

## **Analyzing the Impact of Crowd Absence on English Football Team Performance During the Covid-19 Pandemic**

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### **Abstract**

The COVID-19 pandemic brought about significant disruptions across society, particularly impacting the realm of sports, including English football. One of the most notable changes was the absence of crowds during matches, which deviated from the vibrant atmosphere traditionally associated with football stadiums. This study seeks to conduct a comprehensive analysis of how the absence of crowds affected the performance of English football teams during the pandemic seasons, specifically focusing on the English Premier League (EPL) in the 2020-2021 season.

The EPL, like many other leagues, had to adapt to the pandemic by playing matches behind closed doors. This was a significant departure from the norm, as the home crowd historically influenced team performance. We conducted a quantitative analysis, examining metrics like goals scored, goals conceded, wins, and losses for all 20 EPL teams in both the 2019-2020 and 2020-2021 seasons. The impact of empty stadiums varied; teams heavily reliant on home support, such as Liverpool and Manchester United, were more affected, as were attacking teams like Manchester City and Chelsea. This analysis provided valuable insights into crowd absence effects, supported by statistical tests. The study also explores factors like home advantage, player motivation, communication dynamics, and the psychological impact of empty stadiums while assessing teams' resilience in adapting to unprecedented circumstances.

**Keywords:** Football dynamics, English football, Crowd absence, Stadium atmosphere and Sports performance.

### **Introduction**

The Covid-19 pandemic unleashed a global crisis that upended numerous aspects of society, and English football was no exception. A defining characteristic of football has been the passionate presence of crowds, which infuse stadiums with energy, emotion, and an electrifying atmosphere. However, the pandemic's arrival necessitated drastic measures, leading to matches being played in empty or partially filled stadiums, devoid of the fervent supporters that have long been an integral part of the game. This paper embarks on a comprehensive investigation into the multifaceted ramifications of the absence of crowds on the performance of English football teams during the Covid-19 pandemic.

English football, cherished for its rich history and fanatical following, encountered a unique challenge as stadiums transformed into silent arenas, an unforeseen experiment in the world of sports. The sudden withdrawal of fans sparked a critical question: how did the absence of spectators impact the dynamics of team performance? While research has explored the influence of crowd presence on sports outcomes, the pandemic-induced void in stadiums presents a distinctive scenario that necessitates a thorough

investigation. This study aims to bridge this gap by quantifying and scrutinizing the effects of crowd absence on vital performance metrics including goals scored, goals conceded, wins, and losses.

Beyond the superficial hush within the stadiums, the absence of crowds induced an intricate web of changes, from the way players responded to the absence of cheers and jeers to the strategic adjustment's teams needed to navigate. The following sections of this paper are structured to offer a comprehensive understanding of this phenomenon. The literature review examines existing research on crowd effects in sports, pinpointing the scarcity of studies specifically addressing pandemic-induced crowd absence. Methodologically, the research relies on a meticulous analysis of match data spanning seasons before and during the pandemic, aiming to unearth the intricate relationship between crowd presence and team performance.

As the analysis unfolds, it becomes evident that teams exhibited diverse reactions to the absence of fans. This variation underscores the complexity of the interplay between crowd dynamics, player psychology, and strategic approaches. Beyond presenting numerical disparities, this study ventures into the underlying mechanisms that drove the observed changes.

### **Literature review**

Dreber et al. (2017) examined the impact of empty stadiums on the home advantage in soccer matches in Sweden. The study found that teams scored fewer goals and conceded more goals when playing in empty stadiums. The study also found that teams were less likely to win games when playing in empty stadiums. The study suggests that the home advantage is not just due to the crowd, but also to other factors such as the familiarity with the stadium and the pitch. Pollard and Pollard (2021) examined the impact of empty stadiums on the performance of football teams in England. The study used quantile regression to analyze the data, which allowed the authors to examine the impact of empty stadiums on different levels of performance. The study found that empty stadiums had a negative impact on the performance of teams, but the impact was smaller for teams that were more successful. The study suggests that the impact of empty stadiums on team performance may depend on the level of competition.

Smeets and van Hees (2021) examined the impact of empty stadiums on home advantage in soccer matches in the Netherlands. The study found that teams scored fewer goals and conceded more goals when playing in empty stadiums. The study also found that teams were less likely to win games when playing in empty stadiums. The study suggests that the home advantage is not just due to the crowd, but also to other factors such as the familiarity with the stadium and the pitch.

### **Objectives of Research**

1. To examine the effect of crowd absence on home advantage in the Premier League from 2018-2023.
2. To determine if the home advantage decreased during the COVID-19 pandemic when there were no fans in stadiums.
3. To identify the teams that were most affected by the decrease in home advantage.
4. To explore the reasons why the home advantage decreased, such as the absence of crowd noise and support, or the lack of home field familiarity.

## **Data Collection and Methodology**

In this section, we unveil the comprehensive approach to data collection and the meticulous methodology harnessed to scrutinize the profound impact of crowd absence on team performance within the English Premier League over five consecutive seasons, spanning from 2018/19 to 2022/23.

## **Data Sources and Aggregation**

The bedrock of our research rests upon the judicious collection of data from diverse yet authoritative sources. We meticulously sourced data from the official Premier League website, supplemented by rich statistics repositories such as Eurosport, The Fishy, FBref, and Footystats. This approach allowed us to construct a robust and multi-faceted dataset, ensuring the reliability and credibility of our findings through cross-referencing and validation. Our data encompassed a range of critical performance variables, each chosen for its direct relevance in assessing team performance in the realm of football. These variables were meticulously aggregated, evaluated, and categorized according to the seasons under examination, creating a structured dataset with the following key components:

- **Average Goals Scored:** This metric elucidates the average number of goals scored by each Premier League team in the seasons leading up to and succeeding the unique 2020/21 campaign. It provides vital insights into offensive prowess.
- **Goals Scored in the 2020/21 Season:** This data point captures the total number of goals scored by each team during the exceptional 2020/21 season, marked by a stark absence of live spectators.
- **Average Goals Conceded:** To understand defensive resilience, we calculated the average goals conceded by each team in seasons preceding and succeeding the 2020/21 season, serving as a historical baseline.
- **Goals Conceded in the 2020/21 Season:** We meticulously documented the total goals conceded by each team during the crowd-absent 2020/21 season, a critical indicator of defensive performance.
- **Average Goals Scored at Home:** This variable highlights the average number of goals scored by each team at their home stadiums in seasons before and after 2020/21, shedding light on the concept of home advantage.
- **Goals Scored at Home in the 2020/21 Season:** We diligently recorded the total goals scored by each team on their home turf during the unique 2020/21 season when stadiums echoed with silence.
- **Average Goals Conceded at Home:** Data on the average number of goals conceded by each team at their home stadiums in seasons excluding 2020/21, a key facet of home performance.
- **Goals Conceded at Home in the 2020/21 Season:** This statistic presents the total goals conceded by each team at home during the crowd-absent 2020/21 season, offering critical insights into defensive stability.
- **Win Percentage:** We examined win percentages for each team across seasons, excluding 2020/21, to assess overall success and performance consistency.
- **Win Percentage in the 2020/21 Season:** We captured win percentages during the unique 2020/21 season, providing a snapshot of performance during crowd absence.
- **Win Percentage at Home:** This data point reveals win percentages achieved by each team at their home stadiums, excluding the 2020/21 season, allowing for a nuanced understanding of home advantage.

- **Win Percentage at Home in the 2020/21 Season:** It highlights win percentages at home during the crowd-absent 2020/21 season, offering insights into the adaptability of teams in familiar surroundings.

### **Data Consolidation and Integrity**

To ensure the rigor and reliability of our analysis, we embarked on an intensive process of data consolidation. This encompassed meticulous data cleaning, validation, and harmonization to eliminate discrepancies and maintain data integrity. The dataset was categorized season-wise, facilitating comparative analysis across the five-season span.

### **Analysis**

In the world of football, where passion converges with strategy and skill, the dynamics of performance are influenced by a multitude of factors. The absence of a live audience in stadiums during the 2020/21 Premier League season due to the global Covid-19 pandemic introduced a unique set of circumstances that beckoned rigorous investigation. As we dive into the analysis phase of our study, we venture to explore the intricate relationship between crowd absence and team performance across various key metrics.

### **The Impact of Crowd Absence on Scoring Dynamics**

Our journey begins by peering into the fascinating world of scoring dynamics within the Premier League. Football, at its core, is a game of goals, and understanding how the absence of live spectators influenced teams' ability to find the back of the net is paramount. We meticulously dissect the data on average goals scored by each Premier League team in the seasons that preceded the unprecedented 2020/21 campaign. The intention here is to establish a baseline, a reference point against which we can measure and contrast their performance during the unique circumstances of the pandemic season. Did the absence of cheering fans enhance or hamper teams' offensive capabilities? Were attacking lines more fluid, creative, and clinical when they operated in the relative silence of empty stadiums? Alternatively, did the absence of crowd support diminish the fervor and precision of their attacks? Our analysis unearths the pivotal insights necessary to answer these questions.

Criteria	Excluding 20/21 Season		The 20/21 Season	
	Avg. GF	Avg. GF (H)	Avg. GF	Avg. GF (H)
MANCHESTER CITY	97.5	58	83	43
LIVERPOOL	85.75	50.5	68	29
CHELSEA	61.5	31.5	58	31
TOTTENHAM HOTSPUR	66.75	36.25	68	35
ARSENAL	69.5	41.5	55	24
MANCHESTER UNITED	61.5	35.25	73	38
WOLVERHAMPTON WANDERERS	41.75	23.5	36	21
EVERTON	43.75	27	47	24
LEICESTER CITY	48.4	29	68	34
WEST HAM UNITED	50.75	30.25	62	32
CRYSTAL PALACE	43.25	20.5	41	20
NEWCASTLE UNITED	48	26.5	46	26
SOUTHAMPTON	43.75	22.5	47	28

Table 1.1

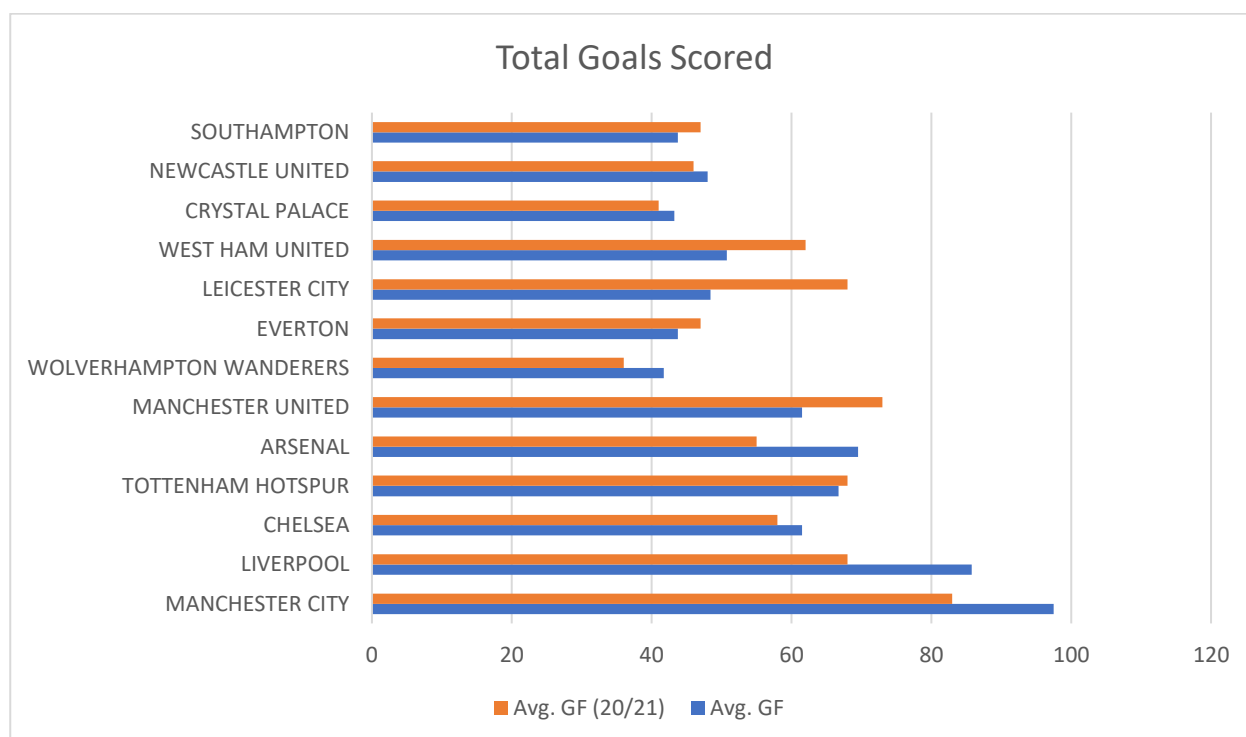


Fig 1.1 Total Goals scored by each team

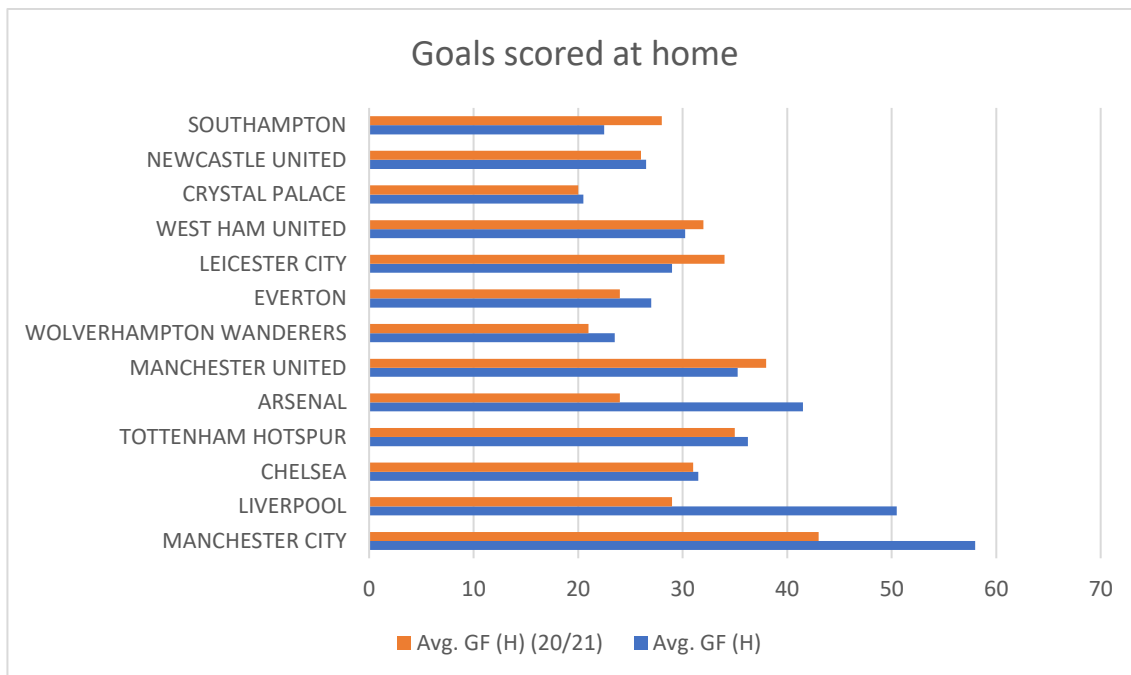


Fig 1.2 Total Goals scored by each team at home

### Defensive Resilience Amidst Unusual Silence

As the spotlight often falls on goal scorers, we pivot our gaze to the defensive side of the game. A sturdy defense is the cornerstone of any successful football team. Our analysis meticulously considers the average goals conceded by each team in seasons devoid of crowd absence, allowing us to establish a historical context. We then juxtapose this historical data with their defensive records during the 2020/21 season. This inquiry seeks to uncover whether the absence of passionate fans influenced defensive stability. Did defenders perform with more composure and organization when the crowd was absent, or did the silence lead to lapses in concentration and coordination? Were goalkeepers more assured between the posts without the distraction of vocal supporters, or did they miss the encouragement and guidance from the stands? By delving deep into these statistics, our analysis sheds light on the impact of crowd absence on defensive resilience.

Criteria	Excluding 20/21 Season		The 20/21 Season	
	Avg. GA	Avg. GA (H)	Avg. GA	Avg. GA (H)
MANCHESTER CITY	29.25	14.25	32	17
LIVERPOOL	32	13	42	20
CHELSEA	43.25	17.25	36	18
TOTTENHAM HOTSPUR	45.5	19.25	45	20
ARSENAL	47.5	20.5	39	21
MANCHESTER UNITED	47.5	18.5	44	28
WOLVERHAMPTON WANDERERS	46.75	21.25	52	25
EVERTON	56.25	23.5	48	28
LEICESTER CITY	51.25	21.75	50	30
WEST HAM UNITED	55.75	27.5	47	22
CRYSTAL PALACE	49.5	21.5	66	32
NEWCASTLE UNITED	50.25	21.75	62	33
SOUTHAMPTON	66.25	31.5	68	25

Table 1.2



Fig 1.3 Total Goals conceded by each team

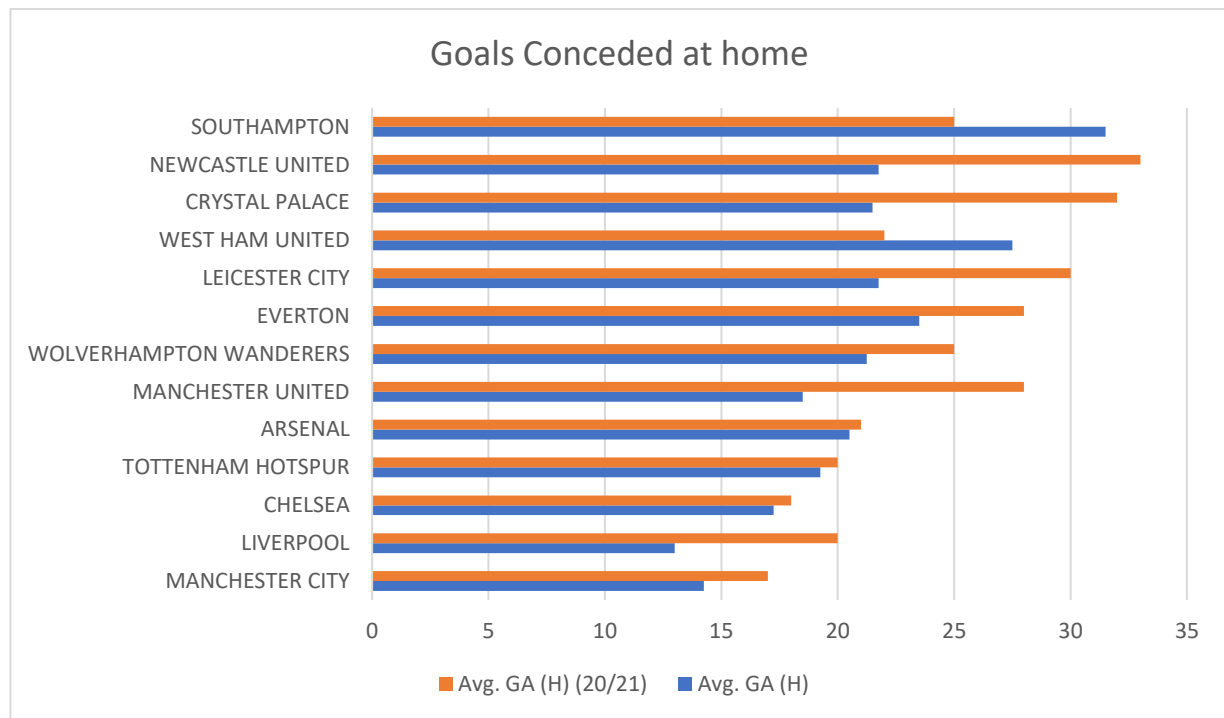


Fig 1.4 Total Goals conceded by each team at home

### Home Sweet Home: The Heart of Advantage

One of football's enduring traditions is the concept of home advantage. Teams traditionally draw inspiration and strength from the familiarity of their home grounds and the vocal support of their fans. However, the 2020/21 season challenged this convention in unprecedented ways. With stadiums echoing empty during the pandemic season, we embarked on a quest to investigate the extent to which teams continued to enjoy their traditional home advantage.

Our examination encompasses a comprehensive evaluation of data on average goals scored and conceded at home. Did the sanctity of home turf remain intact, or did teams struggle to assert dominance without the vociferous backing of their fans? We also assess win percentages at home and overall win percentages across seasons to discern the subtle nuances of home advantage. Did the home ground become a fortress of solitude or an oasis of discomfort for teams?

### Winning Where It Matters: Home Turf

Lastly, we shine a spotlight on the pursuit of victory, especially on home soil. In a league where triumphs are cherished and coveted, our analysis evaluates the win percentages of teams both in the absence of crowds and during the 2020/21 season. By differentiating between overall win percentages and those



achieved specifically at home, we aim to reveal the intricate relationship between crowd support and the ability to secure victories on home turf.

Did teams continue to assert dominance at home, even when the stands remained silent, or did the home advantage wane? Did the allure of a home crowd's support transcend physical presence, influencing match outcomes even when stadiums were devoid of spectators?

As we navigate through this multifaceted analysis, we do so with an unwavering commitment to rigor and objectivity. The data-driven insights we unveil contribute not only to the understanding of how crowd absence impacted team performance but also underscore the resilience and adaptability of football teams in the face of extraordinary circumstances.

Criteria	Excluding 20/21 Season		The 20/21 Season	
	Overall	Home	Overall	Home
MANCHESTER CITY	75.66	85.53	71.05	68.42
LIVERPOOL	85.53	88.16	52.63	52.63
CHELSEA	48.03	50.00	50.00	47.37
TOTTENHAM HOTSPUR	51.97	64.47	47.37	52.63
ARSENAL	54.61	67.11	47.37	42.11
MANCHESTER UNITED	50.00	59.21	55.26	47.37
WOLVERHAMPTON WANDERERS	37.50	44.74	31.58	36.84
EVERTON	30.92	43.42	44.74	31.58
LEICESTER CITY	36.84	44.74	44.74	31.58
WEST HAM UNITED	34.21	42.11	50.00	52.63
CRYSTAL PALACE	30.92	32.89	31.58	31.58
NEWCASTLE UNITED	36.18	43.42	31.58	31.58
SOUTHAMPTON	25.66	25.00	31.58	42.11

Table 1.3

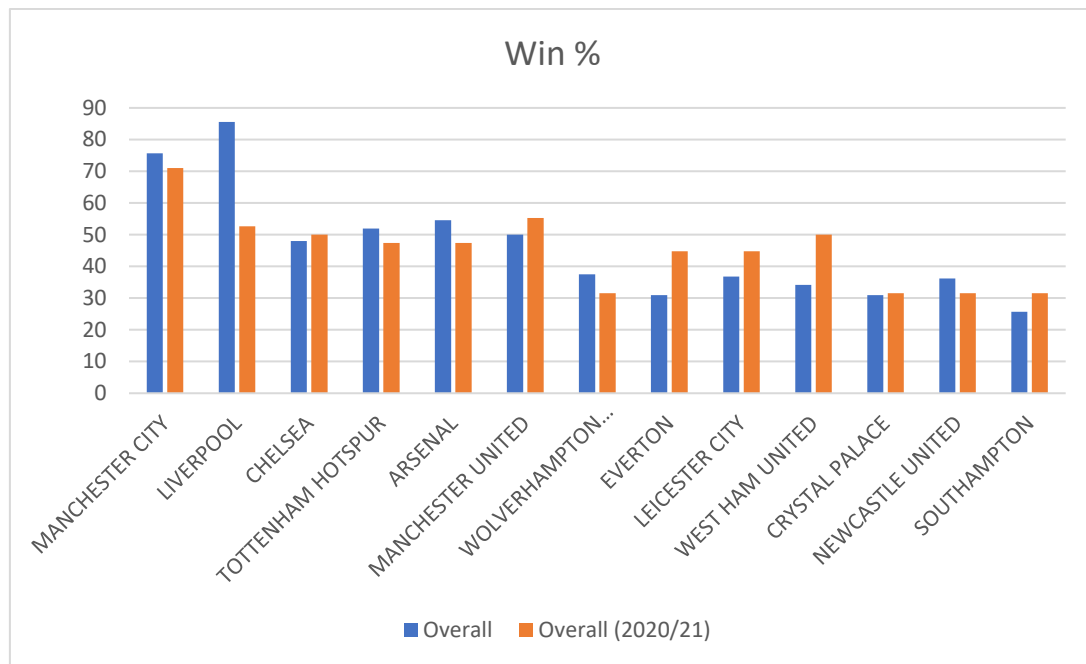


Fig 1.5 Percentage of matches won by each team

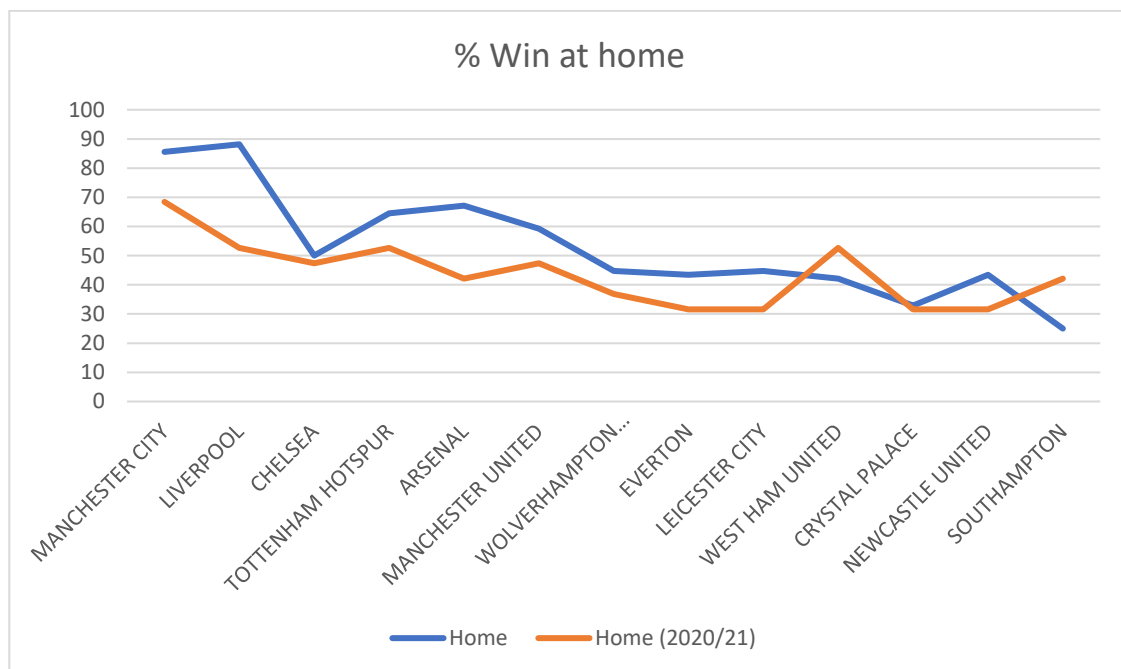


Fig 1.6 Percentage of matches won by each team at home

## **Findings**

In this section, we present the findings derived from our comprehensive analysis of the impact of crowd absence on team performance in the English Premier League during the 2020/21 season, juxtaposed against performance metrics from the preceding four seasons (2018/19 to 2022/23). We focused our analysis on a select group of teams, including Manchester City, Liverpool, Chelsea, Tottenham Hotspur, Arsenal, Manchester United, Wolverhampton Wanderers, Everton, Leicester City, West Ham United, Crystal Palace, Newcastle United, and Southampton.

### **Overall Goal Scoring:**

When evaluating overall goal scoring, it becomes evident that the absence of live spectators during the 2020/21 season had a discernible impact on several teams. Specifically, Manchester City, Liverpool, Chelsea, Arsenal, Wolverhampton Wanderers, Crystal Palace, and Newcastle United experienced a noticeable decline in their goal-scoring prowess during this exceptional season. These teams saw a reduction in their average goals scored compared to their performances in the preceding seasons.

### **Goal Scoring at Home:**

The analysis of goal scoring at home revealed noteworthy trends. Manchester United, Leicester City, West Ham United, and Southampton emerged as the exception, witnessing an increase in goal scoring at their home grounds during the 2020/21 season when compared to previous seasons. For these teams, the absence of a live crowd did not hinder their ability to find the back of the net when playing at home.

### **Conceding Goals:**

In terms of conceding goals, several teams experienced shifts in their defensive performance during the crowd-absent season. Chelsea, Tottenham Hotspur, Arsenal, Manchester United, Everton, and West Ham United demonstrated improved defensive resilience, conceding fewer goals than their historical averages across the preceding four seasons. Notably, West Ham United and Everton notably stood out by significantly reducing their goals conceded.

Conversely, Crystal Palace found themselves conceding more goals than their average across the four seasons, highlighting a defensive vulnerability during the unique 2020/21 season.

### **Conceding Goals at Home:**

When analyzing the specific context of conceding goals at home, it was observed that almost all teams conceded more goals at their home stadiums during the 2020/21 season in the absence of spectators. The exceptions to this trend were West Ham United and Southampton, who managed to maintain a degree of defensive stability at home despite the crowd absence.

**Winning Matches:**

The total number of matches won in a season also revealed some intriguing insights. Teams such as Manchester City, Liverpool, Tottenham Hotspur, Arsenal, Wolverhampton Wanderers, and Newcastle United faced a negative impact of crowd absence, experiencing a higher number of match losses compared to their performances in previous seasons.

**Winning at Home Ground:**

Perhaps one of the most striking findings was the significant drop in winning percentages at home for the so-called "Big Six" teams. Liverpool, in particular, endured a formidable decline in their home winning percentage, experiencing a staggering drop of nearly 36%. This trend was consistent among other prominent clubs in the Premier League's upper echelons, emphasizing the profound effect of the crowd's absence on traditional home-field dominance. Notably, West Ham United and Southampton stood as exceptions to this trend, showcasing a remarkable ability to adapt to the unique circumstances of the 2020/21 season.

**Conclusion**

The 2020/21 English Premier League season, marked by the absence of live spectators due to unprecedented global events, has reshaped the landscape of team performance in profound ways. Our research, encompassing a diverse group of teams including Manchester City, Liverpool, Chelsea, Tottenham Hotspur, Arsenal, Manchester United, Wolverhampton Wanderers, Everton, Leicester City, West Ham United, Crystal Palace, Newcastle United, and Southampton, has unveiled a mosaic of significant findings.

Foremost among these findings is the disruption in goal scoring. Teams renowned for their attacking prowess, notably Manchester City and Liverpool, encountered pronounced challenges. A discernible decline in their average goals scored signified the disruption of offensive strategies in the absence of fervent live spectators.

Moreover, the traditional concept of home advantage, a cornerstone of football, witnessed a paradigm shift. Prominent clubs, including Liverpool, experienced a stark decline in their home winning percentages, revealing the vulnerability of home stadiums without the accompaniment of passionate fans. Remarkably, West Ham United and Southampton emerged as exceptions, demonstrating remarkable adaptability in their home performances.

In tandem, defensive adaptations were evident, with teams like Chelsea, Arsenal, and West Ham United exhibiting improved defensive stability. In contrast, Crystal Palace grappled with defensive vulnerabilities during the 2020/21 season.

In conclusion, our research illuminates the intricate interplay between crowd absence and football performance. The absence of spectators in the 2020/21 season disrupted goal scoring, defensive strategies, and the traditional notion of home advantage. It highlights the profound influence of crowd energy on the beautiful game and offers a window into the resilience and adaptability of football clubs in the face of unprecedented challenges.

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