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## APPROVAL VOTING AS A POLLING METHOD

### 1. APPROVAL VOTING – GENERAL OVERVIEW

The approval voting method, although used in history: e.g. in ancient Sparta and in the city-state of Venice (Girard, 2010; Laslier, Sanver, 2010) never became popular and widespread. Today it found its uses in scientific societies and even at the Security Council of the United Nations. Finally, after the publication of Brams's and Fishburn's (1978) seminal paper it has started to gain more and more of attention.

The main advantage of the approval voting is that it replaces the choice of just one alternative or a candidate, which is typical of majority voting, with expressing the approval or acceptance for as many candidates as the voter feels suitable. Plainly speaking, the voter is simply asked to mark all the candidates he/she would accept for a given position. He/she can approve one candidate, more than one, all, or even none of them. The candidate who gains the highest number of 'approvals' is treated as the winner. This approach to voting rules out the problem of weak preference – the case when the voter prefers equally strong more than one candidate – which makes the choice less difficult and as one may argue that reduces the intensity of the feeling of being undecided. Also, contrary to Condorcet's or Borda's methods, it does not require to make any pairwise or listwise comparisons between the candidates, which makes it relatively simple and quick.

Theoretical presentation and analysis was done by Brams and Fishburn in their book “Approval voting” (1982) while applications in real of experimental elections are presented in the “Handbook of Approval Voting” edited by Laslier and Sanver (2010). First Polish representative sample studies comparing the results of the presidential elections produced by approval vs majority vote were conducted in 2002 by Laslier and Van Der Straeten (2007) and in 2005 by Przybyszewski and Sosnowska (2006). Generally speaking, such paradigm limits the results to the comparisons of the winning candidates who in the case of approval voting can be different from the majority winner and voting paradoxes. Most of unorthodox methods were aimed to prevent the paradoxes of voting – the inability to show the winning candidate and the victory of the candidate unaccepted by the majority of the voters. It lead either to increasing the number of ballots based on the first preference or to allowing the voter to express his/her second, third etc. preferences (i.e. his second, third etc. preferred candidates). Arend Lijphart proposed to divide the voting methods into two basic types: cardinal – the choice of just one candidate, and ordinal – ordering the candidates. Cardinal methods need to be repeatedly used while ordinal methods allow us to mimic the results of the second, third etc. ballots. This property of ordinal methods leads us to ask the question of whether we can use the ordinal voting methods for predicting the results of the elections.

## **2. APPROVAL VOTING AS A POLLING METHOD**

We assume that a well-designed polling method should fulfil three basic conditions:

(a) it should not be overly complex and costly 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 and (c) should aggregate equally well all types of political preferences (i.e. strong as ordinal or cardinal and even as weak as nominal).

The above requirements rule out Condorcet's pairwise comparisons and Borda ranking methods due to their inherent complexity and difficulty. Approval voting, on the other hand seems to be relatively simple, uncostly and easy to use by the voters. However, as it requires the voter to go through the whole list of candidates, it may induce some more sophisticated and effortful cognitions than the majority vote. Three following studies present some arguments for using the approval voting as the alternative to standard polling methods.

### **2.1. Study 1 – cognitive effort under different voting rules <sup>1</sup>**

The study was a process tracing experiment aimed to find differences in the amount of information processed while making a decision under different voting rules: majority rule (choice of one candidate from the list), approval voting (as described above) and the categorization method (in this method voters mark the approved candidates with a “+” mark and disapproved with a “-“ while leaving neutral candidates unmarked).

The method: The participants (N=33) were asked to take part in a choice by a vote of a person for the post of a Dean's office manager and randomly assigned to one of three groups: majority, approval and categorisation. After reading the description of the voting procedure and the presentation of the voting card but before the vote, the participants were asked to get acquainted with 13 candidates using the information board method. The board had the form of a matrix made of the list of 13 rows (candidates) by 14 columns (dimensions/characteristics of a candidate, such as gender, age, education, foreign languages spoken, professional experience, availability, communication skills, coping with stress, organizational skills, ability to work in a team, leadership skills, and openness to new challenges). The task of participants was to open the cells in the matrix to obtain a desired piece of information. The technique we used allowed them to open a single cell, a whole row or a whole column). The number of

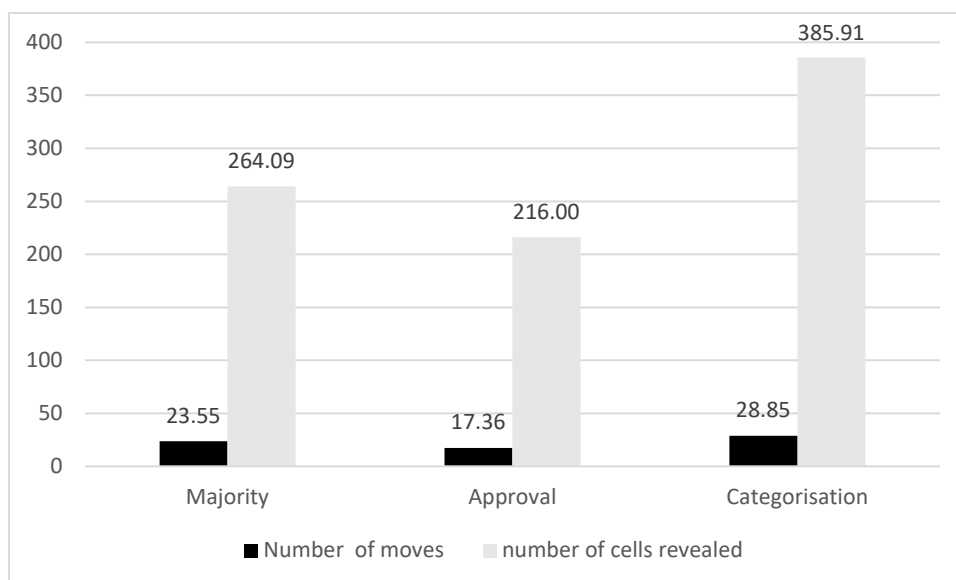
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<sup>1</sup> The full description of the study may be found in Malawski, Przybyszewski & Sosnowska, 2010

those pieces of information was an indicator of the complexity of the data integration and processing before the choice was made.

The results: Two simple and natural measures of the cognitive effort were employed the total number of moves or clicks (M1) and the total number of cells seen by a participant (M2), both measures (M1 and M2) include repetitions, i.e. openings of the same row, column, or a cell more than once. The results are presented in figure 1.

Figure 1 The average cognitive effort measures under three voting rules



As can be seen, the approval voting seems to be the one that requires the lowest number of moves and conduces the participants to reveal the lowest number of cells. The results were statistically tested with the Kruskal – Wallis; for the number of moves the results are statistically significant ( $\chi^2 = 6.23$ ;  $p < .05$ ) while for the number of cells revealed the results are significant on the level of trend ( $\chi^2 = 4.90$ ;  $p < .09$ ).

These results show quite clearly that the approval voting is certainly not more difficult and mentally effortful than the majority vote and is definitely easier than more sophisticated methods (e.g. categorisation of the candidates into three categories).

## 2.2. Ordinal, cardinal and nominal preferences

The voters are different in their level of ‘political sophistication’, which in the case of voting may be visible in the type of their preferences. The most complex is definitely the ordinal type: a voter is capable of building a clear and stable ranking of the candidates, however it is quite probable that it is not a common type of political preference profile. We would argue that if all the voters were capable of creating such a profile the methods of voting based of pairwise comparisons or ranks would be employed worldwide, which is not the case. The possible reason for this is the fact that quite a proportion of the voters hold at least partially ordinal preference profiles: they are capable of revealing their first preference, second and third perhaps, but the rest of the candidates are ranked equally. One may also argue that some of the preferences are in fact nominal: the voters are capable of noticing the differences between candidates but they are undecided about their choices. Thus a well-designed method of polling should accept even those nominal preferences – and we claim that the approval-based model fulfils this requirement. From a psychological point of view, especially taking dual processing models of thinking (Chaiken&Trobe, 1999, Kahneman, 2011 ) the polling method should not induce more complex mental operations than those ‘natural’ for the electoral choices of the citizens.

To test whether the approval voting changes the general mindset in this respect we performed study 2 in which the complexity of choices and preferences was measured by authoritarianism scale.

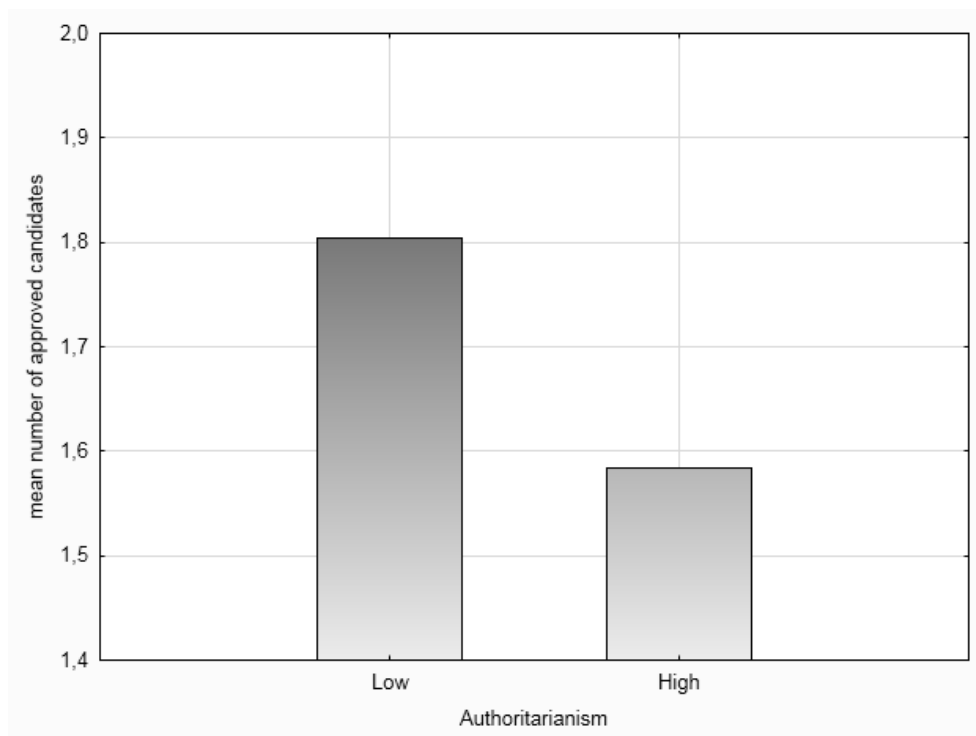
### **2.3. Study 2 – complexity of thought**

The method: During the presidential campaign of 2015 a representative random sample of the Poles (N=1042) were asked to participate in a presidential opinion poll in which they were asked to make their choices in the approval vote. The number of candidates approved was calculated independently for every person and treated as a measure of the complexity of the expressed political preferences.

As the independent variable measuring the complexity/simplicity of political thinking, we decided to use the 9-item scale of authoritarianism by Świątnicki and Przybyszewski (2014), which is composed of non-politics-laden items adopted from other authoritarianism and dogmatism scales. The scale is less politically biased as compared to the original F-scale and of acceptable reliability ( $\alpha = .76$ ). The items pertain to the matters of (a) obedience to parents, authorities, and traditions, (b) following specialist, authorities and advisors when one do not understand the problem, (c) strength and power as important aspects of social life, and (d) high need to moral and ideological unity.

The results: First, simple Anova with authoritarianism (median split) as the factor and the number of candidates approved was performed. The results are presented in fig. 2.

Figure 2. The mean number of approved candidates for the voters of high and low levels of authoritarianism.



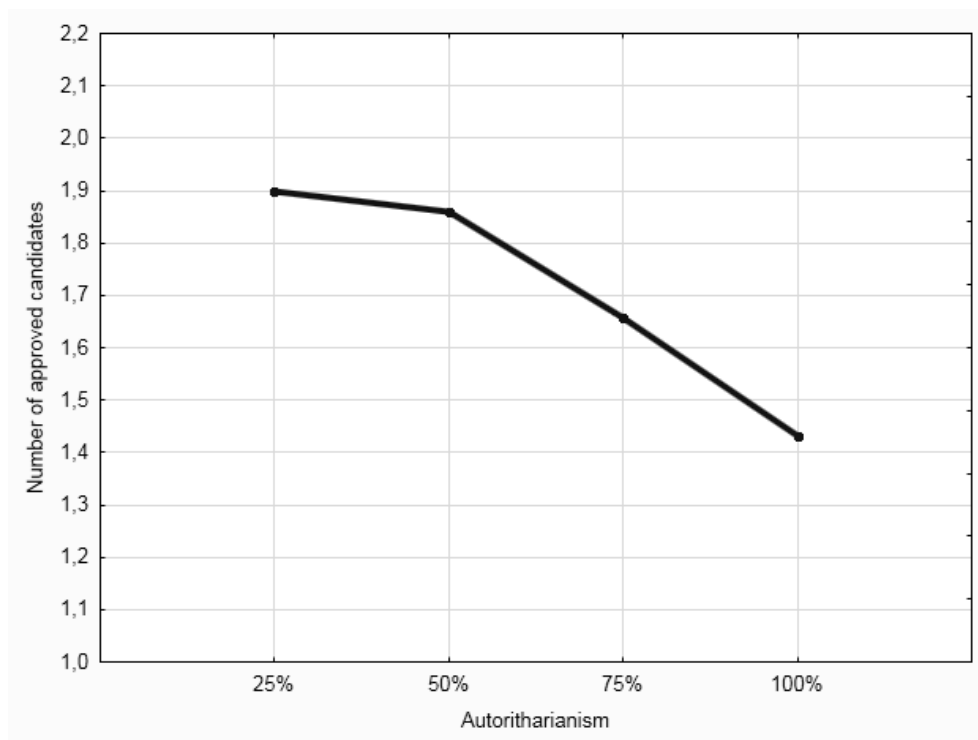
As can be seen, the voters low in authoritarianism approved on average a greater number of candidates as compared to high authoritarianism group. The results are statistically significant ( $F(1, 1042)=11,532, p=.001$ ) and clearly show that the proposed method of polling is

psychologically valid – less sophisticated voters produce less complex voting results which may mean that the method does not induce artificially complex decision processes.

Then we decided to remove the extreme right voters (n=57) from the sample. This was done due to the fact that in 2015 elections the extreme right parties registered five small committees each supporting its own candidate, which made the extreme rightists approve up to five candidates who were to great extent identical in their political programmes.

The results are presented (for quartile split of authoritarianism) in fig. 3.

Figure 3. Authoritarianism and the mean number of approved candidates



The differences for quartile split of authoritarianism are even more striking – the number of approved candidates drops dramatically with the growth of authoritarianism ( $F(3, 995)=10,49$ ,  $p=.000$ ) which gives a strong support to our claims that the method does not bias the decision process.

### 3. THE METHOD

The method for predictions we propose is based on dual voting using (a) the simple majority rule, and (b) approval voting. To illustrate the general idea first let us analyse an abstract example.

#### 3.1. The example of the poll

There are three candidates: A, B and C and the electorate composed of 100 voters. The decision rule is a second-ballot system in which the winner is either a candidate who obtains more than 50% of the votes in the second round ( $d=51$  votes in this case) or the simple majority winner of the second ballot between the two candidates who gained the highest support in the first ballot.

Our electorate may be described by their first preferences which are as follows: A is favoured by 45 voters, B – by 30 voters, and C by 25 voters. The approval for the candidates is much more complex as the number of approved candidates may range from 3 to 0, thus in our example it may be as follows:

*A and B are approved by 20 voters*

*A, B, and C are approved by 10 voters*

*A and C are approved by 15 voters*

*B and C are approved by 10 voters,*

Also some of the voters approve just one of the candidates: 15 voters approve only A; 25 voters approve only B; 5 voters approve only C.

The results of the majority polling will be consistent with the first preferences of the voters: the winning candidate A obtains the support of 45, while B of 30, and C of 25 voters. We also assume that it will be approximately consistent with the results of the first ballot.



The results of the approval poll will be different - A is approved by  $20+10+15+15=60$  voters, B is approved by  $20+10+10+25=65$  voters, and C is approved by  $10+15+10+5=40$  voters. In this case B is a winner.

Table 1 The results of majority and approval poll

Candidate	Majority	Approval
A	<b>45 (winner)</b>	60
B	30	<b>65 (winner)</b>
C	25	40

If the results are consistent with the real-life elections, we see that: (a) none of the candidates obtains  $d=51$  votes (there would be the second ballot, held between two best majority candidates – A and B) and (b) the votes of the supporters of candidate C would be a decisive factor in the second ballot (and the potential supporters of A and B who at the time of polling are still undecided about their majority decision.<sup>2</sup>

The key question is, however about the flow of the electorate of the losers between the candidates in the second ballot, ‘the support reserves’ as we call it. The method we designed allows us to get some insight in this matter and requires to perform only two, relatively easy analytical steps: step 1 calculating of the advantage coefficients, and step 2 eliciting the support reserves.

### 3.2. Advantage coefficients

The first step of the analysis of the approval poll is to calculate the *advantage coefficients* for all the pairs of the candidates following the formula:

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<sup>2</sup> Note that in our example for the sake of simplicity we assumed that all the voters are decided about their choices, however even those undecided still hold their approvals. Technically speaking apart from candidates A,B, and C we may add two categories of the voters: “undecided about going to the ballots” and “undecided about the vote” and still take into account the results of their approval voting.

$$MAC_{A/B} = \frac{\text{majority votes}_A}{\text{majority votes}_B}$$

Majority votes for the candidate A are divided by majority votes for B gives us the value of the majority advantage coefficient for the pair of the candidate A and candidate B. In the case of the example above the values will be as follows:

$$MAC_{A/B} = \frac{\text{majority votes}_A}{\text{majority votes}_B} = \frac{45}{30} = 1.5$$

$$MAC_{A/C} = \frac{\text{majority votes}_A}{\text{majority votes}_C} = \frac{45}{25} = 1.8$$

$$MAC_{B/C} = \frac{\text{majority votes}_B}{\text{majority votes}_C} = \frac{30}{25} = 1.2$$

Then, we repeat the same operation for the approvals correspondingly for the same set of pair of candidates following the formula:

$$AAC_{A/B} = \frac{\text{approval votes}_A}{\text{approval votes}_B} \text{ etc.}$$

It turns out the following results:

$$AAC_{A/B} = \frac{60}{65} = 0.923$$

$$AAC_{A/C} = \frac{60}{40} = 1.5$$

$$AAC_{B/C} = \frac{65}{40} = 1.625$$

Notice the in the case of the first ballot winning pair of candidates (A and B) the majority advantage coefficient of A over B (MAC=.923) is lower than the corresponding value for the approval (AAC=1.5). According to our method it is the indicator that A will not win the second ballot. The very structure of the advantage coefficients shows the potential gain in votes to be obtained from the electorate of the candidates rejected after the first round.

Generally speaking, the candidates who are widely approved, even if not voted for in the first ballot are in a good position as compared to those whose majority support is equal to their

approval. In the first case it is possible to collect some additional votes from the voters of first-ballot losers, in the latter the majority support is close to the ceiling effect and no additional votes may be gained.

### 3.4. Analysis of votes flow between the round – seeking for the optimal strategy for the second round winner

The following analysis is based upon two assumptions (a) the voters of two best candidates will not change their preferences between the rounds against their approvals, or at least this will be an infrequent case, and (b) we assume that the voters who approve both candidates in the second ballot, will vote them at equal probability which allows us to sum up all the approval votes cast for a given candidate. In our example there are 25 voters who supported the candidate C in the first round. Some of them, apart from quite obvious approval for C, also approved the candidate A, B, or both. In the case of our example we stated that:

A and C are approved by 15 voters

B and C are approved by 10 voters,

which may mean that the candidate A may gain 15 votes while the candidate B only 10.

Let us for the sake of the vividness of the advantages of our method, add one more candidate<sup>3</sup>, D. The distribution of approvals may be then as follows:

*A and C are approved by 15 voters*

*B and C are approved by 10 voters,*

*A and D are approved by 9 voters*

*B and D are approved by 16 voters.*

The strategy for the candidate A may be planned on the basis of the analysis of the number of C's and D's voters who approve him/her. In our example, if the candidate A tried to appeal to the voters of the candidate C, his/her would gain 15 votes, while appealing to the candidate's

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<sup>3</sup> In the presidential elections in Poland the number of registered candidates is usually well above 10.

D voters may give him/her only 9 votes. On the other hand, his/her competitor – candidate B – if he/she successfully appeals to the electorate of the C may gain 10 votes, while appealing to the D's voters may produce the additional support of as much as 16 voters. Logical conclusion for the candidate A will be to design between-ballot campaign in a way that increases his/her level of similarity to the candidate C, while the campaign of D should be focused on the candidate's D agenda.

Noteworthy, the above calculations converted into percentages of approval votes predict the real results of the second ballot, which will be shown in the subsequent paragraph.

#### **4. APPLICATION FOR THE CASE OF PRESIDENTIAL ELECTIONS 2015**

In February 2015 most of the polls were in favour of then-current president Bronisław Komorowski, whose support was estimated at as much as 70%. According to the second-ballot electoral law, such result could mean the victory in the first round. However, our first poll conducted with ARIADNA polling agency (end of Feb. 2015) showed that although he is more approved than voted as compared to his stronger competitor Andrzej Duda, the results of Komorowski advantage coefficient analysis against other candidates were not as optimistic. Then the list of registered candidates was changed and a strong anti-establishment candidate – Paweł Kukiz - appeared on political stage. Due to this change we decided to repeat the poll and the results presented below come from the second poll.

The next 2015 poll was conducted in the end of April, about 2 weeks before the elections when the list of candidates was finally set up.

Method: We applied a standardised procedure of majority and approval voting, separated by a set of buffer questions (demography). The order of the voting was randomised. Again, ARIADNA polling agency supplied the national random sample of voters (N=1040) recruited on-line.

The results - raw data: First, we calculated the results of majority voting and approval voting.

The numbers of votes are presented in table 2.

Table 2. The results of majority and approval votes Apr. 2015

	Majority	Approval
Bronisław Komorowski	362	447
Andrzej Duda	219	292
Magdalena Ogórek	57	138
Paweł Kukiz	126	308
Janusz Korwin-Mikke	38	103
Janusz Palikot	19	114
Adam Jarubas	18	74
Paweł Tanajno	3	21
Grzegorz Braun	8	34
Marian Kowalski	8	42
Jacek Wilk	4	37
Undecided	178	-
ALL	1040	-

As can be seen the second ballot will be necessary (none of the candidates reaches the 50%+ threshold of support. Moreover, if we compare the raw data on the support expressed in both voting methods, it is quite apparent that all of candidates but Komorowski is only 23,5% more approved than voted, Duda is 33,3% more approved than voted, while the third strongest candidate – Kukiz is more approved than voted by an enormous value of 144%. Similarly, all anti-systemic or anti-establishment candidates of far right are much more approved than voted. Such distribution of support/approval deserves an in-depth analysis – advantage coefficients will give a hint whether the second and third candidate have any chances to win and electorate flow analysis will reveal whose voters – Komorowski’s or Duda’s produced the enormous approval for Kukiz.

Advantage coefficients analysis: Advantage coefficients were calculated following the standard formula described in the introductory section. The values are presented in table 3.

Table 3. Advantage coefficients MAC and AAC (candidates with < 5% omitted).

	KOMOROWSKI	DUDA	KUKIZ
KOMOROWSKI		AAC .65 MAC .60	AAC .69 MAC .38
DUDA	AAC 1.53 MAC 1.65		AAC 1.05 MAC .57
KUKIZ	AAC 1.45 MAC 2.87	AAC 0.95 MAC 1.74	

The value of AAC calculated for the pair Komorowski-Duda is lower than the value of MAC (AAC=1.5 to MAC=1.65). The same pattern may be found for the pair Komorowski-Kukiz (AAC=1.45 and MAC=2.87). As described in the introductory section, such differences may be understood in the following way – if Duda did not enter the second ballot the flow of Duda’s orphaned electorate to Komorowski would be relatively small. The same would happen in the case of Kukiz’s loss. However in the opposite situation – Komorowski’s loss – the flow to Duda would be much higher and for Kukiz it would be very high.

The same analysis for the pairs of Duda-Komorowski (AAC=.65; MAC=.60) and Duda-Kukiz (AAC=1.05; MAC=.57) shows lower values of MAC than AAC which means that there are some Komorowski voters who approve Duda and Kukiz, while the proportion of Duda’s and Kukiz’s voters who approve Komorowski is relatively small. In our 2005 polls the pattern of results was similar – there were Tusk’s voters who approved Kaczyński and other candidates while there were no Kaczyński’s voters who approved Tusk or anyone else which caused Tusk’s loss in the second ballot (see: Przybyszewski & Sosnowska, 2016). The results presented so far quite clearly show that the first ballot would be indecisive and the results of the second ballot would not be favourable for Komorowski. The results of the election were as predicted – Komorowski lost in the second ballot, mostly because of his inability to gain

the support of 'orphaned' voters, whose support he tried to gain by taking over Kukiz's postulates.<sup>4</sup>

Strategy planning – or electorate flow prediction: The analysis of the approval preferences of the 'orphaned' voters, non-voters and undecided voters allows us to assess the potential electorate flows. Also, if we take into account the way the candidates target their campaign between the first and second round, the precise results including the electorate flow may be calculated.

In the case of Polish presidential election 2015, the situation was extremely interesting. The results of the first ballot were to be indecisive and there was much uncertainty about the results of the final ballot. However, apart from the comparison of advantage coefficients, it is possible to analyse the potential gains from flows electorate between the losing candidates, non-voters and the voters who declare to be undecided. Komorowski (who eventually, to much surprise, came second in the first ballot) was in a very difficult position. Only 6.3% of the Kukiz's voters approved him as a president, while 22% of them approved Duda. On the other hand, Komorowski had a vast approval amongst Ogórek's voters: 38,6%, while his competitor was approved by a narrow margin of 5% of her voters. The results should be however multiplied by the percentages of votes in the majority vote poll. Thus the gain in support for Komorowski is:

$V_K = 0.063 \times 14.6\% \text{ (from Kukiz)} + .38 \times 6.6\% \text{ (from Ogórek)} = 3,43\%$ ; while the potential gain in votes for Duda is:

$V_D = 0.22 \times 14.6\% \text{ (from Kukiz)} + .05 \times 6.6\% \text{ (from Ogórek)} = 3,52\%$

The results show that if Duda and Komorowski sustain their strategies, Komorowski's loss is very probable. The only chance for victory is to find a reservoir of approval not in the

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<sup>4</sup> The strongest postulate of anti-establishment Kukiz movement was a referendum concerning the changes in the electoral system (advocated British first-past-the-post system), changes in taxation law and financing of the political parties. The referendum was put forth by Komorowski and turned out to be total failure – the turnover was only 7,8%.

'orphaned' voters but in non-voters and undecided voters. The analysis of the approvals of these two categories of voters show that Komorowski is approved by 33.5% of undecided voters (about 20% of the electorate) and 29.5% of non-voters (almost 50% of the population). The corresponding approval for Duda is 9.4% and 1%.

The real campaign proved our calculations right – Komorowski ignored the chance to gather the support of non-voters and the undecided and focused his campaign on Kukiz's postulates. This choice was a costly mistake – Andrzej Duda won the elections with a support of slightly more than 51%.

## **5. SUMMARY**

The results the studies presented in this paper prove the method we propose to fulfil most of basic requirements for a good polling method: it is psychologically valid, very easy and unobtrusive for the respondents and due to its simplicity of data collection relatively cost-effective. It was successfully applied in 2005 and 2015 presidential elections in Poland. Also, approval voting was used to assess the viability of post-electoral coalitions in parliamentary elections in Poland and France and Germany.

We assume that it may be used in all the electoral systems when the initial number of candidates is reduced by the procedure or the final results are dependent on the between-ballot or post electoral and/or the electorate flow. It is quite possible, that it may be applied to American elections (the number of candidates before the by-elections is higher and then reduced to two who collect the support of the electorate of those who lost).

The main advantage of the method is that it introduces not only the predictive tools but also allows the users to create sound and supported by data strategies for coalition games and re-directing between ballot electorate flow.



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