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STRATEGIC BEHAVIOR IN EXHAUSTIVE BALLOT VOTING: WHAT CAN WE LEARN FROM THE FIFA WORLD CUP 2018 AND 2022 HOST ELECTIONS?

BASIC RESEARCH PROGRAM
WORKING PAPERS

SERIES: ECONOMICS
WP BRP 130/EC/2016

This Working Paper is an output of a research project implemented at the National Research University Higher School of Economics (HSE). Any opinions or claims contained in this Working Paper do not necessarily reflect the views of HSE

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STRATEGIC BEHAVIOR IN EXHAUSTIVE BALLOT VOTING: WHAT CAN WE LEARN FROM THE FIFA WORLD CUP 2018 AND 2022 HOST ELECTIONS?*

There are many allegations about whether FIFA world cup host countries were chosen honestly or not. We analyse the results of the FIFA Executive Committee voting and reconstruct the set of possible voting situations compatible with the results of each stage. In both elections, we identify strategic behaviour and then analyse the results for honest voting under all compatible voting situations. For the 2018 FIFA world cup election Russia is chosen for all profiles. For the 2022 elections the result depends on the preferences of the FIFA president Sepp Blatter who served as a tie-breaker. If Sepp Blatter prefers Qatar over South Korea and Japan, then Qatar would have been chosen for all profiles. Otherwise there are the possibility that South Korea or Japan would have been chosen as the 2022 host country. Another fact is that if we consider possible vote buying, then it is shown, that the bribery of at least 2 committee members would have been required to guarantee winning of Russia bid and at least 1 member for Qatar.

JEL Classification: D71

Keywords: exhaustive ballot, FIFA elections, manipulation

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* Author would like to thank Fuad Aleskerov and Cristian Trudeau for their comments. This work was prepared within the framework of the Basic Research Program at the National Research University Higher School of Economics (HSE) and supported within the framework of a subsidy granted to the HSE by the Government of the Russian Federation for the implementation of the Global Competitiveness Program

Introduction

On May 27, 2015 seven FIFA officials were arrested.[4] On the same day, Swiss authorities seized electronic data and documents from the FIFA headquarters and "opened criminal proceedings against persons unknown on suspicion of criminal mismanagement and of money laundering in connection with the allocation of the 2018 and 2022 Football World Cups"[5]. The only officially available data on World Cup host country elections are the voting results for each round. How can we analyse them from a social choice theory point of view? While we cannot tell from the results of voting whether anyone sold his vote or not, we can still say in some cases whether or not there was strategic voting. Concerning the World Cup 2018 and 2022 allocation process we show that this kind of behaviour can be observed in both elections and while it did not influence the 2018 results, the 2022 results may have been affected by strategic voting during the second stage of the election. In this paper we reconstruct possible voting situations compatible with the real results and estimate the results of honest voting.

The paper is organized as follows. Section 2 presents the main notions and definitions. Section 3 analyses the World Cup 2018 elections. Section 4 analyses the World Cup 2022 elections. Section 5 discuss the results and concludes.

Main notions and assumptions of the analysis

The FIFA executive committee allocated the 2018 and 2022 FIFA world cups by an exhaustive ballot.[6] If there is an alternative that has more than 50%+1 vote, than it is the final outcome. Otherwise, the alternative with the least number of votes is eliminated and the committee votes again for the remaining alternatives. Voting ends when there is an alternative, which has a simple majority. In the case of ties, there is an intermediate voting between tied alternatives. If just two bids are left and there is a tie, then FIFA President Sepp Blatter has the deciding vote. There are 24 members in the executive committee, but only 22 of them were eligible to vote. In this case 12 votes were needed for a simple majority.

This rule is very similar to Hare's rule or the Instant run-off rule, which is considered one of the least manipulable rules (Aleskerov et al. 2011, 2012). The main difference is that in the Instant run-off rule all the information about the preferences is provided at the beginning and voters rank all the alternatives in advance, while for exhaustive ballot system voter can vote

[4] http://www.bbc.com/news/live/world-europe-32897157
[5] https://www.admin.ch/gov/en/start/documentation/media-releases.msg-id-57391.html
[6] http://www.fifa.com/about-fifa/news/y=2010/m=10/news=executive-committee-approves-voting-process-1325928.html

differently at each stage. It is easy to see that this may lead to higher manipulation. An example of such a situation can be found in Davies et al. (2012).

In this paper we identify possible strategic voters and find the result of voting under sincere preferences. The problem has been little studied in the literature mostly because it is hard to find whether the voters have been manipulated or not. Indeed, in order to do this we need information about sincere preferences, however, this is impossible because this is the private information of the voter. Dey et al. (2015) detect possible manipulations in some elections assuming that the sincere outcome is known by the authority. In this paper, using some rather weak assumptions, we find strategic voters without requiring any additional information about either sincere preferences or a sincere outcome.

Let us define voter types. We have been using the terms informally already. At each round voters are informed about the alternatives available and are asked to vote for their best alternative. If the voter is *sincere* she should just vote for the best available option according to her sincere preferences. In the case when she votes for any alternative other than the best available one, we call her *strategic*.

One reason votes are strategic is to achieve a better overall voting outcome. This is especially important in the case of sequential voting: if voter expect that his best alternative may be eliminated at some stage of the voting, then he may decide to vote for another one instead. Another reason to vote strategically is to influence the elimination order. Let us formulate the proposition, which allows us to detect manipulators.

Proposition 1: In sincere voting and for an exhaustive ballot the number of votes for each alternative cannot decrease at the next round.

This proposition comes directly from the definition of sincere voting. If all voters are sincere then only those whose best alternatives were eliminated, should change their vote. In other words we will look at the *revealed dishonesty*: a special type of the behaviour that contradicts Proposition 1. Formally, we call voter *strategic* if for some consequent rounds he changes his vote from the alternative he voted for in the former round to another alternative, while his former choice is not eliminated. This definition does not mean that we assume that all other voters are sincere, but there is just no contradiction with sincere voting from the available information. When there is only one round, then no one can be revealed as strategic. In the case of two rounds only those who change their mind, while the alternative is still available will be called strategic.

Committee members who are not revealed as strategic should always vote for the same alternative if it still present in the alternatives list. In order to reconstruct possible preference profile we will assume in the next two sections that they start with their best alternative. In the last section, we will consider the vote-buying process, when people are induced to vote for some other alternative than their best. To simplify the proofs we will also assume that all voters have strict rational preferences. In other words, no one is indifferent between several bids and there are no cycles in preferences.

The next section characterizes sincere voting results for 2018 World Cup host country elections. By sincere voting we will consider the case when revealed dishonest voters vote sincerely according to reconstructed preferences.

2018 World Cup host country elections

Let us characterize all sincere voting profiles compatible with the selection process. We start with 2018 World Cup host country election process. Table 1 gives the results for all voting rounds.[7]

Country	England	Netherlands/ Belgium	Spain/ Portugal	Russia
Round 1	2	4	7	9
Round 2	-	2	7	13

Table 1. Voting results for 2018 World Cup host country elections

According to procedure, during the first round, there was no simple majority and England was eliminated, having the least number of votes. During the second round, Russia got an absolute majority (13 out of 22) and won the election. From the voting process, we make the following propositions:

Proposition 2: There were at least 2 strategic voters in the 2018 World Cup host country elections.

Proof. This follows directly from the definition of revealed dishonesty. One can see that the results in Table 1 contradict Proposition 1 because votes for Netherlands/Belgium joint bid decreased by 2. We can say that 2 voters who prefer the Netherlands/Belgium joint bid for any other alternative decided to vote strategically and do not vote for their best alternative.

[7] http://web.archive.org/web/20101206011341/http://www.fifa.com/worldcup/russia2018/media/newsid=1344971/index.html

Proposition 3: All sincere voting profiles compatible with the results in Table 1 appear in Table 2, where m = 0, 1 or 2:

Number of voters	2 voters	2 voters	m voters	2-m voters	7 voters	9 voters
Best alternative	**E**	**NB**	**NB**	**NB**	**SP**	**R**
Second-best	**R**	**?**	**R**	**E**	**?**	**?**
Third-best	**?**	**?**	**?**	**R**	**?**	**?**
Worst alternative	**?**	**?**	**?**	**SP**	**?**	**?**

Table 2. Sincere preferences profile for 2018 World Cup host country elections.
Note: E – England, NB – Netherlands/Belgium, SP – Spain/Portugal, R – Russia, ? – unknown alternative

Proof. The first row is based on the assumption that they initially vote for their best alternative and shows the results of the first round of voting. In the second round results, only votes for Russia had increased. Since England is eliminated the second-best alternative for those with England on the first place is Russia, because their behaviour does not contradict sincere voting. Let us look at two strategic voters. As Russia is the only country whose votes increased we can say that Russia may be their second-best alternative (*m* voters of this type in the sincere profile in Table 2), or their third-best alternative (2-*m* voters of this type in the sincere profile in Table 2) and they vote for Russia because England (their second-best) is no longer available in Round 2. □

We cannot get more information about the sincere profile from Table 1. Let us compute the results of voting for the sincere profile. Votes for every round are given in Table 3.

Country	England	Netherlands/ Belgium	Spain/ Portugal	Russia
Round 1	2	4	7	9
Round 2	-	4	7	11
Round 3	-	-	7-9	15-13

Table 3. Sincere voting results for 2018 World Cup host country elections

The uncertainty with the votes at the third round is based on the second preference of sincere voters, whose best alternative is Netherlands/Belgium. We can summarize the results in a following proposition.

Proposition 4. If all committee members vote sincerely the winner of 2018 World Cup host country elections will be Russia.

In other words, the results of voting were not influenced by strategic behaviour of two voters.

2022 World Cup host country elections

Let us apply the same algorithm to the other election on the same day. Table 4 presents the voting results for 2022 World Cup host country elections.

Country	Australia	Japan	Qatar	South Korea	USA
Round 1	1	3	11	4	3
Round 2	-	2	10	5	5
Round 3	-	-	11	5	6
Round 4	-	-	14	-	8

Table 4. Voting results for 2022 World Cup host country elections

This case is more complex, especially because votes for the Qatar—the winner of the election decreased in the second round. This is one of the reasons why the 2022 elections were considered controversial (see, for example Morris 2011). At the same time, using the definition of strategic voting, we can make the following proposition.

Proposition 5: There were at least 2 strategic voters in the 2022 World Cup host country elections.

It is easy to outline the 2 strategic voters in this case. We can see that one strategic voter has Japan as her best alternative, and the other one has Qatar. Let us study the case from the fourth round. Since there are just 2 alternatives left, 14 voters prefer Qatar and 8 USA. In Round 3, 5 voters declare South Korea as their best available alternative. It is easy to show that two of them prefer USA to Qatar and 3 have the different preferences. Sincere profile for last two rounds is given in Table 5.

Number of voters	11 voters	3 voters	2 voters	6 voters
Best alternative	**Q**	**SK**	**SK**	**U**
Second-best	**?**	**Q**	**U**	**?**
Worst alternative	**?**	**U**	**Q**	**?**

Table 5. Sincere preferences profile for Round 3 of 2022 World Cup host country elections.

Round 2 is more complex since in this round the strategic voting takes place. In addition to two strategic voters, the sincere voter whose best alternative was Australia votes for either South Korea or USA. There are 3 possible allocations of votes of these three voters presented in Tables 6, 7, 8.

Number of voters	1 voter	2 voters (1 sincere and 1 strategic)	10 voters	1 voter (strategic)	2 or 3 voters			2 or 1 voters			4 voters
Best alternative	**J**	**J**	**Q**	**Q**	**SK**			**SK**			**U**
Second-best	**SK**	**U**	**?**	**SK**	**Q**	**Q**	**J**	**U**	**U**	**J**	**?**
Third-best	**?**	**?**	**?**	**?**	**U**	**J**	**Q**	**Q**	**J**	**U**	**?**
Worst alternative	**?**	**?**	**?**	**?**	**J**	**U**	**U**	**J**	**Q**	**Q**	**?**

Table 6. Sincere preferences profile for Round 2 of 2022 World Cup host country elections. Strategic voter whose best alternative is Qatar vote for South Korea.

Number of voters	1 voter (strategic)	2 voters	10 voters	1 voter (strategic)	2 or 3 voters			2 or 1 voters			4 voters
Best alternative	**J**	**J**	**Q**	**Q**	**SK**			**SK**			**U**
Second-best	**SK**	**U**	**?**	**U**	**Q**	**Q**	**J**	**U**	**U**	**J**	**?**
Third-best	**?**	**?**	**?**	**?**	**U**	**J**	**Q**	**Q**	**J**	**U**	**?**
Worst alternative	**?**	**?**	**?**	**?**	**J**	**U**	**U**	**J**	**Q**	**Q**	**?**

Table 7. Sincere preferences profile for Round 2 of 2022 World Cup host country elections. Strategic voter whose best alternative is Japan vote for South Korea.

Number of voters	1 voter (strategic)	2 voters	10 voters	1 voter (strategic)	3 voters			2 voters			3 voters
Best alternative	**J**	**J**	**Q**	**Q**	**SK**			**SK**			**U**
Second-best	**U**	**U**	**?**	**U**	**Q**	**Q**	**J**	**U**	**U**	**J**	**?**
Third-best	**?**	**?**	**?**	**?**	**U**	**J**	**Q**	**Q**	**J**	**U**	**?**
Worst alternative	**?**	**?**	**?**	**?**	**J**	**U**	**U**	**J**	**Q**	**Q**	**?**

Table 8. Sincere preferences profile for Round 2 of 2022 World Cup host country elections. Voter whose best alternative is Australia vote for South Korea.

We get the first line in the voting profile from voting results using the assumption that they start to vote for their best alternative, the results of the first round of voting, and the vote of the committee member whose best alternative is Australia. In Tables 6 and 7 we assume that his vote transferred to the USA and in Table 8 we assume that this vote goes to South Korea. That is why in the Tables 6 and 7 there are 4 voters with USA and 4 voters with South Korea at the first place and in Table 8 there are 5 voters with South Korea at the first place.

Let us look at the second-best alternatives. We start with the voters who have Japan in the first place. In the case of sincere voting after the first round votes no country can increase by more than 1. Due to the fact that the votes for the USA bid increased by two, we can see that at least one of this votes comes from strategic voter. Moreover, for Table 6 case this strategic voter

has Japan in the first place, for Table 7—Qatar and for Table 8 both votes come from strategic voters. Round 3 voting behaviour is consistent with sincere voting, so there is no contradiction with sincere behaviour. Let us study each voting profile.

For Table 6 a strategic voter with Qatar as his best alternative voted in Round 2 for South Korea. In Round 3 we assume that he decided to turn back to his sincere preferences and voted for Qatar. As South Korea in Round 3 remains the same, one voter with Japan as the best alternative should have South Korea as the second best. Since for sincere voting the votes should increase for the USA bid from Round 1 to Round 2 from 3 to 4, for two other voters, who prefer Japan, the second-best alternative should be USA. For the same reason for Table 7 there are 2 voters with Japan on the first and USA at the second place of the preferences.

Table 8 is a little different, because both strategic voters swap their votes for USA. In this case for sincere voting there should be no increase in the votes for USA from Round 1 to Round 2. As USA got 6 votes in Round 3, all voters with Japan in the first place should have USA in the second.

Note that there were 4 (Table 6 and 7) or 5 (Table 8) voters with the South Korea in the first place, but we do not know much about their preferences. Taking into account the information from Table 5 we can only say that there are 3 voters who prefer Qatar to USA and 2 voters who prefer the opposite, but cannot exactly say anything about the position of Japan in these preferences.

Now we can find the results of voting for the sincere voting profiles.

Proposition 6. For the preferences profiles in Tables 6 and 7 the result of sincere voting remains the same.

It is easy to show that for these profiles sincere voting process will look as in Table 9.

Country	Australia	Japan	Qatar	South Korea	USA
Round 1	1	3	11	4	3
Round 2	-	3	11	4	4
Round 3	-	-	11	5	6
Round 4	-	-	14	-	8

Table 9. Sincere voting results for 2022 World Cup host country elections (Case 1).

In other words, if strategic behaviour does not influence the elimination order, then the sincere result will be the same.

Proposition 7. For the preferences profile in Table 8 the sincere outcome may be either South Korea, Japan or Qatar. If more than 11 voters prefer USA to Japan (or exactly 11 voters and the FIFA president is among them), then Japan will be eliminated in Round 2, and results of the voting will remain the same. Otherwise, there are 4 possible situations:

Case 1: If at least 1 voter with USA as the best alternative has Qatar as his second best, then the final result is Qatar.

Case 2: If all 3 voters have Japan in second place, and if 11 voters prefer Japan to Qatar and the FIFA president is among them, then Japan is the final outcome. Otherwise, Qatar is the winner.

Case 3: If 2 voters have Japan on the second place and 1 has South Korea, and if more than 11 voters prefer Japan to South Korea, 11 voters prefer Japan to Qatar and the FIFA president is among them, then Japan is the final outcome. If less than 11 voters prefer Japan to South Korea, 11 voters prefer South Korea to Qatar and the FIFA president is among them, then South Korea is the final outcome. For exactly 11 voters who prefer Japan to South Korea the result depends on the FIFA president preferences. In all other cases Qatar is the winner.

Case 4: If 2 or 3 voters have South Korea in the second place and at most 1 has Japan, and if 11 voters prefer South Korea to Qatar and FIFA president is among them, then South Korea is the final outcome. Otherwise, Qatar is the winner.

Proof. The proof of these proposition is straightforward. For Case 1, if at least 1 voter has Qatar as his second best then at the Round 3 Qatar will get 12 votes and will have simple majority.

For Case 2 at Round 3, South Korea will be eliminated and at Round 4 there may be a tie between Qatar and Japan. If 11 voters including the FIFA president prefer Japan to Qatar, then Japan is the winner.

For Case 3 there will be a tie between South Korea and Japan at Round 3. Depending on the result of the tie-breaking (voting between these two alternatives) either Japan or South Korea goes to the Round 4. Then in Round 4 there may be the tie between Qatar and Japan or South Korea and if 11 committee members including the FIFA president votes against Qatar, then Japan or South Korea will be the final result.

For Case 4 at Round 3 Japan will be eliminated and there may be the tie between Qatar and South Korea at the Round 4. If 11 voters including the FIFA president prefer South Korea to Qatar, then South Korea is the winner.

Discussion of the results

In this paper we analysed the real election process that took place on 2 December, 2010 when the 2018 and 2022 World Cup host countries where chosen. While in both cases there were two strategic voters, in the 2018 vote they did not influence the results but in the 2022 voting they may have changed the winner of the elections.

At the same time these examples also underline some adverse feature of this rule: due to its sequential nature it allows a change votes between rounds. One way to minimize this type of strategic behaviour is to ask committee members to provide the initial ordering of their bids. Although this will not completely eliminate manipulation, it will decrease the strategy space by prohibiting changes of votes if the alternative one has voted for is still available. In other words, it will change the exhaustive ballot system to an Instant run-off.

Even if we rule out sequential voting there still can be some questions for the voting results: whether results may be influenced by possible vote buying. In other words, we can omit the assumption that their first declared alternative is their best and try to answer the question: how many committee members need to be bribed (or in other way induced to cast a different vote) in order to change the voting result to Russia or Qatar. In both situations let us find the least number of voters that need to be bribed consistent with some true voting profile. In other words we want to find the minimal size of a coalition needed to change the voting results from the original winner to any other alternative. Since it is sequential voting, a change in voting results means the change in the elimination process. Let us assume only the situations when bribed committee members vote for Russia or Qatar. So we will not consider more elaborate strategies when someone induced committee members to vote for the non-winners to influence elimination order.

Let us consider 2018 host country elections. How many votes would need to have been changed in order to have Russia to be eliminated in the first round? We can see that the minimum number is 4. Moreover, 3 of them should have voted for England and 1 for the Netherlands/Belgium joint bid. In this case there will be a tie between England, Netherlands/Belgium and Russia: all of them will have 5 votes and Spain/Portugal will have 7 votes. According to procedure there will be additional voting between tied alternatives and the

one with the least votes will be eliminated. Assuming that the votes from Spain/Portugal voters will go to England or Netherlands/Belgium bids, Russia may be eliminated. If any of these assumptions are not true, then minimum number of voters is higher.

In order to eliminate Russia in the second round minimum number of voters needed should also be 4. Moreover, 3 of them should vote for Netherlands/Belgium bid in the second round. In this case there will be a tie between Russia and either Spain/Portugal or Netherlands/Belgium. If fewer voters prefer Russia, then Russia will be eliminated. As in the previous case if any assumptions are not true, then minimal number of voters is higher. We also assume that two strategic voters will not manipulate in this case, because they will just lower the chances of the Netherlands/Belgium bid. If these two voters behave in a same way, then the minimum number of voters will be 6. In order to eliminate Russia in the third round, we should know the preferences of voters with Netherlands/Belgium bid on the first place. In order to have Round 3 all of them should vote sincerely. We know the preferences of 2 members (see Table 2). If the other 2 prefer Spain/Portugal over R, then during Round 3 there will be 13 votes for Russia and 9 for Spain/Portugal. In this case the minimum number of votes needed to change the result is 2 if Sepp Blatter prefers Spain/Portugal and 3 if not. Therefore if Russia is not a real winner, then at least 2 committee members need to be bribed or in other way induced to change their vote for Russia.

Let us do the same analysis for 2022. If someone wants to have Qatar eliminated in the first round at least 7 voters should change their votes. Moreover, 3 of them should vote for Australia, 1 for Japan and 1 for USA. In this case there will be a tie between Qatar and 2–3 other bids, depending on the votes of 2 remaining voters. If Qatar lose the tie-breaking, then it will be eliminated. In order to eliminate Qatar in second round at least 6 votes should change their votes. If strategic voters will behave in a same way as before, then at least 5 voters is needed at the second round, since one of the strategic voters changes his vote from Qatar to some other bid during this round. For elimination at Round 3 at least 4 voters are needed and losing in the tie-breaking. Results for Round 4 depend on the true profile from the previous section. In the case of Tables 6 and 7 at least 3 voters is needed if Sepp Blatter prefer USA over Qatar or 4 otherwise. In the case of Table 8 at the last round there will be a voting between Qatar and South Korea or Japan and there is not enough information about preferences between them. So according to proposition 7 it is possible that the true result is South Korea and Japan. In other words, no committee members should be specially forced to vote for Qatar and Qatar may be the winner because of manipulation at the second round.

In an interview in February 2016[8], Sepp Blatter states that he expected USA to win the election but Michel Platini (and maybe several others) were forced to vote for Qatar. If the true winner should have been USA then at least 3 voters were needed to change the result to Qatar, assuming that Sepp Blatter himself voted for USA. If the true winner was South Korea or Japan, then at least 1 committee member (one of the strategic voters in real election) was needed to guarantee that Japan was eliminated at the second round.

Overall, we can see that in both cases there were strategic voters who influenced the results and helped Russia and Qatar become host countries. If we eliminate their influence, then Russia still should be the winner, but the decision-making process would take three rounds instead of two. In 2022 winner may change to either South Korea or Japan. If we consider how stable the results are, we can show that at least 1 committee member was needed to change the results from true winner to Qatar, and at least 2 members in case of Russia.

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