# Does qualifying for European Football affect a team's league result

## Abstract

The purpose of this paper is to analyse whether playing in the UEFA Champions League or UEFA Europa League impacts how well a Premier League team performs in the league. This will be achieved by looking at how a team that performs in a European competition does in the Premier League and comparing it to the previous season. The paper will also evaluate whether playing a Premier League match within five days of a European fixture (a Champions League or Europa League match) has any impact on how well the team does.

## Introduction

A common reason given when a top team has a poor run of form is the extra fixtures that come with playing in Europe result in the team playing worse. Having to play the best European teams in addition to the league can cause more injuries to occur and players will start to fatigue faster the more matches they play. Teams that do not have a "deep enough squad" may not have the same quality of players to sub in for players that have become injured or need a break to recuperate. The purpose of this paper is to look at whether there is any statistical evidence to back up this statement.

There are two European competitions that a Premier League team can qualify for. These are called the Champions League and the Europa League, with the Champions League being the more prestigious competition of the two. Teams that play in European competitions are made up of the best teams from each country, with countries that generally do better having more teams able to qualify. This means that a team winning the Champions League can claim the title of best team in Europe, as well as qualifying for the Club World Cup to fight to be recognised as the best team in the world. Winning the Europa League also comes with many benefits such as an automatic spot in the champions league and a pre-season fixture against the Champions League winners.

Qualifying for both competitions has changed over the last ten years but currently, for a Premier League team to qualify for the Champions League they must either [1]:

- Finish in the top 4 of the Premier League
- Win the Champions League
- Win the Europa League

However, if a Premier League team wins the Champions League and another wins the Europa League, the team that finishes fourth in the Premier League will be demoted to the Europa League if both European cup winners do not finish in the top four as a maximum of five teams can qualify for Champions League football.

Until 2015-16, only a maximum of four teams could qualify for the Champions League. In 2012, this resulted in Tottenham Hotspur playing in the Europa League despite finishing in fourth place as Chelsea won the Champions League but finished outside the top four [1].

The group stages consist of six games against three other teams, two matches against each team, one played at home and one away. The top two in each group then progress to knockout stages. If a team finishes third in their group, they are demoted to the knockout stages of the Europa League and if a team finishes bottom of their group, they are eliminated from Europe. An example is shown below, with teams highlighted in green progressing to the next stage of the Champions League. Teams in yellow will drop into the Europa League knockout stages and teams in red are eliminated from European football.

| Position | Team | Points |
|----------|--------|--------|
| 1 | Team A | 18 |
| 2 | Team B | 12 |
| 3 | Team C | 6 |
| 4 | Team D | 0 |

Currently, to qualify for the Europa League a team needs to [1]:

- Finish in fifth place in the Premier League
- Win the FA Cup
- Win the Carabao Cup

The FA Cup and Carabao Cup are domestic cup competitions in England (and includes some Welsh teams that play in the English leagues). If the winners of the FA Cup and Carabao Cup have already qualified for European football then the teams that finish sixth and seventh in the league will qualify for the Europa League [5].

In the Premier League, there are six teams known as the "top six." They are Arsenal, Chelsea, Liverpool, Manchester City, Manchester United, and Tottenham. These six teams have qualified for Europe far more than any other team in the league, but in the last five years especially, they have started to dominate and have taken up six of the seven European spots in three of the last five seasons. As a result, this paper will also be comparing how different the last five seasons have been compared to the last ten.

## Methodology

This paper will look at two different factors to determine whether Premier League teams are affected by playing in European competitions. The first factor is whether the number of points a team earns throughout a season differs to previous seasons. The second factor will determine whether the points per game (PPG), differs depending on if a league match is playing within five days of a European fixture.

When a team plays a football match in the Premier League, there are three different outcomes:

- Win = 3 points
- Draw = 1 points
- Loss = 0 points

In total each team plays 38 games throughout the season (playing each team twice – home and away), so to calculate overall PPG over the entire season, the final points tally is divided by 38.

The paper will look at all Premier League teams that played in a European Competition during the last ten seasons [4]. It will compare how they performed in contrast to the previous season and work out the difference. Also, the paper will compare the average PPG after a European fixture and the PPG after a non-European fixture. A weighted average will then be calculated to find the mean difference in PPG with the number of games that a team has played in Europe for that season. The calculation behind this weighted average will be explained later in the paper.

The paper will look at a variety of different variables to see whether certain factors affect the results that the data finds. For example, does playing after the Champions League cause a greater difference than playing after the Europa League.

To prove whether there is a statistical difference in PPG depending on whether a European match is played or if a team earns fewer points across the entire season by playing in Europe. A 95% Confidence Interval will be used for the means found for the 'difference in PPG' and the 'difference in points' data in the Excel document. A 95% interval will be used as it is the traditional interval used within mathematics. Using a smaller interval such as 90% will make the interval narrower where a larger interval such as 99% will make the interval wider.

This means that the following formula will be used:

$$\bar{x} \pm z * \frac{\sigma}{\sqrt{n}}$$
*Equation 1*

Where $\bar{x}$ is the sample mean, $\sigma$ is the standard deviation, $n$ is the size of the dataset and $z$ is the Z-value, which is given by the following table:

| Percentage Confidence | Z-value |
|:---:|:---:|
| 80 | 1.28 |
| 90 | 1.645 |
| 95 | 1.96 |
| 98 | 2.33 |
| 99 | 2.56 |

*Table 1*

As a 95% Percentage Confidence is being used, the Z-value will be 1.96.

## Data

The data is split into six different sections: Overall, Europa League, Champions League, Teams entering Europe, Top 6 and Not Top 6. The Overall sheet contains all information while the other five

spreadsheets break down the data into specific segments to look at a plethora of different factors that may impact how a team performs.

To find the total points that a team finished with, the last eleven years of the Premier League table were used to find their previous seasons results as well as their current results [3]. Until 2015 teams would still qualify for the Europa League if they lost in the FA Cup Final. This allowed teams that were not at the top of the league to still qualify for Europe. [1]. Some clubs were relegated from the top division the same season they qualified and as a result were removed from the dataset. This meant that Birmingham City and Wigan were removed.

The number of games played after European fixtures was found by looking game by game through every team that had qualified for Europe in that season [2]. This is where all league matches that were more than five days after a European fixture were identified and removed. As a result, the number of matches played after a European match may not add up to the total number of matches that a team played in Europe. These gaps can be explained for a variety of reasons: international breaks, cup fixtures replacing league matches or weeks where teams do not have a match. During this process, it was identified that West Ham had qualified for European football in the 2015-16 season but were knocked out of the Europa League in the qualifying rounds.  As a result, West Ham were removed from the dataset along with Birmingham City and Wigan.

A weighted mean was calculated for points per game after a European fixture by multiplying the average PPG after a European fixture by the number of games the team played in Europe in that season. The sum of all teams across the ten seasons is then divided by the total number of games that every team had played within five days of a European fixture. This created a weighted mean. The same method was used to calculate a weighted mean for PPG after a non-European fixtures, with the relevant data. The standard deviation was calculated by using the inbuilt function within Excel.

When calculating the weighted mean for the difference in PPG, the difference for each team was multiplied by the number of games the club played in Europe for that season. As a result, teams that only played two games in Europe have less of an effect on the overall mean compared to teams that played twelve matches. This means that the average difference shown in the data is not 'PPG after European game' subtracted by 'PPG after non-European game.' This enables a more accurate representation of the data to be found.

The total points difference was calculated by subtracting the points a team earned over the course of the previous season by their current season (e.g. in 2011/12 the points difference is calculated by the 2011/12 points total – 2010/11 points total) [3].

To calculate the 95% Confidence Interval, equation 1 will be used.

## Limitations

European fixtures are not the only games that are played before Premier League matches. The FA Cup and Carabao Cup are usually played on weekdays and Premier League matches often are as well. For example, in the Christmas period teams often end up playing four league matches in the space of twelve days, equating to at least two games a week.

Another factor that cannot be accurately measured by the dataset is how many players that started the European fixture in midweek also played in the league game at the weekend. A team aiming for a high finishing position in the league may send out a weaker team in the Europa League [6]. For a top six side in particular, finishing in the top four positions in the league and qualifying for the Champions League is a bigger prize than winning the Europa League. This isn't the case for the Champions League, as it is seen as the most prestigious club competition in the footballing world [7].

Another limitation with the dataset is that the number of injuries a team suffers across a season is not included. Due to the increase in the number of games a team plays, it is reasonable to believe that more injuries will occur. This will have a negative effect on the number of points a team earns over the course of a season.

# Findings

## Premier League

Here, the data shows the last ten years of the Premier League as a whole, including all Premier League teams playing in the Champions League or the Europa League (except for West Ham as mentioned earlier). Teams that played in both the Champions League and Europa League in the same season are also included.

|  | PPG after European match | PPG after non-European match | Difference in PPG (weighted with European matches) | Total points difference |
|---|---|---|---|---|
| Mean (10 yrs) | 1.8020 | 1.7867 | -0.0176 | -3.5652 |
| Mean (5 yrs) | 1.7525 | 1.7874 | -0.1212 | -5.0286 |

*Table 2*

When looking over the last ten years, it initially seems to indicate that teams earn more points immediately after a European match compared to when they have not just played a European fixture. However, when the difference in PPG is weighted with the number of games each team played in Europe, there is a minute difference in PPG. Throughout the entire season, the data indicates that on average teams lose around three to four points over the course of a season. This is the equivalent of one win the previous season turning into a loss.

The number of points that a team loses throughout a season has also increased to around five points. The data shows that the average number of games played has not substantially increased for the last five seasons compared to the last ten. This could indicate that the competition of the league itself has increased over the last few years, or that European competition has gotten harder.

|  | Difference in PPG | Total points difference |
|---|---|---|
| CI 95% Upper (10 yrs) | 0.1207 | -0.6487 |
| CI 95% Lower (10 yrs) | -0.1559 | -6.4817 |
| CI 95% Upper (5 yrs) | 0.0386 | -0.3230 |
| CI 95% Lower (5 yrs) | -0.2809 | -9.7341 |

*Table 3*

For this set of data, if the Confidence Interval for the difference in PPG includes 0 then there is no statistical difference. This is also true when looking at total points difference. If the CI does not

contain 0, there is a negative (if both CI intervals are negative) or positive (if both CI intervals are positive) statistical difference.

Taking a 95% level of significance, the data shows that there is no statistical difference in the PPG a team wins after a European fixture compared to not playing immediately after. However, it does show that if a team qualifies for Europe, to a 95% Confidence level, they will drop points as a result.

## Teams entering Europe

The table below consists only of teams that were not playing in Europe the previous season. The purpose of this set of data is to identify whether teams making the step up into European competitions suffer more than teams that maintained European football from the previous season.

|  | PPG after European match | PPG non-European match | Difference in PPG (weighted with European matches) | Total points difference |
|---|---|---|---|---|
| Mean (10 yrs) | 1.4110 | 1.3936 | -0.0181 | -9.9500 |
| Mean (5 yrs) | 1.4304 | 1.4032 | -0.1042 | -13.9192 |

*Table 4*

Comparing the difference in PPG if a team plays directly after a European match or not, the data shows that teams entering Europe follow a similar pattern to the data representing the entire league. There is a small negative PPG after a European match for the last ten years and a slightly greater negative difference over the last five.

But the points difference for the entire season is much higher for new sides. Teams lose nearly ten points on average over the entire season for the last ten years and nearly fourteen points over the last five. Interestingly, this is despite teams playing on average one to two games less over the last few years.

|  | Difference in PPG | Total points difference |
|---|---|---|
| CI 95% Upper (10 yrs) | 0.2361 | -4.6420 |
| CI 95% Lower (10 yrs) | -0.2724 | -15.2580 |
| CI 95% Upper (5 yrs) | 0.2838 | -7.2720 |
| CI 95% Lower (5 yrs) | -0.4923 | -20.5665 |

*Table 5*

Looking at the 95% confidence intervals, there is no statistical difference between the number of points playing in Europe for the first time earns after a European fixture or not. However, it can be said with certainty that a team will lose points across the entire season. 95% of teams will lose between 4.6 and 15.3 points when looking at the last ten years, and between 7.7 to 20.6 if data for the last five years is used instead. There was little data for the last five years though, so using the ten-year average will likely return a truer estimate.

## Europa League

This dataset will consist of teams that qualified for the Europa League and still in the competition when the Premier League season started. It does not include teams that were initially in the Champions League but finished third in their group and were demoted to the Europa League.

|  | PPG after European match | PPG after non-European match | Difference in PPG (weighted with European matches) | Total points difference |
|---|---|---|---|---|
| Mean (10 yrs) | 1.5319 | 1.4861 | -0.0129 | -4.2500 |
| Mean (5 yrs) | 1.5648 | 1.4717 | -0.0521 | -6.0714 |

*Table 6*

Clubs playing in the Europa League show no difference in their PPG depending on if a European match is played or not. The number of points lost is similar to the Premier League as a whole, with a slight increase in the last five years.

|  | Difference in PPG | Total points difference |
|---|---|---|
| CI 95% Upper (10 yrs) | 0.2177 | -0.7395 |
| CI 95% Lower (10 yrs) | -0.2436 | -7.7605 |
| CI 95% Upper (5 yrs) | 0.2155 | -0.8111 |
| CI 95% Lower (5 yrs) | -0.3197 | -11.3317 |

*Table 7*

Looking at the confidence intervals in the table above, we can see that there is no statistical significance in the PPG if a match is played after a European fixture or not. There is however a statistical significance for the points difference between the current season and the previous. Teams playing in the Europa league will lose points in the season they are playing European football compared to the season they qualified (to a 95% level of significance).

## Champions League

The Champions League is widely regarded as the most prestigious club competition across the world [7]. As a result, teams put a lot of focus and effort into doing well in it, which may result in their league results being affected.

|  | PPG after European match | PPG after non-European match | Difference in PPG (weighted with European matches) | Total points difference |
|---|---|---|---|---|
| Mean (10 yrs) | 1.9901 | 1.9909 | -0.0085 | -3.8824 |
| Mean (5 yrs) | 1.8951 | 2.0172 | -0.1441 | -4.5000 |

*Table 8*

For the last ten seasons, there is no difference in the PPG depending on whether the fixture is played after a European match or not. Yet, over the last five years, there has been a substantial decrease in the PPG after a European match while the PPG after a non-European match has slightly increased. This could explain the increase in the number of points a team loses throughout the season compared to the previous season.

|  | Difference in PPG | Total points difference |
|---|---|---|
| CI 95% Upper (10 yrs) | 0.1909 | 0.6545 |
| CI 95% Lower (10 yrs) | -0.2080 | -8.4192 |
| CI 95% Upper (5 yrs) | 0.0879 | 3.2599 |
| CI 95% Lower (5 yrs) | -0.3762 | -12.2599 |

*Table 9*

Surprisingly, the confidence intervals show that there is no statistical evidence to suggest that playing in Europe effects either the PPG after each match or for the entire season. This may be because teams playing in the Champions League tend to have been at the top of the Premier League for a prolonged period. So have the funds and the brand name to attract the best players around the world, allowing them to have a large squad size with many talented players. As a result, when injuries occur or players need to be rested, they can be replaced with equally capable players.

## Top six

As mentioned earlier, the top six in the Premier League consists of the teams Arsenal, Chelsea, Liverpool, Manchester City, Manchester United, and Tottenham Hotspur. They are regarded as the best teams in the league over the last few years. In the last five years they have dominated the top of the division and have occupied six of the seven European spots three times in the last four years. It would be expected that as these teams are established at the top of English football, playing in Europe will affect them less than other teams.

|  | PPG after European match | PPG after non-European match | Difference in PPG (weighted with European matches) | Total points difference |
|---|---|---|---|---|
| Mean (10 yrs) | 1.8869 | 1.9697 | -0.0747 | -1.4340 |
| Mean (5 yrs) | 1.8150 | 1.9909 | -0.1727 | -2.0370 |

*Table 10*

As stated above, teams in the top six show a very small decrease in the total points they receive throughout the season. This is likely because clubs in the top six have good squad depth so injuries will have less of an effect on how the team performs than for other teams.

|  | Difference in PPG | Total points difference |
|---|---|---|
| CI 95% Upper (10 yrs) | 0.0597 | 1.7597 |
| CI 95% Lower (10 yrs) | -0.2091 | -4.6276 |
| CI 95% Upper (5 yrs) | -0.0360 | 3.0382 |
| CI 95% Lower (5 yrs) | -0.3094 | -7.1123 |

*Table 11*

The table shows no statistical significance for either of the two factors over the last ten years. However, over the last five years, there is evidence to suggest that the top six clubs' PPG is affected by whether they play a match after a European match or not (to a 95% level of significance). As these teams are considered the best in the league, it is surprising that they seem to struggle more than other teams who also play in Europe. In addition, the number of games that the top six play in Europe each season has not increased over the last five years in comparison to the last ten.

This difference may be explained by the fact that the quality of other teams in the league has improved in the last few years. If the top clubs are not performing at their usual standard after a European fixture, they are more likely to drop points against supposedly weaker teams. Whereas in the past teams vying for the Premier League title would only drop points against other teams competing for the title.

## Clubs outside the top 6

The purpose of this set of data is to look at teams that are not considered the best clubs in England and see how they fare in the league after qualifying for Europe.

| | PPG after European match | PPG after non-European match | Difference in PPG (weighted with European matches) | Total points difference |
|---|---|---|---|---|
| Mean (10 yrs) | 1.4234 | 1.2274 | 0.2370 | -10.6250 |
| Mean (5 yrs) | 1.3659 | 1.1901 | 0.1982 | -15.1250 |

*Table 12*

Interestingly, the table shows that on average, teams not classified as one of the top six perform better immediately after a European fixture compared to any other time. This may be as clubs, fans and players experience playing in Europe, the team receives a boost after playing a match. But teams earn fewer points throughout a season. The number of points team lose in the season they play European football compared to the previous season has increased in recent years. This is despite teams playing almost two games less a season in Europe over the last few years compared to the last ten. Half of the teams that qualified for the Europa League only played two ties during the Premier League season.

This figure does not display the total number of European games a team has played though. Teams not in the top six tend to finish in the Europa League and must go through multiple qualifying rounds to make it to the group stage (with Leicester City being an exception in 2016/17). As a result, teams must start training and playing competitive matches earlier than other teams, resulting in less rest for the players and a greater chance of injuries occurring. For example, in the 2018/19 season Burnley played their first Europa League match three weeks before the beginning of the Premier League season. In those first three weeks, there first and second choice goal keepers were both injured [8] (Premier League, 2016).

Another factor is that the players that excelled to propel the team to European football are likely to be bought by bigger clubs such as the top six. This results in the smaller club losing their best players and, combined with qualifying for Europe, can be too much for some clubs. One recent example is Southampton in 2016, who lost several keys players including Sadio Mané and Victor Wanyama to Liverpool and Tottenham Hotspur respectively [10]. The club did not make it out of the Europa League group stage and finished the 2016/17 season with 46 points, down from 63 the previous season [3].

| | Difference in PPG | Total points difference |
|---|---|---|
| CI 95% Upper (10 yrs) | 0.6116 | -4.9194 |
| CI 95% Lower (10 yrs) | -0.1376 | -16.3306 |
| CI 95% Upper (5 yrs) | 0.7337 | -6.4585 |
| CI 95% Lower (5 yrs) | -0.3372 | -23.7915 |

*Table 13*

The table shows that there is no statistical evidence to suggest that playing after a European fixture effects the PPG a team earns, whether it be over the last ten or five years. However, to a 95% level of significance, there is evidence to suggest that teams not classified as the top six will lose points throughout the season.

## Conclusion

To summarise, the general hypothesis from the data is that playing in Europe negatively affects the number of points a team collects over the course of a season. However, playing a league match immediately after playing a European fixture does not have any effect. This indicates that rather than teams suffering an immediate decrease in form, the extra fixtures that come with playing in a European competition cause a small decrease in the number of points a team earns throughout a season.

When the data is broken down and analysed, several conclusions can be made. Teams that were not in Europe the previous season struggle to maintain their European position for the following season. The only exception to this are teams known as the top six and Aston Villa, who were knocked out of the Europa League before the group stage both times. This is likely due to teams that perform above expectations in the league will have their best players bought from them, leaving them with a tougher fixture list while having a weaker squad.

The last five years show that the effect of playing in Europe has increased for all teams. This could be due to a combination of factors such as English teams progressing further in European competitions while the quality of the Premier League has also increased. For the 2018/19 season, it was an all English final in the Champions League (Tottenham Hotspur vs Liverpool) and the Europa League (Chelsea vs Arsenal). This has never happened before in the history of the competition.

This is further backed up by the fact that the three teams with the most injuries in the 2018/19 were all in a European final [9], indicating that the extra games do influence the injuries a team has over the course of the season. Manchester United had over sixty injuries and this may have resulted in the club missing out on Champions League football [9].

For clubs classified as the top six, there is statistical evidence to suggest that in the last five years, playing a Premier League match after a European fixture affects how many points the team will get. This also relates to teams making deeper runs into European football as well as the quality of sides in the Premier League getting strong, teams are unable to breeze past weaker opposition in the league, so if the team is not on their game they can easily drop points.

The data shows that if a club can maintain European football after its first season, then it will likely stay competing in Europe for many seasons afterwards. On the other hand, if a team is not able to maintain the quality of players or strengthen their squad, they are likely to suffer harshly. This is due to several problems, including more injuries occurring due to an increased number of games. Another issue is there best players moving on to more successful clubs in England and the rest of Europe. For teams that are not planning on investing and developing their squad, qualifying for Europe typically results in the following season having a much lower points tally than the previous.

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