



## Football Analytics

### The CIES Football Observatory 2017/18 season

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# Foreword

Football offers incredibly interesting possibilities to when it comes to data-driven analysis. This e-book regroups the Monthly Reports published by the CIES Football Observatory over the course of the 2017/18 season. Two research notes are also included. The contents mainly relate to our three key areas of expertise: the demography study of the players' labour market, the analysis of the technical performance of both teams and players, as well as the economic study of the transfer market.

Dissemination was always at the heart of our approach. For ten years, we have published printed annual studies. These publications ceased in 2014 in favour of monthly and weekly digital reports. This step helped us to share our findings with an even greater audience. Up until the end of 2017, these publications were accessed about two million times. This number is growing week after week alongside the establishment of the CIES Football Observatory as a key reference in the football research area.

This e-book is a complementary attempt to reach people who are passionate about football. We firmly believe that our analysis is a precious tool to help the general public improve its knowledge of the beautiful game. Making fans aware of the multiple stakes at play in today's football is a source of great satisfaction. This e-book is an additional way of allowing us to fulfil our mission at the service of football's sustainable and long-term development.

The key mission of our research group is to advance the frontiers of knowledge on football at large. This includes, but it is not limited to, the critical observation of the problems affecting the beautiful game with a governance and regulation purpose, the understanding of the logics and dynamics of success, as well as the implementation of both conceptual and technical tools to improve squad management and organisational performance.

In our daily work, we aim to analyse football in both a relevant and accessible fashion. Often, the simple description of the phenomena studied and the appraisal of the general context in which they occur provide crucial insights to understand football in its complexity. We also believe that the unique comparative perspective promoted by our research group

is a must for the understanding of the professional game as a whole. The frequent positive feedback by football stakeholders encourages us to continue on this path.

Each of our three key research areas provides in itself a sufficient quantity of issues to develop. However, focusing only on demography, performance or transfers would not allow us to promote such a broad vision of football. Many other issues remain to be investigated and this will always be of interest to us. However, focusing on very specific (or not truly relevant) points without looking at the bigger picture is not what we are trying to achieve. We value and appreciate statistics (and football) far too much to make misleading (or irrelevant) use of them.

The outrageous complexification of methods or interpretations without clear added value in terms of research outputs is also not our goal. Unfortunately, in the academic world and the football analytics community, this is sometimes more the rule than the exception. While always remaining curious about possible innovations, we primarily direct our efforts towards the enhancement of data, procedures and methodologies. Developing needless sophistications is not our priority. This is also valid with regard to visual representations. In other words, we are keen to keep relevance and contents at the core of our approach.

An additional point that reflects our vision is the importance of having a message. While some thematics have greater political implications than others, in all cases, we think that football research (and research in general) should include regulatory issues as an integral part of the analyses. This is indeed how research can contribute to a more nurturing attitude towards football. As pioneers in football analytics, we hope that this e-book will stimulate more people to observe the game in a critical but constructive way.

# Demographic trends in the European football

The demography study of the player's labour market is one of the three key areas of expertise of the CIES Football Observatory. Every year since 2009, we analyse players present in the clubs of 31 top division leagues of UEFA member associations. In order to be taken into account, a footballer had to be present on the 1st October in the first team squad of the clubs surveyed. Moreover, he should have already played in domestic league games during the current season, or, if this was not the case, to have taken part in adult championship matches during each of the two previous ones. The second and third goalkeepers were included in all cases. In 2017, the sample was made up of 11,812 footballers playing for 466 teams.

Figure n°1: Sample of the study, per league (01/10/2017)

[Label]	Name	Players	Clubs	Players per club	[Label]	Name	Players	Clubs	Players per club
[AUT]	Bundesliga	250	10	25.0	[ITA]	Serie A	530	20	26.5
[BEL]	First Division A	406	16	25.4	[NED]	Eredivisie	411	18	22.8
[BLR]	Premier League	406	16	25.4	[NOR]	Eliteserien	407	16	25.4
[BUL]	First League	339	14	24.2	[POL]	Ekstraklasa	409	16	25.6
[CRO]	1. HNL	275	10	27.5	[POR]	Primeira Liga	491	18	27.3
[CYP]	1. Division	354	14	25.3	[ROM]	Liga I	370	14	26.4
[CZE]	Czech Liga	387	16	24.2	[RUS]	Premier League	417	16	26.1
[DEN]	Superliga	340	14	24.3	[SCO]	Premiership	292	12	24.3
[ENG]	Premier League	522	20	26.1	[SRB]	Super Liga	427	16	26.7
[ESP]	Liga	505	20	25.3	[SUI]	Super League	248	10	24.8
[FIN]	Veikkausliiga	289	12	24.1	[SVK]	Super Liga	296	12	24.7
[FRA]	Ligue 1	507	20	25.4	[SVN]	1. SNL	254	10	25.4
[GER]	Bundesliga	475	18	26.4	[SWE]	Allsvenskan	392	16	24.5
[GRE]	Super League	402	16	25.1	[TUR]	Süper Lig	471	18	26.2
[HUN]	NB I	307	12	25.6	[UKR]	Premier League	304	12	25.3
[ISR]	Ligat ha'Al	329	14	23.5	Total		11,812	466	25.3

The study notably covers the thematics of training (club-trained players), internationalisation (expatriate footballers) and stability (players recruited during the year). The CIES Football Observatory is currently the only organisation in a position to provide such an analysis. The statistical indi-

cators that have been reviewed allow us to compare policies pursued by clubs in composing their squads on both a temporal and spatial level.

Figure n°2: Total number of players surveyed, per league (2009-2017)

[Label] Name	Players	[Label] Name	Players
[AUT] Bundesliga	848	[ITA] Serie A	1,742
[BEL] First Division A	1,510	[NED] Eredivisie	1,550
[BLR] Premier League	1,025	[NOR] Eliteserien	1,333
[BUL] First League	1,346	[POL] Ekstraklasa	1,427
[CRO] 1.HNL	1,190	[POR] Primeira Liga	1,771
[CYP] 1.Division	1,541	[ROM] Liga I	1,648
[CZE] Czech Liga	1,251	[RUS] Premier League	1,429
[DEN] Superliga	1,005	[SCO] Premiership	1,165
[ENG] Premier League	1,753	[SRB] Super Liga	1,576
[ESP] Liga	1,721	[SUI] Super League	909
[FIN] Veikkausliiga	1,080	[SVK] Super Liga	1,139
[FRA] Ligue 1	1,778	[SVN] 1.SNL	1,016
[GER] Bundesliga	1,468	[SWE] Allsvenskan	1,324
[GRE] Super League	1,677	[TUR] Süper Lig	1,636
[HUN] NB I	1,314	[UKR] Premier League	1,223
[ISR] Ligat ha,Al	1,155	Total number of different players	33,299

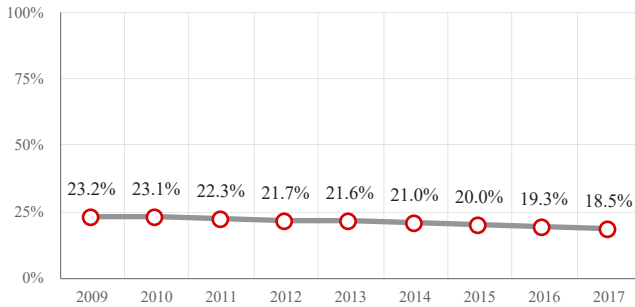
## Training

The analysis of the thematic of training is based on the definition of a club-trained player as conceived by UEFA and used by numerous national leagues so as to encourage the employment of local footballers. Club-trained players are those having spent at least three years between the ages of 15 and 21 in their employer team.

Between 2009 and 2017, the proportion of club-trained players in the squads of teams from the 31 top divisions analysed went down from 23.2% to a new negative record level of 18.5%. This is the eighth year of consecutive decrease. This finding highlights the intensification of the mobility of footballers, as well as the ineffectiveness of measures put into place to encourage the employment of home-grown players.

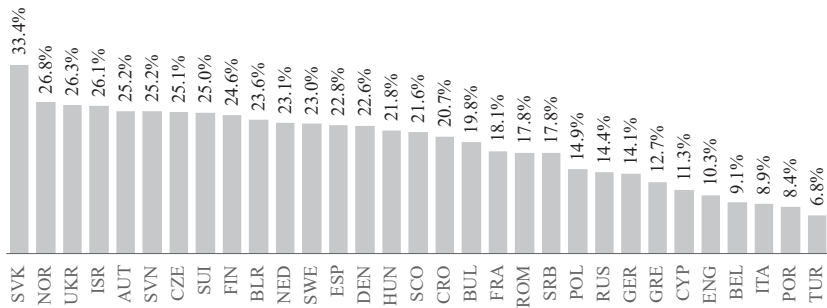


Figure n°3: Evolution in the percentage of club-trained players in squads, 31 European top divisions (2009-2017)



In one league only, the Slovakian top division, club-trained players still account for over one-third of squad members. In 2017, record lows were registered in nine championships, including the Turkish Süper Lig. At the other end of the scale, no record high was observed. The proportion of club-trained players is less than a tenth in four countries: Turkey, Portugal, Italy and Belgium.

Figure n°4: Percentage of club-trained players, by league (01/10/2017)

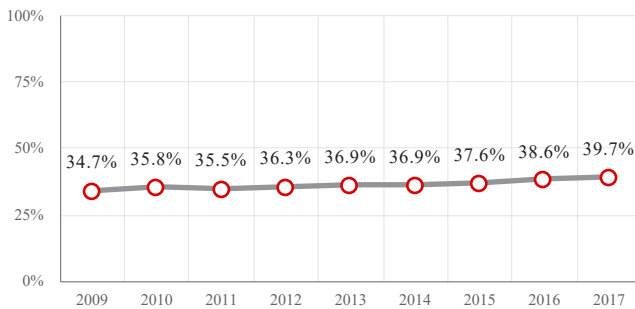


## Expatriates

The notion of expatriate defines players having grown up outside of the national association of their employer club and having moved abroad for football-related reasons. This definition allows us to isolate migrations directly linked to the practice of football. Indeed, players of foreign origin having grown up in the association of their employer team are not considered as expatriates.

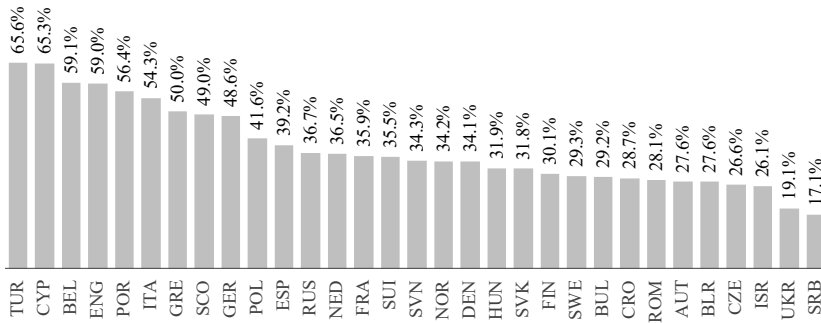
During the period taken into account, the proportion of expatriates in squads of clubs from the 31 European top divisions surveyed has increased steadily: from 34.7% in 2009 to a new record high of 39.7% in 2017. The increase has actually accelerated over the past two years: +1.1% per year since 2015 as opposed to about 0.5% per year for the six previous years.

Figure n°5: Evolution in the percentage of expatriate players in squads, 31 European top divisions (2009-2017)



In 2017, Turkey overtook Cyprus as the country with the championship made up of the highest percentage of expatriate players: 65.6%. This proportion is at least 50% in seven leagues, including the English Premier League and the Italian Serie A. Expatriates represent less than one-quarter of squads in only two countries: Serbia and Ukraine.

Figure n°6: Percentage of expatriate players, by league (01/10/2017)

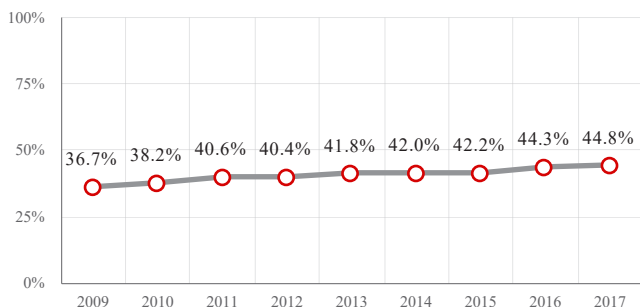


## Stability

In order to measure the stability of teams, we have calculated the percentage of players recruited by their employer club during the year of reference. Footballers having joined the first team squad directly from the youth academy were not considered as new signings.

Between 2009 and 2017, the percentage of new signings in the squads of clubs from the 31 leagues analysed has increased sharply from 36.7% to 44.8%. In 2017, a new record was recorded in 11 out of the 31 competitions: Belgium, France, Hungary, Israel, the Netherlands, Norway, Poland, Portugal, Russia, Sweden and Ukraine. This result also reflects the acceleration of mobility in the footballers' labour market.

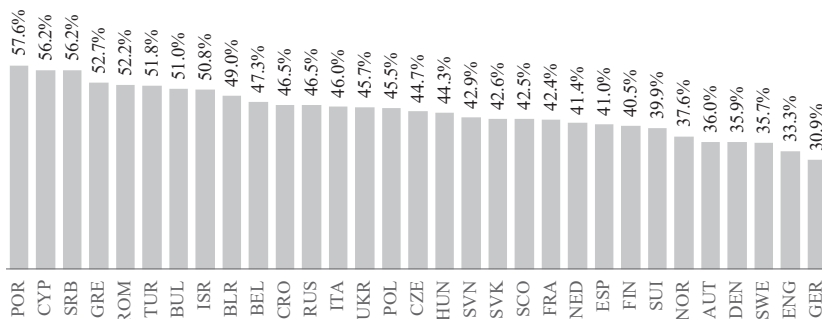
Figure n°7: Evolution in the percentage of new signings in squads, 31 European top divisions (2009-2017)



On the 1st October 2017, players signed over the course of the year represented more than half of squads in eight championships, including the Portuguese Primeira Liga (57.6%). At the other end of the scale, the clubs with the most stable squads were to be found in the German Bundesliga (30.9%) and the English Premier League (33.3%).

As time passes, stability has become a luxury that few leagues and clubs can afford. The gaps between championships are also explained by the different approaches in the manner of conceiving football as a business. However, despite regional differences, our analysis shows that speculation on the transfer of players is an increasingly common activity for more clubs and leagues across Europe.

Figure n°8: Percentage of new signings, by league (01/10/2017)



## Conclusion

Since 2009, the demographic surveys of the CIES Football Observatory confirm the increase in the mobility of players in the footballers' labour market. The teams' squads are more and more unstable. Moreover, mobility occurs ever earlier during the players' career. The constant and considerable drop in the number of club-trained players within squads is a visible instance of this process.

Player mobility pays scant regard to national borders. The continuous increase in the percentage of expatriates reflects the growing internationalisation of the European footballers' labour market. This state of affairs is primarily to the advantage of the wealthiest clubs and leagues that are able to regroup the best players independently of their origin.

The regularity of the trends observed enables us to confirm that a real change is taking place in top-level European football. The central question is to know just how far this process can go without jeopardising the interest of competitions, the credibility of professional football and its sustainable development in the majority of countries.



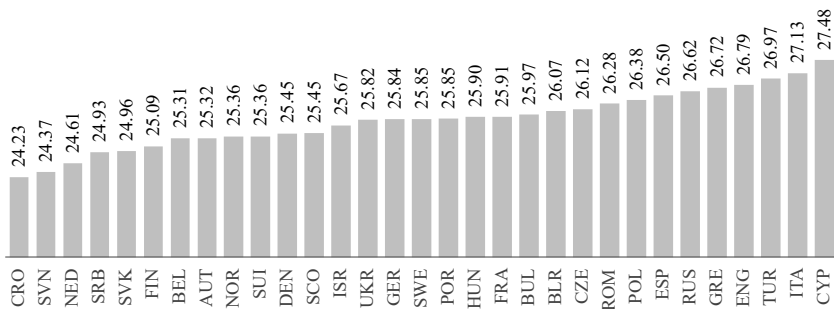
# Is there an optimum squad age to win in football?

Leagues and clubs greatly differentiate themselves with regard to the age of their squad members. While the most competitive teams and championships are not the youngest ones, they are also generally not those with the most seasoned players. The gaps observed also reflect the existence of distinct cultures and strategies. As for the previous chapter, this one relies on the annual surveys carried out since 2009 by the CIES Football Observatory research team.

## Age gaps

Between 2009 and 2017, the Cypriot top division is the competition having regrouped the most seasoned players: 27.5 years on average. Italian Serie A teams also have ageing squads (27.1 years). This is about three years more than in Croatia and Slovenia. The average age of players for all of the 31 top divisions and nine years analysed is 25.9 years.

Figure n°9: Average age of squad members, by league (2009-2017)



Considerable differences in the average age of squad members also exist between teams. Figure 10 lists the clubs with the oldest squads since 2009 in the 31 top division leagues surveyed. The record high was measured for Chievo in 2015: 30.6 years. Two other teams had a squad of players on average over 30 years old: the Cypriot sides AEK Larnaca (2016) and APOEL FC (2012). Eight out of the ten oldest teams are located in the Mediterranean area (Italy, Cyprus, Turkey and Greece). This is a clear first indication of regional peculiarities.

Figure n°10: Oldest squads, 31 European top divisions (2009-2017)

	Year	Average age		Year	Average age
1. Chievo Verona (ITA)	2015	30.58	6. SS Lazio (ITA)	2011	29.70
2. AEK Larnaca (CYP)	2016	30.44	7. İstanbul Başakşehir (TUR)	2017	29.68
3. APOEL FC (CYP)	2012	30.38	8. Internazionale Milano (ITA)	2010	29.60
4. Milan AC (ITA)	2011	29.98	9. Szolnok MÁV (HUN)	2010	29.56
5. Arsenal Tula (RUS)	2016	29.76	10. AOK Kerkyra (GRE)	2011	29.52

At the opposite end of the spectrum, no team since 2009 has had a squad as young as FK Rad Belgrade in 2013: 21.0 years on average. None of the ten youngest teams are located in the most competitive European leagues. Six of them are located in Serbia, Croatia and Finland. The very young squads of some of the clubs in the top ten rankings primarily reflect financial troubles. This was notably the case for Alki Larnaca and Heart of Midlothian in 2013.

Figure n°11: Youngest squads, 31 European top divisions (2009-2017)

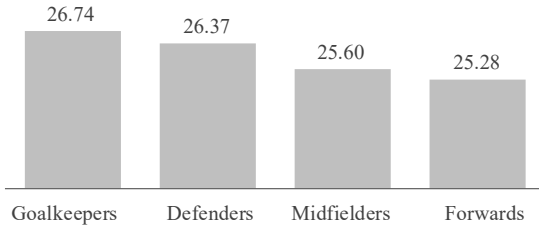
	Year	Average age		Year	Average age
1. FK Rad (SRB)	2013	21.01	6. Lokomotiva Zagreb (CRO)	2012	21.63
2. Alki Larnaca FC (CYP)	2013	21.18	7. FC Honka (FIN)	2014	21.65
3. Stal Kamianske (UKR)	2017	21.24	8. AS Trenčín (SVK)	2014	21.74
4. Heart of Midlothian (SCO)	2013	21.33	9. Hajduk Split (CRO)	2013	21.80
5. PK-35 Vantaa (FIN)	2016	21.62	10. OFK Beograd (SRB)	2014	21.80

The average age of players also vary greatly according to position. The general rule is that goalkeepers are older than defenders, defenders are older than midfielders and midfielders are older than forwards. In the 31 leagues surveyed, goalkeepers were almost 1.5 years older than forwards. This is mainly due to the different physical attributes required by this posi-



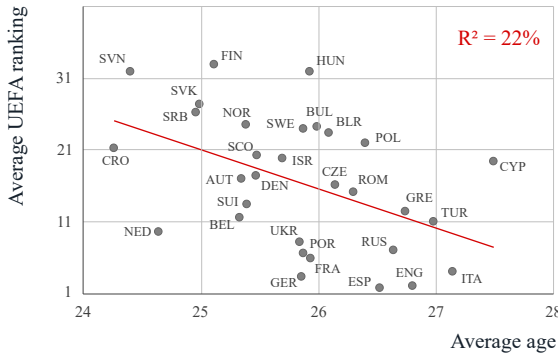
tion, as well as the greater importance of experience for goalkeepers. This is also true for defenders with respect to midfielders and forwards.

Figure n°12: Average age per position, 31 European top divisions (2009-2017)



Another general rule is that the most competitive leagues generally bring together more seasoned players than the least competitive championships. The statistically significant negative correlation between age and UEFA ranking confirms this observation. However, there are many residuals. Dutch and Croatian clubs, for example, clearly over-perform in European Cups with respect to the average age of their squad members. Conversely, Cypriot teams do not achieve the results that one would expect with regard to the experience level of their players.

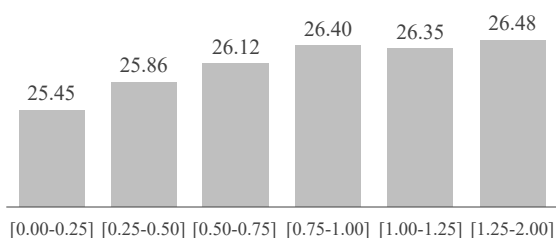
Figure n°13: Correlation between average age and average UEFA ranking per league (2009-2017)



A correlation also exists between the sporting level of clubs and the average age of their squads. The sporting level is calculated using the CIES Football Observatory club coefficient. This exclusive classification method takes into account the performance of national association representatives in European club competitions, the division of the employer club at domestic league level and results achieved.

Generally, clubs that are more competitive have older squads. This rule applies perfectly to each of the four lowest club level categories presented in the next figure. However, no significant difference was observed for clubs in the three top categories. This finding reveals that after a certain threshold of sporting and economic power, the age structure of clubs tends to converge. Our analysis suggests that the optimal average age of squad members is between 26 and 27 years.

Figure n°14: Average age and sporting level as per CIES Football Observatory club coefficient (2009-2017)



## Age for champions

None of the ten youngest champions during the period analysed belong to the most competitive European leagues. The Slovakian side AS Trenčín tops the table ahead of two Dutch clubs: AFC Ajax and PSV Eindhoven. The latter examples show that it is possible to win with very young squads even in countries ranked in the top ten of the UEFA table. However, this

is generally not the case at the very top of the European football pyramid. The youngest big-5 league champion during the period surveyed was Borussia Dortmund in 2011/12 (24.7 years).

Figure n°15: Youngest champions, 31 European top divisions (2009-2017)

	Year	Average age		Year	Average age
1. AS Trenčín (SVK)	2014	21.74	6. Malmö FF (SWE)	2013	23.20
2. AFC Ajax (NED)	2012	22.66	7. RB Salzburg (AUT)	2015	23.23
3. PSV Eindhoven (NED)	2014	22.84	8. FC Nordsjælland (DEN)	2011	23.56
4. Viitorul Constanța (ROM)	2016	23.01	9. BATE Borisov (BLR)	2009	23.68
5. NK Maribor (SVN)	2010	23.02	10. Celtic FC (SCO)	2012	24.02

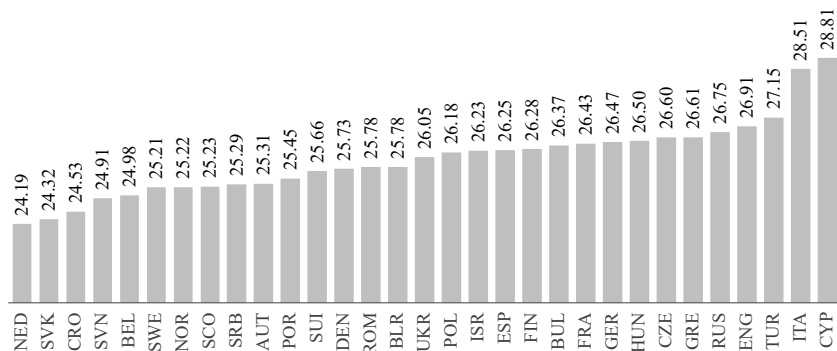
The top ten list of the oldest clubs crowned champions from 2009 to 2017 shows the specificity of the Italian case. Three Serie A teams are among the four champions with the most seasoned squads. Another team from a country with a favourable disposition towards experienced players tops the table: APOEL Nicosia from Cyprus. They are also the only champions whose squad members were on average over 30 years old on the 1st October of the season when they won the league.

Figure n°16: Oldest champions, 31 European top divisions (2009-2017)

	Year	Average age		Year	Average age
1. APOEL FC (CYP)	2012	30.38	6. Viktoria Plzeň (CZE)	2014	28.30
2. Milan AC (ITA)	2010	29.20	7. Zenit St Petersburg (RUS)	2011	28.28
3. Internazionale Milano (ITA)	2009	28.92	8. Fenerbahçe SK (TUR)	2013	28.28
4. Juventus FC (ITA)	2013	28.86	9. Hapoel Be'er Sheva (ISR)	2016	28.17
5. RB Salzburg (AUT)	2009	28.35	10. Bayern München (GER)	2016	27.98

The comparative analysis of the average age of champions between leagues also reveals cultural differences in the perception of the most favourable age structure for a squad. At one extreme, the youngest champions are to be found in the Netherlands (24.2 years), where teams pay great attention to the training and development of young talents. At the other extreme, Cypriot champion teams had the oldest squads over the period surveyed (28.8 years).

Figure n°17: Average age of champions, by league (2009-2017)



## Conclusion

Squad assembly is an art that must be carefully mastered to be successful. Evidence shows that a good balance is necessary to perform durably at the highest level. A balanced age structure permits young footballers to develop alongside more experienced players and progressively replace them as pillars of the team. This is also a necessary prerequisite to maintain a satisfactory level of stability and performance over the long term.

While no single truth exists with regard to the relationship between age structure and success, the median age of champions in the five major European leagues between 2009 and 2017 is a good indicator of a possible benchmark. This figure is 26.5 years old. In accordance with previous findings, we can state that in order to achieve sustainable success, it is important for clubs to have as many players who did not yet celebrate their 27th birthday as footballers over this age threshold.

## A comparative analysis of club-trained players

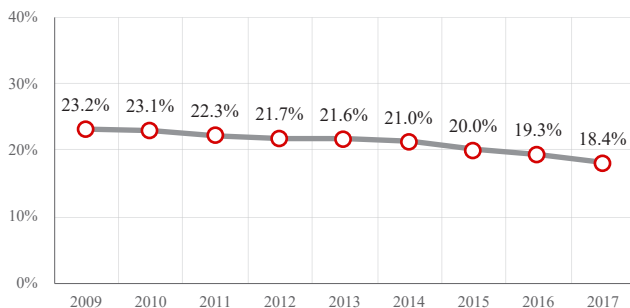
The analysis of the presence of club-trained players in squads across Europe is also particularly interesting when it comes to comparing football cultures and strategies on an international level.

Following UEFA and numerous national associations, the notion of club-trained players defines footballers who have spent at least three years between the ages of 15 and 21 in their team of employment. As previous chapters, the analysis relies on the annual census carried out by the CIES Football Observatory on the 1st October of every year since 2009.

### Trends and gaps

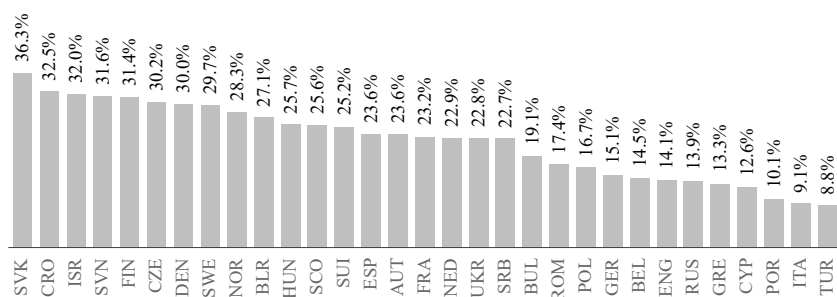
As already underlined, between 2009 and 2017, the proportion of club-trained players in the squads of teams analysed went down year by year from 23.2% to 18.4%. This finding highlights the intensification of the mobility of footballers from an early age, as well as the ineffectiveness of measures put into place to encourage the employment of home-grown footballers.

Figure n°18: Percentage of club-trained players in squads, 31 European top divisions (2009-2017)



The average proportion of club-trained players among squad members in the leagues and period surveyed was 21.2%. The highest percentage was recorded in the Slovakian top division: 36.3%. This is four times more than in the Turkish Süper Lig (8.8%). Mediterranean countries occupy the bottom five positions of the rankings: Turkey, Italy, Portugal, Cyprus and Greece. This reveals the existence of a cultural approach that does not consider the promotion of local talents as a priority.

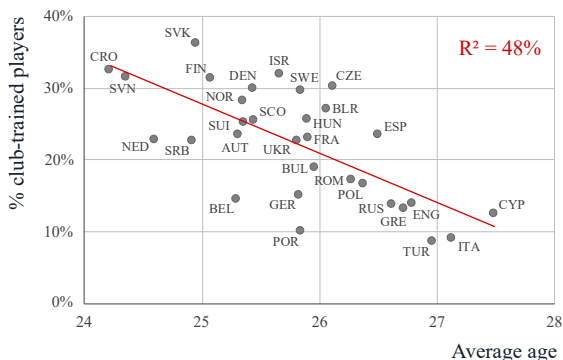
Figure n°19: Percentage of club-trained players in squads, by league (2009-2017)



The average presence of club-trained players correlates with the average age of squads. Belgium and Portugal are the main residuals. In both cases, one would expect a significantly higher proportion of club-trained footballers with respect to the relatively young age of squad members. This finding mainly reflects the tendency for top division Belgian and Portuguese teams to import young talents from abroad. It also shows the high internal mobility of national players.

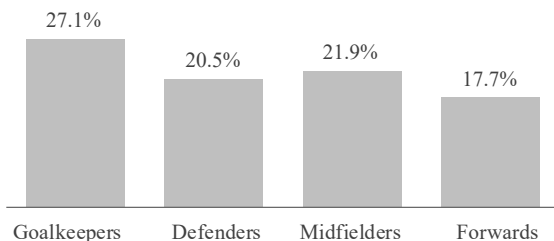
Conversely, in Slovakia, Israel and the Czech Republic, the proportion of club-trained players is much higher than the average age of squads would have suggested. In all these countries, expatriates represent a relatively small proportion of players. Furthermore, national transfers are not very frequent. Club-trained players tend thus to stay longer in the team that trained them compared to the situation observed at European level.

Figure n°20: Average age and % of club-trained players, by league (2009-2017)



A significant gap in the percentage of club-trained footballers also exists between goalkeepers and outfield players. The lowest rate overall was recorded for forwards (17.7%). These gaps reflect different levels of mobility in the football players’ labour market. Forwards are indeed much more mobile than goalkeepers, as well as, even though to a lesser extent, than defenders and midfielders.

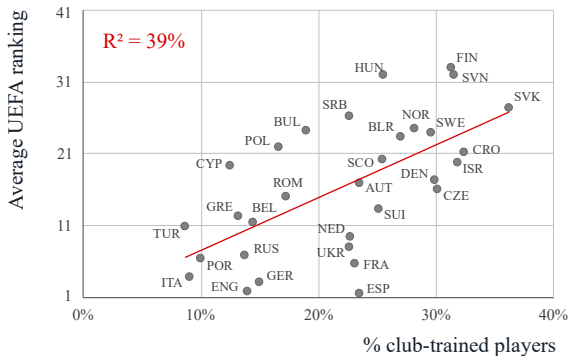
Figure n°21: Percentage of club-trained players in squads, by position (2009-2017)



## Club-trained players and success

A significant correlation was also measured between the relative presence of club-trained players in squads and the sporting level of a league. The proportion of club-trained footballers decreases in parallel with the increase in the sporting competitiveness of a league. Cyprus and Turkey are the main negative residuals. In both cases, national clubs under-perform in European competitions with respect to the very low level of club-trained players in their squads.

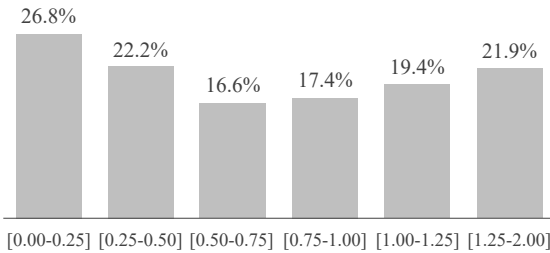
Figure n°22: Percentage of club-trained players and average UEFA ranking, by league (2009-2017)



However, no correlation exists between the percentage of club-trained footballers and the sporting level of clubs. As illustrated in the next figure, only the least competitive teams (CIES club coefficient lower than 0.5) have a higher percentage of players from the youth academy than the very best European clubs (CIES club coefficient higher than 1.25). The lowest proportion of club-trained footballers was recorded for teams in the two intermediate level categories, where transfer market speculation is the strongest.



Figure n°23: Percentage of club-trained players and sporting level of teams as per CIES Football Observatory coefficient (2009-2017)



On average, for all of the leagues and seasons covered, the average percentage of club-trained players among champion winning teams was 24.1%. This is a higher percentage than that measured for all teams as a whole (21.2%). This finding confirms the importance of being able to train top level footballers to achieve sustainable success. The highest percentages of club-trained footballers for a champion were measured for FC Barcelona (2012/13) and Viitorul Constanta (2016/17): 57.7% in both cases.

Figure n°24: Highest percentage of club-trained players, champions of 31 European top divisions (2009-2017)

	Year	%		Year	%
1. FC Barcelona (ESP)	2012	57.7%	. Aalborg BK (DEN)	2013	52.4%
. FC Viitorul Constanța (ROM)	2016	57.7%	. Maccabi Haifa FC (ISR)	2009	52.4%
3. AFC Ajax (NED)	2010	55.2%	8. Malmö FF (SWE)	2014	50.0%
4. FC Koper (SVN)	2009	52.4%	. AS Trenčín (SVK)	2014	50.0%
. Maccabi Haifa FC (ISR)	2010	52.4%	10. IF Elfsborg (SWE)	2012	47.8%

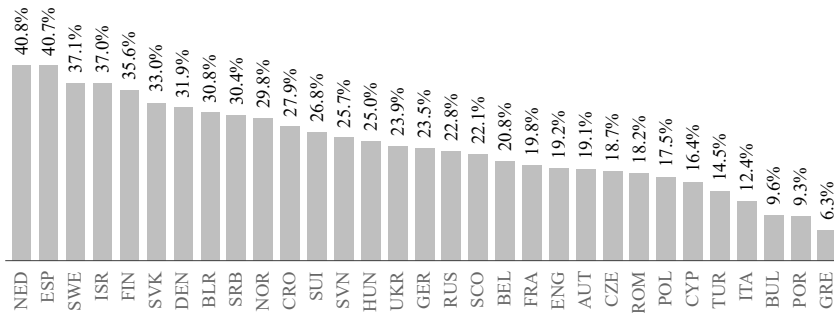
At the opposite end of the spectrum, since 2009, only five teams from the leagues surveyed won the title with no club-trained players in the squad: Ferencvárosi, Ludogorets, Olympiacos, Cluj and Salzburg. Juventus is the only big-5 league team in the top ten. This result also suggests that having at least a few home-grown footballers in the squad is important to achieve success regardless of competition level.

Figure n°25: Lowest percentage of club-trained players, champions of 31 European top divisions (2009-2017)

	Year	%		Year	%
1. Ferencvárosi TC (HUN)	2015	0.0%	6. WKS Śląsk Wrocław (POL)	2011	3.7%
. Ludogorets Razgrad (BUL)	2013	0.0%	7. FC Porto (POR)	2011	3.8%
. Olympiacos FC (GRE)	2013	0.0%	. FC Basel 1893 (SUI)	2016	3.8%
. CFR 1907 Cluj (ROM)	2009	0.0%	9. Juventus FC (ITA)	2015	4.0%
. FC RB Salzburg (AUT)	2009	0.0%	10. FC Steaua București (ROM)	2013	6.7%

The average percentage of club-trained players among champion teams per league also reveals the existence of great cultural differences in European football. At one extreme, Greek (mainly Olympiacos), Portuguese (mainly Porto and Benfica) and Bulgarian (mainly Ludogorets) champions relied on a very limited number of club-trained footballers. At the other, the latter had a crucial role in the Netherlands (mainly Ajax and PSV) and Spain (mainly Barcelona and Real).

Figure n°26: Average percentage of club-trained players for champions, by league (2009-2017)



## Conclusion

Our analysis reveals that the ability to train top level footballers is part of the competitive advantage held by the most successful European clubs. However, this finding is partially related to the current club-trained player definition. Indeed, after three years, a player recruited up until the age of 18 can still be considered as a club-trained footballer for the team that signed him. This encourages top European clubs to lure the best talents initially trained by less competitive teams.

A change in the definition of club-trained or association-trained players could be useful to ensure a sounder development of the European game. Lowering the relevant age range from 15 to 21 years to 12 to 17 years would be helpful in limiting the increasing speculation around the transfer of minors<sup>1</sup>. Indeed, according to FIFA rules, communitarian players can only move abroad after their 16th birthday. This would de facto disallow recruiting teams or associations to acquire a training status.

While having a well performing youth academy does not lead directly to success, the study shows that it is a good indicator of the club's ability to look to the future. The study of a powerful youth setting is also a good indicator of the club's strength as a territorially embedded organisation. Beyond short-term results, investing in youth training can be considered a gauge for the sustainable development of the club as an institution.

1 On this aspect, please refer to the *CIES Football Observatory Monthly Report 20: The international mobility of minors in football*, [www.football-observatory.com/IMG/sites/mr/mr20/en/](http://www.football-observatory.com/IMG/sites/mr/mr20/en/).



# The importance of squad stability

In a collective sport such as football, where the whole is definitively more than the sum of its parts, optimal teamwork and cohesion are key ingredients for performance. To achieve sustainable success, consistent squad management is of fundamental importance. The value of long-term planning for football clubs can be studied through the prism of squad stability.

Here too, the sample is composed of first team squad members present on the 1st October in top division clubs from 31 UEFA member associations. The indicator selected to measure the stability of teams is the percentage of players recruited by their employer club during the year of reference. Young footballers having joined the first team squad directly from the youth academy were not considered as new signings.

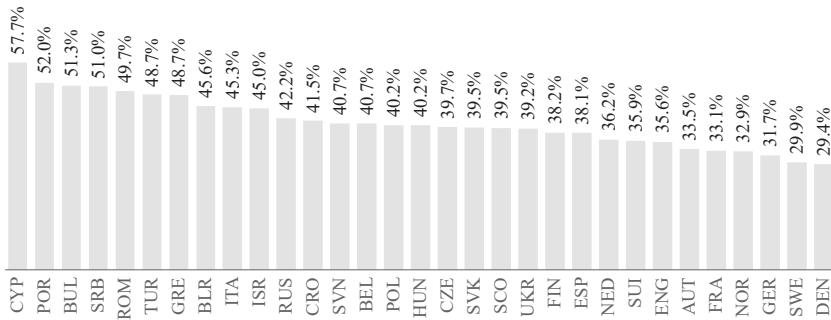
## Comparing (in)stability

As put forward in the first chapter, between 2009 and 2017, the percentage of new signings in squads increased sharply from 36.7% to 44.9%<sup>2</sup>. In 2017, a new record was observed in eleven of the 35 competitions studied: Belgium, France, Hungary, Israel, Norway, the Netherlands, Poland, Portugal, Russia, Sweden and Ukraine. This result reflects the acceleration of mobility in the footballers' labour market. Consequently, the stability of squads is on the decrease.

Throughout the period considered, the highest average percentage of players signed over the course of the year among squad members was recorded in Cyprus (57.7%). This proportion was above half in three other countries: Portugal (52.0%), Bulgaria (51.3%) and Serbia (51.0%). At the other end of the scale, the lowest percentages were observed in the three Scandinavian countries (Denmark, Sweden and Norway), as well as in the German Bundesliga. This finding reveals great differences in the cultural approach to football according to continental area.

2 See figure 7, page 8.

Figure n°27: Percentage of new signings, by league (2009-2017)



The record percentage for new signings was recorded in 2009 for the Turkish side Diyarbakirspor: 96.4% of players present on the 1st October had been recruited during the year. The club was finally relegated. The team with the second highest figure, Neftochimic Burgas, also faced relegation at the end of the 2016/17 season. In general, as developed below, a high percentage of new signings reflects poor squad management and presages sporting difficulties.

Figure n°28: Highest percentage of new signings, champions of 31 European top divisions (2009-2017)

	Year	%		Year	%
1. Diyarbakirspor (TUR)	2009	96.4%	6. FK Senica (SVK)	2009	91.7%
2. Neftochimic Burgas (BUL)	2016	96.3%	7. Ermis Aradippou (CYP)	2013	91.3%
3. Olympiakos Nicosia (CYP)	2010	95.2%	8. FC Vereya (BUL)	2016	90.0%
4. FK Voždovac (SRB)	2014	92.3%	9. Petrolul Ploiești (ROM)	2012	88.0%
5. Ludogorets Razgrad (BUL)	2011	92.0%	10. FK Voždovac (SRB)	2013	87.5%

The Finnish side FC Honka holds the record for the lowest percentage of new signings among first team squad members. In 2010, they finished fourth in the Veikkausliiga without any player with previous experience in adult leagues signed from other teams during the year. This is a unique situation for the leagues and seasons covered. Nations represented in the top ten are very different from those represented among the least stable clubs. The presence of Fenerbahçe SK is quite exceptional with respect to the generally high instability of Turkish clubs.

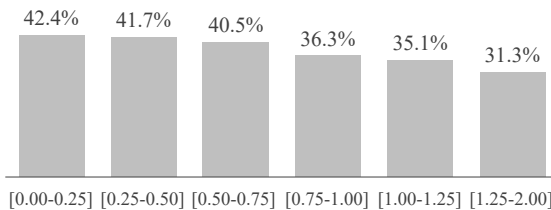
Figure n°29: Lowest percentage of new signings, champions of 31 European top divisions (2009-2017)

	Year	%		Year	%
1. FC Honka (FIN)	2010	0.0%	6. RC Lens (FRA)	2014	4.8%
2. Sønderjysk Elitesport (DEN)	2009	4.3%	7. FK Karpaty Lviv (UKR)	2015	4.8%
3. Tavriya Simferopol (UKR)	2013	4.3%	8. KRC Genk (BEL)	2010	5.0%
4. Molde FK (NOR)	2009	4.5%	9. SV Mattersburg (AUT)	2016	7.7%
5. Fenerbahçe SK (TUR)	2014	4.5%	10. FC Zürich (SUI)	2011	8.0%

### Stability and success

The analysis of stability according to clubs’ sporting level reveals the existence of a general rule: the best performing teams have much more stable squads than the least competitive ones. As illustrated in the next figure, the percentage of new signings decreases for each club sporting level category: from 42.4% for the least performing teams to 31.3% for the most competitive ones.

Figure n°30: Percentage of new signings and sporting level of teams as per CIES Football Observatory coefficient (2009-2017)



This finding highlights the relationship between stability and performance. It reflects the difficulties for teams with few financial means available to set up long-term squad planning. It also shows their tendency to over-speculate on the transfer market. This process often brings about a vicious circle of instability and poor results.

Apart from a lack of vision and resources, corruption is also an issue. As a considerable amount of money circulates through transfers, notably under the form of commission fees for intermediaries with close relationships with club officials, player trading may be easily directed towards personal profit rather than the sporting interest of teams.

As shown in figure 31, clubs having won their league with the highest percentage of new signings are all situated in countries where squads are generally unstable. The only exception is Slavia Praha with respect to the Czech context. This club won the 2016/17 domestic league with more than a half of players recruited after the 1st of January 2016. This high transfer activity was linked to their takeover by a Chinese company.

Figure n°31: Highest percentage of new signings, champions of 31 European top divisions (2009-2017)

	Year	%		Year	%
1. Ludogorets Razgrad (BUL)	2011	92.0%	6. Olympiacos FC (GRE)	2014	62.1%
2. AEL Limassol (CYP)	2011	75.0%	7. Omonia Nicosia (CYP)	2009	56.0%
3. FK Partizan (SRB)	2010	71.4%	8. Galatasaray SK (TUR)	2011	54.2%
4. Crvena Zvezda (SRB)	2015	65.4%	. Astra Giurgiu (ROM)	2015	54.2%
5. HNK Rijeka (CRO)	2016	62.5%	. Slavia Praha (CZE)	2016	54.2%

Ludogorets is also an interesting case as they won the 2011/12 Bulgarian championship with more than nine new recruits out of ten squad members. Season after season, this team kept on winning the Bulgarian title and performing well in European Cup competitions. However, the percentage of new signings went progressively down to reach a record low of only one in five players for 2016/17.

Many clubs from the five major European championships are in the top ten table of champions with the lowest percentage of new signings for the season during which they won the league. Among countries hosting the big-5 leagues, only Italy has no representatives in this ranking. This reflects the overall greater mobility of players in the Peninsula compared to the other four main competitions. The lowest percentage of new signings overall was recorded at Bayern Munich for the 2016/17 season (9.1%).

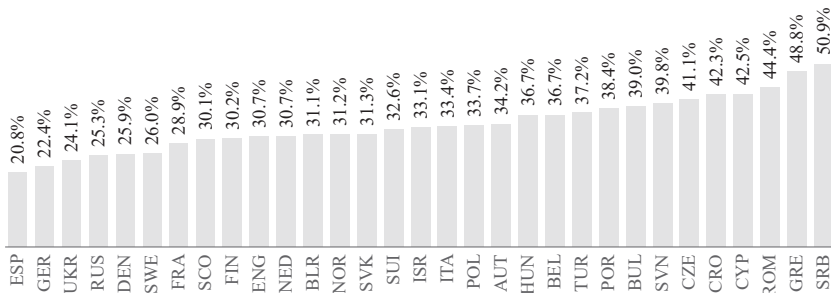


Figure n°32: Lowest percentage of new signings, champions of 31 European top divisions (2009-2017)

	Year	%		Year	%
1. Bayern München (GER)	2016	9.1%	6. Malmö FF (SWE)	2010	12.5%
2. CSKA Moskva (RUS)	2015	9.5%	7. Manchester United (ENG)	2010	12.9%
3. IFK Mariehamn (FIN)	2016	10.0%	8. FC Nordsjælland (DEN)	2011	13.0%
4. FC Barcelona (ESP)	2012	11.5%	9. LOSC Lille (FRA)	2010	13.6%
5. Shakhtar Donetsk (UKR)	2016	11.5%	10. Chelsea (ENG)	2009	14.8%

The average proportion of new signings among first team squad members for champions during the period considered was about one third (34.0%). This is 7.2% less than the figure measured for all teams in the leagues surveyed. This result confirms that clubs with a stable squad are at advantage. The record low was observed in the Spanish Liga (20.8%).

Figure n°33: Average percentage of new signings for champions, per league (2009-2017)



## Conclusion

This analysis reveals the correlation between squad stability and success. The best performing teams have much more stable squads than lesser competitive ones. Between 2009 and 2017, big-5 league champions had on average only about one in four new players as squad members. This proportion can be considered as an optimal balance to achieve success.

The study also highlights the increasing instability of teams across Europe. On the 1st October 2017, 44.9% of players were recruited during the year. This figure was only 36.7% in 2009. If this trend continues, footballers who have been with their employer club for more than one year will soon represent less than half of squad members.

To limit the growing instability, football's governing bodies should act against the increasing financial gaps between teams both nationally and internationally. They should also combat corrupt practices at both transfer market and club management levels. It is also necessary to limit the speculation around players' mobility, notably through a greater protection of training clubs, the enforcement of the third-party ownership ban, as well as the reinforcement of the regulations regarding football intermediaries.

## World football expatriates: a global study

Football is the global game par excellence. It is practiced and viewed in the vast majority of countries worldwide. Year after year, professional leagues establish themselves in a growing number of territories. The labour market of footballers has been strongly internationalised over the last decades. This chapter analyses the presence of expatriate footballers in the world.

As already undelined, the notion of expatriates defines players having grown up outside the national association of their employer club and having moved abroad for sporting reasons. This definition allows us to isolate migrations directly linked to the practice of football. Indeed, players of foreign origin who grew up in the association of their team of employment are not considered as expatriates.

### Study sample

On the 1st May 2018, 12,425 expatriate footballers were recorded in 2,235 teams from 142 leagues of 93 national associations. This figure includes first team squad members having been fielded in domestic league matches during the ongoing season. In the 120 competitions where the list of substitutes was available, presence on the bench also constituted a criterion for inclusion.

Expatriates represent 21.2% of players at global level (+1.2% compared to 2017). This is equivalent to about 5.6 footballers per team. The percentage of expatriates varies between 25.4% in the only OFC league surveyed (New Zealand) and 9.6% at CONMEBOL level. Clubs from the UEFA (24.9%) and CONCACAF (22.0%) leagues analysed also regroup a higher percentage of expatriate footballers than those in the AFC (18.6%) and the CAF (11.0%).

As for age, the expatriate footballers surveyed were on average 26.8 years old on the 1st May 2018. European teams gather the youngest expatriates (26.3 years), while the oldest ones are to be found in Asia (29.0).

This gap reflects different status. At AFC level, quotas for foreign players push teams to look at experienced expatriates. In a more liberal context, European teams rather seek young foreign talents to be transferred on to wealthier teams within the framework of transnational value chains.

Figure n°34: Study sample, by confederation

Confederation	Number of associations	Number of leagues	Number of clubs	Percentage of expatriates	Average age of expatriates
AFC	18	20	267	18.6%	29.0
CAF	4	5	75	11.0%	26.6
CONCACAF	10	12	178	22.0%	27.2
CONMEBOL	10	18	331	9.6%	28.3
OFC	1	1	10	25.4%	27.7
UEFA	50	86	1,374	24.9%	26.3
Total	93	142	2,235	21.2%	26.8

## Main origins at worldwide level

On the 1st May 2018, 178 national associations had at least one representative playing abroad in the leagues surveyed (+2 compared to 2017). Brazil is the most represented country (1,236 expatriates, +42 compared to 2017), followed by France (821, +45) and Argentina (760, -26). The nationals from these three associations make up 22.7% of the total number of expatriates. This percentage increases to 43.4% when taking into account the ten principal exporting countries.

Brazilian expatriates are present in a record number of associations surveyed: 78 out of 93. The Argentineans (65 associations), the French (62) and the Nigerians (60) are also active in more than six out of ten countries. The highest increase in the number of expatriates compared to the 1st May 2017 was recorded for France: from 776 to 821 players under contract with foreign teams.

Figure n°35: Most represented expatriate origins, May 2018

	Number	Since 2017	Main destination		Number	Since 2017	Main destination
1. Brazil	1,236	+42	Portugal	26. Italy	135	=	Malta
2. France	821	+45	England	27. Switzerland	133	+4	Germany
3. Argentina	760	-26	Chile	28. USA	125	+1	Germany
4. Serbia	465	-3	Bosnia-Herzeg.	29. Austria	120	+7	Germany
5. England	413	-19	Scotland	30. Russia	112	-23	Belarus
6. Spain	361	-6	England	31. Japan	111	-20	Singapore
7. Croatia	346	+21	Slovenia	32. Romania	111	-10	Hungary
8. Germany	346	+13	Turkey	33. South Korea	109	+7	Japan
9. Colombia	327	+29	Mexico	34. Greece	107	+2	Cyprus
10. Uruguay	324	+24	Argentina	35. Slovenia	105	+16	Italy
11. Nigeria	306	+8	Norway	36. Scotland	103	-3	England
12. Portugal	261	+18	England	37. Mexico	102	+37	USA
13. The Netherlands	256	+25	England	38. Australia	98	+4	England
14. Ghana	229	-4	USA	39. Czech Republic	95	+3	Slovakia
15. Belgium	220	+7	The Netherlands	40. Venezuela	87	+20	Spain
16. Senegal	189	+14	France	41. Poland	86	+1	Italy
17. Ukraine	182	-11	Belarus	42. Montenegro	83	-13	Serbia
18. Ivory Coast	173	+2	France	43. Canada	78	+12	USA
19. Slovakia	162	-17	Czech Republic	44. Chile	78	-5	Mexico
20. Sweden	160	-7	Norway	45. Norway	78	-14	Sweden
21. Bosnia-Herzeg.	153	-3	Croatia	46. Macedonia	77	+17	Albania
22. Cameroon	152	-19	France	47. Georgia	71	-5	Ukraine
23. Denmark	152	+2	Norway	48. Mali	67	+7	France
24. Ireland	147	+7	England	49. Iceland	58	+4	Sweden
25. Paraguay	144	+12	Argentina	50. Finland	52	-10	Denmark

If we take population into account, the highest rate of expatriates per million of inhabitants was recorded for Iceland (180). This figure is above 100 only for one other association: Montenegro (134). It is also very high for double world champions Uruguay (96) and Croatia (80). Many other former Yugoslavian countries figure high in the table. This finding reflects the outstanding training ability in this area, as well as the existence of well-established international transfer networks.

Figure n°36: Lowest rates of inhabitants per expatriate (at least 50 expatriates), May 2018

	Number of expatriates	Inhabitants per expatriate		Number of expatriates	Inhabitants per expatriate
1. Iceland	58	5,556	11. Northern Ireland	51	35,714
2. Montenegro	83	7,463	12. Denmark	152	37,037
3. Uruguay	324	10,417	13. Portugal	261	40,000
4. Croatia	346	12,500	14. Paraguay	144	45,455
5. Slovenia	105	19,608	15. Belgium	220	50,000
6. Serbia	465	20,833	16. Scotland	103	52,632
7. Bosnia Herzegovina	153	25,000	17. Argentina	760	52,632
8. Macedonia	77	27,027	18. Sweden	160	58,824
9. Ireland	147	30,303	19. Switzerland	133	58,824
10. Slovakia	162	33,333	20. Georgia	71	62,500

## Main origins per region

This chapter analyses the expatriate presence in three world areas: Asia, the Americas and Europe. This allows us to explore the differences in transfer networks according to both origin and destination.

### *Asia*

Brazilians constitute by far the largest contingent of footballers expatriated in Asia (306 players, +14 compared to 2017). They account for almost a quarter of expatriates in the leagues surveyed (24.0%). However, this percentage decreased by 1% compared to May 2017. Only two AFC countries are in the top ten ranking of the most represented nations in Asia: South Korea (76 players, +10) and Japan (46, -12). When it comes to recruiting abroad, Asian clubs tend to favour footballers from other confederations (77.9%).

European footballers are also very well represented in Asian teams. The Spanish are the most present (67, +18), followed by the French (41, -4) and the Serbians (35, +3). African players are quite numerous too, in particular the Nigerians (39 players, +5). This finding reflects the solid

integration of Asia in the global footballers' market despite the existence of quotas limiting the presence of foreigners in clubs.

Figure n°37: Top associations of origin of expatriate players in Asia, May 2018

	Number	Since 2017	Main destination		Number	Since 2017	Main destination
1. Brazil	306	+14	Japan	6. Nigeria	39	+5	India
2. South Korea	76	+10	Japan	7. Argentina	37	+3	China
3. Spain	67	+18	India	8. Serbia	35	+3	Uzbekistan
4. Japan	46	-12	Singapore	9. The Netherlands	29	+9	Indonesia
5. France	41	-4	Qatar	10. England	27	+4	India

### Americas

While Brazilians are the main workforce on a worldwide level, Argentinians play a similar role in the Americas. With 456 players in foreign American countries (-10 compared to 2017), they account for 23.5% of expatriates in this region. Only 105 Brazilians (-16) are expatriated in the Americas. Their number is inferior not only to that of Argentinians, but also to that of Colombians (234 players, -17), Uruguayans (216, +2) and Paraguayans (120, +11).

Nine of the ten countries with the highest contingent of expatriates in the Americas are from this geographical zone. This finding shows that the importation of players in the region essentially follows a logic of proximity. English players are the only exception. This is mainly due to their strong presence in the United States (38 expatriates out of the 41 employed in the region as a whole).

Figure n°38: Top associations of origin of expatriate players in the Americas, May 2018

	Number	Since 2017	Main destination		Number	Since 2017	Main destination
1. Argentina	456	-10	Chile	6. Mexico	68	+24	USA
2. Colombia	234	+17	Mexico	7. Venezuela	47	+13	USA
3. Uruguay	216	+2	Argentina	8. Chile	42	-3	Mexico
4. Paraguay	120	+11	Argentina	9. England	41	-10	USA
5. Brazil	105	-16	Mexico	10. Panama	37	-1	USA

## Europe

Similar to the Asian context, Brazil is the most represented origin among expatriates under contract with the European clubs surveyed: 824 players. However, the proportion of Brazilians among expatriates is much lower in Europe (9.2%) than in Asia (24.0%). While European clubs have developed extensive recruitment networks (149 different national origins), 65.6% of expatriates still come from other UEFA associations.

France is the second-ranked player exporter country on a European level (727 players, +61 with respect to 2017), followed by Serbia (424, -4), Croatia (327, +27) and England (327, -12). Aside from Brazil, the most represented extra-European origins are Argentina (265 players, -15) and Nigeria (249, +1). All confederations are represented in Europe, which reflects the centrality of this continent in the global economy of professional football.

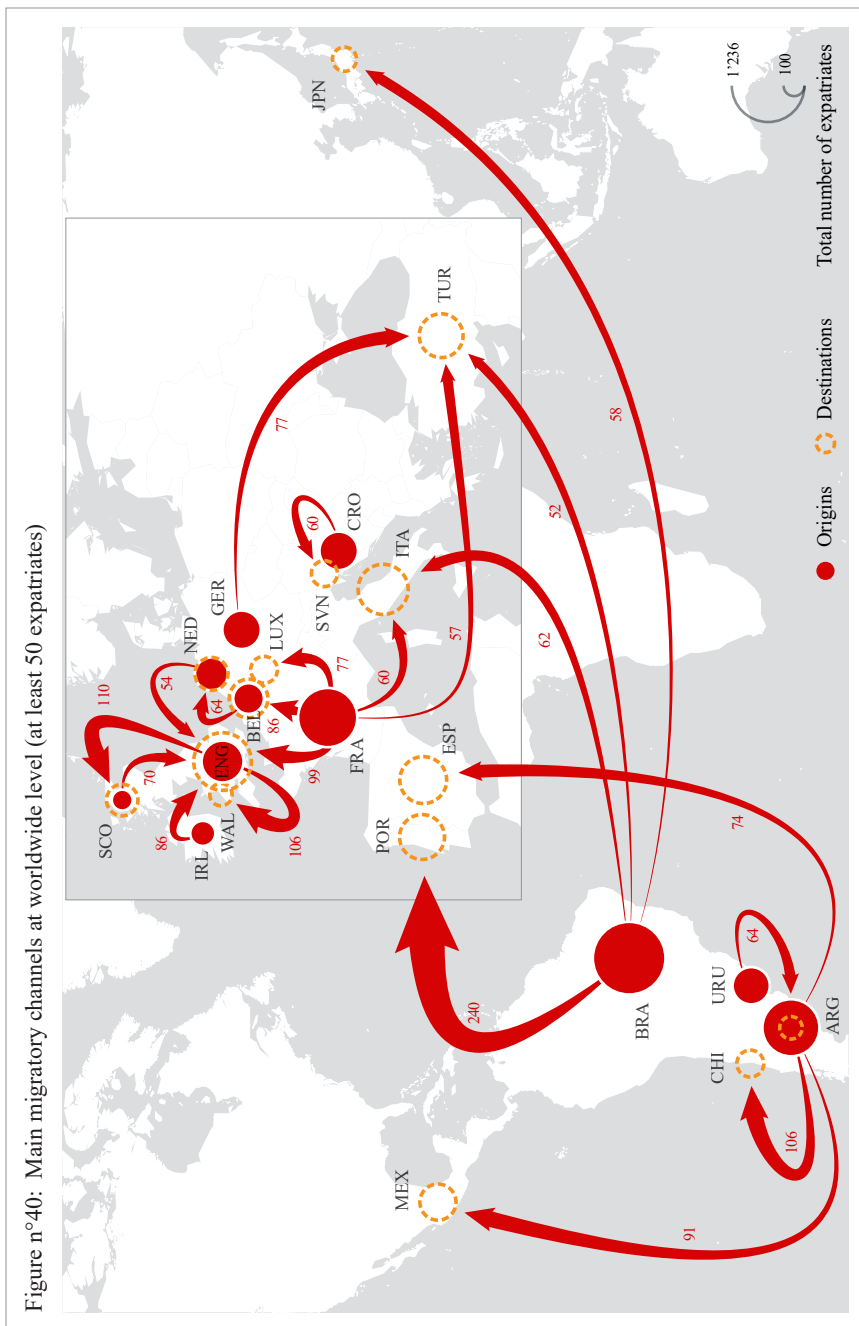
Figure n°39: Top associations of origin of expatriate players in Europe, May 2018

	Number	Since 2017	Main destination		Number	Since 2017	Main destination
1. Brazil	824	+46	Portugal	6. Germany	306	+11	Turkey
2. France	727	+61	England	7. Argentina	265	-15	Spain
3. Serbia	424	-4	Bosnia Herzeg.	8. Spain	259	-28	England
4. Croatia	327	+27	Slovenia	9. Nigeria	249	+1	Norway
5. England	327	-12	Scotland	10. Portugal	233	+11	England

## Conclusion

The international path with the most expatriates involved goes from Brazil to Portugal. On the 1st May 2018, 240 footballers from Brazil were playing in Portugal at professional adult level. The two other main migratory channels between associations at worldwide level link England to Scotland (110 players), as well as Argentina to Chile (106 players).





Despite regional differences, our analysis shows that player migration is a well-established reality in global football. The development of professional leagues across the world will most probably imply a further growth in the number and percentage of expatriates. This process will firstly benefit players from traditional football countries, from where a strong proportion of expatriates still originate (43.4% for the ten main exporting nations).

While importing some players from abroad may be useful for nations aiming at developing their football level, their real challenge lies in the ability to improve the standard of training given to local talents. To reach this goal, the setting up of a long-term strategy is a must.

A good collaboration between clubs, professional leagues and national associations is also of crucial importance. In a very competitive context, irrespective of football's level of development, all associations must consider these aspects to be in the position of maintaining or improving their results.

## 2018 FIFA World Cup™: profile of qualified teams

This chapter analyses the profile of the 32 teams that have qualified for the final phase of the 2018 FIFA World Cup™. The study covers the thematic of age, height, country of birth and employer association of players fielded by each squad during the qualifying matches<sup>3</sup>. It highlights the important differences in team composition. This diversity is one of the key qualities of sporting events such as the FIFA World Cup™. Within the context of globalisation that is often seen as having a homogenising effect, the FIFA World Cup™ refreshes our thirst for the specificities of nations on different levels.

The analysis also shows the strong concentration of players from squads qualified in clubs of the most competitive leagues. Though this deprives many championships of their best players, this process works in favour of competitive balance insofar as a majority of nations have well-trained and experienced players available to them.

### Age

Players from qualified teams were, on average, 27.4 years old when the matches were played. As a comparison, this value is about 25 years of age for the players of 31 top division European championships analysed in the CIES Football Observatory annual census. This gap reflects the tendency for managers to privilege the selection of experienced players that have already proven themselves at the highest level.

The Panamanian squad fielded the oldest players overall (29.4 years of age), followed by Costa Rica (29.0 years of age) and Iceland (29.0 years of age). At the opposite end of the scale, Nigeria (24.9 years of age), Germany (25.7 years of age) and England (25.9 years of age) fielded the

3 For Russia, we have taken into account official matches played between July 2016 and November 2017.

youngest players. By confederation, the average age varies between 26.5 years of age for qualified CAF teams and 28.6 years of age for those of the CONCACAF.

Figure n°41: Average age, qualified teams







































































 Panama	29.4		 Colombia	27.3	
 Iceland	29.0		 Marocco	27.2	
 Costa Rica	29.0		 Peru	27.0	
 Uruguay	28.7		 Belgium	27.0	
 Saoudia Arabia	28.7		 Egypt	27.0	
 Argentina	28.4		 Australia	26.9	
 Russia	28.1		 Tunisia	26.8	
 Spain	28.0		 Switzerland	26.6	
 Poland	28.0		 South Korea	26.5	
 Brazil	27.8		 Iran	26.5	
 Portugal	27.7		 France	26.4	
 Serbia	27.7		 Senegal	26.4	
 Japan	27.5		 Denmark	26.1	
 Croatia	27.5		 England	25.9	
 Sweden	27.4		 Germany	25.7	
 Mexico	27.4		 Nigeria	24.9	

Figure n°42: Average age of qualified teams, by confederation

CONCACAF	28.6	
CONMEBOL	27.8	
AFC	27.2	
UEFA	27.2	
CAF	26.5	
Total	27.4	

## Height

On average, the height of players employed by qualified squads is 181.7cm. This value is slightly lower than that observed in 31 European top division

championships (182.1cm). Spain is the only European country among the seven nations having fielded players with an average height of less than 180cm. At the opposite end, the six nations with the tallest players are UEFA members. It is nevertheless important to make clear that there is no correlation between height and success.

As with age, the differences in height between the associations qualified for the 2018 FIFA World Cup™ are quite significant. At one extreme, Serbia fielded players with an average height of 185.6cm. At the other, players in the Saudi Arabian squad are only 176.2cm in height. The gap between confederations are also important: from 183.2cm for UEFA nations qualified to 179.6cm for those from the CONMEBOL.

Figure n°43: Average height, qualified teams (cm)

 Serbia	185.6	 Costa Rica	181.6
 Sweden	185.2	 Australia	181.3
 Iceland	185.0	 Nigeria	181.2
 Denmark	185.0	 Panama	181.1
 Croatia	184.9	 Portugal	180.5
 Russia	184.3	 France	180.5
 Tunisia	184.0	 Brazil	180.4
 Germany	183.8	 Colombia	180.2
 Belgium	183.8	 Egypt	180.1
 Senegal	183.7	 Uruguay	179.8
 Switzerland	183.5	 Mexico	179.5
 Iran	183.4	 Spain	179.5
 Poland	183.1	 Argentina	179.4
 Marocco	182.4	 Peru	178.3
 South Korea	182.2	 Japan	178.1
 England	182.1	 Saoudia Arabia	176.2

Figure n°44: Average height of qualified teams, by confederation

UEFA	183.2
CAF	182.3
CONCACAF	180.6
AFC	180.4
CONMEBOL	179.6
Total	181.7

## Country of birth

The intensification of mobility on a global level leads to a mixing of populations from all corners of the planet. The accessibility of football to all levels of society is such that migrants often find it a favoured means for expression. At the request of African associations having significant diasporas, the FIFA have progressively allowed dual nationals to represent more easily a second country over the course of their career.

Out of the 1,032 players having participated in the qualifiers for the 31 teams qualified and the 40 Russian players taken into account, 98 were born outside of the association represented (9.1%). The maximum percentage was measured for Morocco (61.5%). On the contrary, seven countries did not field any player born outside their national borders. According to confederation, the values vary between 28.7% for CAF selections qualified and 2.1% for those of the AFC.

Figure n°45: Percentage of players born abroad, qualified teams



































 Morocco	61.5%	 Poland	3.8%
 Senegal	39.4%	 Belgium	3.8%
 Portugal	32.1%	 Sweden	3.7%
 Switzerland	31.0%	 Costa Rica	3.3%
 Tunisia	23.5%	 England	3.2%
 Croatia	15.4%	 Uruguay	3.1%
 Nigeria	11.4%	 Egypt	3.0%
 France	10.0%	 Japan	2.6%
 Spain	8.8%	 Argentina	2.3%
 Australia	8.1%	 Brazil	0.0%
 Panama	6.3%	 Saoudia Arabia	0.0%
 Russia	5.0%	 Iran	0.0%
 Peru	4.9%	 Germany	0.0%
 Iceland	4.5%	 Colombia	0.0%
 Serbia	3.8%	 Mexico	0.0%
 Denmark	3.8%	 South Korea	0.0%

Figure n°46: Percentage of players born abroad of qualified teams, by confederation

CAF	28.7%	
UEFA	9.1%	
CONCACAF	2.8%	
AFC	2.1%	
CONMEBOL	2.0%	

## Association of employment

As a global activity, football generates numerous international mobilities. More and more footballers play in clubs situated outside of the association represented. The percentage of players surveyed in foreign teams in November 2017 was 64.6%. It varies between 100% for players from Croatia, Sweden and Iceland and 0% for the players from Saudi Arabia and England. By confederation, the values range between 78.7% for CONMEBOL and 47.6% for the AFC.

Figure n°47: Percentage of players in foreign clubs, qualified teams















































































































 Croatia	100.0%		 Poland	76.9%	
 Sweden	100.0%		 Portugal	71.4%	
 Iceland	100.0%		 Costa Rica	66.7%	
 Senegal	97.0%		 France	66.7%	
 Serbia	92.3%		 South Korea	58.7%	
 Belgium	92.3%		 Egypt	57.6%	
 Nigeria	91.4%		 Peru	53.7%	
 Switzerland	89.7%		 Japan	47.4%	
 Colombia	88.9%		 Iran	42.4%	
 Denmark	88.5%		 Tunisia	41.2%	
 Uruguay	87.5%		 Spain	35.3%	
 Marocco	84.6%		 Mexico	34.1%	
 Argentina	84.1%		 Germany	32.4%	
 Panama	81.3%		 Russia	5.0%	
 Australia	81.1%		 England	0.0%	
 Brazil	80.0%		 Saoudia Arabia	0.0%	

Figure n°48: Percentage of players in foreign clubs for qualified teams, by confederation

CONMEBOL	78.7%	
CAF	74.7%	
UEFA	63.2%	
CONCACAF	57.5%	
AFC	47.6%	
Total	64.6%	

The concentration of talents and resources in professional football translates into a strong over-representation of footballers playing in the wealthiest leagues and countries. In November 2017, about half of the players who took part in the qualifiers for the squads present in Russia play in six countries, including 15.3% in England (164 players). In total, 57 associations are represented among employer clubs.

Figure n°49: Principle employer associations, players of qualified teams (November 2017)

 England	164		[15.3%]	 China			[2.3%]
 Spain	95		[8.9%]	 Portugal			[2.3%]
 Germany	90		[8.4%]	 Belgium			[2.1%]
 Italy	71		[6.6%]	 Peru			[2.1%]
 France	55		[5.1%]	 Tunisia			[2.0%]
 Russia	55		[5.1%]	 South Korea			[2.0%]
 Mexico	45		[4.2%]	 USA			[2.0%]
 Saoudia Arabia	42		[3.9%]	 Iran			[2.0%]
 Japan	31		[2.9%]	 Brazil			[1.9%]
 Turkey	30		[2.8%]	 Egypt			[1.5%]

## Conclusion

This analysis helps us to understand the economic geography of football worldwide. Thanks to its comparative approach, such a study also allows us to situate each nation studied in the international context. The comparison comes into its own also at the level of confederations. The differences observed show the diversity of such a sporting event as the FIFA World



Cup™. The enlargement to 48 teams with a good distribution of those qualified between continents can only reinforce this process.

It is clearly possible to go deeper into the analysis, in particular to determine the key criteria of success with regard to results of previous editions. Among the determining factors is notably the fact of having a significant number of footballers regularly playing in the most competitive leagues and clubs. The history of the FIFA World Cup™, however, teaches us that other factors come into play and that surprises are often the order of the day.



# Demography of five major women's football leagues

This chapter analyses the composition of squads in five of the world's most developed competitions: four European (Germany, Sweden, France and England), as well as the Women's National Soccer League in the United States. It investigates the criteria of age, origin and international status of players.

The indicators were calculated by taking into account the playing time of each footballer in order to present on-pitch data. The statistics on the main expatriate origins include all the players fielded or having been on the bench at least once for championship matches of the current season up until the 1st June 2018.

## Age

The average age of line-ups fielded by clubs in the five leagues surveyed is 25.4 years. While still relatively young, the age increased compared to the previous year (+0.3 years). The rise was particularly marked in the English (+1.1 years) and French (+0.7 years) top divisions. The economic development of the championships studied is leading to a progressive increase in the average age of players.

Figure n°50: Average age on the pitch, five major women's football leagues

	2017	2018	Evolution
Damallsvenskan (SWE)	31.6%	32.0%	+0.4%
Féminine Division 1 (FRA)	17.6%	27.5%	+9.9%
Frauen Bundesliga (GER)	35.0%	33.3%	-1.7%
NWSL (USA)	30.8%	30.4%	-0.4%
WSL (ENG)	33.3%	35.2%	+1.9%
Total	28.0%	31.6%	+3.6%

Clubs from the US Women's National Soccer League fielded the oldest line-ups (26.7 years). At the opposite end of the table is the English Women's Super League (25.0 years). The gaps between the competitions surveyed diminished compared to 2017. This suggests that the professionalisation of women's football implies a convergence between top leagues from an age perspective.

The three teams having on average fielded the youngest line-ups so far this season are from the English Women's Super League (Yeovil Town, Bristol City and Everton). On the contrary, three out of the four teams with the most experienced line-ups are from the US Women's National Soccer League (Seattle Reign, Utah Royals and Orlando Pride). UEFA Champions League finalists Olympique Lyonnais and VfL Wolfsburg also are among the ten most experienced teams from an age line-up standpoint.

Figure n°51: Youngest and oldest line-ups, five major women's football leagues (June 2018)

Youngest line-ups	Average age	Oldest line-ups	Average age
1. Yeovil Town (ENG)	20.4	1. Seattle Reign (USA)	29.2
2. Bristol City (ENG)	22.8	2. Utah Royals (USA)	28.9
3. Everton (ENG)	23.1	3. Reading (ENG)	28.6
4. Hoffenheim (GER)	23.3	4. Orlando Pride (USA)	28.0
5. Växjö (SWE)	23.5	5. Wolfsburg (GER)	27.8
6. Werder Bremen (GER)	23.9	6. Chelsea (ENG)	27.8
7. Freiburg (GER)	24.0	7. Duisburg (GER)	27.1
8. Guingamp (FRA)	24.1	8. Olympique Lyonnais (FRA)	26.7
9. ASPTT Albi (FRA)	24.1	9. North Carolina Courage (USA)	26.6
10. Limhamn Bunkeflo 07 (SWE)	24.1	10. Vittsjö (SWE)	26.6

## Expatriates

Women's football is generating more and more international migrations. On the 1st June 2017, 300 footballers were expatriated in the 55 clubs analysed (5.4 per team, 24.0% of squads). One year later, this number went up to 348 (6.3 per team, 27.2% of squads). Again, the notion of expatriate refers to footballers playing outside of the association where they started playing football, from where they departed following recruitment by a foreign club.

Figure n°52: Percentage of minutes by expatriates, five major women's football leagues (June 2018)

	2017	2018	Evolution
Damallsvenskan (SWE)	31.6%	32.0%	+0.4%
Féminine Division 1 (FRA)	17.6%	27.5%	+9.9%
Frauen Bundesliga (GER)	35.0%	33.3%	-1.7%
NWSL (USA)	30.8%	30.4%	-0.4%
WSL (ENG)	33.3%	35.2%	+1.9%
Total	28.0%	31.6%	+3.6%

Expatriate footballers played at least one quarter of domestic league minutes in all leagues surveyed: from 27.5% in the top French division to 35.2% in the US Women's National Soccer League. In this case too, a convergence was observed among the competitions analysed. The economic development of women's football fosters the international mobility of players. This will most probably lead to a further increase in the presence of expatriates both on the pitch and in squads.

The highest percentage of minutes by expatriate players was recorded for Arsenal (65.5%). Expatriates played a majority of minutes in six other teams, including UEFA Champions League finalists Wolfsburg. The winners of this competition, Olympique Lyonnais, also figure in the top 20 table (40.8%). Only a club out of the 55 analysed did not field expatriate players: SGS Essen in Germany. The latter figure was five in 2017.

Figure n°53: Highest percentage of minutes by expatriates, five major women's football leagues (June 2018)

1. Arsenal (ENG)	65.5%	11. FFC Frankfurt (GER)	45.9%
2. Rosengård (SWE)	61.0%	12. Bayern München (GER)	45.9%
3. Wolfsburg (GER)	60.9%	13. Utah Royals (USA)	45.7%
4. SC Sand (GER)	57.0%	14. Djurgården (SWE)	45.6%
5. PSG (FRA)	53.2%	15. ASPTT Albi (FRA)	44.6%
6. USV Jena (GER)	52.9%	16. Chelsea (ENG)	44.3%
7. Montpellier (FRA)	50.1%	17. Seattle Reign (USA)	44.2%
8. Bristol City (ENG)	48.2%	18. Houston Dash (USA)	44.0%
9. Yeovil Town (ENG)	47.8%	19. Vittsjö (SWE)	40.8%
10. Duisburg (GER)	46.2%	20. Olympique Lyonnais (FRA)	40.8%

Not including Welsh players in England, Canada is the main exporter of footballers to the leagues surveyed in this report. On the 1st June 2018,

27 Canadians were playing abroad in the competitions analysed. Players from the USA (22, 10 in Sweden) and the Netherlands (20 players, 9 in England) are also well represented. In total, 50 associations have expatriates in the championships studied (+3 compared to 2017).

Figure n°54: Main origins of expatriates, five major women's football leagues (June 2018)

1. Wales	29	. Belgium	10
2. Canada	27	14. Finland	9
3. USA	22	. Germany	9
4. The Netherlands	20	. Iceland	9
5. Scotland	17	. Rep. of Ireland	9
6. Austria	15	. Switzerland	9
7. Denmark	14	19. Japan	8
8. Norway	13	20. England	7
. Sweden	13	. Nigeria	7
10. New Zealand	12	22. Poland	6
11. Brazil	11	. Serbia	6
12. Australia	10	. Spain	6

## Full internationals

On the 1st June 2018, footballers who have already played in national A-teams made up 36.5% of squads of teams studied. Full internationals played 49.5% of total domestic league minutes (+5% compared to the same moment of the season in 2017). This rise reflects the increase in the expatriate presence and confirms the central position of the leagues surveyed in the global economy of women's football.

Figure n°55: Percentage of minutes by full internationals, five major women's football leagues (June 2018)

	2017	2018	Evolution
Damallsvenskan (SWE)	41.8%	37.3%	-4.5%
Féminine Division 1 (FRA)	34.8%	48.2%	+13.4%
Frauen Bundesliga (GER)	52.1%	50.0%	-2.1%
NWSL (USA)	52.3%	57.1%	+4.8%
WSL (ENG)	47.7%	52.4%	+4.7%
Total	44.5%	49.5%	+5.0%

The percentage of minutes by full internationals is over one third in all of the competitions surveyed. It goes from 37.3% in the Damallsvenskan to 57.1% in the NWSL. The highest increase compared to 2017 was recorded for the French Division 1: from 34.8% to 48.2% (+13.4%). A slight decrease was observed in two out of the five leagues studied: the Damallsvenskan (-4.5%) and the Frauen Bundesliga (-2.1%).

The most successful women's teams field almost exclusively players with international status. The highest values in absolute were measured for UEFA Champions League finalists: Wolfsburg (95.5%) and Olympique Lyonnais (95.4%). Full internationals played more than half of domestic league minutes in 22 other teams. At the other end of the scale, the lowest percentages were recorded at Hammarby (5.6%), Sunderland (7.8%) and Växjö (8.9%).

Figure n°56: Highest percentage of minutes by full internationals, five major women's football leagues (June 2018)

1. Wolfsburg (GER)	95.5%	13. Linköping (SWE)	65.8%
2. Olympique Lyonnais (FRA)	95.4%	14. Houston Dash (USA)	65.6%
3. Chelsea (ENG)	94.9%	15. Utah Royals (USA)	63.6%
4. Bayern München (GER)	94.1%	16. Seattle Reign (USA)	63.1%
5. Rosengård (SWE)	91.8%	17. Orlando Pride (USA)	60.5%
6. PSG (FRA)	90.6%	18. Reading (ENG)	59.0%
7. Arsenal (ENG)	89.7%	19. SC Sand (GER)	57.0%
8. Montpellier (FRA)	87.2%	20. Freiburg (GER)	55.0%
9. Manchester City (ENG)	86.0%	21. Sky Blue (USA)	54.1%
10. North Carolina Courage (USA)	77.9%	22. Liverpool (ENG)	53.1%
11. Turbine Potsdam (GER)	72.2%	23. Göteborg (SWE)	51.3%
12. Paris (FRA)	68.8%	24. Washington Spirit (USA)	50.5%

## Conclusion

The economic development and professionalisation of the women's game are leading to several processes already observed at men's level. A convergence process notably exists in terms of players' age. While on average still younger than their male counterparts, women playing in the leagues surveyed are getting older. Up until a certain level, this process will probably continue in the years to come.

A second important trend observed in professional club women's football is the growth in the expatriate presence. While still below the levels observed in the most competitive men's leagues, the number of expatriate footballers in women's clubs surveyed is on the increase. In this case too, a further growth is expected for the next years. The diversity of origins represented in the main leagues should also go up.

Finally, as for the men's game, without corrective measures, financial divides between clubs both at national and international level will increase. The economic development will indeed benefit some clubs and leagues much more than others. The high concentration of full internationals in some clubs of the competitions surveyed already illustrates this process.

From this perspective, it is not a chance that dominant men's teams such as Chelsea, Bayern Munich, Paris St-Germain, Arsenal or Manchester City are in the best positions of the table of teams fielding the highest percentage of full internationals. In the top ten rankings, only Rosengård and North Carolina Courage have no professional team at men's level.



# Performance and playing styles across Europe

The analysis of pitch performances at both individual and collective level is one of the three principle fields of research of the CIES Football Observatory. This chapter compares 35 national competitions across Europe using the database made available by the InStat<sup>4</sup> company. The sample comprises 19,544 matches played between the 1st September 2015 and the 31st August 2017.

The analysis focuses on three aspects: the teams' ball management, the degree of openness of games, as well as the level of power balance between opponents. For each of these domains, we present statistical indicators that permit the ranking of leagues on a pertinent and objective basis.

Figure n°57: Sample of leagues and number of matches analysed

Association	League [Label]	Matches	Association	League [Label]	Matches
Austria	Bundesliga [AUT]	355	Israel	Ligat ha'Al [ISR]	424
Belgium	First Division A [BEL]	556	Italy	Serie A [ITA]*	760
Belarus	Premier League [BLR]	454		Serie B [ITA/2]	964
Bulgaria	First League [BUL]	417	The Netherlands	Eredivisie [NED]	615
Croatia	1. HNL [CRO]	354	Norway	Eliteserien [NOR]	462
Czech Republic	Czech Liga [CZE]	480	Poland	Ekstraklasa [POL]	592
Denmark	Superliga [DEN]	448	Portugal	Primeira Liga [POR]	556
England	Premier League [ENG]*	750	Romania	Liga I [ROM]	529
	Championship [ENG/2]	1,115	Russia	Premier League [RUS]	488
Spain	Liga [ESP]*	760	Scotland	Premiership [SCO]	421
	Segunda División [ESP/2]	935	Serbia	Super Liga [SRB]	571
Finland	Veikkausliiga [FIN]	393	Switzerland	Super League [SUI]	354
France	Ligue 1 [FRA]*	758	Slovakia	Super Liga [SVK]	377
	Ligue 2 [FRA/2]	760	Slovenia	1. SNL [SVN]	350
Germany	1. Bundesliga [GER]*	603	Sweden	Allsvenskan [SWE]	470
	2. Bundesliga [GER/2]	604	Turkey	Süper Lig [TUR]	612
Greece	Super League [GRE]	500	Ukraine	Premier League [UKR]	362
Hungary	NB I [HUN]	395	Total		19,544

4 More information at [instatsport.com/en/](http://instatsport.com/en/).

## Ball management

The first indicator used when comparing leagues from the point of view of ball management is that of the percentage of successful passes. A high value indicates the ability of a team to retain possession of the ball. This indicator notably refers to the technical prowess of players, the pass distance, the playing style, as well as the pressure on the footballers who have possession.

The five major European leagues ranks among the first seven places. The position of the Swedish (third) and the Israeli (fourth) top divisions is surprising, given the relatively modest results obtained by their representatives in European competitions. As illustrated in figure 58, the level of pressure on the player with possession partially explains this result. As for Israel, the lack of verticality is also to be considered (figure 61 and 62).

Generally speaking, the most competitive championships bring together players with superior technical skills and are made up of more clubs whose philosophy of the game is based on possession. Portugal and Ukraine are the only two countries in the top ten places of the UEFA rankings whose level of successful passes is below 80%. As shown in figures 64 and 65, this result must be considered in parallel with the low level of competitive balance in these championships.

Figure n°58: Percentage of successful passes, by league

1. ITA	82.4%	13. BEL	80.1%	25. SVN	78.9%
2. FRA	82.2%	14. BUL	80.0%	26. SRB	78.6%
3. SWE	82.0%	. FIN	80.0%	27. BLR	78.4%
4. ISR	81.8%	16. SUI	79.9%	. GER/2	78.4%
5. ENG	81.4%	17. ROM	79.7%	. ENG/2	78.4%
6. ESP	81.2%	18. UKR	79.6%	30. GRE	78.3%
7. GER	81.1%	. HUN	79.6%	31. SVK	77.7%
8. RUS	81.0%	20. POL	79.3%	32. ESP/2	77.6%
9. TUR	80.6%	21. FRA/2	79.2%	. AUT	77.6%
10. NED	80.5%	. ITA/2	79.2%	34. SCO	77.2%
. DEN	80.5%	23. POR	79.1%	. CZE	77.2%
12. CRO	80.2%	. NOR	79.1%	Average	79.7%

The level of successful passes is reflected, by and large, on the average length of a phase of possession. The values for this indicator vary between

less than 12 seconds for the Czech 1. Liga and 15 seconds for the English Premier League. As a general rule, the phases of possession last longer in the best performing championships than in lesser competitive leagues.

Figure n°59: Average duration of a possession, seconds

1. ENG	15.03	13. TUR	13.46	25. ROM	12.70
2. ITA	14.68	14. FIN	13.38	26. SUI	12.68
3. SWE	14.67	15. NOR	13.37	SRB	12.68
4. ISR	14.66	16. ITA2	13.10	28. POR	12.64
5. NED	14.45	17. GRE	13.03	29. ESP2	12.59
6. ESP	14.43	18. POL	13.01	30. SCO	12.53
7. GER	14.26	19. CRO	12.90	31. SVN	12.42
8. FRA	14.23	20. HUN	12.87	AUT	12.42
9. DEN	13.98	21. FRA2	12.84	33. BLR	12.27
10. RUS	13.81	22. GER2	12.78	34. SVK	11.97
11. ENG2	13.62	23. BUL	12.77	35. CZE	11.93
12. BEL	13.48	24. UKR	12.76	Average	13.27

The indicator of the number of successful passes per minute of possession is also interesting when it comes to understanding the rapidity of ball circulation. The five major European leagues are in this case in the top five positions. Big-5 league teams are not only able to achieve a greater proportion of passes than the average, but are also able to execute them in a speedier manner.

The relatively lower level of passes per minute measured for the Swedish and Israeli top divisions in comparison to the percentage of successful passes probably reflects a lesser need to quickly pass the ball around in order to undo the opponents' defensive game. The same conclusion is valid for the Dutch Eredivisie and the Belgian Pro League.

Figure n°60: Number of passes per minute of possession, by league

1. GER	18.21	13. SVK	17.65	25. SVN	17.43
2. FRA	18.17	14. BLR	17.63	26. POR	17.38
3. ITA	18.12	. CRO	17.63	27. ESP/2	17.35
4. ESP	17.91	16. UKR	17.58	28. SCO	17.33
. ENG	17.91	. FRA/2	17.58	29. BEL	17.28
6. POL	17.90	18. SWE	17.57	30. ISR	17.24
7. RUS	17.88	19. CZE	17.56	31. BUL	17.17
8. AUT	17.83	. ROM	17.56	32. FIN	17.07
9. GER/2	17.76	. ITA/2	17.56	33. NOR	17.04
10. TUR	17.70	22. GRE	17.50	34. NED	16.90
11. DEN	17.68	. ENG/2	17.50	35. SRB	16.69
12. SUI	17.67	24. HUN	17.46	Average	17.55

## Degree of openness

The second area analysed in this chapter is the degree of openness of matches. The number of goals scored is a simple but useful indicator to measure the balance of power between attack and defence according to league. Here also, the gaps observed show up divergences both in the abilities of players and the playing philosophies of teams. The imbalance between clubs can also explain some differences (see below).

The number of goals per match in the competitions studied varies between 2.24 for the Spanish Segunda División and 3.16 for the Swiss Super League. The most open championships locate in Western Europe. The Eastern European league whose teams score the most goals, the Slovakian top division, is only ranked twelfth. The five second division championships analysed are in the second half of the rankings. The big-5 leagues are, on the contrary, in the top half of the table.

Figure n°61: Number of goals per match, by league

1. SUI	3.16	13. SVK	2.68	25. FIN	2.45
2. NED	2.98	14. POL	2.66	26. SRB	2.44
3. SWE	2.94	15. AUT	2.65	27. FRA/2	2.42
4. BEL	2.86	16. FRA	2.61	28. ROM	2.37
5. ESP	2.86	17. HUN	2.58	29. BLR	2.35
6. SCO	2.84	18. CZE	2.58	30. CRO	2.34
7. GER	2.83	19. GER/2	2.56	31. ITA/2	2.33
8. NOR	2.81	20. POR	2.53	32. ISR	2.30
9. ITA	2.77	21. SVN	2.52	33. RUS	2.28
10. ENG	2.75	22. ENG/2	2.51	34. GRE	2.25
11. DEN	2.71	23. BUL	2.50	35. ESP/2	2.24
12. TUR	2.71	24. UKR	2.48	Average	2.60

The indicator for the actual playing time per goal also allows us to evaluate the degree of openness of matches. At one extreme, in the Swiss Super League, a goal is scored every 16 minutes and 17 seconds of effective play. At the other, one must wait 23 minutes and 32 seconds to see a goal in Israel. The average for the 35 competitions analysed is 20 minutes and 32 seconds.

Figure n°62: Effective playing time per goal, by league (minutes:seconds)

1. SUI	16:17	13. SWE	19:35	25. ROM	21:34
2. SCO	18:14	14. AUT	19:40	26. SRB	21:59
3. BEL	18:47	15. GER/2	19:47	27. FRA/2	22:02
4. NED	18:48	16. ENG	19:51	28. FIN	22:15
5. ESP	18:50	17. ITA	20:05	29. ITA/2	22:22
6. GER	18:52	18. DEN	20:14	30. ESP/2	22:48
7. NOR	19:07	19. HUN	20:18	31. GRE	22:48
8. SVK	19:07	20. BUL	20:32	32. CRO	22:54
9. TUR	19:11	21. FRA	20:46	33. BLR	23:18
10. CZE	19:19	22. UKR	20:56	34. RUS	23:29
11. POR	19:30	23. SVN	20:59	35. ISR	23:32
12. POL	19:35	24. ENG/2	21:25	Average	20:32

Generally, the duration of actual play is higher in the most competitive championships than in the lesser performing leagues. This result reflects a greater fluidity of the game. The average effective playing time for the competitions analysed is 55.6%, with a minimum of 51.5% in Portugal and a maximum of 59.6% in Sweden.

Figure n°63: Percentage of effective playing time, by league

1. SWE	59.6%	. RUS	56.6%	25. ITA2	54.4%
2. NED	59.0%	14. ENG	56.5%	26. SUI	54.3%
3. ITA	58.1%	15. SRB	56.2%	27. UKR	54.0%
4. BLR	57.7%	. FRA2	56.2%	. TUR	54.0%
5. FIN	57.5%	17. SVN	56.1%	29. GER2	53.9%
6. FRA	57.2%	18. NOR	55.8%	30. BUL	53.8%
7. DEN	57.1%	19. HUN	55.2%	. ESP2	53.8%
8. ESP	57.0%	20. ENG2	55.1%	32. ROM	53.7%
9. ISR	56.8%	21. SVK	55.0%	33. GRE	53.6%
10. BEL	56.7%	22. SCO	54.7%	34. CZE	53.2%
. GER	56.7%	23. AUT	54.6%	35. POR	51.5%
12. CRO	56.6%	. POL	54.6%	Average	55.6%

## Balance of power

The competition surveyed also differentiate greatly in the power balance between adversaries. Beyond goals scored by each team, the gaps in the number of shots from within the opponents' box and in the number of passes achieved are two technical indicators allowing us to grasp the differences in the pitch production between adversaries.

The most competitive teams not only shoot more often than lesser performing teams, but also are capable of shooting from a closer range. The difference in the number of shots from within the opponents' box is thus a particularly relevant indicator when measuring the power balance between teams.

At the level of the 35 competitions analysed, the gaps per match vary between 3.5 shots in the German Zweite Bundesliga and 5.1 shots in the Croatian top division. More generally, the second divisions of the five major European championships emerge as particularly evenly matched competitions. The low level of openness measured above is in part linked to this observation.

With the exception of the French Ligue 1, the big-5 competitions are part of the most unbalanced championships. While the general level of players is very high, the great differences between the financial means at

the disposal of teams reflects in the dominance of certain clubs. Croatia, Ukraine and the Netherlands are in a similar situation.

Figure n°64: Average gap between shots from within the opponents' box, by league

1. CRO	5.11	13. ESP	4.37	25. TUR	4.05
2. UKR	4.96	14. SRB	4.35	26. FRA	3.95
3. NED	4.94	15. BEL	4.34	. AUT	3.95
4. SWE	4.63	16. GRE	4.32	28. RUS	3.88
5. ENG	4.56	17. DEN	4.25	29. ROM	3.85
6. SVK	4.55	18. GER	4.21	. ITA/2	3.85
7. SUI	4.54	. FIN	4.21	31. POL	3.83
8. POR	4.53	20. BUL	4.14	32. ENG/2	3.74
9. BLR	4.52	21. SVN	4.13	33. FRA/2	3.71
. SCO	4.52	. NOR	4.13	34. ESP/2	3.64
11. ITA	4.49	23. HUN	4.12	35. GER/2	3.51
12. CZE	4.40	24. ISR	4.08	Average	4.24

The average gap of passes carried out by teams confirms the great balance existing in the second divisions of big-5 league countries. At the other end of the scale, this indicator highlights even more the five major European championships as being among the most unbalanced competitions from the point of view of the teams' technical production.

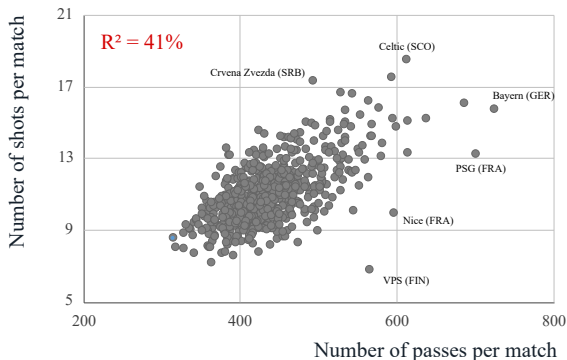
Figure n°65: Average gap of passes between adversaries per match, by league

1. GER	195	13. GRE	156	25. POL	135
2. UKR	179	14. SCO	151	26. TUR	129
3. ENG	176	15. BUL	149	27. NOR	128
4. ISR	174	16. NED	145	28. SVN	127
5. SVK	168	17. DEN	144	29. ENG/2	126
6. ITA	166	18. HUN	143	30. GER/2	124
7. FRA	165	. ROM	143	31. CZE	121
8. RUS	164	20. BEL	140	32. SUI	119
9. CRO	163	21. FIN	138	33. FRA/2	113
10. POR	158	22. SWE	137	. ITA/2	113
. ESP	158	23. SRB	136	35. ESP/2	103
12. AUT	157	. BLR	136	Average	145

While a significantly positive correlation exists at team level between passes and shots, the link is not always very strong. Thus, the gaps be-

tween passes measured in the German, French, Israeli or Russian top divisions only marginally explain the gaps between shots. In this case, while still important, possession is not a key success factor.

Figure n°66: Correlation between average number of passes and shots per match



## Conclusion

This analysis is but an initial foray in exploiting the numerous possibilities available thanks to the exclusive data produced by InStat. The depth and breadth of statistics provided by this company constitutes a solid basis for many possible research projects.

In terms of performance analysis, the greatest difficulty resides in the ability to interpret data taking into account the particularities of the context from which they arise. The principle conclusion that we can draw here is that the top leagues differentiate themselves above all by the fluidity of games, as illustrated by the highest level of successful passes and the quickest ball circulation.

However, a better overall capacity to master the ball does not necessarily lead to more goals. The power balance between opponents and the playing philosophy of teams have the most determining role in the number of goals scored. An unbalanced championship with an attacking mentality



will lead to more goals than an evenly matched competition with a defensive approach. The gaps observed between the top and second divisions in the big-5 league countries largely underwrite this observation.



# How to evaluate player performance?

This chapter lays out the approach developed by the CIES Football Observatory research team to evaluate player performance. It outlines the methodological choices used in order to be able to compare footballers on an objective and reliable basis.

Several steps are necessary to analyse the technical performance of players in a pertinent manner. Our starting point was to categorise technical gestures employed by players in six different areas of the game. These gestures have been selected and assembled in such a way that, when aggregated at team level, they positively correlate to the results.

In order to gain even more relevance, the technical gestures carried out were analysed in the wider context of the rapport of collective strength between teams. It was also necessary to go beyond the technical aspects so as to highlight the players whose presence on the pitch allows the team to surpass itself.

Finally, the transition from the evaluation of players by area of the game to an indicator of general strength has necessitated the establishment of methods of calculation that are applicable to the different existing player profiles without penalising any position or style of play.

## First step: indicators by area of play

The first stage in our approach consists in creating the performance indicators according to the area of play. In order to do this, we have identified the technical gestures that outfield players must accomplish so that their team may win.

The composite indicators developed are perfectly comparable both on the spatial and temporal levels. To maximise their relevance, they combine as much as possible the volume of actions carried out (productivity) and their outcome (efficiency).

From a defensive point of view, the indicator for rigour highlights players who are able to prevent adversaries from creating chances by their strength in duels. The capacity to avoid errors is also integrated into the calculation. This area showcases players who are the best in terms of marking, which necessitates qualities such as physical force, timing and concentration.

Continuing on a defensive level, recovery measures the ability of players to minimise the opponents' chances by intercepting their passes. This domain highlights footballers who are the most able when it comes to anticipating the offensive actions of their adversaries. It involves skills such as positional awareness, tactical intelligence and stamina.

Distribution, the third domain, highlights players who are particularly skilful in keeping the ball moving. This area of competence is very important insofar as it enables teams to control the game. As for individual qualities associated with this domain, technique and vision are of key importance.

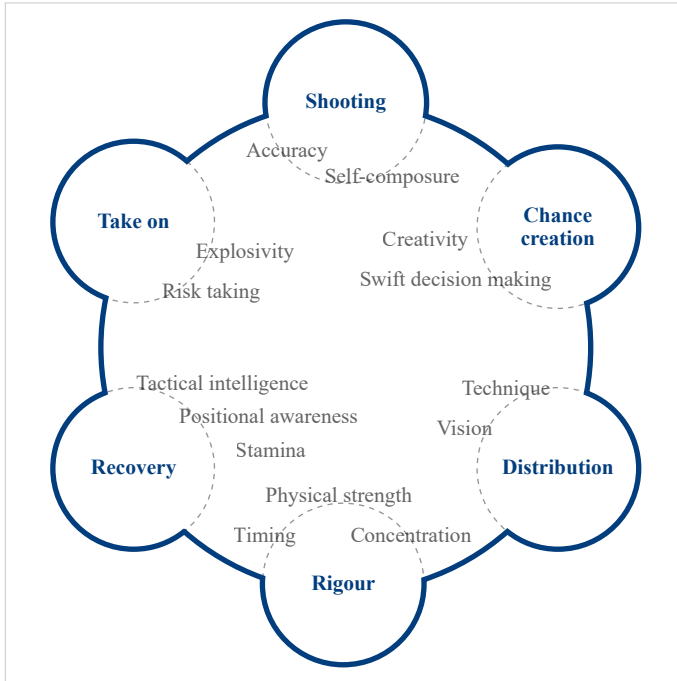
From an attacking point of view, take on measures the ability of players to challenge successfully adversaries. Without footballers able to create an effect of outnumbering, any team would have difficulty creating chances for itself. Apart from technique, necessary qualities in order to excel in this area include taking risks and explosive power.

Chance creation defines the ability to put teammates in a favourable position to shoot. This domain highlights players who are the most able when it comes to making a final pass. Besides qualities already mentioned such as technique and vision, chance creation requires additional skills like creativity and swift decision making.

Finally, the domain of shooting measures the ability of players to shoot successfully at the opponent's goal. In a sport such as football, where the number of goals is very low, having players who are able to take advantage of opportunities is a luxury that few teams can afford. Apart from the above-mentioned skills, shooting relies heavily on accuracy and self-composure.

The six indicators mentioned above are reduced by half in the context of the evaluation of performances at the level of a single match: defensive activity, distribution and attacking activity. This reduction is necessary so as to take into account a sufficiently large number of gestures to allow for a solid statistical analysis.

Figure n°67: Areas of the game for the technical analysis of performance



## Second step: general indexing

Depending on the position played and the team's style of play, footballers have the possibility to perform well in one or more areas of the game. At one extreme, certain strikers focus only on shooting. At the other, box-to-box midfielders are often involved in all areas of the game.

These differences must be taken into account to go from indicators by domain of the game to an indicator that measures the overall strength of a footballer. If this was not the case, the comparability between players would be greatly compromised. To avoid this problem, we have come up with different modalities of calculation that can be applied to all types of player profiles.

The specialist profile corresponds to players who concentrate on one area of the game, most often shooting. The twin skill profile applies especially to centre backs of dominated teams (rigour and recovery). That of the triple skill refers mainly to offensive footballers of teams who lack possession (take on, chance creation, shooting) and to centre backs of dominating teams (rigour, recovery, distribution).

The fourth profile concerns well-rounded players who take part actively in four areas of the game. This profile includes different combinations of skills associated with all the positions except for centre backs. The final profiles are those for multi-skilled players active in at least five areas. These concern primarily box-to-box midfielders and wing backs in tactical formations with three defenders such as the 3-5-2.

At match level, players are evaluated according to their ability to rise above the average level of performance measured for all of the footballers in at least one of the three areas considered: defensive activity, distribution and attacking activity. This procedure also guarantees good comparability between players with different profiles.

Figure n°68: Player profiles for the general index

Type 1	Specialist
Type 2	Twin skills
Type 3	Triple skills
Type 4	Well-rounded
Type 5	Multi-skilled

## Theory in practice

The application of our methodology for the first semester of the 2017/18 season allows us to highlight the outstanding performance levels of both established football stars and promising young talents. The rankings below present footballers having played at least 900 domestic league minutes with the highest scores for each of the six areas of the game taken into account for outfield players.

At the head of tables for rigour are Kalidou Koulibaly (Napoli) for players aged at least 22 and Davinson Sánchez (Tottenham) for U21 footballers. Many players are in the top five positions for more than one game area. Among young talents, this is notably the case for some possible future football stars: Dayot Upamecano (RB Leipzig), Lucas Torreira (Sampdoria), Rodri Hernández (Villarreal), Santiago Ascacibar (Stuttgart) and Tanguy Ndombélé (Lyon).

Lionel Messi (Barcelona) is the only footballer over 21 years old in the top five for three different rankings: take on, chance creation and shooting. This confirms the outstanding talent of the Argentinean prodigy. Two U21 players also rank in the top five positions in all of the three attacking areas considered: Kylian Mbappé (Paris St-Germain) and Malcom Filipe (Bordeaux). Both players should be able to look forward to an excellent career.

Figure n°69: Highest scores by area of play, big-5 leagues (August-December 2017)

#### a) Rigour

##### Over 21

1. Kalidou Koulibaly, 1991, Napoli (ITA)
2. Nicolás Otamendi, 1988, Manchester City (ENG)
3. Marquinhos Aoás, 1994, PSG (FRA)
4. Raúl Albiol, 1985, Napoli (ITA)
5. Phil Jones, 1992, Manchester Utd (ENG)

##### Under 21

1. Davinson Sánchez, 1996, Tottenham (ENG)
2. Andreas Christensen, 1996, Chelsea (ENG)
3. Joe Gomez, 1997, Liverpool (ENG)
4. Dayot Upamecano, 1998, RB Leipzig (GER)
5. Panagiotis Retsos, 1998, Leverkusen (GER)

#### b) Recovery

##### Over 21

1. Sergio Busquets, 1988, FC Barcelona (ESP)
2. Miralem Pjanić, 1990, Juventus (ITA)
3. Jorginho Frello, 1991, Napoli (ITA)
4. Phil Jones, 1992, Manchester Utd (ENG)
5. Thomas Partey, 1993, Atlético Madrid (ESP)

##### Under 21

1. Dayot Upamecano, 1998, RB Leipzig (GER)
2. Santiago Ascacibar, 1997, Stuttgart (GER)
3. Rodri Hernández, 1996, Villarreal CF (ESP)
4. Jorge de Oliveira, 1996, Monaco (FRA)
5. Lucas Torreira, 1996, Sampdoria (ITA)

#### c) Distribution

##### Over 21

1. Jorginho Frello, 1991, Napoli (ITA)
2. Miralem Pjanić, 1990, Juventus (ITA)
3. Luiz Fernandinho, 1985, Manchester City (ENG)
4. Luiz Gustavo, 1987, Marseille (FRA)
5. Adrien Rabiot, 1995, PSG (FRA)

##### Under 21

1. Lucas Torreira, 1996, Sampdoria (ITA)
2. Mikel Merino, 1996, Newcastle (ENG)
3. Santiago Ascacibar, 1997, Stuttgart (GER)
4. Rodri Hernández, 1996, Villarreal CF (ESP)
5. Dennis Geiger, 1998, Hoffenheim (GER)

## d) Take on

1. Isco Alarcón, 1992, Real Madrid (ESP)
2. Neymar Júnior, 1992, PSG (FRA)
3. Lionel Messi, 1987, FC Barcelona (ESP)
4. Paulo Dybala, 1993, Juventus (ITA)
5. Florian Thauvin, 1993, Marseille (FRA)

1. Malcom Filipe, 1997, Bordeaux (FRA)
2. Kylian Mbappé, 1998, PSG (FRA)
3. Tanguy Ndombélé, 1996, Lyon (FRA)
4. Ruben Loftus-Cheek, 1996, Crystal Palace (ENG)
5. Christian Pulisic, 1998, Dortmund (GER)

## e) Chance creation

## Over 21

1. Neymar Júnior, 1992, PSG (FRA)
2. Lionel Messi, 1987, FC Barcelona (ESP)
3. Alexis Sánchez, 1988, Arsenal (ENG)
4. Luis Alberto, 1992, Lazio (ITA)
5. Lorenzo Insigne, 1991, Napoli (ITA)

## Under 21

1. Leroy Sané, 1996, Manchester City (ENG)
2. Malcom Filipe, 1997, Bordeaux (FRA)
3. Kylian Mbappé, 1998, PSG (FRA)
4. Marcus Rashford, 1997, Manchester Utd (ENG)
5. Julian Brandt, 1996, Leverkusen (GER)

## f) Shooting

## Over 21

1. Lionel Messi, 1987, FC Barcelona (ESP)
2. Cristiano Ronaldo, 1985, Real Madrid (ESP)
3. Ciro Immobile, 1990, Lazio (ITA)
4. Mohammed Salah, 1992, Liverpool (ENG)
5. Edinson Cavani, 1987, PSG (FRA)

## Under 21

1. Leon Bailey, 1997, Leverkusen (GER)
2. Timo Werner, 1996, RB Leipzig (GER)
3. Kylian Mbappé, 1998, PSG (FRA)
4. Federico Chiesa, 1997, Fiorentina (ITA)
5. Malcom Filipe, 1997, Bordeaux (FRA)

Our methodology also allows us to rank players per position on the basis of their score in the general index. Eight positional categories are taken into account for the first semester of the 2017/18 season. Players fielded in different positions are included in the rankings of the position played for the most domestic league minutes. For goalkeepers, the indicators analysed are the number and percentage of saves with respect to opponents' chances and goals conceded.

Many players already highlighted in the rankings per area of the game are to be found in the top five per position. However, this is not always the case. Full backs or wing backs, for example, are not very often among the very best performing players per area of the game. Indeed, in the modern game, their position implies polyvalence rather than specialisation. The same holds true for box-to-box midfielders. Our analysis notably brings to the light the outstanding performance level of Napoli's Faouzi Ghoulam.



The youngest players in the U21 rankings are two goalkeepers: Gianluigi Donnarumma and Alban Lafont. Their special status is also reflected by the fact that only three U21 goalkeepers were fielded for more than 900 domestic league minutes in the first semester of the 2017/18 big-5 league season. The youngest outfield players in the rankings are born in 1998: Kylian Mbappé, Dayot Upamecano, Panagiotis Retsos and Dennis Geiger.

Figure n°70: Highest scores by position, big-5 leagues (August-December 2017)

#### a) Goalkeepers

##### Over 21

1. Samir Handanović, 1984, Internazionale (ITA)
2. David de Gea, 1990, Manchester Utd (ENG)
3. Marc-André ter Stegen, 1992, FC Barcelona (ESP)
4. Jan Oblak, 1993, Atlético Madrid (ESP)
5. Alisson Becker, 1992, Roma (ITA)

##### Under 21

1. Alban Lafont, 1999, Toulouse (FRA)
2. Gianluigi Donnarumma, 1999, Milan (ITA)
3. Bingourou Kamara, 1996, Strasbourg (FRA)

#### b) Centre backs

##### Over 21

1. Mats Hummels, 1988, Bayern München (GER)
2. Raúl Albiol, 1985, Napoli (ITA)
3. Nicolás Otamendi, 1988, Manchester City (ENG)
4. Thiago Silva, 1984, PSG (FRA)
5. Sergio Ramos, 1986, Real Madrid (ESP)

##### Under 21

1. Dayot Upamecano, 1998, RB Leipzig (GER)
2. Andreas Christensen, 1996, Chelsea (ENG)
3. Davinson Sánchez, 1996, Tottenham (ENG)
4. Panagiotis Retsos, 1998, Leverkusen (GER)
5. Thilo Kehrer, 1996, Schalke (GER)

#### c) Full backs

##### Over 21

1. Faouzi Ghoulam, 1991, Napoli (ITA)
2. Fabian Delph, 1989, Manchester City (ENG)
3. Dani Alves, 1983, PSG (FRA)
4. Aleksandar Kolarov, 1985, Roma (ITA)
5. Jordi Alba, 1989, FC Barcelona (ESP)

##### Under 21

1. Joe Gomez, 1997, Liverpool (ENG)
2. Jorge de Oliveira, 1996, Monaco (FRA)
3. Nordi Mukiele, 1997, Montpellier (FRA)
4. Pablo Maffeo, 1997, Girona FC (ESP)
5. Lukas Klostermann, 1996, RB Leipzig (GER)

#### d) Defensive midfielders

##### Over 21

1. Jorginho Frello, 1991, Napoli (ITA)
2. Miralem Pjanić, 1990, Juventus (ITA)
3. Luiz Fernandinho, 1985, Manchester City (ENG)
4. Luiz Gustavo, 1987, Marseille (FRA)
5. Adrien Rabiot, 1995, PSG (FRA)

##### Under 21

1. Lucas Torreira, 1996, Sampdoria (ITA)
2. Mikel Merino, 1996, Newcastle (ENG)
3. Santiago Ascacibar, 1997, Stuttgart (GER)
4. Rodri Hernández, 1996, Villarreal CF (ESP)
5. Dennis Geiger, 1998, Hoffenheim (GER)

## e) Box-to-box midfielders

## Over 21

1. Marco Verratti, 1992, PSG (FRA)
2. David Silva, 1986, Manchester City (ENG)
3. Kevin de Bruyne, 1991, Manchester City (ENG)
4. Toni Kroos, 1990, Real Madrid (ESP)
5. Marek Hamšík, 1987, Napoli (ITA)

## f) Attacking midfielders and wingers

## Over 21

1. Lionel Messi, 1987, FC Barcelona (ESP)
2. Neymar Júnior, 1992, PSG (FRA)
3. Raheem Sterling, 1994, Manchester City (ENG)
4. Mohammed Salah, 1992, Liverpool (ENG)
5. Florian Thauvin, 1993, Marseille (FRA)

## g) Central attacking midfielders

## Over 21

1. Paulo Dybala, 1993, Juventus (ITA)
2. Nabil Fekir, 1993, Lyon (FRA)
3. Papu Gómez, 1988, Atalanta (ITA)
4. Alexis Sánchez, 1988, Arsenal (ENG)
5. Mesut Özil, 1988, Arsenal (ENG)

## h) Centre forwards

## Over 21

1. Sergio Agüero, 1988, Manchester City (ENG)
2. Cristiano Ronaldo, 1985, Real Madrid (ESP)
3. Edinson Cavani, 1987, PSG (FRA)
4. Radamel Falcao, 1986, Monaco (FRA)
5. Robert Lewandowski, 1988, Bayern München (GER)

## Under 21

1. Tanguy Ndombélé, 1996, Lyon (FRA)
2. Franck Kessié, 1996, Milan (ITA)
3. Youssef Aït Bennasser, 1996, Caen (FRA)
4. Nicolò Barella, 1997, Cagliari (ITA)
5. Jakub Jankto, 1996, Udinese (ITA)

## Under 21

1. Kylian Mbappé, 1998, PSG (FRA)
2. Malcom Filipe, 1997, Bordeaux (FRA)
3. Leon Bailey, 1997, Leverkusen (GER)
4. Leroy Sané, 1996, Manchester City (ENG)
5. Mikel Oyarzabal, 1997, Real Sociedad (ESP)

## Under 21

1. Dele Alli, 1996, Tottenham (ENG)
2. Pablo Fornals, 1996, Villarreal CF (ESP)

## Under 21

1. Timo Werner, 1996, RB Leipzig (GER)
2. Marcus Thuram, 1997, Guingamp (FRA)
3. Maximiliano Gómez, 1996, Celta Vigo (ESP)
4. Dominic Calvert-Lewin, 1997, Everton (ENG)
5. Tammy Abraham, 1997, Swansea City (ENG)

## Conclusion

Individual performance of players in a collective sport such as football must always be understood within the specific context within which it is produced. The underestimation of the collective conditions of production of individual performance explains numerous failures in the case of transfers.

Geared towards the contextualised profiling of players, our approach is particularly useful for scouting. It facilitates the assembly of a squad made up of players with complementary characteristics. Beyond individual talent, the complementarity between squad members within the context of a given style of play is a key success factor.

In the same vein, our approach can also be used when it comes to choosing which footballers to field. It is also a helpful tool in decision making permitting the favourable development of a team's tactical plan, both with respect to the characteristics of players available and those of the opponents.



# Transfer market analysis: tracking the money

The economic study of the transfer market constitutes the third of the key areas of research of the CIES Football Observatory. This chapter analyses the paying fee transfers having taken place between 2010 and 2017 which involved teams of the five major European championships: the English Premier League, the Spanish Liga, the German Bundesliga, the Italian Serie A and the French Ligue 1.

It first analyses from a historical perspective the sums invested in transfer fees. Secondly, it presents the financial accounts at club level from the 2017 summer transfer window, as well as the principle net monetary flows between leagues. Finally, it examines the transfer operations from the point of view of the gap between fees paid and values estimated by the algorithm that we have exclusively developed<sup>5</sup>.

## Amounts spent

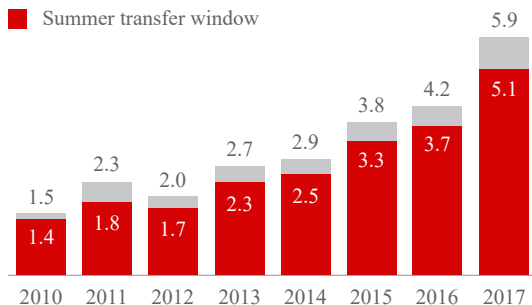
Although the official figures for the amounts spent on transfer fees are often confidential, the extensive media coverage of the main football markets allows us to trace operations. It is thus possible to have a quite clear idea of what actually occurs. The data published in this report includes the fixed transfer indemnities, conditional payments (add-ons), as well as the fees paid for the case of players on loan.

Since 2010, transfer fees paid by big-5 league clubs have strongly increased. For the fifth consecutive year, a record was set in 2017: €5.9 billion (+41% in comparison with the previous year)<sup>6</sup>. If we only take into account the summer transfers, the increase compared to 2016 was 38%: from €3.7 to €5.1 billion.

5 About this, see the chapter «How to evaluate a player's transfer value?», p95.

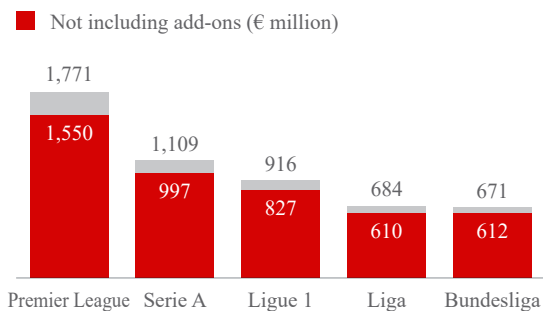
6 The transfer fees negotiated in the case of loans with an obligation to buy are also included in this figure.

Figure n°71: Transfer fees invested by big-5 league clubs, € billion (2010-2017)



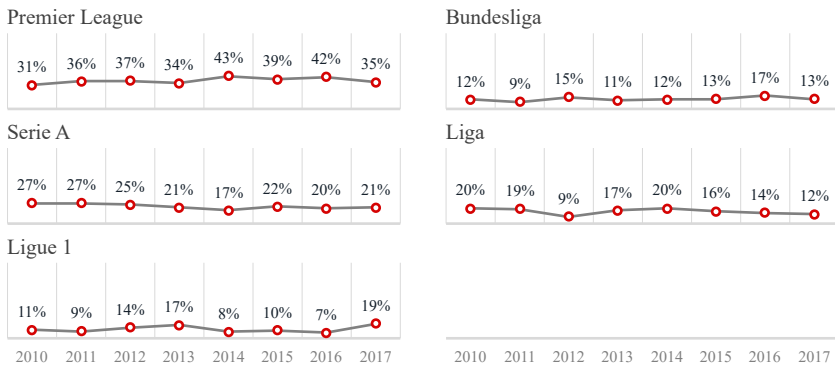
Over the summer of 2017, similar to preceding years, the Premier League clubs have spent the most: about €1.55 billion in fixed transfer fees and €220 million in conditional payments. On average, an English top division club invested €89 million to sign new players. In the other championships studied, this figure varies between €55 million (Italian Serie A) and €34 million (Spanish Liga).

Figure n°72: Transfer fees invested by clubs in the big-5, by league (summer 2017)



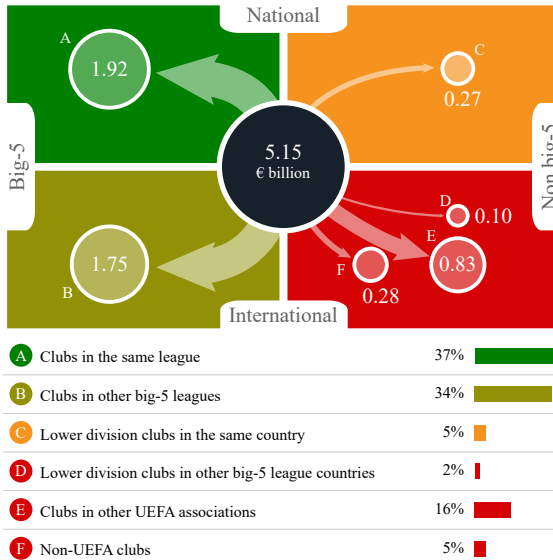
The proportion of expenses of the Premier League clubs in comparison to the transfer fees paid by all of the big-5 league teams was over 30% throughout the period analysed. The decrease observed for 2017 is notably related to the great investments made by Paris St-Germain (€418 million) and Milan (€250 million).

Figure n°73: Distribution of transfer fees invested by clubs in the big-5, by league (2010-2017)



The spatial analysis of the sums invested by big-5 league teams during the summer of 2017 shows that most of the money remains within these championships: €3.7 billion (71% of the total). However, only 52% of paid transfers carried out by big-5 league teams involved players under contract with clubs from these competitions. This imbalance is due to the fact that the most expensive transfers occur between big-5 league teams. The cases of Neymar, Kylian Mbappé and Ousmane Dembélé are perfect examples of this situation.

Figure n°74: Recipients of transfer fees invested by big-5 league clubs (summer 2017)



Rather than call into question the usefulness of the transfer system, as argued in the past by FIFPro notably, our analysis makes a case for the reinforcement of redistribution mechanisms. An increase in indemnities paid to training clubs, as well as an augmentation and generalisation of solidarity contributions such as those planned by FIFA for international transfers, would constitute concrete measures for improving the system.

## Financial assessments

Apart from funds spent, it is interesting to study the net balance sheet for transfer operations. In total, 41 big-5 league clubs out of 98 have made a profit on player transfers carried out in the 2017 summer window. The biggest net profit was recorded for Monaco: +€289 million (€394 million received and €105 million paid out). At the opposite end of the spectrum is Paris St-Germain: -€343 million.



Figure n°75: Net balance of transfers, big-5 league clubs (summer 2017, € million)

(a) Positive balance (top 10)				(b) Negative balance (top 10)			
	In	Out	Balance		In	Out	Balance
1. Monaco (FRA)	394	105	+289	1. PSG (FRA)	75	418	-343
2. Dortmund (GER)	199	89	+110	2. Milan (ITA)	61	250	-189
3. Lyon (FRA)	129	57	+71	3. Manchester Utd (ENG)	11	197	-186
4. Real Madrid (ESP)	139	92	+48	4. Manchester City (ENG)	109	282	-173
5. Fiorentina (ITA)	115	73	+42	5. Chelsea (ENG)	130	236	-105
. Sampdoria (ITA)	105	63	+42	6. Bayern München (GER)	34	102	-68
7. Lazio (ITA)	77	46	+31	7. Marseille (FRA)	4	66	-62
8. Swansea City (ENG)	81	54	+27	8. Brighton & Hove (ENG)	0	54	-54
9. Leverkusen (GER)	89	63	+26	9. Liverpool (ENG)	54	105	-50
10. Arsenal (ENG)	86	60	+26	10. Huddersfield (ENG)	7	55	-49

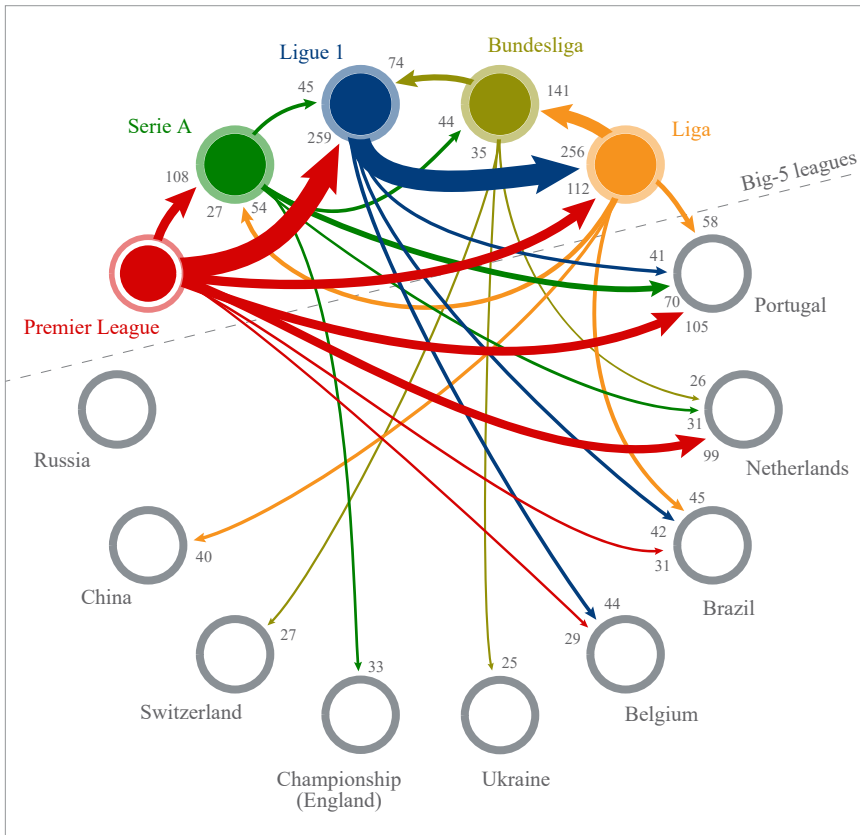
The analysis by league brings to light the Premier League's specificity, which has a clear deficit (-€835 million). Only five English top division teams registered a positive transfer fee balance. Contrary to England, the Spanish Liga has a credit balance (+€9 million). This result is mainly related to Real Madrid's transfer policy (+€47 million).

Figure n°76: Net balance of transfers, big-5 leagues (summer 2017, € million)

	In	Out	Balance
Liga	684	693	+9
Ligue 1	916	861	-55
Bundesliga	671	590	-81
Serie A	1'109	970	-139
Premier League	1'771	936	-835
Total	5'151	4'050	-1'101

The spatial analysis of the balance sheets for international transfers having involved big-5 league teams confirms the key role played by the top English division in the market structure. Five of the seven international relations with the greatest net monetary flows involve the Premier League: -€259 million with France, -€112 million with Spain, -€108 million with Italy, -€105 million with Portugal and -€99 million with the Netherlands.

Figure n°77: Main net monetary flows for international transfers having involved clubs in the big-5, by league (summer 2017, balance  $\geq 25$  € million)



By only taking into account the teams with a credit balance for transfers which involved big-5 league clubs during the summer 2017, it appears that the main beneficiaries are situated within these championships. The 41 big-5 league teams with a positive balance account for €989 million of profits. The record high was observed for French Ligue 1: +€436 million (two thirds of which to Monaco).

Figure n°78: Net beneficiaries of transfers having involved clubs in the big-5, by league category (summer 2017, € million)

	Clubs	Balance		Clubs	Balance
Big-5 leagues	41	+989	Other European countries	68	+731
Ligue 1	10	+436	Portugal	8	+259
Serie A	10	+200	The Netherlands	9	+169
Bundesliga	7	+166	Belgium	8	+93
Liga	9	+110	Ukraine	1	+25
Premier League	5	+77	Switzerland	2	+25
Big-5 league countries lower divisions	50	+286	Turkey	4	+24
England	10	+138	Poland	5	+21
Italy	14	+48	Greece	3	+21
France	9	+39	Denmark	4	+17
Germany	9	+32	Bulgaria	2	+13
Spain	8	+30	Austria	2	+13
Non European countries			Russia	2	+11
Brazil	9	+134	Croatia	1	+10
Argentina	4	+42	Serbia	2	+9
China	1	+40	Others	15	+22
Uruguay	4	+31			
Others	9	+15	Total	186	+2,267

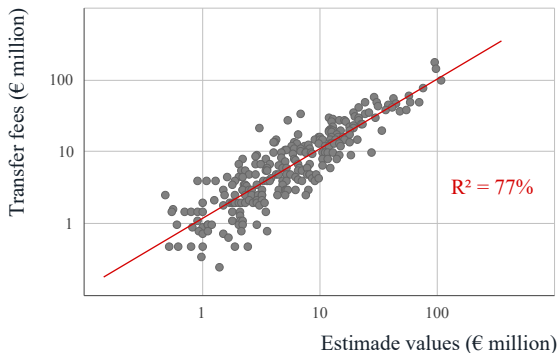
The clubs outside the big-5 with a credit balance for transfers having involved teams from the five major European championships are mainly located in other UEFA countries (notably Portugal, the Netherlands and Belgium), in the English second division (principally thanks to the transfer of players to Premier League teams), as well as in Brazil.

## Transfer operations

As developed in the last chapter of this e-book, the CIES Football Observatory is notably renowned for its ability to estimate scientifically the transfer values of professional footballers. This chapter compares the amounts invested for the transfer of players present in the big-5 at the end of the 2016/17 season with the “fair” values calculated thanks to our algorithm.

The strong correlation between amounts paid and values estimated confirms the solidity of our approach, as well as its strong predictive power.

Figure n°79: Correlation between amounts paid and values estimated for big-5 league players (summer 2017 transfers)



As usual, a negative gap was measured between amounts paid and values estimated. On average, the former were 30% lower than the latter. It is the biggest difference observed since the implementation of the transfer value algorithm. This finding reflects an acceleration of the inflation occurring in the transfer market.

According to the algorithm developed, the most over-paid transfer in absolute terms was that of Kylian Mbappé from Monaco to Paris St-Germain: +€87.4 million between the amount reported (add-ons included) and the estimated sum. Conversely, the best bargain from a financial point of view was achieved by Liverpool for the recruitment of Mohammed Salah (-€19.4 million).

Figure n°80: Greatest gaps between fees paid and values estimated (summer 2017, € million)

	Estimated	Reported	Gap		Estimated	Reported	Gap
1. Kylian Mbappé Monaco (FRA) → PSG (FRA)	92.6	180.0	+87.4	13. Dalbert Henrique Nice (FRA) → Internazionale (ITA)	12.7	29.0	+16.3
2. Ousmane Dembélé Dortmund (GER) → Barcelona (ESP)	95.8	147.0	+51.2	14. Anthony Modeste Köln (GER) → Tianjin Quanjian (CHN)	19.3	35.0	+15.7
3. Benjamin Mendy Monaco (FRA) → Man. City (ENG)	28.5	57.5	+29.0	15. Antonio Rüdiger Roma (ITA) → Chelsea (ENG)	54.2	39.0	-15.2
4. Jordan Pickford Sunderland (ENG) → Everton (ENG)	6.8	34.3	+27.5	16. Kyle Walker Tottenham (ENG) → Man. City (ENG)	41.3	56.0	+14.7
5. Gylfi Sigurdsson Swansea City (ENG) → Everton (ENG)	24.1	49.3	+25.2	17. Leandro Paredes Roma (ITA) → Zenit (RUS)	12.6	27.0	+14.4
6. Mamadou Sakho Liverpool (ENG) → Crystal Palace (ENG)	5.3	28.2	+22.9	18. Milan Škriniar Sampdoria (ITA) → Internazionale (ITA)	14.4	28.0	+13.6
7. Patrik Schick Sampdoria (ITA) → Roma (ITA)	21.0	42.0	+21.0	19. Alex Oxlade-Chamberlain Arsenal (ENG) → Liverpool (ENG)	30.5	43.4	+12.9
8. Nemanja Matić Chelsea (ENG) → Man. Utd (ENG)	30.2	50.3	+20.1	20. Baldé Keita Lazio (ITA) → Monaco (FRA)	19.5	32.0	+12.5
9. Mohammed Salah Roma (ITA) → Liverpool (ENG)	69.4	50.0	-19.4	21. Marko Arnautović Stoke (ENG) → West Ham (ENG)	16.0	27.9	+11.9
10. Harry Maguire Hull (ENG) → Leicester (ENG)	3.1	21.6	+18.5	22. Samuel Clucas Hull (ENG) → Swansea (ENG)	6.5	17.4	+10.9
11. Davide Zappacosta Torino (ITA) → Chelsea (ENG)	11.8	30.0	+18.2	23. Sven Bender Dortmund (GER) → Leverkusen (GER)	4.2	15.0	+10.8
12. Manuel Nollito Man. City (ENG) → Sevilla FC (ESP)	27.4	10.0	-17.4	24. Vitolo Machin Sevilla FC (ESP) → Atlético Madrid (ESP)	47.6	37.5	-10.1

## Conclusion

This chapter highlights the inflation of transfer fees for the recruitment of players from the five major European championships. The average under-estimation of prices with respect to values calculated on the basis of our algorithm and the general increase in amounts invested by big-5 league clubs are clear indicators illustrating the inflation process.

The globalisation of interest in football in general and for the most competitive championships more specifically, would lead one to believe in the continuing trend of inflation of costs on the transfer market. In the short and medium term, the teams from the best leagues should be in a position to increase their turnover. This situation is even more likely to be valid for the most powerful clubs.

In the longer term, in a context where changes in the modes of consumption will reinforce a decrease in television audiences, the main chal-

challenge will be for the clubs' and leagues' ability to diversify even further the sources of monetisation of the sporting spectacle. In any case, for the next five years, it is safe bet that new spending records on the transfer market will be progressively established.

# The transfer of footballers: a network analysis

Football offers a wide array of possibilities to undertake network analysis. This chapter focuses on transfer networks from a triple research perspective. Firstly, it investigates the spatial distribution of expatriate players according to their national origin. The analysis targets the three most represented nationalities abroad: the Brazilians, the Argentineans and the French.

The study then takes leagues as a unit of analysis to understand their labour supply sources at both national and international level. This study is carried out on transfers undertaken by big-5 league clubs from July 2005 to August 2017. Finally, networks are analysed from the perspective of individual clubs. To illustrate such approach, we selected a top level club from each of the five major European championships: Real Madrid, Manchester United, AS Rome, Bayern Munich and Paris St-Germain.

## Networks by origin

The analysis of networks by origin focuses on the representatives of the three countries exporting the most players: Brazil, Argentina and France<sup>7</sup>. The data refers to players present in teams of 139 professional leagues on the 1st October 2017 already fielded in championship matches during the season. In the 116 competitions where the list of substitutes was accessible, the presence on the bench also constituted a criterion for inclusion.

7 See chapter «World football expatriates», page 31. The light differences in some of the figures presented in the two chapters are related to the fact that the date and the sample of the analysis are not the same.

### *Brazilians*

Portugal is by far the chief destination for Brazilians. On the 1st October 2017, 219 footballers from Brazil were playing in the three top levels of competition in Portugal (18.1% of all Brazilians abroad). These footballers were, on average, younger than the Brazilian expatriates taken as a whole: 25.2 years of age as opposed to 27.3. For Brazilians, Portugal is often the first country of migration abroad.

Figure n°81: Principal destinations of Brazilian expatriates (October 2017)

	Number	Average age
Portugal	219	25.2
Japan	71	27.4
Italy	57	27.0
Turkey	44	29.0
France	42	26.1
Thailand	36	29.7
Spain	35	25.6
USA	32	28.0
South Korea	32	27.5
Malta	31	27.4
Total	1,210	27.3

The number of expatriate Brazilians was over 30 in ten countries. Among these are six UEFA member nations, three Asian (Japan, Thailand and South Korea), as well as the United States. Today, the Brazilian player is the only truly global worker in the professional football labour market. Brazilians are present in 80 of 91 associations covered in the October's 2017 census.

### *Argentineans*

Chile and Mexico are the principal destination for Argentinean expatriates. On the 1st October 2017, 98 Argentineans were playing as professionals in each of these two countries. This accounts for over one quarter of all Argentineans abroad (25.7%). In both Chili and Mexico, Argentina is by far the most represented origin among expatriates. Overall, Argentineans abroad are significantly older than expatriates taken as a whole: 28.1 years compared to 26.1.



Figure n°82: Principal destinations of Argentinean expatriates (October 2017)

	Number	Average age
Chili	98	28.4
Mexico	98	28.9
Spain	69	27.0
Italy	44	28.5
Colombia	35	28.9
USA	32	28.0
Peru	30	28.4
Bolivia	30	29.0
Uruguay	27	27.5
Ecuador	26	29.6
Total	760	28.1

Spain and Italy are the only two European associations among the ten principal destinations of Argentinean players. With the exception of the United States, all of the other countries are located in Latin America. While Brazilians are the global source of labour par excellence, Argentineans play a similar role in South America. In total, they are present in 65 of the 91 associations analysed.

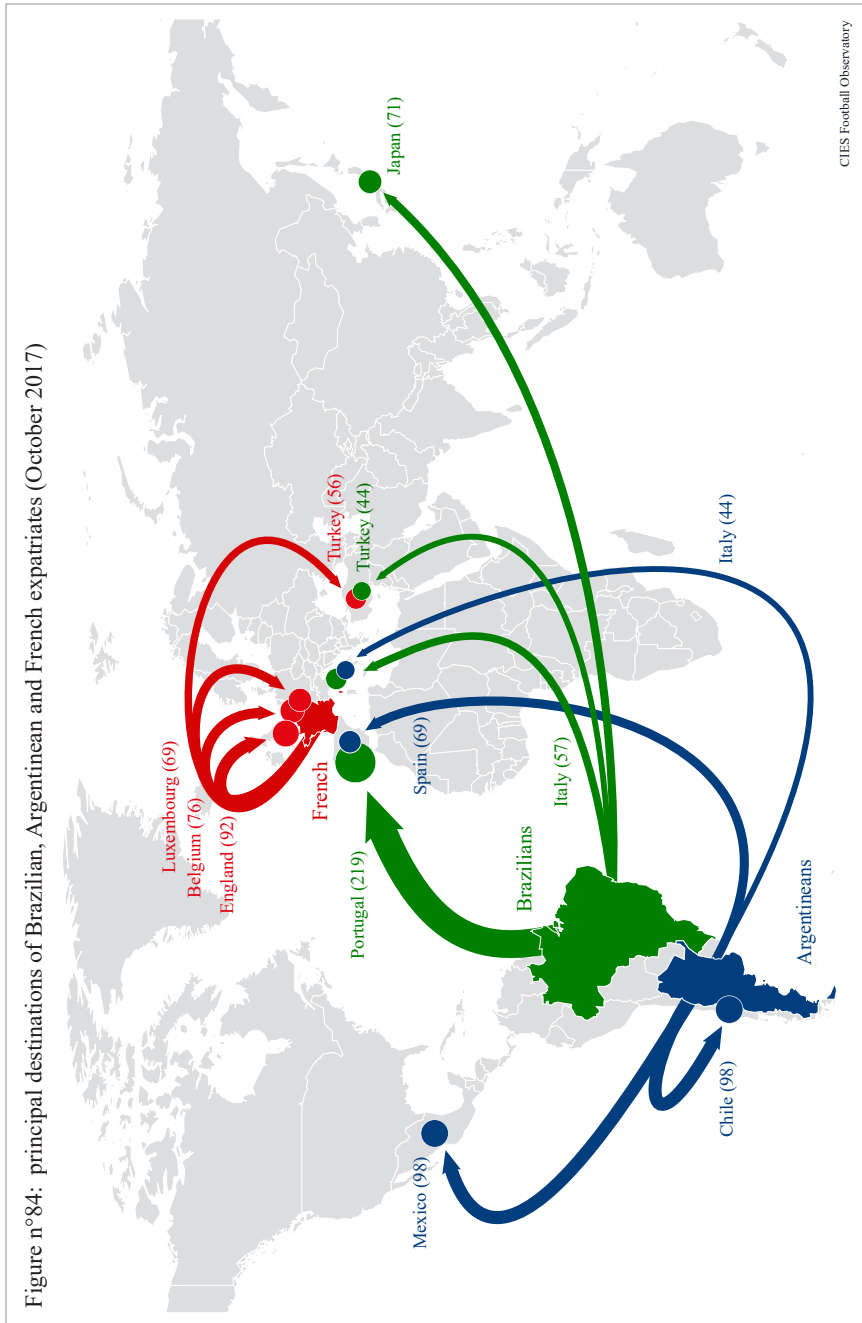
### *French*

Almost a quarter of French expatriate footballers play in English (92) or Belgian professional clubs (76). Four other neighbouring countries are part of the ten principal destinations of French players: Luxembourg, Italy, Spain and Germany. In addition, 56 French nationals are under contract with Turkish clubs, where they are the most represented foreign origin.

Figure n°83: Principal destinations of French expatriates (October 2017)

	Number	Average age
England	92	26.3
Belgium	76	26.5
Luxembourg	69	27.4
Turkey	56	28.7
Italy	47	24.7
Spain	42	25.3
Germany	35	24.5
Greece	26	26.9
USA	26	29.1
Cyprus	23	27.3
Total	732	25.8

The United States is the main non-European destination (26 players). In total, French footballers are present in 61 of the 91 associations surveyed. On average, a French expatriate is only 25.8 years old. This finding reflects the excellence of the French training system and suggests that the number of expatriates from France will further increase in the next future.



## Networks by league

Network analysis is particularly insightful also from the perspective of recruitments carried out by clubs at league level. The study covers players signed between July 2005 and August 2017 by teams from the five major European leagues. Loan returns are also included in the sample. The analysis focuses on the general situation throughout the period considered, as well as on trends observed from the first six seasons studied (2005/06 to 2010/11) to the six last ones (2011/12 to 2016/17).

For the purpose of analysis, we classified the areas of recruitment into five categories: clubs in the same league<sup>8</sup>, in national lower divisions, in foreign big-5 leagues, in other UEFA foreign championships, as well as in leagues outside of UEFA. Over the period considered, clubs in the five main European championships signed 60% of players from clubs in the same country, whether in the same league (32.5%) or in lower divisions (27.5%).

The percentage of national transfers went slightly down between the first and last half of the period analysed: from 61.5% to 58.3%. The same holds true for recruitments from non UEFA leagues (-2.9%). Inversely, the relative proportion of signings from foreign big-5 leagues (+3.3%) and other foreign UEFA leagues (+2.7%) increased. Altogether, almost half of transfers are carried out from other big-5 league teams, whether nationally (32.5%, on the decrease) or internationally (13.8%, on the increase).

Figure n°85: Recruitment league categories of players signed by big-5 league clubs (2005-2017)

	Number	Evolution*
Same league	32.5%	+2.3%
Lower national division leagues	27.5%	+0.9%
Foreign big-5 leagues	13.8%	-3.3%
Other foreign UEFA leagues	18.9%	-2.7%
Non UEFA leagues	7.4%	+2.9%

\* 2011-2017 compared to 2005-2011

8 Including players signed in the summer from teams just promoted to the top division. Conversely, players signed in the summer from clubs just relegated are included in the category lower national division leagues.

Throughout the period analysed, Italian Serie A clubs signed the highest proportion of players from other national teams (about 65%). However, the proportion of national transfers went down by 10.5% from the first to the last six seasons taken into account. This decrease is mainly due to the sharp decline of transfers from lower division Italian clubs in favour of signings from foreign UEFA leagues. This resulted in a significant increase of the percentage of expatriates<sup>9</sup>.

Top division English clubs are particularly active in the recruitment of players from foreign big-5 championships (almost 20% of total signings). Conversely, they are the least active in the direct recruitment of players from outside UEFA leagues (3% only). This relates to the financial wealth of English teams, allowing them to sign the best players among those having already proven themselves in Europe, as well as to the relatively more restrictive conditions to obtain a work permit for non-EU footballers.

Spanish Liga teams transfer a higher percentage of players from non-UEFA countries than clubs in the four other major European championships (about one in ten). However, the proportion of intercontinental transfers decreased by 4% from the first to the second half of the period studied. A decrease was observed in all of the big-5 leagues. This finding reflects the tendency for non-European players to be first signed by clubs outside of the five major European leagues before eventually joining a team in these competitions.

Figure n°86: Recruitment league categories of players signed, per league (2005-2017)

	Premier League	Liga	Ligue 1	Serie A	Bundesliga
Same league	30%	32%	39%	32%	28%
Lower national division leagues	28%	27%	26%	24%	33%
Foreign big-5 leagues	20%	15%	13%	10%	12%
Other foreign UEFA leagues	19%	16%	13%	27%	20%
Non UEFA leagues	3%	10%	9%	7%	7%

The analysis of the main recruitment associations of players signed abroad by big-5 league clubs from July 2005 and August 2017 reveals the importance of transfers between the countries hosting the major European do-

9 For more information about the expatriate presence in the five major European leagues, please refer to *CIES Football Observatory Monthly Report 24: The demographic stock exchange, a new tool at the service of football*, [www.football-observatory.com/IMG/sites/mr/mr24/en/](http://www.football-observatory.com/IMG/sites/mr/mr24/en/).

mestic competitions. At the top four positions are indeed England, Spain, France and Italy. Only Germany remains more on the periphery of the big-5 league international transfer circuits.

Altogether, 41% of international signings were carried out from other big-5 league countries. This percentage went up from 36.8% to 43.9% from the first to the second half of the period studied. The table below confirms the greater difficulty faced by Brazilian, Argentinean and Uruguayan teams to transfer players directly to clubs in the big-5. The same holds true for Scottish and Serbian sides.

Figure n°87: main recruitment associations of players signed abroad by clubs in the big-5, per league (2005-2017)

	Number	Evolution*		Number	Evolution*
1. England	518	+148	11. Switzerland	160	+26
2. Spain	496	+122	12. Turkey	144	+62
3. France	455	+75	13. Greece	138	+34
4. Italy	433	+145	14. Russia	119	+11
5. Portugal	296	+76	15. Scotland	115	-9
6. Germany	292	+68	16. Denmark	83	+13
7. The Netherlands	267	+21	17. Uruguay	76	-8
8. Brazil	252	-28	18. Serbia	68	-2
9. Argentina	224	-18	19. Ukraine	62	+20
10. Belgium	182	+76	20. Sweden	61	+9

\* 2011-2017 compared to 2005-2011

## Networks by club

The same approach undertaken at league level is relevant when studying transfer networks at club level. This allows us to compare recruitment policies. The study covers five top-flight clubs from all of the big-5 European leagues: Manchester United, Real Madrid, AS Rome, Bayern Munich and Paris St-Germain. These teams were always present in the top division league of their country during the period analysed.

The best performing clubs generally sign a higher proportion of players abroad than lesser competitive teams. Between July 2005 and Au-

gust 2017, three out of the five clubs studied signed a majority of players from abroad: Real Madrid (73%), Paris St-Germain (58%) and AS Rome (56%). The percentage in the two remaining teams was also close to 50%: Bayern Munich (46%) and Manchester United (45%).

Figure n°88: recruitment league categories of players signed, per club (2005-2017)

	Manchester United	Real Madrid	AS Roma	Bayern München	Paris St-Germain
Same league	40%	24%	27%	43%	36%
Lower national division leagues	15%	4%	16%	11%	6%
Foreign big-5 leagues	20%	43%	33%	32%	40%
Other foreign UEFA leagues	23%	17%	11%	9%	11%
Non UEFA leagues	3%	13%	12%	5%	8%

On an international level, the most competitive teams sign a higher percentage of players from foreign big-5 league clubs. While it raises transfer costs, this strategy aims at limiting sporting risks as a higher percentage of new signings already proved themselves in the most competitive European leagues. This situation also reflects the widening of the financial gap between clubs on different levels, including within the most competitive leagues. This allows dominant clubs to deprive rivals of their best players in a much quicker and easier way than it was already the case in the not so recent past.

The tables of the main associations of international recruitment per club illustrates the strong focus on Europe of top-flight teams studied. Indeed, Brazil is the only non-European country where the five clubs investigated signed at least five players during the 12-year period analysed. Almost 60% of players transferred from abroad were recruited in big-5 league countries. In total, clubs analysed signed players from no more than 30 foreign countries.

Figure n°89: Main associations of international recruitment, per club (2005-2017)

Manchester United		Real Madrid		Paris St-Germain	
Spain	7	England	18	Italy	14
Portugal	6	Germany	10	Spain	8
Germany	5	Brazil*	6	England	7
The Netherlands	5	Italy	6	Brazil*	5
France	5	France	6		
Italy	5	Portugal	6		
AS Roma		FC Bayern München			
England	13	Spain	8		
Spain	12	Italy	4		
France	11				
Brazil*	7				
Germany	5				

\* non-European

## Conclusion

The study of transfer networks in football is particularly useful in understanding the economic geography of the professional game on a global scale. While the proportion of expatriate players in squads increases, our analysis reveals high concentration levels for both exporting countries and recruitment areas. When it comes to sign players abroad, the best performing teams focus on a limited number of territories.

An increasing number of players in general, and from non-European associations more specifically, first move to intermediary countries in order to prove themselves before to eventually being able to attain a club in the big-5 leagues. This process occurs within the framework of transnational migratory chains. Year by year, players are confronted with a higher international mobility from a younger age<sup>10</sup>.

Within this increasingly speculative and fragmented context, many players get lost along the way. Today more than ever, mental strength and

10 For more information on this aspect, see *CIES Football Observatory Monthly Report 20: The international mobility of minors in football*, [www.football-observatory.com/IMG/sites/mr/mr20/en/](http://www.football-observatory.com/IMG/sites/mr/mr20/en/).



cultural adaptability are of key importance to have a successful career path. Beyond financial considerations, clubs and intermediaries should pay more attention to the human factor to limit the waste of talents and best promote them in the ruthless world of professional football.



## How to evaluate a football player's transfer value?

Professional football generates ever-increasing amounts of money. The budget for clubs of the most attractive leagues augments steadily. Likewise, the transfer sums invested to recruit the most in vogue players grow with each year. This chapter presents the approach developed by the CIES Football Observatory to estimate on a scientific basis the “fair” transfer value of professional footballers.

When we first investigated this vast field, we did not think it would be possible to obtain such convincing results. Like many others, we thought that the rationality of the transfer market for players was relatively weak. However, the high explicative power of the statistical models developed indicates that the degree of rationality is important. Though the amounts invested for some transfers remain surprising, most of them follow a predictable logic.

Within a very dynamic context, the greatest difficulty resides in the ability to predict the level of inflation of costs. This difficulty is all the more tricky as inflation does not intervene in a linear manner in time or according to market segments. This is because the inflation that the values predicted on the basis of our algorithm are generally slightly lower than prices actually paid.

### Modelling interest

By speaking with market actors, it has become clear that the status of the recruiting club has a major influence in determining the transfer price. Even before modelling the transfer value, it is thus necessary to ascertain the type of team that is most likely to have an interest for a given player with regard to his characteristics.

In order to do this, we have used a multiple linear regression. The dependent variable is the sporting level of the buying club. The sample comprises about 4,700 paid transfers having taken place between July 2011

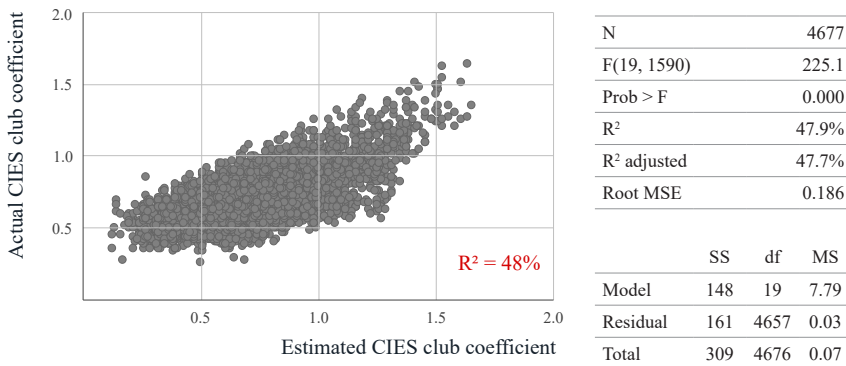
and June 2018. This sample is renewed every six months by taking into account the transactions carried out during the last transfer period.

The sporting level of clubs is calculated on the basis of results obtained in the domestic league, on the level of competition (top division, second, etc.), as well as performances in European competitions of representatives of the association they belong to. For clubs of extra-European countries, a link was established with European associations whose championships were considered as being on a similar level.

The statistical model for estimating the level of the most likely buying club is made up of nineteen variables that refer to the following elements:

- activity in national teams (A or U21) and results;
- activity in clubs (championship or Cups) and results;
- national team results;
- club results;
- goals scored;
- age;
- position;
- league of employment.

Figure n°90: Correlation between the predicted and actual level of the buying club



Only significant variables were retained ( $p < 0.05$ ) so as to improve the solidity of the model and to increase its predictive capabilities. The model thus obtained is very significant as is shown by the Fischer F test ( $p < 0.0000$ ). The level of the projected buying club is strongly correlated

with the level actually observed for the transfers analysed. The value of the coefficient of determination is around 48%. Moreover, the model does not present problems of multicollinearity.

## Modelling values

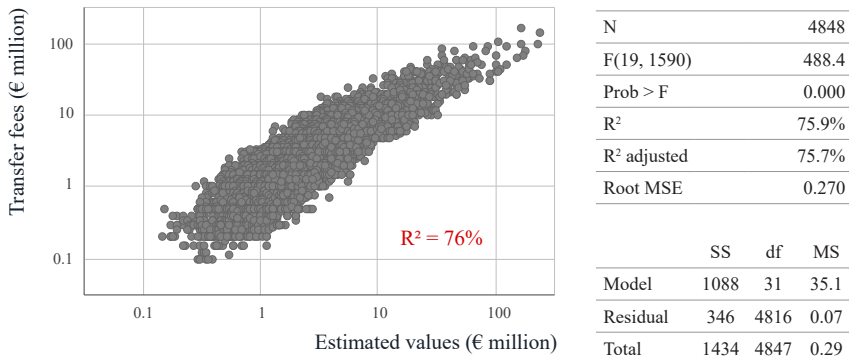
The second step of our approach consists of estimating the transfer value of professional footballers as such. In this case too, we have used a multiple linear regression. The statistical model thus produced is composed of 31 variables referring to the same areas to those used to estimate the level of the buying club. Five additional domains have been taken into consideration:

- contract duration;
- year of transfer;
- book value;
- loan status;
- level of buying club (estimated).

The sample is made up of about 4,800 paying fee transfers having taken place between July 2011 and June 2018. All the variables retained have an error probability of less than 1%. This is reflected in a very high statistical significance and a high level of predictive capability. At big-5 league level, since the first applications in 2013, the correlation between values estimated and fees paid has constantly been above 75%.

The model obtained is again very significant overall as indicated by the Fischer F test ( $p < 0.0000$ ). The estimated values correlate strongly with the actual transfer fees. The adjusted coefficient of determination reaches 76%. Moreover, there are no problems regarding multicollinearity.

Figure n°91: Correlation between predicted and actual transfer values



## Theory in practice

Our methodology allows us to rank players according to their estimated transfer value and. To illustrate this, in January 2018, Neymar was at the head of the table with an estimated value of €213 million<sup>11</sup>. However, his top spot was under increasing threat from younger player such as his teammate Kylian Mbappé (4th with €192 million).

The majority of footballers with the highest transfer value are active internationals, have a long-term contract and are less than 27 years of age. In January 2018, only eight players having already celebrated their 30th birthday were among the 100 most expensive players. This result is explained by the fact that clubs are prepared to pay substantial transfer fees primarily when footballers have many years left in the career to play.

The vast majority of footballers at the top of the table play for competitive teams. Indeed, good results have a positive effect on the value of squad members. Conversely, poor results do not allow clubs to show players under contract in the best light. Good individual performances can only partially compensate collective weaknesses.

11 Regularly updated estimations are available at [www.football-observatory.com/-values-](http://www.football-observatory.com/-values-).

Figure nº92: Highest estimated transfer values for big-5 league players (January 2018)

1. Neymar Júnior PSG (FRA), fw, 25, 2022	213.0	26. Saúl Ñíguez Atlético Madrid (ESP), dm, 23, 2026	100.3
2. Lionel Messi FC Barcelona (ESP), fw, 30, 2021	202.2	27. Bernardo Silva Manchester City (ENG), am, 23, 2022	98.8
3. Harry Kane Tottenham (ENG), fw, 24, 2022	194.7	28. Sergio Agüero Manchester City (ENG), fw, 29, 2019	98.7
4. Kylian Mbappé PSG (FRA), fw, 19, 2022	192.5	29. Christian Eriksen Tottenham (ENG), am, 25, 2020	98.4
5. Paulo Dybala Juventus (ITA), fw, 24, 2022	174.6	30. Alexandre Lacazette Arsenal (ENG), fw, 26, 2022	97.6
6. Dele Alli Tottenham (ENG), am, 21, 2022	171.3	31. Marc-André ter Stegen FC Barcelona (ESP), gk, 25, 2022	96.4
7. Kevin de Bruyne Manchester City (ENG), am, 26, 2021	167.8	32. Ousmane Dembélé FC Barcelona (ESP), am, 20, 2022	96.0
8. Romelu Lukaku Manchester Utd (ENG), fw, 24, 2022	164.8	33. John Stones Manchester City (ENG), cb, 23, 2022	93.7
9. Antoine Griezmann Atlético Madrid (ESP), fw, 26, 2022	150.2	34. Ederson Moraes Manchester City (ENG), gk, 24, 2022	93.5
10. Paul Pogba Manchester Utd (ENG), dm, 24, 2021	147.5	35. Eric Dier Tottenham (ENG), dm, 23, 2021	93.0
11. Leroy Sané Manchester City (ENG), fw, 21, 2021	140.6	36. Edinson Cavani PSG (FRA), fw, 30, 2020	92.5
12. Mohammed Salah Liverpool (ENG), fw, 25, 2022	140.5	37. Dries Mertens Napoli (ITA), fw, 30, 2020	89.8
13. Raheem Sterling Manchester City (ENG), fw, 23, 2020	138.2	38. Koke Resurrección Atlético Madrid (ESP), am, 26, 2024	89.0
14. Luis Suárez FC Barcelona (ESP), fw, 30, 2021	128.7	39. Yannick Carrasco Atlético Madrid (ESP), am, 24, 2022	88.4
15. Marcus Rashford Manchester Utd (ENG), fw, 20, 2020	126.8	40. N'Golo Kanté Chelsea (ENG), dm, 26, 2021	87.4
16. Philippe Coutinho Liverpool (ENG), am, 25, 2022	123.0	41. Timo Werner RB Leipzig (GER), fw, 21, 2020	87.4
17. Gabriel Jesus Manchester City (ENG), fw, 20, 2021	122.6	42. Kyle Walker Manchester City (ENG), fb, 27, 2022	87.1
18. Eden Hazard Chelsea (ENG), am, 27, 2020	119.6	43. Tiemoué Bakayoko Chelsea (ENG), dm, 23, 2022	86.3
19. Gonzalo Higuaín Juventus (ITA), fw, 30, 2021	113.0	44. Georginio Wijnaldum Liverpool (ENG), dm, 27, 2021	85.6
20. Álvaro Morata Chelsea (ENG), fw, 25, 2022	108.0	45. Isco Alarcón Real Madrid (ESP), am, 25, 2022	85.4
21. Robert Lewandowski Bayern München (GER), fw, 29, 2021	107.5	46. Ciro Immobile Lazio (ITA), fw, 27, 2022	85.2
22. Mauro Icardi Internazionale (ITA), fw, 24, 2021	104.5	47. Nicolás Otamendi Manchester City (ENG), cb, 29, 2020	84.8
23. Roberto Firmino Liverpool (ENG), fw, 26, 2020	102.9	48. Anthony Martial Manchester Utd (ENG), fw, 22, 2019	82.0
24. Lorenzo Insigne Napoli (ITA), fw, 26, 2022	102.0	49. Cristiano Ronaldo Real Madrid (ESP), fw, 32, 2021	80.4
25. Samuel Umtiti FC Barcelona (ESP), cb, 24, 2021	101.5	50. Fabinho Tavares Monaco (FRA), dm, 24, 2021	79.3

Most of the footballers with the highest transfer values also play in attacking positions. This player profile is indeed traditionally the one for which clubs are prepared to pay the highest fees. This result would lead one to believe that offensive talents are rarer and thus more sought after. Another possible explanation is that footballers playing in attack are simply more visible and admired by spectators than their colleagues playing in a more defensive role, which could lead to clubs to push up the bidding price to ensure their services.

An additional interesting observation is the over-representation of English Premier League players among those with the highest transfer values: 13 in the top 20 ranking, 27 in the top 50 and 47 in the top 100 of January 2018. This result is a reflection of the financial reach of English clubs that allows them to attract numerous talents from abroad each year. Moreover, transfer costs between Premier League teams are generally higher than between clubs from other championships. All things being equal, the value of a Premier League player is thus higher than that of a footballer playing in other competitions.

## Conclusion

The pioneering approach that we have developed in the field of the scientific evaluation of transfer values has a wide range of uses. Market actors have already availed of it for the following aspects.

### *Transfer negotiations*

In a highly speculative context where fake information is often leaked by the various media involved, it is very useful to base oneself on an objective value with which to define an opening price. The projection of future values can also be beneficial, notably when it comes to the negotiation of add-ons.

### *Contractual negotiations*

Thanks to the algorithm developed, it is possible to envisage likely scenarios on the future transfer values of players. This approach is particularly useful in defining the level of salary offered to a player without involving excessive risk or in determining the optimum length of a new contract.



*Transfer litigation*

Our algorithm is highly suited to situations of litigation over transfer amounts. For example, in fixing an indemnity fee in case of a unilateral breach of contract on a player's part or when former clubs have a right to a percentage fee for players exchanged.

*Credit negotiations*

The objective and independent estimate of transfer values also proves useful when negotiating credits. Indeed, the transfer value of the squad constitutes a reliable indicator of the ability of a club to honour their engagements. This is not necessarily the case when credit worthiness is based on players' book value.

*Taking out insurance*

With the increase in transfer values, it is becoming more and more worthwhile to take out insurance policies covering the possibility of the loss of value of a player, notably through injury. Thanks to our algorithm, we can monitor precisely the current and future values of players under contract.

Aside from any applications by market actors, our approach and independence allows us to bring more transparency and objectivity to transfer operations. Indeed, up until the present, no organisation was capable of judging the validity of transactions on a robust and credible scientific basis. The growing recognition by actors in the game, the media and the public at large confirms the merits and interest of our approach.





