

EURO 2020 groupstage predictions: 2nd match day

Leonardo Egidi - DEAMS, University of Trieste, Italy. Mail: legidi@units.it

15 June 2021

Contents

The statistical model (in brief)	1
Groupstage predictions: 2nd day (16-19 June)	1

The statistical model (in brief)

We use a **double Poisson model with dynamic team-specific abilities** for the attack and the defence. Let (X_i, Y_i) denote the random number of goals scored by the home and the away team in the i -th game, $i = 1, \dots, n$, respectively. `ranking` denotes the Coca-Cola FIFA ranking at May 27th, 2021, whereas `att` and `def` denote the attack and the defence abilities, respectively.

$$X_i | \lambda_{1i} \sim \text{Poisson}(\lambda_{1i}), \quad (1)$$

$$Y_i | \lambda_{2i} \sim \text{Poisson}(\lambda_{2i}), \quad (2)$$

$$\log(\lambda_{1i}) = \text{home} + \text{att}_{h_i,t} + \text{def}_{a_i,t} + \frac{\gamma}{2}(\text{ranking}_{h_i} - \text{ranking}_{a_i}) \quad (3)$$

$$\log(\lambda_{2i}) = \text{att}_{a_i,t} + \text{def}_{h_i,t} - \frac{\gamma}{2}(\text{ranking}_{h_i} - \text{ranking}_{a_i}), \quad i = 1, \dots, n \text{ (matches)}, \quad (4)$$

$$\text{att}_{k,t} \sim \mathcal{N}(\text{att}_{k,t-1}, \sigma^2), \quad (5)$$

$$\text{def}_{k,t} \sim \mathcal{N}(\text{def}_{k,t-1}, \sigma^2), \quad (6)$$

$$\sum_{k=1}^{n_t} \text{att}_{k,t} = 0, \quad \sum_{k=1}^{n_t} \text{def}_{k,t} = 0, \quad k = 1, \dots, n_t \text{ (teams)}, \quad t = 1, \dots, T \text{ (times)}. \quad (7)$$

Lines (1)-(2) display the likelihood's equations (two Poisson distributions); lines (3)-(4) display the log-linear models for the scoring rates λ_1, λ_2 ; lines (5)-(6) display the dynamic prior distributions for the attack and the defence parameters, respectively; line (7) displays the sum-to-zero identifiability constraints. Model fitting has been obtained through the Hamiltonian Monte Carlo sampling, 2000 iterations, 4 chains (`rstan` package). The historical data used to fit the models come from: **Nations' League** (2019-2020), **Euro UEFA Qualifiers** (2020-2021), **World Cup UEFA Qualifiers** (2021), **UEFA Euro 2020** (1st groupstage matches).

The idea is to provide a dynamic predictive scenario: at the end of each match-day, the model will be refitted to predict the remaining matches.

Groupstage predictions: 2nd day (16-19 June)

Posterior matches probabilities from the posterior predictive distribution of the model above are displayed in the table below. `mlo` denotes the most likely exact outcome (in parenthesis, the corresponding posterior

probability). Darker regions in the plots below denote more likely outcomes: on the x -axis the home goals, on the y -axis the away goals.

home	away	home win	draw	away win	mlo
Russia	Finland	0.474	0.255	0.271	1-0 (0.116)
Turkey	Wales	0.357	0.283	0.360	1-1 (0.128)
Italy	Switzerland	0.524	0.265	0.211	1-0 (0.152)
Ukraine	FYR Macedonia	0.628	0.212	0.160	1-0 (0.120)
Denmark	Belgium	0.273	0.257	0.470	0-1 (0.117)
Netherlands	Austria	0.584	0.222	0.194	1-0 (0.115)
Sweden	Slovakia	0.580	0.237	0.183	1-0 (0.136)
Croatia	Czech Republic	0.562	0.238	0.200	1-0 (0.125)
England	Scotland	0.782	0.152	0.066	2-0 (0.139)
Hungary	France	0.147	0.224	0.630	0-1 (0.141)
Germany	Portugal	0.326	0.258	0.416	1-1 (0.123)
Spain	Poland	0.618	0.223	0.159	1-0 (0.134)

