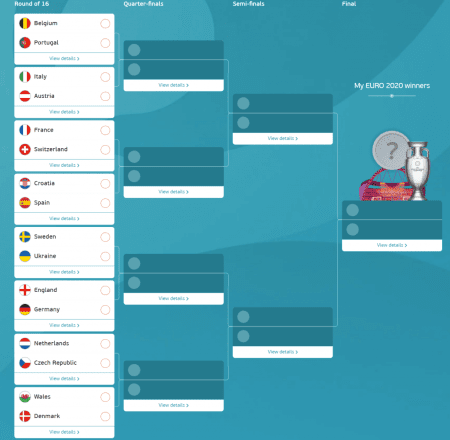
We have reached the knock-out phase of Euro 2020 (or 2021) where the final-16 teams and the games can be shown below:

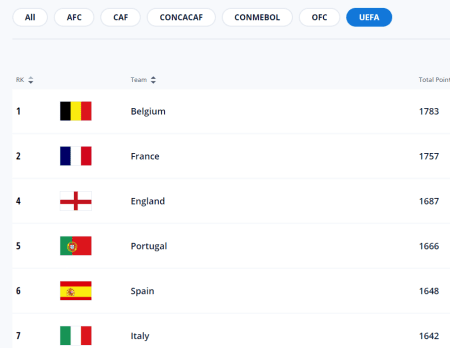


The question is who is going to be the Euro 2020 Winner. Although we cannot predict the Winner, we can estimate the probabilities of each team to win the Euro.

**The Methodology**

This is a very simple model that is based on [UEFA Ranking](https://www.fifa.com/fifa-world-ranking/mens-ranking?dateId=id13295). Our assumption is that each team follows the Normal Distribution, with **mean** its corresponding **ranking** and **standard deviation** the (max ranking – min ranking)/6. Regarding the standard deviation, we assumed that the UEFA teams are coming from the same distribution where the standard deviation can be estimated from the 6 sigma rule.

UEFA Ranking



Finally, once we define the distribution of each team, we will simulate the results of Round 16 and we will estimate the Winner.

**The Code**

We will work in R and we will run **10000** simulations.

# get the UEFA Ranking

ranking<-list(bel=1783,

fra=1757,

eng=1687,

por=1666,

esp=1648,

ita=1642,

den=1632,

ger=1609,

sui=1606,

cro=1606,

net=1598,

wal=1570,

swe=1570,

aus=1523,

ukr=1515,

cze=1459)

# get the range of the max UEFA ranking (Belgium) minus the minimum (San Marino) and devide it by 6

# assuming that 6 sigma is the range

stdev<-(1783-805)/6

sim\_champion<-c()

for (i in 1:10000) {

#######################

#### Final 16

#######################

# game bel vs por

teams\_game1<-c("bel","por")

game1<-rnorm(1, ranking[[teams\_game1[1]]], stdev)>rnorm(1, ranking[[teams\_game1[2]]], stdev)

if (game1) {

qualified\_game1<-teams\_game1[1]

} else {

qualified\_game1<-teams\_game1[2]}

qualified\_game1

# game ita vs aus

teams\_game2<-c("ita","aus")

game2<-rnorm(1, ranking[[teams\_game2[1]]], stdev)>rnorm(1, ranking[[teams\_game2[2]]], stdev)

if (game2) {

qualified\_game2<-teams\_game2[1]

} else {

qualified\_game2<-teams\_game2[2]}

qualified\_game2

# game fra vs sui

teams\_game3<-c("fra","sui")

game3<-rnorm(1, ranking[[teams\_game3[1]]], stdev)>rnorm(1, ranking[[teams\_game3[2]]], stdev)

if (game3) {

qualified\_game3<-teams\_game3[1]

} else {

qualified\_game3<-teams\_game3[2]}

qualified\_game3

# game cro vs esp

teams\_game4<-c("cro","esp")

game4<-rnorm(1, ranking[[teams\_game4[1]]], stdev)>rnorm(1, ranking[[teams\_game4[2]]], stdev)

if (game4) {

qualified\_game4<-teams\_game4[1]

} else {

qualified\_game4<-teams\_game4[2]}

qualified\_game4

# game swe vs ukr

teams\_game5<-c("swe","ukr")

game5<-rnorm(1, ranking[[teams\_game5[1]]], stdev)>rnorm(1, ranking[[teams\_game5[2]]], stdev)

if (game5) {

qualified\_game5<-teams\_game5[1]

} else {

qualified\_game5<-teams\_game5[2]}

qualified\_game5

# game eng vs ger

teams\_game6<-c("eng","ger")

game6<-rnorm(1, ranking[[teams\_game6[1]]], stdev)>rnorm(1, ranking[[teams\_game6[2]]], stdev)

if (game6) {

qualified\_game6<-teams\_game6[1]

} else {

qualified\_game6<-teams\_game6[2]}

qualified\_game6

# game net vs cze

teams\_game7<-c("net","cze")

game7<-rnorm(1, ranking[[teams\_game7[1]]], stdev)>rnorm(1, ranking[[teams\_game7[2]]], stdev)

if (game7) {

qualified\_game7<-teams\_game7[1]

} else {

qualified\_game7<-teams\_game7[2]}

qualified\_game7

# game wal vs den

teams\_game8<-c("wal","den")

game8<-rnorm(1, ranking[[teams\_game8[1]]], stdev)>rnorm(1, ranking[[teams\_game8[2]]], stdev)

if (game8) {

qualified\_game8<-teams\_game8[1]

} else {

qualified\_game8<-teams\_game8[2]}

qualified\_game8

#######################

#### Final 8

#######################

teams\_f8\_1<-c(qualified\_game1,qualified\_game2)

game\_f8\_1<-rnorm(1, ranking[[teams\_f8\_1[1]]], stdev)>rnorm(1, ranking[[teams\_f8\_1[2]]], stdev)

if (game\_f8\_1) {

qualified\_f8\_1<-teams\_f8\_1[1]

} else {

qualified\_f8\_1<-teams\_f8\_1[2]}

qualified\_f8\_1

teams\_f8\_2<-c(qualified\_game3,qualified\_game4)

game\_f8\_2<-rnorm(1, ranking[[teams\_f8\_2[1]]], stdev)>rnorm(1, ranking[[teams\_f8\_2[2]]], stdev)

if (game\_f8\_2) {

qualified\_f8\_2<-teams\_f8\_2[1]

} else {

qualified\_f8\_2<-teams\_f8\_2[2]}

qualified\_f8\_2

teams\_f8\_3<-c(qualified\_game5,qualified\_game6)

game\_f8\_3<-rnorm(1, ranking[[teams\_f8\_3[1]]], stdev)>rnorm(1, ranking[[teams\_f8\_3[2]]], stdev)

if (game\_f8\_3) {

qualified\_f8\_3<-teams\_f8\_3[1]

} else {

qualified\_f8\_3<-teams\_f8\_3[2]}

qualified\_f8\_3

teams\_f8\_4<-c(qualified\_game7,qualified\_game8)

game\_f8\_4<-rnorm(1, ranking[[teams\_f8\_4[1]]], stdev)>rnorm(1, ranking[[teams\_f8\_4[2]]], stdev)

if (game\_f8\_4) {

qualified\_f8\_4<-teams\_f8\_4[1]

} else {

qualified\_f8\_4<-teams\_f8\_4[2]}

qualified\_f8\_4

#######################

#### Final 4

#######################

teams\_f4\_1<-c(qualified\_f8\_1,qualified\_f8\_2)

game\_f4\_1<-rnorm(1, ranking[[teams\_f4\_1[1]]], stdev)>rnorm(1, ranking[[teams\_f4\_1[2]]], stdev)

if (game\_f4\_1) {

qualified\_f4\_1<-teams\_f4\_1[1]

} else {

qualified\_f4\_1<-teams\_f4\_1[2]}

qualified\_f4\_1

teams\_f4\_2<-c(qualified\_f8\_3,qualified\_f8\_4)

game\_f4\_2<-rnorm(1, ranking[[teams\_f4\_2[1]]], stdev)>rnorm(1, ranking[[teams\_f4\_2[2]]], stdev)

if (game\_f4\_2) {

qualified\_f4\_2<-teams\_f4\_2[1]

} else {

qualified\_f4\_2<-teams\_f4\_2[2]}

qualified\_f4\_2

#######################

#### Final

#######################

teams\_f<-c(qualified\_f4\_1,qualified\_f4\_2)

game\_f<-rnorm(1, ranking[[teams\_f[1]]], stdev)>rnorm(1, ranking[[teams\_f[2]]], stdev)

if (game\_f) {

champion<-teams\_f[1]

} else {

champion<-teams\_f[2]}

sim\_champion<-c(sim\_champion,champion)

}

prop.table(table(sim\_champion))\*100

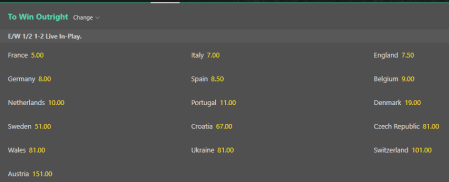
**The Estimated Results**

After running 10,000 simulations, we get that **Belgium** is the most likely team to win the Euro 2020 with a **25.8%** probability followed by **France** (21%) and **England** (13%)

|  |  |
| --- | --- |
| **Team** | **Probability (%)** |
| Belgium | 25.82 |
| France | 21.17 |
| England | 13.18 |
| Denmark | 6.61 |
| Italy | 5.24 |
| Netherlands | 5.18 |
| Spain | 4.74 |
| Portugal | 4.66 |
| Germany | 3.76 |
| Sweden | 2.31 |
| Croatia | 2.14 |
| Wales | 2.1 |
| Switzerland | 1.91 |
| Ukraine | 0.78 |
| Austria | 0.22 |
| Czech Republic | 0.18 |

**The Estimated Odds from the Market/Bookmakers**

According to Bookmaker, the favorite to win the trophy is **France**, followed by **Italy** and **England**.



**My Suggestion**

Personally, I see mispricing in Bookmakers’ odds for Belgium that pays off 9 times (meaning an estimated probability to win the euro 11.11%). So my suggestion is to go with Belgium!