

# Approval Voting as a Method of Prediction in Political Votings. Case of Polish Elections

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**Abstract.** Applications of approval voting to political analyses are conducted. Polish 2015 presidential and parliamentary elections are considered. A question regarding voting by approval voting method was included in the voting polls. Experiments deal with polls over representative samples and give a possibility to predict a winner of the second round of presidential elections and those parliamentary coalitions which may be approved by groups of voters supporting the given parties.

**Keywords:** Approval voting · Experiments · Voting prediction

## 1 Introduction

This paper is aimed to present a new method for predicting the results of the final vote in the second-ballot elections (experiments in Poland). The method we propose utilizes the approval voting technique as a way of eliciting electoral preferences in opinion polls and the properties of the approval voting as the way of predicting results of the final vote. We also use approval voting as method which allows to determine which parliamentary coalitions will be approved by supporters of a given party. Approval voting is a method where a voter chooses as many alternatives as he wants. He can choose none, 1, 2, ..., or even all alternatives.

We assume that a well designed polling method should fulfill two basic conditions: (a) it should not be overly complex in a technical sense or time-consuming for the respondents – i.e. the response technique must be as easy as placing a cross in a box in the real elections, and (b) should not induce any cognitions more sophisticated and effortful than required by a regular electoral decision; in a way, it must be psychologically unobtrusive.

The reason for the above requirements, we believe, is that a voting technique apart from its natural use as a tool for aggregating decisions of big social entities, may be seen as a way of eliciting the opinions and attitudes. From a decision-making

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psychological perspective a voting technique is actually a decision aid i.e. the method of guiding people through the decision process. As such, depending on its construction, it gives different cues of how the information should be sought, collected, inferred and, finally, analyzed. A plethora of studies on different decision-making processes found in various contexts were conducted and even some theories of matching the decision process to the complexity of the problem were constructed (see [1] for review). Although, the studies on this subject in the particular context of voting techniques are scarce, approval voting was quite extensively studied by our team.

Now, let us consider approval voting as a decision aid. There are at least two crucial issues that need to be addressed in this section: (a) the complexity of the decision strategy induced and (b) the information cost of making a decision using a given voting technique.

When people are facing a situation that requires choosing just one alternative from a list, they may use a simple strategy of affected referral (recall what you like) or resort to a non-compensatory rule of satisfying [2], but when a decision requires comparisons of the utility of the alternatives, the strategy employed must include the analysis of every alternative and all of their attributes. In such a case the only proper strategy is the weighted additive model [1], which is based on an effortful and time-consuming process of calculating the weighted sum of all evaluations. As can be easily noted, there is a major difference in the amount of information to be gathered and processed in the decisions.

The second aspect, partly dependent on the amount of data, and partly the very nature of the cognitive process, is the information cost of making a decision using a given voting technique (understood here as the amount of cognitive effort required to make a decision). In psychological research the differentiation between the effortful (i.e. analytical) and the effortless (heuristic) processing is the central tenet of numerous dual-processing models of cognition (see [3, 4]). Given the same amount of data, some of the transformations require more cognitive resources, for example in mathematical cognition, summing up two numbers is less effortful than subtracting. Similarly, in social psychology, it is assumed that numerous cognitive processes are composed of initial automatic stage followed by a more effortful adjustment stage. In a process-tracing study Przybyszewski et al. [5] showed that the decision rules or strategies induced by approval voting and majority voting are very similar, based on principle of elimination and are selective rather than systematic in respect to data processing. Malawski et al. [6] in an information-board experiment analyzed the amount of information processed while making the decision under the majority, approval and categorization rules. The results obtained show that only the categorization rule induces more effortful processing, while approval voting is equally effortless as the majority technique.

The important result of the above studies is that approval voting is no difference from majority voting in terms of simplicity and effortlessness. One reason is the simplicity, but also the process of eliciting the opinion is not different from the process induced by a majority voting.

The approval voting method is a technique that requires less effort to produce more reliable (i.e. more similar to the real-life decisions) predictions of choice, and as such it is more suitable for being used amongst the general public e.g. in the opinion polls.

Most typically, the predictions of the vote in a second ballot require asking a direct question about the choice to be made: “If your candidate was eliminated who are you going to vote for?”; or asking about the choice between all potential pairs of candidates which makes the poll more complex, time consuming and more effortful for respondents. However, typically the undecided voters are given the “have not decided yet” option which subsequently excludes their preferences from the database used for making the predictions and being undecided does not imply lack of preferences.

One of the main properties of voting is strategic voting. Voter casts his/her vote strategically if he/she chooses the alternative which is not his/her best but gives a better overall result than voting for the best one. For example, in two-round presidential election people may not vote for their best candidate if in their opinion he would not cross the threshold. In our research we shall study two-round presidential elections. We analyze elections polls where respondents vote by the classical majority method and by approval voting.

People may vote strategically in a poll in the case of classical majority method because they vote in such a way in elections. Approval voting is not a method popular among voters and they are not experienced in using it, thus it is very likely that they vote in a sincere way.

Among candidates chosen by approval voting the real best candidates may be found, however in our studies we will go beyond the search of the best candidate. We try to predict the choices in the second round, where voters’ choices very often are not their best choices (these are made in the first round). We assume that their second-round best candidates are among those who are approved in approval voting.

The paper is organized as follows. In Sect. 2 we present the approval voting method. In Sect. 3 examples of applications of approval voting in predicting the result of two-round presidential elections are contained. The last section contains conclusions. Appendix is devoted to the application of approval voting in the analysis of parliamentary elections.

## 2 Approval Voting Method

Using approval voting method a voter chooses as many alternatives as he wants: 0, 1, ..., or even all alternatives. Such method was occasionally used in the past, for example in Sparta or during elections of doge of Venice (see [7, 8]). Studies over approval voting started in 1976 with a paper by Brams and Fishburn [9]. The analyses of approval voting were presented in their book “Approval Voting”, edited in 1983 [10]. There was a lot of research after that time. The most important researches are presented in “Handbook on Approval Voting” edited in 2010 by Laslier and Sanver [11]. In this book there is also contained a chapter devoted to applications is [12]. The best known applications are elections in scientific organizations. Approval voting was also a subject of some experiments, the main of which are described in “Handbook on Approval Voting” [13]: while laboratory experiments are presented by Laslier, field experiments are presented by Baujard and Igersheim [14] (see also [15, 16]), Alós-Ferrer and Granić [17] (see also [18]).

The first field experiment was conducted by Laslier and van der Straeten during the presidential elections in France in 2002 (see [14, 15]). There were chosen six voting stations in two towns where an exit poll was conducted. The polling stations were near the voting stations, or even located in the same building. The poll ballot was similar to the voting ballot. Voters vote using the approval voting method. They were informed about the experiment and the approval voting method in the information action before elections. A similar experiment was repeated during the French presidential elections in 2007 (see [14, 16]) and during Hesse elections in 2008 (see [17, 18]). In this last case voters voted also for parties. The results of all experiments differed from the results of elections, so the impact of the voting method was observed. The positive attitude towards approval voting as a new method of voting was noticed.

The authors of this paper discussed the possibility of conducting such a field experiment in Poland, but had not to decide against it because of the difficulty in obtaining permission from the National Election Committee. This difficulty lies in the atmosphere during elections: full of suspicions that there may be attempts to rig the elections. Additional voting (not only reporting on voting as in usual exit polls) conducted just near the voting stations, on similar ballots, would surely lead to serious suspicions among some parties and groups of voters. Another reason was that our previous pilot studies showed that in case of approval voting different results may be obtained in a pilot experiment than in an experiment conducted over representative sample. Neither French nor German experiments dealt with a representative sample. Conducting an exit poll, constructed similarly to the previous field experiments over a representative sample would also be very difficult and expensive. We decided to deal with a representative sample during polls conducted before elections.

In our experiments we want to confirm the following thesis. Let us consider two polls. The first is conducted by the classical majority method, the second by approval voting. We obtain the advantage coefficients of one candidate over the other when we divide the number of votes for one candidate by the number of votes for the other. We conduct these calculations separately for classical majority voting and for approval voting. It is our opinion that if the advantage coefficient of the leader over the second candidate is lower in the case of approval voting than in the case of the classical majority method we may indicate that it is a hint that the leader will not win the second round.

Our experiments consist of polls on Polish presidential elections conducted before elections by the classical majority method and approval voting= over representative samples in 2005 and 2015. The advantage coefficients are calculated and compared. The results confirm our thesis.

### **3 Presidential Polls 2005, 2015**

#### **3.1 Presidential Poll 2005**

The 2005 presidential poll took place in October. About one month earlier, in September 2005, we conducted a presidential poll with questions connected to approval voting (see [19]). The poll was conducted by the Polish branch of international poll agency TNS - TNS OBOP. The method of the poll was face to face, a representative

sample just over 1000 persons was surveyed. Two main candidates during these elections were Donald Tusk and Lech Kaczyński. Tusk was the winner of all the polls, including our own. However, we introduced a new element to the analysis: the advantage coefficients.

The Polish electoral system is a two - round system. In the first round are as many candidates as the preliminary conditions allow. If one of the candidates obtains more than 50 % of votes, the candidate wins the elections. Otherwise, the second round of elections takes place. Two candidates with the highest number of votes in the first round compete in the second round. The candidate with the highest number of votes wins.

In 2005 elections there was no clear winner in the first round. Tusk and Kaczyński obtained the highest number of votes. Tusk was the first, Kaczyński the second. Kaczyński won the second round and the elections.

In the Table 1 we present the advantage coefficients for Tusk and Kaczyński. We divide number of votes for a candidate in a column by number of votes for a candidate in a row. Asterisk (\*) denotes the results for approval voting. Tusk's coefficient over Kaczyński is equal to 1.89 in classical majority voting and to 1.40 in approval voting. The advantage of Tusk over Kaczynski is diminishing in the case where voters can choose more than one candidate, so they may choose not only their best candidate. Such situation is the second-round. A lot of voters do not vote for their the best candidate. So, lower number of votes in case of approval voting may be a hint that there is a significant possibility that Tusk will not win the second – round. Reality confirmed our predictions. Tusk got 36.33 % of votes in the first round, 45.96 % in the second round. Kaczyński got 33.10 % in the first round and 54.04 % in the second round. The next experiment we conducted in 2015<sup>1</sup>.

**Table 1.** Advantage coefficient, 2005 elections (Source: [20])

Candidate	Tusk	Kaczyński
Tusk	–	0.53 0.71*
Kaczyński	1.89 1.40*	–

### 3.2 Presidential Polls 2015

The presidential elections in 2015 took place on May 10<sup>th</sup> and were conducted according to the same rule as in 2005. We cooperate with Ariadna poll agency. Ariadna added to their polls our questions connected to approval voting. The polls were conducted online over a representative sample just over 1000 persons. The results were published in Polish on [tajnikipolityki.pl](http://tajnikipolityki.pl) (secrets of politics), Web portal [20, 21].

<sup>1</sup> The next presidential elections took place in 2010. They were conducted unexpectedly after the Smoleńsk tragedy a couple months before the date implied by the 2005 elections and we had not time to prepare an experiment. And thus we had to wait until 2015.

The first poll was conducted in the end of February. It was the beginning of the election campaign, some candidates had not yet decided to participate, some were slightly recognizable. There were two main candidates, Komorowski and Duda. Komorowski was of that time the president of Poland. Duda had just started his campaign and was an almost unknown politician. He was treated as one of the main candidates because he was a candidate of PiS (Law and Justice) party, which was the main oppositional party of the time. Jarosław Kaczyński (Lech died in the Smoleńsk tragedy, Jarosław is his twin brother) is the leader of this party. At the time, all polls predicted that Komorowski would win in the first round. In our poll voters voted also by approval voting. The results are presented in Table 2.

**Table 2.** Results of February poll, 2015. (Source: Authors' work)

Candidate	Approval	Classical
Komorowski	533	478
Duda	161	183
Jarubas	75	18
Ogórek	180	68
Palikot	170	24
Korwin- Mikke	138	23
Kowalski	31	11

Although Komorowski is the winner of the poll, he does not get a more than half of the votes (some respondents do not answer). He obtained only a bit more votes in case of approval voting than the case of majority voting, so his potential advantage over other candidates was weak. Therefore, we anticipated the possibility of the second round. The analysis of the results of approval voting shows that almost all candidates other than Komorowski and Duda obtained a significantly greater number of votes. Komorowski's was not a strong position as a candidate, a lot of people chose other candidates. As a result it was predicted that it would be difficult for Komorowski to win the second round of the elections. The analysis of advantage coefficients (see Table 3) does not confirm such predictions.

**Table 3.** Advantage coefficients. Presidential poll, February 2015 (Source: Authors' work)

Candidate	Komorowski	Duda
Komorowski	–	0.3020*
		0.3828
Duda	3.3105*	–
	2.6120	

The advantage coefficient of Komorowski over Duda amount to 2.6120 when classical majority voting is applied and 3.3105 in the case of approval voting. The advantage is not lower for approval voting, which renders the situation different from

that of 2005 and serves as a counter-example for the thesis that the advantage coefficient of the leader would be lower if approval voting is applied. Such a thesis was formulated during some discussions.

The next 2015 poll was conducted in the end of April, about 2 weeks before elections. There were the same main candidates as in the previous poll. The poll was conducted online by Ariadna poll agency, over a representative sample. The analysis was published on web page [tajnikipolityki.pl](http://tajnikipolityki.pl) (secrets of politics), [20, 21]. The results are presented in Table 4.

**Table 4.** Results of April poll (Source: Authors' work)

Candidate	Approval	Classical
Komorowski	447	362
Duda	292	219
Ogórek	138	57
Kukiz	308	126
Korwin-Mikke	103	38
Palikot	114	19
Jarubas	74	18
Tanajno	21	3
Braun	34	8
Kowalski	42	8
Wilk	37	4

The same situation as in the February poll was observed. Komorowski won the poll, Duda was the second. In approval voting almost all candidates obtained significantly higher number of votes. The analysis of the advantage coefficients leads to the following observations. The advantage of Komorowski over Duda is 1.652 in classical majority voting and 1.530 in approval voting. So it is lower in case of approval voting. The phenomenon of 2005 elections is observed. It could indicate that if people do not choose only one, most preferable candidate their concentration around Komorowski is sligher. Analogously to 2005 elections it may have been a hint that there would be a second round and Duda would win the elections (Table 5).

**Table 5.** Advantage coefficients. Presidential poll, April 2015 (Source: Authors' work)

Candidate	Komorowski	Duda
Komorowski	–	0.604
		0.653*
Duda	1.652	–
	1.530*	

Our predictions were confirmed as: Duda won the first round without obtaining over 50 % of votes (Duda – 34,76 % of votes, Komorowski – 33,77 % of votes). Komorowski was the second. There was a second round and Duda won the elections (Duda – 51,55 % of votes, Komorowski – 48,45 % of votes).

## 4 Conclusion

The analyses of the role of advantage coefficients for 2005 and 2015 elections may be a support for a thesis that in case of two-round elections diminishing coefficients for a leader are a significant hint that he would not win the elections. The thesis was confirmed in case of Polish presidential elections. It is not possible to find confirmation this thesis for other elections because of lacking polls conducted over representative samples. Other connections between results of approval voting and classical majority voting can give some predictions on results of elections.

## Appendix: 2015 Parliamentary Poll

In this part of our paper we attempted to apply approval voting to the analysis of parliamentary elections. We asked respondents about their best party and for all parties they approved. They were not asked about coalitions but only their choices. We followed the method of the analysis of the Hesse elections [17, 18]. We established whom supported the respondents who chose a given party. On this basis we tried to predict the coalition they may approve. We also asked our respondents to make choice using the disapproval method. Our results demonstrate that the approval and disapproval method do not coincide although they are mathematically isomorphic. A comparison of the results obtained by these two methods show a margin of a potential electorate of a given party.

2015 Polish parliamentary elections took place in October 2015. The poll was conducted about 2 weeks before elections, by Ariadna poll agency, online, over a representative sample. The main debate between the leaders of parties took place after the poll. This influences slightly the similarity between the poll and results of elections. Eight parties were considered in the elections: Prawo i Sprawiedliwość (Law and Justice, PiS), Platforma Obywatelska (Citizen Platform, PO), Kukiz 15, Zjednoczona Lewica (United Left, ZL), Nowoczesna (Modern), Polskie Stronnictwo Ludowe (Polish Peasant Party, PSL), KORWIN, Razem (Together). ZL needed more than 8 % to get into Parliament because it was a coalition. The other parties needed more than 5 %. Results of the poll and of the elections are presented in Table 6.

Let us notice that with the exception of ZL and Razem the results of the poll and the elections are very close. ZL and Razem are two leftist parties. Before the main debate only ZL was recognized by a significant part of society. As a result of the debate one of the leaders of Razem became recognizable and some people decide to vote for this party. As the poll was conducted before the debate, significance of Razem would not be

**Table 6.** Comparison of results of poll and results of election (Source: Authors' work)

Party	Poll	Results of elections
PiS	39.4 %	37.58 %
PO	25.6 %	24.09 %
Kukiz 15	7.2 %	8.81 %
ZL	10 %	7.55 %
Nowoczesna	6.7 %	7.60 %
PSL	5.4 %	5.13 %
KORWIN	4.2 %	4.76 %
Razem	1.1 %	3.62 %

reflected in the results. The sum of percent of votes for both leftist parties is close in the poll and in the elections.

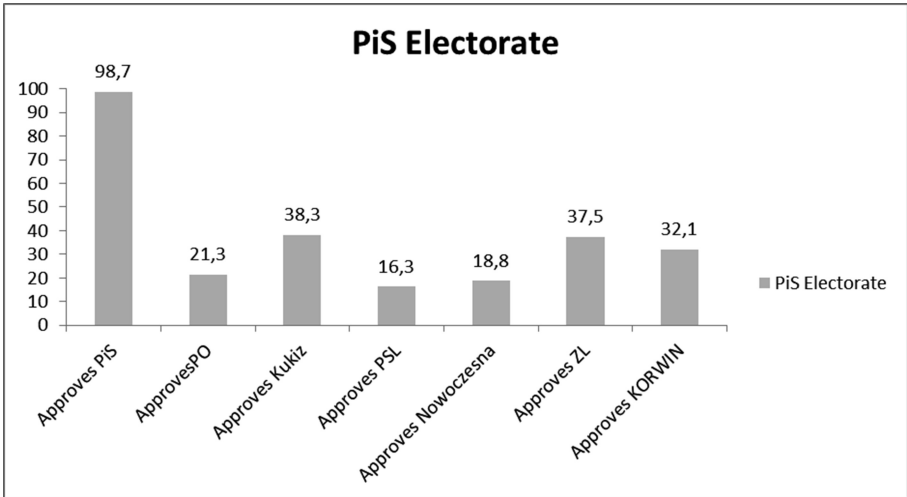
There were some additional questions in the poll. These questions were related to voting methods other than classical majority: approval voting and disapproval method. By disapproval method we mean that respondents choose of which parties they disapprove. The party with the lowest number of such votes wins. Approval and disapproval votings are the same from the mathematical point of view. They are not the same from the psychological point of view what will be demonstrated in data obtained from this poll.

Let us analyze Table 7. In this table the results of voting by all three methods are included with the additional information on the number of votes which neither approve nor disapprove of a given party. These votes form a margin of possible support for the party. Let us note that with exception of PiS, where almost everyone has formed opinion, parties have a large margin. People often neither approve nor disapprove of those parties. The lack of opinion renders the thesis "If I do not approve, I disapprove" false. The total numbers of votes casted to parties are different because some respondents did not answer.

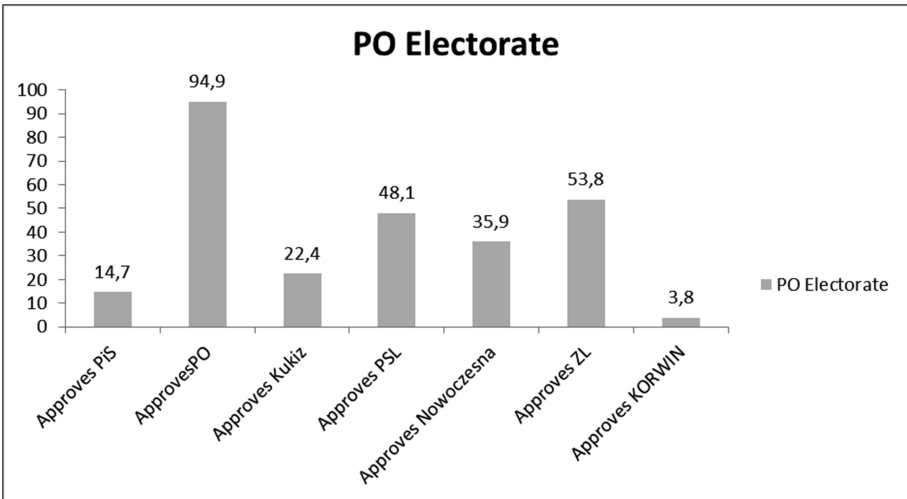
**Table 7.** Parliamentary elections, 2015. Results of classical, approval and disapproval methods (Source: Authors' work).

Party	Approval	Disapproval	Classical majority	Margin
PiS	358	239	240	12
PO	308	235	156	68
Kukiz 15	264	224	44	121
PSL	199	167	33	243
Nowoczesna	223	137	41	349
ZL	297	124	61	188
KORWIN	175	281	26	156
Razem	104	138	7	360

Polls did not demonstrate such an advantage of PiS that would eliminate the necessity of forming a coalition government. Questions about approval voting allow to establish which coalition can be approve of by supporters of a given party. We present which other parties gained the approval of the supporters of each of the four parties which obtained the highest number of votes. The other parties obtained such a small number of votes that it was difficult to distinguish a significant support.

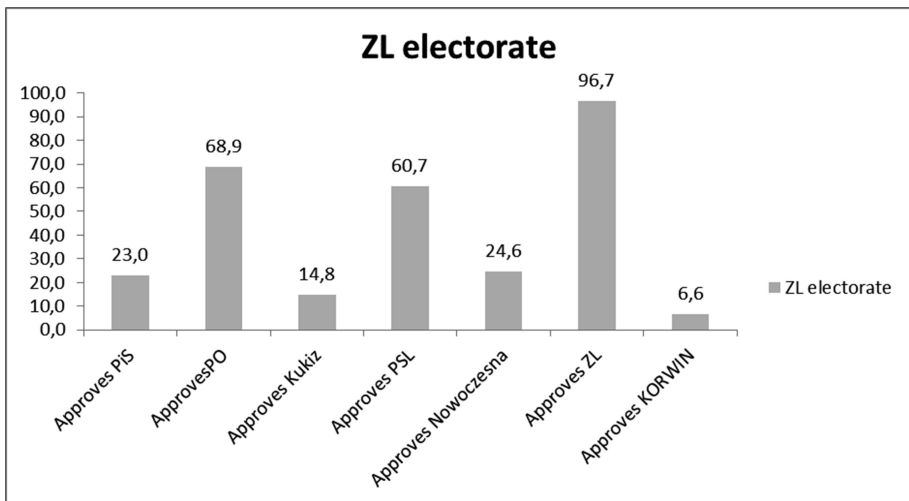


**Fig. 1.** 2015 parliamentary elections. Parties approved of by supporters of PiS (Source: Authors' work)

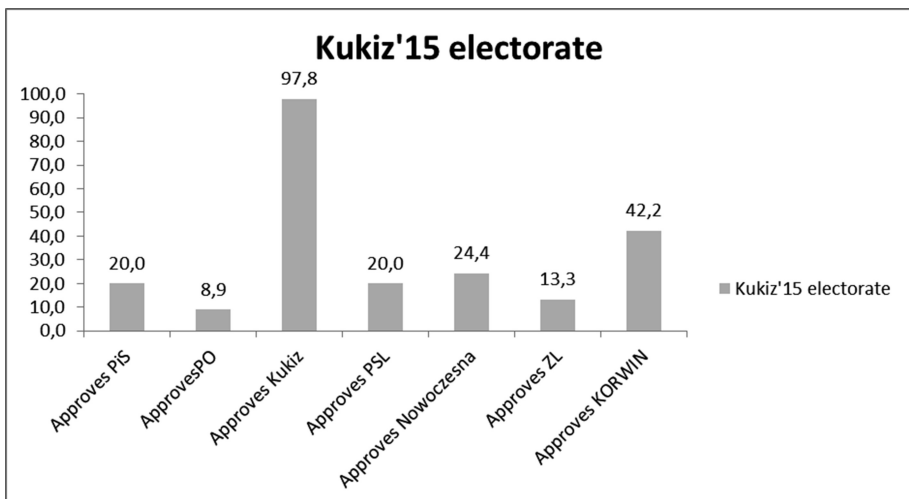


**Fig. 2.** 2015 parliamentary elections. Parties approved of by supporters of PO (Source: Authors' work)

Supporters of PiS approve of Kukiz, ZL and KORWIN. The coalition with Kukiz was considered. Supporters of PO approve of PSL, Nowoczesna and ZL. PO was in parliamentary coalition with PSL at that time. Supporters of ZL approve of PO and PSL. Such coalition was also considered. Supporters of Kukiz approve of KORWIN. There was a plan of a coalition between these parties. So, coalitions which can be found by an analysis of approval voting are the same as the coalitions considered in reality (Figs. 1, 2, 3 and 4).



**Fig. 3.** 2015 parliamentary elections. Parties approved of by supporters of ZL (Source: Authors' work)



**Fig. 4.** 2015 parliamentary elections. Parties approved of by supporters of Kukiz (Source: Authors' work)

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