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Working Paper

Home victory for Brazil in the 2014 FIFA World Cup

Working Papers in Economics and Statistics, No. 2014-17

Provided in Cooperation with:

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Suggested Citation: Zeileis, Achim; Leitner, Christoph; Hornik, Kurt (2014) : Home victory for Brazil in the 2014 FIFA World Cup, Working Papers in Economics and Statistics, No. 2014-17, University of Innsbruck, Research Platform Empirical and Experimental Economics (eeecon), Innsbruck

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Working Papers in Economics and Statistics

2014-17

University of Innsbruck
Working Papers in Economics and Statistics

The series is jointly edited and published by

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Home Victory for Brazil in the 2014 FIFA World Cup

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Abstract

After 36 years the FIFA World Cup returns to South America with the 2014 event being hosted in Brazil (after 1978 in Argentina). And as in all previous South American FIFA World Cups, a South American team is expected to take the victory: Using a bookmaker consensus rating – obtained by aggregating winning odds from 22 online bookmakers – the clear favorite is the host Brazil with a forecasted winning probability of 22.5%, followed by three serious contenders. Neighbor country Argentina is the expected runner-up with a winning probability of 15.8% before Germany with 13.4% and Spain with 11.8%. All other competitors have much lower winning probabilities with the “best of the rest” being the “insider tip” Belgium with a predicted 4.8%. Furthermore, by complementing the bookmaker consensus results with simulations of the whole tournament, predicted pairwise probabilities for each possible game at the FIFA World Cup are obtained along with “survival” probabilities for each team proceeding to the different stages of the tournament. For example, it can be inferred that the most likely final is a match between neighbors Brazil and Argentina (6.5%) with the odds somewhat in favor of Brazil of winning such a final (with a winning probability of 57.8%). However, this outcome is by no means certain and many other courses of the tournament are not unlikely as will be presented here.

All forecasts are the result of an aggregation of quoted winning odds for each team in the 2014 FIFA World Cup: These are first adjusted for profit margins (“overrounds”), averaged on the log-odds scale, and then transformed back to winning probabilities. Moreover, team abilities (or strengths) are approximated by an “inverse” procedure of tournament simulations, yielding estimates of probabilities for all possible pairwise matches at all stages of the tournament. This technique correctly predicted the EURO 2008 final (Leitner, Zeileis, and Hornik 2008), with better results than other rating/forecast methods (Leitner, Zeileis, and Hornik 2010a), and correctly predicted Spain as the 2010 FIFA World Cup Champion (Leitner, Zeileis, and Hornik 2010b) and EURO 2012 Champion (Zeileis, Leitner, and Hornik 2012).

Keywords: consensus, agreement, bookmakers odds, tournament, 2014 FIFA World Cup.

1. Bookmaker consensus

In order to forecast the winner of the 2014 FIFA World Cup, we obtained long-term winning odds from 22 online bookmakers (see Tables 2 and 3 at the end). However, before these odds can be transformed to winning probabilities, the stake has to be accounted for and the profit margin of the bookmaker (better known as the “overround”) has to be removed (for further details see Henery 1999; Forrest, Goddard, and Simmons 2005). Here, it is assumed that the

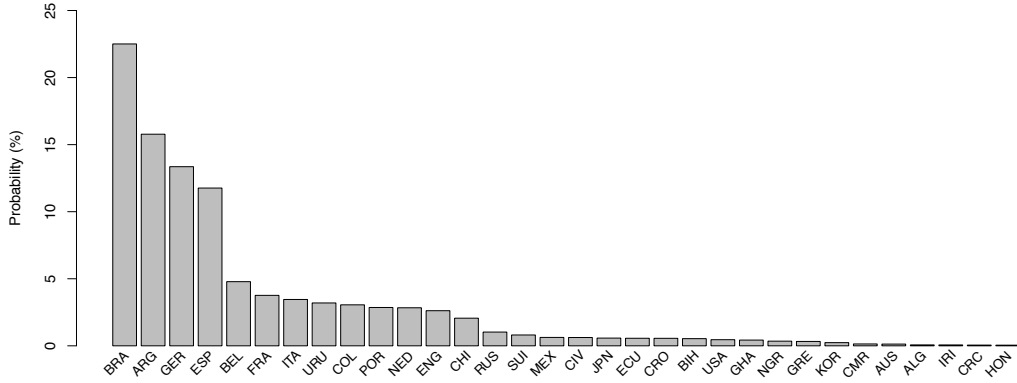


Figure 1: 2014 FIFA World Cup winning probabilities from the bookmaker consensus rating.

quoted odds are derived from the underlying “true” odds as: $quoted\ odds = odds \cdot \delta + 1$, where +1 is the stake (which is to be paid back to the bookmakers’ customers in case they win) and $\delta < 1$ is the proportion of the bets that is actually paid out by the bookmakers. The overround is the remaining proportion $1 - \delta$ and the main basis of the bookmakers’ profits (see also [Wikipedia 2014](#) and the links therein). Assuming that each bookmaker’s δ is constant across the various teams in the tournament (see [Leitner et al. 2010a](#), for all details), we obtain overrounds for all 22 bookmakers with a median value of 15.0%.

To aggregate the overround-adjusted odds across the 22 bookmakers, we transform them to the log-odds (or logit) scale for averaging (as in [Leitner et al. 2010a](#)). The bookmaker consensus is computed as the mean winning log-odds for each team across bookmakers (see column 4 in Table 1) and then transformed back to the winning probability scale (see column 3 in Table 1). Figure 1 shows the barchart of winning probabilities for all 32 competing teams.

According to the bookmaker consensus, Brazil is most likely to take a home victory (with probability 22.5%) and the expected runner-up is Argentina with a clearly lower probability of winning the tournament (15.8%). The defending FIFA World Champion and EURO Champion Spain has only the fourth highest winning probability of 11.8% behind Germany (13.4%). Team Belgium, which played a strong qualification tournament and is considered by some to be an “insider tip”, is the “best of the rest” already with a rather small winning probability of 4.8%. Subsequently, there is a large group of teams with moderately low winning probabilities, including former FIFA World Champions France, Italy, Uruguay, and England, followed by another large group of teams with negligible chances of winning.

Although forecasting the winning probabilities for the 2014 FIFA World Cup is probably of most interest, we continue to employ the bookmakers’ odds to infer the contenders’ relative abilities (or strengths) and the expected course of the tournament. To do so, an “inverse” tournament simulation based on team-specific abilities is used. The idea is the following:

1. If team abilities are available, pairwise winning probabilities can be derived for each possible match (see Section 2).
2. Given pairwise winning probabilities, the whole tournament can be easily simulated to see which team proceeds to which stage in the tournament and which team finally wins.
3. Such a tournament simulation can then be run sufficiently often (here 100,000 times) to obtain relative frequencies for each team winning the tournament.

Team	FIFA code	Probability	Log-odds	Log-ability	Group
Brazil	BRA	22.5	-1.236	-2.128	A
Argentina	ARG	15.8	-1.675	-2.442	F
Germany	GER	13.4	-1.870	-2.486	G
Spain	ESP	11.8	-2.015	-2.479	B
Belgium	BEL	4.8	-2.991	-2.952	H
France	FRA	3.8	-3.242	-3.086	E
Italy	ITA	3.5	-3.330	-3.033	D
Uruguay	URU	3.2	-3.411	-3.058	D
Colombia	COL	3.1	-3.457	-3.081	C
Portugal	POR	2.9	-3.526	-3.131	G
Netherlands	NED	2.8	-3.534	-3.040	B
England	ENG	2.6	-3.616	-3.125	D
Chile	CHI	2.1	-3.861	-3.148	B
Russia	RUS	1.0	-4.570	-3.518	H
Switzerland	SUI	0.8	-4.811	-3.619	E
Mexico	MEX	0.6	-5.067	-3.558	A
Ivory Coast	CIV	0.6	-5.078	-3.573	C
Japan	JPN	0.6	-5.151	-3.588	C
Ecuador	ECU	0.6	-5.174	-3.691	E
Croatia	CRO	0.6	-5.180	-3.588	A
Bosnia-Herzegovina	BIH	0.5	-5.226	-3.730	F
USA	USA	0.5	-5.385	-3.654	G
Ghana	GHA	0.4	-5.451	-3.672	G
Nigeria	NGR	0.3	-5.659	-3.826	F
Greece	GRE	0.3	-5.721	-3.796	C
South Korea	KOR	0.2	-6.044	-3.910	H
Cameroon	CMR	0.1	-6.581	-3.928	A
Australia	AUS	0.1	-6.654	-3.827	B
Algeria	ALG	0.1	-7.304	-4.237	H
Iran	IRI	0.1	-7.341	-4.215	F
Costa Rica	CRC	0.1	-7.525	-4.184	D
Honduras	HON	0.0	-7.630	-4.275	E

Table 1: Bookmaker consensus rating for the 2014 FIFA World Cup, obtained from 22 online bookmakers. For each team, the consensus winning probability (in %), corresponding log-odds, simulated log-abilities, and group in tournament is provided.

Here, we use the iterative approach of [Leitner *et al.* \(2010a\)](#) to find team abilities so that the resulting simulated winning probabilities (from 100,000 runs) closely match the bookmaker consensus probabilities. This allows to strip the effects of the tournament draw (with weaker/easier and stronger/more difficult groups), yielding the log-ability measure (on the log-odds scale) in Table 1.

2. Pairwise comparisons

A classical approach to modeling winning probabilities in pairwise comparisons (i.e., matches between teams/players) is that of [Bradley and Terry \(1952\)](#) similar to the Elo rating ([Elo 2008](#)), popular in sports. The Bradley-Terry approach models the probability that a Team A beats a Team B by their associated abilities (or strengths):

$$\Pr(A \text{ beats } B) = \frac{ability_A}{ability_A + ability_B}.$$

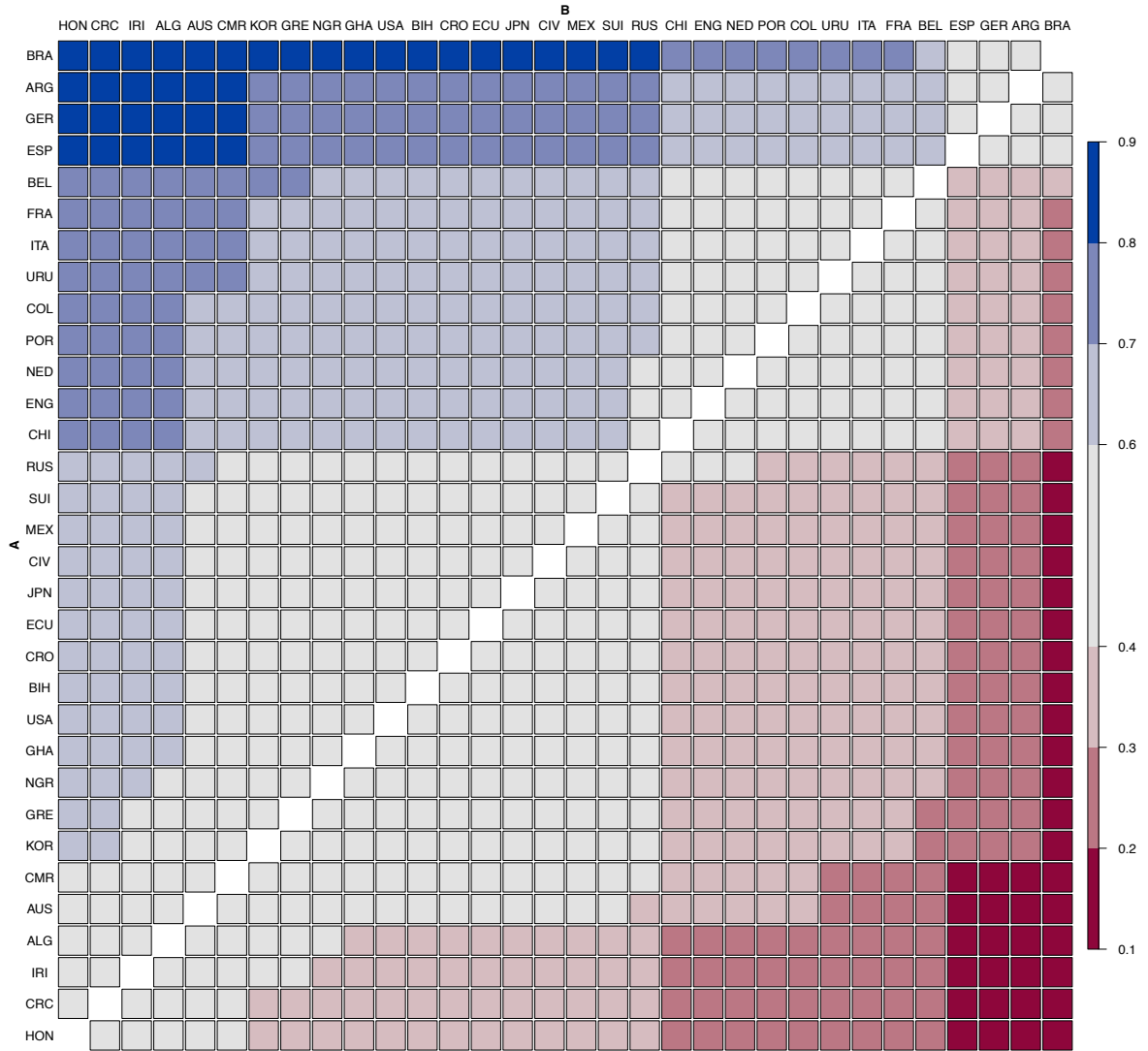


Figure 2: Winning probabilities in pairwise comparisons of all 2014 FIFA World Cup teams. Light gray signals that either team is almost equally likely to win a match between Teams A and B (probability between 40% and 60%). Light, medium, and dark blue/red corresponds to small, moderate, and high probabilities of winning/losing a match between Team A and Team B .

As explained in Section 1, the abilities for the teams in the 2014 FIFA World Cup can be chosen such that when simulating the whole tournament with these pairwise winning probabilities $\Pr(A \text{ beats } B)$, the resulting winning probabilities for the whole tournament are close to the bookmaker consensus winning probabilities. Table 1 reports the log-abilities for all teams and the corresponding pairwise winning probabilities are visualized in Figure 2.

Clearly, the bookmakers perceive Brazil to be the strongest team in the tournament with moderate (70–80%) to high ($> 80\%$) probabilities to beat almost any other team in the tournament. The only group of teams that get close to having even chances are Argentina (with probability of 42.2% of beating Brazil), Germany (with 41.3%), and Spain (with 41.2%). Behind these four strongest teams two or three bigger clusters of teams can be seen, each of which are approximately of the same strength (i.e., yielding approximately even chances in a pairwise comparison). Interestingly, three of the nine teams immediately behind the top 4 have to compete in the same group D: Italy, Uruguay, and England. Hence, this group is both particularly strong and homogeneous, so that it is likely to be very exciting.

3. Performance throughout the tournament

Based on the teams’ inferred abilities and the corresponding probabilities for all matches from Section 2 the whole tournament is simulated 100,000 times. As expounded above, the abilities have been calibrated such that the simulated winning proportions for each time closely match the bookmakers’ consensus winning probabilities. So with respect to the probabilities of winning the tournament, there are no new insights. However, the simulations also yield simulated probabilities for each team to “survive” over the tournament, i.e., proceed from the group-phase to the round of 16, quarter- and semi-finals, and the final.

Figure 3 depicts these “survival” curves for all 32 teams within the groups they were drawn in. Clearly, Brazil and Argentina are the clear favorites within their respective groups A and F with almost 100% probability to make it to the round of 16 whereas all remaining teams have much poorer chances to proceed to the later stages of the FIFA World Cup. The next best teams, Germany and Spain, face much harder groups: Germany plays in group G against Portugal while Spain has to prevail against two strong contenders, The Netherlands and Chile. Group D, as already mentioned above, is particularly well-balanced with three former FIFA World Champions all of which have about equal chances to proceed. The remaining groups C, E, and H are also somewhat balanced but not as tight as group D. Also observe that for some of the groups the curves are rather flat (e.g., F and G) while in other groups there are clear kinks at some stage. The latter indicates that there is a high likelihood of encountering a particularly strong team at that stage. However, note that even the weakest teams in the tournament have probabilities of about 20% to proceed to the round of 16 indicating that the curves just reflect average expected performance and that surprises are by no means unlikely.

To emphasize that stronger and weaker teams are not evenly distributed across the different groups, Figure 4 tries to capture the group strength. More precisely, the average log-ability of the three teams without the groups’ favorite are shown relative to the median team’s log-ability. Again, this brings out clearly that Spain, Italy, and Germany have to prevail against strong contenders to make it into the next round whereas Argentina, Belgium and France have been drawn against relatively weak teams.

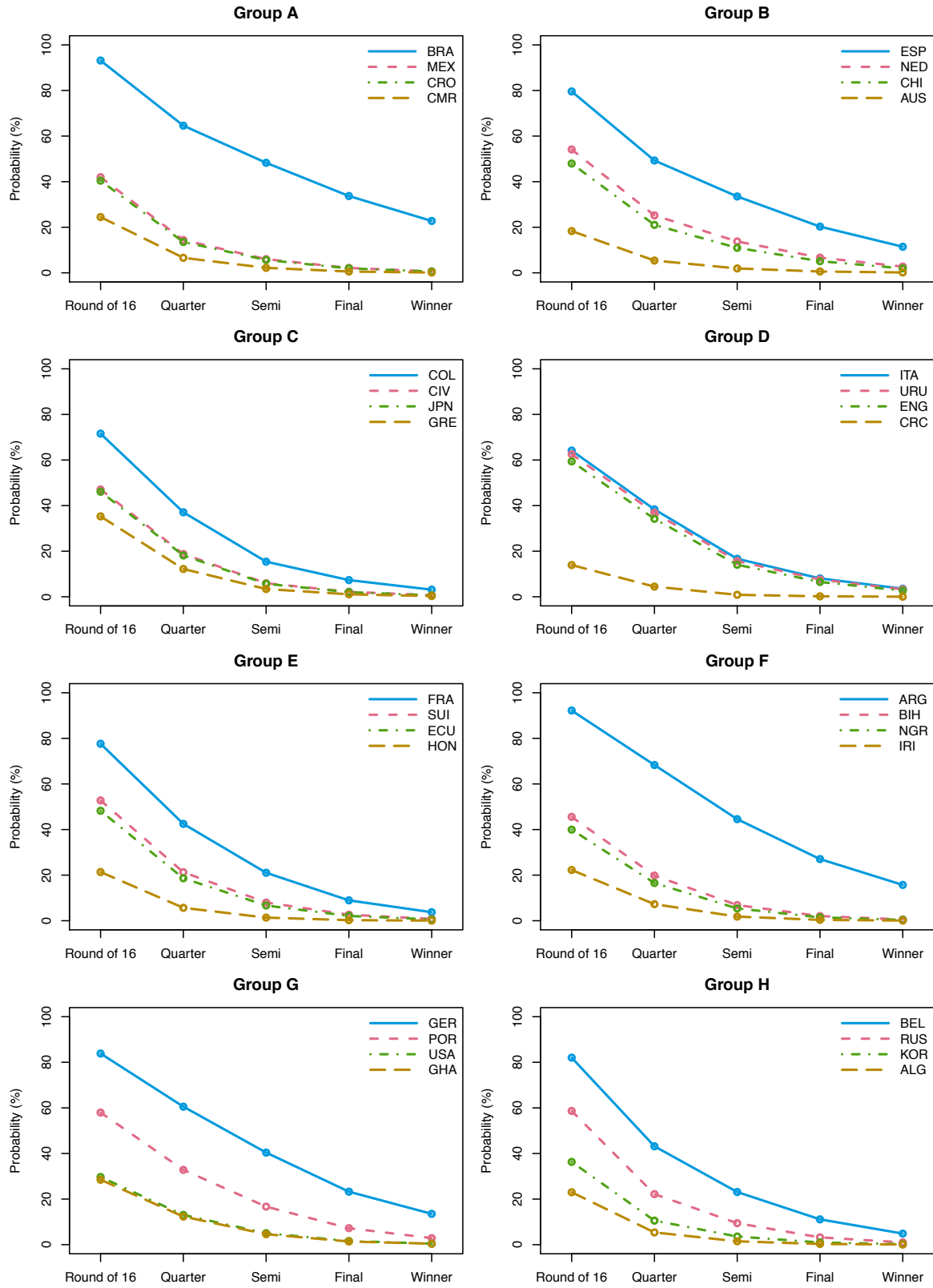


Figure 3: Probability for each team to “survive” in the 2014 FIFA World Cup, i.e., proceed from the group phase to the round of 16, quarter and semi-finals, the final and to win the tournament.

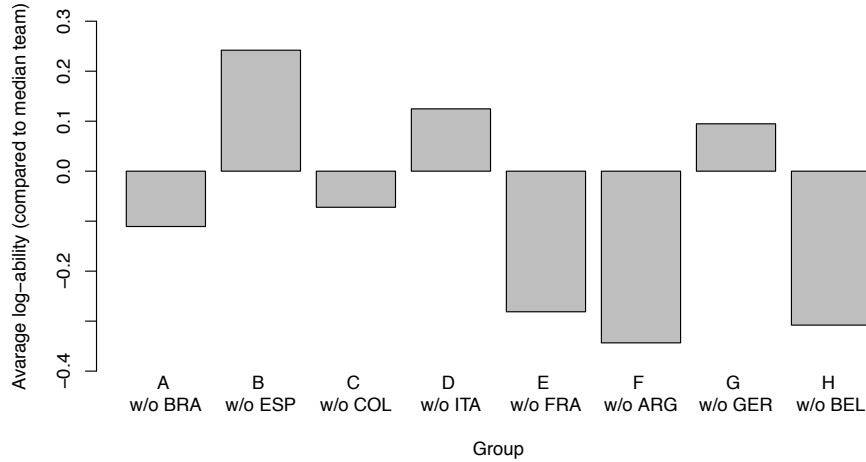


Figure 4: Group strengths. Average log-ability within each group, excluding the group favorite and centered by median log-ability across all teams.

4. Conclusions

Our forecasts for the 2014 FIFA World Cup follow closely our previous studies in [Leitner *et al.* \(2008, 2010b\)](#) and [Zeileis *et al.* \(2012\)](#), correctly predicting the EURO 2008 final, the 2010 FIFA World Champion, and the EURO 2012 Champion. The core idea as established in [Leitner *et al.* \(2010a\)](#) is to use the expert knowledge of international bookmakers. These have to judge all possible outcomes in a sports tournament such as the FIFA World Cup and assign odds to them. Doing a poor job (i.e., assigning too high or too low odds) will cost them money. Hence, in our forecasts we solely rely on the expertise of 22 such bookmakers. Specifically, we (1) adjust the quoted odds by removing the bookmakers’ profit margins (on average 15%), (2) aggregate and average these to a consensus rating, and (3) infer the corresponding tournament-draw-adjusted team abilities using a classical pairwise-comparison model.

Not surprisingly, our forecasts are closely related to other rankings of the teams in the 2014 FIFA World Cup, notably the FIFA and Elo ratings. The Spearman rank correlation of the consensus log-abilities with the FIFA rating is 0.81 and with the Elo rating even 0.89. However, the bookmaker consensus model allows for various additional insights, such as the “survival” probabilities over the course of the tournament. Interestingly, when looking at the scatter plot of consensus log-abilities vs. the Elo rating in [Figure 5](#) two teams are particularly far away from the dotted least-squares regression line: Argentina and Belgium are clearly judged to be stronger or “hotter” in the forward-looking bookmakers’ odds compared to the retrospective Elo rating that aggregates past performances. In case of Brazil’s neighbor country Argentina this is likely to capture a type of home court (or at least continent) advantage while in case of Belgium this may reflect a certain “momentum” that the team is supposed to have.

Needless to say, of course, that all predictions are in probabilities that are far from being certain (i.e., much lower than 100%). While Brazil taking the home victory is the most likely event in the bookmakers’ expert opinions, it is still far more likely that one of the other teams

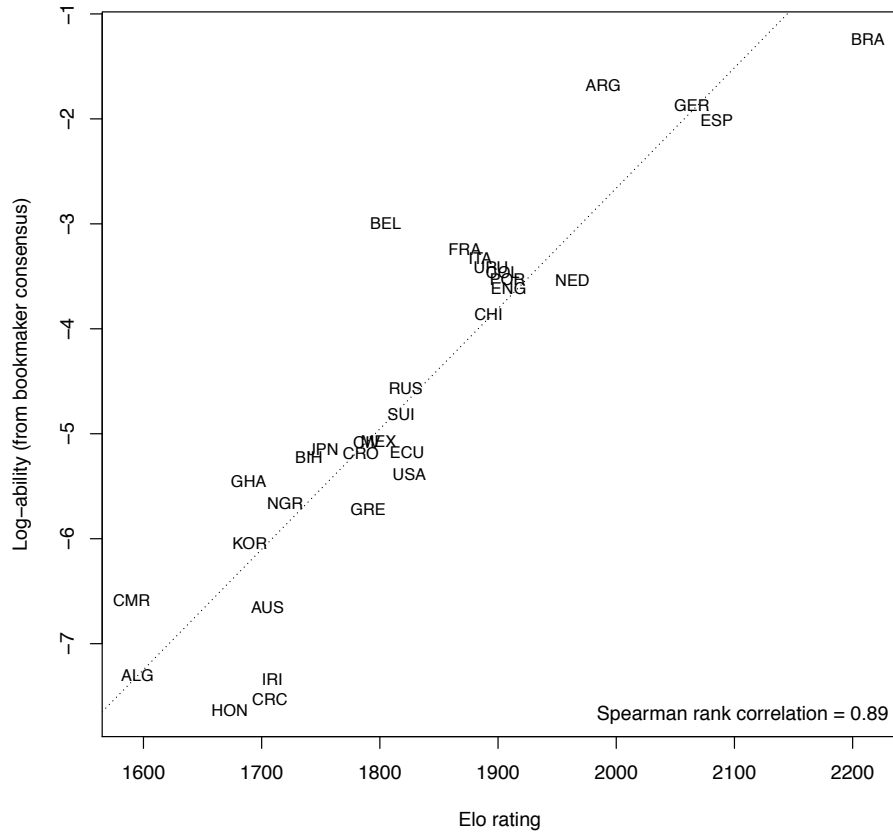


Figure 5: Bookmaker consensus log-ability vs. Elo rating for all 32 teams in the 2014 FIFA World Cup (along with least-squares regression line).

wins. This is one of the two reasons why we would recommend to refrain from placing bets based on our analyses. The more important second reason, though, is that the bookmakers have a sizeable profit margin of (on average) 15% which assures that the best chances of making money based on sports betting lie with them. Hence, this should be kept in mind when placing bets. We, ourselves, will not place bets but focus on enjoying the exciting football tournament that the FIFA 2014 World Cup will be with 100% predicted probability!

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	BRA	ARG	GER	ESP	BEL	FRA	ITA	URU
bwin	3.85	6.00	6.0	7.50	17	21.0	21	26
10Bet	3.45	5.25	6.0	7.25	19	22.0	27	27
ApolloBET	4.00	5.50	7.0	7.50	19	26.0	26	26
BALL2WIN	3.45	4.90	5.7	6.10	16	18.5	20	20
bet365	3.75	5.50	6.5	7.50	19	23.0	26	26
BetButler	4.00	6.00	6.5	8.00	17	21.0	23	29
BETFRED	4.00	5.00	6.5	7.50	15	21.0	26	29
betinternet	4.00	5.50	6.5	7.50	13	21.0	26	26
BETVICTOR	4.00	6.00	6.5	7.50	21	26.0	29	29
Boylesports	4.00	5.50	7.0	7.50	19	26.0	26	26
CORAL	4.00	5.50	7.0	7.50	19	23.0	21	29
Ladbrokers	4.00	5.50	6.0	7.00	17	21.0	23	29
MARATHONbet	3.75	5.50	6.0	7.50	17	23.0	17	26
Paddy.Power	4.00	6.00	6.5	7.50	19	21.0	26	26
skyBET	4.00	5.50	6.0	7.00	17	26.0	26	23
SmartLiveSports	4.00	5.50	6.4	7.40	19	23.0	26	28
SPREADEX	3.80	5.50	7.0	7.00	21	21.0	23	26
StanJames	4.00	5.00	7.0	7.00	21	23.0	26	23
totesport	4.00	5.00	6.5	7.50	15	21.0	26	29
BETDAQ	4.00	6.00	7.2	7.80	22	27.0	29	29
UNIBET	4.00	5.75	6.5	7.50	18	24.0	26	26
William.HILL	4.00	5.50	6.5	7.00	15	21.0	26	29
	COL	POR	NED	ENG	CHI	RUS	SUI	MEX
bwin	26	26	34	34	41	67	81	151
10Bet	33	31	29	33	42	83	106	106
ApolloBET	29	29	34	29	41	101	101	126
BALL2WIN	27	23	25	21	32	75	90	99
bet365	34	29	29	34	41	81	101	151
BetButler	26	34	23	51	41	101	126	126
BETFRED	21	34	29	34	41	81	101	151
betinternet	26	29	29	34	41	67	101	101
BETVICTOR	34	26	34	34	51	101	126	151
Boylesports	29	29	34	29	41	101	101	126
CORAL	34	26	34	29	34	101	81	151
Ladbrokers	23	23	29	34	34	81	101	126
MARATHONbet	26	29	29	34	51	56	81	126
Paddy.Power	26	34	26	34	41	67	101	126
skyBET	26	29	26	29	51	81	126	126
SmartLiveSports	30	30	29	34	40	80	100	150
SPREADEX	29	29	29	29	34	81	101	151
StanJames	29	34	34	34	41	81	126	126
totesport	21	34	29	34	41	81	101	151
BETDAQ	42	34	39	33	50	134	162	180
UNIBET	26	32	30	30	42	80	120	150
William.HILL	23	34	29	34	41	67	101	151

Table 2: Quoted odds from 22 online bookmakers for the first 16 teams in the 2014 FIFA World Cup. Obtained on 2014-05-19 from <http://www.oddscomparisons.com/> and <http://www.bwin.com/>, respectively.

	CIV	JPN	ECU	CRO	BIH	USA	GHA	NGR
bwin	126	126	151	151	126	151	151	251
10Bet	131	161	131	161	161	161	261	261
ApolloBET	151	151	151	151	151	201	201	251
BALL2WIN	78	120	110	110	99	130	130	150
bet365	126	151	126	151	151	226	251	251
BetButler	151	151	151	151	151	151	151	201
BETFRED	151	151	151	151	151	151	201	251
betinternet	126	151	126	151	151	201	201	251
BETVICTOR	151	201	151	151	201	201	201	301
Boylesports	151	151	151	151	151	201	201	251
CORAL	151	81	201	126	151	251	151	251
Ladbrokers	151	151	151	151	201	201	201	201
MARATHONbet	101	126	126	126	151	201	201	201
Paddy.Power	101	151	126	126	151	151	151	201
skyBET	151	151	151	176	151	126	251	201
SmartLiveSports	150	150	150	150	180	200	200	250
SPREADEX	151	151	201	151	201	251	201	301
StanJames	151	151	151	201	151	251	201	301
totesport	151	151	151	151	151	151	201	251
BETDAQ	140	230	205	220	190	260	270	315
UNIBET	150	150	180	150	200	200	250	280
William.HILL	151	126	151	151	151	151	201	251
	GRE	KOR	CMR	AUS	ALG	IRI	CRC	HON
bwin	251	501	401	501	1501	1501	1501	1501
10Bet	311	311	511	511	1551	1551	2601	2101
ApolloBET	351	401	751	501	2001	1501	1501	1501
BALL2WIN	200	200	200	200	200	200	200	200
bet365	301	301	501	501	1501	1501	2501	2001
BetButler	201	251	401	301	1001	801	1001	1001
BETFRED	201	401	501	751	1001	1501	2001	2501
betinternet	251	251	501	501	1001	1001	1001	1501
BETVICTOR	301	501	1001	751	2501	1501	4001	4001
Boylesports	351	401	751	501	2001	1501	1501	1501
CORAL	301	401	501	1001	751	2501	1001	2501
Ladbrokers	251	401	751	1001	1001	1501	2001	2001
MARATHONbet	201	301	501	751	1001	1501	1501	1501
Paddy.Power	201	301	501	501	2001	1501	2001	3001
skyBET	251	501	1001	1001	1501	2001	1501	2001
SmartLiveSports	250	400	710	710	1000	1000	1000	1000
SPREADEX	301	501	1501	1501	2501	2501	4001	2001
StanJames	201	301	1001	1501	2501	2501	4001	4001
totesport	201	401	501	751	1001	1501	2001	2501
BETDAQ	465	560	850	1000	1000	1000	1000	1000
UNIBET	250	300	500	500	1500	1000	750	2000
William.HILL	251	251	751	751	1001	751	2501	2501

Table 3: Quoted odds from 22 online bookmakers for the second 16 teams in the 2014 FIFA World Cup. Obtained on 2014-05-19 from <http://www.oddscomparisons.com/> and <http://www.bwin.com/>, respectively.

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Working Papers in Economics and Statistics

2014-17

Achim Zeileis, Christoph Leitner, Kurt Hornik

Home victory for Brazil in the 2014 FIFA World Cup

Abstract

After 36 years the FIFA World Cup returns to South America with the 2014 event being hosted in Brazil (after 1978 in Argentina). And as in all previous South American FIFA World Cups, a South American team is expected to take the victory: Using a bookmaker consensus rating - obtained by aggregating winning odds from 22 online bookmakers - the clear favorite is the host Brazil with a forecasted winning probability of 22.5%, followed by three serious contenders. Neighbor country Argentina is the expected runner-up with a winning probability of 15.8% before Germany with 13.4% and Spain with 11.8%. All other competitors have much lower winning probabilities with the "best of the rest" being the "insider tip" Belgium with a predicted 4.8%. Furthermore, by complementing the bookmaker consensus results with simulations of the whole tournament, predicted pairwise probabilities for each possible game at the FIFA World Cup are obtained along with "survival" probabilities for each team proceeding to the different stages of the tournament. For example, it can be inferred that the most likely final is a match between neighbors Brazil and Argentina (6.5%) with the odds somewhat in favor of Brazil of winning such a final (with a winning probability of 57.8%). However, this outcome is by no means certain and many other courses of the tournament are not unlikely as will be presented here. All forecasts are the result of an aggregation of quoted winning odds for each team in the 2014 FIFA World Cup: These are first adjusted for profit margins ("overrounds"), averaged on the log-odds scale, and then transformed back to winning probabilities. Moreover, team abilities (or strengths) are approximated by an "inverse" procedure of tournament simulations, yielding estimates of probabilities for all possible pairwise matches at all stages of the tournament. This technique correctly predicted the EURO 2008 final (Leitner, Zeileis, and Hornik 2008), with better results than other rating/forecast methods (Leitner, Zeileis, and Hornik 2010a), and correctly predicted Spain as the 2010 FIFA World Champion (Leitner, Zeileis, and Hornik 2010b) and EURO 2012 Champion (Leitner, Zeileis, and Hornik 2012).

ISSN 1993-4378 (Print)

ISSN 1993-6885 (Online)