Halo effect of diversification and polarization, and the role of relative deprivation based on the 2018 Swedish parliamentary elections results

Dávid Sümeghy
University of Pécs
Department of Political Geography
Development and Regional Studies
Pécs, Hungary
E-mail: suemp96@gmail.com

The starting point of electoral geographical analyses is that the geographical context influences voter behavior and party preferences. The role of context is particularly salient for radical right parties. The halo effect and neighborhoods' heterogeneity can also strengthen the radical right in a homogeneous central area. This research further expands the role of diversity as a contextual effect based on the 2018 Swedish parliamentary elections results. This study at the electoral district level has demonstrated that the rate of diversification plays an important role and generates a vote-boosting effect in the neighborhood of rapidly diversifying electoral districts. The halo effect theory was confirmed by the ethnic polarization index; a homogeneous central electoral district with polarized neighboring districts can also validate the conflict theory and generate extra votes for the radical right party. The study also looked at the relative economic deprivation of neighboring electoral districts, but this did not lead to clear results owing to the strong correlation between economic status and diversity. A worse economic situation relative to neighboring areas was only found to have a significant Sweden Democrat vote-boosting effect in areas with diverse neighboring areas.

Introduction

With immigration and increasing cultural diversity, a political party family has emerged in Europe, the Radical Right Parties[1]. The radical right parties reject the pluralist values of the current liberal, representative democracy and instead seek ethnocracy, a society that favors the 'indigenous' (Betz 2005). However, it is important to note that they are not opposed to democracy itself (this is what distinguishes the radical right from right-wing extremism) and proclaim themselves as champions of true democracy (Rydgren 2018).

In today's Sweden, the radical right is already proving to be a severe factor through the Sweden Democrats[2], putting an end to the former unique state of Sweden[3] (Rydgren–van der Meiden 2019). The party first entered the Swedish parliament in 2010 (5.7%) and has been growing steadily since then, finishing third in the 2018 elections (17.53%).[4]

Over the past decades, there has been considerable academic debate on whether geography and context shape voter behavior and party preferences. Political scientists (e.g. King 1996) argue that individual compositional factors are more influential. They can be used to estimate who an individual will vote for, whereas geography is irrelevant. In contrast, electoral geographical analyses show that geographical environment shapes voter behavior and party preference (Agnew 1988, 1996). Researchers suggest examining contextual factors in addition to individual, compositional effects (Cox 1969, Johnston–Pattie 2006). Voters' decisions are influenced by the local environment and the area where their daily lives are spent. Furthermore, these factors may amplify or reduce general voting behavior based on individual characteristics (Johnston–Pattie 2006). The political thoughts and actions of individuals are geo-sociologically organized (Agnew 1996). These processes may lead locally to election results that differ from the national pattern. Such contextual effects include local media, parties' voter mobilization and campaigning strategies, differences in political culture, tactical voting, economic disadvantage relative to surrounding municipalities, or the influence of local politicians (Books–Prysby 1991, Johnston–Pattie 2006). In Agnew's perception, context can be interpreted as a geographical space (not just the local) that influences the individual's choice of behavior. Johnston–Pattie (2006) narrow this down to emphasize the role of the local milieu, where individuals live their daily lives. The importance of this influence

[1] Radical Right Parties (RRPs), a term originating from Bell (1955). Several similar terms have been used for this party family, e.g. extreme right (Carter 2005), populist radical right (Mudde 2007).

[2] Backlund's (2013) research based on several criteria clearly places the Sweden Democrats on the right edge of the overall left-right dimension. A clear majority of research refers to the Sweden Democrats as a radical right party (e.g. Rydgren–Ruth 2013, Rydgren–Tyrberg 2020, Widfeldt 2018).

[3] While the 1990s saw the rise of radical right parties in Western Europe and Northern Europe, these movements have long failed to become a successful political force in Sweden.

[4] Elections are held in Sweden every four years, with an electoral threshold of 4%.

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is also reflected in Agnew's (1996) study, amplified by attachment to place and local identity. Consequently, the spatial level most often analyzed today is the small scale, especially neighborhoods and electoral districts (Forest 2018). Weaver (2014) also argues for examining the neighborhood level and neighborhood effect, building on previous research, and advocates for collaboration with urban geography.

The analysis of contextual effects is also relevant in recent studies explaining the electoral performance of radical right parties (Green et al. 2016, Evans–Ivaldi 2020, Martig–Bernauer 2018, Miller–Grubesic 2021, Rydgren–Ruth 2013, Rydgren–Tyrberg 2020, Vasilopoulos et al. 2021). The most prominent element of this is the halo effect, which explains the gains of the radical right parties by the diversity of the surrounding areas. According to the halo effect, such parties are strong not in ethnically diverse electoral districts but their neighboring regions (e.g. Bon–Cheylan 1988, Bowyer 2008, Rydgren–Ruth 2013, Vasilopoulos et al. 2021). In such neighboring electoral districts, the threat posed by immigrants emerges; however, frequent and positive contact with immigrants cannot develop to reduce the prejudices (Miller–Grubesic 2021). In this study, I examine the performance of the Sweden Democrats on the level of the electoral districts based on the 2018 election and try to display the additional neighborhood effect of diversity (diversity growth, polarization) and the contextual role of relative deprivation.

Theoretical approach

The causes of support for radical right parties are classically distinguished based on von Beyme's (1988) supply-side and demand-side categorization. Arzheimer (2018) argues that it is challenging to categorize some variables into one of these two categories, as they affect both. Therefore, the author prefers to classify micro-, meso-, and macro-level factors that may influence voting for a radical right party. At the micro-level, anti-immigrant sentiments and unemployment associated with immigration appear (among several other factors), posing multiple threats to the individual (Arzheimer 2018). In recent decades, immigration and the consequent integration challenge have become one of the most critical issues in Western Europe. Nowadays, the main reason for the support of radical right parties is the anti-immigration sentiment[5] (e.g. Cutts et al. 2011, van der Brug et al. 2005). The role of group conflict and deprivation is more significant, and related theories can be divided into several subcategories (Arzheimer 2018). Both ‚realistic group conflict' (Jackson 1993) and ‚ethnic competition' (Bélanger–Pinard 1991) look for the cause of inter-ethnic tensions in the sometimes unfair struggle for resources.

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[5] A party is not necessarily radically right-leaning just because it is against immigration. In Western Europe, even in countries without a successful radical right party, traditional parties are increasingly critical of immigration (Alonso–Fonseca 2012), while mainstream parties in Eastern Europe have become radicalized and are anti-immigration (Minkenberg 2013).

There is also a 'status politics' approach to the collective threat of out-groups (Hofstadter 2002). Still, the struggle is for the indigenous group's social status and cultural hegemony instead of material goods.

In contrast, 'social identity theory' and the resulting 'self-categorization theory' also demonstrate that individuals are willing to favor their group without material and social interests (Tajfel–Turner 1986). Several studies have shown a strong correlation between immigration opposition, voters' anti-immigration sentiment, and the parties' support with nationalist and patriotic values promoting anti-immigration (Semyonov et al. 2004, Wilkes et al. 2008). To summarize, according to conflict theory, in a geographical space, there is strong competition for limited resources (employment, housing) where ethnic groups see each other as rivals (e.g. Blalock 1967). On the contrary, contact theory suggests that continuous positive contact with another ethnic group reduces mistrust and prejudices (Allport 1954, Gaertner et al. 1993, Pettigrew 1998). According to the contact hypothesis, a meta-analysis by Pettigrew–Tropp (2006) demonstrated the bias-reducing effect of positive inter-ethnic contact. Furthermore, the formation of positive contacts reduces the chances of voting for radical right parties (Green et al. 2016, Vasilopoulos et al. 2021).

Anti-immigration sentiment is thus an essential point in the agenda of radical right parties; however, few parties build on this one issue alone (Mudde 1999). The rise of radical right parties in the 1980s and 1990s can also be attributed to social and economic changes. According to the modernization losers' theory, the importance of which is also highlighted by Minkenberg (2003), voters of the radical right parties, who have failed to keep pace with accelerating economic development, have become unemployed and now want to return to the traditional values and restore the status quo (Betz 1993). People who lost their jobs and their homes resented immigrants, blaming them for the situation. Under precarious conditions, indigenous peoples began to fear for their livelihoods (tight labor and real estate market, fewer social benefits, reverse discrimination), and they confronted immigrants. Another critical theory is relative deprivation theory, that is, in the wake of deteriorating market conditions or the economic recession that can already be outlined, the individual cannot realize their planned dreams (Bell 2002, Lipset 1960, Runciman–Runciman 1966). They attribute the cause of their failure to government actions (Rydgren–Ruth 2011). Globalization has also brought about a significant change, resulting in a new class of workers, according to Kitschelt–McGann (1997). They combine liberal market preferences with an authoritarian outlook on society and are supporters of the radical right. Most research agrees that the main supporters of radical right parties are young, unskilled, blue-collar working men with anti-immigrant sentiments (Givens 2004, Ivarsflaten 2008, Lubbers et al. 2002).

At the meso level, the role of party resources and the strength of the local organizational structure, the party ideology, the party system of the country, and

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social capital are all relevant (Arzheimer 2018). At the macro level, institutional factors, the electoral system, the ethnic diversity of an area, unemployment and crime rates, and the role of the media are also influential. The two macro-level variables most analyzed in the context of support for radical right parties are immigration and unemployment (Arzheimer 2018), closely related to conflict theory. Regarding the issue of unemployment, previous studies have yielded mixed results. Jackman–Volpert (1996) or Golder (2003) found a positive effect between aggregate unemployment and radical right party support; some research found no significant relationship (Lubbers et al. 2002), whereas others noted an adverse impact (Arzheimer–Carter 2006, Knigge 1998). Based on previous studies (e.g. Knigge 1998, Swank–Betz 2003), Arzheimer (2018) concluded that the effect of immigration is already more evident, with an increase in votes, although there are also cases where no significant result can be detected, such as for example in Spain (Mendez–Cutillas 2014). A study in Sweden has shown that as more refugees arrive in the country, right-wing voters have become increasingly dismissive, whereas left-wingers have not changed (Andersson et al. 2018). A study by Rydgren–Ruth (2011) found a positive relationship between the proportion of immigrants living in the respective municipality and the number of votes for Sweden Democrats in the 2006 and 2010 parliamentary elections. Dividing immigrants into groups by country of origin, it was found that the party is best represented in municipalities with a high proportion of immigrants from the European Union/European Free Trade Association (excluding Nordic) countries. Whereas non-European voters influenced the support for the party in 2006 negatively, a positive change could be detected by 2010, which was caused by an increasing number of immigrants arriving outside of Europe.

Contextual effects of diversity and relative deprivation

The most apparent contextual effect regarding voting for radical right parties is the halo effect. The halo effect is based on conflict theory and can be interpreted as ‚non-perceived xenophobia' (Kestilä–Söderlund 2007: p. 789). According to the theory, radical right parties receive more votes from ethnically homogeneous districts located in neighborhoods with large immigrant populations. Still, they do not perform well in ethnically mixed areas (e.g. Bon–Cheylan 1988, Bowyer 2008, Rydgren–Ruth 2013). According to Perrineau (1998), the vote-boosting influence of the halo effect is also felt away from areas of high immigrant concentration, not only in the immediate neighborhood. However, this effect is lost over time and could be described by a curve shape that peaks at the edge of the concentration and then slowly decays as the concentration moves away from the center (Evans–Ivaldi 2020). The literature suggests that the contextual role of the halo effect is more likely to be detected at a more satisfactory resolution, with a higher probability of occurrence at lower levels (David et al. 2018, Rydgren–Tyrberg 2020).

In such cases, individuals are so close to immigrants that they pose a threat to the natives; they are aware of their presence but are not so close that frequent interaction between them occurs, which would facilitate the contact hypothesis and the formation of a positive image (Miller–Grubesic 2021). Positive relations between such ethnic groups reduce the chances of voting for radical right parties (Perrineau 1998). At the local level, the presence of a minority group amplifies the potential for inter-ethnic relations, whereas, at higher levels of spatial structure, the company of an external ethnic group creates a sense of threat (Schlueter–Scheepers 2010). Evans–Ivaldi's (2020) research in France, in addition to demonstrating the existence of a halo effect in the case of the Front National, also examined individual attitudes and revealed that the halo effect led respondents to perceive immigrants as a more significant economic and cultural threat. The results of previous studies are unclear as to whether individual socioeconomic variables moderate or amplify (Martig–Bernauer 2018) the halo effect or have no significant influence on it (Evans–Ivaldi 2020). Rydgren–Ruth (2013), analyzing Swedish electoral districts, found a positive role of the halo effect in increasing the Sweden Democrats' vote share, particularly in electoral districts that were the most homogeneous Swedes (<10% immigrant). Following this research's footsteps, Rydgren–Tyrberg (2020) replicated the study with a multilevel model (Swedish municipalities and electoral districts), including the 2014 Sweden Democrats' election results as a dependent variable. The difference in diversity, which plays an important role in the halo effect, was calculated by subtracting the proportion of immigrants living in the most ethnically diverse neighboring electoral district from the ratio of immigrants living in the central electoral district. Although their study again showed a vote-increasing effect in homogeneous Swedish neighborhoods, it was insignificant (Rydgren–Tyrberg 2020).

In this study, the researcher analyzes additional contextual effects of diversity to expand the halo effect theory further. One such potential impact is the rate of diversification of surrounding areas. Conflicts based on cultural differences are intensified by the rapid pace of perceived diversification (Huddie et al. 2005). Olzak (1992) argues that a sense of ethnic threat according to conflict theory is more likely to be triggered by a recent, albeit limited, increase in the size of ethnic minorities than by the stable presence of a large minority group. Similarly, Kaufmann (2014) has shown that rapid ethnic change, particularly in places where the previous experience of diversity is limited, is generally associated with radicalizing local opinion and a rise in radical right voting. The role of rapid diversification is also reflected in the study by Vertovec (2019) in Rotterdam and Pettigrew (2017) in the U.S. Németh (2016) argues that geographical studies of diversity should focus on the dynamics of multiethnicity and the process of change. As a nuance of the halo effect of diversity, the author also considers the difference in ethnic polarization compared to neighbors. Sprague-Jones (2011) has shown that people in more

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ethnically polarized places are more likely to vote for radical right parties. Based on the theory of the halo effect, greater ethnic polarization in the surrounding areas may make it easier to validate conflict theory and the ethnic threat and increase anti-immigration sentiments.

The neighborhood role of economic factors (unemployment, income) has been much less studied, although the theory of relative deprivation (geographically speaking) suggests that it may impact voting. The financial situation in different areas may vary considerably. One region (or even a neighborhood) may be in an economic crisis, whereas another is enjoying a significant boom (Johnston–Pattie 2006). If two areas of different characters are located close to each other, the area's population in a poor economic situation may be subject to relative deprivation. In terms of relative deprivation, it is the people to whom an individual compares themself, who they consider their reference group, that is decisive. Literature suggests that members of the reference group are typically selected based on socioeconomic similarity or geographical proximity (Singer 1981). Studies use proximity to refer to people living in the same municipality or possibly neighbors (e.g. Jencks–Mayer 1990). For example, the Sweden Democrats gained more votes in electoral districts where wealth inequality increased between 1994 and 2014, with individuals more likely to perceive relative deprivation (Palm–Rydgren 2018). However, looking at municipalities, the opposite appears to be true; where inequalities increased, the Sweden Democrats gained fewer votes. The Swedish researchers further extended the reference group spatially to the national level. In electoral districts where incomes increased less than the national average, support for the Sweden Democrats was higher. This research was innovative in that it compared aggregate data for a given electoral district with aggregate indicators for other areas rather than individual economic data. Swedish electoral districts are socio-economically more homogeneous than municipalities (Palm–Rydgren 2018), with less inequality within the area. In a study by Dorn et al. (2020), individual income relative to the national average income was an essential factor behind increasing support for the German Alternative für Deutschland (AfD).

Inoue et al. (2019) used alternative definitions of reference groups to investigate how the relationship between relative deprivation and stress evolves at different geographical scales (within a community, province, and country). Their results showed that the detrimental effect of relative deprivation was more pronounced relative to a larger territorial unit. A similar result was found in Sakketa–Gerber's (2018) study in Ethiopia, where young people were more likely to perceive themselves as economically deprived relative to a larger spatial unit than if they had been compared to their village. The importance of the ideal geographic reference group is also emphasized by San Sebastián et al. (2018). They argue that relative deprivation theory is likely to be sensitive to the choice of geographic boundaries. For example, more potent contextual income effects may be observed at larger

(national) or smaller (neighborhood) scales. In this study, I seek to determine whether relative deprivation compared to neighboring electoral districts in terms of income or employment increases support for the radical right (when controlling for the diversity variable).

Methodology

Besides the scarcity of data derived from a standardized collection, one of the greatest threats to spatial political geography studies is exposure to data sources that are inappropriate for our purposes (O'Loughlin 2003). For this reason, the study had to pay attention to both the suitability of the chosen spatial areas to represent the validity of the theoretical foundations and the availability of data to justify the theories. The spatial analyses also required shapefiles containing polygons to which socioeconomic and electoral data could be assigned.

Most potential effects, such as ethnic diversity, unemployment, income, and neighborhood contextual influences (especially the halo effect), prevail at the neighborhood level. In Sweden, although the smallest statistical unit according to the Nomenclature of territorial units for statistics (NUTS) classification is the municipality, statistical data are available for the settlements and even urban areas, neighborhoods that form the municipality. These data are contained in the demografiska statistikomraden (DeSO), available from Statistics Sweden. Their delimitation is adapted to the boundaries of each municipality and does not cross them. It divides the country into 5984 units, which gives a sufficiently good breakdown to analyze the desired effects. In rural areas with sparse settlement networks, the DeSO subdivision may be oversimplified, including several villages combined, masking the differences in characteristics (Selin 2019). The author downloaded the DeSO shapefile for spatial analysis and mapping from the Statistics Sweden website. For the study of the election results, the researcher chose the electoral districts as the spatial level, following the general recommendation of Arzheimer (2018). In Sweden, this level was also analyzed by Rydgren–Ruth (2013), Rydgren–Tyrberg (2020), and Valdez (2014). In Sweden, there are 6008 electoral districts with an average electorate of between 1000 and 2000 voters. The author downloaded the electoral district shapefiles from the Swedish Election Authority website and attached an excel spreadsheet with the Sweden Democrats' election results in each district, also collected from the Election Authority.

The different numbers of elements also shows that although the bases of the DeSO classification are the electoral districts and the areas of the municipalities, they do not entirely overlap. For this reason, the researcher could only link these areas manually, using ArcGIS software, by going through the DeSOs one by one and assigning their code to the electoral district with the most similar geographic location. Although the matching was facilitated by using ArcGIS's feature to point

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function to create centroids from the polygons of DeSOs and electoral districts, which were then joined using spatial join (based on the spatial proximity of the points in the two layers), a manual review was still required. It was also helpful to compare the names of the electoral districts and the satellite base map loaded under the layers. When linking the databases, the author encountered several data types that required different ways of connecting[6].

As in previous Swedish studies, I illustrate diversity by the proportion of non-European immigrants. Based on the studies of Rydgren–Ruth (2011), which already detected a link between the share of non-European immigrants and the growing support for the radical right in the 2010 elections, and predicted an increase in the role of cultural differences, I also analyze the change in the share of non-Europeans per sign of diversification between 2015 and 2018. As a measure of diversity, I have also included the polarization index, developed for societies where the risk of inter-ethnic conflict is real (Montalvo–Reynal-Querol 2005). The effect of polarization is based on conflict theory (Bélanger–Pinard 1991, Jackson 1993) and status politics (Hofstadter 2002). The natives feel their economic and cultural superiority under threat. The polarization index[7] can be calculated using the following formula.

$$PI = 4 \sum_{j=1}^{K} s_j^2 (1 - s_j)$$

where s_j: Proportion of the j ethnic group in relation to the total population.

Polarization can be influential in places where a dominant majority is accompanied by a dominant minority (Montalvo–Reynal-Querol 2005, Németh 2019). The risk of this is real because high immigration has created areas of ethnic concentration in Swedish cities, and also areas of concentrated poverty (Malmberg–Clark 2020).

I also examined the impact of static (2018 polarization index and non-European share) and dynamic (change in non-European share over three years) halo effects of diversity. The literature typically measures the halo effect by first-rank queen continuity. Miller–Grubesic (2021) defined the halo effect in three ways:

- The difference between the neighbor with the highest immigrant share and the central home area.

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[6] a) If the DeSO and the electoral district area were identical, then the interconnection was smooth. b) In some cases, the electoral district covered most of the DeSO but overlapped a little. In such cases, I have adopted the solution used by Halfvordsson–Ivarson (2021) and ignored the overhang, treating it as if the two areas were completely identical. This occurred primarily in metropolitan DeSOs, where the electoral district was overhanging, but it contained an almost entirely uninhabited area. c), An electoral district is formed by two or more DeSOs. In this rare case, the attributes of the DeSOs were weighted by the population of DeSO units and averaged. d) There are two or more electoral districts in a DeSO. In this case, I was forced to append the value of the DeSO to all the electoral districts in it, and so I could not represent the possible different characteristics of the electoral districts. Fortunately, there were only a few such DeSOs.

[7] Calculated with the share of Swedish, European, and non-European origin groups.

- The difference between the neighbor with the highest immigrant share and the immigrant share of the central home area.
- The difference between the immigrant share of the central home area and the average of the immigrant shares of the neighbors.

Since there is no significant difference in how we define the halo effect based on their results, I calculated it as the difference between the value of the central area and the average of all neighbors (so, if its value is negative, neighbors are more diverse). Using the GeoDa software, I calculated a spatial lag of diversity, which I then subtracted from the diversity value of the central area. I also used the same procedure to determine relative deprivation by comparing an electoral district's employment and median income with its neighbors. Based on previous Swedish electoral studies (Rydgren–Ruth 2011, 2013, Rydgren–Tyrberg 2020) and general theories about radical right voters, I have also considered other electoral district-level variables that may influence the results of the Sweden Democrats. In addition to diversity, I have included variables on education, income (median income), and employment[8] (Table 1).

Table 1

Descriptive statistics for the variables included in the analysis of votes cast for Sweden Democrats at the electoral district level, 2018

Variables	Mean	Standard deviation	Minimum	Maximum
Electoral result of Sweden Democrats, %	17.71	7.04	1.16 (Herrgården; Malmö)	49.56 (Örkelljunga 1; Örkelljunga)
Non-European immigrant, %	10.13	9.85	0.237 (Böle; Timrå)	61.21 (Hovsjö norra; Södertälje)
Δ Non-European immigrant, %	1.79	2.08	−6.6 (Brinkestorp/ Restad; Vänersborg)	26.68 (Sofia 10 Vinter-tullen; Stockholm)
Polarization index	0.49	0.21	0.02 (Hörnefors Östra; Umeå)	0.96 (Marielund; Norrköping)
Low education, %	11.33	6.32	0 (N Fäladen, Kämnär-srätten SÖ; Lund)	45.78 (Råbergstorp-Lagersberg; Eskilstuna)
Non-employed, %	19.91	9.13	3.86 (42 Järvastaden N; Solna)	81.77 (Ryd 1; Linköping)
Median income, thousand SEK	250.83	47.88	116.9 (Engelbrekt 11 Lappkärrsberget; Stockholm)	488.1 (Bromma 18 Södra Ängby; Stockholm)

Source of data: [1], [2]. Polarization index values are the results of the author's calculation. n=6004. The name of the municipality is shown in parentheses after the name of the electoral district.

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[8] Owing to unemployment rate data not being available, it was calculated as the share of non-employed. Persons who had no income from employment or whose income from employment did not exceed the basic amount in the income year are considered not employed.

https://www.scb.se/vara-tjanster/regionala-statistikprodukter/fardiga-tabellpaket/definitioner-for-fardiga-tabellpaket/

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Results

Among the socioeconomic variables, the role of education and income is as expected, with the proportion of low-educated and lower median income increasing support for the Sweden Democrats (Table 2). However, the share of the non-employed shows reduced support for the radical right party. One reason for this is that this category includes those not employed because they are studying in the university. The propensity to vote for the Sweden Democrats is markedly low (Oscarsson–Holmberg 2016). The other factor is the strong correlation between the proportion of non-employed and the share of non-Europeans (Spearman's $\varrho=0.717$; $p=0.000$) (VIF values indicating multicollinearity are below the cut-off).

The negative impact of diversity on party performance can be observed in the proportion of non-European immigrants. The negative effect may seem contradictory at first (Rydgren–Ruth [2013] previously found a similar result). Still, this phenomenon may be caused by the fact that among voters born outside Europe, Sweden Democrats supporters are strongly under-represented (3% in the 2014 election [Näsman 2014]). Furthermore, the role of contact theory may also be reflected in the fact that Swedes have developed positive relationships with immigrants, which has led to a reduction in prejudice, resulting in an overall decrease in support for the radical right in diverse areas (Rydgren–Tyrberg 2020). The change in the share of non-European immigrants has a vote-enhancing effect, with support for the Sweden Democrats stronger in the rapidly diversifying electoral districts. This result would seem to support the role of the dynamic variable, the importance of which is also confirmed in Rydgren–Tyrberg's (2020) studies. The rapid ethnocultural diversification will require new positive relationships for the contact hypothesis to be validated and anti-immigrant sentiment to decrease.

The inclusion of the polarization index together with the proportion of non-European immigrants nuances the picture of diversity. Comparing the estimate for the Sweden Democrats with the actual result, Model 4 is a better estimator than Model 3 in the northern electoral districts (mainly in the municipality of Haparanda), where the high polarization index is owing to the relatively similar size of the Swedish and European groups. In the Nikkala and Grankullen electoral districts of Haparanda, the estimation is also improved; meanwhile, the share of non-European immigrants is below 2% in both electoral districts.

The halo effect of the proportion of non-European immigrants is contrary to expectations. It suggests that the party is stronger in electoral districts with more non-European immigrants than their neighbors. The same result was obtained by Rydgren–Tyrberg (2020) based on the 2014 election (especially in neighborhoods with a high level of non-European residents). The halo effect of diversity is therefore not confirmed. Greater diversity relative to neighboring areas increases support for the Sweden Democrats (compared to previous models, it is not the

degree of diversity but the difference relative to neighbors that are decisive). The Sweden Democrats achieved above 25% in Nybro 3, Krylbo, and Brunnsäng Västra electoral districts. All three electoral districts had 20% more non-European immigrants than their neighbors' mean non-European immigrant value. Although the halo effect can be observed as initially expected in a few places (Almgården has 15% fewer non-Europeans than its neighbors, the Sweden Democrats achieved 41%), not all homogeneous electoral districts with heterogeneous neighbors have strong radical right support (e.g. in Gottsunda-Vårdsätra electoral district, although the average non-European immigrant share of neighbors is 20% higher than in the central district, the Sweden Democrats achieved only 6.8%).

Table 2

Results of linear models with the Sweden Democrats' electoral results at the electoral district level (2018) as dependent variables

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Low education, %	0.750 *** (0.017)	0.741 *** (0.017)	0.754 *** (0.017)	0.759 *** (0.017)	0.741 *** (0.017)
Non-employed, %	−0.140 *** (0.014)	−0.152 *** (0.015)	−0.132 *** (0.014)	−0.133 *** (0.014)	−0.174 *** (0.014)
Median income, thousand SEK	−0.171 *** (0.002)	−0.176 *** (0.002)	−0.164 *** (0.002)	−0.174 *** (0.002)	−0.201 *** (0.002)
Non-European immigrant, %	−0.979 *** (0.015)	−1.003 *** (0.016)	−0.989 *** (0.015)	−0.992 *** (0.016)	−1.204 *** (0.02)
Δ Non-European immigrant, %	0.119 *** (0.037)	0.111 *** (0.038)	0.219 *** (0.068)	0.126 *** (0.038)	0.243 *** (0.072)
Polarization index	0.265 *** (0.639)	0.278 *** (0.651)	0.244 *** (0.648)	0.287 *** (0.671)	0.431 *** (0.861)
Halo Non-European		0.046 *** (0.015)			0.291 *** (0.026)
Halo Δ Non-European			−0.104 *** (0.062)		−0.141 *** (0.073)
Halo polarization				−0.043 *** (0.669)	−0.217 *** (1.204)
Observations	6004	6004	6004	6004	6004
R²	0.505	0.506	0.508	0.506	0.520
Adjusted R²	0.504	0.505	0.507	0.505	0.519
F	1018.429 ***	876.344 ***	883.170 ***	876.285 ***	722.123 ***

Notes: ***p<0.001 **p<0.01 *p<0.05 +p<0.1. Standardized coefficients, with standard errors in parentheses. *Source of data for models: [1], [2].*

The halo effect of the change in the share of non-Europeans over three years has a significant impact on the support for the Sweden Democrats, with the radical right party performing better in electoral districts that are slower to diversify than their surroundings. An illustration of the effect is Segevång Ö (in Malmö), an

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electoral district that is (at least now) more diverse than its neighbors. Still, its neighbors have seen a higher proportion of non-European immigrants (2.17% and 4.17%). Residents here may fear that the surrounding neighborhoods are becoming more diverse (with their electoral district, the neighborhood may become a vast heterogeneous area). This may explain the 27.4% support for the Sweden Democrats.

The halo effect of the polarization index is consistent with the original theory (in contrast to the halo effect on the proportion of non-European immigrants). Living in less polarized districts compared to their neighbors increases support for the Sweden Democrats. However, since I have used an unweighted[9] polarization index, it cannot be generalized that neighbors are polarized owing to a high share of non-European or European immigrants. The polarization may also be caused by the almost equal percentage of Swedish and European immigrants. Compared to its neighbors (PI=0.71), Gryteryd-Södra Hestra (PI=0.35) is one of the least polarized electoral districts. The ethnic picture of Gryteryd-Södra Hestra is dominated by Swedes (90%), with a low proportion of European (8%) and non-European immigrants (2%). Its most polarized neighbor, conversely, has a smaller Swedish majority (66%) and an even split between European (16%) and non-European (18%) immigrants, with other neighbors showing a similar pattern. In the case of Gryteryd-Södra Hestra, a halo effect of diversity (in line with the baseline theory) is also observed, as the district has a 12% lower share of non-European immigrants compared to its neighbors. For these reasons, the Sweden Democrats gained 33.8% in the 2018 election. However, the halo effect of polarization and the share of non-European immigrants do not always point in the same direction. For example, Malmköpings Västra has more non-European immigrants than its neighbors, but its polarization is lower than that of the surrounding districts, with the Sweden Democrats receiving 22.9%.

In addition to the baseline variables, I include two variables indicating relative deprivation (compared to neighboring districts) and the contextual effects of diversity (Table 3). According to the model, the results show that having a higher median income (at the electoral district level) than the average of one's neighbors increases the probability of supporting the Sweden Democrats. However, this may also be caused by the diversity of neighbors. Still, when I include the halo effect of non-European immigrants in the model, the role of income remains significant. By itself, the difference in the proportion of non-employed people in the central electoral district and neighboring electoral districts does not appear to be a significant influence. However, with the inclusion of the contextual effect of diversity, the variable turns significant. In this case, as in the case of income, the party performed better in electoral districts with fewer unemployed than the average

[9] See Németh et al. (2020).

value of its neighbors, indicating better economic status. There are also discrepancies between the employed and non-European neighbors, for example, in Uppsala's Kungsgärdet district, where the average non-European percentage of neighboring districts is 11%. In comparison, the average share of non-employed residents of neighbors is 41.6%, driven by the students living there (but the Sweden Democrats did not perform well there, gaining only 7.13%).

Table 3

Results of linear models, expanded with relative deprivation, with the Sweden Democrats' electoral results at the electoral district level (2018) as dependent variables

| Variables	Model 6	Model 7	Model 8	Model 9
Low education, %	0.748 *** (0.017)	0.753 *** (0.017)	0.731 *** (0.017)	0.744 *** (0.017)
Non-employed, %	−0.135 *** (0.014)	−0.129 *** (0.017)	−0.173 *** (0.014)	−0.141 *** (0.019)
Median income, thousand SEK	−0.187 *** (0.002)	−0.169 *** (0.002)	−0.228 *** (0.003)	−0.194 *** (0.002)
Non-European immigrant, %	−0.981 *** (0.015)	−0.981 *** (0.015)	−1.213 *** (0.02)	−1.217 *** (0.02)
Δ Non-European immigrant, %	0.118 *** (0.037)	0.120 *** (0.038)	0.234 *** (0.073)	0.240 *** (0.072)
Polarization index	0.271 *** (0.644)	0.263 *** (0.644)	0.440 *** (0.865)	0.422 *** (0.872)
Relative deprivation income	0.029 * (0.003)		0.047 *** (0.003)	
Relative deprivation non-employed		−0.013 (0.015)		−0.047 * (0.023)
Halo Non-European			0.308 *** (0.027)	0.312 *** (0.028)
Halo Δ Non-European			−0.139 *** (0.073)	−0.141 *** (0.073)
Halo polarization			−0.207 *** (1.215)	−0.203 *** (1.259)
Observations	6004	6004	6004	6004
R^2	0.505	0.505	0.521	0.521
Adjusted R2	0.505	0.504	0.520	0.520
F	874.427 ***	873.042 ***	652.006 ***	650.773 ***

Notes: ***$p<0.001$ **$p<0.01$ *$p<0.05$ +$p<0.1$. Standardized coefficients, with standard errors in parentheses. *Source of data for models:* [1], [2].

To better isolate the effect of neighborhood diversity on relative deprivation, the author classifes electoral districts into low (average non-European immigrant residents<4%); medium (4%<average non-European immigrant residents<9%), and high (average non-European immigrant residents>9%) groups based on the

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non-European immigrant share of neighboring electoral districts (Figure 1), similar to Rydgren–Tyrberg (2020)[10]. As in the general model, in electoral districts with low and medium diversity neighbors, the Sweden Democrats' support increases if the district's neighbors have a worse employment rate (Table 4). The significant role of wealth differences appears only in the model for neighbors with medium average diversity (Table 5).

Figure 1

The average non-European immigrant share of the neighboring Swedish electoral districts, 2018

Legend:
- 0.95– 4.00
- 4.01– 9.00
- 9.01–49.61
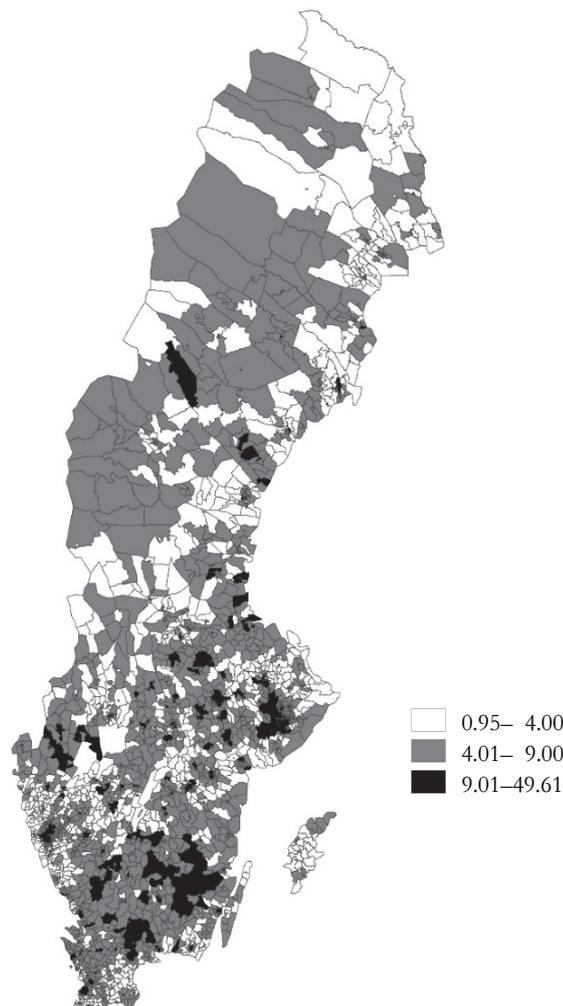
Source: calculations based on Statistics Sweden data.

[10] The authors classified by the diversity of the central district rather than by neighborhood.

As in the general model, the radical right is stronger in electoral districts with a higher median income than their neighborhood. The trend in the proportion of non-employed is reversed in districts with a diverse environment. Based on the relative deprivation theory, the Sweden Democrats are stronger in areas with more non-employed individuals than their neighbors. In Skomaberget (Uppsala), a more homogeneous district than its neighbors (12.27% non-European immigrants compared to an average of 13.32%), the Sweden Democrats scored 20.63%, which was modeled as being since while in Skomanerget, approximately 35% of the population was not employed, the average in the surrounding districts was only 19.5%. In Uppsala, this high non-employment rate may also be caused by students; however, the Sweden Democrats are not particularly popular among them (Oscarsson–Holmberg 2016). The higher non-employed rate compared to its neighbors also has a vote-enhancing effect in diverse areas. An example is Älgbacken (43% of the population is non-European), where the Sweden Democrats achieved 22.47%. Forty-seven point six percent of Älgbacken's population is not employed, while in the neighboring electoral districts, the average is 28.56%.

Table 4

Results of models run on electoral districts categorized by the average value of the non-European immigrant share of neighbors, treating the Sweden Democrats' electoral district level election results (2018) as a dependent variable. Including relative deprivation non-employed

Variables	Low	Medium	High
Low education, %	0.675 *** (0.063)	0.816 *** (0.029)	0.7 *** (0.02)
Non-employed, %	0.091 (0.08)	0.081 ** (0.029)	–0.4 *** (0.02)
Median income, thousand SEK	0.161 *** (0.007)	–0.020 (0.003)	–0.420 *** (0.003)
Non-European immigrant, %	–0.565 *** (0.106)	–0.639 *** (0.043)	–1.06 *** (0.019)
Δ Non-European immigrant, %	0.076 * (0.157)	0.097 *** (0.071)	0.204 *** (0.042)
Polarization index	0.333 *** (2.465)	0.243 *** (1.195)	0.308 *** (0.949)
Relative deprivation non-employed	–0.171 *** (0.081)	–0.160 *** (0.036)	0.066 ** (0.018)
Observations	1033	2592	2379
R^2	0.357	0.573	0.501
Adjusted R^2	0.352	0.572	0.5
F	81.183	494.468	340.384

Notes: ***$p<0.001$ **$p<0.01$ *$p<0.05$ +$p<0.1$. Standardized coefficients, with standard errors in parentheses. *Source of data for models:* [1], [2].

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Table 5

Results of models run on electoral districts categorized by the average value of the non-European immigrant share of neighbors, treating the Sweden Democrats' electoral district level election results (2018) as a dependent variable. Including relative deprivation median income

Variables	Low	Medium	High
Low education, %	0.662 *** (0.063)	0.788 *** (0.029)	0.702 *** (0.021)
Non-employed, %	–0.032 (0.062)	–0.023 (0.025)	–0.347 *** (0.017)
Median income, thousand SEK	0.123 ** (0.008)	–0.075 ** (0.004)	–0.429 *** (0.004)
Non-European immigrant, %	–0.628 *** (0.098)	–0.679 *** (0.042)	–1.06 *** (0.019)
Δ Non-European immigrant, %	0.076 * (0.158)	0.092 *** (0.072)	0.207 *** (0.042)
Polarization index	0.360 *** (2.45)	0.272 *** (1.236)	0.322 *** (0.968)
Relative deprivation non-employed	0.022 (0.011)	0.064 *** (0.005)	0.034 (0.004)
Observations	1033	2592	2379
R^2	0.350	0.569	0.5
Adjusted R^2	0.346	0.568	0.499
F	78.896	487.401	338.884

Notes: ***p<0.001 **p<0.01 *p<0.05 +p<0.1. Standardized coefficients, with standard errors in parentheses.
Source of data for models: [1], [2].

Conclusions

The study results show that in addition to the percentage of immigrants, other neighborhood effects of diversity are also reflected in the support for the radical right Sweden Democrats. The polarization index's contextual impact is consistent with the halo effect theory; increasing support for the radical right party can be observed in electoral districts with more polarized neighbors than the central district. This result supports the statement that the polarization index is a better indicator of social conflicts related to diversity than the percentage of immigrants (Montalvo–Reynal-Querol 2005). The neighborhood effect of the polarization index improved the estimate mainly in electoral districts where neighborhood polarization was due to a nearly equal share of European and non-European immigrants. Consequently, primarily the European immigrant population may feel threatened in terms of economic and social status. Still, aggregate data cannot be used to draw firm conclusions. Furthermore, the perception of spatial differences in polarization concerning the proportion of immigrants is probably less discernible owing to the similarity of the Swedish and European groups. Indeed, Mattsson (2005) argues that Swedishness is strongly linked to European whiteness. Therefore, in this case, the role of the media and the network of contacts may be more important than personal perceptions.

As several studies have already pointed out, the rate of change in diversity should also be taken into account, as it can better represent the threats posed by immigration. The research has confirmed this, as the neighborhood effect of the rate of diversity is also associated with an increase in support for the radical right party. Individuals perceive a recent change in their neighborhood and, even if their electoral district is less diversified, they are more likely to vote for an anti-immigration party. Moreover, rapid diversification makes the contact hypothesis more challenging to validate, especially when newly arrived immigrants come from different countries of origin than those already living there. Since in the models, the diversification of the home area remained significant even when the environmental variable was included, this suggests that areas where diversification is rapid over a broad region (including the central electoral district and neighbors), are likely to experience an increase in anti-immigrant sentiment.

The economic deprivation experienced relative to surrounding electoral districts depends on the proportion of non-Europeans in the surrounding electoral districts owing to the generally worse economic indicators of the areas inhabited by non-Europeans. If the neighborhood's diversity is low or medium, the central area with a better economic position than its neighbors has stronger support for the Sweden Democrats. The correlation between the economic and ethnic variables suggests that the economic variable takes over the role of the halo effect. A worse economic situation relative to neighbors has a radical right vote-boosting effect in electoral districts with diverse neighbors. This category also includes areas that, despite having fewer immigrants than their neighbors, still have a higher share of non-employed. With it, the Sweden Democrats have gained extra votes. In addition to the halo effect, the conflict theory of the labor market, that is, that immigrants take locals' jobs, also applies in these cases.

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