

Space Matters. The Group Threat Hypothesis Revisited with Geographically Weighted Regression. The Case of the NPD 2009 Electoral Success

Celine Teney*

Wissenschaftszentrum Berlin für Sozialforschung, Reichpietschufer, 50, 10785 Berlin, Germany
teney@wzb.eu

Summary: A geographically weighted regression approach is used to assess the association of the electoral success of the NPD, an extreme right-wing political party, during the 2009 German federal election with levels of and changes in immigrant and unemployment rates. The results do not support the group threat hypothesis: the immigrant rate remains non-significant in large areas of West Germany while it shows a negative and significant relationship with NPD electoral success in most localities in East Germany as well as in Northern Bavaria. Instead, findings tend to confirm the contact hypothesis: a higher percentage of immigrants within an electoral district seems to lead to larger interethnic contact opportunities and thus to a lower proportion of votes for the NPD. The largest significant positive association of unemployment rate with NPD electoral results is observed with respect to localities that are situated around the former border between East and West Germany. The large regional variations in the effects of immigrant and unemployment rates point to different mechanisms which are at stake in the association of populist radical right success with unemployment and immigrant rates. These findings illustrate the importance of spatial variability and make the case for a broader new research agenda dedicated to exploring the mechanisms underlying spatial nonstationarity.

Keywords: Populist Radical Right; Germany; NPD; Group Threat; Elections; Unemployment; Immigration; Geographically Weighted Regression.

Zusammenfassung: Der Zusammenhang zwischen dem NPD-Wahlerfolg bei den Bundestagswahlen 2009 und der Höhe und Veränderungen der Ausländer- und Arbeitslosenquoten wird in diesem Artikel auf der Grundlage des geographisch gewichteten Regressions-Ansatzes untersucht. Die Ergebnisse sprechen gegen die Gruppenbedrohungs-Hypothese: Die Ausländerquote ist in großen Teilen Westdeutschlands nicht signifikant, während sie eine negative und signifikante Rolle bei dem NPD-Wahlerfolg in den meisten Wahlkreisen Ostdeutschlands und Nord-Bayerns aufweist. Stattdessen scheinen die Ergebnisse die Kontakt-Hypothese zu unterstützen: Ein höherer Anteil an Ausländern innerhalb eines Wahlkreises scheint zu größeren interethnischen Kontaktmöglichkeiten zu führen und somit den NPD-Wahlanteil zu reduzieren. Die Wahlkreise, die den höchsten positiven Zusammenhang zwischen der Arbeitslosenquote und dem NPD-Wahlergebnis aufweisen, liegen im Grenzgebiet zwischen West- und Ostdeutschland. Die geographische Variation der Ausländer- und Arbeitslosenquoteneffekte deutet darauf hin, dass unterschiedliche Mechanismen für den Zusammenhang zwischen dem Erfolg populistischer rechtsradikaler Parteien und Ausländer- sowie Arbeitslosenquoten im Spiel sind. Diese Ergebnisse verdeutlichen die Bedeutung der Einbindung von geographischen Variablen für soziologische Forschungen und sprechen für die Formulierung einer breiteren Forschungsagenda zur Erforschung der Mechanismen geographischer Varianz.

Schlagworte: Populistischer Rechtsextremismus; Deutschland; NPD; Gruppenbedrohung; Wahlen; Arbeitslosigkeit; Einwanderung; Geographisch gewichtete Regression.

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Introduction

Since the large electoral success of several radical right parties in Europe, research on the impact of regional determinants of votes for radical right parties (the so-called contextual characteristics) has witnessed considerable growth in the international literature. Both cross-national multilevel analyses on radical right votes in Europe and national studies on the most successful European radical right parties such as the Vlaams Belang in Flanders have

boomed in the empirical literature. However, little is known on the variation along contextual characteristics of less successful parties, such as the German radical right parties. This lack of empirical research on less successful radical right parties is mostly due to the too small number of respondents of social surveys admitting their intention to vote for such parties. These small sample sizes are not only due to the relatively low radical right votes in Germany but also to social desirability biases linked to such sensitive survey questions. For instance, Lubbers and Scheepers (2000) compiled all three Allbus data waves of the nineties for their analysis of intentions to vote for the “Republikaner”, which resulted in a sample size of 183 voters. Such small numbers of cases are not sufficient to reliably test hypotheses dealing with contextual factors (Voss 2004: 91). The same is true for studies focusing on the profiles of radical right voters in Germany at the individual level. For instance, the 2005 electoral survey used by Arzheimer (2007) for the analysis of the socio-demographic and attitudinal profiles of radical right electorate was composed of 21 West and 18 East German respondents who expressed their votes for one of the three German radical right parties (DVU, NPD, and Republikaner). Such a small sample size hinders multivariate statistical inference for the analysis of radical right voter profiles (Arzheimer 2005: 420). Previous German studies based on survey data thus suffer from strong limitations in the scope of their analyses and the generalizability of their results. By contrast, the use of aggregate administrative data on electoral successes of the radical right enables to overcome these limitations: the entirety of radical right electorate can be taken into account in the statistical estimations.¹ The drawback of such an approach is that inference on the voting behavior of specific individuals is not possible: the validity of the electorate homogeneity assumption within localities can not be assessed without data on individual voting behavior. Nevertheless, the use of localities as units of observation does not raise ecological fallacy problems as long as inferences on individual effects are not drawn (O’Loughlin et al. 1994). Thus, aggregated data enable the estimation of effects of regional determinants on the average outcome of a locality similarly to multilevel models that assess locality effects on locality average outcomes but without controlling for individual char-

acteristics. The aim of this contribution is to shed light on the spatial variation of the effect of contextual characteristics on the NPD 2009 federal election results. More precisely, the effect of unemployment and immigrant rates on the NPD 2009 federal election results (in terms of the so-called group threat hypothesis) as well as its variation across German electoral districts will be investigated. For this purpose, I will use geographically weighted regressions (GWR) and, as units of observation, electoral districts as the most fine-grained administrative units for which statistical data are available in Germany. Before delineating the methodological procedure followed in this contribution as well as its advantages and limitations over the prevailing use of multilevel regression techniques with respect to the present issue, the literature on the recent development of the NPD and the profile of its electorate will be reviewed. Subsequently, the international and national debates on contextual characteristics affecting populist radical right electoral success will be discussed.

1. The NPD as a Populist Radical Right Party

The radical right political landscape in Germany is composed of three main parties: the Republikaner, Deutsche Volkunion (DVU) and Nationaldemokratische Partei Deutschlands (NPD). Their respective federal electoral results are presented in Table 1.

Since the reunification of East and West Germany, the cumulative results for these three parties at the Federal elections ranged from 1 percent in 2002 to 3 percent in 1998. The lack of large and continuous success of radical right parties in Germany, whether Republikaner, DVU, or NPD, is partly due to the shadow of the Nazi past that still affects Germany’s political culture. This is expressed by an absolute stigmatization of these radical right parties by the

Table 1 Results (%) of the NPD, DVU, and Republikaner (Rep) at the Federal Elections 1990–2009

	NPD	DVU	Rep
1990	0.3	–	2.1
1994	–	–	1.9
1998	0.3	1.2	1.8
2002	0.4	–	0.6
2005	1.6	–	0.6
2009	1.5	0.1	0.4

Source: Bundeswahlleiter

¹ See Biggs & Knauss (2011) and Rydgren & Ruth (2011) for recent analyses of populist radical right success in the United Kingdom and Sweden based entirely on aggregated data.

ruling elites, established parties, and the media (Art 2007; Decker 2008; Koopmans, et al. 2005). Mudde (2007: 245) suggests indeed that the relative failure of radical right parties in a country like Germany can be explained by a particularly hostile political opportunity structure, especially when compared to the larger success of radical right parties in countries with a more favorable environment in which political elites take a more revisionist approach to their Nazi past. In addition, the three radical right parties have repeatedly been facing difficult organizational and legitimacy problems both of which contributed to their relative electoral failures (Arzheimer 2004).

Based on the ideology defended by these three parties, scholars used to distinguish the Republikaner from the NPD and DVU. While the former was traditionally categorized as “populist radical right” (Mudde 2007) or as “new right wing” (Ignazi 1992), the latter were defined as “extreme right parties” (Mudde 2007) or “old right wing parties” (Ignazi 1992). According to Mudde (2007), the NPD was a (non-populist) extreme right party because of its undemocratic and elitist stances. Thus, the NPD did not share the typical characteristics of populism (Decker 2006) that are to be found among the more successful populist radical right parties such as the Vlaams Belang or the Front National. In addition, the NPD and DVU were differentiated from other populist radical right parties because of their anti-democratic discourse (Decker & Hartleb 2006). However, both the Republikaner and DVU, witnessing some success in the past, have seen their electorate decreasing since the end of the nineties. While the Republikaner, created in 1983, still obtained 1.8 percent at the 1998 federal elections, it reached at most 0.6 percent from the 2002 federal elections onwards. The DVU, created in 1987, faced a similar electoral decline. Since the end of the nineties, the DVU had to cope with organizational difficulties and leadership troubles and lost most of its members. The DVU decline led to a mere 0.1 percent of the 2009 federal votes (compared to 1.2 % at the 1998 elections). By contrast, the NPD, created in 1964, increased its voting share significantly by the last two federal elections: while it obtained 0.3 at the 1998 and 0.4 percent at the 2002 federal elections, it attained 1.6 and 1.5 percent during the 2005 and 2009 federal elections, becoming the largest German radical right party. In addition, the NPD has been striving to improve its internal organization and to coordinate its electoral strategy with the DVU (Schulze 2009). Moreover, the NPD manifesto is no longer restricted to racist

and anti-semitic issues but meanwhile also encompasses current social questions such as unemployment, the welfare state, or economic concerns, as well as anti-capitalist and anti-globalization issues (Sommer 2008). Issues such as the criticism of economic globalization, free market capitalism, delocalization of firms, precarization, and labor market instability have been put forward by the NPD (Caiani & Wagemann 2006). Effects of cultural globalization have also been attacked by the NPD in its focus on the negative consequences of further Europeanization and the so-called Americanization of the German culture (Caiani & Wagemann 2006). The NPD has thus been striving in the recent years to shift its program toward more populist issues. In this manner, the NPD has been becoming more consistent with the concept of a populist radical right party characterized by a core ideology composed of nativism, authoritarianism and populism (Mudde 2007, 2010). This is the reason why the NPD will be characterized here as a populist radical right party.

2. The NPD and its Electorate

Besides socio-demographic characteristics of populist radical right voters who are more likely to be male and young and to have a low education and a deprived socio-economic background, the attitudinal profile of this section of the electorate has been investigated by previous studies. The international literature has particularly been focusing on anti-immigrant attitudes, since populist radical right parties are assumed to attract votes mainly because of their anti-immigrant discourse (van der Brug et al. 2000). In this regard, Arzheimer (2008) and Lubbers et al. (2002) show that anti-immigrant attitudes are strong predictors for populist radical right votes across West European countries. Studies investigating the attitudinal profile of populist radical right voters in Germany do not specifically focus on anti-immigrant attitudes but tend to tap various components of extreme right positions (Falter 2000). Extreme right positions are defined through a scale composed of items measuring anti-immigrant attitudes, anti-semitism, the rejection of plurality and democracy, glorification of Nazi leaders as well as strong national identification. Voters for any of the three German populist radical right parties (Falter 2000) and Republikaner voters (Klein & Falter 1996) have on average higher values on this scale than voters of other German parties. These studies conclude that ideological convictions

of the extreme right play a large role in populist radical right votes in Germany (Arzheimer 2005).

Besides anti-immigrant and extreme right attitudes, populist radical right electorate seems also to be driven by protest sentiments (Arzheimer 2008; Arzheimer 2009; Lubbers et al. 2002; van der Brug & Fennema 2003). According to van der Brug et al. (2000: 82), populist radical right parties are assumed to attract protest voters who “want to show their discontent to the political elite by voting for a party that is an outcast in the political arena. The motive for their electoral choices is the party’s perceived opposition to the political regime. Therefore, a protest voter is a rational voter whose objective is to demonstrate rejection of all other parties.” These protest sentiments have been approximated in cross-national comparisons with dissatisfaction with government policies (van der Brug & Fennema 2003) or with a more general dissatisfaction with the way democracy works (Arzheimer 2008). According to Mudde (2007), populist radical right electorates are composed of both anti-immigrant ideological voters and protest voters. Moreover, populist radical right voters might be driven by both anti-immigrant ideology and protest motivations. In their analysis of the motives for populist radical right votes in several European countries, van der Brug and Fennema (2003) conclude that Republikaner votes might primarily be inspired by protest. Similar considerations have been put forward in the German literature. Pappi (1989) conceptualizes Republikaner voters as rational protest voters. The rational decision to vote for the Republikaner could be based on two considerations: Its electorate perceives that mainstream parties do not defend its own interests and are therefore out of vote consideration. Moreover, the electorate feels attracted by the Republikaner anti-immigrant stances (cf. Klein & Falter 1996). Similarly, more recent German studies show that the electorate for the three German populist radical rights parties is more likely to both be highly dissatisfied with the political system and to hold extreme right attitudes (Arzheimer et al. 2001; Falter 2000).

3. Regional Determinants of NPD Electoral Success

If populist radical right voters are characterized by both extreme right ideology and an urge to express protest, where do these convictions and sentiments come from? What accounts for individual motivations to vote for populist radical right parties? How

can regional differences in populist radical right success be explained? Many scholars investigate regional determinants that could account for such conviction, protest and populist radical right votes. In this regard, the most widely tested hypothesis in cross-national and national studies is the group threat hypothesis. The latter is derived from the group threat theory developed by Blumer and based on his recommendation that “race prejudice should be studied in the collective process through which a sense of group position is formed” (Blumer 1958: 7). This hypothesis states that the perception by the majority group that an outside group threatens its group’s prerogative is positively associated with prejudice against the outgroup (Quillian 1995: 586) and can thus lead to exclusionary reactions against immigrants, such as voting for a populist radical right party (Rink et al. 2009). This perceived collective threat is usually measured with macro-social conditions that are presumed to imply a larger degree of competition between the majority and ethnic minorities and thus a greater perceived ethnic threat among the majority. More precisely, the rate of immigrants and negative economic conditions such as the unemployment rate are expected to be significantly and positively associated with populist radical right votes (Lubbers & Scheepers 2001). The group threat hypothesis has been tested with cross-national and national multilevel analysis (e.g., Lubbers et al. 2002; Rink et al. 2009) with contradictory results. With regard to the findings of studies focusing on German populist radical right parties, some researchers found a significant effect of both the immigrant and unemployment rates (Dülmer & Klein 2005; Rotte & Steininger 2001). Sometimes significant effects of the immigrant rate are reported while findings are not significant with respect to the unemployment rate (Lubbers & Scheepers 2001), whereas occasionally unemployment turns out to be a significant predictor while the immigrant rate is not (Lubbers & Scheepers 2000). These inconclusive results might be due to the different scales or levels on which contextual characteristics are being measured (e.g., Bundesland vs. district level in the aforementioned German studies). It has indeed been shown that the impact of contextual characteristics measured at a highly aggregated level can be different from the impact of the same characteristics measured at a more local level (Johnston et al. 2007). Similarly, Dülmer & Klein (2005) argue that the Bundesland level used in the study of Lubbers & Scheepers (2000) in order to test the group threat hypothesis is too heterogeneous to reflect adequately the everyday social

conditions of the majority group. In the same vein, a study of anti-immigrant attitudes among Germans shows that the higher the proportion of immigrants per district, the lower the anti-immigrant attitudes (Wagner et al. 2006). These findings contradict the group threat hypothesis and are explained by the authors in terms of the intergroup contact theory (Allport 1954). Accordingly, contexts with a large immigrant population provide greater contact opportunities with immigrants, which, in turn, reduce anti-immigrant prejudice (Schlueter & Wagner 2008). The intergroup contact hypothesis could indeed explain the West-East puzzle in anti-immigrant attitudes among Germans: anti-immigrant prejudice is much lower in the West than in the East, although the relative immigrant population size is much higher in the West (Wagner et al. 2003). According to Wagner et al. (2006), whether the proportion of immigrant has a positive or negative effect on anti-immigrant prejudice might depend on the scale of the measured contextual characteristics: the proportion of immigrants measured at small geographical units such as the districts maximize the approximation of intergroup contact opportunity while the effect of immigrant proportions measured at larger geographical units (such as regions or countries) might be influenced by a third confounding variable, namely negative political propaganda on the supposed economical threat posed by the immigrant population.

The contact hypothesis has been extensively tested with data on anti-immigrant attitudes but much less with respect to political behavior such as populist radical right votes. An exception is the study of Biggs and Knauss (2011) in which they investigate the effect of contextual characteristics on membership in the British National Party: the contact hypothesis is confirmed at the local level while the group threat hypothesis is confirmed at the higher level. The argument of Wagner et al. (2006) that the proportion of immigrants can exert a varying effect on anti-immigrant prejudice depending on the contextual scale used in its measurement could therefore provide an explanation of the inconclusive findings with respect to votes for the populist radical right in Germany.

Coenders & Scheepers (1998) show that changes in unemployment and immigrant rates in the Netherlands exerted an additional effect on anti-immigrant attitudes: a rapid rise in immigration and unemployment significantly increased anti-immigrant attitudes. In this line of thought, it is argued that perceived group threat might be made more salient by changes in rather than by effective levels of im-

migrant and unemployment rates since individuals seem to pay special attention to changes in information flow (Hopkins 2010). Yet empirical findings in this respect have remained ambiguous. For instance, change in immigrant rate across Swedish municipalities was not significantly related to anti-immigrant attitudes (Hjerm 2009). In the same vein, Arzheimer and Carter (2006) report that change in immigrant and unemployment rates did not significantly affect populist radical right votes across European countries. For the German case, the two studies of Lubbers & Scheepers (2000, 2001) offer mixed results: in their study on voting intention for the Republikaner (2000), they find significant and positive effects of the rapid rise in both unemployment and immigrant rates, while their study on the voting intention for any of the three German populist radical right parties (2001) does not replicate these effects.

Finally, the effect of immigrant and unemployment rates on populist radical right votes is likely to show spatial variation across Germany. A study on the NSDAP electoral success of 1930 highlights the importance of taking spatial variation and local specificities into account for refining our understanding of electoral success (O'Loughlin et al. 1994). More contemporarily, the aforementioned study of Wagner et al. (2006) sheds light on a non-linear relationship between immigrant rate and ethnic prejudice. Similarly, a non-linear association of immigrant rate within German districts with the use by respondents of ethnic categories for defining problematic social groups is reported by a very recent study (Schaeffer 2012). Moreover, studies that include (former) East Germany in their sample tend to show that East Germany significantly differs from West Germany in the parameter estimates (Rotte & Steininger 2001).

Most authors, however, only briefly mention the East-West divide. This divide points to a significant geographical variation in the association of immigrant and unemployment rates on NPD electoral success. In Figure 1, the spatial distribution of the NPD 2009 electoral success indeed indicates a strong and non-random variation: a clear East-West divide in the NPD electoral success. At the same time, NPD voting share is not uniform across all East electoral districts; a corridor surrounding the Berlin area and extending eastward to the Polish border to westward to the former inner German border shows lower NPD electoral success than the remaining Eastern districts. Because NPD electoral success shows large disparities across electoral districts, one can also expect spatial variability in the

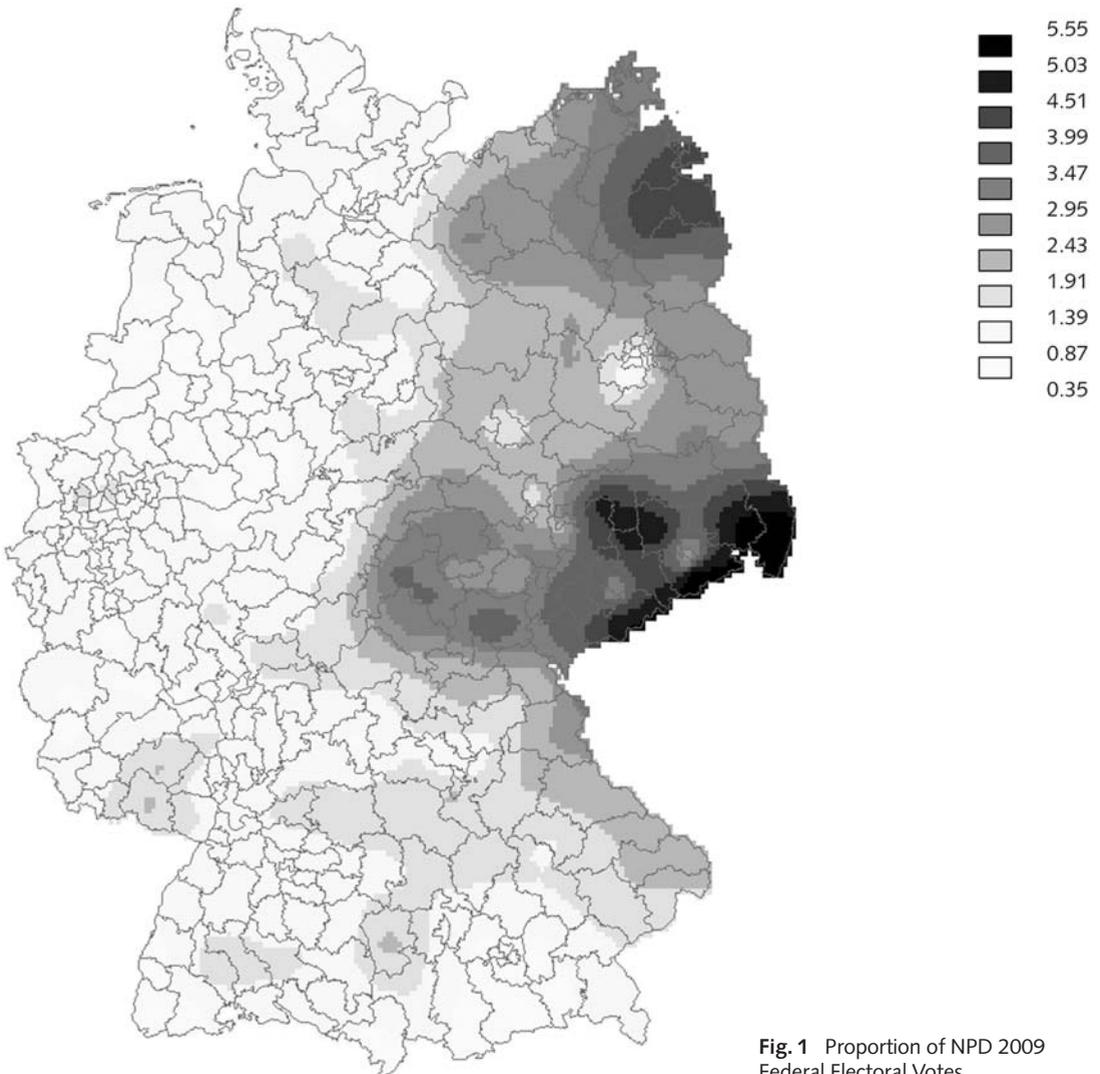


Fig. 1 Proportion of NPD 2009 Federal Electoral Votes

relationship of immigrant and unemployment rates with NPD voting share across electoral districts.

4. Methods

4.1 Geographically Weighted Regression

Most of previous studies that investigated the impact of contextual variables on populist radical right votes use multilevel regression techniques. Multilevel regression is a methodology for the analysis of clustered data; multilevel models provide accurate estimates of relationship and accurate estimates of standard errors at the individual level by

taking clustering into account (Cohen et al. 2003). In addition, these techniques enable the analysis of multilevel data within a single regression model: predictors at multiple levels of aggregation can be simultaneously estimated, i.e. the variability within and between clusters can be taken into account by partitioning the error terms into the different clustering levels. Moreover, this clustered variability can be modeled by assessing the impact of predictors measuring cluster as well as individual characteristics. Thus, in addition to the estimation of the effect of individuals' characteristics on their outcomes, the effect of the characteristic of any cluster on the average outcome of individuals belonging to this cluster can be assessed (Raudenbush & Bryk

2002; Snijders & Bosker 1999). These techniques are extensively used in educational research in which the clustering of data is obvious (pupils nested within schools) and the effect of school composition and settings on pupils' outcomes are the primary interest (Teddle & Reynolds 2000). Multilevel regression techniques have also been enjoying increasing attention in the past years from social scientists working on cross-national comparison, for example on multilevel analyses of the group threat hypothesis (Hjerm 2007; Quillian 1995; Scheepers et al. 2002; Semyonov et al. 2006). In these studies, geographical units such as districts, Bundesländer or countries are considered as higher level units, while populist radical right votes or voting intentions compose the dependent variable at the individual level. However, the application of multilevel techniques for the analysis of spatial data relies on the arbitrary fragmentation of spatial context into discrete units disconnected from one another at a higher hierarchical level (Fotheringham et al. 2002). That is, the use of multilevel techniques assumes that unemployment and immigrant rates influence the average probability of populist radical right votes uniformly throughout a spatial unit defined *a priori*. A further implication of the use of multilevel techniques is that the contextual characteristics of a higher-level unit affect exclusively the average outcome within this unit, due to the multilevel assumption of independence of individual units belonging to different higher-level units (Chaix et al. 2005). However, the effects of space are continuous (Fotheringham et al. 2002), so that voters might be affected by the macro-social conditions not only of their area of residence but also of the context beyond these administrative boundaries, such as the surrounding areas. In sum, by conceptualizing areas as higher-level units within a multilevel approach, the existing empirical literature fails to consider the geographic patterns of areas and overlooks the possibility that the association of unemployment and immigrant rates with the average populist radical right vote probability measured at different points in space might not be constant. Indeed, most of the aforementioned multilevel studies utilize a random intercept model, exploring the "global effect" of unemployment and immigrant rates on the average voting probability in a variety of settings. However, examining the average effects of unemployment and immigrant rates across all geographic areas produces a coefficient that might hide interesting aspects of how local context either enhances or impedes the average odds of populist radical right voting. Therefore, the

inconsistency of the results of previous studies might be in part due to the prevailing use of "global models" in which a single coefficient summarizes the relationship between explanatory variables and the average outcome of localities. This, in turn, is an oversimplification eliding potential spatial variation in the relationship between explanatory and outcome variables thus leading, potentially, to misleading conclusions (Cho & Gimpel 2009).

In this contribution, I propose the use of geographically weighted regression (GWR) as a relatively new and promising statistical alternative (Fotheringham et al. 2002) to the prevailing use of multilevel techniques for the analysis of spatial data in social sciences. The GWR approach extends the traditional regression framework in order to estimate local rather than global parameters, so that the GWR model is written as follow:

$$y_i = \beta_0(u_i, v_i) + \sum_k \beta_k(u_i, v_i)X_{ik} + \epsilon_i$$

Where (u_i, v_i) denotes the coordinates of i th point in space (in this contribution each i th point represents the centroid of an electoral district) and $\beta_k(u_i, v_i)$ is a realisation of the continuous function $\beta_k(u, v)$ at point i (Fotheringham et al. 2002: 52). Thus, GWR is a regression approach with spatial weight values for each regression point i such that sampled observations near to i have more influence in the parameter estimations than sampled observations farther away (measured by Euclidean distance between centroids). The weight values for data points in the regression, in other words, decay gradually with distance following the curve of a normal distribution (Brunsdon et al. 1998). The weights matrix is operationalized through spatial kernels. A spatial kernel is placed over each data point and determines the weight of each data point in the calibration of the model at location i . The specification of a spatial kernel relies on two critical decisions. One decision pertains to the "bandwidth" or size of the spatial kernel. I use a continuous decay function, so that points that are close have greater weight than points that are increasingly distant (following the normal distribution curve), and points beyond a certain range have no influence. A second decision is related to whether the spatial kernel should have a fixed size for all points or allowed to vary (Cho & Gimpel 2010). The optimal bandwidth and a fixed spatial kernel function were selected according to the Akaike Information Criterion (AIC) minimization procedure which provides a trade-off between goodness-of-fit and degrees of freedom. Thus, and in contrast to multilevel techniques, the use of the AIC minimization procedure in

the selection of the size and function of the spatial kernel helps to find the best fit to the data without the requirement of an *a priori* decision by the researcher. A comparison of AIC diagnostics was also made in order to assess whether GWR provides a better fit than a global model while adjusting for the different degrees of freedom in the two models (Graif & Sampson 2009). Since a separate regression equation is calibrated for each data point with the GWR approach, the resulting parameter estimates can be mapped in order to examine local variation of the estimates (Wen et al. 2010). All in all, GWR provides an exploratory research approach for the investigation of spatial heterogeneity in the association of explanatory and outcome variables. An already mentioned characteristic of this approach is the use of aggregated data as unit of observation. While in multilevel models the effect of locality characteristics on localities' outcome average can be assessed by controlling for individual characteristics, GWR does not allow for controlling individual characteristics when estimating contextual effects. Nevertheless, GWR provides a promising alternative to shed light on issues and spatial variation for which reliable data at the individual level are lacking, such as in the case of the present exploration.

I used the software GWR 3.0 (Fotheringham n.d.) and followed the procedure suggested by Fotheringham et al. (2002) to build the best suited GWR models. The maps depicting the descriptive statistics and the GWR results were created with the freeware Philcarto 5.07 (Waniez n.d.). I made use of shaded contours in the maps to highlight the variation in the values of the local parameter estimates (Fotheringham et al. 2002). Furthermore, this type of map is well suited to illustrate estimates and statistics that are not independent from one another across localities (Waniez 2008).

4.2 Data

The units of analysis are the 299 electoral districts ("Wahlkreise") which are administrative units composed of a similar number of German inhabitants (on average about 250,000 inhabitants per electoral district). The electoral district's centroids are used as data points for the GWR estimations. The data used in the analysis were retrieved from the official German statistical institute (Statistisches Bundesamt, Bundeswahlleiter). The NPD electoral share is calculated with the total number of valid votes per district as denominator (the correlation between

NPD voting shares calculated with the total number of valid votes per district and with the total eligible population per district as denominators is 0.996). The spatial distribution of the 2009 non-German citizen and unemployment rates are mapped respectively in Figures 2 and 3. Both rates show large variation across electoral districts.

The immigrant rate (Figure 2) is higher in the South West of Germany as well as in highly urbanized areas (e.g., Berlin, München, Stuttgart, Hamburg). From Figure 3, the industrial West of Germany, the Northern part of Germany and above all East Germany (included Berlin) suffer from the largest unemployment rates.

Differences in the proportion of unemployment and immigrants since the previous federal election (i.e., rate of 2005 minus rate of 2009 in unemployment and immigrants) will be used to assess the effect of change on NPD electoral success (maps not shown). While the values for change in immigrant rate are not very large (ranging from -1.38 to 1.16), change in unemployment rate shows large variation (ranging from -0.6 to 11.15). Moreover, with the exception of a single electoral district, change in unemployment rate has positive values across all electoral districts (i.e., unemployment has decreased everywhere since 2005). In addition, the East-West divide is evident in changes in unemployment rates: changes in unemployment have large values across all East German districts (except in localities surrounding Berlin and Leipzig) and low values in West Germany. Lastly, the hypothesis will be tested by taking control variables into account that have shown to affect populist radical right votes at the individual level or at an aggregate level: percent of population between 18 and 35 years old; percent of lowly educated (i.e. without vocational secondary degree), population density, and a proxy of GDP (i.e., tax revenue from enterprises per capita).

5. Statistical Results of Standard OLS and GWR Estimations

The statistical results are presented in a stepwise approach. First, NPD electoral results are regressed solely on unemployment and immigrant rates. Since most of previous studies did not add any contextual control variables by assessing the group threat hypothesis, this first analytical step will approximate the model design of previous studies. In a second step, the change in unemployment and immigrant

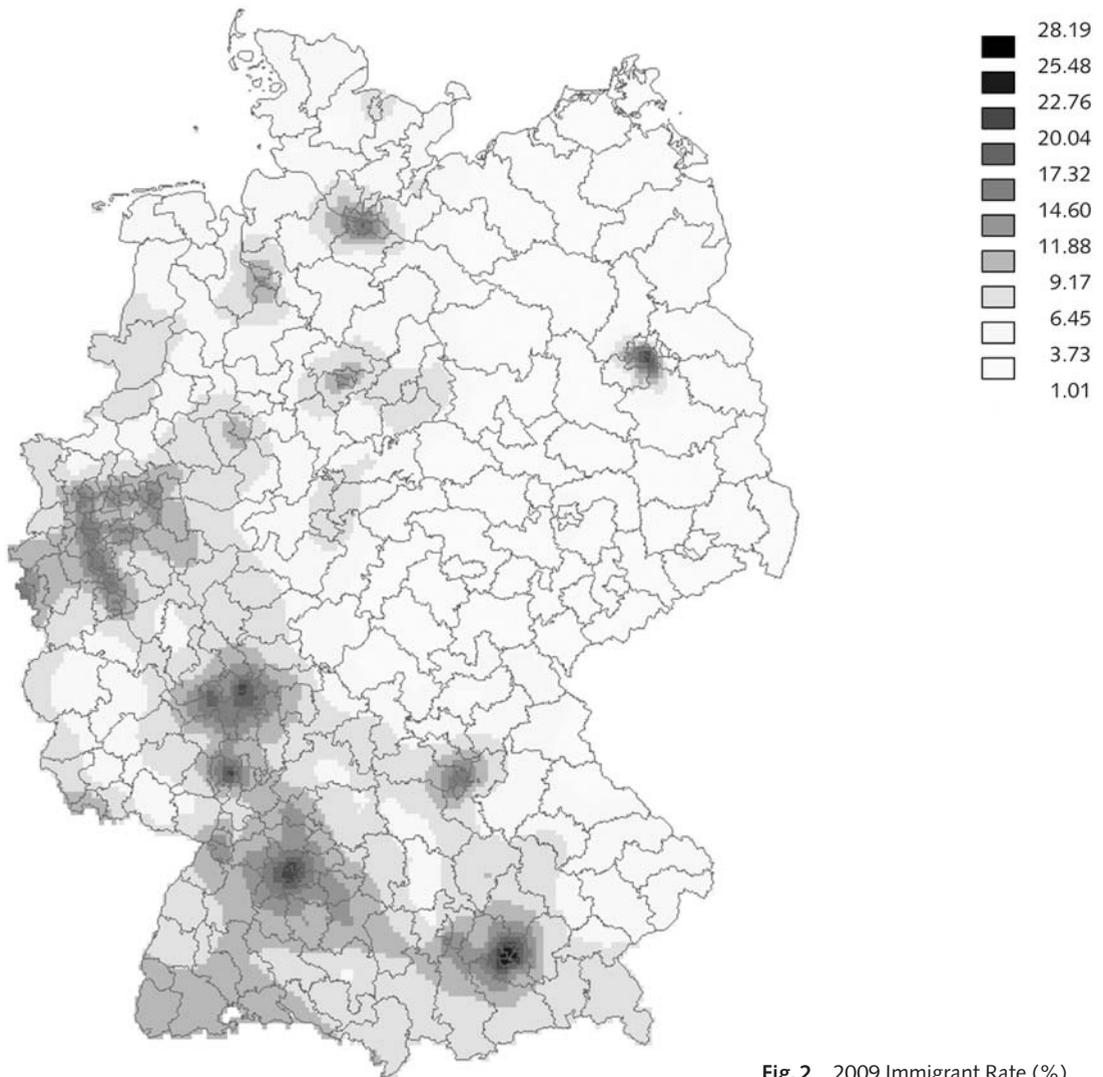


Fig. 2 2009 Immigrant Rate (%)

rates will be introduced along with the aforementioned control variables. This second step will assess the effect of changes in unemployment and immigrant rates on NPD electoral results as well as the robustness of the effect of unemployment and immigrant rates. Moreover, these two models will be estimated both with a standard OLS regression approach (in which the impact of each independent variable is fixed across the entire studied area) and with the GWR approach in order to evaluate the added value of the GWR approach over the OLS regression model.

Table 2 presents the estimations with unemployment and immigrant rates. The first standard OLS

model yields an adjusted R^2 value of 0.49. Both independent variables are significant,² but show inverse coefficients: the relation of NPD electoral success with unemployment rate is positive while its relation with immigrant rate is negative over the whole study area. In other words, the higher the unemployment rate and the lower the immigrant rate

² This paper follows Gelman & Hill (2007: 17) in that it implicitly assumes “that the errors $\eta_{i}, \dots, \eta_{n}$ can be considered as a random sample from a distribution (for example, $N(0, \sigma^2)$) that represents a hypothetical ‘superpopulation’”. This seems justified in light of the fact that the theories that I test in this work are not particular to the German elections of 2009.

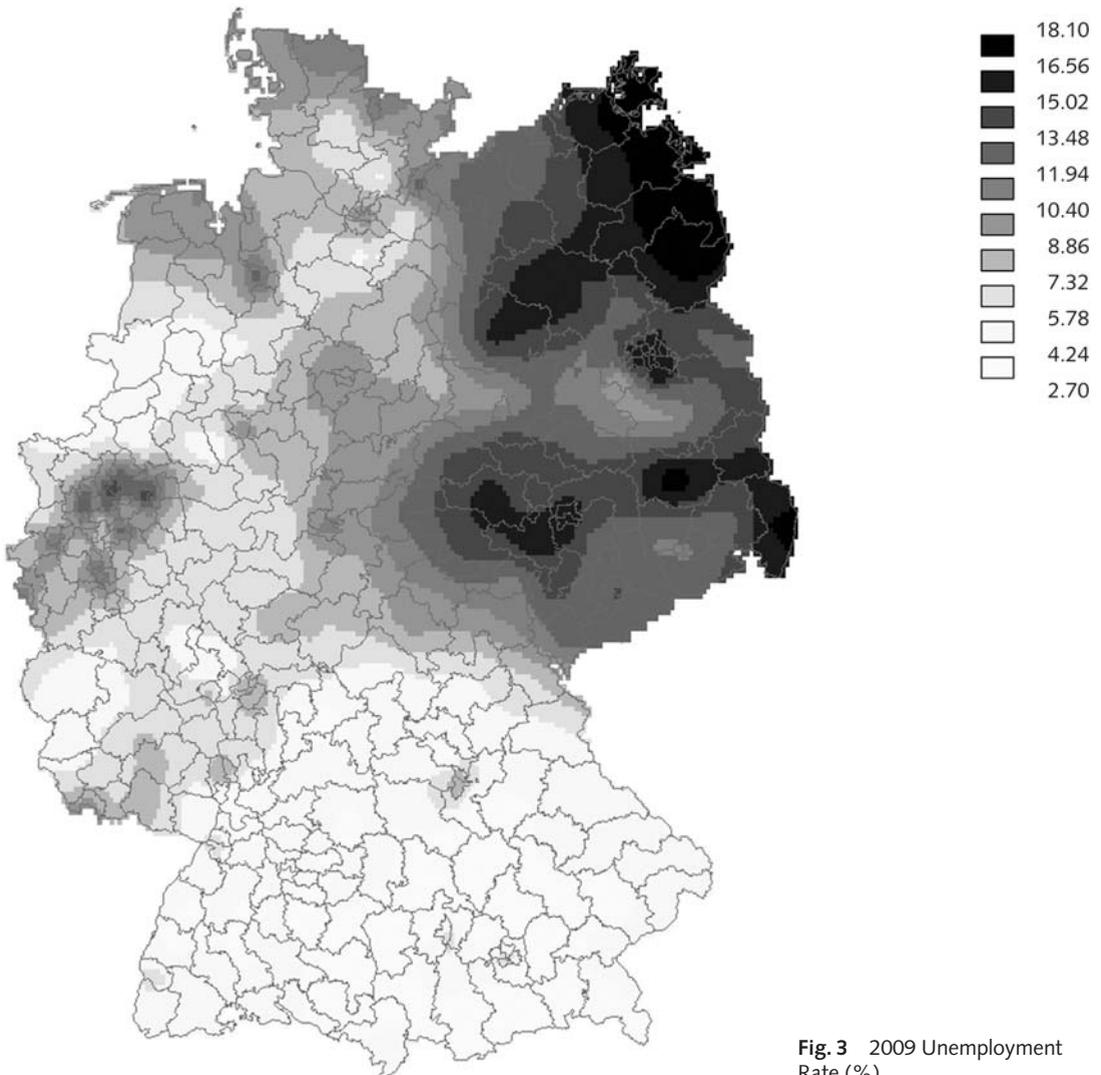


Fig. 3 2009 Unemployment Rate (%)

in an electoral district, the higher the electoral district's NPD voting share. A dummy that differentiates between East and West electoral districts is introduced in the second OLS model, since previous studies highlighted an East-West divide in populist radical right voting.

In this second OLS model, the coefficients of both percent of immigrants and percent of unemployment remain significant but decrease to a large extent compared to the previous model. In addition, adjusted R^2 increase up to 0.66 and AIC statistic is 497.58, indicating that the second OLS model provides a better fit to the data than the first one. These preliminary results for the effect of immi-

grant rate tend to support the contact hypothesis and reject the group threat hypothesis, since the percent of immigrants is negatively associated with the percent of NPD votes. In other words, the higher the immigrant rate, the lower the NPD voting share. If we now have a look at the GWR results, it can be concluded that the GWR approach provides a better fit. Indeed, the AIC statistic is much lower for the GWR model (309.86) than for the OLS global model (620.01) and the adjusted R^2 value for the GWR model increased up to 0.87. Moreover, the last column of Table 2 shows that the p-values of the Monte Carlo test of spatial variability are lower than 0.001 for the intercept and immigrant rate and lower than 0.01 for unemployment

Table 2 Global OLS Regression Results, GWR Coefficient Ranges for East and West Germany and Results of the Monte Carlo Test of Spatial Variability of the Group Threat Effect on NDP Results during the 2009 Federal Elections (Without Controlling Variables)

	OLS estimates		GWR estimates						MC p-Value
	Model 1	Model 2	Lwr Quartile		Median		Upr Quartile		
			East	West	East	West	East	West	
intercept	1.20 (0.12) ***	1.21 (0.10) ***	1.25	0.59	2.71	0.99	3.91	1.24	***
% immigrant	-0.08 (0.008)***	-0.03 (0.008)***	-0.32	-0.05	-0.16	-0.04	-0.09	-0.02	***
% unemployed	0.12 (0.01)***	0.03 (0.01)***	0.01	0.05	0.06	0.07	0.11	0.10	*
East		1.60 (0.13)***							
Adjusted R ²	0.49	0.66	0.87						
AIC	620.01	497.58	309.86						

N=299. OLS = ordinary least squares; GWR = geographically weighted regression; MC = Monte Carlo tests of spatial variability; AIC = Akaike Information Criterion
 The GWR model is based on a fixed spatial kernel function with a bandwidth of 28 electoral districts. This model was selected according to the AIC minimization procedure.
 * $p < 0.01$, *** $p < 0.001$

rate. In other words, the extent to which the coefficients of the model vary across space departs significantly from a random distribution, with at least a 99 percent confidence level. Furthermore, the summary statistics of the local GWR parameters (lower quartile, median and upper quartile estimated parameters of the 51 East and 248 West electoral district centroids) indicate that the coefficients of unemployment and immigrant rates on NPD electoral success are nonstationary across the electoral districts. Moreover, the different parameter estimates quartiles for East and West show large differences. The immigrant rate estimates in East Germany are indeed stronger and vary to a larger extent than the ones in West Germany. The variation of the unemployment rate estimates is also larger in the East than in the West.

In Table 3, change in unemployment and immigrant rates as well as population density, GDP and percent of young and low educated are introduced in the models.³ Here again, the AIC and adjusted R² statistics show that the GWR estimates provide a better fit for the data than the standard OLS regression model. The OLS coefficient for the effect of immigrant rate by taking the control variables

into account (Table 3) decreases in magnitude compared to the OLS estimate for immigrant rate of Table 2 but remains significant. The effect of immigrant rate on NPD electoral results, in other words, remains significantly negative even when the effects of change in unemployment and immigrant rates, GDP, density, and the proportion of low educated and young are controlled. Similar conclusions can be drawn with regard to the GWR estimates: The GWR immigrant rate estimates slightly decrease in magnitude in the full model of Table 3. These GWR immigrant rate estimates still vary significantly across space, with a p-value lower than 0.001 for the Monte Carlo Test of spatial variability. The OLS as well as GWR estimates for unemployment rate also slightly decrease in magnitude in Table 3 compared to previous model. In addition, while the overall effect of the unemployment rate remains largely significant, the GWR estimates do not vary significantly across space.

If we now have a look at the OLS estimates for change in immigrant and unemployment rates, the second hypothesis can be rejected: while change in immigrant rate does not significantly affect NPD voting share, change in unemployment rate has a significant and negative effect on NPD electoral results. In other words, a rapid decrease in unemployment since 2005 is associated with lower NPD electoral support. However, a further look at the GWR

³ The variance inflation factor for this full model does not point to serious multicollinearity problems (Cohen et al. 2003).

Table 3 Global OLS Regression Results, GWR Coefficient Ranges for East and West Germany and Results of the Monte Carlo Test of Spatial Variability of the Group Threat Effect on NDP Results during the 2009 Federal Elections (With Controlling Variables)

	OLS estimates		GWR estimates						MC p-Value
	Model 1	Model 2	Lwr Quartile		Median		Upr Quartile		
			East	West	East	West	East	West	
intercept	0.366 (0.38)	1.651 (0.36) ***	1.972	0.877	4.844	1.335	7.491	1.54	***
% immigrant	-0.034 (0.01) **	-0.0062 (0.01)	-0.260	-0.025	-0.149	0.010	-0.067	0.032	***
% unemployd	0.088 (0.01) ***	0.023 (0.01) **	0.026	0.039	0.050	0.053	0.085	0.088	
Δ immigrants	0.030 (0.11)	-0.114 (0.09)	-0.473	-0.133	-0.123	-0.072	0.173	-0.019	
Δ unemployed	-0.174 (0.02) ***	-0.058 (0.02) ***	-0.120	-0.130	0.041	-0.059	0.154	-0.032	
GDP	0.001 (0.06)	-0.034 (0.05)	-0.113	-0.076	0.093	-0.040	0.398	-0.005	**
Pop density	0.000 (0.000) *	0.000 (0.000)	0.000	-0.000	0.000	-0.000	0.000	0.000	
% low edu	0.007 (0.03)	0.0104 (0.023)	-0.034	0.008	0.039	0.029	0.166	0.059	
% youth	0.001 (0.02)	-0.039 (0.02) **	-0.174	-0.070	-0.109	-0.054	-0.059	-0.027	
East		1.540 (0.15) ***							
Adjusted R ²	0.561	0.671	0.86						
AIC	579.88	494.052	392.45						

N = 299. OLS = ordinary least squares; GWR = geographically weighted regression; MC = Monte Carlo tests of spatial variability; AIC = Akaike Information Criterion

The GWR model is based on a fixed spatial kernel function with a bandwidth of 68 electoral districts. This model was selected according to the AIC minimization procedure.

* $p < 0.01$, ** $p < 0.05$, *** $p < 0.001$

estimates for change in unemployment shows that this negative relationship does not hold for every electoral district. While the association of change in unemployment and NDP electoral success is constantly negative in the West German districts, a more complex trend is to be found across the East German districts: The relationship is negative in the lower quartile of the GWR East German estimates but positive in the median and upper quartile of the East German estimates; the direction of the effect of change in unemployment varies across East Ger-

man districts. Moreover, the GWR estimates for change in unemployment show a much larger variation across the East than across the West German districts.

All in all, these summary statistics provide a strong case for pursuing a geographically weighted regression approach in the analysis of the NDP electoral success in order to take spatial heterogeneity into account. Therefore, the GWR results will be now investigated in more detail by visualizing how the

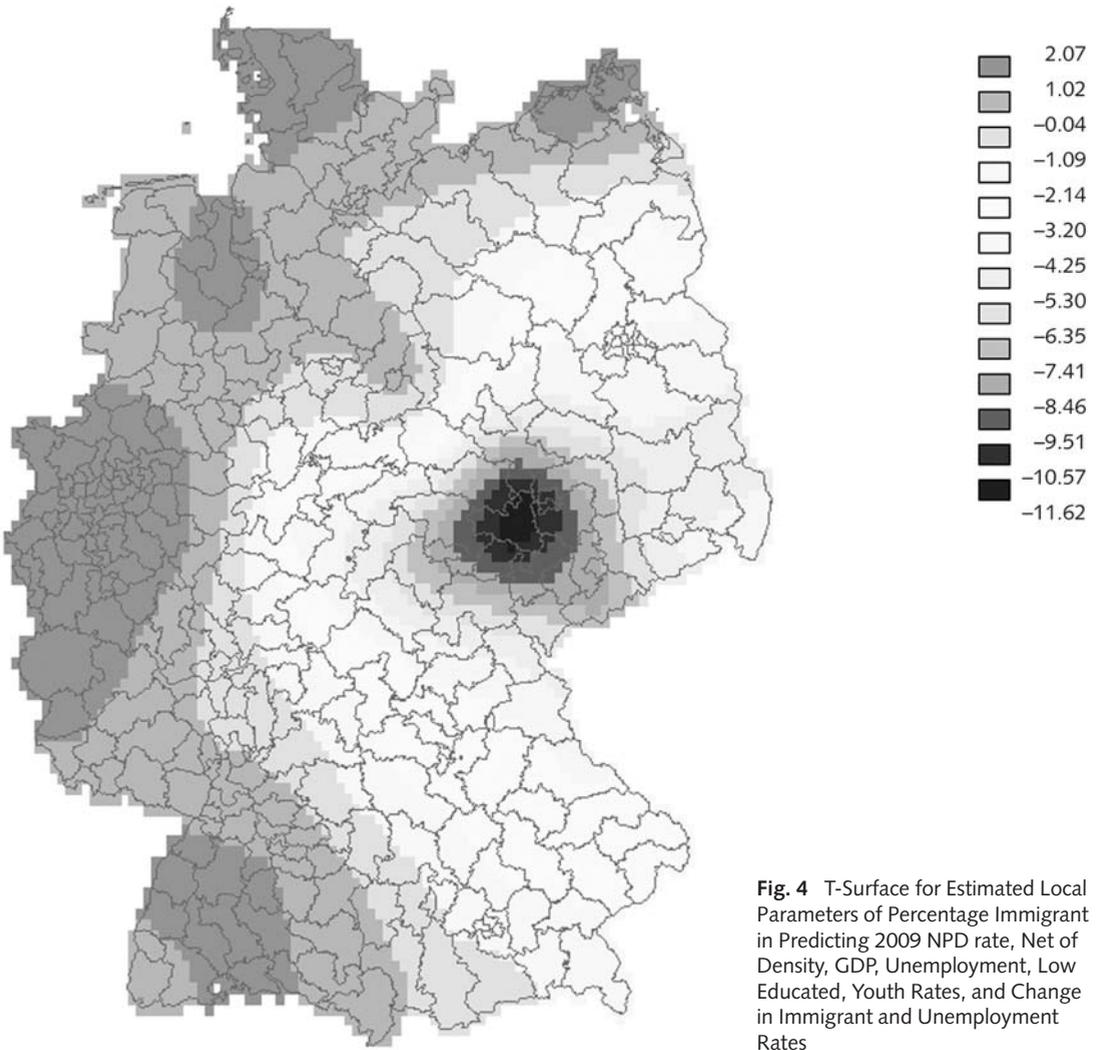


Fig. 4 T-Surface for Estimated Local Parameters of Percentage Immigrant in Predicting 2009 NPD rate, Net of Density, GDP, Unemployment, Low Educated, Youth Rates, and Change in Immigrant and Unemployment Rates

local GWR parameters change over the studied area. More precisely, I will present the mapping of GWR estimates for the variables of interest that exert a significant global effect on NPD electoral results: immigrant and unemployment rates as well as change in unemployment rate.

The spatial distribution of the t-values for the estimated local parameter of immigrant and unemployment rates in predicting NPD electoral success is presented respectively in Figure 4 and 5. These figures map the t-values of the GWR estimates of the full model of Table 3. These maps show similar spatial variation in the t-values to the maps based on the restricted model of Table 2; areas with large t-values in the full model also have high t-values in

the restricted model. Nevertheless, the t-values based on the full model are of lower magnitude than the t-values based on the restricted model. Figure 4 shows that the immigrant rate does not significantly affect NPD electoral success in all German localities. More precisely, the estimated coefficients of areas in South, West, and North Germany have a t-value within the Limits of -1.36 and 1.96 , suggesting that the immigrant rate does not affect significantly (at $p < 0.05$) all data points. Moreover, the largest t-values are to be found in East Germany. From this map, spatial patterns are clearly distinct: While NPD electoral success is significantly and negatively affected by immigrant rate (with p. values lower than -1.96) in an area composed of most East German districts and Northern

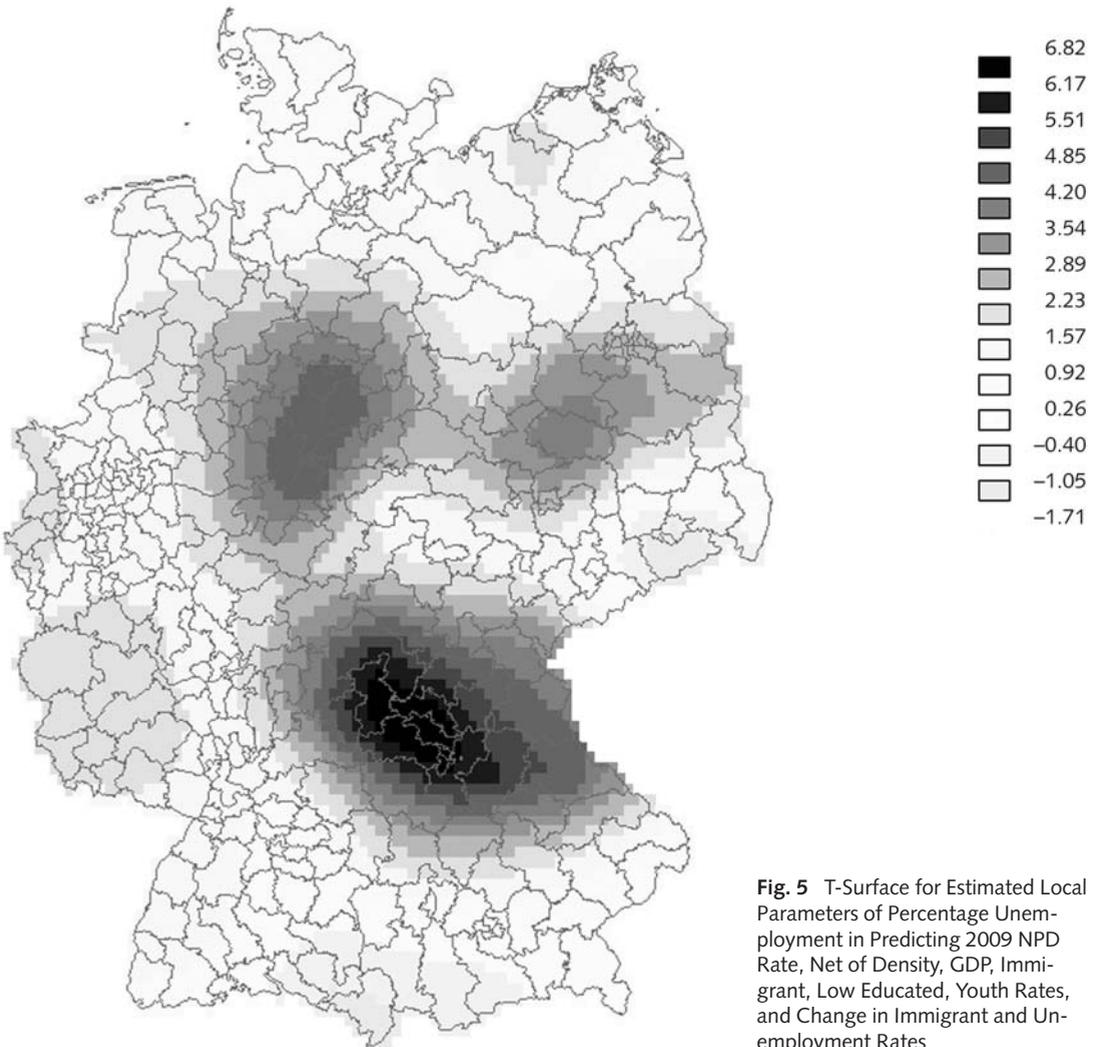


Fig. 5 T-Surface for Estimated Local Parameters of Percentage Unemployment in Predicting 2009 NPD Rate, Net of Density, GDP, Immigrant, Low Educated, Youth Rates, and Change in Immigrant and Unemployment Rates

Bavaria, this effect is non-significant in the remaining localities (with the exception of ten out of 248 West electoral districts that show a p. value higher than 1.96). Not all East German districts, however, show a p-value lower than -1.96; in the Northern part of East Germany this effect is not significant. In addition, the largest negative t-values are to be found in localities surrounding Leipzig and Halle. From these detailed results, it can be concluded that the contact hypothesis, rather than the group threat hypothesis, can best explain the relation between immigrant rate and NPD electoral success in some (but not all) German localities: the higher the immigrant rate, the lower the NPD rate. Furthermore, the spatial patterns of Figure 4 points to a non-linear relationship between immigrant rate

and NPD electoral rate. Indeed, these variations in the local parameter estimates of the effect of immigrant rate on NPD electoral success could be due to the large differences in the observed immigrant rates between East (on average 2.36 %) and West Germany (average of 9.67 %). According to these results, the association between immigrant rate and NPD electoral success is stronger and negative in localities with low immigrant rates, while it remains mainly non-significant in localities with high immigrant rates. These findings are in the same line as the ones of Rink et al. (2009), who found a curvilinear effect of the immigrant rate on Vlaams Belang votes in Flanders municipalities, so that this effect shows a steep initial increase, which flattens with growing numbers of immigrants per municipi-

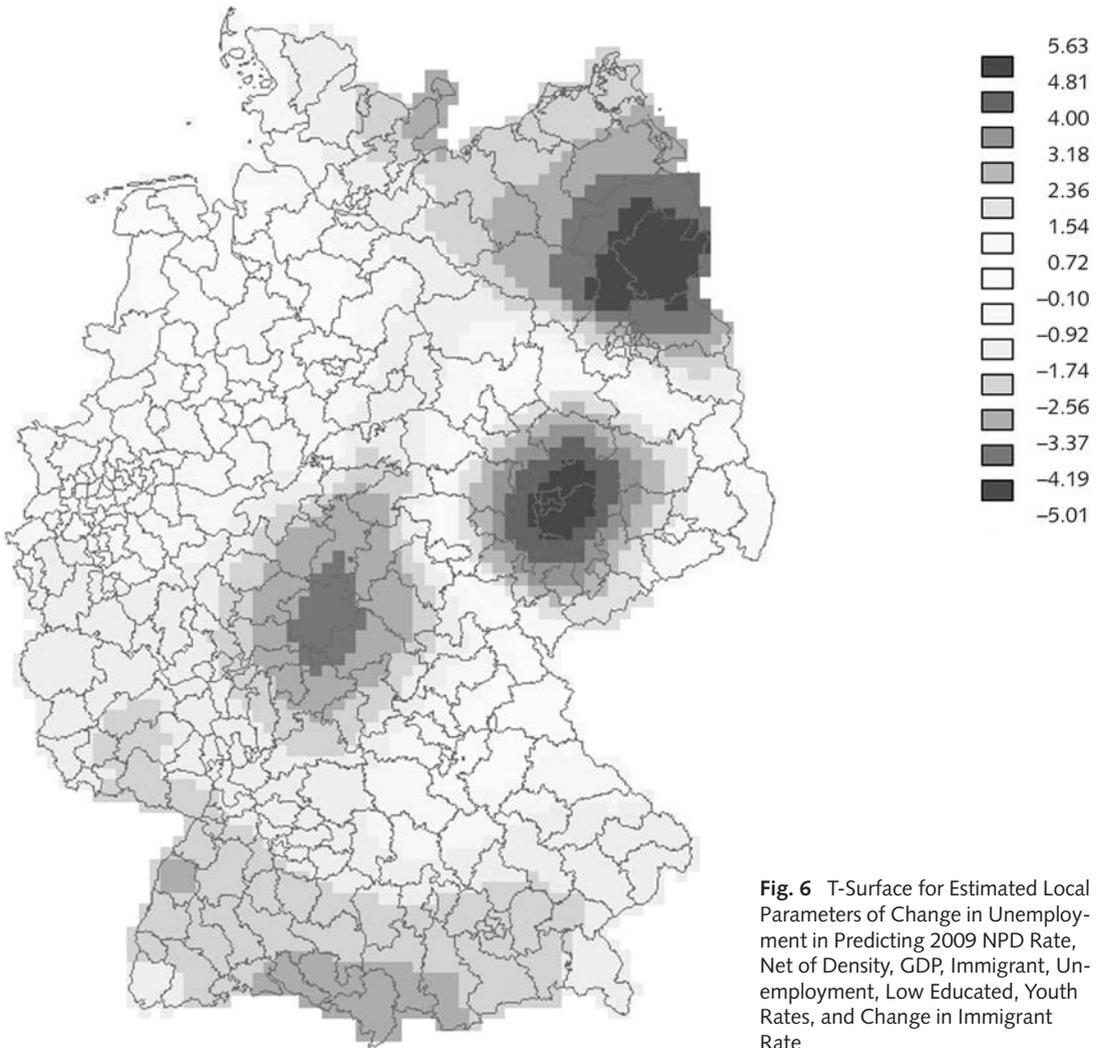


Fig. 6 T-Surface for Estimated Local Parameters of Change in Unemployment in Predicting 2009 NPD Rate, Net of Density, GDP, Immigrant, Unemployment, Low Educated, Youth Rates, and Change in Immigrant Rate

palities.⁴ Similarly, these results confirm the findings of Wagner et al. (2006), who highlighted a curvilinear negative relationship between percent of immigrants and anti-immigrant attitudes in Germany. According to their results, the effect of contact opportunities (measured with the proportion of immigrant) on anti-immigrant attitudes becomes weaker as the proportion of immigrant increases. My results suggest indeed that their finding of a curvilinear effect of the contact hypothesis also applies to populist radical right votes in Germany.

⁴ In contrary to my results the findings of Rink et al. (2009) report a negative effect of immigrant rate on Vlaams Belang electoral success.

If we now have a look at the spatial distribution of t-values for the estimated local parameters of unemployment rate in predicting the NPD electoral success in Figure 5, the estimated coefficients of most electoral districts are not significant (with a t-value lower than 1.96). Nevertheless, the unemployment rate exerts a largely significant and positive impact on NPD electoral success in localities surrounding the former border between East Germany and North Bavaria, as well as between East Germany and West of Niedersachsen. In addition, but to a lesser extent, the effect of percent of unemployment on NPD electoral results is significantly positive in localities situated in the area South West of Berlin. Thus, the areas in which unemployment rate mostly affect NPD electoral results are located

on the former border between East and West Germany (albeit not all former border localities are significantly affected). An explanation for these spatial patterns might lie in the large unemployment rate gap between East (average of 13.45 %) and West Germany (on average 7.38 %); this gap might increase the salience of unemployment issues in areas that are located between East and West Germany. This, in turns, could lead to a larger effect of unemployment rate on NPD electoral success in some of these former border localities. According to these results, it can also be concluded that the relation between unemployment rate and populist radical right vote is anything but linear. Indeed, the impact of unemployment rate on NPD electoral success is not significant in some localities in East Germany that suffer from the highest unemployment rate in Germany, while the largest impact of unemployment on NPD votes is to found, among other places, in Northern Bavaria, an area with a low unemployment rate.

The last map (Figure 6) shows the t-values for the local parameter estimates of change in unemployment on NPD electoral results. Recall that unemployment decreases in all electoral districts since 2005 (with the exception of one). In most areas of Germany, these t-values do not exceed the significant limits of 1.96 and -1.96 . Nevertheless, the effect of change in unemployment is significantly negative in some localities. In the extreme South of Germany, on the border between Hessen and Thüringen, and in Mecklenburg-Vorpommern, a decrease in unemployment since 2005 is significantly associated to less NPD voting share. A decrease in the salience of unemployment issue seems thus to lead to less NPD support. A last result from this map is worth mentioning: change in unemployment has a significantly positive effect in highly located electoral districts around Leipzig. Here, the effect surrounding Leipzig and Halle goes in the opposite direction than the global effect: the larger the decrease in unemployment, the higher the NPD voting share. Moreover, these localities around Leipzig and Halle are the ones in which the immigrant rate exerts the largest negative effect on NPD electoral success (see Figure 4).

6. Conclusion

The purpose of this article was to refine the results of previous empirical studies on the explanatory power of the group threat hypothesis for the variation of populist radical right electoral success

across different contextual settings. Furthermore, this contribution is the first one to systematically investigate the impact of contextual variables on the electoral results of the currently most successful German populist radical right party, the NPD. More specifically, this article aimed at investigating spatial heterogeneity in the association of immigrant and unemployment rates on 2009 NPD electoral success in Germany. I examined whether change in unemployment and immigrant rates significantly affected NPD 2009 federal elections results as group threat might have been salient due to changes in rather than effective levels of unemployment and immigration.

Summing up, both the standard OLS regression and GWR approaches led to the rejection of the group threat hypothesis. Indeed, the association of NPD electoral success with unemployment rate turned out to be positive while its relation with immigrant rate was negative in both the global estimates (standard OLS regression) and the local parameter estimates (GWR). These results tend to confirm the contact hypothesis: a higher immigrant percentage within an electoral district seems to lead to larger interethnic contact opportunities and thus to lower NPD votes. These findings are in line with the conclusions of Biggs & Knauss (2011) and Wagner et al. (2006): immigrant share measured at a local level affects anti-immigrant attitudes or behaviour in the direction predicted by the contact hypothesis. However, this negative effect of the immigrant rate on NPD electoral success should be nuanced. The GWR results showed that the immigrant rate effect on NPD voting rate is not significant in large areas of West Germany, while this effect is highly significant in most localities of East Germany as well as in Northern Bavaria. These results point to a non-linear relationship between immigrant rate and populist radical right votes over space. A possible explanation for this varying impact might be that the immigrant rate effect on NPD electoral results becomes weaker and non-significant as the proportion of immigrant increases, such as in most part of West Germany. On the other hand, these results might be due to the length of settlement of immigrant populations. The West German population might indeed be already used to cultural heterogeneity, since the immigration flows to West Germany goes back to the fifties and the West German “Gastarbeiter” policy. By contrast, the settlement of a larger immigrant population is a recent phenomenon in East Germany. In this line of reasoning, the contact hypothesis might have a significant effect in areas where ethnic contact oppor-

tunities are recent, and remains non-significant in localities where ethnic contact opportunities have since long become a matter of fact in the daily life of the majority population. Unfortunately, even if this historical explanation is appealing, it would be hard, if not impossible to empirically test its validity in Germany with any reliability; it would be very difficult to disentangle the effect of the duration of immigrant settlement from the effect of effective immigrant population size due to high multicollinearity.

Significant spatial variation could also be detected in the unemployment rate effect on NPD electoral success, also suggesting a non-linear relationship between unemployment rate and NPD electoral results. Thus, even if the global effect of unemployment rate is significantly positive, the NPD electoral results remain unaffected by unemployment rate in large areas of North, East, South, and West Germany. The largest significant positive association between unemployment rate and NPD electoral results was found around the crescent composed of localities situated on the former border between East and West Germany. More precisely, localities surrounding the former borders between East Germany and Northern Bavaria and between East Germany and West of Niedersachsen were the areas in which unemployment rates were most strongly associated with NPD electoral share. Since the East-West divide in this manner turns out to play a large role in the spatial variability of the local parameter estimates for unemployment rate, it would be interesting to compare these results with spatial patterns in other countries. I suggested that unemployment issues could be made much more salient in this crescent area surrounding the former border than in other German localities, because of the large unemployment rate gap between East and West Germany. Further studies with a similar design in other European countries with respect to economic divides across different regions could test the generalizability of my findings and the present interpretation. For instance, the analysis of the unemployment rate effect on Front National in France could also show interesting spatial patterns between the economically more deprived North and the highly prosperous Îles de France and Rhône Alpes regions. Moreover, the association of change in unemployment and immigrant rates with NPD electoral results was also estimated. Previous research showed that change can exert an additional effect on populist radical right votes: change might make perceived group threat more salient than effective levels of unemployment and immigrants. The OLS

statistical analysis indicates that change in immigrant rates was not significantly associated with NPD electoral results. Nevertheless, the relationship between change in unemployment and NPD electoral share is significant: the larger the decrease in unemployment since 2005, the lower the NPD electoral results. A decrease in the salience of unemployment issues therefore appears to be linked to less NPD support. Nevertheless, a generalisation of this effect for the entire studied area can not be drawn: change in unemployment was significantly and negatively associated with NPD electoral results only in South Germany, on the border between Hessen and Thüringen as well as in North of Mecklenburg-Vorpommern. The effect was significantly positive in localities surrounding Leipzig and non-significant in the remaining areas. Recent research on the group threat hypothesis has mainly focused on the effect of effective level of unemployment and immigrant rate. The few studies that exist investigating change in unemployment and immigrant rates on populist radical right success, report inconclusive results. This inconsistency might be due to the fact that the direction of the effect of change in unemployment differs across localities, as highlighted by my results. Future research could shed light on the plausibility of this interpretation.

The effects of all independent variables in the estimation showed much larger variation in their magnitude in East than in West Germany. This might be due to the large changes that East Germany had to face since the reunification. These huge transformations might have brought some instability which was indicated in my estimations by the very large variations in regression coefficients across East German localities.

Overall, these findings emphasize spatial heterogeneity and thus put into perspective the results of previous global models. Indeed, even if the global effects of unemployment and immigrant rates as well as change in unemployment were significant, large localities of the studied area remained unaffected by these independent variables. Moreover, even where the unemployment and immigrant rates were of similar magnitude, the local response turned out to vary. Thus, these results demonstrate that global parameter estimates such as the ones presented in previous multilevel regression studies do not accurately represent the values of specific local study areas and therefore might lead to misleading conclusions. Indeed, global models tend to hide interesting spatial patterns in the data and parameter estimates because they assume that parameter estimates are constant over the investigated local-

ities. This assumption turns out to be erroneous in the analysis of the group threat hypothesis with respect to NPD electoral results in Germany. In avoiding these kinds of misleading conclusions based on “one-size-fits-all models” (Graif & Sampson 2009), the more comprehensive consideration of spatial heterogeneity suggests an extension of the research agenda with respect to populist radical right votes. As already highlighted by the analysis of O’Loughlin et al. (1994) of the NSDAP electoral results of 1930, regional and local contexts of voting decisions are indeed important factors to take into account. In sum and as rejoinder to the recommendation of Mudde (2007: 216), this contribution suggests that the analysis of spatial heterogeneity within a country could enhance the state of the debate on contextual characteristics affecting populist radical right votes.

Lastly, and beyond the populist radical right party debate, the methodological approach used in this article makes a good case for itself. Indeed, with few exceptions (e.g., Calvo & Escolar 2003; Cho & Gimpel 2009; Cho & Gimpel 2010; Elcheroth & Spini 2009; Graif & Sampson 2009), this contribution is one of the first studies in social science to apply the relatively new and promising GWR approach. By considering spatial heterogeneity in data and parameter estimates, GWR can complement previous results based on multilevel regression techniques. Indeed, while the use of multilevel regression techniques can shed light on cross-level interaction effects and confirm contextual effects by controlling individual characteristics, GWR is able to identify spatial patterns the consideration of which could significantly improve the empirical basis of sociological analysis. Thus, multilevel regression techniques and GWR could be used complementarily to detect patterns, confirm findings, test, refine, and build theories. As Cho & Gimpel (2010: 74) summarize it, “since spatial nonstationarity may well be a rule rather than an exception in the study of many political phenomena, social scientific analyses should be mindful that relationships may vary by location”. Thus, and in the light of my results, the exploration of spatial heterogeneity in empirical social science is a promising avenue: the detection of spatial variability in parameter estimates may effectively motivate the formulation of new research agenda dedicated to exploring the mechanisms underlying spatial nonstationarity. Indeed, spatial patterns observed in such an explorative approach can lead to the development and refinement of hypotheses which in turn can be tested with other statistical methods and other types of

data. Empirical debates in sociology, and in the social science more generally, may strongly benefit from the insights provided by this geographical perspective.

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Autorenvorstellung

Celine Teney, geb. 1981 in Belgien. Studium der Soziologie und Ethnologie in Freiburg und der quantitativen Methoden der Sozialwissenschaften in Leuven. Promotion in Brüssel. Von 2006–2010 wissenschaftliche Mitarbeiterin an der Université Libre de Bruxelles; seit 2010 wissenschaftliche Mitarbeiterin am WZB.

Forschungsschwerpunkte: Migrationssoziologie, Kosmopolitismus und Kommunitarismus, quantitative Methoden.

Wichtigste Publikationen: High Political Participation, High Social Capital? A Relational Analysis of Youth Social Capital and Political Participation (mit L. Hanquinet) in: *Social Science Research* (im Erscheinen); Endorsement of Assimilationism among Ethnic Minority and Majority Youth in a Multination-Multiethnic Context: The Case of Brussels, in: *European Sociological Review* 27, 2011; Attitudes toward Homosexuals among Youth in Multiethnic Brussels (mit S.V. Subramanian), in: *Cross-Cultural Research* 44, 2010; Voting patterns among ethnic minorities in Brussels (Belgium) during the 2006 local elections (mit D. Jacobs, A. Rea & P. Delwit) in: *Acta Politica* 45, 2010.