

Supplementary Information

For

“Unlocking Dynamics of Goal-scoring: The Showdown Between Direct and Indirect
Transition Goals Across Football Leagues”

By

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1. Supplementary Information:

Supplementary information with the results obtained in each of the observed leagues is presented below:

Table S1: Distribution of the types of goals per league

		Games Observed with Goals	Total Goals	Goals by NT + SP	Goals by OT + POS OUT	% Of goals By OT + POS OUT
Top Leagues	Germany	148	492	211	281	57,11 %
	Italy	177	540	257	283	52,41 %
	Spain	173	494	248	246	49,80 %
Totals		262	827	482	345	
Marginal Leagues	Netherland	132	483	275	208	43,06 %
	Portugal	139	368	201	167	45,38 %
	Russia	110	293	174	119	40,61 %
Totals		381	1144	650	494	
Emerging Leagues	UAE	86	275	165	110	40,00 %
	Qatar	63	211	116	95	45,02 %
	Saudi	113	341	201	140	41,06 %
Totals		498	1526	716	810	
Totals		702	3497	1848	1649	

Note: NT + SP – Goals where there is no offensive transition reported (direct or Positive outcome). Goals from Non-transitions and Set Pieces. OT + POS OUT – Goals obtained by Offensive transition and Positive Outcome.

Table S2. Distribution of relative frequencies from the studied variables across the nine leagues classified.

Performance indicators	Top Leagues % (n=810)			Marginal Leagues % (n=494)			Emerging Leagues % (n=345)		
	Germany (n = 281)	Italy (n = 283)	Spain (n = 246)	Netherland (n = 208)	Portugal (n = 167)	Russia (n = 119)	UAE (n = 110)	Qatar (n = 95)	Saudi (n = 140)
Goals by Transition									
OT	81,85 (n= 230)	77,03 (n= 218)	79,27 (n= 195)	82,21 (n= 171)	74,85 (n= 125)	84,87 (n= 101)	75,45 (n= 83)	75,79 (n= 72)	78,57 (n= 110)
POS OUT	18,15 (n=51)	22,97 (n=65)	20,73 (n=51)	17,79 (n=37)	25,15 (n=42)	15,13 (n=18)	24,55 (n=27)	24,21 (n=23)	21,43 (n=30)
Start Zone									
Z1	3,56 (n= 10)	1,77 (n= 5)	2,44 (n= 6)	4,81 (n= 10)	4,79 (n= 8)	5,04 (n= 6)	3,64 (n= 4)	3,16 (n= 3)	3,57 (n= 5)
Z2	21,35 (n= 60)	27,56 (n= 78)	19,92 (n= 49)	23,08 (n= 48)	20,36 (n= 34)	28,57 (n= 34)	20,00 (n= 22)	33,68 (n= 32)	23,57 (n= 33)
Z3	2,49 (n= 7)	3,53 (n= 10)	4,47 (n= 11)	3,37 (n= 7)	2,40 (n= 4)	0,84 (n= 1)	2,73 (n= 3)	2,11 (n= 2)	4,29 (n= 6)
Z4	10,32 (n= 29)	5,30 (n= 15)	6,10 (n= 15)	11,06 (n= 23)	6,59 (n= 11)	9,24 (n= 11)	8,18 (n= 9)	11,58 (n= 11)	5,71 (n= 8)
Z5	17,08 (n= 48)	14,49 (n= 41)	17,48 (n= 43)	16,83 (n= 35)	14,37 (n= 24)	17,65 (n= 21)	21,82 (n= 24)	14,74 (n= 14)	17,14 (n= 24)
Z6	9,25 (n= 26)	7,77 (n= 22)	3,66 (n= 9)	5,77 (n= 12)	7,78 (n= 13)	10,92 (n= 13)	8,18 (n= 9)	7,37 (n= 7)	6,43 (n= 9)
Z7	6,41 (n= 18)	4,95 (n= 14)	8,94 (n= 22)	8,17 (n= 17)	5,99 (n= 10)	2,52 (n= 3)	3,64 (n= 4)	2,11 (n= 2)	8,57 (n= 12)
Z8	14,23 (n= 40)	14,84 (n= 42)	20,33 (n= 50)	14,42 (n= 30)	19,16 (n= 32)	16,81 (n= 20)	13,64 (n= 15)	8,42 (n= 8)	12,14 (n= 17)
Z9	5,69 (n= 16)	4,95 (n= 14)	6,10 (n= 15)	4,81 (n= 10)	10,18 (n= 17)	5,04 (n= 6)	7,27 (n= 8)	8,42 (n= 8)	6,43 (n= 9)
Z10	1,42 (n= 4)	3,18 (n= 9)	2,44 (n= 6)	0,96 (n= 2)	3,59 (n= 6)	0,00 (n= 0)	2,73 (n= 3)	4,21 (n= 4)	2,14 (n= 3)
Z11	6,41 (n= 18)	9,54 (n= 27)	7,32 (n= 18)	10,58 (n= 22)	6,28 (n= 6)	2,52 (n= 3)	7,27 (n= 8)	3,16 (n= 3)	8,57 (n= 12)
Z12	1,78 (n= 5)	2,12 (n= 6)	0,81 (n= 2)	0,96 (n= 2)	1,20 (n= 2)	0,84 (n= 1)	0,91 (n= 1)	1,05 (n= 1)	1,43 (n= 2)

Zone of 1st action									
Short	38,04 (n= 107)	40,28 (n= 114)	47,15 (n= 116)	39,42 (n= 82)	38,32 (n= 64)	47,06 (n= 56)	37,27 (n= 41)	41,05 (n= 39)	38,57 (n= 54)
Medium	54,80 (n= 154)	53,71 (n= 152)	45,53 (n= 112)	49,52 (n= 103)	56,89 (n= 95)	42,86 (n= 51)	50,91 (n= 56)	53,68 (n= 51)	52,14 (n= 73)
Long	7,12 (n= 20)	6,01 (n= 17)	7,32 (n= 18)	11,06 (n= 23)	4,79 (n= 8)	10,08 (n= 12)	11,82 (n= 13)	5,26 (n= 5)	9,29 (n= 13)
Nr of Passes									
0	5,34 (n= 15)	7,07 (n= 20)	6,10 (n= 15)	9,13 (n= 19)	7,19 (n= 12)	5,04 (n= 6)	5,45 (n= 6)	3,16 (n= 3)	2,86 (n= 4)
1	17,08 (n= 48)	14,84 (n= 42)	18,29 (n= 45)	17,31 (n= 36)	18,56 (n= 31)	14,29 (n= 17)	16,36 (n= 18)	14,74 (n= 14)	20,71 (n= 29)
2	23,13 (n= 65)	21,55 (n= 61)	16,26 (n= 40)	24,04 (n= 50)	26,35 (n= 44)	22,69 (n= 27)	27,27 (n= 30)	25,26 (n= 24)	26,43 (n= 37)
3	21,35 (n= 60)	20,49 (n= 58)	22,36 (n= 55)	23,08 (n= 48)	19,16 (n= 32)	21,01 (n= 25)	20,00 (n= 22)	32,63 (n= 31)	27,86 (n= 39)
4	19,92 (n= 56)	15,55 (n= 44)	17,48 (n= 43)	15,86 (n= 33)	15,57 (n= 26)	21,85 (n= 26)	17,27 (n= 19)	14,73 (n= 14)	12,86 (n= 18)
5	7,11 (n= 20)	10,25 (n= 29)	8,94 (n= 22)	4,33 (n= 9)	5,99 (n= 10)	6,72 (n= 8)	8,18 (n= 9)	6,31 (n= 6)	5,71 (n= 8)
6	2,49 (n= 7)	6,01 (n= 17)	4,07 (n= 10)	2,40 (n= 5)	2,99 (n= 5)	3,36 (n= 4)	0,91 (n= 1)	3,16 (n= 3)	2,14 (n= 3)
7	2,14 (n= 6)	2,12 (n= 6)	2,44 (n= 6)	1,92 (n= 4)	1,20 (n= 2)	3,36 (n= 4)	3,64 (n= 4)	0,00 (n= 0)	0,00 (n= 0)
8	0,36 (n= 1)	0,71 (n= 2)	2,85 (n= 7)	1,44 (n= 3)	0,60 (n= 1)	0,29 (n= 0)	0,91 (n= 1)	0,00 (n= 0)	0,00 (n= 0)
9	0,00 (n= 0)	0,71 (n= 2)	0,29 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,84 (n= 1)	0,00 (n= 0)	0,25 (n= 0)	0,71 (n= 1)
10	0,36 (n= 1)	0,35 (n= 1)	0,29 (n= 0)	0,48 (n= 1)	0,00 (n= 0)	0,84 (n= 1)	0,00 (n= 0)	0,25 (n= 0)	0,71 (n= 1)
11	0,71 (n= 2)	0,35 (n= 1)	0,00 (n= 0)	0,37 (n= 0)	0,60 (n= 1)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)
12	0,00 (n= 0)	0,00 (n= 0)	0,41 (n= 1)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)
Match Status									
Home	49,11 (n= 138)	53,71 (n= 152)	55,69 (n= 137)	55,29 (n= 115)	52,69 (n= 88)	56,30 (n= 67)	50,91 (n= 56)	44,21 (n= 42)	60,00 (n= 84)
Away	50,88 (n= 143)	46,29 (n= 131)	44,31 (n= 109)	44,71 (n= 93)	47,31 (n= 79)	43,70 (n= 52)	49,01 (n= 54)	55,79 (n= 53)	40,00 (n= 56)
POS OUT									
Corner Kick	41,18 (n= 21)	29,23 (n= 19)	37,25 (n= 19)	27,03 (n= 10)	28,57 (n= 12)	33,33 (n= 6)	33,33 (n= 9)	34,78 (n= 8)	26,67 (n= 8)
Goal Kick	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)
Throw in	7,84 (n= 4)	1,54 (n= 1)	0,00 (n= 0)	8,11 (n= 3)	2,38 (n= 1)	5,56 (n= 1)	3,70 (n= 1)	4,35 (n= 1)	0,00 (n= 0)
Free Kick	15,69 (n= 8)	26,15 (n= 17)	31,37 (n= 16)	21,62 (n= 8)	28,57 (n= 12)	27,78 (n= 5)	18,52 (n= 5)	30,43 (n= 7)	33,33 (n= 10)
Penalty Kick	35,29 (n= 18)	43,08 (n= 28)	31,37 (n= 16)	43,24 (n= 16)	40,47 (n= 17)	33,33 (n= 6)	44,44 (n= 12)	30,43 (n= 7)	40,00 (n= 12)
Goal by transition Nr									
1	28,47 (n= 80)	33,92 (n= 96)	34,55 (n= 85)	29,33 (n= 61)	37,72 (n= 63)	34,45 (n= 41)	20,91 (n= 23)	33,68 (n= 32)	33,57 (n= 47)
2	28,83 (n= 81)	26,50 (n= 75)	24,39 (n= 60)	20,19 (n= 42)	29,34 (n= 49)	31,93 (n= 38)	22,73 (n= 25)	24,21 (n= 23)	22,86 (n= 32)
3	21,35 (n= 60)	19,43 (n= 55)	20,33 (n= 50)	21,15 (n= 44)	14,97 (n= 25)	18,49 (n= 22)	24,55 (n= 27)	18,95 (n= 18)	20,00 (n= 28)
4	13,17 (n= 37)	10,25 (n= 29)	10,57 (n= 26)	15,38 (n= 32)	11,98 (n= 20)	7,56 (n= 9)	21,82 (n= 24)	13,68 (n= 13)	13,57 (n= 19)
5	5,34 (n= 15)	5,30 (n= 15)	5,28 (n= 13)	10,10 (n= 21)	3,59 (n= 6)	5,04 (n= 6)	6,36 (n= 7)	4,21 (n= 4)	5,71 (n= 8)
6	2,49 (n= 7)	2,83 (n= 8)	3,25 (n= 8)	3,37 (n= 7)	2,40 (n= 4)	1,68 (n= 2)	0,90 (n= 1)	4,21 (n= 4)	2,14 (n= 3)
7	0,00 (n= 0)	1,77 (n= 5)	1,22 (n= 3)	0,48 (n= 1)	0,00 (n= 0)	0,84 (n= 1)	1,82 (n= 2)	1,05 (n= 1)	2,14 (n= 3)
8	0,04 (n= 1)	0,00 (n= 0)	0,41 (n= 1)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,90 (n= 1)	0,00 (n= 0)	0,00 (n= 0)
1st Action									
Pass	76,16 (n= 214)	74,21 (n= 210)	76,83 (n= 189)	66,82 (n= 139)	68,26 (n= 114)	71,43 (n= 85)	74,55 (n= 82)	75,79 (n= 72)	78,57 (n= 110)

Drive	23,84 (n= 67)	25,09 (n= 71)	23,17 (n= 57)	33,17 (n= 69)	31,74 (n= 53)	28,57 (n= 34)	25,45 (n= 28)	24,21 (n= 23)	21,43 (n= 30)
Nr players involved									
1	5,69 (n= 16)	6,00 (n= 17)	6,10 (n= 15)	8,65 (n= 18)	8,98 (n= 15)	4,20 (n= 5)	5,45 (n= 6)	3,16 (n= 3)	3,57 (n= 5)
2	17,08 (n= 48)	15,90 (n= 45)	17,07 (n= 42)	18,27 (n= 38)	22,16 (n= 37)	14,29 (n= 17)	20,91 (n= 23)	15,79 (n= 15)	21,43 (n= 30)
3	27,76 (n= 78)	26,86 (n= 76)	23,17 (n= 57)	30,77 (n= 64)	32,34 (n= 54)	27,73 (n= 33)	30,91 (n= 34)	32,63 (n= 31)	34,29 (n= 48)
4	25,98 (n= 73)	22,97 (n= 65)	26,42 (n= 65)	26,44 (n= 55)	17,96 (n= 30)	22,69 (n= 27)	23,64 (n= 26)	29,47 (n= 28)	25,00 (n= 35)
5	15,66 (n= 44)	16,25 (n= 46)	18,70 (n= 46)	9,62 (n= 20)	11,98 (n= 20)	19,33 (n= 23)	11,82 (n= 13)	12,63 (n= 12)	12,14 (n= 17)
6	3,91 (n= 11)	8,83 (n= 25)	10,16 (n= 25)	4,33 (n= 9)	2,99 (n= 5)	5,88 (n= 7)	2,73 (n= 3)	5,26 (n= 5)	2,86 (n= 4)
7	2,14 (n= 6)	1,06 (n= 3)	1,22 (n= 3)	0,96 (n= 2)	2,40 (n= 4)	4,20 (n= 5)	2,73 (n= 3)	1,05 (n= 1)	0,00 (n= 0)
8	0,71 (n= 2)	1,41 (n= 4)	1,62 (n= 4)	0,96 (n= 2)	0,60 (n= 1)	0,84 (n= 1)	1,82 (n= 2)	0,00 (n= 0)	0,71 (n= 1)
9	0,71 (n= 2)	0,71 (n= 2)	0,81 (n= 2)	0,00 (n= 0)	0,00 (n= 0)	0,84 (n= 1)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)
10	0,36 (n= 1)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,60 (n= 1)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)	0,00 (n= 0)

Table S3. Binomial logistic regression of the performance indicators that were associated with Goals by Direct Transition (OT) vs Indirect Transition (POS OUT) – Germany League

Goals by Direct Transition (OT) vs Indirect Transition (POS OUT) – Germany League				
	Binomial logistic regression		Adjusted Model	
Performance indicators	p	OR (95% CI)	p	OR (95% CI)
Start Zone				
5 vs 4	0.044	5.014 (1.04-24.13)	0.050	4.866 (1.00-23.74)
Nr of Passes				
7 vs 4	0.033	3.400 (1.10-10.50)	0.019	4.129 (1.26-13.53)

Note: p: p value; OR: Odd ratios; 95% CI: confidence intervals (95%).

Italy Leagues on the analyses of Binomial logistic regression of the performance indicators does not show any associations with Goals by Direct Transition (OT) vs Indirect Transition (POS OUT)

Spanish Leagues on the analyses of Binomial logistic regression of the performance indicators does not show any associations with Goals by Direct Transition (OT) vs Indirect Transition (POS OUT)

Table S4. Binomial logistic regression of the performance indicators that were associated with Goals by Direct Transition (OT) vs Indirect Transition (POS OUT) – Netherlands League

Goals by Direct Transition (OT) vs Indirect Transition (POS OUT) – Netherlands League				
	Binomial logistic regression		Adjusted Model	
Performance indicators	p	OR (95% CI)	p	OR (95% CI)
1st Action				
<i>Pass vs Drive</i>	0,047	2.438 (1.01-5.88)	0.008	4.243 (1.45-12.43)
Nr of Passes				
2 vs 4	0.012	7.294 (1.55-34.31)	0.007	8.778 (1.83-42.13)
2 vs 3	0.013	4.047 (1.35-12.16)	0.007	4.755 (1.54-14.65)
0 vs 3	-	-	0.029	6.442 (1.20-34.45)
0 vs 4	-	-	0.016	11891 (1.60-88.39)

Note: *p*: *p* value; OR: Odd ratios; 95% CI: confidence intervals (95%).

Table S5. Binomial logistic regression of the performance indicators that were associated with Goals by Direct Transition (OT) vs Indirect Transition (POS OUT) – Portugal League

Goals by Direct Transition (OT) vs Indirect Transition (POS OUT) – Portugal League				
	Binomial logistic regression		Adjusted Model	
Performance indicators	p	OR (95% CI)	p	OR (95% CI)
Start Zone				
5 vs 2	0.035	3.283 (1.09-9.93)	0.035	3.541 (1.09-11.47)
5 vs 6	-	-	0.014	9.4332 (1.59-54.91)
5 vs 7	0.037	10.636 (1.16-97.59)	0.023	13.904 (1.43-134.90)
5 vs 8	0.007	5.121 (1.55-16.95)	<.001	12.991 (3.04-55.56)
5 vs 9	0.011	8.864 (1.65-47.54)	0.002	21.587 (3.11-150.00)
5 vs 11	-	-	0.018	23.542 (1.72-322.66)
Nr Players Involved				
1 vs 2			0.022	5.484 (1.28-23.57)
1 vs 3	-	-	0.011	6.869 (1.57-30.13)
1 vs 4	0.038	4.375 (1.08-17.68)	0.003	13.540 (2.45-74.92)
1 vs 5	-	-	0.008	11.760 (1.88-73.42)

Note: *p*: *p* value; OR: Odd ratios; 95% CI: confidence intervals (95%).

Table S6. Binomial logistic regression of the performance indicators that were associated with Goals by Direct Transition (OT) vs Indirect Transition (POS OUT) – Russia League

<i>Goals by Direct Transition (OT) vs Indirect Transition (POS OUT) – Russia League</i>		
Binomial logistic regression		
Performance indicators	p	OR (95% CI)
Nr Players Involved		
<i>1 vs 4</i>	0,037	17.33 (1.19-253.19)
<i>5 vs 4</i>	0,049	9.177 (1.01-83.11)

Note: *p*: *p* value; OR: Odd ratios; 95% CI: confidence intervals (95%).

Table S8. Binomial logistic regression of the performance indicators that were associated with Goals by Direct Transition (OT) vs Indirect Transition (POS OUT) – Qatar League

<i>Goals by Direct Transition (OT) vs Indirect Transition (POS OUT) – Qatar League</i>				
	Binomial logistic regression		Adjusted Model	
Performance indicators	p	OR (95% CI)	p	OR (95% CI)
Zone of 1st action				
<i>Short vs Medium</i>	0.009	3.929 (1.41-10.96)	0.027	3.553 (1.16-10.89)
Nr of Passes				
<i>3 vs 1</i>	0.031	10.706 (1.24-92.22)	0.036	11.525 (1.18-112.91)
<i>3 vs 2</i>	0.014	5.765 (1.42-23.41)	0.035	5.319 (1.12-25.22)

Note: *p*: *p* value; OR: Odd ratios; 95% CI: confidence intervals (95%).

UAE Leagues on the analyses of Binomial logistic regression of the performance indicators does not show any associations with Goals by Direct Transition (OT) vs Indirect Transition (POS OUT)

Table S9. Binomial logistic regression of the performance indicators that were associated with Goals by Direct Transition (OT) vs Indirect Transition (POS OUT) – Saudi League

<i>Goals by Direct Transition (OT) vs Indirect Transition (POS OUT) – Saudi League</i>		
Binomial logistic regression		
Performance indicators	p	OR (95% CI)
Start Zone		
<i>1 vs 4</i>	0.031	28.000 (1.35-580.59)
<i>1 vs 8</i>	0.012	30.000 (2.14-421.12)
<i>1 vs 9</i>	0.025	32.000 (1.56-656.05)
<i>1 vs 2</i>	0.024	14.857 (1.42-154.99)

Note: *p*: *p* value; OR: Odd ratios; 95% CI: confidence intervals (95%).