Electoral Congruence and Novelty: Accounting for Partially New Parties

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Electoral volatility is the most widely used indicator of party system change (Pedersen 1979, 1980, Roberts & Wibbles 1999, Tavits 2005, Drummond 2006, Mainwaring & Zoco 2007, Lane & Ersson 2007, cf. Tavits 2008a). However, the calculation of volatility poses problems in party systems where there is high discontinuity in *electons* – to propose a common term for parties and any other "electoral units", most importantly coalitions.[1] Discontinuity can either mean breakthrough of new electons or innovation among old ones, such as splits and mergers. While some genuinely new electons can be identified easily, challenges are posed by:

a) those that appear new – for example, adopting a new name – but are in fact old ones gone through a makeover,
b) those that are reasonably novel in terms of organisation or personnel, yet have clear links to old ones, possibly even retaining a name, and
c) those that split/merge so that the principal successor or predecessor is unidentifiable.

Classifying such *partially novel electons* dichotomously as new/old or linking them to single successors/predecessors can be highly misleading from the perspective of party development. Furthermore, it can also disproportionately affect volatility scores either by substantially increasing or decreasing them.

Partly inspired by Barnea & Rahat's (2010) work, this paper proposes a new measure of *congruence/novelty* based on three dimensions: (a) organization including name, (b) leader and (c) candidates. The proposed index of congruence/novelty is useful on its own right as it allows connecting electons to their predecessors in a refined way. Yet, the paper also demonstrates how the measures can be used for calculating volatility scores that offer a more meaningful reflection of party system change compared to crudely linking some parties to single predecessors/successors while declaring others as perfectly new. In particular, it offers substantial improvements for measuring party system change in countries with frequent new parties and high levels of electon innovation.

[1] While the term might be awkward at first sight, it is necessary to emphasize the conceptual distinction between "electoral units" and political parties. *Electoral coalitions* are a commonplace in many (new) democracies; sometimes *non-party organizations* contest elections and even more often some "parties" (defined as electoral units) do not have a proper "party" behind the; some *party lists incorporate* independent candidates or members of other parties; *Individual candidates* and parties that contest *sub- or supra-national elections* only (e.g. Danish Eurosceptics) also deviate from the norm party is an electoral unit is a party. In practical terms, "electon" is easier to use in text when one needs to refer specifically both to "parties and electoral coalitions".

We proceed as follows: firstly, a three-dimensional conceptualization of party novelty/congruence and criteria for operationalization are proposed; secondly, to illustrate the proposed new measure, we look at five elections with different types of electon innovation from countries that differ in terms of size, region and electoral system; the third section of the paper proposes a split-vote method for using novelty and congruence scores for more nuanced calculation of volatility scores.

Degrees of congruence and novelty

In their conceptually driven work that empirically mostly draws on Israel's *Kadima*, Barnea & Rahat (2010) emphasize the importance of the concept of *party newness* to analysis of party system change and propose a *threshold* to determine dichotomously whether a party should be considered new. Their study is based on a framework of eight criteria, inspired by V.O. Key's (1942) notion of parties as 'tripartite systems of interaction':

(a) *Party-in-the-electorate* (criteria: label, ideology, voters).
(b) *Party-as-organization* (formal/legal status, institutions, activists).
(c) *Party-in-government* (representatives, policies).

Indeed, party newness has generally been used as a *dichotomous* variable (Hug 2001, Sikk 2005, Bartolini & Mair 2007, Lago & Martínez 2011, Mainwaring, España & Gervasoni 2009, Mainwaring & Zoco 2007, Mair 1993, Powell & Tucker 2009, Tavits 2008a, 2008b). However, there are no reasons why novelty could or should not be used as an *interval* variable in party system studies. This paper proposes exactly such a measure drawing on Barnea & Rahat's (2001) notion of multi-dimensional newness. This study is inspired by their intellectual rationale, but takes the logical next step in going beyond a threshold of newness and adopting a more nuanced approach to novelty instead. The paper proposes a parallel measure of congruence/novelty ranging from 0 (prefect incongruence or lack of novelty) to 1 (perfect novelty or congruence). The aggregate congruence and novelty scores are based on three dimensions: organization (including name), leadership and candidates. Thereby, this paper generally adopts Barnea & Rahat's (2001) framework, but combines and reconfigures some of their criteria and introduces and additional criterion (candidates).

Congruence and novelty are notated and defined as follows:

- (Pairwise) congruence of electon Y to X is $C_{X\text{-}Y} = ({C^O}_{X\text{-}Y} + {C^L}_{X\text{-}Y} + {C^C}_{X\text{-}Y}) / 3$, where X is an electon in t-1 and Y an electon in t and C^O, C^L, C^C are congruence scores for organization, leaders and candidates.
- (Pairwise) novelty of electon Y vis-à-vis X is $N_{X\text{-}Y} = 1 - C_{X\text{-}Y}$
- Total novelty of Y vis-à-vis all electons X_i (i=1…n) in t-1 is $N_Y = 1 - \Sigma C_{Xi\text{-}Y}$.

Organization is a combined dimension of party structures (both on national and local level) and name. A *genuinely old* electon must retain its name together with the organizational

structure while a *genuinely new* one should contest elections under a novel name. As we are interested in electons – i.e. both parties and electoral coalitions – our focus is both on *electoral* names and electoral and internal (party) organization. For example, an electoral coalition of two parties (that nevertheless retain an independent identity) that previously contested elections separately should be considered as *partially* new. A new party that is based on a former electoral coalition can also be seen as partially new, but to a lesser extent. [2] The congruence score benchmarks for organization are assigned as follows (intermediate scores can be used to reflect specific circumstances in complex or non-standard situations):

- 1.0: an electon is congruent to itself in previous election, i.e. 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 equally sized electons is a benchmark has a congruence score of 0.5 to both;
- 0: an electon that is completely new – i.e. unrelated to identifiable precursors in terms of organization and name.

Leader. An electon with an unchanged leader *ceteris paribus* obviously cannot be considered new. Alternatively, a degree of novelty always accompanies a party with a genuinely new leader – when a leader is changed following a competitive contest, for example after the previous leader steps down or is displaced following an electoral defeat. On the other hand, novelty is obviously more qualified if the new leader has previously been near party leadership or held a top political office for the party. Additionally, electons led by former key players in country's politics – heads of government and executive presidents – do not count as fully genuinely new even if they did not lead or even belong to a party previously (following Sikk 2005) – in such cases total novelty is reduced without affecting pairwise congruence scores.[3] The congruence scores benchmarks for leaders are:

- 1.0: an electon retains the leader from previous election;
- 0.5: the new leader has been the party leader earlier, was previously a deputy leader, held a major political office for the party or was a visible leader of an internal faction;
- 0.5: the old leader stepped down for obviously non-political reasons (e.g. death or illness);
- 0.25: the new party leader previously held a low profile (related to the electon);
- 0.0: the new party leader is recruited from outside of the electon.

Candidates. If all candidates of an electon *Y* contested previous elections for an electon *X*, the two electons can be considered perfectly congruent. If none of the candidates on the list of Y contested the previous elections, *Y* is perfectly novel. If the candidates come from two or

[2] This constitutes another reason for combining name and electoral organization is that sometimes an electon with an unchanged name actually has a somewhat changed identity – e.g. when parties that formed a coalition merge before the subsequent election under the same name. See Latvian examples of such mergers below.

[3] Electoral coalitions may or may not have formal leadership, often the leaders of its constituent parties act as co-leaders and changes amongst them contribute to discontinuity.

more previous electons, the congruence to each of them can be established by the share of candidates previously in each respective list. Both for practical and substantive purposes, we are generally only looking at the percentage of candidates among the top 20-25 per cent of candidates contested elections previously,[4] in contrast to some earlier studies analysing full candidate lists (e.g. Shabad & Slomczynski, 2004, Kreuzer & Pettai 2003). Candidate list "tails" often have very high turnover levels – the percentage of new candidates in Czech Republic and Poland ranged from 77.1 to 84.5 (1992–98, ibid: 155). Some of the case studies presented in this paper also show evidence that there is substantially more stability on the top of electoral lists.

The definition of what constitutes the top of a candidate list depends on country's electoral system. It is fairly straightforward in systems with nationwide closed lists (Israel). Similarly, if closed national compensation lists are used in a multi-tier system (Estonia), these can be used as they can be expected to reflect the position of candidates in party hierarchy. In systems with no national tier, top-ranking candidates in districts are used for calculation. In countries with open lists, preference votes for candidates provide a means of identifying top candidates (e.g. Latvia, Poland). The same applies for semi-open lists (Denmark) where voters have a bigger or smaller role in determining the order of the candidates.[5]

Note that the study does not look at changes in (governing) coalition patterns and turnover in MPs or ministers – that are sometimes considered relevant for assessing party novelty – as they are impossible to apply for (a) parties that have had little chance of government and (b) extra-parliamentary parties, including drop-outs. A further technical issue regards MPs and ministers, especially small parties or small parliaments. If the number of MPs for a party is very low (say, in single digits), congruence levels fluctuate dramatically as just one happens to lose or retain a seat or a cabinet portfolio.

The following section illustrates congruence and novelty indexes by looking at countries from different regions using different electoral systems. Our focus is generally on single pairs of elections and notable electons (generally those which have undergone interesting transformations). However, depending on easy availability of interesting data, other issues related to electon novelty are discussed. Specifically, we discuss electoral coalitions (Latvia), compare congruence data with spatial electoral data (Israel) and related electons' earlier and later novelty scores (Estonia). In two cases studies (Poland and Denmark) we also discuss the "stability" of the candidate congruence index – i.e. the degree to which the index fluctuates as we move from the analysis of the apex of candidate lists to delve further down.

[4] Top candidates in the most recent election are compared to full candidate lists in the preceding one. This asymmetry is intentional. Comparing full candidate lists is likely to underestimate congruence as there is evidence of considerable movement in the tails of lists – we can assume that candidates further down the list take elections less seriously than those at the top (as their chances of getting elected are weak, or non-existent for most). Hence, by focussing on the top ranking candidates, we analyse *serious candidates* only. On the other hand, we want to establish whether the top candidates were running at all in previous elections, rather than running as top candidates. It is less likely for new top candidates to be running for the first time than for former top candidates to leave politics – because of retirement, internal party rules on term limits for its candidate etc. Also, while the former (turnover by choice) obviously makes electons more novel, it should not necessarily be the case with the latter (turnover out of necessity).

[5] Countries using single mandate districts are not covered in this paper – candidate positions in party hierarchy is difficult to determine in such countries and congruence scores can be based on all candidates or a random sizable subset.

Case studies of electon congruence and novelty

This section illustrates the proposed congruence/novelty indices by looking at cases of different electon transformation. The case studies analysed include a genuinely new party (Zatler's Reform Party in Latvia 2011), 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 a party system collapse (the fall of Solidarity Electoral Action, Poland 2001). The examples covered are both from Western European and Central and Eastern Europe and cover a range of different electoral rules. Even though the focus is on individual electons of interest, where possible, the congruence scores (especially that of candidates) will be compared to other major electons.

A genuinely new party: Zatler's Reform Party (Latvia, 2011)

Table 1. Latvian parliamentary election results 2010-2011, vote % (seats %)

		2010	2011
SC	Harmony Centre *Politisko partiju apvienība "Saskaņas Centrs"*	*26.0 (29)*	*28.4 (31)*
ZRP	Zatlers's Reform Party *Zatlera Reformu partija*	–	20.1 (22)
Unity	*Vienotība*	*31.2 (33)*	18.8 (20)
NA	National Alliance *Nacionālā apvienība 'Visu Latvijai!' – 'Tēvzemei un Brīvībai/LNNK'*	*7.7 (8)*	13.9 (14)
ZZS	Green and Farmer's Union *Zaļo un Zemnieku savienība*	*19.7 (22)*	*12.2 (13)*
LPP/LC	Šlesers's Reform Party LPP/LC *Šlesera Reformu partiju Latvijas Pirmaja partija/"Latvijas Ceļš"*	–	2.4 (0)
PLL	"For a Good Latvia" *Partiju apvienība "Par Labu Latviju"*	*7.7 (8)*	–
PCTVL	"For Human Rights in United Latvia" *"Par cilvēka tiesībām vienotā Latvijā"*	1.4 (0)	0.8 (0)

Source: Centrālā vēlēšanu komisija (www.cvk.lv).
Note: results of coalitions in *italics*.

The results of 2010 and 2011 parliamentary elections in Latvia are shown in Table 1. Early elections in 2010 were held as the parliament was dissolved in a referendum initiated by president Valdis Zatlers following his unsuccessful bid for re-election. It is interesting to note that the parliament elected in 2010 was *exclusively* based on electoral coalitions, two of which merged into proper political parties before 2011 elections. In 2011, ZRP – a party set up by former president Valdis Zatlers – was the only genuine newcomer, but as we will see below, some of the other electons also exhibited significant degrees of novelty.

Tables 2-4 show congruence matrices for the three dimensions and Table 5 gives the aggregate congruence and novelty scores. Unity and NA had transformed from electoral coalitions into proper parties between 2010 and 2011 and are therefore marginally novel (see Table 2). PLL (2010) was a coalition of two parties – the People's Party (TP) and LPP/LC – only the latter of which ran in 2011. None of the old electons changed leaders, but there were minor changes related to the transformations of three coalitions (Unity, NA, LPP/LC, see Table 3).

Table 2. Congruence matrix and novelty index: Organization

	2011						
2010	SC	ZZS	PCTVL	Unity	NA	LPP/LC	ZRP
SC	1						
Unity				.75[a]			
NA					.75 [a]		
ZZS		1					
PLL						.75[b]	
PCTVL			1				
Novelty	*0*	*0*	*0*	*.25*	*.25*	*.25*	*1*

[a] Formally a coalition in 2010.
[b] LPP/LC part of PLL coalition in 2010.

Table 3. Congruence matrix and novelty index: Leader

	2011						
2010	SC	ZZS	PCTVL	LPP/LC	Unity	NA	ZRP
SC	1						
Unity					.75[a]		
NA						0.5[d]	
ZZS		1					
PLL				.75[b]			
PCTVL			1[c]				
Novelty	*0*	*0*	*0*	*.25*	*.25*	*.5*	*1*

[a] Solvita Āboltiņa, was a co-chair of the coalition in 2010 and the leader of its largest party (New Era).
[b] Ainārs Šlesers, the leader of LPP/LC in 2011 was a co-chair of PLL coalition in 2010.
[c] Three chairpersons.
[d] One of two the party leaders in 2011 was a co-chair of the coalition in 2010.

In parliamentary elections, Latvia is divided into five districts corresponding to historical regions of the country plus the capital Riga. The five top candidates from each of the five districts were included in the analysis – constituting about 22 per cent of candidates.[6] Four electons (SC, Unity, ZZS and PCTVL) showed remarkable continuity in terms of their 25 leading candidates (see Table 5). As expected, ZRP appeared almost perfectly novel. Interestingly, only about half of the top candidates for NA in 2011 had been candidates in 2010, that might be related to the fact that at the time of the merger, "All for Latvia!" (*"Visu Latvijai!",* VL), previously the junior partner, had overtaken "For Fatherland and Freedom"/LNNK *("Tēvzemei un Brīvībai/LNNK"*, TB/LNNK) in importance. The candidate line-up of LPP/LC was also fairly novel – one could speculate that the party tried to freshen up its candidate list following the decision of the People's Party (*Tautas Partija*, TP) not to contest the election (and later dissolve itself altogether) that led to a loss of a number of prominent candidates.[7]

Table 4. Congruence matrix and novelty index: Candidates

	2011						
2010	SC	ZZS	Unity	PCTVL	LPP/LC	NA	ZRP
SC	.96						
Unity			.84				.08
NA						.52	
ZZS		.88					
PLL					.56		
PCTVL				.80			
Novelty	*.04*	*.04*	*.16*	*.20*	*.40*	*.44*	*.92*

Note: Congurence < 0.05 omitted

[6] 29 per cent in case of PCTVL that fielded 85 candidates.
[7] The inclusion of "Šlesers's Reform Party" in its name was no more than a (hostile) pun on the name of the party of the former president – who promised to fight the power of oligarchs (including Šlesers, LPP/LC leader) in Latvian politics.

Overall (see Table 6), ZRP appears virtually perfectly new, reflecting the aim of the former president to run candidates with no previous party political experience. Most other electons appear more old than new, yet the scores for NA and LPP/LC reflect a certain degree of novelty, that is reasonable given the developments within these electons between the elections.

Table 5: Overall congruence and novelty

	2011						
2010	SC	ZZS	PCTVL	Unity	LPP/LC	NA	ZRP
SC	0.98						
Unity				0.78			
NA						0.59	
ZZS		0.96					
PLL					0.69		
PCTVL			0.93				
Novelty	*0.03*	*0.06*	*0.11*	*0.18*	*0.29*	*0.32*	*0.98*

Note: Congurence < 0.05 omitted

A partially new party: Kadima, Knesset elections in 2006

Table 6. Israeli parliamentary election results 2003-6, vote % (seats %)

	2003		2006	
Kadima	–		22.0	(24.2)
Labour-Meimad	14.5	(15.8)	15.1	(15.8)
Shas	8.2	(9.2)	9.5	(10.0)
Likud	29.4	(31.7)	9.0	(10.0)
Yisrael Beitenu	–		9.0	(9.2)
National Union/Yisrael Beitenu	5.5	(5.8)	–	
National Union/NRP	–		7.1	(7.5)
NRP	4.2	(5.0)	–	
Gil	–		5.9	(5.8)
Yahadut HaTorah	4.3	(4.2)	4.7	(5.0)
Meretz	5.2	(5.0)	3.8	(4.2)
Ra'am/Ta'al	2.1	(1.7)	3.0	(3.3)
Hadash	3.0	(2.5)	2.7	(2.5)
Balad	2.3	(2.5)	2.3	(2.5)
Shinui	12.3	(12.5)	0.2	(0)
One Nation	2.8	(2.5)	merged w Labour	
Yisrael BaAliyah	2.2	(1.7)	merged w Likud	
Others	4.2	(0)	5.6	(0)

Source: Diskin & Reuven (2007)

While *Kadima* – established by prime minister Ariel Sharon four months before 2006 *Knesset* elections – adopted a new name, it was clearly a splinter from *Likud* in other respects. Hence, in terms of its name and organization, *Kadima* can be assigned a novelty coefficient of 0.5 (= congruence to *Likud*).

Ehud Olmert – *Kadima's* leader at the time of elections – had been a leading cabinet member and acting Prime Minister replacing Ariel Sharon after he suffered a stroke. The party would have been completely congruent to *Likud* in terms of leadership if Sharon had led *Kadima* to elections, as he was the leader of *Likud* right up to setting up the new party. However, given the partial novelty of Olmert as the leader, *Kadima* can be assigned a novelty (and congruence to *Likud*, as he had served in major cabinet positions for the party) coefficient of 0.5 in terms of leadership.

In terms of its top ranking candidates, *Kadima* was fairly congruent with *Likud* and marginally congruent with other Israeli political parties, in particular Labour (see Table 7). The overall congruence with established parties was 0.6 while congruence with Likud was equal to its novelty coefficient (0.4).

Table 7: Kadima 2005: congruence in terms of top-ranking candidates

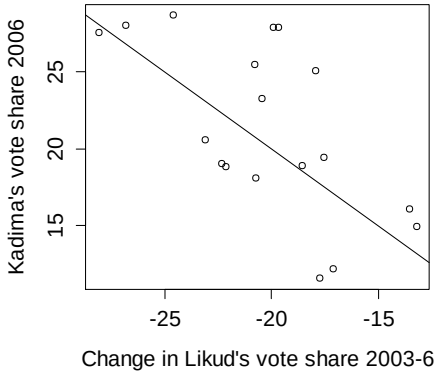
	congruence
Likud	.40
Labour	.10
Yisrael BaAliyah	.03
One Nation	.03
National Union	.03
Total	.60
Novelty	*.40*

Note: Top 25% = 30 candidates

Table 8. Kadima 2005: coefficient of novelty and congruence to Likud.

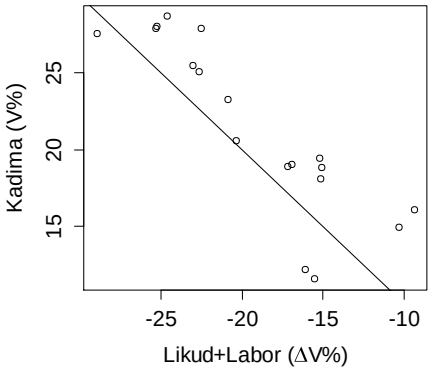
Criterion	Novelty	Congruence to Likud
Organization	0.5	0.5
Leader	0.5	0.5
Candidates	0.4	0.4
Total	0.47	0.47

Figure 1: Change in Likud's support (2003-6) and Kadima's vote share (2006)



Note: Adjusted R-squared: 0.96

Figure 2: Change in Likud and Labor's combined support (2003-6) and Kadima's vote share (2006)



Note: Adjusted R-squared: 0.98

In summary, based on the three criteria, *Kadima* is an almost perfect example of a quasi-new party (see Table 8). Ecological data (based on 18 regions) confirms that support for *Kadima* was strongly determined by the change in *Likud's* support, although even better by the combined vote change of *Likud* and Labor (the latter has a substantial independent effect, see Figures 1 & 2). That provides further evidence of significant overlap between the supporters of *Kadima* and one time supporters of *Likud* (and Labour). Hence, I concur with Barnea & Rahat's (2005) conclusion that it is difficult to decide whether it should be seen as a new electon or a splinter from *Likud*. However, this single coding decision impacts very strongly the traditional volatility index for the 2005 Israeli elections. As shown later, the congruence and novelty coefficients provide a remedy against such dichotomous choices as they can be used for the calculation of electoral volatility as a measure of party system change to account for *partial* novelty of parties.

A splinter: Danish People's Party (1998)

In 2005, Pia Kjærsgaard, the former leader of Progress Party (*Fremskridtspartiet*, FP) decided to leave the party following a long-standing internal strife where she was increasingly ending up on the losing side. She went on to set up the Danish Peoples's Party (*Dansk Folkeparti*, DF), and was joined by three other MPs and about one third of the party members (Pedersen 2006).

The new party was perfectly congruent with FP in terms of its leader ($C^{L}_{FP\text{-}DF} = 1.0$), but entirely novel in terms of the name. A new organization was created from scratch and a membership drive followed, but Kjærsgaard was very dominant in the party and the former members of FP made up the core of the new party (Pedersen 2006). Hence, in terms of name and organization the Danish People's Party in 1998 elections can be considered to partially congruent with FP in 1994($C^{O}_{FP\text{-}DF} = 0.5$). The stump FP retained its name and still relied on bulk of its original membership and organization ($C^{O}_{FP\text{-}FP} = 1.0$). The party's new leader Kirsten Jacobsen was previously a leading figure in the party and the arch-rival from the anti-Kjærsgaard wing ($C^{L}_{FP\text{-}FP} = 0.5$).

Table 9. Danish parliamentary election results 1994-1998 vote % (seats %)

	1994	1998
Social Democrats *Socialdemokratiet* (SD)	34.6 (35.4)	35.9 (36.0)
Liberals *Venstre, Danmarks Liberale Parti* (V)	23.3 (24.0)	24.0 (24.0)
Conservatives *Det Konservative Folkeparti* (K)	15.0 (15.4)	8.9 (9.1)
Socialist People's Party *Socialistisk Folkeparti* (SF)	7.3 (7.4)	7.6 (7.4)
Danish People's Party *Dansk Folkeparti* (DF)	–	7.4 (7.4)
Center Democrats *Centrum-Demokraterne* (CD)	2.8 (2.9)	4.3 (4.6)
Social Liberals *Det Radikale Venstre* (RV)	4.6 (4.6)	3.9 (4.0)
Unity List *Enhedslisten - De Rød-Grønne* (EL)	3.1 (3.4)	2.7 (2.9)
Christian People's Party *Kristeligt Folkeparti* (KFP)	1.9 (0.0)	2.5 (2.3)
Progress Party *Fremskridtspartiet* (FP)	6.4 (6.3)	2.4 (2.3)
Other Parties	1.0 (0.6)	0.4 (0.0)

Source: Nielsen (1999)

In terms of parliamentary candidates, the stump FP was more congruent with FP in 1994 than DFP. 25 per cent of (all) Danish People's Party candidates in 1998 had run in the Progress Party's list in previous election. Of the Progress' Party's candidates, 36 per cent had been the party's candidates in previous election – not much fewer than before the split in 1994 when 45 per cent of its candidates had been nominated in the previous election[8] (aggregate data from *Folketingsvalget den 11. marts 1998*). When looking at the top 25 per cent of the most popular candidates in districts, [9] the congruence was much higher for both: $C^{C}_{FP\text{-}DF} = 0.65$ for the Danish People's Party and $C^{C}_{FP\text{-}FP} = 0.78$ for the Progress Party. Hence, DF candidate list was less congruent with FP's in 1994 than that of stump FP while the latter was comparable

[8] Yet, this is relatively low compared to the main two Danish parties, the Social Democrats (75%) and Liberals (*Venstre*, 57%).

[9] Based on the combined vote shares – i.e. personal votes and proportionally distributed party list votes (see Elklit 2005). 1-4 top candidates per district depending on magnitude.

to congruence levels in the lists of two main Danish parties (Social Democrats: 0.82 and *Venstre* 0.77).

The overall congruence was 0.72 for DF and 0.76 for FP. Notably, the similar aggregate scores results from high convergence on different dimensions – FP was highly congruent in terms of organization and name and DF in terms of leader. Aggregate novelty was 0.28 for DF and 0.24 for FP; that is exactly the reminder of congruence as neither of the electons was congruent to any other electon in 1994.[10]

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

In 2003, Estonia saw an electoral earthquake when Res Publica – a genuinely new party founded less than two years before its first elections, became one of the largest parties in the parliament and Juhan Parts, the party leader became the prime minister. However, the fortunes of the party turned very quickly as it saw popular support erode and already in 2004 the party leadership agreed a merger to the neo-liberal Reform Party that the latter later ruled out as Res Publica was seen as a liability rather than an asset (Taagepera 2006). In April 2006, Taavi Veskimägi and Tõnis Lukas, the leaders of Res Publica and Pro Patria (a major conservative party) announced plans to merge.

The two parties officially merged in June 2006 and until May 2007 (i.e. after its first elections in March 2007) the party was led by the former leaders of its two constituent parts. Both leadership and organization congruence (to both previous electons) can be set high at 0.85. Firstly, there was substantial leadership continuity because of the transitory dual leadership. Secondly, the new party was based on a formal merger of the two organizations and the name of the new party was based on the names of two constituent parts. Hence, at the time of its first elections in 2007 the party was actually halfway between a proper party and an electoral coalition.[11]

In terms of top-ranking candidates in nationwide party lists[12], Pro Patria and Res Publica Union (IRL) was highly congruent with both of its constituent parts (exactly 0.39), and the overall candidate novelty was 0.23 – i.e. 23% of top candidates were not candidates in 2003 on any lists. Hence, the total congruence of IRL to both IL and RP was 0.70, while the overall novelty was 0.18, based on 0.15 for leaders and organization and 0.23 for candidates.

Notably, the candidate novelty had been very high for Res Publica in 2003 (0.87), making it an example of a genuinely new party to rival the Latvian ZRP in 2011. In 2011 parliamentary elections, IRL showed very high levels of self-congruence in terms of its candidates (0.74). Interestingly, candidate novelty of 0.26 resulted mostly from "return candidates" (i.e. those

[10] Notably, none of the top candidates had run on any other list than FP.
[11] The reason why the merger had to take place before the election was that Estonian electoral law does not allow electoral coalitions, only allowing registered political parties and individual candidates to run.
[12] All data from Estonian National Electoral Committee (www.vvk.ee). 31 of the 125 candidates listed. In parliamentary elections, Estonia uses two tiers of party lists – the national lists used for allocating compensation mandates to ensure proportionality are closed while district lists are open. While three quarters of mandates were allocated in electoral districts, most of the successful candidates were also highly placed in national lists.

who had skipped the 2007 election) and local politicians moving into national politics. Hence, there were virtually no "genuine newcomers" amongst the top 25 per cent candidates in 2011.

Table 10. Estonian parliamentary election results 2003-2007 vote % (seats %)

	2003	2007
Reform Party *Reformierakond* (RE)	17.7 (18.8)	27.8 (31)
Centre Party *Keskerakond* (KE)	25.4 (27.7)	26.1 (29)
Pro Patria and Res Publica Union *Isamaa ja Res Publica Liit* (IRL)	–	17.9 (19)
Res Publica (RP)	24.6 (27.7)	–
Pro Patria *Isamaaliit* (IL)	7.3 (6.9)	–
Social Democratic Party *Sotsiaaldemokraatlik Erakond* (SDE)	7.0 (5.9)[a]	10.6 (10)
Estonian Greens *Eestimaa Rohelised* (EER)	–	7.1 (6)
People's Union *Rahvaliit* (RL)	13.0 (12.9)	7.1 (6)
Others and single candidates	4.8 (0.0)	3.3 (0)

[a] Moderates (*Mõõdukad*)
Source: Pettai 2004, 2008.

Party system collapse: Polish Sejm elections in 2001

The 2001 *Sejm* election brought a wholesale and highly complicated transformation of the Polish political scene, the details of which are impossible to cover here (for excellent overviews see Millard 2003b and Szczerbiak 2002). We only focus on congruence of three new electons to Solidarity Electoral Action in 1997.

Table 11. Polish parliamentary election results 1997-2001 vote % (seats %)

Party	2001	1997
SLD-UP: Alliance of the Democratic Left-Labour Union *Sojusz Lewicy Demokratycznej - Unia Pracy*	41.0 (47.0)	27.1 (35.7)
UP: Labour Union *Unia Pracy*	–	4.7 (0.0)
PO: Civic Platform *Platforma Obywatelska*	12.7 (14.1)	–
SO: Self-Defence of the Polish Republic *Samoobrona Rzeczypospolitej Polskiej*	10.2 (11.5)	–
PiS: Law and Justice *Prawo i Sprawiedliwosc*	9.5 (9.6)	–
PSL: Polish Peasant Party *Polskie Stronnictwo Ludowe*	9.0 (9.1)	7.3 (5.9)
LPR: League of Polish Families *Liga Polskich Rodzin*	7.9 (8.3)	–
AWS: Solidarity Electoral Action *Akcja Wyborcza Solidarnosc*	5.6 (0.0)	33.8 (43.7)
UW: Freedom Union *Unia Wolnosci*	3.1 (0.0)	13.4 (13.0)
ROP: Movement for Reconstruction of Poland *Ruch Odbudowy Polski*	–	5.6 (1.3)
Others	1.0 (0.0)	8.1 (0.4)

Source: Millard 2003b, Szczerbiak 1998

The main casualty of the 2001 electoral earthquake was the Solidarity Electoral Action (*Akcja Wyborcza Solidarność Prawicy*, AWS) who fell from being the winner of 1997 elections and the leading party in the government. Not only did the oppositional ex-communist Democratic Left Alliance-Labour Union (*Sojusz Lewicy Demokratycznej-Unia*

Pracy, SLD-UP) come to power, but AWS that had been the biggest party in Poland after 1997 was entirely left out of the new parliament (failing to cross the 8% threshold required of electoral coalitions). The fall of AWS can partly attributed to its poor performance in the government, but the rise of new parties played an important role too. Four new parties entered the Sejm: Civic Platform (*Platforma Obywatelska*, PO), Self-Defence of the Republic of Poland (*Samoobrona Rzeczpospolitej Polskiej*, SO), Law and Justice (*Prawo i Sprawiedliwość* PiS) and League of Polish Families (*Liga Polskich Rodzin*, LPR); three of them (PO, PiS and LPR) had some degree of congruence with AWS.

Civic Platform (PO), the biggest of the new electons[13] was set up in 2001 by three prominent Polish politicians: Andrzej Olechowski, Maciej Płażyński and Donald Tusk. Olechowski was an independent candidate and a surprise runner-up in 2000 presidential elections, who had served as a foreign and finance minister in two governments of different political hues in the first half of 1990s. Płażyński was the Speaker of the Sejm for AWS since 1997 (*Ruch Społeczny*, RS) and one of the leaders of a party belonging to the coalitions. Finally, Tusk was a Senator and one of the leaders of Freedom Union (*Unia Wolności*, UW) who left the party following a defeat in the leadership contest as the ASWP-UW coalition led by Jerzy Buzek had collapsed.[14] PO was founded in January 2001 and until after the 2001 elections, all three were *de facto* leaders of the party, while later on Płażyński became the official leader.

In terms of leaders, the Civic Platform was slightly congruent with both ASWP and UW. Płażyński – one of the leading founders and the first official leader of the party[15] – had held a high office for ASWP and was one of the leaders in an important constituent unit of ASWP (leader congruence = 0.25). Meanwhile, Tusk was a prominent member of UW and a strong leadership contender (leader congruence = 0.25). However, as Olechowski was an independent and neither of the other two founders had occupied the top spot in AWS or UW, the leader novelty could be set at a relatively high 0.5.

In terms of organization, the Civic Platform was also mildly congruent with both AWS and UW as it inherited constituent parties/fractions from both. However, it adopted a wholly new name that did not overlap at all with either AWS or UW. Hence, the organizational congruence can be set at most at 0.2 with each and novelty coefficient at 0.6.

Law and Justice (PiS) was also formed shortly before elections in March 2001 by Lech and Jarosław Kaczyński. The party was roughly based on Centre Agreement (*Porozumienie Centrum*, PC) that had been part of the AWS in 1997, but also attracted a high number of splinter groups from other conservative groupings elections and benefitted from the popularity of Jarosław Kaczyński's twin brother Lech who was an independent Minister of Justice in Buzek's government (see Millard 2003b). The party had a novel name and was organizationally an amalgam of various political groups, some of which had previously been associated with AWS, leading to congruence score of 0.3 and novelty score of 0.7.

[13] Established as a loose coalition/movement, it was only officially registered as a party after its initial election.
[14] In an interesting turn of events, 2004, Buzek ran for the European Parliament on PO's list and served as the President of the European Parliament 2009-12.
[15] BBC Monitoring July 9, 2001, Poland: Centre-right group to become party after elections.

When the party group was created in the Sejm in July 2001, it included 18 MPs and was headed by Kazimierz Marcinkiewicz, former cabinet chief for PM Buzek. However, the Kaczyński broterhs were the most prominent politicians in the newly founded party with Lech being the first formal leader. Even though many of the leading founders of PiS had been previously affiliated to AWS, none of them (with the exception *independent* Lech Kaczyński) was very prominent in the coalition. Hence, there was only limited leadership congruence (0.25) and plenty of novelty (0.75).

The League of Polish Families (LPR) was a merger of two small radical conservative groupings (National Party, SN and National-Democratic Party, SND) in April 2001. Before the 2001 parliamentary elections it was joined by a scattering of other parties, some of which had previously been affiliated to AWS and arguably yielded more political significance – such as the Polish Agreement (PP), the Catholic-National Movement (RKN), the Alliance for Poland (PdP) and the Movement for Rebuilding Poland (ROP)[16] (see de Lange & Guerra 2009 and "League of Polish Families Forges…" 2001). The first leader of the party was Marek Kotlinowski – a failed parliamentary candidate for National Christian Bloc for Poland (BdP) in 1997 that won only 1.4 per cent of the vote. He was perhaps lesser known figure than some of the marginal yet vociferous politicians with background in or close to AWS – such as Jan Łopuszański, the former leader of PP, Gabriel Janowski of PdP, Antoni Macierewiczof RKN (in 1997, a candidate for ROP) or Roman Giertych of SN (SN, candidate for BdP in 1997) [17] (see "League of Polish Families Forges…" 2001). Hence, in terms of organization, LPR had a slight congruence with AWS (0.1), ROP (0.1) and BdP (0.1), resulting in a novelty score of 0.7, but much higher if we only consider parliamentary parties (i.e. AWS and ROP, 0.8). In terms of leadership, it was most slightly congruent with the marginal BdP (0.2 as Giertych was a notable figure in the alliance), but negligible with either AWS or ROP – as none of the leading figures with background in AWS held a leading political position and ROP's commitment to LPR is debatable. Hence, in terms of parliamentary parties the leadership novelty of LPR was perfect.

The candidate data for 2001 and 1997 elections was obtained from the database Political Transformation and the Electoral Process in Post-Communist Europe, University of Essex (http://www.essex.ac.uk/elections/). Unfortunately, the database for 1997 only contained information about the candidates of five parties that entered the parliament. Hence, the congruence of 2001 electons to extra-parliamentary formations cannot be assessed. In particular, the dataset for 1997 candidates does not include Self-Defence (that is therefore excluded from the tables) or Labour Union (UP) that was part of the SLD-UP electon in 2001. Hence, the estimate for SLD-UP's novelty reflects congruence to parliamentary parties, but too high vis-à-vis all 1997 electons. In 2001, Poland was divided into 19 electoral districts (down from 52 four years earlier). Open party lists were used and the final ordering of candidates was determined by the number of preference votes cast. This rank ordering was used for determining the top 25 per cent of candidates, even though preference votes led to

[16] ROP led by the former Prime Minsiter Jan Olszewski was the last to join and first to leave the party after the election (Millard 2003a).

[17] There was reportedly a leadership struggle between the former leaders of SN, PP, RKN and PdP (""League of Polish Families Forges…" 2001) and the size of the LPR faction was cut in half during the parliamentary term due to defections .

only limited re-ordering of candidates compared to party orderings. The candidate lists of 2001 were compared both to 1997 *Sejm* and Senate candidate lists.[18]

Table 12 shows a wide range of novelty scores for electons that contested 2001 *Sejm* elections in Poland. Some of them (PiS, LPR and particularly SO) appear almost perfectly genuinely new. While PO was set up primarily by component parts of UW and AWS, its candidate lists still show good degree of novelty, though congruence with UW and AWS is still notable. Overall, Polish parties seem to have a good degree of candidate turnaround between elections – even for the three continuing electons (AWS, SLD, PSL), the congruence with their predecessor was between 0.49 and 0.61. Notably, however, if we look at the most highly ranked candidates (top 10% in terms of preference votes, see Table 13), we see higher degree of congruence. Narrowing the focus even further (to only the first ranking candidates in the 19 constituencies) would lead to higher congruence with AWS97 for PO and LPR (both 0.28). Hence, there seems to be a general pattern (also confirmed in Denmark) of more congruence at the top and more novelty (even amongst stable electons) in the tails of candidate lists.

Table 12. Poland 1997-2001: Candidate congruence and novelty (top 25% in districts)

	2001						
1997	AWS	SLD-UP	PSL	UW	PO	PiS	LPR
UW				0.39	0.11		
AWS	0.61				0.12	0.08	0.08
SLD		0.56					
PSL			0.49				
Novelty[a]	0.36	0.40	0.48	0.60	0.76	0.86	0.87

Notes: Congurence < 0.05 omitted
[a] incl non-party candidates in 1997

Table 13. Poland 1997-2001: Candidate congruence and novelty (top 10% in districts)

	2001						
1997	AWS	SLD-UP	PSL	UW	PO	LPR	PiS
UW				0.61	0.11		
AWS	0.85				0.18	0.16	0.13
SLD		0.75					
PSL		0.06	0.66				
ROP						0.05	
Novelty[a]	0.12	0.20	0.30	0.39	0.68	0.79	0.80

Notes: Congurence < 0.05 omitted
[a] incl non-party candidates in 1997

Table 14 compares the congruence and novelty indices of the Polish electons to the other electons discussed. The case studies included electons that were genuinely novel (ZRP in Latvia and LPR in Poland), as well as those which novelty was negligible (IRL in Estonia). However, a good number of electons studied fall between the extremes, some of which were reasonably novel (PiS and perhaps also PO in Poland) while others were only moderately novel and were mostly predecessors of earlier electons (FP and DF in Denmark). The substantive discussion of the cases broadly confirms the assigned congruence and novelty scores, hence attesting to the validity of the proposed approach. Echoing Barnea & Rahat's (2011) conclusion, *Kadima* appears as a perfect example of a quasi-new party that is

[18] Available online: http://www.rodzinapolska.pl/wybory/archiwum/vii2001/38_2.htm (accessed 25 February 2013). Some candidates who ran for Senate in 1997 as non-affiliated candidates, were considered to be new candidates in 2001.

congruent with a predecessor and novel to a very similar degree – classifying it as a splinter from *Likud* or a genuinely new party would both be highly misleading. Such electons pose constant and significant difficulties when calculating volatility scores, as the strategies that have so far been used do not allow for *partial novelty*. We proceed to discuss a solution based on the congruence and novelty scores that would not only allow for a meaningful coding of partially novel electons, but also deals effectively with mergers and electoral coalitions.

Table 14 Party congruence and novelty: comparative summary

		Congruence				
Pair of electons	*Country/years*	*Organization*	*Leader*	*Candidates*	*Total*	*Novelty*
IL – IRL	Estonia 2003-07	0.85	0.85	0.39	0.70	0.18
RP – IRL	Estonia 2003-07	0.85	0.85	0.39	0.70	0.18
FP – FP	Denmark 1994-98	1.00	0.25	0.78	0.68	0.24
FP – DF	Denmark 1994-98	0.50	1.00	0.65	0.72	0.28
Likud – Kadima	Israel 2003-06	0.50	0.50	0.40	0.47	0.47
AWS – PO = UW – PO	Poland 1997-2001	0.20	0.25	0.11	0.19	0.62
AWS – PiS	Poland 1997-2001	0.30	0.25	0.08	0.21	0.77
AWS – LPR	Poland 1997-2001	0.10	0.00	0.08	0.06	0.89
Unity – ZRP	Latvia 2010-11	0.00	0.00	0.08	0.03	0.98

Using congruence and novelty indices for calculating volatility

For the calculation of volatility scores, the approach outlined above is obviously useful for detecting electons that are genuinely new in a political system (such as the Latvian ZRP or, with some qualifications, the three Polish parties analysed), using a certain threshold. However, I would argue that the interval congruence and novelty scores can be used in calculations for obtaining better (more realistic) volatility indices. This section first proposes a *split-vote strategy* for calculating volatility indices explaining the congruence and novelty scores, followed by two empirical examples: Denmark 1994-8 and Estonia 2003-7. The elections saw relatively simple cases of split (Denmark) and merger (Estonia) with the rest of the party system remaining reasonably stable. Hence, they are straightforward enough to for illustrate the method, while arguably the split-vote strategy has an even bigger advantage in more complex settings.

If an electon is almost perfectly novel (N > 0.9), it can be considered to be genuinely new and all of its votes would contribute to the volatility score. For electons that are only *partially novel*, their links to older electons are taken into account, and their vote share is split based on the novelty score between *virtual electons* – a genuinely new component and a successor component (or possibly several successor components).

For *splits and mergers*, the vote share can be assigned to successors and predecessors in proportion to congruence scores. The following hypothetical example explains the method (using notation explained above).

An electon X (50% votes) splits into two electons Y_1 (30%) and Y_2 (20%)

- The *novelty scores* are $N_{Y1} = 0.5$ (for Y_1) and $N_{Y2} = 0.1$ for A2.
    - Hence, 15% of (total) votes are assigned to Y_1 as a novel electon:

$V_{Y1}{}^{N} = V_{Y1}N_{Y1} = 30\% \cdot 0.5 = 15\%$, and

- 15% for Y_1 as the continuation of X:
  $V_{Y1}{}^{CX} = V_{Y1}(1 - N_{X\text{-}Y1}) = 30\% \cdot 0.5 = 15\%$.
- Similarly, 2% of votes are assigned to Y_2 as a novel electon:
  $V_{Y2}{}^{N} = V_{Y2}N_{Y2} = 20\% \cdot 0.1 = 2\%$, and
- 18% for Y_2 a continuation of X:
  $V_{Y2}{}^{CX} = V_{Y2}(1 - N_{X\text{-}Y2}) = 20\% \cdot 0.9 = 18\%$.
  (Note: $V_{Y1}{}^{\underline{N}}$ stands for votes for Y1 as a novel electon and $V_{Y1}{}^{\underline{CX}}$ for Y_1 as a continuation of X)

- The *congruence scores* (against X) are $C_{XY1} = 0.5$ (for Y_1) and $C_{XY2} = 0.9$ (for Y_2).
  - The vote share of X in *t* is split between its *virtual predecessors* proportionally to their congruence:
  - $V_X{}^{PY1} = V_X C_{X\text{-}Y1} / (C_{X\text{-}Y1} + C_{X\text{-}Y2}) = 50\ \% \cdot 0.5 / (0.5 + 0.9) = 17.9\%$
    ($V_X{}^{\underline{PY1}}$ stands for votes for X as a predecessor of $\underline{Y_1}$)
  - $V_X{}^{PY2} = V_X C_{X\text{-}Y2} / (C_{X\text{-}Y1} + C_{X\text{-}Y2}) = 50\ \% \cdot 0.9 / (0.5 + 0.9) = 32.1\%$.
- For simplicity, let us assume that the only competitor was electon Z that was perfectly congruous between the two elections ($N_Z = 0$).

The most basic strategy for calculating volatility (referred to as "strategy 1" below) would be to look at electon names and raw vote shares in the two elections disregarding any continuity between X and Y_1 and Y_2:

	V_{t-1}	V_t	Change
X	50%	–	–50%
Y_1	–	30%	+30%
Y_2	–	20%	+20%
Z	50%	50%	0%
		Volatility:	50%

The proposed split-vote strategy ("strategy 2") is based on transformed vote shares according to the formulas presented above:

	V_{t-1}	V_t	Change
$Y_1{}^{CX}$	17.9%	15%	–2.9%
$Y_1{}^{N}$	–	15%	+15.0%
$Y_2{}^{CX}$	32.1%	18%	–14.1%
$Y_2{}^{N}$	–	2%	+2.0%
Z	50%	50%	0.0%
		Volatility	17%

The two strategies lead to very different volatility coefficients. The assumption of no continuation between X and Y_1 and Y_2 in (1) clearly inflates the volatility score beyond reasonable. The split-vote strategy removes bulk of the volatility as Y_1 and especially Y_2 are congruent with X; notice that the high novelty of Y_1 and strong congruence of Y_2 with X are the main contributing factors to the overall volatility score. There are three alternative and widely used strategies for dealing with the issue of continuity that are arguably simpler than the split-vote strategy based on weightings by congruence and novelty scores:

(3) Identifying a successor electon, that should be Y_2 because of clearly higher congruence:

	V_{t-1}	V_t	Change
Y_1	–	30%	+30%
X / Y_2	50%	20%	–30%
Z	50%	50%	0%
	Volatility:		30%

(4) Contrasting the combined vote share of Y_1 and Y_2 to that of X:[19]

	V_{t-1}	V_t	Change
Y_1+Y_2	50%	50%	0%
X	50%	50%	0%
	Volatility:		0%

(5) Splitting the vote in (t-1) according to support in (t):

	V_{t-1}	V_t	Change
Y_1^{CX}	30%	30%	0%
Y_2^{CX}	20%	20%	0%
B	50%	50%	0%
	Volatility:		0%

The last two strategies very clearly underestimate the level of electoral change in the hypothetical example while there are no alternative ways to code predecessors/successors of electons. Identifying a single successor, as done in (3) still overestimates volatility. While more novel than Y_2, Y_1 was still *half-congruent* with A, meaning it shared a name, a leader or a good number of top candidates – amounting to a degree of continuation that should not be overlooked.

Notice that identifying a single successor is fairly straightforward here, due to large difference in novelty scores. However, if two equally strong parties terminated an ad hoc coalition, deciding on a single successor might be much more difficult and controversial, and can lead to a more glaringly overestimated volatility score. Similar problems can arise in case of mergers – the example of Estonia 2003-7 below illustrates the big impact that coding decisions can have if strategy (3) is adopted.

The Danish case study helps to illustrate the hypothetical example as it includes a major split – the establishment of the Danish People's Party (DFP) by the former leader of the Progress Party (FP). As shown in table 14, the votes cast for FP in 1994 are split between the virtual predecessors of DFP and stump FP. As the votes are split proportionally to their congruence, the virtual vote share of FP is slightly higher (as its congruence to FP in 1998 was higher – 0.76 compared to 0.72). In 1998, the votes for DFP and FP 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 in 1998 is assigned to virtual predecessors. The aggregate volatility index based on the split-vote strategy is lower than the one based on strategies 1 and 3 that would overestimate volatility by disregarding important congruence between FP1994 and DFP. Combining vote shares in 1998 (strategy 4) or splitting it in 1994 according to 1998 vote shares of the two parties (strategy 5) would

[19] This method has been used in many previous studies (including Bartolini & Mair 1990, Sikk 2005).

arguably underestimate volatility by overlooking the significant weakening of FP (that was more congruent to the predecessor, after all) that lead to its eventual fall into obscurity.

Table 14. Volatility in Denmark 1994-8.

	1994	1998	Change
FP	6.4	2.4	–
DFP	–	7.4	–
FP (congruent component)	**6.4 · 0.76 / (0.76+0.72) = 3.3**	**2.4 · 0.76 = 1.8**	**–1.5**
DFP (congruent component)	**6.4 · 0.72 / (0.76+0.72) = 3.1**	**7.4 · 0.72 = 5.3**	**+2.2**
FP (novel component)	**–**	**7.4 · 0.28 = 2.1**	**+2.1**
DFP (novel component)	**–**	**2.4 · 0.24 = 0.6**	**+0.6**
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
		Aggregate volatility	**9.3**
	Strategy 1 & 3: FP perfect successor, DFP genuinely new		11.8
	Strategy 4: votes in 1998 combined		7.8
Strategy 5: FP vote in 1994 split between FP and DFP proportionally to their vote in 1998			7.8

Before moving on the Estonian example that includes a significant merger of two electons, we need to introduce further virtual electons to be used in case of mergers:

- When X_1 and X_2 merge to form a new electon Y, the vote share of *incongruent* component in t-1 is $V_{X1}^{IY} = V_{X1}(1–C_{X1\text{-}Y})$
  (where V_{X1}^{IY} stands for vote share of X_1 as a incongruent to Y).
- The vote share of Y 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:
  $V_Y^{SX1} = V_Y(1–N_Y)C_{X1\text{-}Y}/(C_{X1\text{-}Y}+C_{X2\text{-}Y})$
  (where V_Y^{SX1} stands for vote share of Y as a successor to X_1).

The aggregate volatility based on the split-vote strategy is remarkably different from those based on alternatives strategies (see Table 15). Strategy 1 obviously overestimates volatility as it completely disregards congruence between IRL and its constituent parts. Strategies 3b, 4 and 5 can be argued to underestimate volatility somewhat by disregarding the mild yet still significant novelty of IRL. However, all are highly problematic in substantive terms. Firstly, a dichotomous choice between IL and RP as a sole predecessor (strategies 3a and 3b) would partly be a matter of investigator's taste, yet may increase the overall volatility score almost by half!

Strategies 4 and 5 both emphasize the joint decrease in the support of IRL and its constituent predecessor. However, the incentive to merge was arguably different for RP and IL. On one hand, RP was motivated by the desire to stop its dwindling popularity. On the other hand, IRL (whose support was on the way up) hoped to benefit from RP's modern organization,

attractive candidates and better votes/seats ratio for bigger parties.[20] The two parties were essentially equal partners in IRL and its vote share could be seen as a downturn for RP (albeit not as bad as it might have suffered on its own) and a mild improvement for IL. In this example, strategy 5 suffers from a further peculiar shortcoming – it is based on electon's support in previous election, while popularity of political parties can fluctuate substantially between elections. Indeed, shortly before the merger in June 2006, RP and IL had changed roles as RP's support in public opinion polls was less than a third compared to that of IL ("Erakondade toetus püsis juunis endisena", 2006).

Table 15. Volatility in Estonia 2003-7.

	2003	2007	Change
RP	24.6	–	–
IL	7.3	–	–
IRL	–	17.9	–
$RP^{I\text{-}IRL}$ (incongruent component)	**$V_{RP}^{I\text{-}IRL} = 7.4$**	–	–7.4
$IL^{I\text{-}IRL}$ (incongruent component)	**$V_{IL}^{I\text{-}IRL} = 2.2$**	–	–2.2
RP (predecessor/successor to IRL)	**$V_{RP}^{P\text{-}IRL} = 17.2$**	**$V_{IRL}^{S\text{-}RP} = 6.5$**	–10.7
IL (predecessor/successor to IRL)	**$V_{IL}^{P\text{-}IRL} = 5.1$**	**$V_{IRL}^{S\text{-}IL} = 6.5$**	+1.4
IRL^{N} (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
		Aggregate volatility	**27.8**
		Strategy 1: IRL genuinely new	39.4
		Strategy 3a: IL as the sole predecessor of IRL	32.0
		Strategy 3b: RP as the sole predecessor of IRL	21.5
		Strategy 4: Combining the support in 2003	21.5
		Strategy 5: IRL vote split proportionally between the two successors	21.5

Note: diagram with full formulas in Appendix.

Conclusion

This paper proposes a *novel measure of party (electon) novelty* and a *new strategy for calculating volatility*. The three-dimensional concept of electon newness and interval measure of congruence and novelty provides the basis for split-vote approach to volatility index. The case studies of electons and electoral volatility scores provide a preliminary and successful test of the validity of the measures. The interval index of novelty does chime with what we know about the particular cases; the proposed strategy for the calculation of volatility does lead to meaningful indices that neither over or underestimates volatility. Furthermore, the split-vote approach entirely eliminates the need to make dichotomous and controversial coding decisions that can strongly impact the volatility index.

[20] Especially given Estonia's modified d'Hondt system of seat allocation that is among the least proportional amongst proportional systems: the system uses divisors 1, $2^{0.9}$, $3^{0.9,}$ … that strongly favours bigger parties.

An obvious disadvantage of the congruence/novelty index is that it requires a researcher to study individual electons in some depth (if the indices are to be reliable) and calculating candidate congruence can be demanding, especially in larger countries and if the data is not in a convenient format. In the cases analysed here, leadership congruence proved to be relatively easy to track from online (news) sources;[21] furthermore, one can assume that if there is little information about a new leader, we can almost by definition assume his or her novelty. Assessing organizational congruence can be more difficult as data on party organization can be rather limited and fragmented – especially when electoral politics in a country revolves around complex coalitions – e.g. in Latvia and, in particular, Poland. However, rough indices are relatively easy to estimate for major parties. Data on candidates is easily available online for European elections during the last decade or two, even though the matching of candidates can be time-consuming, depending on the format of the data. For older elections, candidate data would be more difficult to obtain – proxies such as MP turnover could be carefully used in such cases.[22] However, because the index of novelty/congruence is based on three independent dimensions, perfect reliability of each them is less essential, as aggregation can iron out errors. Furthermore, even rough and imperfect congruence and novelty scores can be used in the split-vote approach of calculating volatility.

The split-vote approach to volatility is computationally slightly more complex and time-consuming than traditional strategies. However, the arithmetical complexity pales compared to the mathematics behind even the standard statistical methods currently widely used in political research. As shown above, the split-vote approach eliminates the need to code new electons, successors and predecessors dichotomously and hence greatly reduces the risk of seriously under- or overestimating party system change as a result of coding decisions – a risk that is inescapable when using the traditional strategies. On the other hand, an alternative (arguably simpler) approach to splits and mergers that combines support when electons run separately can seriously underestimate levels of party system change.

More generally, the split-vote strategy relying on virtual electons calls into question whether *party* is a proper unit of analysis for calculating volatility or even analysing *party system* dynamics.[23] Not only is a party only one possible electon and is sometimes completely absent in parliamentary elections (e.g. Latvia 2010); party transformation can sometimes be highly complex, involving several parties and various degrees of novelty, often in conjunction. The traditional volatility toolkit does not allow account for such complex realities, but as is shown in this paper, split-vote approach relying on degrees of congruence/novelty and virtual electons can produce meaningful and foolproof indices with fairly limited extra effort.

[21] That even applied for the relatively old Danish case study.
[22] However, before more research is available on the relationship between candidate and MP turnover, the reliability of the proxy remains uncertain.
[23] The volatility scores based on congruence and novelty indices and split-vote strategy may also provide a better approximation of (perceived) voter-level volatility that has long been one of the aims of analysis of volatility (Pedersen 1979, Bartolini & Mair 2007).

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Appendix: RP, IL and IRL (Estonia 2003-2007) with formulas