

Saturday in the stadium: On higher attendance on Saturdays in Norwegian Elitserien soccer league

Stepan Ermakov and Alex Krumer*



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Abstract: In this paper we examine data from soccer games played in the Norwegian Eliteserien male league during the seasons from 2009 to 2019. Our regression analysis, which controls for many potential confounding factors, finds that Saturday games attract close to 5 percent larger stadium attendance than Sunday games. A possible reason for this is the relatively late kick-off time of the Sunday games. Our results indicate that moving a large share of games from Sunday to Saturday would increase teams' gate revenues that have had a negative trend for several years. These findings have implications for the stakeholders of the leagues, calendar committees, and local business.

Keywords: Schedule effects, soccer, attendance demand, Eliteserien.

JEL classification: D00, L00, D20, Z20.

Address for correspondence:

Stepan Ermakov, Faculty of Business Administration and Social Sciences, Molde University College, Britvegen 2, Molde, 6402, Norway, stepan.er@gmail.com.

Alex Krumer (corresponding author), Faculty of Business Administration and Social Sciences, Molde University College, Britvegen 2, Molde, 6402, Norway, alex.krumer@himolde.no.

* The usual disclaimer applies.

1 Introduction

There is a growing interest in studying the effect of schedule on attendance demand in professional soccer. For example, previous studies have shown that midweek games attract lower crowds in England (Buraimo, 2008; Buraimo & Simmons, 2015; Forrest & Simmons, 2006), Spain (Buraimo & Simmons, 2009), Germany (Krumer & Lechner, 2018; Schreyer & Däuper, 2018; Schreyer, Schmidt & Torgler, 2019), the Netherlands, (Besters, van Ours & van Tuijl, 2018), Norway (Kringstad, Solberg & Jacobsen, 2018), and Peru (Buraimo, Tena & de la Piedra, 2018). Also, games on non-usual days have a reduced stadium attendance in England, France, Spain, Germany (Goller & Krumer, 2020), and Belgium (Wang, Goossens & Vandebroek, 2018). Finally, a late kick-off time on Thursday games in the UEFA Europa League has a negative effect on the size of the audience (Krumer, 2020). Thus, it is important to consider fans' preferences when planning the schedule.¹

Despite a large number of studies, a recent comprehensive review on attendance demand literature by Schreyer and Ansari (2021), notes a notable absence of research on minor leagues. In this paper, we address this issue by focusing on Norwegian Eliteserien, which is the top male soccer league in Norway.² There has been increased interest in Norwegian soccer in recent years because of the growing number of superstar players such as Erling Håland and Martin Ødegaard. However, according to Buraimo, Tena and de la Piedra (2018), Norwegian soccer is considered as an emerging market rather than as a developed one. Developed soccer markets are well-established, have a rich history, generate significant non-domestic revenue, and have limited potential to increase their stadium attendance. While developing or emerging markets may have

¹ For example, according to Goller and Krumer (2020), the decision to schedule Monday games in the German Bundesliga led to large protests, which led the German Football Federation (DFL) to abolish these Monday games.

² Two papers on Norwegian soccer have focused on the relationship between the TV broadcast and stadium attendance. In the first, Solberg and Mehus (2014) used surveys and found that TV broadcast had a negative effect on the willingness to attend games. In the other, Kringstad, Solberg, and Jacobsen, (2018) used real data from the Norwegian soccer and found that live broadcast domestic games on 'free TV' is positively correlated with stadium attendance, but games from the top European leagues had a negative relationship with stadium attendance in Norway.

been established many decades ago, their professionalization took place not long ago. Such leagues may face intense competition with developed soccer markets, usually losing their best players to more established soccer leagues. The attendance in such leagues as Eliteserien may be less affected by economic factors (such as unemployment) than by product quality and fans' preferences.

Eliteserien was ranked 22nd in the recent UEFA ranking published in 2020 and has been outside the top 20 for the last 10 seasons.³ This suggests that Eliteserien has limited possibilities of growing the revenue from the TV contracts. This situation puts extra pressure on the Norwegian teams that struggle to keep their fans at the stadium. However, attendance has dropped by 35 percent over the last decade. Even when adjusting the numbers to the size of the stadiums, which have also changed over the years, the attendance as a share of the stadium capacity has dropped by about 12 percentage points.

This paper is motivated by the relatively late kick-off time of Sunday games, which is the main soccer day in Eliteserien. More specifically, since 2014, the share of Sunday games has gradually increased from 52 percent to 66 percent, and the share of Saturday games decreased from 21 percent to 11 percent between the 2013 and 2019 seasons. More importantly, more than 80 percent of the Sunday games in Eliteserien had a kick-off time of 18:00 or later.⁴ Given such a late hour, this paper follows Krumer (2020), who showed that Thursday games in the UEFA Europa League that start at 19:00 attract a larger audience than games that kick off at 21:05. One possible reason for that is that the following day (Friday) is a working day. Thus, the aim of this paper is to investigate whether Saturday games attract a higher audience than Sunday games because of the late kick-off time on Sunday, which may not be convenient for many fans who start their workweeks on Monday morning or have young children.

³ For additional details, see <https://www.uefa.com/memberassociations/uefarankings/country/#/yr/2021>.

⁴ According to the Norwegian Football Federation, the kick-off time and date are ultimately decided by the teams and TV broadcasters.

We use data from 11 seasons between 2009 and 2019 and control for more than 30 confounding factors, which can be roughly grouped into the following categories: economic/demographic, geographic, team-related, game-related, and TV broadcast of different leagues. Our regression analyses show that, on average, Saturday games attract 4.9 percent higher attendance than Sunday games. Given that TV broadcasts generate only 17 percent of total revenue, Elitserien still depends on game-day revenue (gate receipts), whose share was only 15 percent in 2018, reductions of roughly 16 percent and 29 percent compared to 2017 and 2015, respectively (UEFA, 2017; UEFA, 2019; UEFA, 2020). For comparison, in other countries with larger aggregate revenues, but lower share of TV broadcast than in Norway, the gate receipts generate a much larger share. For example, according to UEFA (2020), in the Netherlands, the TV broadcast and gate receipts generate 15 percent and 29 percent of the total revenue, respectively. The respective numbers in Scotland are 10 percent and 43 percent, in Switzerland 9 percent and 31 percent, and in Sweden, they are 12 percent and 24 percent.

Thus, it is worthwhile for the Norwegian soccer authorities to consider having a larger share of games on Saturdays after the end of COVID-19 restrictions.⁵ Beyond the general increase in attendance and in gate receipts, this change may also increase the attendance of young fans, whose support is important for long-run perspectives. In addition, having more games on Saturdays may have a positive effect on local business since fans are more likely to attend local restaurants after games on Saturday than on Sunday evening after 20:00.

The remainder of the paper is organized as follows. Section 2 describes the Norwegian soccer market. The data and some descriptive results are presented in Section 3. Section 4 presents the empirical strategy. The results are contained in Section 5, and we offer concluding remarks in Section 6.

⁵ Another possibility is to schedule Sunday games earlier, but given the lack of data, we could not make a credible estimation of the effect of the earlier Sunday's kick-off times.

2 Description of the Norwegian soccer

2.1 Norwegian soccer market

Eliteserien was founded in 1937 and was initially called Norgesserien. Since then, it had a few major structural changes until it finally became a professional soccer league in 1991. To better understand and classify today's soccer market in Norway, we will briefly discuss the history of the top Norwegian division from the 1960s (when many developed European leagues became professional) to the 1990s.⁶

On August 20, 1960, the state-owned monopoly NRK started broadcasting Norwegian soccer games. The teams could not earn money on broadcasting and had no power to influence the state policies. In the 1970s, the Norwegian Football Federation (NFF) started selling NRK broadcasting rights for the top league games. Thanks to live broadcasts of English games, soccer gained popularity on TV. Over the following decade, the business took interest in advertising through soccer, but the state-owned NRK was a commercial-free channel. At the time, all Norwegian athletes, including soccer players, were mostly amateurs. Throughout the 1970s there was an ongoing debate on professionalism and amateurism in sports, and by the end of the decade the special committee (Idrettstinget) decided that there were no grounds to oppose the professionalization of soccer by the internationally established rules. By 1991, the top Norwegian soccer league was ready to become professional.

According to the 2018 UEFA club licensing benchmarking report (UEFA, 2020), Norway was one of 17 countries (out of 55 members of the UEFA) that reduced their aggregate revenue by about 5 percent, dropping to the level of 2016 (€146m). TV broadcasts generated 17 percent of the total revenue, while the gate receipts brought only 15 percent, equaling €21m in 2018, reductions of roughly 16 percent and 29 percent in local currency compared to 2017 and 2015, respectively

⁶ See Fossøy, Moe and Fretland (2017) for a more comprehensive review on the history of Norwegian soccer.

(UEFA, 2017; UEFA, 2019).⁷ For example, in Sweden, which is the closest country in terms of aggregate revenues, the gate receipts generated 23 percent of the total revenue of €154m in 2018.

The recent decline in the gate receipts was compensated by the increased revenue of the TV broadcast after Eliteserien had signed a new deal with Discovery in 2017. However, compared with countries that have a lower share of TV revenues, such as the Netherlands, Scotland, Switzerland, and Sweden, Norway lags far behind in terms of the share of gate receipts. One possible risk is that, in the future, TV revenues might not increase quickly enough to compensate for the decline in the gate receipt revenues. Therefore, Norwegian teams still depend on game-day revenue, and if they continue to lose spectators, they might face grave financial challenges, which will lower their chances of performing well internationally and worsen their already weak financial situation.

2.2 Description of Eliteserien

Our focus is on the top Norwegian soccer league, or Eliteserien, as it has been known since the 2017 season. To avoid confusion, we will use this name regardless of the time period, although our analysis covers the 11 seasons from 2009 to 2019.

The tournament has a round-robin structure in which each of the 16 teams plays twice against all the other 15 teams, once at home and once away, totaling in 30 games per season. Thus, the regular tournament consists of 30 rounds of eight games, which are usually played during a single week, although there are cases when games of some rounds are played much later than the rest of the round.⁸

Teams receive three points for a win, one point for a draw, and no points for a loss. Those teams that finish 15th and 16th by the end of the season are relegated to the OBOS-Ligaen, which

⁷ The exchange rates applied are: 1NOK=€0.104 (UEFA, 2020); 1NOK=€0.107 (UEFA, 2019); 1NOK=€0.112 (UEFA, 2017).

⁸ A detailed discussion about the scheduling in Norway can also be found in Flatberg, Nilssen, and Stølevik (2009).

is the second-tier league in Norway. The 14th-ranked team enters the promotion/relegation play-off against a team from OBOS-Ligaen. The champion of the season enters the UEFA Champions League qualification for the next season. The teams ranked second and third, and the winner of the domestic cup enter the UEFA Europa League qualification.

Unlike many other leagues that use the Autumn–Spring schedule, the Norwegian Eliteserien uses a Spring–Autumn schedule because of the climate conditions. A season usually starts between week 10 and week 15 (in the annual calendar) and ends between week 45 and week 48. It usually takes between 30 to 37 weeks to run all 30 rounds, with most seasons lasting 34 weeks. Seven out of 11 Eliteserien seasons had at least a two-week summer break, usually in July (for more details, see Table A1 in Appendix).

Table 1 presents the distribution of games by days of the week, where we see that most of the games take place on weekends. A typical weekend in Eliteserien consists of between four and six games on Sunday, usually with kick-off time at 18:00, one or two games on Saturday, and a game on Monday or Friday. In rare cases, games are played on other weekdays. The reason for these midweek games is that there are not enough weekends, since the schedule must consider international breaks for national teams' games, and weather conditions. It is also important to mention that, in every season, all the games in each of the last two rounds are played at the same time. These games are scheduled on Sundays at 18:00, except for the 2018 season.

[Insert Table 1 about here]

The distribution of games by weekdays and times during the day depends largely on a TV deal the Eliteserien had signed. Over the 11 seasons, the Eliteserien had three different TV partnerships. The first lasted from 2009 to 2012, when Lyse Energi purchased rights for five Sunday games, NRK owned the rights for one Saturday game, while TV2 bought evening games on Sundays and Mondays. However, in the 2011–2012 seasons, NRK was replaced by MAX, which broadcasted games on Saturdays, Fridays or Thursdays. Thus, during these seasons, usually three games per round – all on different days of the week – were televised on public TV. During

this period, most games had a kick-off time of 18:00 or later with only 5–10 percent starting earlier on any day of the week.

The next TV deal included four seasons from 2013 to 2016. About 20 percent of the games in this period had a kick-off time of 15:00, and only two games per round were broadcast on public TV. Since the 2017 season, the Eliteserien TV rights have been bought by Discovery and the number of games starting at 18:00 increased to 68–78 percent, with almost 100 percent of the games starting at 18:00 or later. The number of games broadcast on public TV decreased to 48 in 2017 and 45 in 2018–2019.

3 Data and descriptive results

3.1 Eliteserien's attendance over the years

Data on all Eliteserien games from 2009 to 2019 were collected from various sources. The reason for the selected period is because 2009 was the first season to have 16 teams in the league, and 2019 is the last season that was not affected by COVID-2019. The main sources for the data were Transfermarkt (<https://www.transfermarkt.com/tippeligaen/startseite/wettbewerb/NO1>) and the Norwegian Football Association (<https://www.fotball.no/>).

To estimate the possible relationship between Saturday games and attendance, we use two outcome variables on the level of a single game. Taking into account the possible non-linearity in the effects on dependent variable, our first outcome variable is a natural logarithm of attendance that is often used in the literature on attendance demand (Buraimo & Simmons, 2015; Buraimo, Tena & de la Piedra, 2018; Krumer, 2020; to mention a few).

We then define the share of capacity by dividing the total attendance of each game by the stadium capacity of the venue where the game took place. To collect the stadium capacity and the stadium age, we went through each stadium individually, tracking the historical data on how the stadium capacity changed over the relevant seasons. Most stadiums had a detailed description on

their clubs' websites, but in some cases the information was collected on Wikipedia or Nordic Stadiums website (<https://www.nordicstadiums.com/>).

Table 2 shows the average attendance for the teams that participated in the Eliteserien. In the 11 seasons between 2009 and 2019, 25 teams participated in Eliteserien: 11 teams participated in at least 10 seasons, and eight teams participated in fewer than five seasons. Out of all the 25 teams, 13 marked the average attendance of less than 5000 spectators. Out of 14 teams with eight and more seasons in Eliteserien, only two had an average share of capacity lower than 50 percent. Only Kristiansund BK had an average capacity higher than 80 percent, and it also marked the largest share of sold-out games (17.8 percent).⁹ The overall share of sold-out games is very low, with most clubs having fewer than 10 percent of their games sold out.

[Insert Table 2 about here]

The teams that participated in Eliteserien both in the 2009 and 2019 seasons saw a 10.2–61.5 percent drop in their season's average attendance, except for Strømsgodset, which had a reduction of only 0.4 percent. In Tables A2 and A3, which appear in the Appendix, we present detailed information on average attendance and the share of the stadium capacity of each team over the seasons. Figure 1 presents the development of attendance-related variables over the seasons.

[Insert Figure 1 about here]

The decrease in average stadium capacity can be perhaps explained by the fact that new teams in the tournament had smaller stadiums than the teams they had replaced. For example, in 2012, Fredrikstad with a capacity of 12,169 seats, was relegated to the second-tier league. It was replaced by Sarpsborg 08, whose stadium capacity is 8022 seats. In 2017, Aalesund, with a capacity of 10,778 seats was relegated and replaced by Ranheim, whose stadium capacity is only

⁹ Games with a more than 95 percent share of stadium capacity.

3000 seats. Moreover, the average stadium capacity might have declined because some teams reduced their stadium capacities during renovation to make the stadiums more comfortable for the audience or adapt them to the declining interest of fans.¹⁰ Nevertheless, when looking at attendance as share of a stadium's capacity, we also see a negative trend.

3.2 Variables

One of the important procedures when measuring the effect of Saturday games on attendance is to separate the effects of other factors that are correlated both with the probability of allocating games on Saturdays and the stadium attendance. Thus, to select these factors and include them in our analysis, we will follow the scientific work on the determinants of stadium attendance demand.

One of the first studies on soccer attendance was published by Bird (1982). Since then, the body of literature on the subject has grown substantially and the context has become broader, covering such topics as broadcasting, market size, scheduling, historical rivalries, etc. (Besters, van Ours & van Tuijl, 2018; Buraimo & Simmons, 2008; Buraimo & Simmons, 2009; Buraimo, Tena & de la Piedra, 2018; Schreyer, Schmidt & Torgler, 2019, and others). There are also two papers that focus on Norway (Kringstad, Solberg & Jacobsen, 2018; Solberg & Mehus, 2014). Both highlighted the impact of TV broadcasting on stadium attendance in Eliteserien.

Overall, we use about 30 different variables from the literature on stadium attendance demand that relate to game quality measured among others by teams' abilities, TV broadcast, scheduling, and geographic and demographic features. These variables are summarized in Table 3.

¹⁰ For example, two teams drastically decreased their stadium capacities by moving to another stadium. Stabæk moved from Telenor arena (15,000 capacity) to Nadderud arena (7000 capacity) at the beginning of 2012 season. Similarly, Vålerenga changed their stadium during the 2017 season and moved from Ullevaal stadium (27,200 capacity) to Inility arena (17,333 capacity).

[Insert Table 3 about here]

We see that the average stadium attendance of the games played on Saturday (7769) is higher than that of games played on Sunday (6754) or midweek days (7422). Similarly, the average capacity of stadiums that host Saturday games (12,210) is higher than that of Sunday games (11,329), but lower than that of midweek games (12,448). However, the average share of capacity of Saturday games is the highest (66 percent), ahead of Sunday (61 percent) and midweek (62 percent). Note that in 35 out of 2640 games in our dataset (1.3 percent), the share of capacity was above 1, suggesting that these games had larger crowds than the usual capacity of the stadium.

We use ELO ratings as a measure of teams' abilities that may play a role in attendance demand. These rankings give different weights to previous results of the teams as a function of the strength of opponents. The ELOfootball website (<http://www.elofootball.com/>) contains information on the ELO rating for all the Eliteserien teams in the 2009–2019 seasons. The higher the ELO rating, the higher the quality of the team.¹¹ We also include the teams' positions in the tournament table before the respective game – *home position* and *away position*.¹² We see that teams with higher *ELO home* and *away* rating meet each other more often on Saturdays than on other days. Similarly, teams' table rankings are the lowest on Saturdays, suggesting that Saturdays' games are associated with teams of higher ability.

In order to consider weather conditions during the games, we included the *air temperature* and $(\text{air temperature} - 14)^2$ variables.¹³ The latter variable tries to capture the non-linear effect of the air temperature that is different from 14 degree of Celsius, as suggested by Hoffmann, Ging and Ramasamy (2002). We also use the *distance between the home and away team's stadiums*

¹¹ See Hvattum and Arntzen (2010) for additional details on ELO ratings in soccer.

¹² The first round of the season uses the final position of the previous season. The newly promoted teams have the positions 14, 15, or 16 depending on their rankings in the previous season of OBOS-Ligaen and on how many teams have been relegated from Eliteserien the previous season.

¹³ The data was obtained from <https://seklima.met.no/observations/>. Note that we had no data on air temperature for six games.

measured in kilometers since the closer the teams are to each other, the easier it is for the away fans to travel to the game venue. We take the distance of the shortest possible route between the stadiums, according to Google Maps. The descriptive statistics also show that the average distance between the stadiums is higher on Sundays (623 km) than on Saturdays (465 km) and midweek games (563 km). In addition, we use stadium age and its squared term to account for possible attractiveness of stadium's facilities.

It is also important to note that more than half of the 666 games played on midweek have been televised on public TV (56 percent). This number is much lower for Saturdays (24 percent) and Sundays (17 percent). On the contrary, almost 72 percent of the games played on Sundays and 64 percent of games played on Saturdays have been played at the same time as the games of the English Premier League (EPL) that were streamed live on Norwegian TV. The share of games that have coincided with the EPL games during midweek days is only 25 percent.

In addition, we used the list of rivalry games from the Wikipedia to define a derby in our dataset.¹⁴ In sum, 13 different derby types composed 176 games in 11 seasons (for the full list, see Table A4 in the Appendix). We see that the share of derby games is twice as large on Saturdays than on any other day of the week. In addition, following Kringstad, Solberg, and Jacobsen (2018), we take into account the away games of Rosenborg BK, which may attract a larger crowd because that has been the most successful Norwegian team in recent decades, with 21 championship titles in the last 30 years.

Finally, it is important to note that every year there are games that take place on the May 16th, one day before the Constitution Day, which is a public holiday. These games traditionally attract large crowds to the stadiums. As evidence, the average attendance of the games that take place on May 16 is 10,966, compared to an average of 6948 on other dates in our sample.¹⁵

¹⁴ See https://en.wikipedia.org/wiki/List_of_association_football_club_rivalries_in_Europe#Norway.

¹⁵ For additional details on data and descriptive results, see Ermakov (2020).

4 Empirical Strategy

When estimating the relationship between Saturday games and stadium attendance we need to acknowledge that allocation of games into different days is not random. It depends on many factors, such as weather, the timetable of the European Cups, national team tournaments, etc. Moreover, the descriptive analysis illustrated that games played on different weekdays also vary in the quality of the participating teams and kick-off times. These factors are likely to correlate with both game allocation and stadium attendance. This means that a simple comparison of average attendances on different weekdays would potentially lead to biased and inconsistent estimates. Thus, we need to control for these deviations from random selection into treatment (that is, Saturday games).

The rich database presented in the previous section enables us to opt for a selection-on-observables approach; that is, controlling for the reasons for the deviations from random assignment into Saturday games. Thus, the most basic specifications take the following forms:¹⁶

$$(1) \ln(\text{Attendance}_i) = \alpha + \beta_1 \text{Saturday}_i + \beta_2 \ln(\text{Capacity})_i + \phi X_i + \mu \text{SeasonDummies}_i + \varphi \text{WeeknumberDummies}_i + \varepsilon_i$$

$$(2) \text{Share of Capacity}_i = \alpha + \beta_1 \text{Saturday}_i + \beta_2 \ln(\text{Capacity})_i + \phi X_i + \mu \text{SeasonDummies}_i + \varphi \text{WeeknumberDummies}_i + \varepsilon_i$$

Our main goal is to estimate β_1 in both regressions while controlling for *stadium capacity* and other potential confounding factors X discussed in the description analysis. In addition, we control for time-specific effects that could have occurred in the observed period by including seasonal dummies. Finally, to account for possible seasonality within a season, such as school holidays, we include calendar week dummies.

¹⁶ Given that share of capacity has an upper bound, we also estimate model (2) with a Tobit estimator.

5 Results

Table 4 demonstrates the results of estimating model (1). We find a significantly larger attendance in games that take place on *Saturdays* compared to other days. After controlling for variety of potential confounding variables that include things like teams' strengths, local derbies, TV broadcast, and others, the results in Column 1 show that the Saturday games attract, on average, 4.4 percent larger attendance than other days. This result is statistically significant at the 1 percent level. Given that the average attendance in the sample is 7080 (see Table A2), our finding suggests that a Saturday game attracts an average of about 311 more fans. Column 2 shows the results of the same analysis, but without midweek games. We find that Saturday games attract a 4.9 percent higher audience than Sunday games, on average.

[Insert Table 4 about here]

It is also worth mentioning some other results from the analyses presented in Table 4. For example, Rosenborg's away games attract 14.5–16.5 percent larger attendance. Also, derby games and games that take place on May 16 attract about 25 percent larger audience. In addition, home teams attract 9.3 percent larger attendance before the games in the European competitions. This may be related to the bigger support the fans wish to give their teams before important games. However, we find no such a relationship after European games. Interestingly, being broadcast on public TV is associated with a larger audience. In addition, games that take place in parallel with games in the English Premier League that are broadcast on Norwegian TV are likely to attract lower stadium attendance. These TV-related results replicate the previous findings of Kringstad, Solberg and Jacobsen (2018), who used earlier seasons (2005–2011) than those in our dataset.

We see a similar picture in Table 5, where the outcome variable is attendance as the share of stadium's capacity. More specifically, we find that games that take place on Saturday have 2.3 percentage points higher capacity than the other days (Column 1). When only comparing Saturdays and Sundays (Column 2), the former have, on average 2.6 percentage points larger share of capacity. Both results are statistically significant at the 1 percent level. As previously, games that

take place in parallel with the English Premier League that are broadcast on Norwegian TV have an average of 1.8–3.6 percentage points lower share of capacity. It is also worth mentioning that games that took place during the FIFA World Cups or the UEFA European Championships had 3.2 percentage points lower share of capacity.¹⁷

[Insert Table 5 about here]

Overall, we see that both approaches show that games on Saturdays attract a larger audience, which can be explained by late hours of Sunday games. This result is in line with Krumer (2020), who showed that Thursday games in the UEFA Europa League that start at 19:00 attract a larger audience than games that kick off at 21:05. A possible reason for this is that the following day (Friday) is a working day. Thus, it is worthwhile for the Norwegian soccer authorities to consider having a larger share of games on Saturdays. Beyond the increase of the crowd on stadiums, this change may also have a positive effect on local business since fans may consider spending time in local restaurants after games on Saturday because the following day is not generally a working day. However, it is less likely that people spend an evening in a restaurant on a Sunday evening after 20:00 because Monday is a traditional working day.

6 Conclusion

This paper is motivated by interaction between previous literature on the effect of schedule on attendance and late kick-off time of Sunday games in the top male soccer Norwegian Eliteserien league. Using data from 11 seasons, and taking into account various confounding factors, we find that Saturday games have a significantly larger attendance than other days of the week. They attract a 4.9 percent larger audience and are associated with a higher share of capacity of about 2.6 percentage points compared to Sunday games.

¹⁷ The results of the Tobit regressions yield very similar coefficients. The results of these regressions are available upon request.

This result is important for emerging league like Eliteserien because, despite some recent increase in TV broadcasting income, this source of revenue has a limit, which may not compensate for ongoing negative trend in Elitserien's attendance. In addition, Norway is far behind other comparable countries in terms of gate receipt revenues. It is also possible that, along with the increased revenues, a larger stadium attendance may bring more sponsorships and lead to better TV broadcast contracts in the future.

Beyond the possible immediate financial benefit of the teams from the move to Saturdays, it is important to note that higher attendance of young fans is especially important, since these fans have a long-run perspective on teams' support. Thus, the move to Saturday games avoids the obstacle that is driven by attending school early the next morning. In addition, such a move may benefit soccer players who can spend more time with their families on Sundays. Moreover, from the broader perspective, local businesses like restaurants may benefit from larger crowds after a game on Saturday compared to Sunday. Therefore, we call on the Norwegian Football Federation to consider the increase in Saturday games.

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Tables and figures

Table 1. The distribution of games by days of the week (number of games)

Weekday	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Monday	34	38	39	32	17	24	14	14	29	36	26	303
Tuesday	3	1	0	2	4	8	4	0	8	0	2	32
Wednesday	15	13	8	14	3	2	9	8	5	12	6	95
Thursday	12	4	21	3	14	14	6	9	5	0	9	97
Friday	1	0	20	21	15	24	22	19	4	1	12	139
Saturday	33	28	21	37	50	43	50	50	37	35	27	411
Sunday	142	156	131	131	137	125	135	140	152	156	158	1563
Total	240	240	240	240	240	240	240	240	240	240	240	2640

Table 2. Average attendance per club in Eliteserien

Team	Seasons	Average attendance	Average share of capacity (%)	Sold out games	
				Total	Share (%)
Rosenborg BK	11	15,770	73.6	19	11.5
Vålerenga	11	10,377	42.8	1	0.6
Molde FK	11	8439	75.0	17	10.3
Odds BK	11	6487	53.1	0	0
Strømsgodset	11	6147	68.8	1	0.6
Lillestrøm SK	11	5975	52.0	2	1.2
SK Brann	10	12,402	73.9	18	12.0
Viking FK	10	10,044	61.4	1	0.7
Stabæk	10	5161	69.9	9	6.0
Haugesund	10	4793	53.4	1	0.7
Tromsø	10	4159	62.2	5	3.3
Aalesund	9	8226	76.3	16	11.9
Start	8	6401	44.3	0	0
Sarpsborg 08	8	4300	53.6	0	0
Bodø/Glimt	6	3477	62.7	5	5.6
Sogndal	6	3331	59.3	3	3.3
Sandefjord	5	4293	65.2	5	6.7
Fredrikstad	3	8838	70.1	3	6.7
Kristiansund BK	3	3986	89.7	8	17.8
Sandnes Ulf	3	3377	68.0	5	11.1
Hønefoss	3	2977	72.3	4	8.9
Mjøndalen	2	2475	58.9	1	3.3
Ranheim IL	2	1950	65	2	6.7
FK Lyn	1	4219	15.5	0	0
Kongsvinger	1	2774	41.4	0	0

Table 3. Descriptive statistics

Variable	Saturday					Sunday					Midweek				
	Obs	Mean	St.D	Min	Max	Obs	Mean	St.D	Min	Max	Obs	Mean	St. D	Min	Max
Stadium attendance	411	7769	4149	1949	21,597	1563	6754	3789	1142	21,474	666	7422	3883	1884	21,130
Total stadium capacity	411	12,210	6052	3000	27,200	1563	11,329	5752	3000	27,200	666	12,448	6265	3000	27,200
ln (Attendance)	411	8.82	0.52	7.58	9.98	1563	8.67	0.53	7.04	9.97	666	8.78	0.51	7.54	9.96
ln (Stadium capacity)	411	9.29	0.50	8.01	10.21	1563	9.21	0.51	8.01	10.21	666	9.30	0.51	8.01	10.21
Share of capacity	411	0.66	0.18	0.25	1.19	1563	0.61	0.17	0.08	1.24	666	0.62	0.19	0.10	1.16
Tournament position of home team before the game	411	8.02	4.71	1	16	1563	8.82	4.61	1.00	16.00	666	8.80	4.57	1	16
Tournament position of away team before the game	411	7.93	4.39	1	16	1563	8.47	4.64	1.00	16.00	666	8.17	4.60	1	16
ELO rating of home team	411	1619	93	1386	1849	1563	1602	91.21	1374	1869	666	1601	82.68	1390	1858
ELO rating of away team	411	1617	89	1389	1864	1563	1600	91.42	1375	1860	666	1607	84.67	1379	1853
Air temperature	411	12.89	5.99	-3.90	27.70	1557	11.28	6.34	-7.60	28.50	665	11.68	6.08	-5.2	28.9
(Air temperature - 14) ²	411	37.05	52.01	0.00	320.4	1557	47.56	66.06	0.00	466.6	665	42.30	51.70	0.01	368.6
Distances between the home and away team's stadiums. km	411	464.9	449.3	8.60	2056	1563	623.1	502.8	0.00	2183	665	563.0	470.9	8.6	2183
Stadium age	411	12.32	11.88	0	58	1563	12.24	12.25	0	58	666	12.12	11.89	0	58
(Stadium age) ²															
Game on Public TV (Yes = 1, No=0)	411	0.24	0.43	0	1	1563	0.17	0.37	0	1	666	0.56	0.50	0	1
Game collides with EPL live broadcast on Norwegian TV (Yes = 1, No = 0)	411	0.64	0.48	0	1	1563	0.72	0.45	0	1	666	0.25	0.43	0	1
Home team promoted to Eliteserien this season (Yes = 1, No = 0)	411	0.14	0.35	0	1	1563	0.15	0.36	0	1	666	0.16	0.36	0	1
Away team promoted to Eliteserien this season (Yes = 1. No = 0)															
Rosenborg is away team (Yes = 1, No = 0)	411	0.07	0.26	0	1	1563	0.06	0.24	0	1	666	0.06	0.24	0	1
Derby (Yes = 1, No = 0)	411	0.12	0.32	0	1	1563	0.06	0.23	0	1	666	0.06	0.23	0	1
Game takes place before or after international break (Yes = 1., No = 0)	411	0.12	0.33	0	1	1563	0.13	0.34	0	1	666	0.06	0.23	0	1
Game takes place during the World Cup or UEFA Euro (Yes = 1, No = 0)	411	0.09	0.28	0	1	1563	0.03	0.18	0	1	666	0.05	0.21	0	1
Home team plays before the European cup game (Yes = 1, No = 0)	411	0.07	0.25	0	1	1563	0.05	0.23	0	1	666	0.01	0.09	0	1
Away team plays before the European cup game (Yes = 1, No = 0)	411	0.07	0.25	0	1	1563	0.05	0.22	0	1	666	0.01	0.11	0	1

Home team plays after the European cup game (Yes = 1, No = 0)	411	0.03	0.16	0	1	1563	0.06	0.24	0	1	666	0.00	0.04	0	1
Away team plays after the European cup game (Yes = 1, No = 0)	411	0.04	0.19	0	1	1563	0.06	0.24	0	1	666	0.00	0.07	0	1
Home team is already a champion (Yes = 1, No = 0)	411	0.005	0.07	0	1	1563	0.007	0.08	0	1	666	0	0	0	0
Away team is already a champion (Yes = 1, No = 0)	411	0.002	0.05	0	1	1563	0.007	0.08	0	1	666	0	0	0	0
Home team is already relegated (Yes = 1, No = 0)	411	0.002	0.05	0	1	1563	0.01	0.10	0	1	666	0	0	0	0
Away team is already relegated (Yes = 1, No = 0)	411	0	0	0	0	1563	0.01	0.10	0	1	666	0	0	0	0
Total population in the county of the team (before the 2014 counties), in thousands.	411	365.2	165.8	108.0	690.3	1563	343.6	162.8	107.9	690.3	666	360.8	163.7	107.9	6903
Game is played on May 16 (Yes = 1, No = 0)	411	0.04	0.19	0	1	1563	0.01	0.07	0	1	666	0.09	0.29	0	1
Kick Off Time (KOT) between 14 and 15 (Yes = 1, No = 0)	411	0.00	0.00	0	0	1563	0.00	0.03	0	1	666	0.00	0.00	0	0
KOT between 15 and 16 (Yes = 1, No = 0)	411	0.25	0.43	0	1	1563	0.07	0.25	0	1	666	0.02	0.15	0	1
KOT between 16 and 17 (Yes = 1, No = 0)	411	0.08	0.28	0	1	1563	0.01	0.10	0	1	666	0.01	0.12	0	1
KOT between 17 and 18 (Yes = 1, No = 0)	411	0.05	0.21	0	1	1563	0.00	0.04	0	1	666	0.00	0.00	0	0
KOT between 18 and 19 (Yes = 1, No = 0)	411	0.55	0.50	0	1	1563	0.76	0.43	0	1	666	0.30	0.46	0	1
KOT between 19 and 20 (Yes = 1, No = 0)	411	0.02	0.15	0	1	1563	0.03	0.17	0	1	666	0.59	0.49	0	1
KOT after 20 (Yes = 1, No = 0)	411	0.05	0.22	0	1	1563	0.13	0.33	0	1	666	0.07	0.25	0	1

Table 4. OLS estimates for Ln(Attendance) as an outcome variable

VARIABLES	(1)	(2) Without midweek
	All data	
Saturday	0.044*** (0.013)	0.049*** (0.014)
Ln (Stadium capacity)	0.625*** (0.015)	0.634*** (0.017)
Home position before the game	-0.003* (0.002)	-0.002 (0.002)
Away position before the game	-0.002 (0.001)	-0.002 (0.002)
ELO home	0.002*** (0.000)	0.002*** (0.000)
ELO away	0.000* (0.000)	0.000 (0.000)
Air temperature	-0.000 (0.001)	0.001 (0.001)
(Air temperature) ²	-0.000*** (0.000)	-0.000*** (0.000)
Stadium age	-0.011*** (0.001)	-0.010*** (0.002)
(Stadium age) ²	0.000*** (0.000)	0.000*** (0.000)
Ln (distance between the cities)	0.005 (0.006)	0.010 (0.007)
Game on Public TV (Yes = 1, No=0)	0.059*** (0.015)	0.038** (0.020)
Game collides with EPL live broadcast on Norwegian TV (Yes = 1, No = 0)	-0.029 (0.018)	-0.055* (0.030)
Home team promoted to Eliteserien this season (Yes = 1, No = 0)	0.037** (0.015)	0.034** (0.017)
Away team promoted to Eliteserien this season (Yes = 1, No = 0)	0.025 (0.016)	0.018 (0.018)
Rosenborg is away team (Yes = 1, No = 0)	0.145*** (0.022)	0.165*** (0.024)
Derby (Yes = 1, No = 0)	0.271*** (0.016)	0.260*** (0.020)
Game takes place before or after international break (Yes = 1, No = 0)	0.021 (0.020)	0.026 (0.023)
Game takes place during the World Cup or UEFA Euro (Yes = 1, No = 0)	-0.055** (0.028)	-0.048 (0.034)
Home team plays before the European cup game (Yes = 1, No = 0)	0.093*** (0.027)	0.094*** (0.028)
Away team plays before the European cup game (Yes = 1, No = 0)	0.033 (0.025)	0.034 (0.026)
Home team plays after the European cup game (Yes = 1, No = 0)	-0.011 (0.025)	-0.015 (0.025)
Away team plays after the European cup game (Yes = 1, No = 0)	-0.038 (0.024)	-0.047* (0.025)
Game takes place on May 16 (Yes = 1, No = 0)	0.275*** (0.038)	0.255*** (0.058)
Home team is already champion (Yes = 1, No = 0)	0.191*** (0.055)	0.179*** (0.053)

Away team is already champion (Yes = 1, No = 0)	0.027 (0.053)	0.022 (0.053)
Home team is already relegated (Yes = 1, No = 0)	-0.323*** (0.107)	-0.328*** (0.107)
Away team is already relegated (Yes = 1, No = 0)	0.060 (0.072)	0.051 (0.072)
Ln(Total population in the county of the team, in thousands)	0.024* (0.012)	0.016 (0.014)
Constant	-0.331 (0.287)	-0.438 (0.345)
Seasonal dummies	Yes	Yes
Calendar week dummies	Yes	Yes
Kick-off time dummies	Yes	Yes
Observations	2,631	1,967
R-squared	0.798	0.809

Notes: The outcome variable is Ln(Attendance). Column 1 represents all the data. Column 2 represents data without midweek games. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

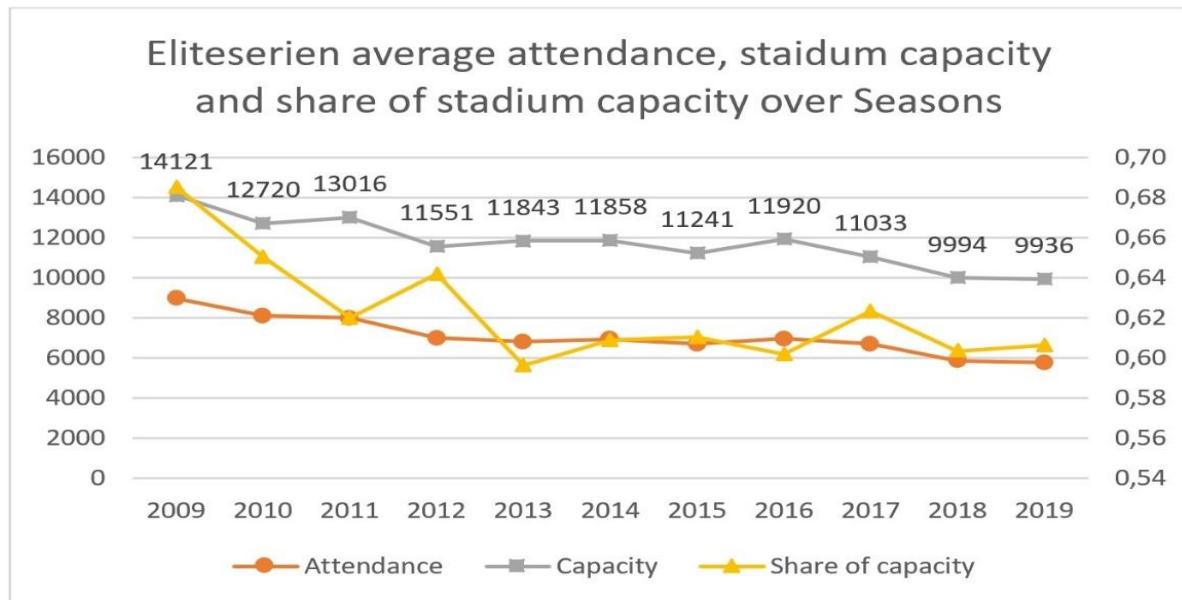
Table 5. OLS estimates for share of capacity as an outcome variable

VARIABLES	(1)	(2)
	All data	Without midweek
Saturday	0.023*** (0.008)	0.026*** (0.008)
Ln (Stadium capacity)	-0.196*** (0.008)	-0.190*** (0.009)
Home position before the game	-0.001* (0.001)	-0.001 (0.001)
Away position before the game	-0.001 (0.001)	-0.001 (0.001)
ELO home	0.001*** (0.000)	0.001*** (0.000)
ELO away	0.000** (0.000)	0.000 (0.000)
Air temperature	-0.000 (0.001)	0.001 (0.001)
(Air temperature) ²	-0.000*** (0.000)	-0.000*** (0.000)
Stadium age	-0.005*** (0.001)	-0.005*** (0.001)
(Stadium age) ²	0.000*** (0.000)	0.000*** (0.000)
Ln (distance between the cities)	-0.001 (0.003)	0.002 (0.003)
Game on Public TV (Yes = 1, No=0)	0.036*** (0.009)	0.025** (0.012)
Game collides with EPL live broadcast on Norwegian TV (Yes = 1, No = 0)	-0.018* (0.010)	-0.036* (0.018)
Home team promoted to Eliteserien this season (Yes = 1, No = 0)	0.020** (0.009)	0.017 (0.010)
Away team promoted to Eliteserien this season (Yes = 1, No = 0)	0.013 (0.009)	0.009 (0.010)
Rosenborg is away team (Yes = 1, No = 0)	0.099*** (0.014)	0.106*** (0.015)
Derby (Yes = 1, No = 0)	0.164*** (0.010)	0.160*** (0.012)
Game takes place before or after international break (Yes = 1, No = 0)	0.011 (0.011)	0.014 (0.014)
Game takes place during the World Cup or UEFA Euro (Yes = 1, No = 0)	-0.032** (0.016)	-0.032* (0.018)
Home team plays before the European cup game (Yes = 1, No = 0)	0.055*** (0.018)	0.056*** (0.018)
Away team plays before the European cup game (Yes = 1, No = 0)	0.017 (0.015)	0.017 (0.016)
Home team plays after the European cup game (Yes = 1, No = 0)	-0.007 (0.016)	-0.008 (0.016)
Away team plays after the European cup game (Yes = 1, No = 0)	-0.021 (0.015)	-0.025* (0.015)
Game takes place on May 16 (Yes = 1, No = 0)	0.183*** (0.025)	0.163*** (0.040)
Home team is already a champion (Yes = 1, No = 0)	0.147*** (0.035)	0.139*** (0.035)

Away team is already a champion (Yes = 1, No = 0)	-0.004 (0.032)	-0.008 (0.032)
Home team is already relegated (Yes = 1, No = 0)	-0.117*** (0.033)	-0.121*** (0.033)
Away team is already relegated (Yes = 1, No = 0)	0.025 (0.047)	0.020 (0.047)
Ln(Total population in the county of the team, in thousands)	0.018** (0.007)	0.012 (0.008)
Constant	0.690*** (0.163)	0.644*** (0.193)
Seasonal dummies	Yes	Yes
Calendar week dummies	Yes	Yes
Kick-off time dummies	Yes	Yes
Observations	2,631	1,967
R-squared	0.428	0.438

Notes: The outcome variable is share of capacity. Column 1 represents all the data. Column 2 represents data without midweek games. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Figure 1. Eliteserien average attendance, stadium capacity and share of stadium capacity



Appendix

Table A1: Eliteserien tournament structure

Season	First game, week number	Last game, week number	Difference in weeks	Last round day	Last round time	Summer break start, week number	Summer break end, week number
2019	13	48	35	Sunday	18:00	29	31
2018	10	47	37	Saturday	18:00	27	31
2017	14	48	34	Sunday	18:00	30	32
2016	11	45	34	Sunday	18:00	No break	
2015	15	45	30	Sunday	18:00	28	30
2014	13	45	32	Sunday	18:00	No break	
2013	11	45	34	Sunday	18:00	No break	
2012	13	47	34	Sunday	18:00	No break	
2011	12	48	36	Sunday	18:00	27	29
2010	11	45	34	Sunday	18:00	32	34
2009	11	44	33	Sunday	18:00	28 31	30 33

Table A2: Teams' average attendance over the seasons

Team	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average	2009–2019
Aalesund	10,218	10,146	9566	9183	8192	7601	6695	6369	6062			8226	
Bodø/Glimt	4233					3218	3184	3668		3218	3339	3477	-21.1
FK Lyn	4219											4219	
Fredrikstad	10,293		9072	7149								8838	
Haugesund		4660	4541	4514	5078	5579	5386	5212	4455	4316	4185	4793	-10.2
Hønefoss		3313		2900	2717							2977	
Kongsvinger		2774										2774	
Kristiansund BK									3824	4041	4091	3986	
Lillestrøm SK	7602	6676	6010	5692	5481	5899	5527	5855	5628	5559	5791	5975	-23.8
Mjøndalen							2608					2343	2475
Molde FK	7995	8395	9818	9362	8822	9241	8951	8392	7785	7110	6956	8439	-13.0
Odds BK	7362	6585	5713	5177	5298	7157	7911	8038	7106	5383	5627	6487	-23.6
Ranheim IL										2018	1883	1950	
Rosenborg BK	17,652	16,844	14,514	13,394	14,805	13,915	18,039	17,585	17,592	16,423	12,703	15,770	-28.0
SK Brann	15,929	13,744	13,012	12,339	11,305	11,985		12,380	11,858	10,431	11,042	12,402	-30.7
Sandefjord	5805	4390					4125		4011	3136		4293	
Sandnes Ulf				3921	3138	3071						3377	
Sarpsborg 08			3818		3689	3946	3869	3875	4689	4987	5526	4300	
Sogndal			3210	3658	3380	3349		3143	3246			3331	
Stabæk	9477	8014	7431	3903		3834	3880	3808	3960	3655	3652	5161	-61.5
Start	8231	8388	7055		6183	5962	6155	4465		4771		6401	
Strømsgodset	5316	5903	5707	6100	6525	6708	7030	6826	6271	5939	5297	6147	-0.4
Tromsø	5175	4696	4842	4209	4445		3635	4031	3596	3655	3312	4159	-36.0
Viking FK	13,070	11,530	10,255	9893	10,284	10,014	10,272	8813	7380		8933	10,044	-31.7
Vålerenga	10,788	13,650	13,336	10,908	9819	9755	10,099	9073	9702	9180	7834	10,377	-27.4
Average attendance	8960	8107	7994	7019	6823	6952	6710	6971	6698	5864	5782	7080	-35.5
Total attendance, in millions	2.15	1.95	1.92	1.68	1.64	1.67	1.61	1.67	1.61	1.41	1.39	1.70	-35.3

Note: The table presents seasonal average attendance for each team. The last column represents the change in percentage between 2009 and 2019. The calculation for Haugesund is from 2010 to 2019.

Table A3: Teams' average share of capacity over the seasons (%)

Team	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average	2009-2019
Aalesund	94.8	94.1	88.8	85.2	76.0	70.5	62.1	59.1	56.2			76.3	
Bodø/Glimt	69.2					52.6	52.1	60.0		69.7	72.4	62.7	3.1
FK Lyn	15.5											15.5	
Fredrikstad	81.1		72.2	56.9								70.1	
Haugesund		51.9	50.6	50.3	56.5	62.1	60.0	58.0	49.6	48.1	46.6	53.4	-5.3
Hønefoss		80.4		70.4	66.0							72.3	
Kongsvinger		41.4										41.4	
Kristiansund BK									86.1	91.0	92.1	89.7	
Lillestrøm SK	66.1	58.1	52.3	49.5	47.7	51.3	48.1	50.9	48.9	48.3	50.4	52.0	-15.8
Mjøndalen							62.1					55.8	58.9
Molde FK	71.1	74.6	87.3	83.2	78.4	82.2	79.6	74.6	69.2	63.2	61.8	75.0	-9.2
Odds BK	58.9	52.7	45.7	41.4	42.4	57.3	63.3	68.3	60.4	45.7	47.8	53.1	-11.0
Ranheim IL										67.3	62.8	65.0	
Rosenborg BK	82.4	78.6	67.8	62.5	69.1	65.0	84.2	82.1	82.1	76.7	59.3	73.6	-23.1
SK Brann	93.7	82.1	77.7	73.7	67.5	71.6		73.9	70.8	62.3	65.9	73.9	-27.8
Sandefjord	88.2	66.7					62.7		60.9	47.6		65.2	
Sandnes Ulf				78.9	63.2	61.8						68.0	
Sarpsborg 08			47.6		46.0	49.2	48.2	48.3	58.5	62.2	68.9	53.6	
Sogndal			57.1	65.1	60.1	59.6		55.9	57.7			59.3	
Stabæk	63.2	46.0	49.5	79.0		77.7	78.6	77.1	80.2	74.0	74.0	69.9	10.8
Start	57.0	58.1	48.8		42.8	41.3	42.6	30.9		33.0		44.3	
Strømsgodset	59.5	66.1	63.9	68.3	73.0	75.1	78.7	76.4	70.2	66.5	59.3	68.8	-0.2
Tromsø	77.4	70.2	72.4	63.0	66.5		54.4	60.3	53.8	54.7	49.5	62.2	-27.9
Viking FK	78.7	69.5	61.8	59.6	63.1	61.4	63.0	54.1	46.4		56.2	61.4	-22.6
Vålerenga	39.7	50.2	49.0	40.1	36.1	35.9	37.1	33.4	46.2	55.4	47.3	42.8	7.7
Average attendance	68.5	65.0	62.0	64.2	59.6	60.9	61.0	60.2	62.3	60.4	60.6	62.3	-7.91

Note: The table presents seasonal average share of capacity for each team. The last column represents the change in percentage between 2009 and 2019. The calculation for Haugesund is from 2010 to 2019.

Table A4: Derby games

Derby	Number of games
Vålerenga Fotball vs. Lyn Fotball	2
Rosenborg BK vs SK Brann	20
Lillestrøm SK vs. Vålerenga Fotball	22
Molde FK vs. Rosenborg BK	22
Kristiansund BK vs. Molde FK	6
Sarpsborg FK vs. Fredrikstad FK	2
Strømsgodset IF vs. Mjøndalen IF	4
SK Brann vs. Vålerenga Fotball	20
FK Bodø/Glimt vs. Tromsø IL	10
Aalesunds FK vs. Molde FK	18
Viking FK vs. FK Haugesund	18
SK Brann vs. Viking FK	18
IK Start vs. Viking FK	14