

Strategic voting in the 2011 and 2015 Polish Senate elections: Testing Duverger's Law in the second-order elections ¹

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Abstract

This article tests Duverger's law through analysis of the Polish Senate elections in 2011 and 2015. These two elections were held under the new first-past-the-post (or single-member plurality) system, which replaced formerly used unlimited vote. The main aim of the article is to test, whether we can confirm the expectations of strategic voting in the context of the so-called second-order elections, as the Polish Parliament is a classical example of the asymmetrical bicameralism, with the secondary role of the upper chamber, the Senate. The results show that the strategic voting was not universal phenomenon under the plurality rule, as indicated by many violations of Duverger's law. Our research confirmed that the effect of electoral institutions (institutional structure) is contingent and (at the district level) inhibited by country-specific conditions, with potentially strong influence of the second-order character of the Polish Senate elections.

KEY WORDS: Poland; second-order elections; party system; strategic voting; Duverger's law

INTRODUCTION

Recent empirical research on voting in single-member districts (SMDs), based on extensive datasets of election results, demonstrated the general (although not perfect) validity of Duverger's law (1954), i.e., that the average outcome under plurality rule is generally consistent with two-party competition (Singer and Stephenson, 2009; Singer, 2013). However, most authors dealing with Duverger's original assumptions have been usually given considerable attention to the effects of electoral rules in the so-called first-order elections, i.e. elections to the lower chambers of the national parliaments, just because the lower chamber elections are crucial in the process of national government formation.³

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³ More to the concept of the first- and second-order elections see Reif and Schmitt (1980), Reif (1997), Marsh (1998), Schmitt (2005), Hix and Marsh (2007).

In this paper, we aim to fill that gap, testing Duverger's assumptions just in the second-order elections. Specifically, we focus on the electoral system used in elections to the Polish Senate, the upper chamber of the Polish bicameral parliament. This choice has several advantages. First, the role of the Polish Senate, as well as the Senate elections, in the evolution of the Polish party system, and generally in Polish politics, is secondary due to its role in the legislative process, as the Senate can not significantly amend acts (Gwiazda, 2009, p. 367). So, the Polish Senate elections are a very good example of the second-order elections. Second, in the period between 1993 and 2007, when unlimited (or multiple) vote was used in the Senate elections, Duvergers's expectations that a majoritarian system produces a two-party competition was confirmed in Senate elections (Gwiazda, 2009, p. 367). Finally, as the Polish Senate election in 2011 and 2015 were held under the new first-past-the-post (FPTP), or single-member plurality, system, the Polish case is very useful to test Duvergers's expectations in context of partially transformation of the Polish party system, as both elections were characteristic by entrance of the new parties to the Polish parliament (cf. Kubát, 2012; Tworzecki, 2012; Marcinkiewicz and Stegmaier, 2016).

This paper is organized as follows. First, we briefly review the existing formal literature on Duverger's law. In the second part, the data and methods of analysis are introduced. In the third part, an analysis is presented, and finally, the concluding section formulates some implications of the results for further research.

1 THEORY: 'MICRO-DUVERGERIAN' AGENDA AND STRATEGIC VOTING

The importance of Duverger's seminal work, *Political Parties* (1954), lies in the fact that Duverger was one of the very first authors who highlighted the possibility to predict relationships between electoral system and political outcomes (Taagepera, 2007, p. 101). This research area was later called 'Duvergerian agenda' by Shugart (2005) who emphasized its role as forming the core of the field of electoral studies research during the 1990s (Shugart, 2005, p. 28).

Duverger's (1954) assumption that plurality rule can create two-party competition is based on two underlying effects ('mechanical' and 'psychological') which create incentives for voters and candidates to act

strategically.⁴ The Duvergerian logic thus assumes that voters are short-term instrumentally rational, concerned only about affecting the outcome of the current election (Singer, 2013, p. 203). Strategic voting is then indicated by the presence of voters who desert their preferred (small) parties (candidates), if they have only limited chances to gain a seat (as the reactions of political actors to the expected consequences, and at the same time, the anticipations of the operation of electoral rules, i.e. the workings of the mechanical factor), in favour of less preferred parties (candidates) with real chances to succeed. Similarly, parties can act strategically by not nominating candidates (or by joining other parties or coalitions) in districts where they traditionally have only limited support, with deterring potential new entrants from entering the race. It is then possible to describe Duverger's law as an equilibrium that is reached only over a series of elections (Gaines, 1999, p. 837; Benoit, 2006, pp. 74–76; Grofman, Bowler and Blais, 2009, pp. 1–3). In repeated elections, provided that all voters and parties act perfectly strategically, the equilibrium will emerge in that only two candidates receive all the votes and the votes obtained by the third and following candidates approximate zero.

At the empirical level of individual countries, most attention has been paid to countries violating the assumption that plurality rule would lead to two-party competition even at the national level (e.g., Grofman, Blais and Bowler, 2009). Here, for instance Dunleavy and Diwakar (2011) argued that the USA seems to be a case of 'stunted development', the UK has moved substantially away from Duvergerian predictions, and India shows partial Duvergerian conformity, but combined with substantial vertical scattering of non-Duvergerian results (Dunleavy and Diwakar, 2011, p. 855).

On the other hand, some studies, focused on the analysis of strategic voting in other countries, confirmed the assumptions related to the Duverger law. For instance, Reed (2001) argued that the 1993 Italian mixed-member majoritarian (MMM) system, based largely on SMDs, confirmed the assumptions of Duverger's law, as most of the electoral districts moved closer to bipolar competition. Similarly, Reed (1990), analyzing election outcomes in Japanese elections in the period of 1947–1986 (when Japan used single non-transferable vote), confirmed the validity of the law of simple plurality elections (i.e. Duverger's law), although the process of reducing the number of candidates was very long (equilibria was reached through trial and error processes only) and the 'learning process' (rather than rationality) connects structure and behaviour. Finally, Maškarišec (2015) found consistent, but not linear, movement towards

⁴ While the mechanical effect concerns how votes are translated into seats, the psychological effect consists of candidates' and voters' response to the working of the mechanical effect (cf. Benoit, 2006, p. 74–76).

the Duvergerian equilibrium in Mongolia (in the period of 1996–2004, when Mongolia used a two-round system, yet a non-majoritarian one), although the emergence of bipolar party politics in Mongolia was not an immediate process, but it was reached only over a series of elections.

Similarly, a recent analysis, working with large data sets of elections in SMDs, confirmed that district magnitude had (at the district level) the effect that Duverger expected, although the effect of electoral institutions could be contingent and (at the district level) inhibited by country-specific conditions (for instance, social cleavages that generate demand for additional parties) (Singer and Stephenson, 2009, p. 481). Clark and Golder (2006), who analysed the underlying causal process by which sociological and institutional factors shaped party systems, then concluded that Duverger was right about the determinants of party systems, as plurality rule systems acted as a ‘brake’ on the process by which societal pressures translate into a growth or a decline in the number of political parties (Clark and Golder, 2006, p. 706). Finally, Raymond (2015), in his analysis of west European elections prior to the adoption of proportional representation, confirmed Clark and Golder’s finding about importance of ‘social cleavage explanation’.⁵ Thus, the occupational diversification, or the emergence of class cleavage, respectively, was positively associated with the increase of mean district-level party system fragmentation, eventually leading (in case of presence of higher levels of social cleavage diversity) to violation of the two-party assumption associated with anticipated effect of the Duverger’s law (cf. Raymond, 2015, pp. 2–5).

Thus, although some studies found rather mixed results, an important fact in this context is that even Duverger (1954, p. 228) did not consider his proposition as absolutely valid, but rather as a possible tendency which may be influenced by other factors. Nevertheless, existing two-party competition at the district level does not lead automatically to two-party competition at the aggregate (national) level. On the contrary, nationwide two-party competition is possible, as voters may think strategically not just about the district level but also about the national level, for instance with regard to the question of who will form the government (Gaines, 1999, pp. 837–838).

However, the assumption about voter’s rationality was questioned by Reed (1990, p. 335–336) who pointed to the uncertain psychological foundations of the assumption of short-term instrumental rationality, namely that voters will correctly analyse the situation and maximize their self-interest. In this context,

⁵ Singer and Stephenson (2009) analysed district-level data from 3,291 SMD election contests in 47 countries between 1994 and 2003; Clark and Golder (2006) analysed 294 presidential and 867 legislative elections between 1946 and 2000; Raymond (2015) analysed 147 legislative elections between 1832 and 1939 in six west European countries.

models grounded in Downsian (1957) approach, where political competition is based on a single dimension, are quite often in conformity with Duverger's expectations (Grofman, Blais and Bowler, 2009, p. 4). According to Downs (1957, p. 48) a rational voter decides with regard to 'sophisticated' voting, which is meant that the voter does not vote for his preferred alternative, but for alternative ensuring the best realizable outcomes, after considering of anticipated votes by other voters (Riker, 1982, p. 762). In Downsian perspective thus the process of voting (or candidate selection) takes place as a part of the 'selection process', rather than an 'expression of preference' (Riker, 1982, p. 764).

Nevertheless, Reed (1990) stressed that voter's rational decisions are limited as party preferences are typically known at national, rather than district level; learning, rather than rationality, then connects structure and behaviour (Reed, 1990, p. 336). This finding is very important, as that the effect of strategic voting is expected to work just at the district level. Furthermore, Grofman, Blais and Bowler (2009, p. 4) emphasized that logic underlying Duverger's law is in contrast to Grofman's 'embeddedness effects', i.e. an assumption that electoral rule (institutional structure) are embedded within a wider political system that provides its own set of incentives (cf. Grofman, 1999, pp. x–xi).

Nevertheless, even Duverger's original work was based on the assumption that the electoral system is not the only (exclusive) determinant of the number of parties. More importantly, Clark and Golder (2006, p. 680) emphasized that in spite of being referred to as the father of the so-called institutionalist approach, Duverger clearly described the way in which social and institutional variables interact. However, many researchers often ignore his argument that the number of political parties is not determined primarily by electoral systems (institutional structure) but by social-economic factors (social structure). It is for that reason why Duverger describes the effect of electoral systems metaphorically as that of 'a brake or an accelerator' which hinders or facilitates growth in the number of political parties, but considers social-economic factors as the decisive 'driving power' of a country's party system (Duverger, 1954, p. 235). Thus, although electoral rules (institutional structure) play an important role for Duverger, it is rather social heterogeneity (social structure) which is the primary driving force behind the multiplication of political parties. Electoral arrangements then only act as a modifier, translating the effect of social forces into the exact number of parties (Clark and Golder, 2006, p. 704).

2 DATA AND METHODS

The basic data for this analysis consist of district-level results of the 2011 and 2015 Polish Senate elections as collected by the National Election Office of Poland (*Państwowa Komisja Wyborcza*). Because of the above-mentioned

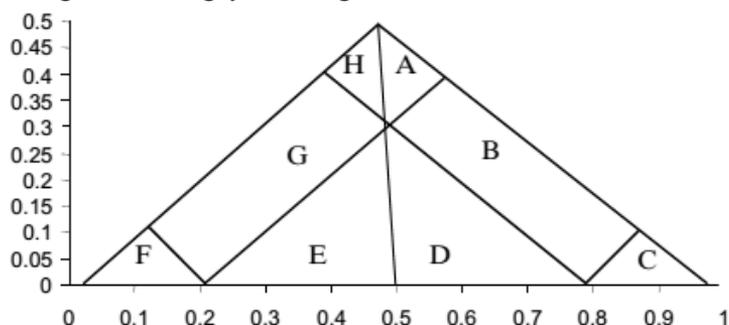
problems, we take different approaches to studying the extent of strategic voting at the level of Polish SMDs, within the framework of the ‘micro-Duvergerian’ agenda.

First, we analyse the character of electoral competition (number of political parties) at the micro level. At the basic level of SMDs, we simply calculate the percentage of the vote obtained by the top two (parties) candidates. However, as this may create a misleading picture of the size of the party system, we will also use a measure which weights parties according to their relative sizes. Specifically, we calculate the effective number of electoral parties (*ENEP*) in each district as a measure of strategic voting and the effective number of parliamentary parties (*ENPP*) as a measure of parliamentary fragmentation (Laakso and Taagepera, 1979). According to Duverger’s theory, plurality rule should lead to two-party competition, with effective number of parties of approximately two, while majoritarian rule should produce a larger effective number of parties. However, as the *ENEP* produces various values of fragmentation, Taagepera (2007, p. 103) argues that countries with an *ENEP* ranging between 1.5 and 2.5 are consistent with Duverger’s law.

Second, we use the segmented Nagayama diagrams, which help us understand the nature of competitiveness at the district level. The main advantage of the Nagayama diagrams is that these diagrams can visually (i.e. more intuitively than other methods) display and compare the electoral outcomes for the degree of competition between the most successful parties (candidates), and the extent to which smaller parties (candidates) get a substantial share of votes (Reed, 2001; Taagepera, 2004; Grofman et al., 2004). In an effort to express in detail the characteristics of electoral competition, Grofman et al. (2004) divide the Nagayama diagram into eight segments that would reflect the relative strengths of first-, second- and other-ranking parties (candidates).⁶ While thus the percentage of results in segments A, B and C (see Figure 1) can be taken as indicating bipolarized results, the proportion of districts in segments F, G and H indicates multiparty results.

⁶ These sub-divisions are delimited by the two sloping triangles and by a vertical line at $V1 = 0.5$. At the horizontal axis of the diagram (Figure 1) we see the vote share of the largest party, $V1$ (from 0 to 100%), and at the vertical axis the vote share of the second largest party, $V2$ (from 0 to 50%) (cf. Grofman et al., 2004, pp. 275–279).

Figure 1: Segmented Nagayama diagram



Source: *Grofman et al., 2004*

Finally, we use Cox's (1997) Second-First Loser ratio, *SF*-ratio (the vote share secured by the second loser in relation to the votes secured by the first loser). The *SF*-ratio is particularly useful because it offers a detailed insight into the electoral behaviour at the lowest level of aggregation, including any instances of strategic voting (or the degree of tactical voting) across SMDs. Similarly, the *SF*-ratio offers the possibility to indicate various degrees of strategic defection from less competitive to more competitive districts across SMDs (Moser and Scheiner, 2009, p. 51). An *SF*-ratio near 0 signifies a Duvergerian equilibrium (the first loser is way ahead of the second loser), while the value of 1 shows a non-Duvergerian equilibrium where voters are unable to coordinate, leaving the two losers nearly tied. In other words, as it becomes clear who the top challenger in an SMD will be, voters become much less likely to continue to support candidates who are expected to run third or worse. As a result, the second-ranking candidate will have many more votes than the third-ranking candidate in the district. In contrast, if voters are either unwilling or unable to cast strategic ballots, the *SF*-ratios will tend to be higher.

However, using the *SF*-ratio is not without potential problems. First, by looking at *SF*-ratios one is not able to exactly differentiate between different *SF*-ratio distributions, especially ones that are very similar. Second, *SF*-ratio values can be ambiguous for several reasons: a) when both the second and the third loser are considered potentially strong candidates and therefore neither is abandoned by voters; or, b) when both are truly minor candidates, and neither receives many votes. Third, *SF*-ratios themselves cannot identify who the key actors are. Finally, *SF*-ratio does not consider deviations from two-party competition in which multiple small parties combine to capture significant portions of the vote (Cox, 2001, p. 237; Moser and Scheiner, 2009, p. 55; Singer, 2013, p. 210). For these reasons, we used also so-called Third-First Loser ratio, *TF*-ratio, introduced by Singer (2013). The *TF*-ratio is defined as the vote share secured

by the parties finishing fourth (in other words, as the third runner-up) or worse as a proportion of the votes secured by the first runner-up. The *TF*-ratio is useful as another indicator of strategic coordination failure by voters and elites because it shows whether the support for third-place or worse candidates is greater than the margin between the first- and second-place candidates (Singer, 2013, p. 210).

3 STRATEGIC VOTING IN THE 2011 AND 2015 SENATE ELECTIONS

3.1 Character of the district-level party competition

As we mentioned above, the Polish party politics (both in the Sejm and the Senate) was characteristic by the long-term, also not linear, reduction of fragmentation at the legislative level, together with the strong signs of structural stabilization and some evidence of the stability of inter-party competition (cf. Gwiazda, 2009, pp. 355–371; Gwiazda, 2016, pp. 92–112). This is possible documented by the values of the *ENPP* (see Table 1), which show clear trend to bipolarization in the Senate elections and at the same time the reduction of relevant parties in the Sejm elections.

The Polish party competition thus was since 2005 dominated by contestation between the liberal-conservative Civic Platform (*Platforma Obywatelska*, PO) and the social-conservative Law and Justice (*Prawo i Sprawiedliwość*, PiS), which was in the Sejm accompanied by the small agrarian Polish People's Party (*Polskie Stronnictwo Ludowe*, PSL), and the long-term declining the Democratic Left Alliance (*Sojusz Lewicy Demokratycznej*, SLD) (cf. Kubát, 2012, pp. 34–38; Gwiazda, 2016, pp. 92–112).⁷

However, the 2015 Sejm election was very important, as the representation of small parties has undergone considerable changes. The SLD, which candidated in coalition the United Left (*Zjednoczona Lewica*, ZL), together with the Your Movement (*Twój Ruch*, TR),⁸ lost their parliamentary representation (for the first time since the first free elections in Poland in 1991), while two new parties entered the lower house: the populist Kukiz'15 and the liberal Modern (*Nowoczesna*), thus complemented traditional parliamentary parties: the PiS, the PO, and the PSL (Marcinkiewicz and Stegmaier, 2016).

⁷ The SLD was, until the elections of 2005, one of the two strongest Polish parties (cf. Kopeček, 2005, p. 505–526; Kubát, 2012, p. 34–38).

⁸ The TR was renamed parliamentary 'rookie' from elections of 2011, Palikot Movement (*Ruch Palikota*, RP) (cf. Kubát, 2012; Gałązka and Waszak, 2013).

Table 1: Effective number of parliamentary parties (*ENPP*), 1989 – 2015

	1989	1991	1993	1997	2001
Sejm	-	10.86	3.88	2.95	3.60
Senate	1.02	10.71	3.58	2.87	1.70
	2005	2007	2011	2015	Mean
Sejm	4.26	2.82	3.00	2.75	3.32
Senate	2.76	1.95	2.03	2.05	2.42

Source: *Gallagher, 2016, author's own calculations.*

However, the attention to the effective number of parliamentary parties (*ENPP*) may create a misleading picture of the size of the party system. The main reason behind this problem is that the effect of strategic voting is expected to work just at the district level. These effects, which Duverger called ‘mechanical’ and ‘psychological’, create incentives for voters and candidates to act strategically. Strategic voting is then indicated by the presence of voters who desert their preferred (small) parties (candidates), if they have only limited chances to gain a seat, in favour of less preferred parties (candidates) with real chances to succeed.

Thus, table 2 presents the percentage of the vote received by the top two candidates. The results demonstrate that when the FPTP was first applied in 2011, the top two candidates lost a significant amount of votes to the expense of other parties’ candidates. The combined vote share of the top two candidates exceeded 80% only in 11 of 100 districts (i.e. 11.00%), or more than 70% of the vote in 37 SMDs, respectively. We thus can conclude that the outcome of the 2011 Polish Senate elections was in stark contrast to the assumptions related to Duverger’s law.

On the other hand, in 2015 some of the electoral districts moved closer to bipolar competition. The top two candidates obtained more than 90% of the vote in nine districts (in all cases they received 100% of the votes), more than 80% in almost every third district (32.00%), and similarly between 70% and 80% in almost one third of cases (31.00%). Similarly, there was a significant decline in the number of districts in which the combined vote share of the top two candidates fell below 70% (from 63.00% in 2011 to 37.00% in 2015), with only a minimum number of the districts where it fall below 50% (three SMDs in 2011 compared to two SMDs in 2015). Thus, in 2015 the electoral system indicated (to some extent) the anticipated tendency to create, in the course of a series of elections, an equilibrium where only two candidates receive all the votes.

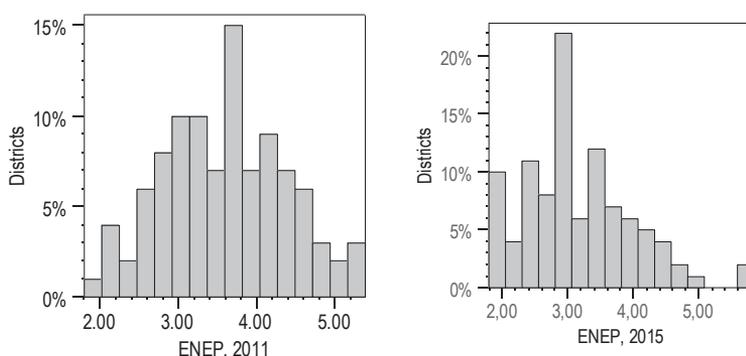
Table 2: The vote for the top two candidates, 2011 and 2015 (N = 100)

Vote share of the top two candidates	Number of districts		Percentage of districts	
	2011	2015	2011	2015
90.00 – 100.00	2	9	2.00	9.00
80.00 – 89.99	9	23	9.00	23.00
70.00 – 79.99	26	31	26.00	31.00
60.00 – 69.99	32	26	32.00	26.00
50.00 – 59.99	28	9	28.00	9.00
40.00 – 49.99	3	2	3.00	2.00

Source: *Państwowa Komisja Wyborcza, author's own calculations.*

Note: in 2011 the top two candidates received 100% of the votes in one SMD, while in 2015 in nine SMDs.

Figure 2 plots the effective number of electoral parties (*ENEP*) in the Polish Senate SMDs for both the 2011 and 2015 elections, confirming the findings presented above. In 2011, a large part of the districts located approximately between the values of 3.0 and 4.0, with 92.00% of the districts had an *ENEP* greater than 2.5, thus violating Duverger's law. More interestingly, whereas the *ENEP* in 2011 ranged from 1.81 to 5.32 (with a mean value of 3.59), by 2015 the range slightly widened to between 1.79 and 5.84, while a mean value decreased to 3.14. However, although the typical *ENEP* value decreased in 2015 to approximately three, the amount of the districts with *ENEP* greater than 2.5 decreased only slightly, from 92.00% to 79.00%, and competition at the district level thus remained far away from the Duvergerian equilibrium.

Figure 2: Histogram of effective number of electoral parties (*ENEP*), 2011 and 2015(N = 100)

Source: *Państwowa Komisja Wyborcza, author's own calculations.*

The high concentration of SMDs between the values of 3.0 and 4.00 in 2011, or around the level of three effective candidates in 2015, respectively, thus reflected Cox's non-Duvergerian equilibrium and can be interpreted as an indicator of voters' limited rationality, or problems with strategic decisions. This finding is thus contrary to our expectation, as we expected that increasing stabilization and institutionalization of the Polish party system since elections of 2007, together with the prevailing dominance of a contestation between the liberal-conservative PO and social-conservative PiS, will be factors leading to the existence of electoral competition approaching two-party dominance (with limited minor party strength) even at the district level.

Table 3: Distribution of effective number of electoral parties (*ENEP*), 2011 and 2015 (N = 100)

	<i>ENEP</i> micro (min)	<i>ENEP</i> micro (max)	<i>ENEP</i> micro (mean)	<i>ENEP</i> macro	<i>ENEP</i> < 2.0 (% / n)	<i>ENEP</i> = 2.01–2.50 (% / n)	<i>ENEP</i> > 2.51 (% / n)
2011	1.81	5.32	3.59	3.59	1.00 (1)	7.00 (7)	92.00 (92)
2015	1.79	5.84	3.14	3.15	10.00 (10)	11.00 (11)	79.00 (79)
All elections	1.79	5.84	3.37	3.37	5.50 (11)	9.00 (18)	85.50 (171)

Source: *Państwowa Komisja Wyborcza*, author's own calculations.

Note: $ENEP_{\text{micro (min)}}$ – minimum value of *ENEP* at constituency level, $ENEP_{\text{micro (max)}}$ – maximum value of *ENEP* at constituency level, $ENEP_{\text{micro (mean)}}$ – average value of *ENEP* in the aggregate of constituencies, $ENEP_{\text{macro}}$ – value of *ENEP* at national level.

3.2 Nagayama diagrams for the Polish Senate party competition

The results from segmented Nagayama diagrams (Figure 3) for the Polish Senate SMDs in elections of 2011 and 2015 are summarized in Table 4. As well as the values of *ENEP*, also these results confirmed that the character of the Polish Senate electoral competition was relatively uniform across both elections, but at the same time far from the Duvergerian logic.

The results for the 2011 elections show that most of the districts lie in segment G (77.00%) indicating competition between more than two parties (i.e. the competitive multi-party segment of the diagram), although the most of the districts in this segment approached segment H, which already defines strong competitive two-party dominance. In contrast, we found only a very limited number of districts in the segments with no substantial third-party strength: none in segment A (competitive dominance of the top two parties where the winner taking 50% or more of the total vote in the district), 8.00% in segment B (two-

party dominance combined with ‘non-competitiveness’, as the largest contender obtained more than 50% of the vote and was much stronger than the second strongest party in the district), or 7.00% in segment H (competitive dominance of the top two parties where none of the top two parties was able to gain more than 50% of the vote in the district), respectively. Finally, 8.00% of the districts are in segments D and E, characterised by neither strong or complete single- or two-party dominance nor political competitiveness.

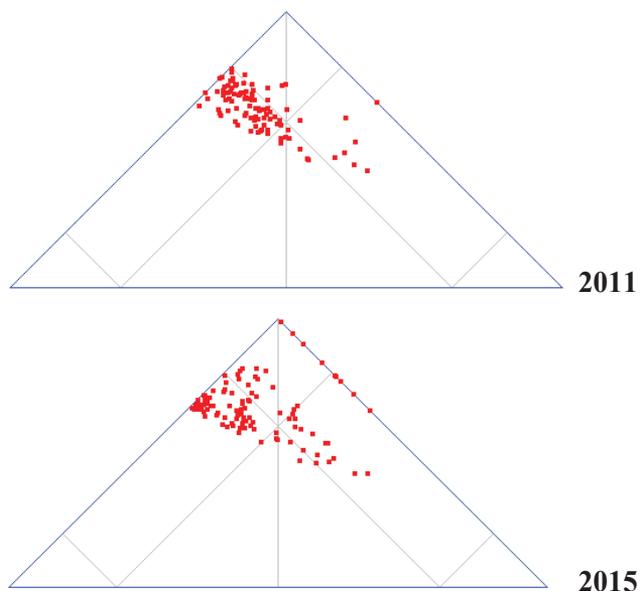
The results for the following elections in 2015 then show that the pattern of electoral competition at the district level was changed in only a limited way. Primarily, the most of the districts again witnessed the presence of the competitive multi-party electoral competition (segment G), but on the other hand, the proportion of districts in segment G declined significantly from 77.00% in 2011 to 56.00% in 2015. At the same time, the number of districts in segments D and E, characterised by neither strong or complete single- or two-party dominance nor political competitiveness, remained almost the same between elections (8.00% in 2011 compared to 5.00% in 2015).

Thus, the most striking difference between the 2011 and 2015 elections was in the number of districts in segments with no substantial third-party strength (A, B and H), which almost doubled. First, the number of the districts which were characterised by very limited minor party strength and political competition between the top two parties, with the winner taking 50% or more of the total vote in the district (segment A) rose from zero to 7.00%.

Second, the second largest number of districts in this group (segment H) showed strong competitive two-party dominance, although none of the top two parties was able to gain more than 50% of the vote here, with the proportion of such districts increased from 7.00% to 12.00%.

Third, the prevailing category of districts with no substantial third-party strength, remained in segment B, characterised by a similar type of competition as segment A, with one important exception, namely non-competitiveness. The proportion of districts in this segment rose steeply from 8.00% in 2011 to 20.00% in 2015.

Figure 3: Segmented Nagayama diagrams, 2011 and 2015 (N = 100)



Source: *Państwowa Komisja Wyborcza, author's own calculations.*

To summarize the above-mentioned findings according to the three categories proposed by Grofman et al. (2004; see Table 4), the results for both elections taken together show that only 17.50% of the districts did not have any substantial third-party strength, representing two-party competition (segments A, B and C), and similarly only 6.50% witnessed neither strong or complete single- or two-party dominance nor political competitiveness (segments D and E). Furthermore, if we complement the first category with segment H, which also represents (competitive) dominance of the top two parties, the proportion of the districts with limited minor party strength is still far from one-third of all SMDs (27.00%). In contrast, multi-party competition (segments F and G) is found in almost two-third of the districts (66.50%).

Table 4: Distribution of SMDs by Nagayama segments, 2011 and 2015 (N = 100)

<i>Segments</i>	Number of districts			Percentage of districts		
	2011	2015	All districts	2011	2015	All districts
A	0	7	7	0.00	7.00	3.50
B	8	20	28	8.00	20.00	14.00
C	0	0	0	0.00	0.00	0.00
D	5	2	7	5.00	2.00	3.50
E	3	3	6	3.00	3.00	3.00
F	0	0	0	0.00	0.00	0.00
G	77	56	133	77.00	56.00	66.50
H	7	12	19	7.00	12.00	9.50
Total	100	100	200	100.00	100.00	100.00
<i>Categories of districts</i>						
Categories with no substantial third-party strength (A + B + C)	8	27	35	8.00	27.00	17.50
Competitive districts (F + G + H)	84	68	152	84.00	68.00	76.00
Neither strong or complete single- or two-party dominance nor political competitiveness (D + E)	8	5	13	8.00	5.00	6.50
Total	100	100	200	100.00	100.00	100.00

Source: *Państwowa Komisja Wyborcza, author's own calculations.*

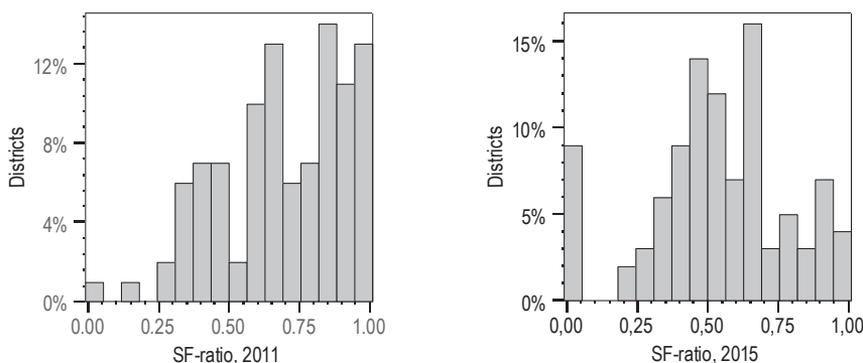
Therefore, it is apparent that the character of electoral competition in Polish Senate elections is relatively uniform. The outcomes of the both elections (2011 and 2015) were characterized by a predominance of multi-party configurations, supplemented by a mix of competitive or non-competitive two-party configurations, thus significantly distorting the Duvergerian logic and signalling a significant departure from Duverger's law.

Overall, the analysis using the Nagayama diagrams, too, supports the argument that the tendencies to classical Duvergerian competition are only effective over a series of elections, as even in Poland we found that some amount of the electoral districts (although certainly not far enough) moved closer to bipolar competition. We thus find evidence for Tavits and Annus' (2006) 'learning hypothesis' that strategic voting in third-wave democracies tends to increase as voters (but also political elites) become more experienced with the electoral process.

3.3 Distribution of the *SF*-ratios and *TF*-ratios across the SMDs

As with the previous indicators, even the values of *SF*-ratios and *TF*-ratios (Figures 4 and 5, Table 5) confirmed the prevalence of multi-party electoral competition in the Senate elections, with only a minor and very slow shift to a bipolar competition between elections in 2011 and 2015. As a result, in elections of 2011 only two districts (2.00%) showed competition indicating a Duvergerian equilibrium (*SF*-ratio), while in nearly half of the SMDs (47.00%) the *SF*-ratio values were above the upper limit. Similarly, the election results indicated voters' limited willingness and ability to vote strategically by abandoning hopeless candidates in favour of those with a chance to succeed. Thus, we have found higher levels of strategic failure, with many voters casting their ballot for candidates that came out third, fourth or below, with only in a less than quarter of the districts (22.00%), the values of the *TF*-ratio fell within the limit.

Figure 4: Histograms of *SF*-ratios, 2011 and 2015 (N = 100)

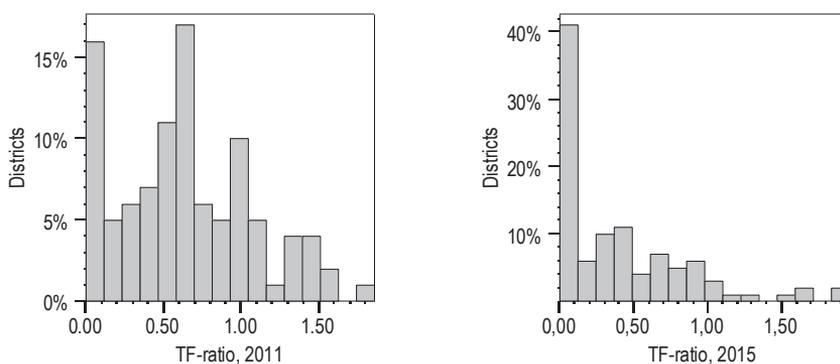


Source: *Państwowa Komisja Wyborcza*, author's own calculations.

As with the previous indicators, even the values of the *SF*-ratios and *TF*-ratios confirmed only limited transformation of Polish electoral competition in 2015. As a result, the proportion of districts with competition indicating a Duvergerian equilibrium increased from 2.00% to 11.00% (*SF*-ratio) or from 22.00% to 48.00% (*TF*-ratio), respectively, while in only one fifth of the SMDs (20.00%) the *SF*-values were above the upper limit, compared to 47.00% of the SMDs in previous elections of 2011. At the same time, the election results indicated voters' limited willingness and limited ability to vote strategically by abandoning hopeless candidates in favour of those with a chance to succeed. Thus, despite the overall decrease of candidates between elections of 2011 and 2015 (as we will show in detail below), we still found a significant relatively high levels of

strategic failure, with many voters casting their ballot for candidates that came out third, fourth or below. In more than one fifth of the districts (21.00%), the values of the *TF*-ratio were above the upper limit, compared to 34.00% in 2011.

Figure 5: Histograms of *TF*-ratios, 2011 and 2015 (N = 100)



Source: *Państwowa Komisja Wyborcza, author's own calculations.*

Two factors are very important in this situation. First, as we mentioned above, the number of candidates has decreased by 15.40% between elections in 2011 and 2015 (from 500 to 423 candidates). Second, while the number of candidates per one seat did not change significantly (5.00 in 2011 in contrast to 4.23 in 2015), we see more dramatic changes in case of individual parties, including two largest Polish parties. While in 2011 the PO and the PiS candidates have stood in 93 SMDs, in 2015 the PiS increased number of its candidates to 98, while the PO candidates stood only in 83 SMDs, so one of the two largest parties did not file candidates in 17.00% of the districts.

Even more significant changes can be observed in the case of the other parties which received representation in the 2015 Sejm elections. In 2011, the SLD stood 68 candidates, as well as the PSL, and similarly even in 2015 the PSL nominated 58 candidates; the RP nominated no candidates in the 2011 Senate elections. However, continuing decline of the SLD, as well as the TR, formerly known as the RP, resulted in fact that coalition United Left, which was formed by the SLD and the TR, together with some minor parties, nominated only 31 candidates, i.e. only about approximately half than the SLD themselves in 2011.

Similarly, parties which received representation in the Sejm for the first time in 2015, nominated only very limited amount of candidates in the Senate elections: the liberal party Modern nominated 16 candidates and the populist Kukiz'15 only nine candidates. No other political party or movement nominated

a significant number of candidates in 2015, compared to 2011 when the Union of the Presidents – Citizens for the Senate (*Unia Prezydentów – Obywatele do Senatu*, UP-OdS) under the leadership of Rafał Dutkiewicz, the mayor of Wrocław, the fourth-largest city in Poland (since 2002), nominated 30 candidates.

Table 5: Distribution of *SF*-ratios and *TF*-ratios in SMDs, 2011 and 2015 (N = 100)

	<i>SF</i> < 0.25 (% / n)	<i>SF</i> = 0.26–0.74 (% / n)	<i>SF</i> > 0.75 (% / n)	<i>TF</i> < 0.25 (% / n)	<i>TF</i> = 0.26–0.74 (% / n)	<i>TF</i> > 0.75 (% / n)
2011	2.00 (2)	51.00 (51)	47.00 (47)	22.00 (22)	44.00 (44)	34.00 (34)
2015	11.00 (11)	69.00 (69)	20.00 (20)	48.00 (48)	31.00 (31)	21.00 (21)
All elections	6.50 (13)	60.00 (120)	33.50 (67)	35.00 (70)	37.50 (75)	27.50 (55)

Source: *Państwowa Komisja Wyborcza, author's own calculations.*

Our analysis thus confirmed the findings that the *SF*-ratio patterns are dependent not only upon strategic behaviour by voters, but by elites as well (see Moser and Scheiner, 2009, p. 55). Despite the experience of the previous election, which showed that the mechanical effects of the electoral system will translate into considerable under-representation of a smaller parties, the number of candidates in many SMDs was so high that parties were unable to send a clear message to voters as to which candidates were eventually competitive against the candidates of both the PiS and the PO. Non-Duvergerian equilibrium then can be interpreted as an indicator of voters' limited rationality, or problems with strategic decisions, which resulted from several reasons.

First, the number of candidates in many districts significantly exceeded the mean number of candidates. Thus, although the mean number of candidates was 4.23 in 2015, the number of candidates in 17 SMDs reached five, in 14 SMDs six, in 8 SMDs seven, and in one SMDs eight candidates. Second, the PO did not file candidates in 17 out of all 100 SMDs, thus created situation, where voters were unable to determine whether a candidate was the first or the second runner-up, and failed to coordinate their actions towards abandoning the weaker candidate. Third, this situation was strengthened by the continuing decline of the SLD, so the leftist electorate stand before decision to which parties transfer their votes. Fourth factor which possibly inhibited amount of strategic voting and rational decisions of voters was based on the fact, that party preferences are typically known at national, rather than district level. Finally, the fifth factor is associated with the character of the Senate elections, in other words secondary role of the second chamber in Polish politics, as the Senate elections can be

classified as the second-order elections, with regard to Reif and Schmitt's (1980) second-order elections theory.

All these factors thus can inhibit short-term instrumental rationality of voters. Incomplete offer of both strongest parties in all SMDs (especially in case of the PO), together with a high number of candidates in many districts, and second-order character of elections (or its irrelevance with regard to the question of who will form the government, respectively), all contributed to decline of strategic voting. As a result, supporters of the third-place or worse candidates faced little incentive to cast their vote elsewhere, which leads to a non-Duvergerian equilibrium and many votes for candidates other than the two major parties. As we can see in Table 6, the candidates of the PO and the PiS received together 62.54% of the votes in 2011 and despite some increase in recent Senate elections in 2015 (68.07%), third-place or worse candidates still received almost a third of the votes, out of which almost one sixth came to candidates of non-parliamentary parties, including independent candidates.

Table 6: The percentage of votes for the political parties in the Senate elections, 2011 and 2015 (parties with the representation in the Sejm)

	PiS	PO	PSL	SLD	Kukiz'15	Modern	Others
2011	26.94	35.60	9.11	9.60	-	-	18.74
2015	38.41	29.66	7.71	4.04	1.38	2.63	16.17

Source: *Państwowa Komisja Wyborcza*.

CONCLUSION

The aim of the presented paper was to analyse strategic voting in the context of the so-called second-order elections, namely elections to the upper chamber of the Polish parliament, the Senate. We have used some alternative methods to study the assumptions related to Duverger's law, and have come to several conclusions. First, our analysis has shown that strategic voting is not a universal phenomenon in the Polish Senate elections in 2011 and 2015 under the plurality rule, as indicated by many violations of Duverger's law in Hungarian SMDs.

Specifically, while the *ENPP* (measuring at constituency level) reached the value of 2.03 in 2011, or 2.05 in 2015, respectively, thus indicating the reduction to almost real two-party system at this level (in the sum of all SMDs), the opposite is true for the values of *ENEP* which increased to 3.59, or 3.15, respectively, (the mean value of all SMDs), clearly indicating disruption of bipolarization of the Polish Senate political competition. Furthermore, the amount of the districts with *ENEP* greater than 2.5, indicating violation of the

Duverger's law, decreased only slightly between elections in 2011 and 2015 (from 92.00% to 79.00%), and competition at the district level thus remained far away from the Duvergerian equilibrium.

The very similar findings confirmed also the Nagayama diagrams which intuitively graphed the character of party competition. Even here, we confirmed that most of the districts (two-thirds) witnessed multi-party competition, supplemented with six and half percent of the districts with neither strong or complete single- or two-party dominance nor political competitiveness, and only in slightly more than one quarter of the SMDs we found two-party competition with none substantial third-party strength, again with only a limited transformation to two-party competition between elections in 2011 and 2015. Similarly, the values of *SF*-ratio indicated voters' limited willingness to vote strategically by abandoning hopeless candidates in favour of those with a chance to succeed. We found the prevalence of multi-party electoral competition in the Polish Senate elections, with only a minor and very slow shift to a bipolar competition between elections in 2011 a 2015.

Overall, we concluded that despite the experience of the previous election, which showed that the mechanical effects of the electoral system will translate into considerable under-representation of a smaller parties, the number of candidates in many SMDs was so high that parties were unable to send a clear message to voters as to which candidates were eventually competitive against the candidates of both the PiS and the PO. Another important factor which must be mentioned, is the fact that the PO, as the second strongest Polish party, did not file candidates in almost fifth of the districts, thus created political situation, where voters were unable to determine whether a candidate was the first or the second runner-up, and failed to coordinate their actions towards abandoning the weaker candidate. Third, this situation was strengthened by the continuing decline of the SLD, so the leftist electorate stand before decision to which parties transfer their votes, as the Duvergerian logic assumes that voters are short-term instrumentally rational, concerned only about affecting the outcome of the current legislative election. Finally, the character of the Senate elections, as second-order elections, must be mentioned. While in the Sejm elections voters rather prefer (or should be prefer) strategic voting, or so-called 'voting with the head', as they may be afraid to waste their votes, in Senate elections voters can prefer 'the sincere voting', or so-called 'voting with the heart'. Thus voters make a genuine choice for the party of her/his closest ideologically preference, no matter that their vote may waste, because unlike in first-order elections, in the second-order elections their votes have no impact on process of the government formation. However, the extent of the second-order elections theory assumptions and their influence, as well as the mechanism standing behind them, should be thoroughly investigated and as such it is an important subject for further research.

All these factors thus can inhibit short-term instrumental rationality of voters, namely that voters will correctly analyse the situation and maximize their self-interest, resulted in significant departure from the Duvergerian logic and expectations of the Duverger's law. On the other hand, our findings make it clear that plurality rule significantly reduces fragmentation of the party system (which is inhibited by the electoral system's mechanical effects), even if the election results are not always in full compliance with Duverger's law, as some indicators of strategic behaviour at the SMD level show that various SMDs can move far away from the Duvergerian equilibrium. We thus confirmed the original way how Duverger conceived of his law, i.e., that electoral system (as an institution) plays an important role, but only in modifying the effect of social forces on the creation of political parties. The plurality rule (as an institutional structure) thus in SMDs acted as a 'brake' on the process by which societal pressures translate into an excessive growth in the number of political parties, but on the other hand, it could not entirely suppressed the underlying processes by which sociological factors shaped Polish party competition in the Senate elections in 2011 and 2015.

Future research then should provide a more comprehensive answer on whether (or to what extent) strategic behaviour of Polish voters in Senate elections can eventually transform in following elections, as some authors claim that the expectations of Duverger's law, as an equilibrium where only two candidates receive all the votes and the votes obtained by the third and following candidates approximate zero, is reached only over a series of elections (Gaines, 1999). Similarly, only repeated elections under the same electoral system can support or refuse the Tavits and Annus' (2006) 'learning hypothesis' that strategic voting in third-wave democracies tends to increase as voters (but also political elites) become more experienced with the electoral process. However, the second-order character of Senate elections lead us to hypothesize that even in the future, the Polish Senate elections would not be able to fully meet expectations of strategic voting based on the Duvergerian logic. Finally, an extension of the research to another countries, where a legislature is characteristic by asymmetrical bicameralism, could confirm, or refuse, whether the significant exceptions to the Duverger's law are typical for most second-order elections, or whether Polish case is an significant exception compared to other countries.

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