

**FINAL ACCEPTED MANUSCRIPT FOR *PARTY POLITICS***

**Party novelty and congruence: A new approach to measuring party change and volatility**

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**ABSTRACT**

We propose a new three-dimensional approach to party newness and an interval index of party congruence/novelty. Building on that, we also propose a split-vote-by-congruence (SBC) approach to electoral volatility that employs the index. Four elections from different countries that exhibited different forms of party change are used to illustrate the approach. The congruence/novelty index corresponds to our qualitative case knowledge and the SBC approach leads to meaningful volatility scores. Ad hoc coding of parties as new/old or singular successors/predecessors can seriously over- or underestimate volatility that explains divergence among volatility scores in literature. By eliminating the need for dichotomous and often controversial coding decisions, the SBC approach allows for a substantially more reliable calculation of volatility.

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How to assess party system change? The Pedersen index of electoral volatility (Pedersen, 1979, 1980) has become the de facto gold standard measure that is easy to calculate by simply adding up all vote gains or losses by individual political parties. In this article, we fully endorse the volatility index as the best available measure of party system change, despite some limitations (Bartolini and Mair, 1990; Powell and Tucker, 2014; Rattinger, 1997; Sikk, 2005). However, we propose an enhanced approach to its calculation that accounts for the volatile nature of parties themselves and, in particular, the diversity among new parties.

Prompted by electoral successes since the 1980s, a growing amount of literature has analysed new parties in Western and Eastern Europe, focussing mostly on the determinants of their emergence (Drummond, 2006; Hanley and Sikk, 2016; Harmel 1985; Harmel and Robertson 1985; Lane and Ersson, 2007; Lucardie 2000; Mainwaring and Zoco, 2007; Powell and Tucker, 2014; Roberts and Wibbles, 1999; Sikk, 2012; Tavits, 2005, 2006, 2008a). Many such parties have been genuinely new,<sup>1</sup> while others have resulted from reconfiguration and transformation of existing parties, particularly in Central and Eastern Europe (CEE).

Correctly identifying new parties is essential for a meaningful calculation of volatility (emphasized by Barnea and Rahat, 2011; Powell and Tucker, 2014; see also Ersson, 2012). However, this is difficult when parties do not fit the dichotomous classification as new or old. Examples of *partially novel* parties abound in CEE but they are also

found in long-standing democracies (see examples of Kadima and Danish People's Party below). Furthermore, different degrees of novelty even occur in well-established and generally stable parties – contrast, for example, the election of Jeremy Corbyn as the leader of the British Labour Party in 2015 to much smaller changes over the preceding twenty years. Partial novelty is also embedded in splits and mergers, and the formation and collapse of electoral coalitions. As all four mix novelty and oldness, strictly linking them to a single successor or precursor can be difficult or misleading.

However, classifying parties as either new or old and linking them to a singular predecessor or successor is the standard practice in current approaches to electoral volatility. In this article, we suggest a more nuanced method to account for partial novelty or significant discontinuity in 'electons' – to propose a common term for parties and other electoral units. 'Electons' stresses the conceptual distinction between political parties as organizations and electoral units. Also, electoral units come in a variety of forms – electoral coalitions are a commonplace in many (new) democracies, sometimes non-party organizations contest elections and some electoral 'parties' lack crucial features of political parties (e.g. members, proper organization, programmatic profile). The term 'electon' puts the emphasis on elections and avoids evoking other specific features of parties. Finally, it is a short and simple alternative for the term 'parties and electoral coalitions' used ubiquitously due to the varied nature of contemporary electons.

The electoral volatility index poses challenges in countries with high levels of electoral discontinuity (rise and disappearance of electons) or innovation (splits, mergers, electoral coalitions, see Ibenskas and Sikk, 2017; Marinova, 2015). First, some apparently new electons – e.g. with a new name – can be old parties rebranded. Secondly, electons with novel organization or personnel can have significant links to old ones, possibly even retaining a name. Finally, electons can split and merge – sometimes in complex combinations that makes pinning down a singular successor or predecessor difficult or even impossible.

Therefore, classifying electons bluntly as new or old, and identifying a singular successor or predecessor can misconstrue party development. Partially novel electons are particularly common in CEE and often defy ‘correct’ dichotomous coding; yet, such coding decisions can result in very different volatility scores. Our proposed approach considers both the *novelty* of electons and their *congruence* (similarity) with previously existing electons.<sup>2</sup>

We start by proposing a measure of electon congruence/novelty (congruence/novelty), inspired by the notions of multidimensional party newness (Barnea and Rahat, 2011; Litton, 2015). The measure incorporates three dimensions: (a) organization, including name, (b) leader and (c) candidates. *Congruence* refers to the degree of similarity between a pair of electons in consecutive elections. *Novelty* refers to the newness of an electon *vis-à-vis* a predecessor or all previous electons combined. The

congruence/novelty index is useful for various purposes: identifying new electons; measuring aggregate novelty in elections to reflect levels of party system change and continuity; or even measuring change in established parties, where periods of stability can be punctuated by bouts of change. Party change is obviously not limited to these dimensions; for example, programmatic change can occur independently of the other dimensions. However, it is not included here as (a) programmatic change is more difficult to measure and requires more in-depth information and (b) party competition (in CEE and elsewhere) is not always highly programmatic.

We start by outlining specific criteria for the operationalization of congruence/novelty and testing the validity the index by looking at four elections exhibiting different kinds of electon innovation. The second half of the article proposes an enhanced *split-vote-by-congruence approach* to electoral volatility using *virtual electons* based on congruence/novelty scores. We compare our approach to other commonly used approaches to volatility calculation and offer two illustrative examples.

### **Degrees of congruence and novelty**

What constitutes a ‘new’ party has long preoccupied students of party politics (for overviews see e.g. Litton, 2015; Emanuele and Chiaramonte, 2016). Thereby, party newness has until now generally been conceptualized dichotomously with various criteria for distinguishing between ‘new’ and ‘old’ parties.<sup>3</sup> There is still no universally

accepted definition of ‘new parties’ but different coding decisions can lead to big differences in volatility scores and, hence, assessments of party system stability. In their conceptually driven work, Barnea and Rahat (2011) emphasize the particular importance of the concept of party newness to the analysis of party system change. They develop a framework of eight criteria inspired by Key’s (1942) notion of parties as ‘tripartite systems of interaction’ involving: (a) Party-in-the-electorate (label, ideology, voters), (b) Party-as-organization (formal status, institutions, activists), and (c) Party-in-government (representatives, policies). Barnea and Rahat propose a threshold to distinguish between old and new parties and demonstrate their framework by analysing the borderline case of Israel’s Kadima party. In her study of party novelty and change in European Parliament elections, Litton (2015) also adopts a multidimensional approach to party newness. Analysing the degree of change within parties, she maps party novelty on two ordinal scales: (a) change in parties’ structural affiliation (mergers, splits, alliances) and (b) change in parties’ trademark attributes (name, leader and programme) (Litton, 2015: 714). Both studies make important advances in theoretical and empirical foundations of the study of party system and party change.

However, further progress can be made on three fronts. First, strict thresholds of newness can be problematic in borderline cases – coding protocols can have a particularly big impact on volatility if the parties are very successful (such as Kadima discussed by Barnea and Rahat). Secondly, the requirement to identify a single successor/predecessor after splits and mergers leads to similar problems, particularly if

they involve highly successful but ad hoc electoral coalitions. Finally, we concur with Litton's notion of gradual party change, but argue that it is desirable to move beyond a qualitative scale and propose an interval scale of electon novelty.

The proposed index of aggregate electon *congruence* (the polar opposite of *novelty*) ranges from 0 (perfect incongruence) to 1 (perfect congruence) and is based on three dimensions: (a) organization including name, (b) leadership and (c) candidates.<sup>4</sup> Hence, we follow Barnea and Rahat's framework, reconfiguring some of their criteria and introducing a more systematic approach to candidate congruence/novelty. Furthermore, we apply the framework to a threefold differentiation of electon characteristics found in Litton's two-dimensional conceptualisation of party change. Below, we identify broad benchmark conditions for congruence scores (see supplementary materials for additional detail), but the specific scores often need to consider the circumstances of a particular case (as illustrated by examples in the following section).

*Organization* combines organizational structure and name. A genuinely old electon must retain both (organizational congruence = 1), while a genuinely new one must have no identifiable precursors in terms of organization and name (0). Between these two extremes are electons with minor changes to their name, electoral organization or both (0.75), those that experience more substantial changes (e.g. a merger of two similarly sized electons, 0.5) and those that use an old name despite being organizationally highly novel (0.25).<sup>5</sup>

As we are interested in both parties and electoral coalitions, we consider both electoral and ‘extra-electoral’ organization and names. For example, a coalition of parties that have previously contested elections separately should be considered as partially new (congruence = 0.5). A new party emanating from an entrenched electoral coalition is also partially new, but less so (0.75).

*Leader.* An election with no leadership changes is perfectly self-congruent (congruence = 1). A new leader always brings a degree of novelty, particularly when elected in a competitive contest, for example after an electoral defeat. Congruence is lowest if the leader has no previous party political experience (0). It increases gradually if the new leader has held a low profile in its party (0.25), held a political office as an independent or a medium-ranking office in a party (0.5) or has previously been near the party’s leadership, leading a faction or holding a top political office for the party (0.75).

*Candidates.* If all candidates of an election contested previous elections with the same election, it is perfectly self-congruent. If none of the candidates contested the previous election, the election is perfectly novel. If the candidates come from several previous elections, the pairwise congruence depends on the share of candidates who previously ran on each list. For practical and substantive reasons, we suggest looking at the carry-over among top-ranking candidates.<sup>6</sup> This contrasts with earlier studies on candidate turnover that have tended to analyse full candidate lists (e.g. Kreuzer and Pettai, 2003; Shabad and Slomczynski, 2004). Very high levels of turnover are common among



candidates with no electoral prospects that have little importance for the substantive degree of continuity. Our case studies below also show that stability tends to be substantially higher amongst highly ranking candidates than among the tails of candidate lists.

What constitutes the ‘top’ of a candidate list depends on electoral system. In closed list systems, list placements reflect the position of candidates in party hierarchy. Under open or semi-open lists, top candidates are identified by preference votes.<sup>7</sup> As a threshold, we use the top 25% of candidates relative to assembly size or district magnitude.

### **Congruence and novelty in changing party systems**

This section discusses key examples of different election transformations to illustrate the congruence/novelty index, covering older and newer democracies and different electoral rules. We include four cases highlighting the most common and challenging issues in coding party novelty – a partially new party (Kadima, Israel 1996), a splinter (Danish People’s Party, 1998), a merger (Pro Patria and Res Publica Union, Estonia 2007) and an electoral coalition collapse (Poland 2001). We focus on interesting individual elections, but also compare their congruence scores to those of other major elections.

*A partially new party: Kadima (Israel, 2006)*

Due to its unusual genesis, Kadima presents a true borderline case of electon novelty and could justifiably be classified as a new, old or a splinter party. Kadima was established by Prime Minister Ariel Sharon four months before the 2006 Knesset elections (see Table 1) and while it adopted a new name, it was in many ways a splinter from Likud (Sharon's former party) as many former Likud members and functionaries defected to Kadima and populated its institutions. Hence, Kadima's organizational novelty and congruence to Likud were both medium (0.5).

**Table 1 Israel 2003-6 (vote %)**

	2003	2006
Kadima		22.0
Labour-Meimad	14.5	15.1
Shas	8.2	9.5
Likud	29.4	9.0
Yisrael Beitenu		9.0
National Union/Yisrael Beitenu	5.5	
National Union/NRP		7.1
Gil		5.9
Meretz	5.2	3.8
Shinui	12.3	0.2
One Nation	2.8	merged w Labour
Yisrael BaAliyah	2.2	merged w Likud
Others	20.1	18.3

Source: Diskin and Reuven, 2007.

Ehud Olmert – Kadima's leader at the time of elections – became party leader and Prime Minister after Sharon suffered a stroke before the election. Kadima's leadership would have been perfectly congruent to Likud had Sharon led the party to elections, as he was Likud's leader until setting up Kadima. However, as Olmert had served in major cabinet positions for Likud, Kadima's leadership novelty and congruence to Likud were

medium (0.5). Congruence of Kadima's top candidates with Likud was high (0.4) and only marginal with other parties (data: Knesset n.d.).<sup>8</sup>

The aggregate congruence with Likud was 0.4 and with all established parties combined 0.6, making Kadima a prototypical partially new party (novelty = 0.4). We concur with Barnea and Rahat (2011) that it is difficult to classify Kadima as a new electon or a splinter from Likud. However, the choice very strongly affects the volatility index for the election, resulting in either highest ever volatility in Israel or the lowest in four consecutive elections (Barnea and Rahat, 2011: 315). As shown below, the congruence/novelty index can provide a remedy against such (impossible) dichotomous choices in calculations of electoral volatility.

*A splinter: Danish People's Party (1998)*

In 1995, Pia Kjaersgaard, the former leader of the Danish Progress Party (FP) left the party following a long-standing internal strife where she ended up on the losing side. She set up the Danish People's Party (DF) that was joined by three other MPs and about one third of FP members (Pedersen 2006). DF entered the parliament after the 1998 elections, siphoning away support from FP (see Table 2).

The new party was perfectly congruent with FP in terms of its leader, but adopted an entirely novel name. A new organization was created and a membership drive followed, but Kjaersgaard remained dominant and former FP members constituted the core of the

new party (Pedersen, 2006). Hence, in terms of name and organization the DF in 1998 can be considered partially congruent (0.5) with FP in 1994. Organizational congruence to the stump FP was perfect, as the party retained its name, bulk of its original membership, and organization. Leadership congruence can be set at 0.5 as the new leader Kirsten Jacobsen had been a leading figure of FP's anti-Kjærsgaard flank.

**Table 2 Denmark 1994-8 (vote %)**

	1994	1998
Social Democrats	34.6	35.9
Liberals	23.3	24.0
Conservatives	15.0	8.9
Socialist People's Party	7.3	7.6
Danish People's Party		7.4
Progress Party	6.4	2.4
Others	13.4	13.8

Source: Nielsen, 1999.

Candidate congruence of FP (1994) was higher with the stump FP than DF. 25% of all DF candidates in 1998 had previously run on FP's list. Of FP's candidates, 36% had run for the party in the previous election – not much fewer than in 1994 when 45% of candidates had carried over from the previous election.<sup>9</sup> When looking at the most popular 25% of candidates in districts,<sup>10</sup> the congruence was much higher for both DF (0.65) and FP (0.78). Hence, the DF candidate list was less congruent with FP's list in 1994 than that of the stump FP while the latter's self-congruence was comparable to main Danish parties (Social Democrats 0.82 and Liberals 0.77).

The aggregate congruence scores for DF and FP were similar (0.72 and 0.76, respectively), but congruence varied across dimensions, FP scoring highly on organization and name and DF on leadership. The aggregate novelty (0.28 and 0.24,

respectively) was the inverse of aggregate congruence as both were non-congruent with other 1994 elections.

*A merger: Pro Patria and Res Publica Union (Estonia, 2007)*

In 2003, Estonia saw the breakthrough of Res Publica (RP) – a genuinely new party in name, leader and candidates. Its leader, Juhan Parts became the Prime Minister after the election, but the party's popular support quickly eroded and already in 2004 RP's leadership was planning a merger with one of the centre-right parties. In April 2006, RP and Pro Patria (IL, an established conservative party) announced plans to merge.

The merged party (IRL) was jointly led by the former leaders of its two constituent parts until May 2007. Hence, at the time of the March 2007 elections (see Table 3), it was halfway between an electoral coalition and a proper party.<sup>11</sup> Both leadership and organizational congruence (to RP and IL) can be set high at 0.85 because of the transitory dual leadership arrangement and a name combining the names of its predecessors.

In terms of candidates, IRL was highly congruent with both (congruence = 0.39) while 23% of top candidates were electoral novices (candidate novelty 0.23).<sup>12</sup> The aggregate congruence to both IL and RP was 0.7, while the overall novelty was 0.18 (0.15 for leaders, 0.15 for organization, 0.23 for candidates). Remarkably, in 2003, the

archetypical genuinely new RP had had very high candidate novelty (0.87). In contrast, in 2011 parliamentary elections, IRL had very high candidate self-congruence (0.74).

**Table 3 Estonia 2003-7 (vote %)**

	2003	2007
Reform Party (RE)	17.7	27.8
Centre Party (KE)	25.4	26.1
Pro Patria and Res Publica Union (IRL)		17.9
Res Publica (RP)	24.6	
Pro Patria (IL)	7.3	
Social Democratic Party (SDE)	7.0 <sup>a</sup>	10.6
Estonian Greens (EER)		7.1
People's Union (RL)	13.0	7.1
Others and individual candidates	4.8	3.3

<sup>a</sup> Moderates

Source: Pettai, 2004, 2008.

#### *Electoral coalition collapse (Poland, 2001)*

The 2001 Sejm election brought a wholesale and complex transformation of the Polish political scene (Table 4).<sup>13</sup> We only focus on congruence of three new electors to Solidarity Electoral Action (AWS), that had led the government following the successful 1997 election, but dropped out of the parliament altogether in 2001. Four new parties entered the Sejm in 2001, three of which were significantly congruent with AWS.

**Table 4 Poland 1997-2001 (vote %)**

Party	1997	2001
Democratic Left Alliance-Labour Union (SLD-UP)	27.1	41.0
Civic Platform (PO)		12.7
Self-Defence of the Polish Republic (SO)		10.2
Law and Justice (PiS)		9.5
Polish Peasant Party (PSL)	7.3	9.0
League of Polish Families (LPR)		7.9
Solidarity Electoral Action (AWS)	33.8	5.6 <sup>a</sup>
Freedom Union (UW)	13.4	3.1
Movement for Reconstruction of Poland (ROP)	5.6	
Others	12.8	1.0

Notes: <sup>a</sup> Solidarity Electoral Action of the Right (AWSP).

Source: Szczerbiak, 1998; Millard, 2003b.

*Civic Platform (PO)*, the biggest of the new electons,<sup>14</sup> was established in January 2001 by three prominent politicians: Andrzej Olechowski, Maciej Płażyński and Donald Tusk. Olechowski was runner-up in the 2000 presidential elections and had served in governments of different political hues in the early 1990s. Płażyński was Speaker of the Sejm for AWS since 1997 and led one of AWS's constituent parties (Szczerbiak, 2002). Finally, Tusk was one of the leaders of Freedom Union (UW) who left the party in 2000. The party had three de facto leaders until after the election in September 2001; Płażyński was elected the official leader only later.

In terms of leadership, PO was slightly congruent with both AWS and UW (both 0.25). Płażyński and Tusk had been very prominent members of AWS and UW, respectively. However, as neither had been the respective main leader and Olechowski was an independent, leadership novelty can be set relatively high at 0.5. Organizationally, PO was mildly congruent with AWS and UW as it inherited constituent parties or factions. However, as it adopted a completely new name, organizational congruence with each can be set at 0.2 and overall novelty at 0.6.

*Law and Justice (PiS)* was also formed shortly before the elections by twin brothers Lech and Jarosław Kaczyński. The party was roughly based on Centre Agreement, formerly part of AWS, but attracted several conservative splinter groups and drew on the popularity of Lech Kaczyński, an independent Minister of Justice in the AWS-led government (see Millard, 2003b). The party had a novel name and was organizationally an amalgam of various political groups, some of which had been previously associated with AWS, leading to a congruence score of 0.3 (novelty 0.7).

The Sejm PiS party group was headed by former Prime Minister Jerzy Buzek's (AWS) cabinet chief. However, the Kaczyński brothers were always the key figures in PiS with Lech becoming its first formal leader. Even though many of PiS's leading founders had previously been affiliated to AWS, none of them had held a prominent position. Hence, leadership congruence was limited (0.25) and novelty high (0.75).

*The League of Polish Families (LPR)* was a merger of two radical conservative groupings in April 2001. It was joined by a scattering of other parties; some that had previously been affiliated to AWS yielded significant influence, such as the Movement for Rebuilding Poland (ROP).<sup>15</sup> LPR's first leader was the little known Marek Kotlinowski (Polish News Bulletin 2001). Hence, organizationally LPR was slightly congruent with AWS and some minor parties<sup>16</sup> (0.1 each) and a novelty score of 0.7. LPR's leadership was slightly congruent only with the tiny National-Christian Bloc for



Poland (NCBdP),<sup>17</sup> but none of its leaders had a background in AWS and ROP's commitment to LPR was debatable.<sup>18</sup>

Candidate-wise both PiS and LPR appeared almost perfectly new (Table 5).<sup>19</sup> While PO's congruence with UW and AWS was notable, it still had a high degree of candidate novelty. Overall, candidate turnover was fairly high – the self-congruence of three continuing electons (AWSP, SLD, PSL) was between 0.49 and 0.61. We see a similar pattern as noted for Denmark – amongst new and old electons alike, candidate novelty is lower at the top and higher in the tails of candidate lists. Congruence increases considerably among top 10%-ranking candidates (Table 5, in parentheses) and even higher amongst district top candidates (0.28 for both AWS-PO and AWS-LPR).

**Table 5 Poland 1997-2001: Candidate congruence and novelty, top 25% (10%)**

1997	2001						
	AWSP	SLD-UP	PSL	UW	PO	PiS	LPR
AWS	0.61 (0.85)				0.12 (0.18)	0.08 (0.13)	0.08 (0.16)
SLD		0.56 (0.75)					
PSL		0 (0.06)	0.49 (0.66)				
UW				0.39 (0.61)	0.11 (0.11)		
ROP							0 (0.05)
Novelty <sup>a</sup>	0.36 (0.12)	0.40 (0.20)	0.48 (0.30)	0.60 (0.39)	0.76 (0.68)	0.86 (0.80)	0.87 (0.79)

Notes: Congruence < 0.05 omitted

<sup>a</sup> Includes non-party candidates in 1997

Source: authors' calculations based on Popescu and Hannavy, 2001.

Table 6 compares the congruence and novelty for all electons analysed in this section, including those with genuine (LPR) and negligible novelty (IRL). However, several electons fall between the extremes, some of them fairly novel (PiS and PO), others moderately so (FP and DF) and Kadima right in the middle of the scale.

Echoing Barnea and Rahat's (2011) conclusion, Kadima comes across as a perfect example of a partially new party that is clearly congruent with its predecessor but also novel to a significant degree. Classifying Kadima either way would be highly misleading. Such elections pose common difficulties for measuring party system change using electoral volatility, because dichotomous coding of parties as new or old does not allow for such partial novelty. In the following section, we propose a new approach to electoral volatility employing congruence/novelty scores that allows for partially novel elections and deals effectively with splits, mergers and electoral coalitions.

**Table 6 Party congruence and novelty: summary**

Pair of elections	Country	Congruence				Novelty
		Organization	Leader	Candidates	Total	
IL – IRL	Estonia	0.85	0.85	0.39	0.70	0.18
RP – IRL	Estonia	0.85	0.85	0.39	0.70	0.18
FP – FP	Denmark	1.00	0.25	0.78	0.68	0.24
FP – DF	Denmark	0.50	1.00	0.65	0.72	0.28
Likud – Kadima	Israel	0.50	0.50	0.40	0.47	0.47
AWS – PO = UW – PO	Poland	0.20	0.25	0.11	0.19	0.62
AWS – PiS	Poland	0.30	0.25	0.08	0.21	0.77
AWS – LPR	Poland	0.10	0.00	0.08	0.06	0.89

### **A new approach to electoral volatility**

The traditional approach to electoral volatility demands all elections to be classified as new or successor parties. Coding decisions regarding Kadima-like partially novel parties can seriously over- or underestimate electoral volatility. In this section we demonstrate how congruence/novelty scores can be used for a more nuanced calculation of electoral volatility that takes partial novelty fully into account and allows for linking elections to several predecessors or successors. We argue that this approach generates

volatility indices that better reflect the substantive extent of party system change. First, we outline a split-vote-by-congruence approach for calculating volatility indices. This is followed by two empirical illustrations based on elections that saw relatively simple cases of a split (Denmark) and a merger (Estonia) with the rest of the party system remaining fairly stable.

Aggregate congruence and novelty between electons A and B are defined and notated as follows:

- Pairwise congruence between electons A and B ( $C_{AB}$ ) is the mean congruence for organization, leaders and candidates.
- Pairwise novelty of electon B vis-à-vis A is  $N_{AB} = 1 - C_{AB}$
- Overall novelty of B vis-à-vis all i electons in t-1 is  $N_B = 1 - \sum C_{AiB}$

The approach involves *virtual electons* – the votes for partially novel electons are split into novel and congruent (i.e. precursor) components. For splits, votes are split between virtual predecessors (successors for mergers) in proportion to their respective congruence. The following hypothetical example explains the method.

Assume the Amazing Party (A, 50% of votes) splits into two: the Great Party (G, 30%) and the Highly Amazing Party (H, 20%). For simplicity, assume that the electoral support for the Dull Party (D) is stable at 50% and it lacks any novelty. G has kept several high-profile candidates and some local branches of A, but its leader is a political newcomer. In contrast, H not only carries a slightly modified name of A but also kept its

leader and most of the candidates. The overall congruence between A and G is  $C_{AG} = 0.3$  and  $C_{AH} = 0.9$ . As neither of the new electons has links to D, their novelty is simply the inverse of congruence:  $N_G = 0.7$  and  $N_H = 0.1$ . Therefore,  $30\% \cdot 0.7 = 21\%$  of G's votes are assigned to virtual electon  $G_N$  (G as Novel) and  $30\% \cdot 0.3 = 9\%$  to virtual electon  $G_A$  (G as continuation of A). Similarly, the virtual vote share of  $H_N$  is  $20\% \cdot 0.1 = 2\%$  and  $H_A$   $20\% \cdot 0.9 = 18\%$ .

In t-1, A's vote is split between the virtual predecessors of G and H proportionally to their congruence.<sup>20</sup> Vote for A as a predecessor of G is:

$$V_A^G = V_A C_{AG} / (C_{AG} + C_{AH}) = 50 \% \cdot 0.3 / (0.3 + 0.9) = 12.5\%$$

and vote for A as a predecessor of H:

$$V_A^H = V_A C_{AH} / (C_{AG} + C_{AH}) = 50 \% \cdot 0.9 / (0.3 + 0.9) = 37.5\%$$

A basic yet commonly used approach to volatility calculation is the *no-connection approach* (NC, Table 7),<sup>21</sup> based on vote differences disregarding continuity between the electons. It produces very different aggregate volatility scores compared to our proposed *split-vote-by-congruence approach* (SBC, Table 8). The assumption of no continuity between the electons in the no-connection approach is clearly unreasonable. The split-vote-by-congruence approach reduces volatility as G and especially H are congruent with A. The high novelty of G and congruence between H and A make the biggest contributions to aggregate volatility.

**Table 7 No-connection approach**

	$V_{t-1}$	$V_t$	Change
A	50	–	–50
G	–	30	+30
H	–	20	+20
D	50	50	0
<b>Volatility:</b>			<b>50</b>

**Table 8 Split-vote-by-congruence approach**

	$V_{t-1}$	$V_t$	Change	
$G_A$	12.5	9.0	–3.5	G as a continuation of A
$G_N$		21.0	+21.0	G as a novel elector
$H_A$	37.5	18.0	–19.5	H as continuation of A
$H_N$		2.0	+2.0	H as a novel elector
D	50.0	50.0	0.0	
<b>Volatility:</b>			<b>23</b>	

Not all literature uses the rather blunt no-connection approach. Four alternatives have been used that take continuity between electors into account. The *most similar party approach (MSP)* would identify H as the successor of A ( $V = 30$ ).<sup>22</sup> The *largest party approach (LP)* connects a defunct party to its largest successor (Party G,  $V = 20$ ).<sup>23</sup> The *combined votes approach (CV)* adds together the votes of G and H in t-1 ( $V = 0$ ).<sup>24</sup> Finally, *split-votes-by-support approach (SBS)* comes closest to the proposed SBC approach, but instead of splitting votes based on similarity, the vote for A in t-1 is split according to the *electoral support* of successors ( $V = 0$ ).<sup>25</sup> CV and SBS are the only simple ways to account for multiple successors or predecessors but very clearly underestimate volatility. Identifying a single successor can either over- or underestimate volatility, depending on whether the protocol favours similarity between the electors (MSP) or the largest party (LP). In our example, choosing MSP over LP increases volatility by a ratio of 50%.

Choosing a single successor can be even more challenging and have an even bigger impact if two equally strong parties created or terminated an ad hoc coalition, a significant party experienced a split (Danish example below) or important parties merged (Estonian example). Full details on alternative approaches to SBC and a diagram detailing the more complex Estonian case are found in supplementary materials.<sup>26</sup>

Between 1994 and 1998, the Danish Progress Party (FP) experienced a major splinter in the form of the Danish People's Party (DF). We split the FP's 1994 vote (6.4%) in two, between virtual predecessors of DF and stump FP proportionally to congruence (see Table 9); the virtual vote share of FP (3.3%) is slightly higher than that of DF (3.1%) due to its higher congruence to FP (0.76 vs 0.72). In 1998, the votes for DF (7.4%) and FP (2.4%) are split between (a) the electons as successors to FP and (b) the parties as novel electons. As the novelty of both electons was rather low (0.28 and 0.24, respectively), bulk of their vote (3.2% and 5.3%) is assigned to virtual predecessors.

**Table 9 Volatility in Denmark 1994-8**

	1994	1998	Change
FP (congruent component)	$\frac{6.4 \cdot 0.76}{0.76 + 0.72} = 3.3$	$2.4 \cdot 0.76 = 3.2$	-0.1
DF (congruent component)	$\frac{6.4 \cdot 0.72}{0.76 + 0.72} = 3.1$	$7.4 \cdot 0.72 = 5.3$	+2.2
FP (novel component)		$2.4 \cdot 0.28 = 0.7$	+0.7
DF (novel component)		$7.4 \cdot 0.24 = 1.8$	+1.8
SD	34.6	35.9	+1.3
V	23.3	24.0	+0.7
K	15.0	8.9	-6.1
SFP	7.3	7.6	+0.3
CD	2.8	4.3	+1.5

RV	4.6	3.9	-0.7
EL	3.1	2.7	-0.4
KFP	1.9	2.5	+0.6
Other	1.0	0.4	-0.6
		<b>NC, MSP:</b>	<b>11.8</b>
		<b>SBC:</b>	<b>8.5</b>
		<b>LP, CV, SBS:</b>	<b>7.8</b>

The resulting aggregate volatility index based on the SBC approach (8.5) is lower than the one based on NC and MSP (11.8)<sup>27</sup> that code FP as a continuation and DF as a new party, hence disregarding important congruence between FP and DF. Identifying DF as the largest of FP's successors, combining vote shares in 1998 or splitting it in 1994 (approaches LP, CV and SBS respectively) underestimates volatility by overlooking the significant weakening of FP (the more congruent successor). The differences in volatility scores may look numerically modest but are considerable in *relative* terms – compared to split-vote-by-congruence approach, SBC, NC and MSP overestimate volatility by 39% and the other approaches underestimate it by 8%. Even more substantial differences can occur in countries with less stable party systems in CEE and in some long-standing democracies that have experienced more party change.

Before considering the Estonian example, we need to introduce further virtual electons to be used with mergers. When X and Y merge to form a new electon Z, the vote share  $V_X^{IZ}$  of incongruent component in  $t-1$  is:

$$V_X^{IZ} = V \cdot X \cdot (1 - C_{XZ}).$$

The vote share of Z in  $t-1$  is split proportionally according to the relative congruence of the constituent parts (following the principle of virtual predecessors used with splits) to obtain the vote shares of virtual successor electons:

$$V_Z^X = V_Z \cdot (1 - N_Z) \cdot C_{XZ} / (C_{XZ} + C_{YZ}),$$

where  $V_Z^X$  stands for vote share of Z as a successor to X.

In Estonia 2003-7, the SBC approach produces very different volatility scores compared to traditional strategies (see Table 10). The NC approach vastly overestimates volatility by ignoring significant congruence between IRL and its constituent parts. Approaches LP (RP as the largest predecessor), CV and SBS underestimate volatility by overlooking IRL's mild but significant novelty. Picking IL instead of RP as IRL's sole predecessor (MSP if focussing on IRL's name or prioritising the more established party) would depend on investigator's taste (or at least the rule would be difficult to standardize), yet would increase the overall volatility score almost by half compared to approach LP.



**Table 10 Volatility in Estonia 2003-7**

	2003	2007	Change
<i>RP</i>	24.6		
<i>IL</i>	7.3		
<i>IRL</i>		17.9	
RP <sub>I-IRL</sub> (incongruent component)	$V_{RP}^{I-IRL} = 7.4$		-7.4
IL <sub>I-IRL</sub> (incongruent component)	$V_{IL}^{I-IRL} = 2.2$		-2.2
RP <sub>IRL</sub> (congruent component)	$V_{RP}^{P-IRL} = 17.2$	$V_{IRL}^{S-RP} = 6.5$	-10.7
IL <sub>IRL</sub> (congruent component)	$V_{IL}^{P-IRL} = 5.1$	$V_{IRL}^{S-IL} = 6.5$	+1.4
IRL <sub>N</sub> (novel component)		$V_{IRL}^N = 5.0$	+5.0
RE	17.7	27.8	+10.1
KE	25.4	26.1	+0.7
SDE	7.0	10.6	+3.6
EER		7.1	+7.1
RL	13.0	7.1	-5.9
Others	4.8	3.3	-1.5
		<b>NC: 39.4</b>	
		<b>MSP: 32.0</b>	
		<b>SBC: 27.8</b>	
		<b>LP, CV, SBS: 21.5</b>	

Note: Detailed calculations in supplementary materials.

LP, CV and SBS emphasize the decrease in the support of IRL compared to its predecessors. However, the incentives behind the merger were very different for RP and IL. RP wanted to halt its collapse; IL – whose support was increasing – to benefit from RP’s better organization, attractive candidates and a better seats/votes ratio for bigger parties under modified d’Hondt. The two were essentially equal partners and IRL’s vote share was a downturn for RP (though not as bad as it would have suffered on its own) but a mild improvement for IL. Here, SBS suffers from a further peculiar shortcoming – it is based on previous election’s votes, but party support can fluctuate greatly between elections. Before the merger, IL’s support in opinion polls was three times higher than that of RP even though the opposite was the case in 2003 election (Mell, 2006).

## Conclusion

In this article, we propose a new multi-dimensional concept of party novelty. The concept and the accompanying interval measure of party congruence/novelty allows for partial novelty and is not only useful for understanding the extent of change within individual parties, but also forms the basis for a split-vote-by-congruence approach to calculating volatility. Four case studies of party change and two illustrations of the new approach were used to test their validity. The novelty index chimes with our assessment of the cases based on in-depth knowledge; the proposed approach to volatility leads to meaningful and improved indices. Most importantly, the split-vote-by-congruence approach eliminates the need for dichotomous and potentially contentious coding of parties (as new, or singular successors/predecessors) that often leads to significantly over- or underestimated volatility. The examples served to showcase the advantages of the approach, although the advantages are more significant in more complex situation.

An obvious challenge for the congruence/novelty index is that in order to be reliable, it requires more information on individual electons than traditional approaches.<sup>28</sup> In the cases analysed here, leadership congruence was easy to determine based on online sources (even for the older Danish election); if little information is available about a new leader, novelty can be assumed. Assessing organizational congruence can be more difficult as information on party organization can be rather limited and fragmented, especially when electoral politics revolves around complex coalitions. However, rough

levels of congruence/novelty are easy to estimate for major parties and, in any case, this is also necessary for classifying parties meaningfully as new or old.

Calculating candidate congruence can be time-consuming, especially in larger countries or where data is unavailable in a convenient format. However, candidate data are increasingly available online. To our knowledge, extensive time series data are being collated for several West European countries; we have collated a candidate data set for nearly all elections in CEE since 1990s and are developing a computer code for automatically linking candidates between elections and calculating split-vote-by-congruence volatility. When candidate data are not available, MP turnover could be used as a proxy for dealing with continuing parties. More generally, where data is lacking, the split-vote-by-congruence approach can be used with rough estimates of congruence/novelty. The approach is computationally slightly more complex and time-consuming than traditional approaches to volatility. However, the complexity pales compared to the mathematics behind even the most basic regression methods widely used in political research.

More fundamentally, our approach involving virtual electons problematizes whether a *party* is a proper unit of analysis for calculating volatility or analysing party system dynamics. Our approach could even provide a better approximation of perceived voter-level volatility (i.e. do voters believe or feel that they have changed their preferences) that was perhaps the main original aim of electoral volatility index. Firstly, a ‘party’ is

only one possible type of elections, which can be completely absent in some parliamentary elections (e.g. Latvia 2010). Secondly, party transformation is sometimes highly complex, involving several parties and various degrees of novelty, often in conjunction. The split-vote-by-congruence approach can explicitly account for such complexities. The extra effort required is richly compensated by eliminating the need to justify often contentious or even impossible dichotomous coding.

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## Notes

<sup>1</sup> Not successors to existing parliamentary parties, have a novel name and structure, and do not have any important figures from democratic politics among their prominent member (Sikk, 2005).

<sup>2</sup> Our approach could also detect continuations among small parties for which candidate data but little other information might be available. Often grouped together as “other”, they can reduce the reliability of volatility indices (see Casal Bértoa et al, 2015)

<sup>3</sup> See Bartolini and Mair, 2007; Emanuele and Chiaramonte, 2016; Hug, 2001; Lago and Martínez, 2011; Mainwaring et al, 2009; Mainwaring and Zoco, 2007; Mair, 1993; Powell and Tucker, 2014; Sikk, 2005; Tavits, 2008a, 2008b.

<sup>4</sup> Coalition patterns and MP/ministerial turnover also reflect party change (Barnea and Rahat, 2011; Gherghina, 2015), but their value is more limited as they do not apply to (a) non-governing parties and (b) electors that did not enter the parliament twice. MPs and ministers are problematic if their number per party is small – congruence can fluctuate greatly if only one seat is lost or retained.

<sup>5</sup> An organizationally stable party with a highly novel name would be highly self-congruent (0.75).

<sup>6</sup> We contrast *top-ranking candidates* to *full candidate lists* in the preceding election. This asymmetry is intentional. Top-ranking candidates take elections more seriously and are more important for political parties. However, we are interested in being a candidate in previous election, rather than being a top-ranking candidates. Top candidates are less likely to be new than former top candidates to leave politics (due to retirement, intra-party term limits etc.). Turnover by choice is a better indicator of novelty than turnover by necessity.

<sup>7</sup> Candidate importance is more difficult to determine under single mandate districts; we suggest looking at all candidates weighted by vote shares. More research is needed to operationalise congruence and scrutinize the index under different electoral systems.

<sup>8</sup> Top 25% of candidates on nationwide lists in 2006 compared to full lists in 2003.

<sup>9</sup> Lower than Social Democrats (75%) and Liberals (57%) (data: Indenrigsministeriet, 1999).

<sup>10</sup> Rankings based on the combination of personal votes and proportionally distributed list votes (see Elklit, 2005); 1-4 candidates per district based on magnitude.

<sup>11</sup> The merger was hastily completed before the election as the Estonian electoral law only allowed registered political parties and individual candidates (but no coalitions) to run.

- <sup>12</sup> Top 31 candidates on nationwide lists (data: Estonian National Electoral Committee, [www.vvk.ee](http://www.vvk.ee)).
- <sup>13</sup> For details see Szczerbiak, 2002; Millard, 2003b.
- <sup>14</sup> Established as a coalition and registered as a party after the election.
- <sup>15</sup> Such as the Polish Agreement (PP), the Catholic-National Movement (RKN) and the Alliance for Poland (PdP). See Polish News Bulletin, 2001; de Lange and Guerra, 2009.
- <sup>16</sup> ROP and BdP.
- <sup>17</sup> O.2, Roman Giertych, its former candidate, was a notable figure in the alliance.
- <sup>18</sup> ROP, led by the former Prime Minister Jan Olszewski, was the last to join and first to leave LPR after the election (Millard 2003a).
- <sup>19</sup> Top 25% of candidates in 19 districts based on preference votes compared to 1997 Sejm and Senate lists; some non-affiliated 1997 Senate candidates considered new in 2001. Data from Popescu & Hannavy, 2001.
- <sup>20</sup> Pairwise congruences sometimes do not add up to one – e.g. when after a split the leaders of successors were all prominent politicians in the parent party. Therefore, the congruence is adjusted using total congruence in the following formulas.
- <sup>21</sup> Used, for example by Birch 2003; Powell & Tucker, 2014
- <sup>22</sup> The difference between NC and MSP is sometimes vague, NC tends to focus on party names, MSP allows for more changes.
- <sup>23</sup> Similar to ‘largest-successor method’ (Casal Bértoa et al, 2015), the more general term also applies for predecessors.
- <sup>24</sup> This approach (also ‘aggregation method’, Casal Bértoa et al, 2015) has been extensively used (Bartolini and Mair, 1990, Bielasiak, 2002, Chiaramonte and Emanuele, 2017, Dassonneville and Hooghe, 2015, Lane and Ersson, 2007; Sikk, 2005).
- <sup>25</sup> Used in Sikk 2005 for complex electoral coalitions.
- <sup>26</sup> In principle, novelty and congruence should be calculated for all electons. This is not done here to keep the examples simple; distinction between stable and changing electons was also very clear.
- <sup>27</sup> Score in Dassonneville and Hooghe, 2015; Núñez et al, 2016.
- <sup>28</sup> The aggregation of three dimensions would iron out minor errors. More work is needed on the relationship between the dimensions and possible weighting to best capture substantive party change.

## Supplementary materials for “Party Congruence and Novelty: A New Approach to Measuring Party Change and Volatility”

### **Dimensions of party change**

We propose an index of aggregate electon congruence, ranging from 0 (perfect incongruence) to 1 (perfect congruence), based on three dimensions: (a) organization including name, (b) leadership, and (c) candidates. Benchmark scores and descriptions for each dimension are given below. Note that it is not only possible for electons to take any intermediate score within each dimension – equally, any combination of scores on the three dimensions is empirically possible. Although some of these combinations may only be rarely observed, no value on any dimension logically precludes a score on another – i.e. it is possible for an electon to exhibit high candidate continuation despite choosing an outsider as a leader.

#### *Organization*

This dimension refers to all organizational units of an electon such as local, regional and national branches as well as official factions, sub-groupings or significant special interest groups including youth organizations. In addition, yet less importantly, this dimension refers to the name of an electon as it appears on the ballot paper. In case of ad hoc coalitions, parties often retain their official name in national registers, yet compete under a different name and even established parties occasionally innovate to highlight particular aspects of their programme or their leading candidate (see e.g. the change of the Austrian People’s Party (ÖVP) to “ÖVP – Liste Sebastian Kurz” in the 2017 parliamentary election).

We propose the following congruence benchmarks for organizational congruence (intermediate scores can be used to reflect specific circumstances):

- 1.0: an electon is congruent to itself in the previous election as it retains the name and electoral organization;
- 0.75: minor changes to name or electoral organization, or cosmetic changes to both;
- 0.5: substantial changes to name, organization or coalitional changes, including mergers. A merger of two similarly sized electons is a benchmark with a congruence score of 0.5 for both;
- 0.25: an electon which was absent from one or two previous elections but retains the name of a previously existing electon;



- 0: an electon that is completely new with no identifiable precursors in terms of organization and name.

### *Leader*

This dimension refers to the highest-ranking and formally most powerful representative of an electon, irrespective of formal title. In case of collective leadership, overall congruence is calculated as the average of individual leaders' congruence scores.

The congruence scores benchmarks for leadership are:

- 1.0: an electon retains the leader from previous election;
- 0.75: the new leader was previously a deputy leader, held a major political office for the party, has been the party leader before, or led an important internal faction;
- 0.5: the old leader stepped down for obvious non-political reasons (e.g. death or illness) or the new leader has held an important political office as an independent;
- 0.25: the new party leader previously held a low profile, but has been associated with political parties before;
- 0.0: the new party leader is recruited from outside of the political elite.

### *Candidates*

This dimension refers to individuals contesting an election under an electon's name, i.e. they appear on its candidate list(s) or are the electon's official candidate in a single-member districts (i.e. not merely endorsed by it). Thereby, candidates do not need to be members of the electon in question (and can hold membership in other electons); candidates that are members of an electon but contest elections as independents are not considered.

Candidate congruence is equal to the share of an electon's candidates at time  $t$  that contested the election at  $t-1$ .

- If all candidates of an electon contested previous elections with the same electon, it is perfectly self-congruent. If none of the candidates contested the previous election, the electon is perfectly novel.

- If the candidates come from several previous elections, the pairwise congruence depends on the share of candidates who previously ran on each list.

We suggest contrasting *top-ranking* candidates to *full candidate lists* in the previous election. Top-ranking candidates have a higher importance for political parties, have higher chances of getting elected and are more likely to have previously run for office (hence the comparison with full candidates lists from the previous election). Furthermore, candidates with no electoral prospects are more likely to leave politics, resulting in high levels of candidate turnover; however, this is of little importance to the substantive degree of election continuity. What constitutes *top-ranking* candidates depends on the electoral system. We suggest using the top 25% (relative to assembly size or district magnitude, respectively) based on list positions (closed-lists), preference votes (semi-open lists), or a ranking of vote shares (single-member districts).

## Volatility calculations (other approaches than SBC)

Denmark

### No-connection (NC) and most similar party approach (MSP), Denmark 1994-8

	1994	1998	Change
FP	6.4	2.4	-4.0
DF	-	7.4	+7.4
SD	34.6	35.9	+1.3
V	23.3	24.0	+0.7
K	15.0	8.9	-6.1
SFP	7.3	7.6	+0.3
CD	2.8	4.3	+1.5
RV	4.6	3.9	-0.7
EL	3.1	2.7	-0.4
KFP	1.9	2.5	+0.6
Other	1.0	0.4	-0.6
<b>Total volatility:</b>			<b>11.8</b>

### Largest party approach (LP) Denmark 1994-8

	1994	1998	Change
FP → DF	6.4	7.4	+1.0
stump FP	-	2.4	+2.4
SD	34.6	35.9	+1.3
V	23.3	24.0	+0.7
K	15.0	8.9	-6.1
SFP	7.3	7.6	+0.3
CD	2.8	4.3	+1.5
RV	4.6	3.9	-0.7
EL	3.1	2.7	-0.4
KFP	1.9	2.5	+0.6
Other	1.0	0.4	-0.6
<b>Total volatility:</b>			<b>7.8</b>

### Combined vote approach (CV) Denmark 1994-8

	1994	1998	Change
FP → DF+FP	6.4	7.4 + 2.4 = 9.8	+3.4
SD	34.6	35.9	+1.3
V	23.3	24.0	+0.7
K	15.0	8.9	-6.1
SFP	7.3	7.6	+0.3
CD	2.8	4.3	+1.5
RV	4.6	3.9	-0.7
EL	3.1	2.7	-0.4
KFP	1.9	2.5	+0.6
Other	1.0	0.4	-0.6
<b>Total volatility:</b>			<b>7.8</b>

### Split-by-support approach (SBS), Denmark 1994-8

	1994	1998	Change
DF (76% of combined vote in 1998)	6.4 * 76% = 4.9	7.4	+2.5
FP (24% of combined vote in 1998)	6.4 * 24% = 1.5	2.4	+0.9
SD	34.6	35.9	+1.3
V	23.3	24.0	+0.7
K	15.0	8.9	-6.1
SFP	7.3	7.6	+0.3
CD	2.8	4.3	+1.5
RV	4.6	3.9	-0.7
EL	3.1	2.7	-0.4
KFP	1.9	2.5	+0.6
Other	1.0	0.4	-0.6
<b>Total volatility:</b>			<b>7.8</b>

*Estonia*

**No-connection approach (NC) Estonia 2003-7**

	2003	2007	Change
RP	24.6		-24.6
IL	7.3		-7.3
IRL		17.9	+17.9
RE	17.7	27.8	+10.1
KE	25.4	26.1	+0.7
SDE	7.0	10.6	+3.6
EER		7.1	+7.1
RL	13.0	7.1	-5.9
Others	4.8	3.3	-1.5
<b>Total volatility:</b>			<b>39.4</b>

**Most similar party approach (MSP) Estonia 2003-7**

	2003	2007	Change
RP	24.6		-24.6
IL → IRL	7.3	17.9	+10.6
RE	17.7	27.8	+10.1
KE	25.4	26.1	+0.7
SDE	7.0	10.6	+3.6
EER		7.1	+7.1
RL	13.0	7.1	-5.9
Others	4.8	3.3	-1.5
<b>Total volatility:</b>			<b>32.0</b>

**Largest party approach (LP) Estonia 2003-7**

	2003	2007	Change
RP → IRL	24.6	17.9	-6.7
IL	7.3		-7.3
RE	17.7	27.8	+10.1
KE	25.4	26.1	+0.7
SDE	7.0	10.6	+3.6
EER		7.1	+7.1
RL	13.0	7.1	-5.9
Others	4.8	3.3	-1.5
<b>Total volatility:</b>			<b>21.5</b>

**Combined vote approach (CV) Estonia 2003-7**

	2003	2007	Change
RP + IL → IRL	24.6 + 7.3 = 31.9	17.9	-14.0
RE	17.7	27.8	+10.1
KE	25.4	26.1	+0.7
SDE	7.0	10.6	+3.6
EER		7.1	+7.1
RL	13.0	7.1	-5.9
Others	4.8	3.3	-1.5
<b>Total volatility:</b>			<b>21.5</b>

**Split-by-support approach (SBS) Estonia 2003-7**

	2003	2007	Change
RP (77% of combined vote in 2007)	24.6	17.9 * 77% = 13.8	-10.8
IL (23% of combined vote in 2007)	7.3	17.9 * 23% = 4.1	-3.2
RE	17.7	27.8	+10.1
KE	25.4	26.1	+0.7
SDE	7.0	10.6	+3.6
EER		7.1	+7.1
RL	13.0	7.1	-5.9
Others	4.8	3.3	-1.5
<b>Total volatility:</b>			<b>21.5</b>

Steps in split-by-congruence (SBC) volatility calculation, RP, IL and IRL (Estonia 2003-2007)

