

Who will be champion? A predictive analysis of performance

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1. Introduction

The 21st Monthly Report of the CIES Football Observatory presents a predictive analysis of the number of points that each big-5 league club will obtain at the end of the season. In order to do this, we use a multivariate statistical model built on the basis of results observed from the 2011/12 season onwards. The model takes into account the offensive and defensive performances of big-5 league teams until the 31st December of each season, as well as the level of their grip on the game.

The analysis highlights that four out of the five current leaders are the most likely champions: Chelsea in the English Premier League, Real Madrid in the Spanish Liga, Bayern Munich in the German Bundesliga and Juventus in the Italian Serie A. In the French Ligue 1, Monaco should overtake Paris St-Germain and Nice.

According to our approach, despite recent wins, Manchester United won't be able to rank higher than sixth. Moreover, Hamburg will be relegated for the first time in its history. Let's us wait a few months to see how accurate these predictions will prove to be.

2. Defensive performance

The defensive performance of a team is primarily measured by taking into account the number of goals conceded. This indicator can be significantly enhanced by including the number of shots conceded by teams from inside their own box. Indeed, any teams that are successful defensively in the long run not only concede few goals, but are also able to prevent as much as possible their adversaries from shooting from close range.

Up until the 31st December 2016, the lowest value in terms of goals conceded per match at big-5 league level was measured for Bayern Munich. The highest value was recorded for Cagliari. The biggest gap within a league was observed in the English Premier League between Chelsea and Swansea.

Figure 1: maximum and minimum values per league, goals conceded* per match (until 31.12.2016)

Premier League

1. Chelsea FC	0.68
2. Tottenham Hotspur FC	0.72
3. Manchester United FC	1.00
18. Sunderland AFC	1.84
19. Hull City AFC	2.16
20. Swansea City AFC	2.32

Liga

1. Villarreal CF	0.69
2. Club Atlético de Madrid	0.87
3. Real Madrid CF	0.93
18. Granada CF	2.06
. Real Sporting de Gijón	2.06
20. CA Osasuna	2.13

Ligue 1

1. OGC Nice	0.68
2. Paris St-Germain FC	0.79
3. AS St-Etienne	0.84
18. SM Caen	1.78
19. FC Metz	2.00
. FC Lorient	2.00

Bundesliga

1. FC Bayern München	0.56
2. Eintracht Frankfurt	0.75
3. RB Leipzig	0.94
16. 1. FSV Mainz 05	1.88
17. Hamburger SV	1.94
18. SV Werder Bremen	2.13

Serie A

1. Juventus FC	0.82
2. AS Roma	1.00
3. AC Chievo Verona	1.11
18. Palermo US	1.94
. Pescara Calcio	1.94
20. Cagliari Calcio	2.33

* Not including own-goals

The big-5 league team having conceded the most shots from within its own box is Hull City. At the other extreme, Liverpool conceded the least. The other teams by league having left their adversaries with the fewest chances to shoot from short range are Atlético Madrid, Paris St-Germain, Bayern and Juventus.

Figure 2: maximum and minimum values by league, short-range shots conceded per match (until 31.12.2016)

Premier League

1. Liverpool FC	3.9
2. Manchester United FC	4.8
3. Manchester City FC	4.9
18. Burnley FC	10.1
19. Sunderland AFC	10.6
20. Hull City AFC	10.8

Liga

1. Club Atlético de Madrid	5.3
2. FC Barcelona	5.5
. Real Madrid CF	5.5
18. Real Sporting de Gijón	9.1
19. CA Osasuna	9.3
20. Granada CF	9.9

Ligue 1

1. Paris St-Germain FC	4.0
2. FC Nantes	5.7
. Toulouse FC	5.7
18. OGC Nice	7.8
19. FC Metz	8.7
20. Dijon FCO	9.2

Bundesliga

1. FC Bayern München	4.4
2. RB Leipzig	5.4
3. BV 09 Borussia Dortmund	6.3
16. SV Darmstadt 98	9.3
17. SV Werder Bremen	9.5
18. Hamburger SV	9.7

Serie A

1. Juventus FC	4.6
2. SSC Napoli	5.2
3. Atalanta BC	5.4
18. Palermo US	9.4
19. Torino Calcio	9.8
20. Empoli FC	10.1

3. Grip on the game

A team's strength is also measured by its capacity to keep possession of the ball. The indicator of the number of successful passes is very useful in this regard. Moreover, teams who are successful over the long term are capable of territorial domination. In this case, the indicator of the number of successful passes in the opposite half is particularly relevant.

The record number of passes per match up until the 31st December was recorded for Bayern Munich: 635. This value is 3.5 times higher than that observed for Darmstadt. The other clubs by league having achieved the least number of passes per match are West Bromwich Albion, Osasuna, Nancy and Crotone.

Figure 3: maximum and minimum values by league, successful passes per match (until 31.12.2016)

Premier League

1. Liverpool FC	507
2. Manchester City FC	500
3. Arsenal FC	476
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18. Sunderland AFC	232
19. Burnley FC	229
20. West Bromwich Albion FC	221

Liga

1. FC Barcelona	544
2. Real Madrid CF	469
3. UD Las Palmas	466
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18. RCD Espanyol	266
. CD Leganés	266
20. CA Osasuna	214

Ligue 1

1. Paris St-Germain FC	611
2. OGC Nice	527
3. Olympique Lyonnais	426
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18. SC Bastia	271
19. FC Metz	265
20. AS Nancy-Lorraine	262

Bundesliga

1. FC Bayern München	635
2. BV 09 Borussia Dortmund	526
3. VfL Borussia M'gladbach	476
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16. Hamburger SV	250
17. 1. FSV Mainz 05	247
18. SV Darmstadt 98	181

Serie A

1. SSC Napoli	574
2. AC Fiorentina	447
3. Juventus FC	445
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18. Udinese Calcio	295
19. Cagliari Calcio	294
20. FC Crotone	222

Bayern Munich is also the club that made the most successful passes in the opponents' half of the pitch. This result reflects the ability of the Bavarian team to territorially dominate their adversaries. Barcelona, Naples and Arsenal also made more than 300 successful passes per match in the opposite half of the pitch.

Figure 4: maximum and minimum values by league, successful passes in the opposite half (until 31.12.2016)

Premier League

1. Arsenal FC	303
2. Liverpool FC	296
3. Manchester City FC	293
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18. Sunderland AFC	129
19. West Bromwich Albion FC	123
20. Burnley FC	120

Liga

1. FC Barcelona	324
2. Real Madrid CF	250
3. Club Atlético de Madrid	232
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18. CD Alavés	124
19. CA Osasuna	118
20. RCD Espanyol	114

Ligue 1

1. Paris St-Germain FC	272
2. Stade Rennais FC	211
3. Olympique Lyonnais	208
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18. FC Metz	135
19. SC Bastia	133
20. AS Nancy-Lorraine	129

Bundesliga

1. FC Bayern München	351
2. BV 09 Borussia Dortmund	245
3. Bayer 04 Leverkusen	230
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16. Hamburger SV	132
17. 1. FSV Mainz 05	118
18. SV Darmstadt 98	91

Serie A

1. SSC Napoli	319
2. Internazionale Milano FC	233
3. AS Roma	227
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18. Udinese Calcio	151
19. Cagliari Calcio	138
20. FC Crotone	117

4. Offensive performance

Goals are of fundamental importance in football. Similar to goals conceded, the indicator of the number of goals scored is a reasonably accurate reflection of the clubs' level. The ability of teams to shoot after penetrating their opponents' box is also a very useful indicator to estimate the offensive abilities beyond the role played by chance.

Monaco is top of the rankings for the number of goals scored per match. Only two other teams in the big-5 scored more than 2.5 goals per game: Real Madrid and Barcelona. At the other end of the spectrum, the offensive sterility of Empoli is noteworthy. Similarly, Nantes, Darmstadt and Pescara scored less than 0.7 goals per match.

Figure 5: maximum and minimum values by league, goals scored* per match (until 31.12.2016)

Premier League

1. Liverpool FC	2.37
2. Chelsea FC	2.16
3. Arsenal FC	2.11
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18. Middlesbrough FC	0.84
. Hull City AFC	0.84
. Sunderland AFC	0.84

Liga

1. Real Madrid CF	2.67
2. FC Barcelona	2.56
3. Sevilla FC	1.94
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18. Granada CF	0.88
19. CD Leganés	0.81
. CA Osasuna	0.81

Ligue 1

1. AS Monaco	2.84
2. Paris St-Germain FC	1.84
3. Olympique Lyonnais	1.83
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18. AS Nancy-Lorraine	0.79
19. Angers SCO	0.74
20. FC Nantes	0.67

Bundesliga

1. FC Bayern München	2.31
2. BV 09 Borussia Dortmund	2.19
3. RB Leipzig	1.81
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. Hamburger SV	0.88
17. FC Augsburg	0.81
18. SV Darmstadt 98	0.69

Serie A

1. SSC Napoli	2.22
2. AS Roma	2.11
3. Juventus FC	2.00
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18. FC Crotone	0.82
19. Pescara Calcio	0.67
20. Empoli FC	0.56

* Not including own-goals

No big-5 league team attempted as many shots from within their opponents' box as Real Madrid. The other top performing teams in this area by league are Liverpool, Paris St-Germain, Bayern and Rome. Palermo's supporters have, on the other hand, every right to be worried. The same holds true for clubs at the bottom of the tables in their respective leagues.

Figure 6: maximum and minimum values by league, short-range shots taken per match (until 31.12.2016)

Premier League

1. Liverpool FC	10.8
2. Manchester United FC	10.2
3. Manchester City FC	10.1
18. Hull City AFC	5.6
19. Burnley FC	5.3
20. Middlesbrough FC	5.2

Liga

1. Real Madrid CF	12.5
2. FC Barcelona	11.4
3. Sevilla FC	8.8
18. Real Sporting de Gijón	5.0
. Granada CF	5.0
. RCD Espanyol	5.0

Ligue 1

1. Paris St-Germain FC	9.4
2. Olympique Lyonnais	9.3
3. AS Monaco	8.4
18. SC Bastia	5.5
. FC Metz	5.5
20. AS Nancy-Lorraine	5.1

Bundesliga

1. FC Bayern München	11.6
2. RB Leipzig	9.9
3. BV 09 Borussia Dortmund	9.6
16. Hertha BSC Berlin	6.1
17. SV Darmstadt 98	5.6
. FC Augsburg	5.6

Serie A

1. AS Roma	11.3
2. Internazionale Milano FC	10.7
3. Juventus FC	9.9
18. Empoli FC	5.5
19. Bologna FC	5.1
20. Palermo US	5.0

5. Conclusion

In order to predict the outcome of the championships, we took into account results observed between 2011/12 and 2015/16 (five seasons). The above-mentioned indicators were integrated within a multivariate statistical model estimating points achieved in the second half of the season. The predicted final rankings result from the addition between points achieved up until December 31st and points estimated using the model for the remaining half of the season.

Although scientifically sound, it goes without saying that this predictive exercise can only, at best, get as close as possible to what will actually transpire. We must indeed always allow for the role of chance in football. Anyway, according to our statistical model, the final rankings of the big-5 leagues will be the following.

Figure 7: Premier League final rankings according to the CIES Football Observatory predictive model

Final ranking	Points	31/12	Evol
1. Chelsea	88	1	=
2. Liverpool	86	2	=
3. Man. City	78	5	+2
4. Arsenal	78	3	-1
5. Tottenham	73	4	-1
6. Man. United	73	6	=
7. Everton	55	7	=
8. Southampton	53	9	+1
9. Bournemouth	49	10	+1
10. WBA	49	8	-2
11. West Ham	46	12	+1
12. Watford	45	13	+1
13. Crystal Palace	43	17	+4
14. Leicester	43	15	+1
15. Stoke City	42	14	-1
16. Burnley	41	11	-5
17. Middlesbrough	38	16	-1
18. Swansea	33	20	+2
19. Sunderland	31	18	-1
20. Hull	29	19	-1

Figure 8: Liga final rankings according to the CIES Football Observatory predictive model

Final ranking	Points	31/12	Evol
1. Real Madrid	90	1	=
2. FC Barcelona	86	2	=
3. Sevilla FC	71	3	=
4. Atlético Madrid	68	6	+2
5. Real Sociedad	66	5	=
6. Villarreal CF	61	4	-2
7. Athletic Club	57	7	=
8. SD Eibar	53	8	=
9. Málaga CF	53	13	+4
10. Las Palmas	52	10	=
11. Celta Vigo	49	11	=
12. RCD Espanyol	48	9	-3
13. CD Alavés	45	12	-1
14. RC Deportivo	45	16	+2
15. Valencia CF	44	17	+2
16. Real Betis	43	14	-2
17. CD Leganés	40	15	-2
18. Sporting Gijón	34	18	=
19. Granada CF	28	19	=
20. CA Osasuna	27	20	=

Figure 9: Ligue 1 final rankings according to the CIES Football Observatory predictive model

Final ranking	Points	31/12	Evol
1. Monaco	79	2	+1
2. Paris SG	78	3	+1
3. Nice	72	1	-2
4. Lyon	69	4	=
5. Guingamp	56	5	=
6. Marseille	56	6	=
7. Rennes	54	7	=
8. Toulouse	50	9	+1
9. St-Etienne	50	8	-1
10. Montpellier	49	11	+1
11. Bordeaux	48	10	-1
12. Lille	45	12	=
13. Nantes	43	17	+4
14. Caen	42	19	+5
15. Angers	42	16	+1
16. Nancy	41	13	-3
17. Bastia	41	14	-3
18. Dijon	40	15	-3
19. Lorient	40	20	+1
20. Metz	39	18	-2

Figure 11: Serie A final rankings according to the CIES Football Observatory predictive model

Final ranking	Points	31/12	Evol
1. Juventus	83	1	=
2. AS Roma	78	2	=
3. Napoli	77	3	=
4. Lazio	67	4	=
5. Internazionale	66	7	+2
6. Atalanta	65	6	=
7. Milan	61	5	-2
8. Fiorentina	57	9	+1
9. Torino	56	8	-1
10. Genoa	52	12	+2
11. Udinese	51	11	=
12. Sampdoria	51	13	+1
13. Chievo Verona	50	10	-3
14. Cagliari	45	14	=
15. Sassuolo	43	16	+1
16. Bologna	43	15	-1
17. Empoli	32	17	=
18. Pescara	31	20	+2
19. Crotone	29	19	=
20. Palermo	29	18	-2

Figure 10: Bundesliga final rankings according to the CIES Football Observatory predictive model

Final ranking	Points	31/12	Evol
1. Bayern	83	1	=
2. Leipzig	68	2	=
3. Dortmund	62	6	+3
4. Frankfurt	55	4	=
5. Hoffenheim	54	5	=
6. Hertha Berlin	54	3	-3
7. Köln	48	7	=
8. Leverkusen	48	9	+1
9. Freiburg	45	8	-1
10. Schalke 04	45	11	+1
11. Mainz	42	10	-1
12. M'gladbach	40	14	+2
13. Augsburg	38	12	-1
14. Wolfsburg	37	13	-1
15. Bremen	36	13	-2
16. Ingolstadt	35	17	+1
17. Hamburg	30	16	-1
18. Darmstadt	23	18	=