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Spatial effects and party nationalization: The Geography of partisan support in Mexico

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ABSTRACT

Nationalization captures the degree to which parties receive similar vote shares throughout the national territory, and is therefore explicitly interested in spatial aspects of party competition. This paper draws on spatial econometrics to analyze how parties compete across space. On the basis of a geo-referenced dataset of support for three major Mexican parties during the 2012 election, the analysis examines why there are spatial patterns of party support beyond what would be expected on the basis of district composition. The paper shows that spatial context has an independent effect on cross-district party performance, and that party support in one district increases the likelihood of party support nearby, thus highlighting why more explicit attention to space is important to understand the origins of nationalization.

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1. Introduction

Contemporary parties and party systems differ substantially in their degree of nationalization, which reflects the extent to which parties receive similar levels of electoral support across the national territory (Jones and Mainwaring, 2003). Whereas a first generation of nationalization scholars generally focused on single countries and studied changes in nationalization over time (Stokes, 1967; Rokkan, 1970; Schattschneider, 1960; Claggett et al., 1984), recent scholarship has demonstrated how country-level societal and institutional factors influence variation in nationalization across countries (e.g. Caramani, 2004; Chhibber and Kollman, 2004; Hicken, 2009; Lublin 2017; de Miguel 2017; Hicken and Stoll 2017). Both bodies of literature analyze the factors that influence whether parties can successfully attract support from geographically dispersed constituencies, either by presenting one nationwide programmatic platform supported by similar constituencies across districts or by crafting a multitude of more targeted appeals (Crisp et al., 2013). While the cross-national literature identifies country-level variables that influence nationalization, such as the electoral system, the degree of decentralization and ethno-linguistic heterogeneity (e.g. Harbers, 2010; Lago-Peñas and Lago-Peñas, 2011; Golosov, 2014; Wahman, 2015), the earlier literature identifies variables at the

subnational level that facilitate or impede the spread of parties to specific districts. Rokkan (1970), for instance, describes the challenges encountered by Norwegian parties as they sought to broaden their territorial base beyond urban centers. While the overall increase of “cross-location transaction flows” (p. 238) facilitated the spread of parties, the geographical, cultural and socio-economic characteristics of districts influenced the ease with which parties could take root, and whether they had to adapt their mobilization strategies to attract local support. Yet, while the earlier literature had often associated nationalization with political modernization, and expected progressive nationalization as political institutions mature (e.g. Blondel, 1969; Sundquist, 1973: 340), recent cross-national studies have pointed out that low nationalization is not necessarily a transitional phenomenon. Since the degree of nationalization can be low even in older democracies, nationalization scholars should take a closer look at the subnational variables that affect how parties compete across space.

Early scholars of nationalization and party development often devoted considerable attention to theorizing the role of space and geography, but they lacked the empirical and analytical tools to effectively test their intuitions. The persistence of low nationalization in many contemporary democracies challenges scholars to theorize the role of space more thoroughly, and advances in spatial analysis and the greater availability of geo-referenced data now make it possible to systematically investigate spatial effects. The Constituency-Level Elections Archive (CLEA), for instance, has recently released shapefiles for electoral districts to link electoral

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data to geographic locations.¹ Ultimately, the lower party and party system nationalization scores are, the less information national aggregates – such as vote shares – provide about patterns of party competition in different parts of a country, and the more important questions about spatial effects become. Understanding how spatial and aspatial factors interact is thus a timely endeavor for scholars seeking a more complete picture of party competition.²

To highlight the contribution of spatial and aspatial explanations for nationalization the paper analyzes district-level vote shares for three major Mexican parties in the 2012 congressional election. In 2012, as in previous and subsequent elections, spatial clusters of party support appeared above and beyond what would be expected on the basis of differences in the socio-economic composition of districts. Fig. 1 maps the residuals of a regression model, and visualizes the spatial distribution of the unexplained component once compositional effects are taken into account.³ In blue districts, parties perform worse than we would expect on the basis of district characteristics, whereas they perform better in red districts. The spatial pattern that emerges is one of over- and underpredicted districts clustered in space, and it is well documented in the literature on Mexican party politics (e.g. Klesner, 2005; Klesner, 2007; Baker, 2009; Hernández-Hernández, 2015). As is apparent from the maps, spatial context has an independent effect on cross-district party performance. This provides the empirical motivation for considering the role of space for party nationalization, and for analyzing party competition through the lens of geography. Taking into account spatial effects and modeling them explicitly offers a richer and more complete picture of why parties are successful in specific districts than accounts that solely rely on variables tapping into district composition.

The first part of the paper draws on the nationalization literature to identify aspatial and spatial explanations for party support, and outlines the empirical implications consistent with each type of explanation. The second part analyzes the nature of spatial dependence empirically, and explores to which extent aspatial and spatial explanations can account for the observed patterns. The paper demonstrates that – while conceptually distinct – both types of explanations complement each other empirically. Moreover, it shows that without explicit attention to spatial effects, we may draw misleading inferences about aspatial factors. Overall, the existence of spatial effects beyond what would be expected on the basis of the composition of districts highlights the need to take space seriously as a factor influencing party nationalization.

2. The spatial dimension of party and party system development

Weber (1919) famously described the state as a “compulsory association which organizes domination ... within a territory”. Within these states, especially in modern democracies, the process of representation also tends to be organized along territorial lines (Bendix, 1977). States as well as political parties are, therefore, spatial organizations, that have to overcome geographic challenges in order to be effective. The literature on political development emphasizes the close connection between the formation of states

and the emergence of national party systems (Rokkan, 1970; Blondel, 1969; Schattschneider, 1960). As state control over borders and territories increased, institutionalized channels for the expression of preferences became crucial means to influence national policies and policy-makers (Caramani, 2004). The degree to which national issues dominate the political agenda and voters align themselves with nationwide parties is therefore a crucial axis along with political systems can be compared (Chhibber and Kollman, 2004; Jones and Mainwaring, 2003). Comparativists care about nationalization, because broad territorial support for major parties is likely to translate into policy and spending priorities that benefit nationwide constituencies, rather than narrowly targeted particularistic interests (Crisp et al., 2013; Castañeda-Angarita, 2013).

Scholars have proposed and tested various explanations for the degree of nationalization over time and across countries. The following section draws on this literature to distinguish between spatial and aspatial explanations for nationalization. Whereas spatial explanations emphasize horizontal dynamics and the role of geographic factors, such as proximity, aspatial explanations highlight variables unrelated to geography (see Cho, 2003). Even though they are conceptually distinct, both types of explanations may complement each other empirically and explain different aspects of the broader phenomenon. The following section identifies different types of explanations and outlines their observable implications.

The aggregation of interests is one of the fundamental tasks of political parties, and scholarship on nationalization examines the extent to which parties fulfil this function geographically. Blondel (1969: 120–121), for instance, highlights that a nationalized or – in his terms – extensive party “attempts to ‘occupy’ the territory and both aims at covering the country and succeeds in doing so.” Claggett et al. (1984: 80) conceptualize nationalization as the geographical convergence of partisan support. They note that nationalization “is inherently an aggregate concept” as it represents the similarity of geographic units (see also Rokkan, 1970: 181).⁴

2.1. Aspatial explanations

The literature on political development has tended to think about the dynamics driving nationalization as a transition from territorial to functional cleavages (Lipset and Rokkan, 1967; Caramani, 2004). In Western Europe, local party bastions were characteristic of earlier phases of electoral development, and the emergence of national parties was associated with “the breakdown of local traditions of government” (Caramani, 2004: 31). Parties played an active role in this transformation as their search for votes drove them to expand territorially. Competitive behavior, in other words “resulted in the spread of parties across territories and in the deterritorialization of political cleavages” (Caramani, 2004: 293). Instead of centering on territorial cleavages related to local, spatially-circumscribed political identities, party competition came to be organized around cross-local functional cleavages, which divided the electorate along nationwide lines of conflict. Voters now tended to think of themselves as workers, miners or business owners, rather than conceiving of their political interests primarily in terms of their place of residence. This

¹ The project website contains the most recent information on GeoReferenced Electoral Districts Datasets: <http://www.electiondataarchive.org/datacenter-gred.html> (accessed January 15th, 2016).

² For more on the distinction between spatial and aspatial (see Cho, 2003)

³ The full model is reported in Tables 2–4 (Model 1) and discussed more extensively below.

⁴ While this paper conceives of nationalization as the similarity of electoral support for parties across districts, other scholars have conceptualized nationalization as the uniformity of electoral swings (Claggett et al., 1984). Static and dynamic nationalization are distinct in terms of measurement and underlying causes (Morgenstern et al., 2009; Morgenstern et al 2017; Alemán and Kellam 2017).

Note: Residual maps are based on Model 1 in Tables 2–4, and were drawn with *GeoDa* based on shapefiles obtained from Mexico's Instituto Nacional de Estadística, Geografía e Informática (INEGI). Red indicates positive residuals and blue negative residuals.

Fig. 1. Residual maps, 2012.

transformation was not complete, and cultural or linguistic differences continued to play a significant role in politics. However, following this logic, nationalization can be explained by the extent to which functional cleavages dominate politics. The more prominent functional cleavages are, the higher the expected degree of nationalization.

The implication of this explanation is not, however, that party support is distributed uniformly. Rather, even though the approach emphasizes aspatial factors, the composition of districts in terms of potential party supporters varies. Moreover, districts with similar socio-demographic characteristics are likely to be located near each other, so that we would still expect to find some degree of spatial

clustering in terms of party support. These spatial effects can be accounted for by variables capturing the composition of districts (Vilalta y Perdomo, 2004), and we would expect party support to map fairly neatly onto the spatial distribution of the societal groups that parties aim to represent. Heavily industrialized areas would therefore exhibit higher support for parties representing the interests of workers than districts where economy and society are dominated by small businesses or agriculture.

Much of the recent comparative literature has sought to identify country-level variables that influence nationalization. The spatial distribution of party support within countries, and the question whether districts with similar vote shares are clustered or dispersed, is then generally beyond the scope of inquiry. Since many institutional variables identified in this literature do not vary within countries, they cannot be leveraged to explain spatial patterns in subnational analyses. Yet, country-level variables that tap into national aggregates often have subnational implications. There is considerable evidence, for instance, that ethno-linguistic fragmentation hampers nationalization (e.g. Caramani, 2004; Golosov, 2014; de Miguel 2017). This implies that culturally, religiously or linguistically distinct regions should deviate most strongly from national averages. Similarly, in countries where the degree of regional authority is asymmetric across regions (Hooghe et al., 2016), we should see autonomous regions deviating more from national patterns. In sum, for aspatial explanations, spatial patterns are a corollary of the spatially uneven distribution of district characteristics.

2.2. Spatial explanations for nationalization

Adopting a spatial perspective requires a somewhat different conceptualization of units of analysis than has been customary in comparative politics. In spatial analysis “rather than considering *N* observations as independent pieces of information, they are conceptualized as a single realization of a process” (Anselin and Bera, 1998: 252). In addition to the variables contained within each unit, spatial analyses explore whether neighboring districts influence an observed outcome. The range of possible causal factors is therefore broader than just district-specific variables.

Rokkan (1970) highlights that the spread of parties was “not only ... a process in *time* but also ... in *space*” (p. 182, emphasis in original). The mobilization of party support was shaped significantly by spatial factors, such as the topography, economy and culture of regions, and the intensity of their interaction with urban centers. Contemporaneous accounts likened the territorial expansion of the organizations that came to characterize the political landscape, such as trade unions, to the “spread of the measles” (Hedström, 1994: 1170). The notion of contagion highlights the spatial nature of expansion, and the role location and proximity played in the process.

Spatial explanations emphasize the role of geography in building and maintaining party organizations. Even though competitive politics create incentives for parties to compete broadly, competition also encourages them to focus on those districts where they are likely to get a return on their investment. More than 75 percent of parties do not compete uniformly across districts, and decide “that some constituencies are simply not worth the time, resources, and effort of fielding a candidate” (Potter and Olivella, 2015: 76). Even in countries like Mexico, where electoral law requires parties to appear on the ballot nationwide (Harbers and Ingram, 2014), the resources parties devote to local campaigns and branches vary significantly (Harbers, 2014). Geography matters when deciding how to best

allocate scarce resources as “any interview with a party operative would reveal ... logistical considerations: moving campaign resources and volunteers between districts, covering districts that exist in the same media market, and so on. These considerations would imply that, all else being equal, parties would much rather enter districts in close proximity to districts where they have already deployed resources than districts where such resources are distant” (Potter and Olivella, 2015: 76). How to effectively compete across space therefore remains a challenge for parties in contemporary democracies.

To better understand how and why patterns of party support emerge from a spatial perspective, it is useful to distinguish between two types of spatial processes commonly identified in the literature: place-based and propagation-based.⁵ First, dependence may be the result of *place-based effects*, where neighboring districts have similar levels of party support due to their ‘common exposure’ (Darmofal, 2015) to explanatory variables that do not align with the units of analysis and are not included in the model. A group of neighboring districts might be part of the same media market, for instance, and a party could decide to target that market with campaign messages in order to get a leg up in one of the districts (Cho, 2003: 369–370). Because media markets do not map neatly onto electoral districts, we would observe clusters of party support in districts that are part of the same local market.

Beyond campaigns, for which the analogy of exposure might be most obvious, place-based effects can also result from the influence subnational executives have over federal election outcomes. Governors play an important role in campaigns within their jurisdictions (Langston, 2007) and networks, such as unions and social movements, are key for mobilizing voters (Holzner, 2010). Yet, the internal divisions of these organizations generally do not align with electoral districts, so that the mismatch between the spheres of influence of the actors controlling political resources and electoral districts are important place-based reasons for spatial patterns of party support.

Moreover, the distribution of resources on which parties can draw during elections bears the imprint of earlier political developments. Rodden (2011) argues that the built environment, i.e. the spatial distribution of the type of housing and public infrastructure, continues to bear the imprint of the Industrial Revolution. The built environment, in turn, exerts a strong influence on contemporary political preferences and vote patterns. Furthermore, a union may be strong in some parts of a country due to factors that reflect past political alignments, rather than contemporary socio-economic characteristics. The same holds true for party organizations. Wuhs (2016) highlights the importance of foundational elections for regional party strength in subsequent elections, as alliances are forged during critical junctures and become entrenched in local politics. The place-based reasons for spatial dependence can therefore be ‘contingent’ because they reflect past choices of key political actors. Overall, from a place-based perspective, the reasons for spatial patterns of party support are “static” in the sense that they come from variables that do not align with the units of analysis and are not included in the model.

Second, spatial dependence may also be related to *propagation-based effects*, such as diffusion or contagion. This perspective is more dynamic and emphasizes the causal importance of interactions between neighboring districts in generating party

⁵ For a more in-depth discussion of the distinction between place-based and propagation-based processes in comparative politics see Harbers and Ingram (2015).

support. Its basic tenet is that nearby units interact more with each other than distant ones. Accounts of early party development describe the geographic patterns of party expansion, highlighting that it is easier to build a local party organization in a district adjacent to one with a pre-existing chapter than without copartisans nearby (Blondel, 1969; Panebianco, 1988).

In his analysis of Norway, Rokkan (1970: 191) analyzed the “spread of party organizations from the central areas to the periphery” and the factors that facilitated or impeded electoral mobilization. He highlighted that the relative ease with which parties could take root was largely determined by the intensity of “cross-local transaction flows”, such as “the entry into a wider network of economic relations”, “the mobility of workers”, “the development of cross-local contacts through the schools, the armed forces, the administrative services, and the dominant church”, and “the entry into a wider market of information exchange within the nation” (p. 238–9). Parties encountered difficulties in the mobilization of voters especially in areas that were relatively isolated (p. 189). From a propagation-based perspective, the spatial patterns come from interactions between proximate districts through cross-district flows or “vectors of transmission” (Baller et al., 2001).

In thinking about the pathways that facilitate flows, roads and transportation infrastructure are most intuitive. Much like Rokkan's study of Norway, Wuhs' (2015) identifies highways as facilitators of party expansion in Querétaro, Mexico. The National Action Party (PAN) initially made inroads in urban areas, and party expansion into more rural territories proceeded along traffic arteries between party strongholds. The key determinant for whether the PAN was able to establish a foothold in a specific rural district were therefore not so much the characteristics of the district, but rather the presence of an urban party base nearby. In such cases, compositional differences between rural districts are insufficient to explain party performance.

The logistical challenges inherent in electoral campaigns are significant, and party resources and volunteers are not distributed uniformly throughout the territory. Even in an era of mass communication, an organization on the ground matters, and the time and costs involved in campaigning are influenced significantly by distance. Deploying precious resources to a district nearby is less difficult and less costly than moving resources across space to more distant places. Party expansion or diffusion is thus not a mechanistic process, but the result of the strategic behavior of parties confronted with limited resources and the challenges of geography.

In addition to infrastructure, the mobilization of party support proceeds through social networks and political information often travels through personal channels (Baybeck and Huckfeldt, 2002; Wilson, 2008; Baker, 2009). Because electoral districts are essentially artificial units, re-drawn periodically to ensure an equal number of voters in each district, they do not match social and personal networks. District borders are porous, and the intensity of personal exchanges is influenced by proximity, as people close to each other are more likely to interact. Distance therefore serves as a proxy for the intensity of interactions that cannot (yet) be observed directly (Hedström, 1994; Tolnay et al., 1996; Kopstein and Reilly, 2000).

Even though place- and propagation-based perspectives are conceptually distinct, over time they likely reinforce each other. A party may be able to establish itself in one region of the country due to place-based factors, for instance because the local elite switched its allegiance from one party to another. Having this regional base then facilitates further expansion into the neighboring areas that

interact with it. At the same time, the displaced party now not only underperforms in the districts affected by the elite switch, but – due to the lack of resources close-by – campaigning in surrounding districts has become more costly. The landscape that parties encounter is not static, as parties compete not only for votes, but for votes located in space.

2.3. Empirical implications of aspatial and spatial explanations for nationalization

On the basis of the previous discussion, we can outline the empirical implications of aspatial and spatial explanations for spatial patterns of party support. The empirical analysis in the next section then investigates the extent to which the observed patterns are consistent with each of these scenarios. At the outset, however, it is important to highlight that in spatial analysis evidence for the spatial process is indirect, as the precise nature of the data-generating process is unobservable (e.g. Cho and Gimpel, 2012; Cho, 2003; Baller et al., 2001). Instead, researchers look for patterns that are consistent with the hypothesized process. Thus, while we generally do not know the specific pathway for diffusion, or the nature of common exposure, the analysis reveals which type of data-generating process best fits the data.

In the first scenario, aspatial explanations account for subnational differences in party support. Even though we may initially observe regionalized support, spatial autocorrelation disappears (or is greatly reduced) once district-level predictors of party support variables are taken into consideration.⁶ Differences in party support can thus be attributed to compositional effects, rather than a spatial process.

In the second scenario, place-based dynamics best capture the reasons for spatial patterns in party support. In this case, we expect spatial autocorrelation to persist even after compositional effects have been accounted for. Evidence for this process emerges from spatial autocorrelation in the error term of a regression model (Anselin and Bera, 1998: 249; also Cho, 2003). Substantively, the spatial patterning is caused by omitted, spatially clustered covariates. Darmofal (2015) refers to this as attributional dependence. The appropriate modeling strategy should then address the spatial error, and this specification would fit the data better than the non-spatial model. Note that identifying a spatial error process is not only interesting for substantive reasons, but it is also important methodologically, because ignoring the process can lead to biased standard errors in an OLS regression (Baller et al., 2001).

In the third scenario, there is also a spatial process but one dominated by propagation-based dynamics. Spatial dependence persists after variables tapping into district composition have been included. Substantively, however, this patterning is generated by the spatial lag of the dependent variable as high party support in one district increases the likelihood of party support in neighboring districts, controlling for the effect of other district characteristics included in the model. Anselin and Bera (1998: 247) refer to this as “substantive spatial dependence”, because the interaction between units is part of the causal process. The appropriate specification for this scenario is a spatial lag model. Again, the relevance of identifying the spatial lag is substantive as well as methodological, since in this scenario the initial OLS model will not only be biased but also inconsistent (Anselin, 1988).

⁶ Following Anselin and Bera (1998), the terms spatial dependence and spatial autocorrelation are used interchangeably.

3. Spatial patterns of party support in Mexico: testing aspatial and spatial explanations

The empirical puzzle addressed in this paper are spatial patterns of party support during the 2012 election in Mexico's 300 electoral districts.⁷ The lower chamber of the Mexican Congress (*Cámara de Diputados*) is composed of 500 members, 300 of which are directly elected by plurality vote. The remaining seats compensate smaller parties and are distributed through proportional representation. District borders are determined by the National Electoral Institute (*Instituto Nacional Electoral* – INE) on the basis of census data to ensure that all districts represent a roughly equal number of voters. The number of electoral districts per state ranges from 2, in the least populous states, to 40, in the state of Mexico (*Estado de México*).⁸

Fig. 2 provides an opportunity to visually inspect the distribution of vote shares for the three major parties in the 2012 elections. Borders of the 31 states and the federal district of Mexico City are traced in black. The maps align with the spatial patterns of party support documented in the literature on Mexico. The Party of the Institutionalized Revolution (*Partido Revolucionario Institucional*, PRI), which dominated Mexican politics for more than seven decades, is the party with the highest nationalization score (Table 1).⁹ The PRI captures votes in the north as well as the south of the country, but it is comparatively weak in the center and the southernmost state of Chiapas. The National Action Party (*Partido Acción Nacional*, PAN) has the second highest nationalization score. The party traditionally performs well in the north and across the more Catholic *Bajío* region, which encompasses parts of Guanajuato, Querétaro, Aguascalientes, and Jalisco. The least nationalized party is the left-wing Party of the Democratic Revolution (*Partido de la Revolución Democrática*, PRD). The PRD generally does well in the southern part of the country and the Federal District of Mexico City.

Spatial patterns in party support in and of themselves are hardly surprising, though, as Mexico's regions differ substantially in terms of societal and economic characteristics and the three major parties attract support from distinct societal groups (e.g. Klesner, 2009). Differences between the north and the south are so pronounced that some speak of 'two Mexicos', contrasting a "poor, unequal, authoritarian and divided Mexican 'South'" with "a rich, democratic

and more equal 'North'" (Correa-Cabrera, 2013: 2). Vote patterns partially align with these cross-regional differences. While the PRI has traditionally performed best in rural areas where voters are comparatively poor and less educated, strongholds of the center-right PAN tend to be urban, and populated by more educated and affluent voters (Klesner, 2007; Mizrahi, 2003; Fernández-Durán et al., 2004). As PAN predecessors had been associated with a Catholic resistance movement to the secular state, the so-called *Cristero Rebellion* (1926–29), the party has performed well in bastions of conservative Mexican Catholicism, especially the *Bajío* region which constituted the heartland of the uprising. Areas with high PRD support are more diverse. The PRD has obtained high vote shares in the Federal District, where it has established linkages with urban social movements, but it also performed well in marginalized areas across the south. These differences have been born out in analyses at the aggregate and the individual level (Klesner, 2005).¹⁰ What is remarkable, however, is that spatial patterns exist above and beyond what we would expect on the basis of such differences in the socio-economic composition of districts. The tools of GIS and spatial analysis allow us to explore not only *whether* party support differs across subnational units, but also *how* party support is distributed across space. The following section uses spatial analysis to unpack the origins of the spatial patterns of party support in Mexico.

In spatial econometrics observations are assumed to be connected with their neighbors, and the connectivity matrix, W , indicates for all pairs of observations whether a neighbor relationship exists between the units (see Beck et al., 2006). The most common way to conceptualize the neighbor relationship between areal units, such as electoral districts, is contiguity or sharing a common border (Anselin and Rey, 2014: 35). In this analysis, weights are specified on the basis of first order queen contiguity. The most widely used test for spatial autocorrelation is Moran's I (Moran, 1950; Cliff and Ord, 1972). The Global Moran's I statistic is similar to Pearson's correlation coefficient, in that it ranges from $+1$, to -1 . A positive and significant value indicates that connected units are similar in terms of party support whereas a negative value indicates that connected units have divergent values. In this case, Moran's I value is positive and significant for all parties (Table 1), again underscoring the existence of spatial patterns of party support.¹¹

The district-level predictors of party support are drawn from Klesner's (2005) ecological study of electoral competition in Mexico.¹² The dependent variable in the analysis is the district-level vote share obtained by the respective party in the 2012 election. Included predictors are the share of the population that self-identifies as Catholic, that has access to health services, and that

⁷ In spatial analysis, choosing units that are either too small or too large creates methodological problems. In this case, the primary concern is that electoral districts may be too small, because the literature has highlighted the role governors play in shaping federal electoral outcomes (e.g. Langston, 2007). Previous aggregate level studies of party performance in Mexico offer no clear guidance on which subnational unit is most appropriate, as results have been examined at the level of electoral precincts (e.g. Franco Vivanco et al., 2014), municipalities (e.g. Klesner, 2005, 2007), electoral districts (e.g. Fernández-Durán et al., 2004; Hernández-Hernández, 2015) and states (e.g. Bruhn, 1996). The intraclass correlation (ICC), a tool from multi-level modeling, can be used to explore how much electoral districts within the same state resemble each other (Hox, 2002). In this case, the ICC reveals that more than half of the observed variation is at the state-level (Table 1). While this is substantial, it also indicates that an analysis aggregating vote shares at the state-level runs the risk of over-aggregation, which supports the decision to proceed with district-level data. For more on choosing the appropriate unit of analysis in subnational and spatial analysis see Anselin and Bera (1998), Anselin and Rey (2014), Harbers and Ingram (2015) and Soifer (2014).

⁸ While districts do not cut across state borders, they do not follow municipal boundaries. Given vast population differences between municipalities, some electoral districts encompass multiple municipalities while municipalities in metropolitan areas, such as Mexico City, can contain more than one district. A non-partisan process of redistricting is supposed to prevent "gerrymandering". For detailed information about the 2004 round of redistricting, during which the districts used in the current analysis were drawn, see IFE (2005).

⁹ In 2012, legislative elections were held concurrently with presidential elections, and nationalization scores for all parties are higher than during mid-term elections.

¹⁰ Since nationalization captures the similarity of geographic units in terms of the level of partisan support (Claggett et al., 1984), aspatial and spatial explanations are tested at the aggregate level only. While the analysis explores in which types of districts a party does well, and how these districts are distributed across space, it cannot shed light on who in the district actually voted for the party (see King (1997) on the risk of ecological fallacy in aggregate analyses). Substantively, the models of party support in Tables 2–4 take as their starting point insights from individual-level analyses as to which voters tend to support specific parties, and use this as a proxy for how easy it might be for a party to make inroads (Klesner, 2005).

¹¹ All spatial analyses were conducted with the open-source software packages *GeoDa* or *GeoDa Space*.

¹² Individual-level models of voting behavior tend to include additional predictors, such as ethnicity or employment status. The reason why I opt for a model with only four predictors is that these additional variables tend to be highly correlated with those already in the model. When variables such as the percentage of the population speaking an indigenous language were added, diagnostics indicated potential problems of multicollinearity.

Note:
 Maps were drawn with ArcMap 10.1 based on shapefiles obtained from Mexico's Instituto Nacional de Estadística, Geografía e Informática (INEGI). State borders are traced in black, whereas borders for electoral districts appear in lighter shades.

Fig. 2. The geography of party support, 2012.

Table 1
Indicators for the distribution of party support.

	PRI	PAN	PRD
<i>Intra-Class Correlations</i>	0.55	0.64	0.79
Groups = 32 states.			
<i>Party Nationalization Score</i>	0.86	0.76	0.68
Calculations based on Jones and Mainwaring's (2003) Gini-based nationalization measure with electoral districts as units.			
<i>Global Moran's I for Vote Shares</i>	0.68	0.67	0.83
Calculations based on queen contiguity.			

is illiterate.¹³ The final indicator in Klesner's (2005) model, urbanization, is captured here by population density, or the average voting age population per square kilometer in each district.¹⁴ Results are shown by party in Tables 2 through 4.

For each of the three major parties, the tables show three models. Model 1 is a non-spatial OLS regression to which diagnostics for spatial effects have been added. Model 2 adds dummies for five Mexican regions to the substantive predictors in Model 1, following the common practice in the literature to include them in studies of voting behavior.¹⁵ Model 3 includes the four substantive predictors as well as a spatial lag term.

The results for Model 1 for all three parties are broadly consistent with previous analyses. Whereas the PRI performed better in more Catholic districts, in those where a larger share of the population has access to health services, and in districts with higher levels of illiteracy, population density is negatively associated with support for the PRI. PAN support is higher in more Catholic districts and in those where a larger share of the population has access to health services. Support for the PAN is negatively associated with the indicators for illiteracy and, somewhat surprisingly, with population density. PRD support, by contrast, is negatively associated with access to health services and the share of the population that self-identifies as Catholic, and positively with illiteracy and population density. Combined, these variables account for about a third

of the explanatory power of Model 1.

The results of Model 1 indicate that aspatial explanations emphasizing the role of compositional effects hold significant sway. The diagnostics for spatial effects, at the bottom of each table, include the Moran's I indicator for regression residuals. A comparison of the Moran's I values from Table 1 to those in Tables 2 through 4 demonstrates that the inclusion of the four predictors reduces spatial autocorrelation. Compositional effects thus account for part of the spatial autocorrelation we initially observed. The diagnostics also highlight, however, that spatial patterns remain, even after the inclusion of these predictors. For all three parties, Moran's I is still significant, indicating that OLS models are inappropriate. Fig. 1 maps the spatial distribution of residuals for the three parties. As indicated above, blue indicates negative residuals and red positive residuals. The maps highlight the spatially uneven performance of the models as over- and underpredicted districts are clustered in space. Moreover, they show similarities with the maps in Fig. 2. In districts where parties perform well, they thus tend to garner votes above and beyond what we would expect on the basis of district-level characteristics.

To capture this geographic over- and underperformance of parties, which is well-documented in the literature, quantitative analyses of individual or aggregate voting behavior in Mexico generally include region dummies. In Klesner's (2005) ecological study, for instance, these dummies account for about half of the explanatory power of the models. The increase in explanatory power is replicated in Model 2, where region dummies have been added to the four district-level predictors. The increase is most pronounced for the PRD, which is also the party with the most regionalized support. Adding the dummies increased the value of R-squared with about 17 percent for the PRI, 21 percent for the PAN and 28 percent for the PRD. The dummies suggest that the PRI does significantly better in the Center West, in the Mexico City area, which includes the Estado de México, and in Northern states compared to the center of the country. The PAN does significantly worse in the Mexico City area, whereas the PRD performs better in the South and around Mexico City, but worse in the North and the Center West.

Even though the results in Model 2 are consistent with previous studies, including dummies in studies of aggregate party support is undesirable for two reasons. First, from a substantive perspective, their analytical value is limited (Ahram, 2011; Harbers and Ingram Forthcoming). They do not shed light on the data-generating process, and we learn nothing about the origins of spatial patterns. Essentially, the dummies increase the explanatory power of the model without "replacing proper names with variables" (Przeworski and Teune, 1970). Second, from a methodological perspective, the dummies do not resolve the issue of spatial autocorrelation sufficiently. The diagnostics for Model 2 show that Moran's I remains significant for all parties even after the dummies are included. This highlights the need for the spatial specification in Model 3.

Lagrange Multiplier (LM) diagnostics shed light not only on the

¹³ Data for these three indicators are taken from the 2010 census. Klesner's (2005) analysis draws on municipal-level data. One common challenge for spatial analyses is that information is not available at the required level of aggregation. Census indicators, for instance, are not normally provided for electoral districts. For the 2010 census, however, Mexico's Instituto Nacional de Estadística, Geografía e Informática (INEGI) has cooperated with the National Electoral Institute to aggregate key census indicators at the district level. These data are available through the Sistema Estadísticas Censales a Escalas Geoelectorales (<http://gaia.inegi.org.mx/geoelectoral/viewer.html>). The indicators used here are 'P15YM_AN' (Illiteracy), 'PCATOLICA' (Catholic), and 'POBTOT' to calculate population shares. While Klesner (2005) measures industrialization as the percentage of the population employed in manufacturing, this indicator is not included in the database for 2010. I therefore use access to health services ('PDER_SS') to tap into the share of the population in formal employment, as compared to subsistence agriculture or the more precarious informal sector. The census indicator measures the total number of people entitled to receive health services by institutions such as the Instituto Mexicano del Seguro Social (IMSS), the Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (ISSSTE and ISSSTE estatal), Petróleos Mexicanos (PEMEX), the Secretaría de la Defensa Nacional (SEDENA), the Secretaría de Marina Armada de México (SEMAR), or the Sistema de Protección Social en Salud.

¹⁴ Data for this indicator were obtained from INE's *Tipología de los distritos electorales* (<http://www.ine.mx/docs/IFE-v2/DERFE/DERFE-DistritosElectores/DERFE-ProductosGeoElecDesc-docs/TipologiaDistritosElectores.pdf>), which contains demographic and geographic information about all electoral districts to gauge how time-consuming and costly it is to maintain the voter registry. Districts are grouped into nine categories, and resources for voter registration are distributed according to this classification.

¹⁵ The division of states into five regions follows Klesner (2005). North: Baja California, Baja California Sur, Coahuila, Chihuahua, Durango, Nuevo León, San Luis Potosí, Sinaloa, Sonora, Tamaulipas, Zacatecas; Center-West: Aguascalientes, Colima, Guanajuato, Jalisco, Michoacán, Nayarit, Querétaro; Mexico City Area: Federal District, Estado de México; South: Campeche, Chiapas, Guerrero, Oaxaca, Quintana Roo, Tabasco, Veracruz, Yucatán.

Table 2
Federal deputy elections, PRI.

	Model 1 (OLS)			Model 2 (OLS)			Model 3 (Spatial Lag)		
	Coef.	s.e.	p	Coef.	s.e.	p	Coef.	s.e.	p
Constant	3.3705	4.7413	0.478	6.7680	5.359	0.208	−4.2997	3.5311	0.223
Catholic	11.1829	3.8567	0.004	9.2522	4.9042	0.060	5.9168	2.8219	0.036
Access to Health Services	26.4837	4.3341	0.000	15.5109	4.7927	0.001	8.4015	4.1871	0.045
Illiteracy	33.5183	11.4985	0.004	54.5422	12.9481	0.000	28.513	8.069	0.000
Population Density	−0.0007	0.0001	0.000	−0.0007	0.0001	0.000	−0.0001	0.0001	0.319
North				7.6571	1.5323	0.000			
South				1.9649	1.5248	0.199			
Mexico City				4.4092	1.5331	0.004			
Center-West				4.5298	1.4662	0.002			
ρ							0.7508	0.1201	0.000
N	300			300			300		
R-squared (adjusted or pseudo)	0.30			0.36			0.66		
AIC	1962.407			1942.023					
<i>Diagnostics</i>		<i>value</i>	<i>p</i>		<i>value</i>	<i>p</i>		<i>value</i>	<i>p</i>
Moran's I		0.51	0.000		0.49	0.000			
LM (lag)		171.624	0.000		160.363	0.000			
Robust LM (lag)		11.452	0.001		10.840	0.001			
LM (error)		162.303	0.000		150.368	0.000			
Robust LM (error)		2.131	0.144		0.845	0.358			
Anselin-Kelejian Test								0.108	0.742

Note: In Model 2, *Center* is the base category. For Model 3, the pseudo R-squared is reported.

existence of dependence, but also on its nature. As outlined above, spatial dependence can be generated by two types of processes: (1) place-based, where patterns in party support are related to neighboring districts having similar properties not captured by variables in the model, or (2) propagation-based, where patterns emerge because of the interaction among districts. Each data-generating processes requires a different approach to modeling (Anselin and Rey, 2014). Place-based processes should be modeled with a spatial error specification, which accounts for the presence of spatially clustered omitted variables. Propagation-based processes, by contrast, require a spatial lag specification. Lagrange Multiplier (LM) diagnostics examine regression residuals to identify which of the two alternatives best fits the data. They are

reported at the bottom of Tables 2 through 4.

If the simple versions of the LM lag and error test are both significant, as in this case, this suggests that both types of spatial dependence are present. Substantively, this implies that place-based and propagation-based explanations for nationalization play a role in generating the observed patterns. To determine which type of process is more prominent, it is necessary to consult the robust version of LM lag and error diagnostics. If both of these are still significant, as is the case for the PRD, the value of the test statistic should guide the specification search (Anselin and Rey, 2014: 121). For all three parties, the diagnostics point towards a spatial lag specification as the most appropriate option. Party support is thus not only shaped by compositional effects or

Table 3
Federal deputy elections, PAN.

	Model 1 (OLS)			Model 2 (OLS)			Model 3 (Spatial Lag)		
	Coef.	s.e.	p	Coef.	s.e.	p	Coef.	s.e.	p
Constant	−13.3763	6.8600	0.052	−7.4667	7.6832	0.332	−3.3136	5.0491	0.512
Catholic	24.0880	5.5802	0.000	26.8096	7.0312	0.000	6.6834	5.0344	0.184
Access to Health Services	35.6086	6.2709	0.000	22.3463	6.8713	0.001	10.7363	6.3632	0.092
Illiteracy	−48.1148	16.6369	0.004	−63.2675	18.5637	0.001	−26.1630	12.077	0.030
Population Density	−0.0008	0.0002	0.000	−0.0002	0.0002	0.283	−0.0004	0.0001	0.009
North				3.2372	2.1968	0.142			
South				1.8160	2.1860	0.407			
Mexico City				−7.3122	2.1981	0.001			
Center-West				2.2085	2.1021	0.294			
ρ							0.7230	0.1371	0.000
N	300			300			300		
R-squared (adjusted or pseudo)	0.27			0.34			0.67		
AIC	2184.05			2158.18					
<i>Diagnostics</i>		<i>value</i>	<i>p</i>		<i>value</i>	<i>p</i>		<i>value</i>	<i>p</i>
Moran's I		0.54	0.000		0.53	0.000			
LM (lag)		191.547	0.000		175.244	0.000			
Robust LM (lag)		10.444	0.001		3.734	0.053			
LM (error)		183.750	0.000		173.968	0.000			
Robust LM (error)		2.647	0.104		2.458	0.117			
Anselin-Kelejian Test								0.077	0.781

Note: In Model 2, *Center* is the base category. For Model 3, the pseudo R-squared is reported.

Table 4
Federal deputy elections, PRD.

	Model 1 (OLS)			Model 2 (OLS)			Model 3 (Spatial Lag)		
	Coef.	s.e.	p	Coef.	s.e.	p	Coef.	s.e.	p
Constant	49.5287	5.8252	0.000	29.7717	6.1250	0.000	9.7381	4.8806	0.046
Catholic	–21.6132	4.7384	0.000	–9.2505	5.6053	0.099	–6.0217	2.8547	0.035
Access to Health Services	–29.0506	5.3249	0.000	–11.1573	5.4778	0.043	–4.3104	3.6302	0.235
Illiteracy	29.9052	14.1271	0.035	8.9156	14.7990	0.547	9.7008	7.4738	0.194
Population Density	0.0012	0.0002	0.000	0.0006	0.0002	0.000	0.0004	0.0001	0.002
North				–5.1530	1.7513	0.004			
South				3.626	1.7427	0.038			
Mexico City				6.2001	1.7523	0.001			
Center-West				–4.5211	1.6758	0.007			
ρ							0.8223	0.08	0.000
N	300			300			300		
R-squared (adjusted or pseudo)	0.34			0.47			0.83		
AIC	2085.933			2022.192					
<hr/>									
<i>Diagnostics</i>		<i>value</i>	<i>p</i>		<i>Value</i>	<i>p</i>		<i>value</i>	<i>p</i>
Moran's I		0.69	0.000		0.69	0.000			
LM (lag)		322.959	0.000		306.590	0.000			
Robust LM (lag)		26.330	0.000		8.253	0.004			
LM (error)		300.762	0.000		300.711	0.000			
Robust LM (error)		4.133	0.042		2.374	0.123			
Anselin-Kelejian Test								0.516	0.472

Note: In Model 2, *Center* is the base category. For Model 3, the pseudo R-squared is reported.

spatially-clustered omitted variables, but also by party support in neighboring districts. Model 3 reports the results of the spatial analysis. In addition to the predictors in Model 1, it includes a spatially lagged dependent variable (ρ). The insignificant Anselin-Kelejian test suggests that the inclusion of the lag term sufficiently resolves residual spatial autocorrelation.

A comparison of Models 1 and 3 for the three parties shows that most predictors remain significant after the inclusion of the spatial lag, though for some the magnitude of the coefficient is reduced. This underscores the importance of aspatial explanations, as predictors associated with district composition are robust to the inclusion of the spatial lag term. For the PRI, which is the most nationalized party, only population density is no longer significant in Model 3. Interestingly, whereas the percentage of the population that self-identifies as Catholic remains a significant predictor for PRI support after the inclusion of the lag term, it becomes insignificant for the PAN. This result might seem counterintuitive at first glance, given the party's early association with Catholic opposition to the secular state. However, it echoes results from previous studies. Klesner (2005) finds a significant relationship between aggregate support for the PAN and the share of the population that self-identifies as Catholic, even though at the individual-level religiosity is associated with support for the PRI (Moreno, 2003). He notes that aggregate self-identification as Catholic is highest in the states of the Bajío, so that at the aggregate level the variable likely captures the legacy of regionalized opposition to the secular state during the Cristero Rebellion (Klesner, 2005: 113–115). Substantively, the variable therefore taps into an early PAN presence, as the Bajío was one of the first regions where the party contested elections, and it expanded its organization from its homebase (Lujambio, 2001). This resonates with Wuhs' (2016) argument about the importance of path dependence for explaining subnational patterns of party support. It also underscores how spatial and aspatial explanations may complement each other, and why it is important to consider both within the same analysis. The analysis shows that compositional variables may pick up spatial effects, and if these are not modeled explicitly, we run the risk of misinterpreting the determinants of party support.

Of the three parties, the PRD has the lowest nationalization

score, and the highest value for spatial autocorrelation. Moran's I remains high for the PRD in Models 1 and 2, even after the covariates are included, which indicates the presence of substantial spatial effects. It is not surprising that including a spatial lag term alters the findings of Model 1 more substantially than for the other two parties. In Model 3, two of the four predictors – illiteracy and access to health services – are no longer significant. The magnitude of the coefficients for population density and the share of the population that self-identifies as Catholic is reduced substantially, even though both remain significant. The model clearly highlights the explanatory role of space for the PRD, as party support in a district significantly increases the likelihood of party support nearby. Since the PRD is the smallest of the three major parties, and the one most strapped for resources (Harbers, 2014), spatial considerations are particularly important for the party. This again illustrates the complementarity of spatial and aspatial explanations, and highlights why it is important to consider both simultaneously. In a non-spatial model, other variables may pick up spatial effects, leading us to draw misleading inferences.

4. Conclusion

Nationalization captures how similar geographic units within a country are in their level of party support. Building and maintaining the nationwide organizations required to “catch-all over” (Caramani, 2004) is not easy though, and the difficulties parties encounter in broadening their base feature prominently in the early literature on nationalization and party development. This early literature explored how the characteristics of specific places and their proximity to others influenced whether parties were successful in their “attempts to ‘occupy’ the territory” (Blondel, 1969: 120–121). While scholars of nationalization have made considerable progress in recent years in identifying variables at the country-level that influence the degree of nationalization, the role of subnational factors highlighted in the early literature has received relatively scant attention, even though advances in spatial methods and the greater availability of geo-referenced data now make it possible to systematically investigate them. This paper demonstrates that – in addition to district-level characteristics – spatial

context plays an important role in shaping cross-district party performance. The degree of nationalization is thus determined by factors at the country-level, as well as by spatial and aspatial factors at the subnational level. More systematic attention to how these factors interact promises a more complete picture of party competition than previous accounts have been able to offer.

Partisan support in Mexico has exhibited spatial patterns above and beyond what would be expected on the basis of differences in the socio-economic composition of districts. Moreover, over- and underperforming districts are clustered in space. The paper draws on spatial and aspatial explanations to uncover the origins of these patterns. The analysis yields three main results. First, maybe least surprisingly, the analysis shows that aspatial factors tapping into district characteristics hold significant sway. Most of the district-level predictors of party support are robust to the inclusion of a spatial lag term. The socio-economic composition of districts thus plays an important role for whether parties are able to attract voters. Second, the spatial diagnostics show considerable support for substantive spatial dependence, indicating that spatial patterns of party support are not merely artefacts of variables missing in the model. Space plays an independent causal role, as party support in one district significantly increases the likelihood of party support in nearby districts. This is in line with the intuitions of early nationalization scholars that distance influences parties' strategic considerations and determines the ease with which they can take root in a locality. Supporters and resources nearby give parties a leg up in party competition. As the inclusion of the spatial lag term shows, in Mexico this consideration appears to be particularly acute for the PRD, the smallest and most resource-strapped of the three parties. Third, the results highlight why it is important to examine the role of aspatial and spatial explanations in the same analysis. Where spatial effects exist, but are not modeled adequately, district-level variables may erroneously pick up spatial effects, leading to misleading conclusions about the determinants of party support. Contemporary support for the PAN, for instance, is influenced by the proximity to historic party strongholds. Patterns of party support thus tend to be "sticky".

Overall, the results encourage scholars to pay more explicit attention to the role of space in shaping cross-district party performance. In closing, I would like to highlight some of the additional insights a geographic lens may yield for scholars of nationalization, and how we may push this line of enquiry even further. First, as outlined above, in spatial analysis the evidence for the spatial process is indirect, and we generally do not know the exact nature of common exposure for place-based effects or the precise vectors of transmission for propagation-based effects. Spatial diagnostics can only identify which type of process takes place, but not how or why. In this paper, hypotheses about the nature of common exposure or vectors of transmission were drawn from the nationalization literature. A promising next step would therefore be the collection of qualitative data to better understand the causal process, and to pin down the specific vectors of transmission driving diffusion (Harbers and Ingram *Forthcoming*). Moreover, it would be interesting to explore the existence of regional effects, that is the degree of spatial heterogeneity. The current analysis relies on the premise that the same relationships hold across the territory, but it is possible that the magnitude and significance of coefficients or the data-generating process itself differ between regions. Spatial effects might be particularly pronounced in peripheral areas, for instance, whereas they matter less in metropolitan centers. Ultimately, more explicit attention to space promises to shed light on how subnational and national-level factors interact in explaining the degree of nationalization across countries.

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