research.

In the last two regressions of this section of the results, the *final ranking* and the amount of *derby losses* are simultaneously added to the model. The effect of the two performance measures on *arrests* is displayed in the fifth regression. The *final ranking* has a significant effect at a 5% significance level. When a team drops one place in the standings, the average amount of arrests decline by 0.205. Just as the first regression of Table 5.2. *derby losses* does as well have a significant effect on *arrests* at a 5% significance level. An additional derby loss from a club causes on average a 1.516 increase in the quantity of arrests. This is in line with the current existing literature. The regression regarding the effect of the combination of *final ranking* and *derby losses* on *imposed bans* is presented in the sixth column. The effect of *final ranking* on *imposed bans* does still not have a significant effect at a 5% significance level. This means that it cannot be assumed that the negative coefficient of -0.0472, is significantly different from zero. The effect of the variable *derby losses* on *imposed* bans does also not have a significant effect at a 5% significance level. However, the effect is significant at a 10% level, which causes the coefficient to be marginally significant. The effect of 0.671 implies a positive effect between the two. An extra lost derby during a season increases the number of imposed bans on average by 0.671.

Concludingly, the effect of the final ranking in the competition and the amount of derby losses only have a significant effect of the amount of arrests. The two performance measures do not seem to influence the quantity of imposed banning orders during a season. The coefficients of the two

regressions with *final ranking* and *derby losses* combined are as good as equal compared to the other regression where the performance measures are estimated separately.

5.2   Effect of top 3 and bottom 3

In the second section of the results, the effect of ending up into the *top 3* and the *bottom 3* on the two fan hooliganism measures will be investigated. These measures are the variables *arrests* and *imposed bans*. The results of the fixed effects regressions are presented in Table 5.2. Each column shows the results of a separate regression, with the corresponding dependent variable given in the first row of the table.

Table 5.2 Linear regression results for the relationship of top 3, bottom 3 and derby losses on fan hooliganism measures

	(1)	(2)	(3)	(4)	(5)	(6)
Variable	**Arrests**	**Imposed bans**	**Arrests**	**Imposed bans**	**Arrests**	**Imposed bans**
Top 3	2.547	0.0244			3.060	0.236
	(2.816)	(0.777)			(2.802)	(0.801)
Bottom 3	-1.006	0.584			(1.362)	0.437
	(1.281)	(0.692)			(1.320)	(0.707)
Derby losses			1.375**	0.639*	1.535**	0.635*
			(0.675)	(0.333)	(0.682)	(0.345)
N	1380	1380	1380	1380	1380	1380
R-Squared	0.726	0.475	0.727	0.478	0.728	0.478

Note. Standard errors are in parentheses; The coefficients of the club, league and season fixed effects are not included in the table. However, they are used in the regressions; *p < 0.10, **p <0.05, ***p < 0.01.

In the first regression the effect of the *top 3* and *bottom 3* on the *arrests* is being displayed. Finishing in the *top 3* increases the number of *arrests* on average by 2.547 and finishing in the *bottom 3* decreases *arrests* on average by 1.006. However, the effect of both of the independent variables on the quantity of arrests are not significant at a 5% significance level. This is quite surprising, because the final league ranking of a team did have a significant influence on the amount of arrests. Moreover, the variables *top 3* and *bottom 3* are derived from the *final ranking* variable.

In the second regression the effect of ending up in the *top 3* and *bottom 3* on the *imposed bans* is being evaluated. The coefficient of getting into the top 3 or bottom 3 are both not significant at a 5% significance level. Therefore, it cannot be assumed that the coefficients of 0.0244 for *top 3* and 0.584 for *bottom 3*, differ from zero. This is less surprising compared to the results of the previous regression. This is due to the fact that the effect of the position in the final standings on the amount of imposed banning orders was also insignificant in Table 5.1.

The third and fourth regression contain the effect *derby losses* on *arrests* and *imposed bans*. The regressions have already been discussed in section 5.1 and will therefore not be further evaluated in this section. Despite this, the results of the regressions are shown at Table 5.2 to ensure integrality.

In the last two regression of this section of the results, the *top 3*, *bottom 3* and the amount of *derby losses* are simultaneously added to the model. The effect of the three performance measures on *arrests* are displayed in the fifth regression. The coefficients of the *top 3* and *bottom 3* variables are not significant at a 5% significance level. This means that it cannot be assumed that the coefficients of 3.060 for *top 3* and -1.362 for *bottom 3*, significantly differ from zero. However, the effect of *derby losses* on the amount of *arrests* does have a significant effect at a 5% significance level. An additional derby loss from a club causes on average a 1.535 increase in the quantity of arrests. This is in line with the literature.

The regression regarding the effect of *top 3*, *bottom 3* and *derby losses* on *imposed bans* is presented in the sixth column. The variables *top 3* and *bottom 3* do not have a significant effect at a 5% significance level, which means that it cannot be assumed that the coefficient is significantly different from zero. The variable *derby losses* does also not have a significant effect on *imposed bans* at a 5% significance level. Therefore, it is not possible to assume that the coefficient of the number of derby losses differs from zero. However, the result is significant at a 10% level, which makes the coefficient of 0.635 marginally significant. This implies that losing an extra derby increases the quantity of imposed banning orders by 0.635. Speaking of a causal effect is not possible at this significance level.

All in all, the variables which include getting into the top 3 or bottom 3, appear not to be good predictors for the quantity of arrests and imposed banning orders. All of the coefficients are not significant at a 5% significance level, and not even significant at the marginal significance level of 10%. This is contradictory when comparing it with the significance of the effect of *final ranking* on the number of *arrests*. The *top 3* and *bottom 3* of the league do not give significant results, while the *final ranking* does have significant coefficients when using the amount of arrests as dependent variable. It appears to be that the relation between the final standings of the league and the quantity of arrests is linear. This is due to the fact that the *final ranking* variable is a step-by-step variable. Every extra position gained on the standings, gives on average the same amount of change in the amount of arrests and imposed banning orders. This *final ranking* variable does not distinguish different effects for different places in the standings. For instance, according to the variable, the effect of moving up from fifth to fourth is just as big as the effect of gaining one place from nineteenth to eighteenth. This together with the finding that ending up in the top 3 or bottom 3 of the standings does not give a

significant result, makes the appearance of a non-linear relationship between a club's position in the final ranking and the number of arrests during a season highly unlikely.

6   Conclusion and discussion

This thesis attempts to find an answer to the research question: *To what extent does the performance of a football club impact the volume of hooliganism around football matches in England and Wales between 2003 and 2018?* In the past, few quantitative research has been executed regarding this subject. The main takeaways from the existing literature is that the effect of performance from a team on the quantity of disorderly behavior during games, depends strongly on the individual. An individual who feels more identified with a club as a supporter, generates a higher volatility in emotions. In general, fans tend to experience more negative loaded emotions when the team they are supporting loses a match. However, there has also been a paper in which was stated that winning sides are caught up more in infringements. Already existing literature also stated that derby's cause an increase in violent behavior among supporters. Other causes of hooliganism have been explored in more detail, together with the policy measures and their effectivity.

To answer the research question, data has been retrieved from a statistical organization called 'The Home Office'. The data included the amount of arrests and imposed banning orders per club per season, which served as fan hooliganism measures. In total, this information has been retrieved from 92 English and Welsh football clubs from 2003 to 2017. With the panel data, Ordinary Least Squares regressions with club, league and season fixed effects have been executed. This is done to control for differences between and within clubs, leagues and seasons. The multiple regressions have been created with different combinations of variables. Firstly, the effect of a team's *final ranking* and *derby losses* (the policy measures) on the amount of *arrests* and *imposed banning orders* (the hooliganism measures) have been researched. There was found that losing more derby's has a significant increasing effect on the quantity of arrests. However, the final ranking in the league does not follow the same pattern. An improvement in the final ranking increases the amount of arrests during a season significantly. The final ranking and the number of derby losses during a season did not show any significant effect on the number of imposed banning orders.

To explore if the relation between the final league ranking and the quantity of arrests is linear, the *final ranking* variable was replaced by the variables *top 3* and *bottom 3*. The top 3 and bottom 3 of the competition are the most important final places, because it means promotion, relegation or qualifying for European tournaments. Highly significant results could be a sign that getting to the top or bottom

places of a league, causes a higher or lower effect on the number of arrests compared to gaining or losing a place in the middle of the standings. However, no significant results were found by this replacement. This means that there is no evidence to suggest that the pattern of the effect of final ranking on the number of arrests during a match is non-linear or concentrated in the extremes of the ranking distribution. Furthermore, the regressions including top 3 and bottom 3 as performance measure, did not contain a significant effect on the number of imposed banning orders, just as the other performance measures. Therefore, there seems to be no causal relation between the performance of a club and the amount of imposed banning orders.

To conclude, the performance of a football team clearly has a significant effect on the volume of hooliganism in and around the stadium, during matches. There was specifically a visible pattern regarding the effect of the final finishing position in the league and the number of lost derby's on the quantity of arrests in and around the stadium. However, an improvement of gaining a place in the standings seems to cause an increase in hooliganism, whereas a decline in derby losses causes a decrease in hooliganism. These findings are contradictory to each other. Therefore, in subsequent researches, it would be interesting to look at the effect of both performance measures in more detail to see why they are not in line with each other. Another interesting follow-up research could be to look at the effect of performance measures on the number of violent infringements after Covid-19, as the emotional state of the society has changed substantially.

This research also has some limitations. Firstly, there are still factors which could possibly lead to omitted variables bias. For instance, the effect of changes in the club, like a new unpopular club owner, team manager or player. This could have an effect on the performance of a team as well as on the amount of arrests. Secondly, there is a chance that there is reversed causality between the performance and the fan behavior. The possible effect of fan behavior on team performance has been mentioned in section 2.2. However, this was found at the college level and not at a professional level. This does not mean that there is no reverse causality at all at a professional level. Looking at the effect of fan hooliganism on the performance of a team at a professional level, could therefore be another interesting follow-up research.

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