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Pan European analysis on the fluidity of football matches

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1. Introduction

This report analyses different indicators regarding the fluidity in matches played since the 1st of July 2019 in a total of 37 European competitions: 30 top divisions of UEFA member associations, the five second divisions of the countries hosting the big-5 leagues, as well as the Champions League and the Europa League. The data used are sourced from our partners InStat.

The study first looks at the percentage of effective playing time, i.e. the time during which the ball was in play, in each of the 37 competitions taken into account, and then analyses in more depth the underlying reasons for stoppage time: the interruptions due to the ball going out of play, as well as resulting from fouls committed by players.

Figure 1: study sample

AUT	Bundesliga	309 matches
BEL	Pro League	491 matches
BLR	Premier League	360 matches
BUL	First League	347 matches
CRO	1. HNL	286 matches
CZE	Fortuna League	459 matches
DEN	Superliga	348 matches
ENG	Premier League	642 matches
ENG/2	Championship	954 matches
ESP	Primera Division	628 matches
ESP/2	Segunda Division	764 matches
FIN	Veikkausliiga	220 matches
FRA	Ligue 1	557 matches
FRA/2	Ligue 2	559 matches
GER	Bundesliga	512 matches
GER/2	2. Bundesliga	513 matches
GRE	Super League	403 matches
HUN	NB I	341 matches
ISR	Ligat ha'Al	396 matches
ITA	Serie A	623 matches
ITA/2	Serie B	644 matches
NED	Eredivisie	446 matches
NOR	Eliteserien	379 matches
POL	Ekstraklasa	447 matches
POR	Primeira Liga	495 matches
ROM	Liga I	459 matches
RUS	Premier League	394 matches
SCO	Premier League	363 matches
SRB	Super Liga	466 matches
SUI	Super League	290 matches
SVK	Fortuna liga	289 matches
SVN	1. SNL	296 matches
SWE	Allsvenskan	373 matches
TUR	Süper Lig	581 matches
UKR	Premier League	295 matches
UEFA	Champions League	348 matches
UEFA	Europa League	778 matches

2. Effective playing time

On average, the effective playing time recorded in the 37 competitions analysed was 61.3%. The highest values were observed in Israel (66.9%), the Netherlands (65.6%) and Russia (65.4%). The effective playing time in the Champions League (64.7%) and the Europa League (62.5%) is also relatively great. The Spanish Liga (59.3%) is the only big-5 league competition with a value below the European average.

Matches in the second divisions of countries hosting the big-5 leagues, as well as in the Czech, Greek, Portuguese and Scottish top divisions are quite frequently interrupted. With an effective playing time of just 55.9%, the Spanish second division stands out as the competition among the 37 surveyed where the matches are the least fluid.

Figure 2: % of effective playing time

ISR	Ligat ha'Al	66.9%
NED	Eredivisie	65.6%
RUS	Premier League	65.4%
UEFA	Champions League	64.7%
SWE	Allsvenskan	64.7%
GER	Bundesliga	63.9%
BLR	Premier League	63.6%
ITA	Serie A	63.2%
BEL	Pro League	63.0%
FIN	Veikkausliiga	63.0%
SVN	1. SNL	62.7%
UEFA	Europa League	62.5%
FRA	Ligue 1	62.4%
DEN	Superliga	62.4%
NOR	Eliteserien	62.1%
CRO	1. HNL	62.0%
ENG	Premier League	62.0%
GER/2	2. Bundesliga	61.4%
HUN	NB I	61.4%
POL	Ekstraklasa	61.1%
SVK	Fortuna liga	61.0%
TUR	Süper Lig	60.7%
SUI	Super League	60.7%
UKR	Premier League	60.7%
SRB	Super Liga	60.0%
FRA/2	Ligue 2	59.8%
BUL	First League	59.6%
ROM	Liga I	59.4%
ESP	Primera Division	59.3%
ITA/2	Serie B	59.3%
AUT	Bundesliga	59.3%
SCO	Premier League	58.3%
POR	Primeira Liga	58.3%
GRE	Super League	57.5%
ENG/2	Championship	57.2%
CZE	Fortuna League	56.8%
ESP/2	Segunda Division	55.9%

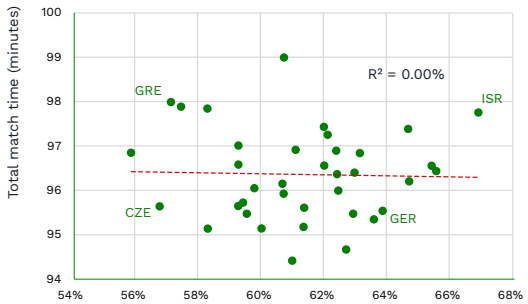
On average, a match of the competitions analysed lasts 96'14". Referees in the Turkish top division add the most extra time: nine minutes on average. Conversely, in Slovakia, the extra time added by referees is only 4'25". At big-5 league level, the values vary between 7'26" in the Premier League and 6'22" in Ligue 1. The extra time for the Champions League (6'12" on average) and the Europa League (6'00") are lower compared to the major championships.

Figure 3: total match time

TUR	Süper Lig	01:39:00	########
ENG/2	Championship	01:37:59	#######
GRE	Super League	01:37:53	#######
POR	Primeira Liga	01:37:51	#######
ISR	Ligat ha'Al	01:37:45	#######
ENG	Premier League	01:37:26	#######
SWE	Allsvenskan	01:37:23	#######
NOR	Eliteserien	01:37:15	#######
ESP	Primera Division	01:37:00	#######
POL	Ekstraklasa	01:36:55	######
DEN	Superliga	01:36:54	######
ESP/2	Segunda Division	01:36:51	######
ITA	Serie A	01:36:50	######
ITA/2	Serie B	01:36:35	######
CRO	1. HNL	01:36:33	######
RUS	Premier League	01:36:33	######
NED	Eredivisie	01:36:26	######
BEL	Pro League	01:36:24	######
FRA	Ligue 1	01:36:22	######
UEFA	Champions League	01:36:12	######
UKR	Premier League	01:36:09	######
FRA/2	Ligue 2	01:36:03	######
UEFA	Europa League	01:36:00	#####
SUI	Super League	01:35:55	#####
ROM	Liga I	01:35:43	#####
AUT	Bundesliga	01:35:39	#####
CZE	Fortuna League	01:35:38	#####
GER/2	2. Bundesliga	01:35:36	#####
GER	Bundesliga	01:35:32	#####
BUL	First League	01:35:28	#####
FIN	Veikkausliiga	01:35:28	#####
BLR	Premier League	01:35:21	#####
HUN	NB I	01:35:10	#####
SRB	Super Liga	01:35:08	#####
SCO	Premier League	01:35:08	#####
SVN	1. SNL	01:34:40	####
SVK	Fortuna liga	01:34:25	####

Contrary to expectations, there is no correlation between the percentage of effective playing time and the total length of matches. This result shows that level of fluidity in the game is not taken into account by referees when it comes to adding extra time. This could therefore encourage players of teams in difficulty, or having gained an advantage, to disrupt the rhythm of the game, knowing that the stoppage time will not have much influence on the amount of minutes added.

Figure 4: % of effective playing time and total match time



3. Ball out of play

The main reason for the game stopping is that the ball goes out of play. On average, for the 37 competitions analysed, this situation represents a little over a fifth of the total match time. In this case also, the differences between competitions are quite marked, with values varying between almost 25% in the English top division or the Scottish Premiership and less than 18% in the Israeli Ligat ha'Al or the Italian Serie A.

In the case of the ball going out of play too, the Spanish Liga (20.6%) is the only big-5 league where the percentage of stoppage time is above the average measured on a European level. The value recorded for the Champions League is, however, the fourth lowest (18.3%), while that observed in the Europa League is slightly higher (20.1%).

Figure 5: % of match time with the ball out of play

ENG/2	Championship	24.7%
SCO	Premier League	24.6%
CZE	Fortuna League	22.6%
AUT	Bundesliga	22.1%
SUI	Super League	21.9%
ESP/2	Segunda Division	21.7%
NOR	Eliteserien	21.7%
ENG	Premier League	21.6%
DEN	Superliga	21.2%
GER/2	2. Bundesliga	21.0%
POL	Ekstraklasa	20.7%
ESP	Primera Division	20.6%
FIN	Veikkausliiga	20.4%
POR	Primeira Liga	20.4%
BUL	First League	20.4%
UEFA	Europa League	20.1%
SVK	Fortuna liga	20.1%
HUN	NB I	20.1%
ROM	Liga I	20.1%
CRO	1. HNL	20.0%
ITA/2	Serie B	20.0%
SRB	Super Liga	20.0%
FRA/2	Ligue 2	20.0%
BEL	Pro League	19.9%
SVN	1. SNL	19.7%
GER	Bundesliga	19.6%
GRE	Super League	19.5%
BLR	Premier League	19.4%
NED	Eredivisie	19.4%
TUR	Süper Lig	19.3%
UKR	Premier League	19.0%
SWE	Allsvenskan	18.8%
FRA	Ligue 1	18.8%
UEFA	Champions League	18.2%
RUS	Premier League	17.7%
ITA	Serie A	17.6%
ISR	Ligat ha'Al	17.5%

A statistically significant correlation was measured between the proportion of stoppage time due to the ball going out of play and the average length of passes made by teams from the 37 competitions surveyed. Logically, the more the latter have a short passing game, the less likely for the ball to go out of play.

The analysis of residuals is particularly interesting here. This allows us showing that, relative to the average length of passes, the time lost is particularly high in England, both in the Premier League and the Championship, and in Italy. This result reflects a cultural dimension according to which players from clubs in these countries tend to take their time before putting the ball back into play.

A positive correlation also exists between the proportion of stoppages due to the ball going out of play and the percentage of successful passes made by teams. In this case also, the analysis of residuals highlights, on one hand, the championships where players are not inclined to quickly put the ball back into play (England, Scotland and Italy in particular), and on the other, leagues where footballers have the opposite attitude (Austria, Russia, Israel, Belarus, Serbia).

Figure 6: % of match time with the ball out of play and average length of passes

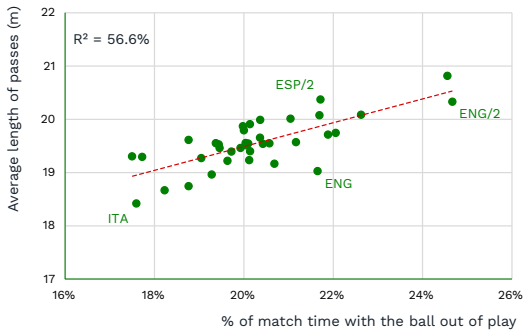
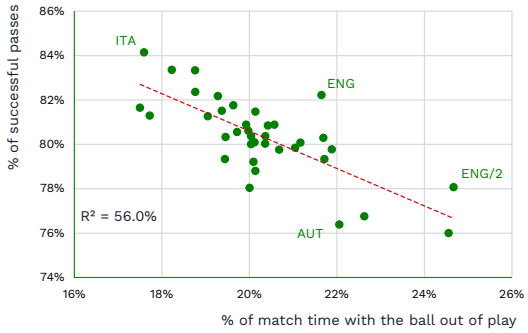


Figure 7: % of match time with the ball out of play and % of successful passes



4. Stoppage time due to fouls

Fouls constitute the second most important reason for interrupting the game. On average, they represent 14.8% of the total match time in the 37 competitions covered in the study. The differences between championships are remarkable. Indeed, the values vary between almost one-fifth in the Greek Super League (19.0%) and slightly more than one-tenth in the Dutch Eredivisie (11.5%).

The championships of North and Western Europe are among those where time lost due to fouls is the lowest, while the championships of the South and East of the continent find themselves in the opposite situation. The Champions League (13.6%) and the Europa League (13.9%) are below the European average, as well as the English Premier League (12.5%) and the German Bundesliga (13.0%).

Figure 8: % of stoppage time due to fouls

GRE	Super League	19.0%
ESP/2	Segunda Division	18.3%
POR	Primeira Liga	17.4%
ROM	Liga I	16.8%
CZE	Fortuna League	16.8%
ITA/2	Serie B	16.7%
BUL	First League	16.6%
UKR	Premier League	16.4%
SRB	Super Liga	16.3%
FRA/2	Ligue 2	16.3%
ESP	Primera Division	16.2%
TUR	Süper Lig	15.9%
SVK	Fortuna liga	15.6%
ITA	Serie A	15.4%
HUN	NB I	15.2%
POL	Ekstraklasa	15.1%
AUT	Bundesliga	15.1%
FRA	Ligue 1	14.8%
CRO	1. HNL	14.4%
ENG/2	Championship	14.3%
GER/2	2. Bundesliga	14.1%
SVN	1. SNL	14.1%
BLR	Premier League	13.9%
UEFA	Europa League	13.9%
SUI	Super League	13.8%
BEL	Pro League	13.8%
UEFA	Champions League	13.6%
SCO	Premier League	13.4%
RUS	Premier League	13.4%
FIN	Veikkausliiga	13.1%
GER	Bundesliga	13.0%
SWE	Allsvenskan	12.8%
DEN	Superliga	12.7%
ENG	Premier League	12.5%
NOR	Eliteserien	12.5%
ISR	Ligat ha'Al	12.2%
NED	Eredivisie	11.5%

Logically, the time lost and the number of fouls committed are positively correlated (r2=68%). We find thus the same geographical differences as those highlighted above. The average number of fouls per match for all the competitions analysed is around 28, with a maximum in the Serbian top division (35.6) and a minimum in the English Premier League (21.5). Differences in the refereeing style also explain these gaps.

Figure 9: average number of fouls per match

SRB	Super Liga	35.6	xxxxxxxxxx
GRE	Super League	33.8	xxxxxxxxx
BUL	First League	32.1	xxxxxxxxx
POR	Primeira Liga	31.7	xxxxxxxx
CZE	Fortuna League	31.6	xxxxxxxx
ITA/2	Serie B	31.5	xxxxxxxx
UKR	Premier League	31.4	xxxxxxxx
SVK	Fortuna liga	31.1	xxxxxxxx
BLR	Premier League	31.1	xxxxxxxx
ROM	Liga I	31.1	xxxxxxxx
ESP/2	Segunda Division	30.8	xxxxxxxx
HUN	NB I	30.6	xxxxxxxx
POL	Ekstraklasa	30.3	xxxxxxxx
AUT	Bundesliga	30.0	xxxxxxxx
FRA/2	Ligue 2	29.1	xxxxxxxx
SVN	1. SNL	28.0	xxxxxxx
ITA	Serie A	27.6	xxxxxxx
CRO	1. HNL	27.3	xxxxxxx
SWE	Allsvenskan	27.1	xxxxxxx
ESP	Primera Division	27.1	xxxxxxx
TUR	Süper Lig	26.9	xxxxxxx
BEL	Pro League	26.6	xxxxxxx
UEFA	Europa League	26.5	xxxxxxx
GER/2	2. Bundesliga	26.3	xxxxxxx
RUS	Premier League	26.2	xxxxxxx
FRA	Ligue 1	25.8	xxxxxx
SUI	Super League	25.7	xxxxxx
ISR	Ligat ha'Al	25.5	xxxxxx
UEFA	Champions League	25.2	xxxxxx
SCO	Premier League	24.9	xxxxxx
FIN	Veikkausliiga	24.9	xxxxxx
ENG/2	Championship	24.7	xxxxxx
GER	Bundesliga	24.6	xxxxxx
NOR	Eliteserien	24.4	xxxxxx
DEN	Superliga	23.7	xxxxxx
NED	Eredivisie	22.1	xxxxx
ENG	Premier League	21.5	xxxxx

On average, a foul results in a stoppage time of 30.6 seconds. In this case too, the differences between competitions are important. At one extreme, the restart of the play after a foul is particularly slow in Turkey (35.1"), in Spain, as well as in England, while it is particularly rapid in the top divisions from Belarus (25.5"), Serbia, Sweden and Israel.

Figure 10: seconds lost per foul

TUR	Süper Lig	35.1
ESP	Primera Division	34.9
ESP/2	Segunda Division	34.7
ENG/2	Championship	33.9
ENG	Premier League	33.9
FRA	Ligue 1	33.3
GRE	Super League	33.1
ITA	Serie A	32.4
FRA/2	Ligue 2	32.3
POR	Primeira Liga	32.2
DEN	Superliga	31.2
ROM	Liga I	31.1
UEFA	Champions League	31.0
SUI	Super League	31.0
GER/2	2. Bundesliga	30.8
ITA/2	Serie B	30.7
SCO	Premier League	30.7
CZE	Fortuna League	30.5
CRO	1. HNL	30.5
NED	Eredivisie	30.2
FIN	Veikkausliiga	30.2
GER	Bundesliga	30.2
UEFA	Europa League	30.2
UKR	Premier League	30.1
BEL	Pro League	29.9
NOR	Eliteserien	29.8
BUL	First League	29.7
RUS	Premier League	29.5
POL	Ekstraklasa	29.0
AUT	Bundesliga	28.8
SVN	1. SNL	28.5
SVK	Fortuna liga	28.4
HUN	NB I	28.3
ISR	Ligat ha'Al	28.0
SWE	Allsvenskan	27.7
SRB	Super Liga	26.2
BLR	Premier League	25.5

5. Conclusion

A first very interesting result of this study is the absence of correlation between the effective playing time and the total length of matches. This indicates that the fluidity of the game only has a small influence on the choice of referees to add extra time. The discrepancies observed between countries are therefore more linked to national traditions than to an actual consideration of the rhythm set by players during matches.

For more uniformity, as in other sports, the question of the transition to effective playing time is relevant also in football. However, with respect to the current context where the interruptions to the game are only partially compensated, such an innovation would risk giving a further advantage to dominant teams, which also raises issues insofar as competitive balance is already a problem in many competitions.

The report also reveals that the fluidity of the game depends on geographical and cultural logics. Thus, for example, the number of fouls and time lost due to them tends to be higher in Southern and Eastern European leagues than in championships from the North and West of the continent. England is a stand-alone case as the number of fouls is particularly low, but the number of seconds lost per foul is rather high.

The Turkish Süper Lig stands out as a competition in which the time taken to restart play after a foul is the longest: 35.1" of stoppage time on average as opposed to an average of 30.6" for the 37 competitions studied as a whole. The lowest value recorded was in the Belarus top division (25.5"), while the average number of fouls varies between 35.6 in the Serbian Super League and 21.4 in the English Premier League.

The proportion of stoppage time due to fouls in comparison to the total length of matches is also very different according to the competition. It is almost one-fifth in the Greek Super League (19.0%) and just over one-tenth in the Dutch Eredivisie (11.5%). The values regarding the effective playing time oscillate, on the other hand, between 66.9% in the Israeli Ligat ha'Al and 55.9% in the Spanish Segunda División.