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## THE LOCALIZATION OF ELECTORAL VOLATILITY: EVIDENCE FROM SERBIA AND CROATIA<sup>3</sup>

### Lokalizacija izborne kolebljivosti: primeri Srbije i Hrvatske

**ABSTRACT:** *This study introduces a novel methodology for measuring, exploring and describing the processes of party nationalization and localization. The key component of this approach is using electoral volatility as a baseline measure for computing party localization indices. For the purposes of this study, conventional definition of localization as non-uniform territorial political response (Caramani, 2004) is redefined as non-uniform, but spatially contingent responses of territorial units to national political forces. Using network analysis, the authors introduce quantitative approach for studying spatial and dynamical aspects of party systems and demonstrate its usefulness and applicability in cases of two post-communist systems: Serbia and Croatia. The results demonstrate that different components of party systems (new versus stable parties) exhibit different levels of nationalization and localization, which has been overlooked in previous studies. In line with previous research (Bochsler, 2010c; Golosov, 2016; Schakel, 2017), this study confirms that the Croatian party system is less nationalized than Serbian, but there are some similarities between the two countries in terms of the distribution of electoral volatility. In the discussion part of the study, limitations of new methodology are explained and directions for its further development are outlined.*

**KEY WORDS:** electoral volatility, party nationalization, party systems, network analysis, party localization

**APSTRAKT:** *U ovom istraživanju predstavljena je nova metodologija merenja, istraživanja i opisa procesa partijske nacionalizacije i lokalizacije. Ključna komponenta ovog pristupa jeste upotreba izborne kolebljivosti kao fundamentalne*

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*mere na osnovu koje će indeksi lokalizacije biti izračunati. Za svrhe ove studije, konvencionalna definicija lokalizacija kao neuniformnog teritorijalnog političkog odgovora (Caramani, 2004) se redefiniše kao neuniformni, ali prostorno kontingentni odgovori teritorijalnih jedinica na nacionalne političke snage. Koristeći mrežnu analizu, autori uvode novi kvantitativni pristup istraživanja prostornih i dinamičkih aspekata partijskih sistema i demonstriraju njihovu korisnost i primenljivost na slučaju dva postkomunistička sistema: Srbije i Hrvatske. Rezultati pokazuju da različite komponente partijskih sistema (nove versus stabilne partije) imaju različite stepene nacionalizacije i lokalizacije, što je nalaz koji nisu zabeležile prethodne studije ovih fenomena. Saglasno prethodnim istraživanjima (Bochsler, 2010c; Golosov, 2016; Schakel, 2017), ova studija potvrđuje da je Hrvatska manje nacionalizovani sistem od Srbije, ali postoje sličnosti između dve države u pogledu distribucije izborne kolebljivosti. U diskusiji, autori ističu ograničenja nove metodologije i skiciraju smernice za njen dalji razvoj.*

**KLJUČNE REČI:** izborna kolebljivost, partijska nacionalizacija, partijski sistemi, mrežna analiza, partijska lokalizacija

## Introduction

Scholars have taken for granted for a long time that modern political parties have nationalized structures, which assumes that they “exist and compete countrywide” (Bochsler, 2010c: 607). Party nationalization has been an important concept in the studies aiming to challenge this convention. The key question of party nationalization studies is if there are spatial differences or spatial variability of electoral behavior, political preferences and electoral support for different political parties (Caramani, 2004; Jones & Mainwaring, 2003).

In a strict sense, party nationalization can be defined as “territorial homogenization of electoral behavior” (Caramani, 2004, p. 1) which is a result of social and political processes of party system transformation from a fragmented type of localized and clientelistic political competition to national representation. The nationalization of politics implies translation of local and regional socio-cultural cleavages (religious, ethno-linguistic, urban-rural) and associated peripheral opposition to centralized government into a completely national political arena followed by administrative centralization and cultural standardization (Bochsler, 2010c; Caramani, 2004; Jones & Mainwaring, 2003). The results of these processes can be seen and measured by observing the spatial patterns of electoral behavior in any country with free democratic elections, namely those patterns from which we can infer that the voters exhibit “uniform responses to political forces” (Caramani, 2004:36).

The literature on party nationalization has thoroughly described and explained old Western democracies, and several measurement strategies have been proposed in order to capture the level of nationalization of given party systems (Caramani, 2004; Claggett, Flanigan, & Zingale, 1984; Lago & Montero, 2014; Simón & Guinjoan, 2018). However, much uncertainty still

exists when party nationalization is ought to be explained in post-communist new democracies. In his seminal study, Bochsler (2010b) has shown that the institutional explanations of party nationalization do not hold in post-communist countries. This class of explanations focuses on the role of centralization of the governments and the progressive transformation of electoral politics of modern politics into competition for a limited number of high-power positions in the central government. Since the starting position of the democratization process in post-communist societies is already a highly centralized political system, with only slight variations, this cannot account for the variability in the degree of party nationalization in the post-communist world (also demonstrated in Bochsler, 2010c).

Therefore, the starting point of nationalization and the general process of party system development is not comparable in post-communist region and in Western Europe. Moreover, the dissolution of federal countries, followed by armed conflict and civil war as in case Yugoslavia, presents an analytical challenge for theoretical discussions of how, when and if nationalization process is taking place in specific post-communist systems. In turn, this challenge moves the research focus towards explaining the differences in nationalization/localization levels of different post-communist countries, starting from their first democratic election and the divergent paths of party system dynamics leading towards greater nationalization or localization levels over time. Recent research (Bochsler, 2010b) has demonstrated that party nationalization in some post-communist democracies can be reasonably well explained as a consequence of the territorial or spatial distribution of political and social preferences structured around territorially-based social cleavages (Lipset & Rokkan, 1967). Existence and importance of cleavages such as core-periphery, urban-rural and those centered around ethnic social issues may cause lower levels of party nationalization because they increase the spatial variability in political preference. As Zielinski (2002) noted, cleavages don't directly translate into parties, which means that the relationship between them is mediated by the structure of party systems themselves. With nationalization being the attribute of the party system, lower levels of this process in post-communist societies can be seen as an indicator of the territorial or spatial variability of political preferences structured around ethnic and territorially-based (center-periphery, urban-rural) cleavages (see Schakel, 2017 for detailed discussion). Therefore, Bochsler broadly concludes that "party nationalization in post-communist democracies is closely related to the territorial structure of social divisions" (Bochsler, 2010:824). Still, it is important to note that nationalization cannot be described or explained as a linear, uniform process, especially in volatile and heterogenous post-communist region. As cleavage structures and territorial dimensions of politics change over time, it is more likely that we will witness divergent paths of nationalization/localization dynamics than an uniform trend, which ultimately raises the importance of robust methodology for measuring these processes.

Surprisingly, party nationalization is seldom studied in direct relation to one of the most important aggregate measure of electoral behavior — electoral

volatility. Electoral volatility can be seen one of the best indicators of party system change and is an essential measure of party system dynamics, especially relevant for unstable and unpredictable party systems of post-communist democracies (Epperly, 2011; Pedersen, 1979; Powell & Tucker, 2014; Tavits, 2008). Given that the nationalization is studied through its observable consequences in form of homogenization of electoral behavior, it is surprising that previous studies didn't attempt to describe nationalization in terms of homogenization of electoral volatility inside the territory of a nation-state.

Having this in mind, we state four key aims of this study. First aim is to demonstrate that party nationalization can be measured using electoral volatility as an aggregate property of party systems. As a second aim, we develop a new definition of party localization, the reverse process to nationalization. Third aim focuses on a new method for measuring and studying both nationalization and localization (following the general measurement strategy and redefinition of localization). Finally, the fourth aim is to demonstrate the usefulness of these methods by comparing the nationalization/localization processes in Serbia and Croatia, two post-communist democracies with many similarities, but more than a few differences in terms of dynamics and territorial attributes of their respected party systems.

Localization is a process opposite to nationalization and it is conventionally defined as non uniform responses of territorial units to independent locally based factors (Caramani, 2004). In other words, if nationalization implies homogeneity of electoral behavior across the territory of the nation-state, localization is defined as the existence of heterogeneous patterns of electoral behavior across different subnational territories. However, in cross-national research, we cannot always know if there is a correspondence between the spatial unit of analysis and local political factors and therefore, we cannot conclude that any type of heterogeneity implies the existence of the process of localization of politics. Therefore, in this paper, we propose a redefinition of this process as non uniform, but spatially contingent responses of territorial units to national political forces. We will argue that local factors produce contingent spaces of political homogeneity or uniform political behavior on a smaller, territorially constrained scale. Previous studies of party nationalization and localization have been focused on territorial differentiation and variability and have not dealt with the need for local associations (contingent homogeneity) between measures of electoral behavior as a prerequisite for localization. Second and third aims of this paper are centered on improving the methodology for studying both processes.

A key component of this methodology is dividing the analysis into studies of two different spaces of political competition. One of the main arguments in explaining party nationalization is that its key dynamical component includes the gradual erosion of territorially-based party strongholds over time (Bochsler, 2010c; Caramani, 2004). In a broad historical context, as the electoral game on the national level became more sophisticated and more competitive throughout XX century, major parties had to fight for votes across the entire territory of the nation-state, which implied that they couldn't count on territorially concentrated

electoral support. On the other hand, emergence of new parties, specifically those targeting regionally or locally based cleavages, introduces a new form of competition on the national level. If the goal of new parties is only to gain representation in the national parliament, they enter the competition without aspiring for voter support in all parts of the country. Therefore, we can expect different levels of nationalization for new and stable parties (see Powel & Tucker, 2014 for detailed discussion on distinction between new and stable parties), with the former part of the party system being less nationalized than the latter.

In summary, we argue that our study offers a fresh perspective to the research of party nationalization and localization with the development of a new methodology for exploring both processes through the lens of electoral volatility. The remaining part of the paper proceeds as follows: (1) in data & methods section we will explain the nature of subnational electoral data needed for the study and introduce new methods; (2) results section will demonstrate the application of these methods to Serbia and Croatia; (3) in the discussion part of the paper we will compare the results for two countries and present a thorough review of developed methodology, including its limitations and directions for further improvement.

## Data & Methods

In order to study processes of party nationalization and localization using the approach we have outlined in the introduction, data consisting of electoral results on the subnational level is required. This study is focused on comparing party nationalization in two post-communist countries: Serbia and Croatia. Powell and Tucker (2014) have defined one set of criteria for inclusion of elections in post-communist countries into the calculation of different party system measures. A key component of this set is that elections have to be characterized as at least “partially free” in corresponding Freedom House report and same has to hold for the subsequent electoral cycle. Six electoral cycles in both Serbia and Croatia satisfy this condition. For Serbia, we will take into account the electoral results of the following years: 2003, 2007, 2008, 2012, 2014 and 2016. And for Croatia: 2000, 2003, 2007, 2011, 2015, and 2016. This will result in volatility indices calculated for five different years in each country. Electoral data is made publicly available by respective electoral commission agencies of both countries.<sup>4</sup>

Different electoral agencies have different ways of organizing and presenting electoral data on a spatial level. This largely depends on the electoral system, namely the division of the country into electoral districts. Serbian electoral system treats the entire country as single electoral district and electoral results are organized and aggregated into different spatial and administrative levels. Following recent research (Lee & Rogers, 2019), we have selected NUTS3 as a

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4 Data for Serbia is acquired from the website of National electoral commission (<http://www.rik.parlament.gov.rs/>) and for Croatia from the website of State electoral commission (<http://www.izbori.hr>).

basic unit for spatial analysis in Serbia as and it's a standardized spatial unit in EU region with its population ranging between 150 and 800 thousand. In this study, the province of Kosovo and Metohija is excluded from the analysis and the graphical representation of the results. Although the electoral data is available for this territory, it is not spatially representative as the Albanian population is not participating in the election (resulting with low absolute turnout) and the electoral conditions cannot be held as identical to those in the rest of Serbia. Therefore, the spatial analysis will be conducted on 24 NUTS3 territories, corresponding to administrative districts of Serbia with Kosovo and Metohija excluded.

Croatian electoral system defines 12 electoral districts for parliamentary elections. However, only 10 of those districts are territorially defined and the remaining two are reserved for the minority lists and votes from the Diaspora. Since those districts cannot be spatially represented, only votes from the remaining ten will enter the analysis. Territorial electoral districts in Croatia do not correspond to NUTS3 level and they represent larger territories (there are 21 NUTS3 territories). Croatian electoral commission does not aggregate electoral data into this level (or any other level other than electoral districts) and such conversion or re-aggregation is not technically possible. Therefore, we will keep electoral districts as the basic units of spatial analysis for Croatia. However, choosing different units of analysis is not an issue due to the nature of our methodological approach, which will be described below.

As stated in the introduction, one of our aims was to provide a new methodology for studying nationalization/localization process in terms of electoral volatility. Before introducing our method, we will review the most common party nationalization measures used in the current literature. The most common group of measures are the indices of frequency, notably Caramani's territorial coverage index (Caramani, 2004), which measures the percentage of territorial units, usually electoral districts in which individual parties compete. If all parties compete in all districts, then the percentage is 100% which equals to the highest possible level of party nationalization. The main drawback of this method is that it does not refer to variability in the level of party support and it can't be applied to the electoral systems based on one electoral district (the case of Serbia). The second group of indices is based on calculations of the variance in party support over different spatial units of analysis. Index of variation (Rose & Urwin, 1975) is calculated as the mean absolute deviation of results of an individual party in different sub-national territorial units from its national score. The main drawback of this method (as with all the approaches of measuring raw variance) is that the resulting measure has no upper limit and therefore without proper standardization method it is not applicable in cross-country studies. Also, this method suffers from scale issue as we can expect a bigger variance for more successful parties and smaller variance for small parties, which will inflate the average nationalization score of systems with few small parties. The third group consists of measures of party system inflation. This measure compares the number of successful (effective) competing parties at the local level (of electoral

districts) and the level of competing parties at the national level (Cox, 1999; Cox & Knoll, 2003). If the party system is bigger on the national scale than it is on average on the local district level, then we have a low level of nationalization. In a truly nationalized system, politics on a local level is nothing but a microcosm of politics at the national level and then we would have no party system inflation. Inflation measures have the most problematic applications in systems based on proportional representation (it was designed to be applied only in majoritarian systems), and especially in systems with one electoral district.

Finally, the fourth group is made of the most advanced measures in party nationalization literature, the measures of inequality which are based on Gini coefficient (Gini, 1921). The basic idea is to measure the inequality of territorial distribution of party vote shares across the country. If territorial inequality is low, there are no significant spatial differences in average support for all political parties which indicates high levels of party nationalization. Jones and Mainwaring (2003) developed the index, but its original form (as a simple compliment of the Gini index) it also suffers from scale issues, as the numerical space of values of Gini increases for large parties, and stays small for smaller ones. Also, since this approach focuses on the inequality measurement, it is more susceptible to bias due to differences in sizes of spatial units of analysis. Moreover, the inequality level (in electoral support) can directly be a consequence of the inequality in district sizes. Therefore, adjustments of this raw version of the Gini index had to be made. Bochsler (2010a) developed standardized weighted party nationalization score by correcting and adapting the Gini formula to become more sensitive to the differences and inequalities produced by the differences in party size and number, but also by the differences in district number and size. This score also has a clear interpretation and in case of extreme heterogeneity and high inequality of the electoral support (for all parties) across the country, it would be close to zero and its highest value is 1, which indicates the perfect level of nationalization (absolute homogeneity).

The main drawback of Bochsler's standardized party nationalization score is that it is not an aggregate measure of the party system, but a weighted combination of the spatial inequality measures of individual political parties. Although it has been adjusted in order to reduce the bias due to the size of parties and size and number of spatial units of analysis, it is still based on the results of individual parties as the focal point of the analysis. Contrary to this approach, we use the volatility measure of the entire party system as the starting point of the analysis. Adopting the best measurement practices of the previous studies of electoral volatility, we can split the analysis into two parts centered on exploring: (1) the new-party nationalization (2) and the nationalization of stable parties in each party system, while maintaining the focus on the party system as a whole and not its individual elements. We stress out that the relationship between volatility and party nationalization is complex and understudied in the literature. Post-communist countries are a special case because they experience high levels of volatility in the early period of democratic transition which may "lead to the erosion of local party strongholds and to increasing party nationalization"

(Bochsler, 2010c: 813). Consequently, the highly nationalized party system is open to the entrance of the new parties because new political actors have fewer troubles adapting to different requirements, preferences, and cleavages to different political spaces inside the nation-state (Author, 2018). Because of this, the starting point of our methodology is a precise and robust measurement of electoral volatility.

Index of electoral volatility, first introduced by Pedersen (Pedersen, 1979) measures the aggregate change of party systems between subsequent elections by calculating the relative average of the difference in results of each party in two elections. Minimal value of this index is 0%, indicating the absence of any sort of change and maximal value is 100%, indicating the complete change in party results and a reversal of the structure of political power between parties. One of the recent developments in measuring electoral volatility is concerned with its decomposition into two components. This idea came from two research teams almost simultaneously (Mainwaring, España-Najera, & Gervasoni, 2009; Powell & Tucker, 2009). Within-system volatility (type B volatility) was previously defined through restrictive formula constructed by Sarah Birch (2003). She calculated electoral volatility only for those parties which are consistently relevant for the political system and therefore she indirectly defined the type of volatility which is generated by the changes from within the party system. Powell and Tucker's term "stable parties" for each electoral cycle is analytically defined as "those above the threshold for inclusion in the political system at the time of both the current election and the previous election" (Powell & Tucker, 2014: 5). All other parties, namely those who enter the political arena with significant electoral success and those who exit the party system because they consistently fail to gain national representation after they have once lost it are counted as extra-system parties and their electoral results contribute to extra-system volatility (type A volatility).

The state of the art methodology for reducing bias in calculating electoral volatility was systematically introduced by a recent study by Casal Bértoa and colleagues (Casal Bértoa, Deegan-Krause, & Haughton, 2017). This methodology with slight variations (introduced in Author, 2018) was used in our study. Key components of this approach are as follows: (1) calculation process of index of electoral volatility (for both types of volatility) for each election period passes through five iterations beginning with inclusion threshold of 1% and ending with a threshold of 5%; (2) transitional pairs procedure is used to link the results of parties in subsequent elections and determine if the party contributes to within- or extra- system volatility; (3) continuity detection procedure is used to determine if there is a continuity between results of two different electoral lists due to party name changes and changes in coalitions; (4) for each of the five thresholds electoral volatility is calculated for both types; (5) average for five thresholds is calculated for both types of volatility in order to receive a single value which can be compared with other periods and other countries. These values are the starting point for measuring party nationalization. Apart from that, robust and precise measurement of volatility levels (with the most recent methodological advancements) is currently lacking in in-depth studies of both Serbian and Croatian party system as previous approaches have shown

measurement inconsistencies (cf. Antonić, 2005; Goati, 2004; Kovačević, 2014; Vučićević, 2016).

In developing our methodological approach, we follow Bochsler's principle which states that: "measures of party nationalisation should only vary as a function of the territorial variance of the votes and be influenced as little as possible by other, external factors" (Bochsler, 2010a:155). The same principle holds for any attempt of measuring localization. However, in the introduction, we have stated that localization can't be based solely on random heterogeneity of electoral behavior across the nation-state. If researches explore just the spatial variability of electoral data then its level would highly vary depending on the choice of the spatial unit analysis (as demonstrated by Lee & Rogers, 2019) and the entire concept of heterogeneity implies any variability between spatial units, without any spatial constraints placed upon it. However, in this study, we explore both nationalization and localization as truly spatial phenomena and we are interested in spatially constrained heterogeneity and spatially constrained associations in voting data (or their absences).

In a methodological sense, it's more logical to search for the association between variables than for their absence; therefore our study is aimed towards detecting patterns of spatial associations between levels of electoral volatility of sub national spatial units. To be more precise, we are looking for territorial configurations inside the nation-state which have similar levels of volatility to each other and different levels in comparison with other spatial units and the national average. The larger the number of these configurations is, the localization process is more intensive and vice versa. In order to detect these configurations, we apply network science methodology.

A network is a mathematical structure describing the structure of the relations (ties) between units of analysis (nodes) (Wasserman & Faust, 1994). The presence of a tie between two nodes is an indicator of the existence of a defined relationship over a pair of nodes. Correlation network is a method developed inside psychology (Borsboom & Cramer, 2013; Epskamp, Cramer, Waldorp, Schmittmann, & Borsboom, 2012) and biology (Castelo & Roverato, 2009; Kraemer, Schaefer, & Boulesteix, 2009; Tenenhaus, Guillemot, Gidrol, & Frouin, 2010). The basic unit of analysis in correlation network is a variable and the ties are defined as some sort of correlation relationship where the ties are weighted according to the corresponding correlation coefficient. In other words, the network statistically behaves as a model of correlation interactions, where the position and the role of variables are not predefined (in comparison to structural equation modeling), but rather estimated from the totality of the structure of relationships of all variables which is an emergent phenomenon. The choice of correlation measure determines the structure of any given network model. In this study, we will estimate regularized partial correlation networks (Epskamp & Fried, 2016; Liang, Song, & Qiu, 2015) where the association between two variables is measured after removing the shared variance between all the variables in the network. In the context of a given network, two nodes which are not connected with a tie are conditionally independent and two connected nodes share a unique proportion of their (co)variance. In addition to this, the gLASSO penalty (Zou,

2006) is implemented, which means that extremely weak partial correlations are reduced to zero, in order to produce a more parsimonious network model. Finally, variables in our study are the spatial units of analysis and each variable stores a time series of values of electoral volatility index for a given spatial unit (with 25 values for each series corresponding to five calculated volatility indices for each threshold level per election period). Therefore, by applying this method we will be able to measure if there exists a local, unique association between the volatility levels of any given pair of territorial units inside each country or if the volatility levels of two territories are conditionally independent.

As stated before, our analysis aims to determine if there are territorial configurations with highly localized associations of volatility levels different from the others and the national average. In network terms, finding these configurations can be achieved using community detection methods. Communities inside the network are subsets of nodes which have a higher probability of being connected with each other than the probability of each of them being connected with another node outside of the community (Girvan & Newman, 2002; Newman, 2010). In other words, a community is a group of nodes which are similar to each other and different from the rest of the network, which corresponds to our definition of territorial configurations which are indicators of localization processes. Therefore, if we detect communities in partial correlation network (as described above), the number and the size of the communities will be used as a measure of the localization of electoral volatility in a given territorial system. In order to simplify the visualization of the data, network communities will not be presented in conventional network forms but as a colored map of a given country with spatial units of different colors belonging to different communities. Spatial contingency coercion will be imposed on the community detection algorithm which means only communities consisting of neighboring spatial units will be shown. In addition to that, we will also calculate the index of localization of electoral volatility (Author, 2018) which quantifies the number and size of network communities into a simple measure of localization with minimal value 0 (no communities detected, absolute party nationalization) and maximum level 1 (all spatial units belong to some of the communities, absolute localization of politics).

Finally, we should note that the network approach to party nationalization puts a spatial constraint on partial correlations. Although the size of the spatial unit of analysis is not directly controlled for in the analysis, the number of neighbors is, so the more neighbors a spatial unit has, the method demands higher levels of partial correlation with the neighbors in order for localization to be detected. Unit size is indirectly controlled for, because larger units (such as those where capital cities are located) have a bigger impact on the shared variance of all spatial units when that variance is removed (using partial correlation coefficients), the bias (in favor of larger units) is reduced. Therefore, we predict no issues in choosing different units of spatial analysis in the case of Serbia and Croatia.

The entire network analysis procedure will be repeated two times: (1) for times series of extra-system electoral volatility (type A), (2) and for within-system electoral volatility (type B) in order to gain insight into development of nationalization/localization process for new and stable parties of the two analyzed party systems. Analysis was performed using *R* statistical computing

software with the following packages: *qgraph* for estimating partial correlation networks (Epskamp et al., 2012), *igraph* for community detection procedure (Csardi & Nepusz, 2006), *raster* and *sp* for plotting maps (Bivand, Pebesma, & Gomez-Rubio, 2013; Hijmans & van Etten, 2012).

## Results

Figure 1 shows the estimated time series of electoral volatility in Serbia, with two major components differentiated. Throughout the majority of the analyzed period, the dominant component is type B volatility, which means that the major component of party system dynamics in Serbia is generated by vote switching between stable parties. Highest levels of both electoral volatility components are registered in 2012 elections. This election year is the key reference point of the party system dynamics. Before those elections, volatility generated by the new parties was relatively small. In 2012, a new party (Serbian progressive party) competed for the first time, which resulted with huge electoral success. After 2012, type A volatility was above 10 % in both 2014 and 2016 elections. In snap elections of 2016, type A volatility was greater than type B, with several new parties of fragmented Serbian opposition competing for the first time, with almost no significant vote switched between stable parties.

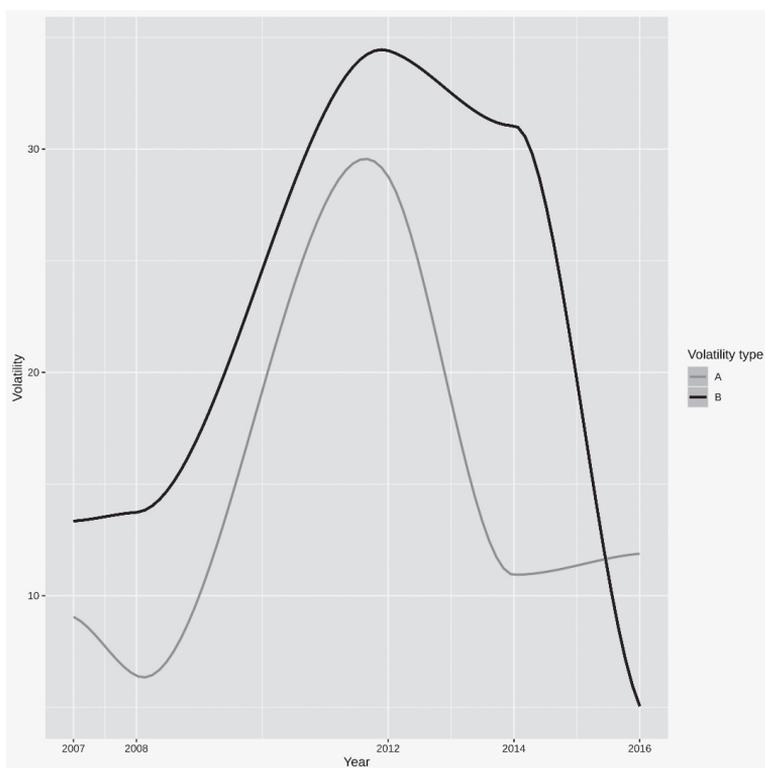


Figure 1 – Components of electoral volatility in Serbia, 2007–2016

Figure 2 shows the spatial distributions of total volatility level between NUTS3 units of analysis (Serbian counties). Distributions reveal higher spatial variance for those election periods with higher levels of electoral volatility (2012, 2014). Aside from the first analyzed elections, there are no noticeable outliers in the distributions. These preliminary results, do not suggest that we should expect high localization of electoral volatility in Serbia.

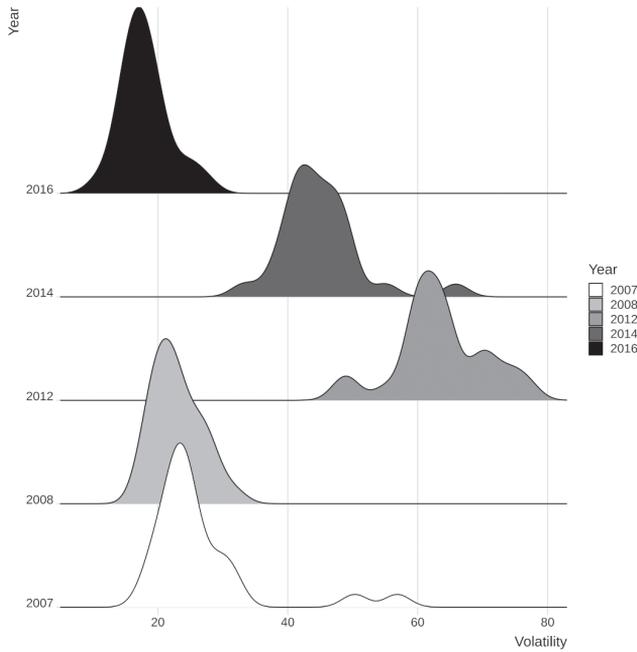


Figure 2 – Spatial distribution of total electoral volatility index in Serbia

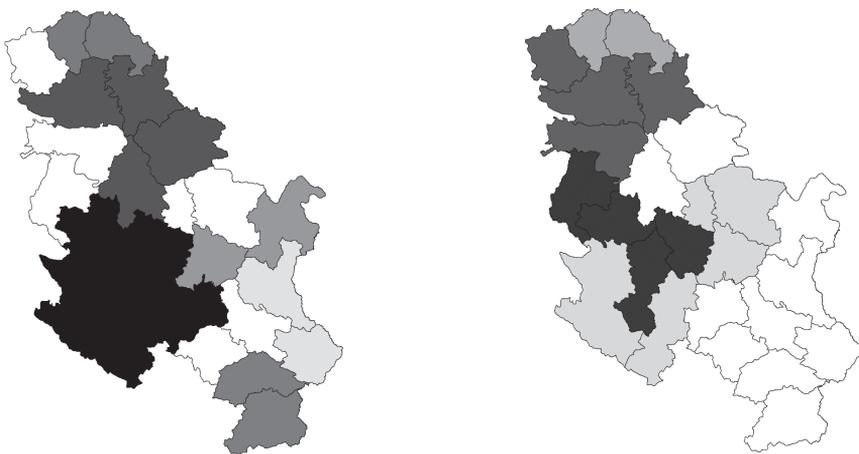
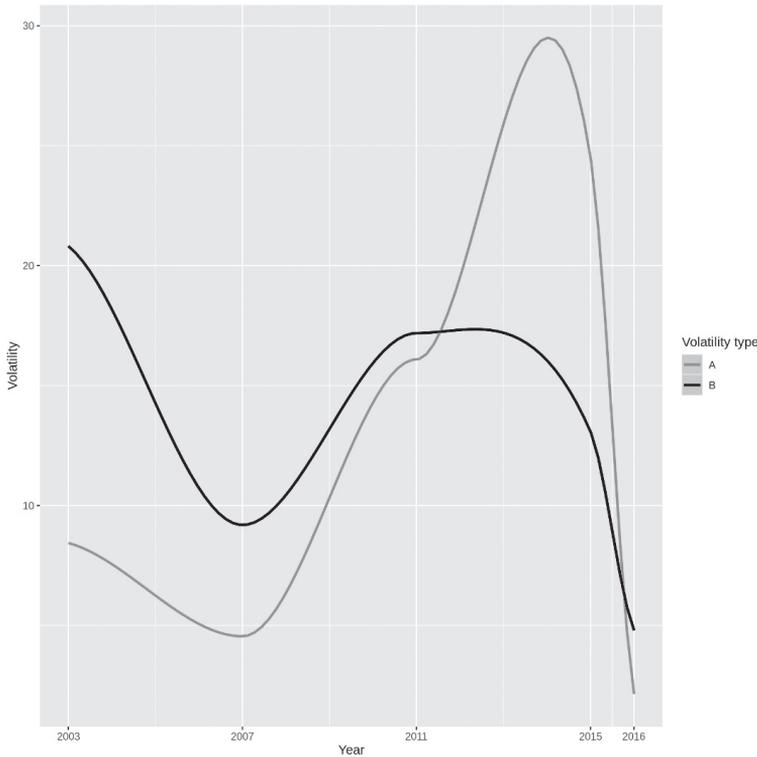


Figure 3 – Maps of network communities for Serbia.  
Left: type A volatility. Right: type B volatility

The left map shown in figure 3 shows communities for type A electoral volatility. The majority of counties belong to one of the network communities. In total, there are 6 territorial configurations with associated levels of this type of volatility. The central community (purple) encompasses the counties with two largest cities in Serbia (Belgrade and Novi Sad), while the northern community (brown) captures the counties with the highest percentage of the Hungarian minority in Serbia. The counties not belonging to a community have volatility levels not similar to any of their neighbors, but more similar to the national average and thus they represent the areas where party nationalization process is stronger than any localized political process. Communities, in this case, can be conceived as distinct local political spaces where new parties must compete in a different manner, as the voters from those counties (in different communities) do not respond in same way to the changes in the party system.

The right map in figure 3 shows communities for type B electoral volatility. In comparison to the left map, there are fewer communities and more counties not belonging to any community, which suggest that this type of volatility is much more nationalized. In other words, the political field where established “system” parties compete is more nationalized, meaning that those parties no longer have significant distinctive, territorial strongholds in terms of the electorate, but for the most part, compete in a single national arena. Colored counties show some of the localized territories, which may be interpreted as the remaining strongholds or areas where some of the stable parties have differentiated influence in comparison to others. This area covers, again, the counties with the highest proportion of Hungarian minority, almost the entire province of Vojvodina, large portions of western and central Serbia, as well as the territories with the highest proportion of Bosniak minority. This suggests that some part of Serbian party dynamics, specifically the competition between long-serving stable parties can still be explained by the existence of regional and ethnic cleavages, despite the fact that the large portion of the territory is under the influence of party nationalization process.

Figure 4 shows the time series of two types of volatility for Croatia. The key election year for the Croatian party system is 2015 where we can note the only spike in growth of type A volatility. In three election cycles (2003, 2007 and 2016) we can note that the volatility of new parties is below 10% which is significantly lower than in the case of Serbia. The 2015 elections are the only elections in Croatia in the analyzed period where new parties have made a significant impact and those are the first elections after Croatia has joined the EU.



*Figure 4* – Components of electoral volatility in Croatia, 2003–2016

Figure 5 shows the spatial distribution of total volatility in Croatian electoral districts. Similar to Serbia, we can note that the spatial variability is higher when we have larger levels of total electoral volatility. It is interesting that in the case of Croatia we have several clear outliers in more than one case and that in the case of 2015 elections we have a bimodal spatial distribution. This points towards the conclusion that some of the districts may have consistently different volatility levels in comparison to the national average (distribution mean), which indicates higher localization levels. The left map shown in figure 6 shows network communities for type A volatility. As we can see, with the exclusion of one district, the remaining territory of Croatia is divided into three large spatially contingent territories. This implies that the electoral competition field for new parties consists of three territories where the electorate reacts differently to new political forces. In turn, that points towards a highly localized political space and party system.

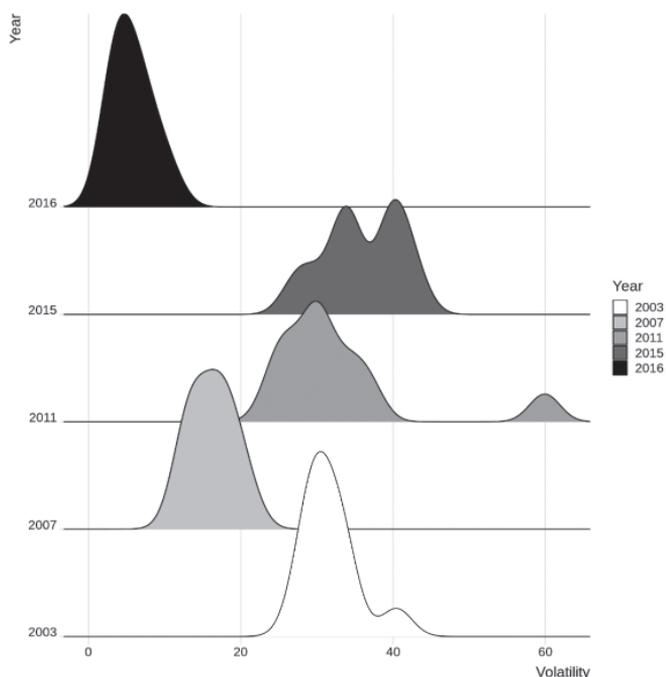


Figure 5 – Spatial distribution of total electoral volatility index in Croatia

The right map in figure 6 shows slightly less localized territory when type B volatility is considered. Again, we have three communities, but with three nationalized electoral districts. Similarly to the Serbian case, again we find somewhat higher levels of nationalization in case of type B volatility, meaning that the stable parties compete in a more spatially homogenous political space.

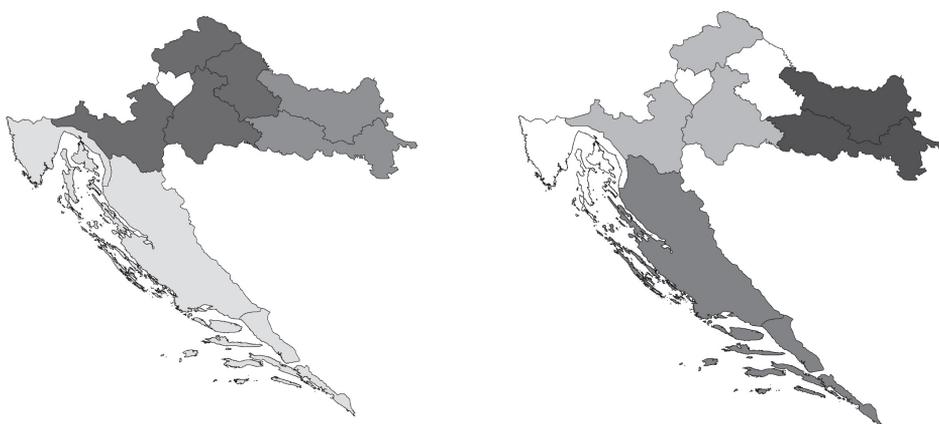


Figure 6 – Maps of network communities for Croatia. Left: type A volatility. Right: type B volatility

Finally, the results of network community analysis can be quantified using the volatility localization index (Author, 2018). Table 1 shows the values of the indices for each country and each component of electoral volatility. The results align with the inferences made from visual inspections of the network community map. In general, we can say that Croatia has a highly localized party system, with type A volatility exhibiting a higher level of localization. Serbia is more nationalized than Croatia, especially concerning type A volatility.

Table 1 – Volatility localization index  
for each country and volatility type

Country	Type.A	Type.B
Serbia	0.72	0.6
Croatia	0.9	0.7

## Discussion

This study set out to accomplish four research goals. First three aims were methodological and interconnected. The results related to these three aims of this study demonstrate the possibility of measuring and investigating the processes of party nationalization and (conceptually and methodologically redefined) localization using electoral volatility as a baseline measure. The most interesting finding was that after decomposing volatility into two different components, those parts of party systems (new parties vs. stable parties) exhibit a different level of nationalization/localization. This finding isn't present in previous literature and it suggests that party nationalization and localization are not one-dimensional concepts in relation to the party system as a whole.

If we bridge the findings from the analysis of electoral volatility and party nationalization one obvious finding emerges from the analysis. When we detect a localized part of the party system, the electoral volatility generated by it is lower than it would be if it the part of the system was more nationalized. This finding is most strikingly present in case of type A electoral volatility. When new parties are confronted with a highly localized electorate, they have multiple local and regional arenas to conquer as each part of that electorate responds differently to new political actors. On the contrary, when the system is highly nationalized, all parties enter the same battlefield and fight for the electorate which responds to the changes in political system in a more territorially homogenous manner. These findings point towards an understudied area of party systems research, and further studies are needed to determine the nature of the link between type A volatility and localization process.

Finally, evidence from Croatia and Serbia showed us how our approach to party nationalization and localization can produce important insights into different aspects of party system dynamics. The main similarity of two systems is that type B volatility is the dominant type of volatility in the analyzed period. Apart from that, for both systems, we can conclude that this type of volatility is more nationalized, which again points out further studies of these systems

(and other post-communist party systems) towards examining the nature of these finding in a more robust manner and on a larger scale. However, when we focus on the new parties, the highly localized arena of Croatian politics places much more constraints on the results of new parties and apart from one electoral cycle (2015), Croatian new parties haven't made much impact and generated a significant amount of electoral volatility. In the case of Serbia, we recorded somewhat higher volatility of new parties, even in cases of snap elections (e.g. 2016). In accordance with the present results, previous studies have demonstrated that Croatia has more localized party system than Serbia (Bochsler, 2010c; Golosov, 2016; Schakel, 2017). However, our study introduced a new methodology based on electoral volatility indices and this result demonstrates that method is capable of estimating nationalization and localization metrics using different spatial units of analysis which wasn't explored in previous studies.

Differences in nationalization levels between Croatia and Serbia are interesting in light of regional aspects of their respective party and electoral systems. In multicultural regions of Istria and Vojvodina, we can observe different developments of regional party systems. Despite well-developed regional identity and previous history of different forms of regional autonomy, no genuine regional party system has developed in Vojvodina (Zuber & Džankić, 2017), as electoral support parties with strong regionalist tendencies remains rather low on both national and provincial level and thus we didn't observe the development of "a fully mobilized center-periphery cleavage" (Schkalel, 2017: 315). On the other hand, in Istria regionalist parties are electorally strong and win seats in both regional and national assemblies, even in European parliament (Koprić et al., 2017). This difference in regionalist politics, points towards the conclusion that we should expect lower nationalization levels in Croatia than in Serbia. Still, there are additional factors which reinforce the process of nationalization in Croatia. First of all, boundaries of 10 electoral districts (as well as the boundaries of counties) are drawn in manner that they "cross-cut and divide up the five historical regions" (Koprić et al., 2017: 78) and therefore limiting the possibility of mobilization of the electorate on regional and local basis. This is potentially of more relevance to nationalization score based on type B volatility, because stable, larger parties are those who need to mobilize the electorate across county and district borders and this could potentially explain why levels of nationalization are more similar in Serbia and Croatia when type B volatility is considered. Further studies are needed in order to capture and explain the exact nature of electoral rules and design of electoral systems on nationalization levels, especially in post-communist countries with strong ethnic political cleavages.

Our methods have several important limitations which have to be taken into consideration. First of all, our approach requires a time series of volatility measures to estimate partial correlations between spatial units. This prevents the researcher from calculating the localization index for one electoral cycle, which is possible using other methods. Second, using regularized partial correlations removes the shared variance from the associations between spatial units. Since

our approach is novel, it is not known whether removing shared variance biases the estimated network structure towards a network of lower density. Our hope is that this limitation will be more transparent as the methodology is advanced in future studies.

In summary, we argue that this study establishes a new quantitative framework for measuring and exploring party nationalization and localization using network methodology. Network analysis, especially correlation networks haven't been present in quantitative studies of party systems and we hope the present study demonstrates its usefulness. The ever-evolving complexity of modern political party systems requires the rapid advancement of new methodologies to capture different aspects of generating processes shaping the structure and function of these systems. Party nationalization and localization are important socio-spatial processes and we have demonstrated a relationship between them and the change of electoral volatility of new parties. Further work is required to establish the viability and generalizability of these findings, using a larger sample of post-communist and consolidated democracies around the globe.

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