Contextual effects of immigrant presence on populist radical right support: testing the 'halo effect' on FN voting in France

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Introduction

Research into the populist radical right (PRR) in Europe identifies immigration as a key issue for such parties (Mudde 2007). While the relationship between immigration and the radical right vote has been firmly established at the level of individual attitudes (e.g. van der Brug et al, 2000; Van der Brug and Van Spanje, 2009;), there is still a need for a better understanding of how the presence of immigrants may shape support for the radical right spatially. The first ecological models looking at socio-economic conditions of PRR support using a variety of operationalisations across countries found a strong association between immigration and PRR vote (e.g. Jackman and Volpert, 1996). More recent work confirms that immigration has a significant and robust effect on voting for the radical right at the meso-level (Georgiadou et al., 2018). Multi-level tests have tended to confirm these findings (e.g. Berning, 2016).

The link between ecological and individual explanations of immigration on PRR support implies causal links between immigrant presence, ethnocentric attitudes and PRR vote. Explanations of such links are generally based upon the two principal social psychological theories of prejudice, namely ethnic competition and intergroup contact (Allport, 1954; Quillian, 1995). According to ethnic competition theory, symbolic perceptions of immigration-related threats may increase anti-immigrant sentiments, thus fuelling support for the radical right. Contact theory postulates that, under conditions of high-quality contact, intergroup contact with immigrants may reduce prejudice, and by extension, the contemporary literature expects that this will decrease support for PRR parties. Empirically, however, the recent literature on the relationship between immigrant presence, immigration attitudes and voting for the PRR illustrates the complexity of the mechanisms at play, showing mixed results according to scale of measurement and/or immigration proxy, and notably failing to account fully for why high levels of support for the PRR may be found in local areas with low or virtually no immigrant presence.

Combining insights from both contact and ethnic competition theories, this paper seeks to examine further the link between immigration and the radical right, and to resolve somewhat the puzzle of PRR support in areas of low immigrant presence. Specifically, we build on the concept of 'halo effect' developed by earlier contextual studies of the PRR vote to account spatially for the phenomenon of higher levels of PRR electoral support in areas adjacent to and at further distance from zones of high immigrant population, but lower in those 'migrant' areas themselves (Bon and Cheylan, 1988; Bowyer, 2008; Rydgren and Ruth, 2013).

In its original formulation, the halo theory postulates that individuals living adjacent to ethnically diverse areas experience sporadic contact with immigrants through daily commuting and retail activities, but lack quality contact and therefore will be more likely to perceive those groups as a threat, resulting in higher support for the PRR. In contrast, individuals living in areas with high immigrant presence experience quality intergroup contact which reduces their prejudice and in turn their propensity to vote for the PRR (Perrineau 1998). By linking context with attitudes and behaviour, the concept of halo potentially provides new insights into the mechanisms underpinning the contextual effects of immigration on voting for the PRR. However, the majority of tests of the halo effect to date have relied exclusively upon qualitative accounts and/or ecological inference, mapping areas of migrant population and PRR support. A link to individual behaviour, let alone to individual attitudes, has only been tested recently (Klinger et al, 2017; Savelkoul et al., 2017; David et al., 2018; Janssen et al. 2019), not yet in the French case, and not systematically in terms of halo effect.

This paper fills this empirical gap by focusing on individual behaviour, and the effect of local context on this, to understand better the presence of a mechanism between immigrant presence and PRR support. Drawing on a unique set of geocoded data from a survey of French voters, we present a first test of the halo effect at both the ecological and individual level, using a series of multi-level models to test for evidence of such an effect on the vote for the Front National (FN) in the first-round of the 2017 French presidential election. The first section discusses the concept of halo in relation to existing theories of ethnic contact and competition. We then turn to describing the survey and methodology, before we present our main findings. We find evidence for a significant curvilinear halo effect at the individual level, amongst voters living around and at further distance from areas with significantly higher-than-average immigrant populations. A series of alternative specifications confirm that this effect is robust to different model specifications and, as far as these can be tested, to competing theories such as ethnic change and residential segregation, as well as the regional composition of the immigrant population in respondents' neighbourhoods. Moreover, the halo is independent of the general socio-economic context in which voters live, tested by unemployment and education levels, as well as socio-demographic voter attributes. Most importantly, a path analysis confirms the presence of halo effects on associated individual attitudes related to PRR voting, thus providing a significant step forward in understanding the mechanisms linking subjective experience of immigration with radical right vote.

Immigration and the PRR vote

The voluminous body of research on the PRR vote has established a strong link between immigration and support for the radical right. Typically, PRR parties formulate a nativist platform framing immigration as a threat to the welfare and cultural fabric of Western societies (Mudde 2007). In individual vote choice models, opposition to immigration has been identified over time as one of the main attitudinal drivers of support common to these parties' otherwise diverse voters (van der Brug et al, 2000; Ivarsflaten, 2008; Van der Brug and Van Spanje, 2009; Zhirkov, 2014; Oesch and Rennwald, 2018). Earlier ecological studies have found a strong relationship between immigration and PRR voting (Jackman and Volpert, 1996; Knigge, 1998; Golder, 2003; Georgiadou et al., 2018). Multi-level tests have confirmed the role of anti-immigration attitudes as one of the main drivers of the PRR vote (Lubbers et al, 2002; Arzheimer, 2009; Berning, 2016; Edo et al. 2019).

Explanations of such links between immigrant presence, ethnocentric attitudes and PRR vote are generally based upon mechanisms derived from social psychological theories of prejudice, most notably conflicting theories of intergroup contact, on the one hand, and ethnic competition, on the other hand. The former draws upon Allport's contact theory (1954) which hypothesises that, under certain specific conditions, the existence of significant cooperative interactions with minority groups will produce a reduction in ethnic prejudice and stereotyping of members of these groups, and therefore a decrease in support for the PRR. Similar research stresses the importance of such personalized interactions, intergroup friendships (Pettigrew 1998) and 'acquaintance potential' (Cook 1962).

According to theories of ethnic competition, majority ethnic groups are held to be in direct competition with immigrant groups, and other minority populations, over both materialist – i.e. economic – and symbolic – i.e. social and cultural— resources, and from this perceive a need to defend their own interests and identities (Tajfel et al, 1971). Other things being equal, they will therefore be more likely to support nativist parties that defend the principles of exclusive access to

national assets – in other words, a welfare-chauvinist ideology (Mewes and Mau, 2013) – and of the promotion of ethno-cultural homogeneity of the majority group (Rydgren, 2007).

Contextual effects of immigrant presence

Earlier studies found that the local context is an important determinant of individual attitudes towards immigrants (e.g. Middleton 1976). Empirically, recent studies illustrate, however, the complexity of the relationship between immigrant presence, immigration attitudes and voting for the PRR, showing mixed results, and notably failing to account fully for high PRR support in areas with low immigrant presence. Using a large-scale individual-level data set with geocodes, Savelkoul et al. (2017) examine the effect of neighbourhood ethnic composition on individual voting for the radical right in the Netherlands, and find that ethnic minority density is positively related to the likelihood to vote for the Party for Freedom (PVV). Kaufmann (2017) shows on the other hand that support for the United Kingdom Independence Party is negatively correlated with ethnic diversity, but underlines the role of change in immigration, specifically increases in immigration population producing higher individual PRR support. In their recent meta-analysis of ethnic context and immigration attitudes, Kaufmann and Goodwin (2018) emphasize the role of ethnic change and report a significant association between increase in ethnic diversity and elevated threat. Other studies such as Halla et al. (2017) and Patana (2018) also emphasize the role of immigration change and find that the inflow of immigrants into a local community significantly increases the vote share for the radical right.

In the Dutch case, Janssen et al. (2019) find that, at the local level, the effect of ethnic minority presence on the intention to vote for the PVV is curvilinear and is higher in areas with intermediate levels of immigration, compared with low or very high percentages of non-western minorities where support for the radical right is lower. On the other hand, van Wijk et al. (2019) find no effect for local ethnic composition and local economic conditions on voting for the PVV after controlling for individual characteristics. Earlier ecological studies such as Biggs and Knauss (2012) report a significant relationship between minority group size and support for the radical right, while emphasizing the effect of residential segregation. The authors note that support for the radical right is higher in cities where minorities are sufficiently numerous to be perceived as a threat, and where they are highly segregated (2012: 643).

One reason for these mixed findings is methodological and may relate to the immigration indicators that are used. A recent meta-analysis of structural factors of radical right voting in Western Europe suggests that the significance and direction of the relationship for immigration is highly dependent on the type of proxy used (Amengay and Stockemer 2019). More importantly, research indicates that contact and threat theories operate differently at different levels of aggregation. The comparative study by Weber (2015) illustrates such a 'modifiable areal unit problem' and demonstrates that the effect size and statistical significance of immigrant presence vary with the delimitation of the spatial units of analysis. The meta-analysis of studies of ethnic context and immigration attitudes by Kaufmann and Goodwin (2018) finds a non-linear relationship between ethnic context and threat, with higher diversity predicting threat responses at the smallest and largest scales, whereas in medium-size units such as neighbourhoods, diversity is associated with reduced threat. Schlueter and Scheepers suggest that, at local level, the "primary impact of minority group size will be an enhancement of opportunities for intergroup contact" while in larger spatial contexts, "outgroup size [is] associated with an enhancement of threat perceptions" (2010: 293). Similarly, Biggs and Knauss (2012) posit that different mechanisms may be at play at different

geographical scales. Empirically, David et al. (2018) show that the size and significance of the impact of immigration on extreme right voting and anti-immigrant attitudes vary by different scales of measurement. The work by Dinesen and Sønderskov (2015) suggests that negative correlations tend to be higher at smaller scales. Typically, studies of contextual factors of the FN vote in France identify a positive correlation between immigrant presence and FN vote at higher levels of aggregation, while the correlation becomes negative at the municipality level (Rojon, 2013; della Posta, 2013).

Hypothesizing a 'halo' effect

Thus, we still lack a better explanation of how the presence of immigrants may shape support for the radical right, and we need more solid empirical evidence of the mechanisms that link the presence of immigrants to immigration attitudes and ultimately to the PRR vote. Contextual studies of PRR vote and immigrant presence have developed the concept of a 'halo effect' to account for the phenomenon of higher levels of PRR electoral support neighbouring, but not entering, areas of immigrant presence. The first implicit statement of the phenomenon comes from Bon and Cheylan's study of FN support in the French city of Marseille in 1986, where they noted FN support "not in areas of strong migrant population or economically marginalised areas, but on their margins" (1988: 270-71, authors' translation). Perrineau hypothesised that majority populations living close enough to immigrant populations to be aware of their presence, through sporadic contact, but lacking quality contact or information regarding such groups, will be more likely to perceive these latter as a greater threat and therefore vote for the radical right, and that such an effect may continue to operate in areas which are further away from areas with high concentration of immigrants (1998: 148)

Such accounts of socio-spatial redistribution and their political impact implicitly invoke and combine theories of ethnic prejudice as an explanatory mechanism. In areas of high immigrant presence, the existence of interaction and significant, high-quality contact between groups should reduce negative attitudes towards immigrants, and posterior to this, support for the radical right. In the ethnically more homogeneous periphery, on the other hand, perception of neighbouring immigrant presence, but without high-quality contact which would diminish feelings of competition, should produce instead increased levels of prejudice conducive to PRR support. Beyond that periphery, the distance reduces immigrant contact to the extent that there is a null effect on prejudice and PRR support. Consequently, the functional form of the halo effect on PRR support is expected to be curvilinear, peaking at intermediate distance, peripheral areas, and declining again beyond those zones, other things being equal.

In terms of the French FN vote, this halo has never been tested robustly, however. Beyond cartographical mapping of FN vote and immigrant population, the issue has generally been addressed indirectly, by considering the level of urbanisation, identifying growing support for the party as the distance from the main urban centres increases (Bussi et al, 2012). Outside France, a small number of ecological studies have attempted to unpick empirically the halo effect beyond a descriptive analysis of relative proportions of PRR vote and immigrant population. Bowyer (2008) examined the link between ethnic composition and British National Party vote in the 2002 and 2003 local elections, using ecological data to identify a diverging contextual effect across two spatial levels – increased PRR support in local authority areas with higher ethnic diversity, consistent with ethnic threat, but lower support in electoral wards with high ethnic diversity, consistent with contact theory. These two opposing dynamics would support the halo effect hypothesis. In Sweden, Rydgren

and Ruth (2013) explicitly test for the presence of a halo effect across national electoral districts, and find evidence that those districts with lower immigrant populations situated next to districts with high concentrations have the highest propensity to support the Sweden Democrats. Using aggregate data at the level of Swiss municipalities, Martig and Bernauer (2018) find evidence of both direct negative effects of minority populations on the share of the SVP, and of halo effects.

Within these accounts of the halo, there are two clear omissions. First, from a spatial perspective, there is no specification of the distance from the centre of an immigrant population to the borders of the area affected by the halo. In its original formulation, the halo is a qualitative construct, applied to both sub-communal (within-city) and inter-communal (across-city) levels, rendering definitions of those areas which are peripheral or central largely subjective. Second, for most of them, tests of such halo have remained at the ecological level, thereby only testing by implication a consistent link between individual behaviour and social context within aggregate measures, let alone demonstrating an attitudinal mechanism.

Only a few studies have looked explicitly at the individual level. In the US, using field experiments and small-scale interactions, Enos (2017) identifies the interaction between size of community, distance between ethnic populations and levels of segregation in the effect on intercommunal relations and perceptions of the other. In Germany, Klinger et al (2017) use geocoded data from the 2014 ALLBUS General Social Survey to look for a halo effect at the individual level, but find no evidence of this. The multilevel path analysis by Green et al. (2016) suggests a positive association between the presence of immigrants and individual PRR voting in Switzerland, indirectly through threat perceptions. In Belgium, David et al. (2018), while not specifically testing a halo effect, use geolocalised voter data and find that the presence of immigrants has a greater impact on attitudes towards immigration and extreme right voting in the surrounding areas than within the immediate vicinity of voter residence.

A French empirical case study of the 'halo'

In this article, we suggest a possible spatial operationalization of the halo effect which we test on the Front National (FN)[1] vote and attitudes in France. The FN is generally considered a typical instance of the West European PRR (Mudde 2007) and the perceived importance of immigration is underlined by the vast literature dedicated to the party (Mayer and Perrineau, 1992, 1996; Lewis-Beck and Mitchell, 1993; Mayer, 2002; Crépon et al, 2015, Edo et al. 2019). Anti-immigration attitudes represent a distinct individual predictor for FN vote over time (Perrineau, 1998; Mayer, 2013, 2017).

Using data from the [*NAME OF PROJECT anonymized for reviewing process*] 2017 French post-presidential election survey which included sub-communal geocoding of its respondents, we test a series of multilevel models to look at the halo effect on FN vote both directly and mediated by immigration attitudes. Using a multilevel model with high spatial resolution allows us to answer important questions linked to immigrant presence, ethnic prejudice and the FN vote, as well as testing more broadly for a halo effect at the individual level, thus surmounting some of the traditional hurdles of contextual analysis of immigration effects.

First, the design allows us to test the effect of distance from areas of high immigrant presence – the operating term we use to designate the spatial centres of the halo effect – whilst controlling for

[1] The party was renamed *Rassemblement national* in June 2018. To avoid ambiguity, we use its former label which has been used in the literature to date, and was correct for the time-period of the analysis.

other individual and contextual effects. Attitudes concerning ethno-cultural diversity, which are core to PRR vote, are strongly determined by individuals' cultural capital and their socio-economic position (Hainmueller and Hopkins, 2014), and it is therefore crucial to control for such individual characteristics. Second, the design of the survey allows us to look at the contextual effects of immigrant presence at different scales, and how these operate independently – if indeed they do – of the halo, along with other important socio-economic drivers of the FN vote, including level of urbanisation and unemployment. Standard models of PRR vote would lead us to expect, ecologically, a positive association between vote for these parties and immigrant levels. However, the halo effect predicts a negative association in the local area, positive association at increasing distances, and a null or negative effect at the greatest distances. This then allows us to understand if there also exists an independent effect, proxying for media effects or other behavioural drivers, of immigration beyond the halo. Additionally, we look at contextual effects of education and local socio-economic conditions. This follows recent research such as Van Wijk et al. (2019), which demonstrates that support for the PRR tends to be much lower in areas with higher shares of highly educated residents. The recent study by Hoxhaj and Zuccotti shows that the relationship between attitudes towards immigration and presence of immigrants is conditioned by the socioeconomic characteristics of the area of residence, and that "the positive relationship between immigrant concentration and (positive) attitudes decreases as the socioeconomic condition of areas worsens" (2020: 16).

Finally, and most notably, our research design allows us to look for evidence of the halo effect on attitudes as well as voting behaviour. Recent studies have underlined the importance of perceptions of individuals in the understanding of the ethnic make-up of their environment (Laméris et al 2018; Laurence et al. 2019). In line with this research, we test one important foundational assumption of the halo that the contextual effects of immigrant presence on support for the FN are mediated by immigration attitudes, in particular voter perception of both symbolic and instrumental ethnic threats.

Data and method

The analysis is based upon data collected as part of the [*NAME OF PROJECT anonymized for reviewing process*] project survey collected after the 2017 presidential elections in France (see Appendix A1 for data information). This survey provided a nationally representative sample of 19,454 respondents who had agreed to geocoding of their location, recorded at street level, to allow matching on contextual socio-economic and demographic data at the neighbourhood (IRIS)[2] level. IRIS are statistically aggregated areas of c. 2000 inhabitants produced by the French national statistical and economic agency (INSEE) which provide a cluster of individuals spatially arrayed in an approximation of a *quartier* (neighbourhood). There are a total of 50,153 IRIS in metropolitan France, which are nested in 36,529 *communes* (municipalities) themselves nested in 96 *départements*. We do not include *communes* because these vary substantially in size, from tiny rural *communes* with fewer than 100 inhabitants, to the largest metropolitan cities such as Paris. The voter geocoding allows the calculation of the straight-line distance of respondents from areas of

[2] *Ilots Regroupés pour l'Information Statistique* (IRIS), https://www.insee.fr/en/metadonnees/definition/c1523. We used the 2015 geography (COG2015) which was the latest available for socio-demographic data.

high immigrant population, using street-level location for the former and the relevant IRIS's geographic centroid for the latter. The main models use first-round vote for Marine Le Pen in the 2017 presidential election as the dependent variable, measured as a binary variable between Le Pen vote and votes for all other candidates, and therefore employing a logit function. To avoid possible compositional effects linked to respondents in the survey who themselves are immigrants, we take out any who were not born in France. Studies show that perceived ethnic threat is generally more salient among majority populations (Oliver and Wong 2013), so it is important that we control for immigrant background. As an additional check, we also run models excluding respondents with at least one foreign-born parent, to eliminate further second-generation effects (Appendix A6). As we are primarily interested in vote choice, we also remove non-responses, those who abstained, or cast blank or spoiled ballots. Together with missing values across the set of predictor variables, the main unweighted analytical sample is 12,414. A comparison of the full sample and analytical sample on outcome and predictor variables revealed no evidence of bias through this loss of cases (Appendix A1, Table 1).

Areas of high immigrant presence were identified at the IRIS level using the proportion of immigrants on the total population. We use immigrant – which includes French of foreign origin – rather than foreign measures as this reflects the implied ethnic diversity relevant to PRR vote. Let us recall here that the French census does not collect information about individuals' religion or ethnicity. Objective measures based on the countries of birth of the respondent and their antecedents cannot take into account later-generation descendants of immigrants (Simon 2010). While this limitation should be noted, recent research suggests nonetheless that second-generation immigrant residential mobility is generally low in France, showing persistent patterns of ethnic clustering (McAvay 2018), whereby shares of first-generation immigrants may more generally be seen as a good proxy for ethnic diversity across local areas.

In order to identify areas that are the most ethnically diverse, we tag those IRIS with large immigrant population. Previous research into ethnic threat and anti-immigrant prejudice (Quillian, 1995; Schneider, 2008) tends to use continuous predictors such as proportion of immigrant population, rather than identifying a cut-off for group size. Biggs and Knauss find on the other hand that contact operates only in local areas where the minority proportion exceeds a certain threshold (one-tenth to one-quarter) (2012: 642). Recent studies such as Savelkoul et al. (2017) also suggest that the effect of neighbourhood ethnic composition on voting for the radical right may be conditional on the size of the immigrant population, identifying an empirical threshold of 15 per cent of the total neighbourhood population. In their analysis of residential mobility, Lancee and Schaeffer (2015) use an arbitrary cut point, defining the 15% most diverse neighbourhoods in Germany as high-diversity areas, while taking diversity levels below the median (50%) to reflect more homogeneous neighbourhoods.

In this paper, areas with a strong immigrant presence are identified from all 50,153 IRIS in metropolitan France, as those with an immigrant population one standard deviation higher than the national average. As with most cut-offs, this is an ad hoc decision – in practice meaning an immigrant population proportion of just under 17.5%. A test of a range of other cut-offs found that this provided the best model fit amongst different specifications (Appendix A2, Figure 1 and Table 1). Following Lancee and Schaeffer, we use the nationwide average for our calculations, bearing in mind that there are large disparities in immigrant populations across regions, in particular the Île-de-France i.e. Paris and its region, where immigrants represent over 18% of the total population, as against 9% for the rest of the country. As will be discussed below, our models include higher-level controls of immigrant presence for *départements*, which help account for regional variance as well

as for the Île-de-France 'idiosyncrasy'. In total, 4,089 areas of high immigration were identified in mainland France, including Corsica, at the IRIS level, representing just over 8% of the total number of IRIS. For each respondent in the survey, the straight-line distance between the nearest area and their location was measured using the street-level geocoded location of the respondent and the centroid of this nearest area of high immigrant presence.

The expectation from the halo effect is that, as this distance initially increases, the probability of voting for Le Pen increases, then drops away as the distance increases further. We test this first in an individual level model, including random IRIS and *département* intercepts to allow comparison with subsequent models, to check that a basic halo effect is visible in a naïve specification. Distance is measured in kilometres, included as a main term and a quadratic term, to pick up non-linearity, and is reported in the model by 10km increments, to allow visibility of the quadratic term parameter estimates at lower decimal places. We include three demographic controls – gender, coded for women; age (continuous coding, including a quadratic term to test for possible curvilinearity) and level of education, recoded into four categories – lower and no education, intermediate, secondary, and tertiary (the reference). These three controls are standard demographic predictors of PRR vote in France (Mayer 2013). Additionally, the PRR literature suggests that feelings of deprivation rather than actual objective economic conditions are stronger predictors of voting for those parties (eg. Mughan et al. 2003, Im et al. 2019) and we therefore include a measure of subjective deprivation – a four-point measure ranging from low deprivation ('our household is well off') to high deprivation ('our household really cannot get by').

Given the importance of the periurban / rural geographical account of FN support, it is important to control for this as a competing explanation to the halo: immigrants in France tend to cluster in urban centres and suburban areas (*banlieues*), much less in the more distant outskirts and rural areas.[3] We therefore include a dummy variable controlling for urban v periurban / rural profile of respondents' locations, derived from the INSEE zoning, and grouping metropolitan, suburban and so-called 'multipolar' areas, in contrast to medium-sized and small towns together with rural *communes*.[4]

Secondly, we bring context in and test a multi-level logit model of Le Pen vote on the previous Level 1 variables, as well as fixed contextual Level 2 IRIS variables, and Level 3 *département* variables, with random intercepts. As indicated earlier, Level 2 nests hierarchically within Level 3. This model incorporates immigrant population and proportion of unemployed at both Level 2 and Level 3, as measured by the 2013 census.[5] We also add the share of residents with a university degree in the respondent's home IRIS. This allows us to control for possible contextual effects which have been linked in the previous literature to radical right support, such as unemployment (Sipma and Lubbers 2018) and education (Van Wijk et al. 2019). More specifically, it also allows us to check if – in addition to the halo effect – there is evidence of independent contextual effects from immigration.

As a next step, we include a set of attitudinal predictors following standard accounts of FN support in France to test for evidence of the halo mechanism. We include measures of cultural threat ("French culture is threatened or enriched by immigration [seven-point Likert scale]"; economic threat ("immigrants are good or bad for the French economy [seven-point scale]"; authoritarianism ("the country needs a good dose of law and order" [seven-point scale]); Euroscepticism ("has

[3] 'La localisation géographique des immigrés', https://insee.fr/fr/statistiques/2121524

[4] 'Le nouveau zonage en aires urbaines de 2010', https://www.insee.fr/fr/statistiques/1281191

[5] We also tested the inclusion of the Level 2 IRIS immigrant measure with a quadratic term, to provide an additional test for composition – lower support for Le Pen in areas of very high and very low immigrant presence; higher support in other areas. However, no statistically significant effect was found.

France's membership of the EU been a good, neutral, or bad thing?" [three-point scale]); populism ("the most important political decisions should be taken by the people, not politicians" [five-point scale]); moral conservatism ("same-sex marriage should be equal in the eyes of the law to marriage between people of the opposite sex" [seven-point scale]), and economic interventionism ("the government should take steps to reduce economic inequality" [seven-point scale]). All attitudes are coded to associate positively with Le Pen vote, and in the full model, we expect all of them to be significant.

Fourth, we explore the possible role of intergroup contact in the model and ask to what extent this covaries with halo distance. Let us note here that the set of necessary conditions are not available in the survey to fully test contact. We must consider possible endogeneity with attitudes and therefore restrict this to a conservative control to test against the halo hypothesis. Simply put, are we in fact picking up the effect of contact with ethnic minorities through the use of a spuriously inflected test of neighbouring perceptions? We use an item asking respondents to estimate the frequency of contact with people of a different ethnic origin, ranging from 'never' to 'every day', coded by predominant time period (day, week, month). We expect that greater frequency of contact would be associated with lower ethnic prejudice and consequently a direct effect on Le Pen vote, however not affecting the halo.[6] We then suggest a more complex specification to test the independent and conditioned effect of intergroup contact on the halo, by addressing both quantity and quality of contact.

Next, we look at the role of attitudes as mediators of the contextual effects of immigrant presence on support for the FN. To that end, we use a structural equation model, with paths from halo to each of the attitude items, as depicted in Figure 4 in the next section. The model specifies a set of random intercept models to the mediating attitudes, all with a Gaussian identity family/link function, with the direct attitudinal effects leading to the dependent vote variable, under Bernouilli logit – identical to the parameter estimates from the full model. Because of the inclusion of both metric and binary outcomes, we use a generalised structural equation model (GSEM), fitted using the gsem package in Stata. If the halo effect influences individual perceptions of immigrants, and therefore alters political behaviour, we would expect attitudes related to immigrants to mediate the halo effect on vote, but attitudes unrelated to the halo – but still related to Le Pen support – not to include this indirect effect. Given research into the effect of perceived threat on ethnic prejudice and authoritarianism (Feldman and Stenner, 1997; Feldman, 2003; Cohrs and Ibler, 2009), we would expect related attitudes, such as the need for law and order, to be affected similarly to the cultural and economic threat variables (Koslowski, 2012), as should also be the case for Euroscepticism which is conceptually linked to migration, free movement of labour and Schengen (Gajewska, 2006). However, we would expect small or no effects on irrelevant attitudes such as economic interventionism and moral conservatism.

As a final step, we carry out a series of robustness checks. For robustness checks where null findings, or findings in line with our main specifications, are found, we include information on these in the Appendix. First, we check for the quality of fit of the quadratic distance terms to pick up the halo effect. We apply a fractional polynomial transformation (Royston and Sauerbrei, 2008) to identify the best fitting curve from the distance effect (Appendix A3). Second, we replace the vote variable with a propensity to vote (PtV) measure, to check that the model is not inadvertently confounding party support effects with personality effects for Marine Le Pen (Appendix A3). Similarly, we test the

[6] Let us note here that our subjective measures of contact denote 'ethnic minorities' while our contextual variables use shares of 'immigrants' as a proxy for such diversity. This difference in subject is a product of the different measures in survey and census data, the 'ethnic minority' measure not being present in the census.

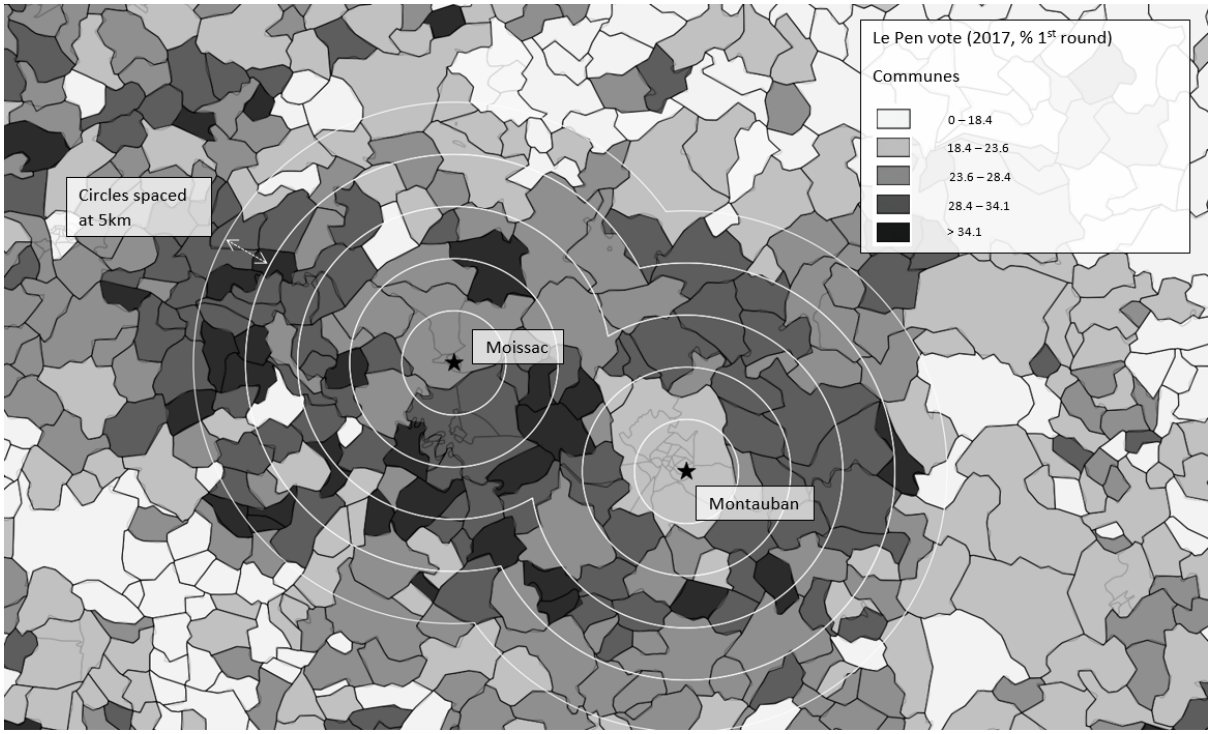
halo using the second-round runoff of the 2017 presidential, where Le Pen increased her first-round support from 21.3 to 33.9 per cent of the vote (Appendix A3).

As regards immigration, we test our model for compositional effects associated with second-generation immigrants in our survey (Appendix A6). At contextual level, we use an alternative dataset at a higher level of aggregation to control more specifically for the presence of non-European immigrants (Appendix A7). While the PRR may target immigration from Eastern European countries, the nativism of those parties is most consistently directed at non-European immigrants (Mudde 2007: 70). Therefore, it is important to test our model according to shares of 'non-White' immigration across local areas. We discuss the data limitations of this test in the supporting Appendix. Lastly, we move to two competing theories of the halo. First, following literature emphasizing the central role of ethnic change rather than static proportions in anti-immigration attitudes and the PRR vote (Kaufmann and Goodwin 2018), we control for increase in ethnic diversity over time (Appendix A8). Second, we try to look at the effect of ethnic segregation in the area of residence. Here, we follow ecological studies such as Biggs and Knauss (2012), which show that PRR support increases with residential segregation between whites and non-whites, rather than with the actual proportion of non-whites. Again here, the methods and limitations from available data are explained in Appendix A9.

Findings

We start with an illustrative example of a possible halo effect at the ecological level. The map shows the geographic distribution of the 2017 first-round Le Pen vote in *communes* (vote share not being available by IRIS) surrounding the town of Montauban in the Tarn-et-Garonne *département* in the South-West of France (Figure 1). The stars identify areas of high immigrant presence, at the IRIS level. These two areas – the *Coulée Verte* district of Montauban and the town centre of Moissac – have particularly high proportions of immigrant population, with 33.9% and 29.6% of the total population, respectively.

Figure 1. Example of halo distance – 5km concentric circles around areas of High Immigrant Population mapped on PRR vote, French presidential elections, 1st round



Following previous descriptive accounts of the halo effect, the map shows the negative association between immigrant presence and FN vote – the districts where Marine Le Pen's support is highest lie outside the immediate vicinity of the immigrant loci. The concentric circles, positioned at 5km increments, indicate that *communes* between 5 and 20km from the immigrant loci are where the FN candidate performs best electorally. As distance increases further, however, support tends to drop off. Such a dynamic would correspond to what the halo effect predicts.

Table 1. Multi-level logit models of halo effect for (a) baseline demographic; (b) contextual; (c) education, and (d) full model specifications

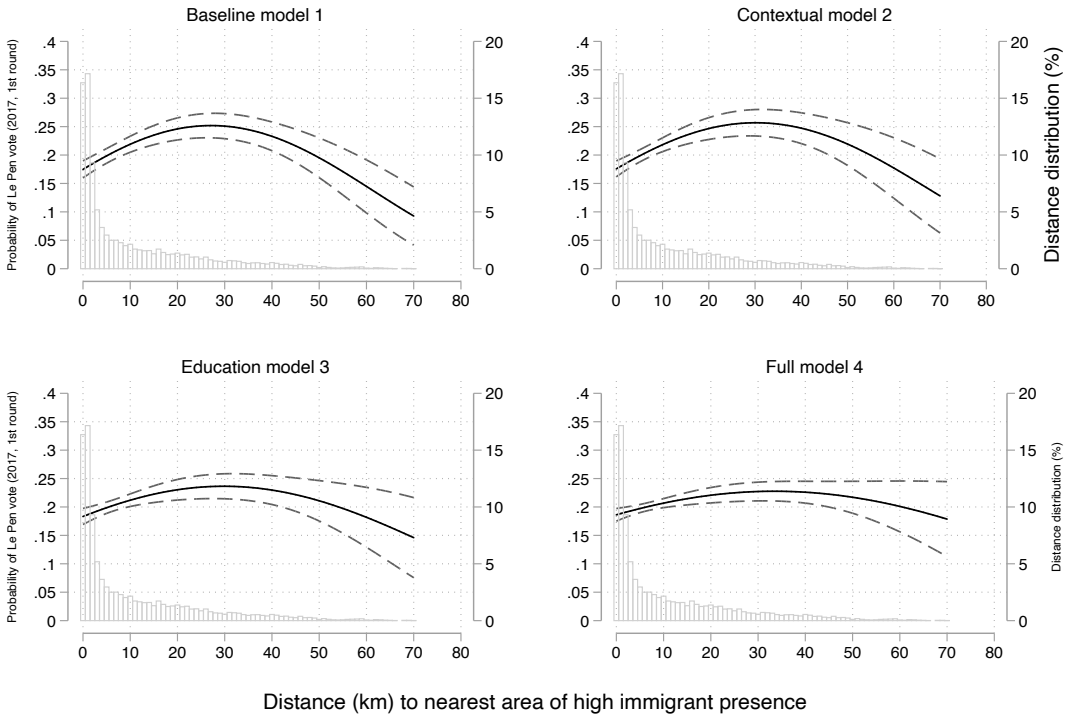
First-round Le Pen vote, 2017	1 - base	2 - context	3 - education	4 - full
Female	-0.029	-0.026	-0.034	-0.058
	(0.055)	(0.054)	(0.054)	(0.070)
Age	0.065***	0.066***	0.063***	0.028
	(0.011)	(0.011)	(0.011)	(0.014)
Age^2	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Education - secondary	0.899***	0.902***	0.870***	0.596***
	(0.074)	(0.074)	(0.074)	(0.094)
Education - intermediate	1.364***	1.371***	1.329***	0.814***
	(0.079)	(0.079)	(0.078)	(0.098)
Education - technical / none	1.466***	1.474***	1.423***	0.918***
	(0.102)	(0.103)	(0.102)	(0.128)
Subjective deprivation	0.440***	0.436***	0.425***	0.076
	(0.036)	(0.036)	(0.036)	(0.046)
Distance (10kms)	0.422***	0.396***	0.268***	0.294**
	(0.072)	(0.077)	(0.078)	(0.099)
Distance^2 (10kms)	-0.078***	-0.066***	-0.045**	-0.044*
	(0.015)	(0.016)	(0.016)	(0.020)
Urban	-0.014	-0.013	0.078	0.157
	(0.069)	(0.071)	(0.072)	(0.091)
Immigrant % IRIS (Level 2)		-0.014*	-0.020**	-0.013
		(0.007)	(0.007)	(0.009)
Unemployed % IRIS (Level 2)		0.007	-0.006	-0.002
		(0.006)	(0.007)	(0.008)
Immigrant % dép. (Level 3)		0.152***	0.167***	0.145***
		(0.028)	(0.026)	(0.029)
Immigrant % dép.^{2} (Level 3)		-0.005***	-0.006***	-0.005***
		(0.001)	(0.001)	(0.001)
Unemployed % dép. (Level 3)		0.084***	0.079***	0.059**
		(0.018)	(0.017)	(0.019)
University educated % IRIS (Level 2)			-0.026***	-0.019***
			(0.004)	(0.005)
Cultural threat				0.332***
				(0.026)
Economic threat				0.301***
				(0.026)
Law and order				0.275***
				(0.024)
Same-sex marriage				0.054***
				(0.016)
Govt. reduces inequality				0.029
				(0.024)
Populism				0.211***
				(0.037)
Euroscepticism				1.192***
				(0.063)
Constant	-4.295***	-6.137***	-5.288***	-8.673***
	(0.305)	(0.428)	(0.431)	(0.612)
Département (Level 3) σ^2	0.118***	0.052**	0.034*	0.021
	(0.030)	(0.018)	(0.015)	(0.018)
IRIS (Level 2) σ^2	0.690***	0.691***	0.670***	0.902***
	(0.167)	(0.166)	(0.165)	(0.254)
AIC	11292.278	11257.770	11224.959	7571.814
Observations – all models	Level 1: 12414; Level 2: 9484; Level 3: 96			

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Do we find evidence of this aggregate-level, descriptive association in individual behaviour? The baseline model (Table 1, 1 – base) including just individual level indicators conforms largely to expectations. Demographic predictors follow the pattern found in other research into the first-round vote for Marine Le Pen, namely an absence of the gender gap historically found in PRR vote (Amengay et al, 2017) and a lower probability of Le Pen vote amongst the more highly educated (Ivarsflaten and Stubager, 2013). A quadratic effect can be observed for age, with a significant increase in support for Le Pen amongst younger voters and a decrease in the older age bands, which is line with previous literature such as Arzheimer (2009). Feelings of economic deprivation have a significant and positive effect, increasing the probability to vote Le Pen. Furthermore, the distance effect conforms to the halo hypothesis, with a positive linear term and negative quadratic.

Model 2 (2 – context) depicts the multi-level model including immigrant and unemployment measures at Level 2 (IRIS) and Level 3 (*département*). There remains significant variance between *départements* and between IRIS which is not explained by the fixed part of the model. Looking at the fixed effects at Level 1, the same effects as in the baseline individual model are present. There is no significant effect for urbanisation. Looking at Level 3, the model confirms the presence of macro effects linked to unemployment, positively associated at departmental level with Le Pen vote, suggesting that feelings of deprivation may be compounded in the case of areas of economic hardship in which they are nested. Unemployment at Level 2 does not reach significance, however this is in part due to covariance with the Level 1 deprivation measure, removal of which sees a positive coefficient, significant at the 95% level, for the IRIS unemployment rate. This follows a stable finding from previous research into ecological predictors of Le Pen / FN vote (Arzheimer and Evans, 2010; Evans and Ivaldi, 2012), and it is in line with research showing a recent consolidation of the FN vote among the most precarious and vulnerable sectors of the electorate (Mayer, 2017). We also find that the Level 2 and Level 3 immigration effect mirrors that found by Rojon (2013) and della Posta (2013) – a negative coefficient at the IRIS level, but a positive coefficient at the departmental level. This is nonetheless inflected by a negative quadratic term, reflecting the lower probability of Le Pen vote in departments with the highest levels of immigrants. Local conditions see higher immigrant presence reducing PRR support, as predicted by contact theory, but higher levels in less local parts of the surrounding higher spatial unit motivating PRR support.

Figure 2. Fitted probability of halo effect across halo specifications (cf Table 1) with 95% confidence intervals



For a more concrete sense of the halo effect, the curvilinear effect is plotted in Figure 2 as a fitted probability, using average fitted values based on average marginal effects (AMEs).[7] The distribution of distances to high immigrant area across respondents is underlayed as a histogram. At initial increases in distance from nearest area of high immigrant presence, the probability of a Le Pen vote increases, until around 20 km where the curve flattens and 95% confidence intervals begin to overlap significantly. Beyond 30-35km, the curve drops, with widening confidence intervals as the number of observations drops for individuals living a relatively large distance from an area of high immigration. These findings first confirm the radius to the halo effect of immigration on PRR vote within commuting or retail range in areas where voters are most likely to interact with immigrants daily, in line with the general premises of the halo.

In model 3 (3 – education), we test the halo distance against contextual effects of university education. In line with previous research (Van Wijk et al. 2019), we find a strong negative association between support for Le Pen and shares of university degree holders in the local area, which corroborates that support for the PRR tends to be much lower in areas with higher shares of highly educated residents. This does reduce the coefficient size of the distance effect. Nonetheless, these remain significant, which suggests that there is a halo effect independent of education levels in the home IRIS.

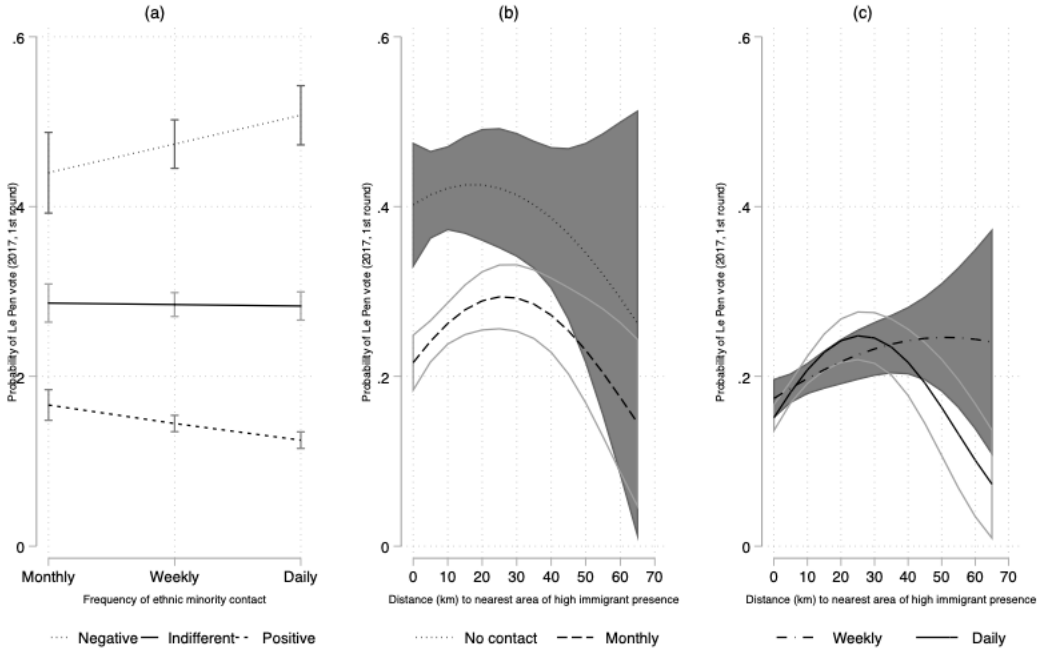
In model 4 (4 – full), we introduce the seven attitudinal predictors, tapping economic and cultural threat, authoritarianism, Euroscepticism, populism, moral conservatism and economic interventionism. Here, inter-*département* variance is accounted for, but there remains significant

[7] All plots use the plotplain Stata scheme (Bischof, 2017).

variance between IRISs within *départements*. At this stage we do not look at the relative impact of each attitudinal variable on the halo's independent effect. The key expectation here is that the halo effect should wash out, if the attitudes entirely mediate its effect on vote. This is clearly not the case. In all but one case – government reduction of inequality – the attitudes go in the expected PRR direction, with positive and significant coefficients. However, whilst there is a reduction in the size of halo effect, it remains significant, suggesting either that the halo may also act as a proxy for other contextual effects of the FN vote which may not necessarily be mediated by PRR attitudes, or that there are further mediators (analysed below) which are not specified in our model.

As a final step, we introduce the concept of contact into the modelling, based upon respondents' stated frequency of contact with different ethnicities. The models so far have implied contact levels from the distance measure. We cannot test contact robustly, given its possible endogeneity with the attitudinal items. Here we simply wish to ascertain if, first, there is a clear contact effect, and second, whether this covaries strongly with the halo. To explore this further, following Voci and Hewstone (2003), we introduce the notion of *quality* of contact as an additional and independent dimension to *quantity* of contact with different minorities. We then look at a more complex specification of inter-ethnic contact, to check if there is any impact on the distance variable (Appendix A4, Table 1). To what extent is PRR vote motivated by the independent, and multiplicative effects of these two aspects to contact? Again, the test is not robust to endogeneity, and we therefore remove the attitudinal variables to avoid issues of collinearity. We include simplified versions of the quality and quantity contact variables (see details in Appendix A4). We also include an interaction term, with the expectation that frequent negative contact will operate differentially on PRR vote than frequent positive contact. Alongside this test, we run a separate model including those respondents reporting no contact (and therefore with no quality measure). Here we interact this variable with the halo itself, to understand further the inter-relationship, if any, between the halo and contact. Full models are reported in Appendix A4, for reasons of space; Figure 3 reports the key findings through the predicted probabilities from these models.

Figure 3. Measures of ethnic minority contact (quantity and quality) and Le Pen vote with 95% confidence intervals

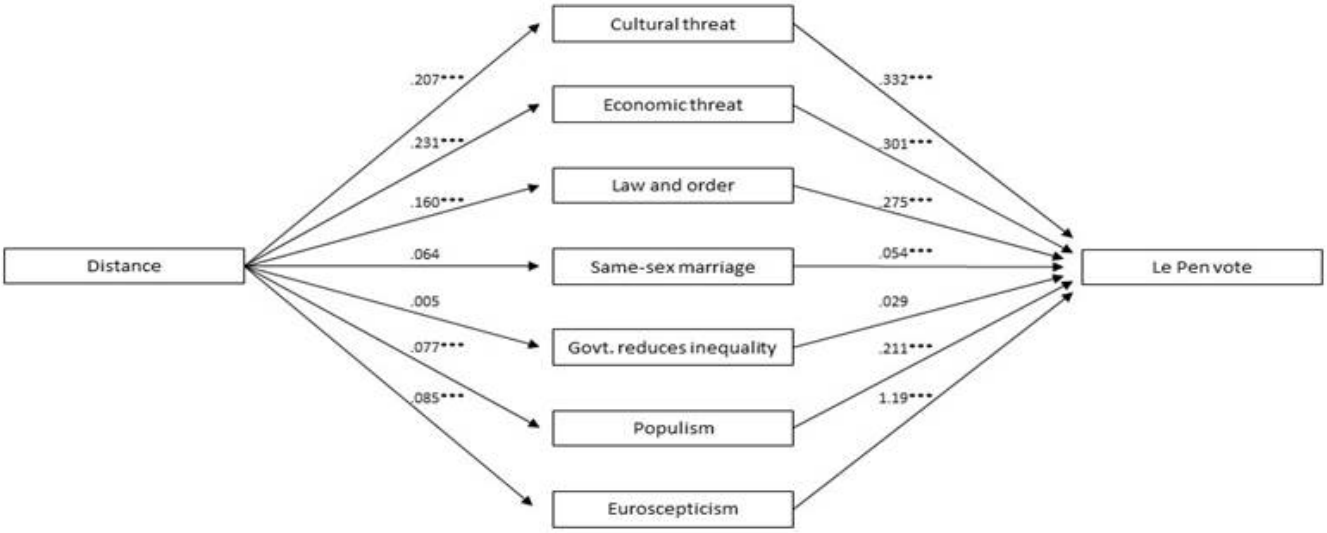


The findings in panel (a) of Figure 3 are in line with the expectations of the halo, namely that the average reduction in support for the radical right through greater contact is only true of those with a broadly positive stated experience, while those who view such contact as negative are in fact more likely to vote Le Pen at higher levels of frequency of self-reported intergroup contact. Panels (b) and (c) map the conditional effect of contact quantity across the halo. As would again be anticipated from theory, the curvilinear effect of halo is most visible for respondents who report the most frequent contacts with immigrants, showing a significant increase in radical right support for those in the peripheries surrounding areas of strong immigrant presence. Less expected is the greater differentiation among the monthly and greater than monthly group, with a similar curve to the daily group, contrasting with the absence of an effect for the weekly group. We do not have an explanation for this contrast. Also of note is the high level of support for Le Pen among those reporting no contact living within the halo effect radius. While the size of the CIs suggests greater heterogeneity, this is suggestive of segregation, with no contact despite relative proximity of ethnic groups, which we explore under the robustness test section following. While the nature of our measure of contact does not allow to examine this further, these findings confirm the crucial role of intergroup contact in the structuration of immigration attitudes and voting for the radical right, however differently operating along the halo distance.

Finally, we use the GSEM (Appendix A5, Table 1) to look at the mediation model, to understand which, if any, of the seven attitudinal predictors mediate the halo effect. Theoretically, we would expect only those attitudes linked to migrant threat to be substantially affected by the halo. Those variables linked to PRR support in France that are less connected, or unconnected to immigration, should see weaker or null effects. The indirect paths from halo distance to attitudes are presented in Figure 4. (For clarity, we omit the direct effect of distance, the quadratic distance term, and the socio-demographic and higher level terms, which are specified as in model 3.) The mediation paths

generally correspond to expectations. Both economic and cultural threat of migrants are strongly determined by the halo effect. As anticipated, there is a weaker but significant effect for law and order, Euroscepticism and populism.[8] Conversely, there is no significant effect on moral conservatism and economic interventionism, with both effects independent of halo.

Figure 4. Mediation model of halo distance on attitudes



Note: distance^2 omitted for clarity – follows significance of linear term. Direct distance effect, demographic controls and Level 2/3 fixed effects also omitted.

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

This confirms the role of attitudes mediating between halo and the PRR vote. However, there remains the independent effect of the halo distance to account for. A series of additional predictors were tested, to address possible under-specification, both at the ecological and individual levels. There was no evidence of contextual or compositional effects from the socio-economic profile of IRIS, beyond unemployment, education and immigration. At the individual level, the greatest reduction in the halo effect – but still only partial – came from the inclusion of FN party identification (itself strongly determined by the halo). This suggests that, in addition to the attitudinal effects of the halo, there may also be an identity effect in those communities adjacent to areas with high presence of immigrants, as well as additional mediators unanticipated by our specification.

Robustness tests

Lastly, we move to our robustness tests. Full models and specifications for each of these tests can be found in the supplementary appendix. With regard first to the quadratic distance term, a fractional polynomial regression (Royston and Sauerbrei, 2008; Royston, 2013) using the baseline model for

[8] With regard to the populist item, we would simply note that this item, along with all the others, except economic inequality, link to the latent dimension of authoritarianism, and we might therefore expect some small shift through attitudinal constraint (Converse, 1964; Zaller, 1992).

simplicity, confirms that this is the best-fitting approximation of the halo's distance effect on Le Pen vote (Appendix A3, Figure 1 and Table 1). Second, we test the baseline model, but control for possible Le Pen personality effects by using respondents' self-assessed propensity to vote (PtV) for the FN. The same curvilinear fit is visible (Figure 1 in Appendix A3). The respective dependent variable scales are not directly comparable, but there is no evidence that any confounding personality effects are biasing findings in the first-round presidential vote model. Furthermore, in the more fully specified models, including the mediation model, the independent effects of the individual and contextual predictors are very similar to the presidential model. Third, we run our model using the second-round runoff of the 2017 presidential, and find no significant change to the halo, suggesting an attitudinal effect on voters beyond simple PRR political affiliation (Appendix A3, Figure 1 and Table 1).

Looking at immigration variables, we test further for compositional effects and run the model excluding second-generation immigrants, that is respondents with at least one foreign-born parent, and find no substantive change to the halo (Appendix A6). We then address the composition of immigrant populations, delineating between the presence of European and non-European immigrants at contextual level, and find no significant change to our distance effect according to shares of European and non-European immigration across local areas (Appendix A7). Finally, we assess two competing theories of the halo. We look at a dynamic measure of change in ethnic diversity over time, rather than our main static measures, but find no significant effect, and no change to the halo (Appendix A8). Looking at the effect of ethnic segregation at the local level, within the bounds of what available data permit, similarly shows no significant change to the halo effect (Appendix A9).

Discussion

This article has provided the first robust test of the existence of a halo effect at the individual level in France, controlling for contextual determinants of PRR vote, and exploring the attitudinal mechanism by which such an effect should work. Our findings show a significant curvilinear halo effect at the individual level, amongst voters living around and at further distance of areas with significantly higher-than-average immigrant populations. This effect is robust to different model specifications and independent of the general socio-economic context in which voters live, as well as socio-demographic voter attributes.

The use of the distance measure to an area of high immigrant presence defined by migrant threshold allows the estimation of scale – that is, the distance between community and migrant population which reflects the tenets of the contact and competition theories, while addressing some issues associated with assessing the relationship between immigrant presence and PRR voting at different scales of measurement i.e. local versus departmental. As surmised in these theories, areas with direct, daily contact with dense migrant communities are not the areas where individuals will be more predisposed to vote for a PRR candidate such as Marine Le Pen – and, given the nature of our test, this is not a compositional artefact. Nor is there a consistent pattern of PRR support in areas far from areas of high immigrant presence, where contact with migrant populations of those specific zones is likely to be minimal, but where more diffuse migrant populations may or may not be present.

Our findings confirm and expand on the older French literature on the halo effect which posited an extensive radius to the migrant effect on PRR vote, emphasizing important aspects of the political

geography of intergroup contact, and how perceptions of immigration may be shaped by where voters live and interact with immigrants daily. As the distances in our halo suggest, only in areas corresponding to zones within travelling distance of an area of high immigration, for commuting or retail reasons, for example, do we find a significant increase in the likelihood of PRR vote.

Most importantly, this paper confirms the presence of individual attitudinal drivers from the halo on voting for the radical right. Building on previous work on contextual effects of immigrant presence at the aggregate level, the path analysis in this paper helps underline some of the attitudinal mechanisms through which contextual factors act to shape subjective experiences of immigration, and how these are reflected in voting for the PRR.

There are some limitations to this research, however. First, our test does temper any over-statement of the halo effect. Whilst there is a statistically significant, non-linear effect, the change in vote probability for Le Pen is moderate, pointing to the role of the halo as conditioning effect rather than principal driver of PRR vote. Second is the articulation between halo and intergroup contact. While the link between the two can be established conceptually, our research design has not permitted to explore further the role of contact, beyond checking the robustness of the halo effect to its inclusion. Research has recognized that intergroup contact does not emulate 'real world' interactions (Dixon et al. 2005). Given our contact measurement in this paper, we cannot be sure of the relative non-recursive effects with attitudes – how perceptions of migrants condition perception of contact – so this finding requires further confirmation.

Finally, whilst the link between halo, attitudes and vote is evident, the mechanisms leading to these attitudinal positions needs to be understood. Previous research has shown that choice of residential location can be partly driven by political attitudes (e.g. Hui, 2013). Our data being cross-sectional, we cannot say to what extent attitudes have changed in situ, and to what extent individuals with such attitudes have co-located. Theories of 'white flight', and in the French case, the shift of FN support precisely from areas characterised here as areas of high immigrant presence – in particular, ethnically diverse *banlieues* – in the 1980s and early 1990s, to the periurban, ethnically more homogeneous areas since the early 2000s (Girard and Rivière, 2013; Andrieu and Lévy, 2007; Guilluy, 2014), would support the latter hypothesis. Without extensive panel data, however, this remains impossible to test. Similarly, our research design does not allow to explore further other contextual effects that may be reflected in the halo. To some extent, the geography of the halo in this paper corresponds with France's peripheries where FN voters cluster. As the mediation of halo by populism suggests, future research should look into feelings of socio-territorial segregation and discontent associated with such peripheries. In relation to 'white flight' and possible 'friends-and-neighbours' effect, another possible avenue would be to look at FN attitudes in social context taking a social identity perspective on how group membership may prescribe such attitudes.

Notwithstanding these caveats, this paper makes a significant contribution to the literature on the relationship between immigration and the PRR, helping disentangle contact and threat by providing robust empirical evidence of how these mechanisms may interact to shape immigration attitudes and the PRR vote across different spatial scales as well as different levels of ethnic diversity. In particular, our results shed light on some of the current issues discussed in the growing literature on the urban/rural cleavage which increasingly structures the PRR vote in France and Europe, and which may be regarded as a second-order manifestation of deeper demographic and cultural divides (Maxwell 2019). As the 'space between us' (Enos 2017) continues to grow, the halo provides a key to understanding the ever more complex relationship between growing spatial ethnic polarization, attitudes towards ethnic diversity and, eventually, support for the PRR.

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Appendix

Revision, as of Wednesday, 20 May 2020

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A1. Data information and sample descriptives

The [*NAME OF PROJECT anonymized for reviewing process*] survey was conducted by BVA from 11 May to 25 June 2017 and it included a representative national sample of 19,454 respondents aged 18 years and older. The data were collected through quota sampling based on the criteria of gender, age, education, size of area of residence, and administrative region, and they included geocoding of all respondents at the neighbourhood (IRIS) level i.e. units of about 2,000 inhabitants. The project was funded by the *Agence Nationale de la Recherche* (ANR) as part of the [*NAME AND DETAILS OF PROJECT*].

For more information, see: [*HERE LINK TO PROJECT WEBSITE*]

Table 1. Analytical and full sample descriptives on outcome and predictor variables

		Analytical sample			Full sample		
	Variable	n	Mean / proportion	Std. Dev.	n	Mean / proportion	Std. Dev.
L1	Le Pen vote, first round	12,414	0.20	0.40	15,868	0.20	0.40
	Female	12,414	0.52	0.50	19,454	0.55	0.50
	Age	12,414	49.02	15.70	19,454	47.74	15.84
	Education - secondary	12,414	0.25	0.43	19,454	0.26	0.44
	Education - intermediate	12,414	0.26	0.44	19,454	0.27	0.44
	Education - technical / none	12,414	0.09	0.29	19,454	0.10	0.31
	Distance (km)	12,414	10.35	13.05	18,887	10.14	12.94
	Urban	12,414	0.67	0.47	19,451	0.66	0.47
	Subjective deprivation	12,414	2.16	0.80	19,227	2.22	0.82
	Cultural threat	12,414	4.20	2.11	18,745	4.20	2.10
	Economic threat	12,414	3.83	1.85	18,411	3.86	1.85
	Law and order	12,414	4.85	1.99	18,706	4.82	1.98
	Same-sex marriage	12,414	2.83	2.11	18,621	2.90	2.15
	Govt. reduces inequality	12,414	5.76	1.48	18,910	5.78	1.48
	Populism	12,414	3.97	1.13	18,770	4.01	1.12
	Euroscepticism	12,414	-0.41	0.74	18,504	-0.39	0.74
L2	University %	9,484	21.50	9.74	13,031	21.22	9.70
	Immigrant %	9,484	8.65	7.80	13,031	8.76	8.10
	Unemployed %	9,484	12.99	6.16	13,217	13.07	6.36
L3	Immigrant %	96	7.07	4.14			
	Unemployed %	96	12.90	2.21			

A2. Tests of national (n) immigrant proportion cut-offs

Areas with a strong immigrant presence are taken from all 50,153 IRIS in metropolitan France as those with an immigrant population one standard deviation higher than the national average– that is an immigrant population of just under 17.5%. As can be seen from Figure 1 and Table 1 below, a test of a range of other cut-offs shows that this provides the best model fit amongst different specifications.

Figure 1. Tests of national (n) immigrant proportion cut-offs (weighted and unweighted, 1σ – 3σ)

Halo distance effect in context model (2) – fitted probabilities for unweighted (m) and weighted (z) cut-offs, at integer and half (-h) σ cut-offs

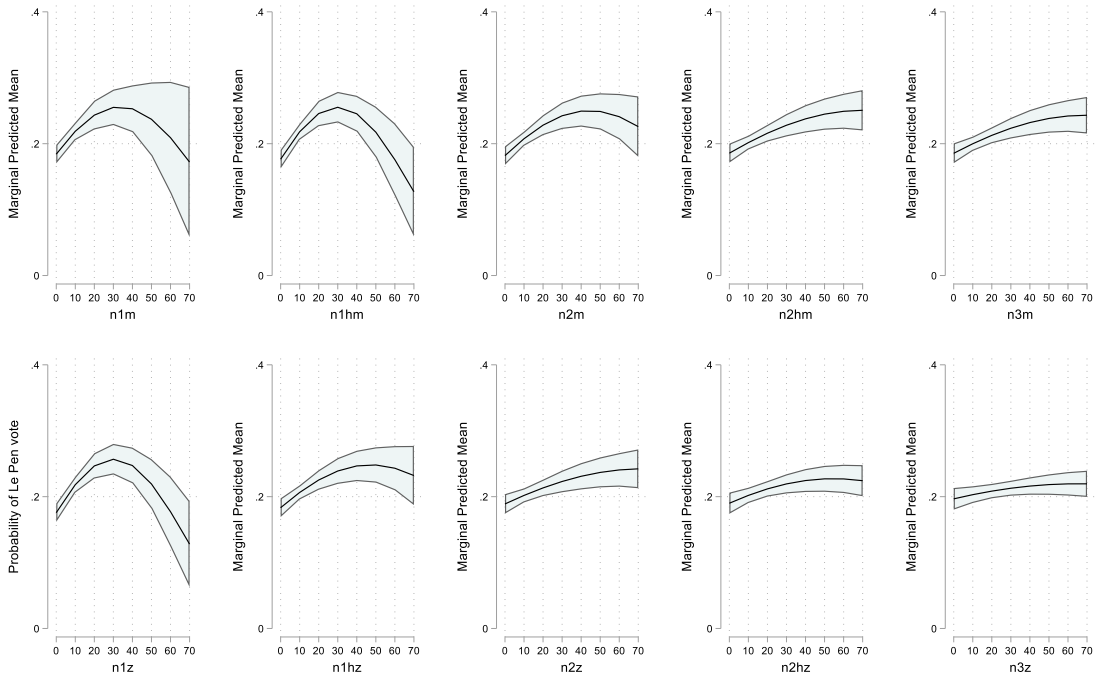


Table 1. Contextual model fit using unweighted (m) and weighted (z) cut-offs, at integer and half (-h) σ cut-offs

	(1) n1m_model	(2) n1hm_model	(3) n2m_model	(4) n2hm_model	(5) n3m_model
N	12414	12414	12414	12414	12414
AIC	11269.1	11259.7	11267.5	11273.1	11275.1

	(1) n1z_model	(2) n1hz_model	(3) n2z_model	(4) n2hz_model	(5) n3z_model
N	12414	12414	12414	12414	12414
AIC	11257.8	11269.9	11277.7	11280.4	11280.2

A3. Baseline, fractional polynomial, propensity to vote and second-round runoff models of halo distance effect

We test alternative specifications of halo distance for robustness. We first apply a fractional polynomial transformation (Royston and Sauerbrei, 2008) to identify the best fitting curve to check for the quality of fit of the quadratic distance terms to pick up the halo effect. Figure 1, model 1 shows the distance effect for the original baseline model. Model 2 shows the fractional polynomial fit with a power transformation (0.5, 2) which improves upon linear and natural log models. The halo effect 'accelerates' at a greater rate than our hypothesised model expects. Second, we replace the first-round vote variable with a propensity to vote (PtV) measure (Figure 1, model 3) and finally the second-round runoff Le Pen vote (Figure 1, model 4).

Figure 1. Alternative specifications of halo distance for robustness, using fractional polynomial transformation of distance measure; alternative second-round runoff; and 'propensity to vote' dependent variable

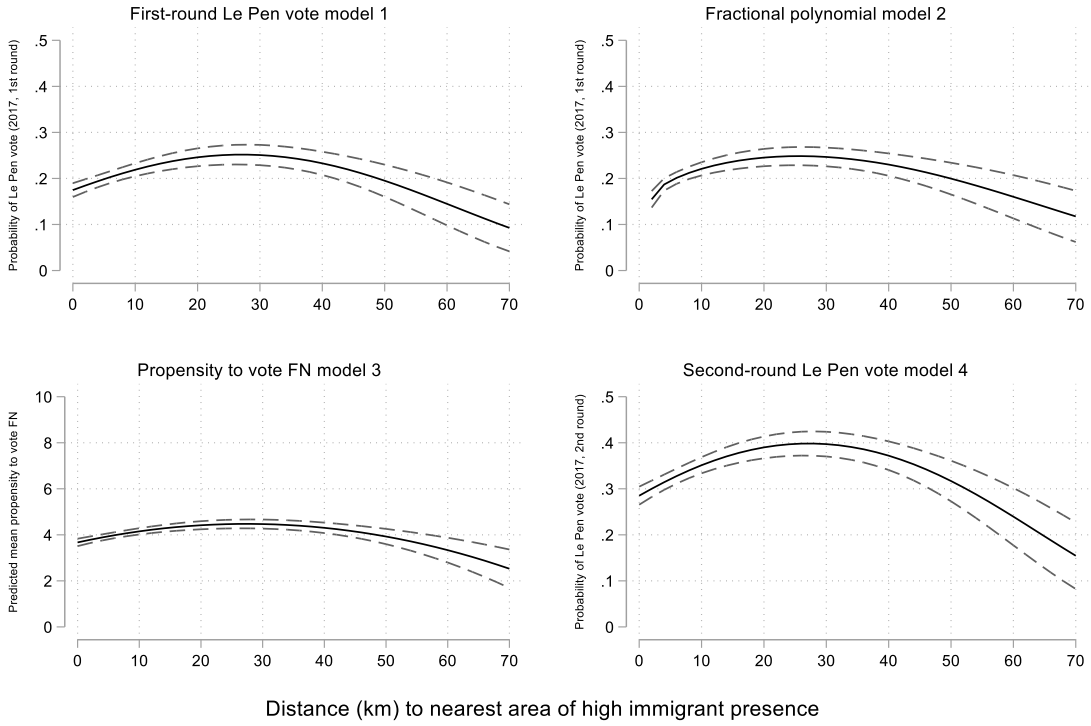


Table 1. Baseline model; fractional polynomial transformation of distance measure; 'propensity to vote', and second-round runoff dependent variable

	Baseline	Fractional polynomial	PtV	Second-round vote
	(1)	(2)	(3)	(4)
Female	-0.029	-0.029	-0.187**	-0.080
	(0.055)	(0.054)	(0.069)	(0.053)
Age	0.065***	0.064***	0.033*	0.035**
	(0.011)	(0.011)	(0.014)	(0.011)
Age^2	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Education - secondary	0.899***	0.898***	0.993***	0.802***
	(0.074)	(0.074)	(0.087)	(0.071)
Education - intermediate	1.364***	1.366***	1.768***	1.295***
	(0.079)	(0.079)	(0.090)	(0.076)
Education - technical / none	1.466***	1.465***	1.869***	1.360***
	(0.102)	(0.102)	(0.129)	(0.102)
Subjective deprivation	0.440***	0.443***	0.671***	0.627***
	(0.036)	(0.036)	(0.044)	(0.038)
Distance (10kms)	0.422***		0.578***	0.477***
	(0.072)		(0.091)	(0.070)
Distance^2 (10kms)	-0.078***		-0.105***	-0.088***
	(0.015)		(0.019)	(0.015)
Urban	-0.014	0.016	-0.184*	-0.107
	(0.069)	(0.071)	(0.091)	(0.068)
FP term 1 Distance^(.5 2)		0.622***		
		(0.102)		
FP term 2 Distance^(.5 2)		-0.040***		
		(0.009)		
Constant	-4.295***	-4.494***	2.074***	-3.089***
	(0.305)	(0.314)	(0.360)	(0.288)
Département (Level 3) σ^2	0.118***	0.114***	0.209***	0.108***
	(0.030)	(0.029)	(0.051)	(0.029)
IRIS (Level 2) σ^2	0.690***	0.686***	0.893	0.545***
	(0.167)	(0.166)	(0.238)	(0.158)
AIC	11292.278	11289.427	67958.415	11069.698
Observations		Level 1: 12414		Level 1: 9936
		Level 2: 9484		Level 2: 7942
		Level 3: 96		Level 3: 96

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A4. Contact and distance interaction models

To look at a more complex specification of inter-ethnic contact, we include simplified versions of the quality and quantity contact variables, collapsing quality (originally a seven-point scale ascertaining whether respondents' contact with ethnic minorities was positive or negative) into a three-point scale (-1 = negative; 0 = indifferent; +1 positive) and quantity into a three-point scale (1 = monthly or less; 2 = at weekly or less; 3 = daily or less). For the distance interaction with quantity, we treat the four-point scale, which re-introduces the 'no contact' response as a categorical variable, using 'no contact' as the reference.

Table 1. Contact (quality / quantity) and distance interaction models

First-round Le Pen vote, 2017	Quality*quantity of contact	Distance*quantity of contact
Female	0.044	-0.051
	(0.059)	(0.055)
Age	-0.024***	-0.025***
	(0.002)	(0.002)
Secondary school	0.868***	0.865***
	(0.080)	(0.075)
Intermediate	1.420***	1.356***
	(0.087)	(0.080)
Technical / none	1.357***	1.356***
	(0.113)	(0.104)
Subjective deprivation	0.415***	0.486***
	(0.039)	(0.037)
Urban	-0.114	-0.004
	(0.077)	(0.073)
Distance (10kms)	0.393***	0.147
	(0.083)	(0.231)
Distance^2 (10kms)	-0.064***	-0.042
	(0.017)	(0.048)
Contact quality	-0.682***	
	(0.128)	
Contact frequency	-0.011	
	(0.044)	
Contact quality * Contact frequency	-0.190***	
	(0.052)	
Contact: Monthly		-1.141***
		(0.230)
Contact: Weekly		-1.473***
		(0.218)
Contact: Daily		-1.674***
		(0.210)
Monthly * Distance		0.246
		(0.260)
Weekly * Distance		0.064
		(0.250)
Daily * Distance		0.435
		(0.245)
Monthly * Distance^2		-0.032
		(0.054)
Weekly * Distance^2		0.022
		(0.053)
Daily * Distance^2		-0.070
		(0.053)
Immigrant % IRIS (Level 2)	-0.012	-0.011
	(0.007)	(0.007)

Unemployed % IRIS (Level 2)	0.007	0.008
	(0.007)	(0.006)
Immigrant % dép. (Level 3)	0.155***	0.157***
	(0.028)	(0.029)
Immigrant % dép.^{2} (Level 3)	-0.005***	-0.005***
	(0.001)	(0.001)
Unemployed % dép. (Level 3)	0.089***	0.083***
	(0.018)	(0.019)
Constant	-3.743***	-2.839***
	(0.367)	(0.393)
Département (Level 3) σ^2	0.038*	0.057**
	(0.017)	(0.019)
IRIS (Level 2) σ^2	0.740***	0.771***
	(0.196)	(0.175)
AIC	9794.213	11187.156
Observations	Level 1: 11914	Level 1: 12414
	Level 2: 9194	Level 2: 9484
	Level 3: 96	Level 3: 96

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A5. Main mediation path model

Table 1. Main GSEM mediation path model, full estimates

First-round Le Pen vote, 2017	
Immigrant % IRIS (Level 2)	-0.013
	(0.009)
Unemployed % IRIS (Level 2)	-0.002
	(0.008)
Unemployed % dép. (Level 3)	0.059**
	(0.019)
Immigrant % dép. (Level 3)	0.145***
	(0.029)
Age	0.028
	(0.014)
Female	-0.058
	(0.070)
Education - secondary	0.596***
	(0.094)
Education - intermediate	0.814***
	(0.098)
Education - technical / none	0.918***
	(0.128)
Cultural threat	0.332***
	(0.026)
Economic threat	0.301***
	(0.026)
Distance (10kms)	0.294**
	(0.099)
Distance^2 (10kms)	-0.044*
	(0.020)
Urban	0.157
	(0.091)
Immigrant % dép.^{2} (Level 3)	-0.005***
	(0.001)
Govt. reduces inequality	0.029
	(0.024)
Same-sex marriage	0.054***
	(0.016)
Law and order	0.275***
	(0.024)
Populism	0.211***
	(0.037)
Euroscepticism	1.192***
	(0.063)
Age^2	-0.001***
	(0.000)
Subjective deprivation	0.076
	(0.046)
Uni educated % IRIS (Level 2)	-0.019***
	(0.005)
M1[ID_LEVEL3]	1.000
	(.)
M2[ID_LEVEL3>ID_IRIS_COG15_x]	1.000
	(.)
Constant	-8.673***
	(0.612)
Cultural threat	
Age	0.031***
	(0.007)
Female	0.027
	(0.038)
Education - secondary	0.432***
	(0.048)
Education - intermediate	0.759***
	(0.049)
Education - technical / none	0.820***
	(0.070)
Distance (10kms)	0.207***
	(0.039)
Distance^2 (10kms)	-0.042***
	(0.009)

Age^2	-0.000***
	(0.000)
Subjective deprivation	0.313***
	(0.024)
Constant	2.207***
	(0.187)
Economic threat	
Age	0.021***
	(0.006)
Female	0.152***
	(0.033)
Education - secondary	0.415***
	(0.041)
Education - intermediate	0.757***
	(0.043)
Education - technical / none	0.822***
	(0.061)
Distance (10kms)	0.231***
	(0.034)
$Distance^2$ (10kms)	-0.045***
	(0.008)
Age^2	-0.000***
	(0.000)
Subjective deprivation	0.326***
	(0.021)
Constant	2.098***
	(0.162)
Govt. reduces inequality	
Age	0.012*
	(0.005)
Female	0.219***
	(0.026)
Education - secondary	0.361***
	(0.033)
Education - intermediate	0.531***
	(0.034)
Education - technical / none	0.482***
	(0.049)
Distance (10kms)	0.005
	(0.027)
$Distance^2$ (10kms)	0.001
	(0.006)
Age^2	-0.000
	(0.000)
Subjective deprivation	0.322***
	(0.017)
Constant	4.066***
	(0.129)
Same-sex marriage	
Age	-0.009
	(0.008)
Female	-0.317***
	(0.038)
Education - secondary	0.059
	(0.048)
Education - intermediate	0.085
	(0.050)
Education - technical / none	0.180*
	(0.071)
Distance (10kms)	0.064
	(0.039)
$Distance^2$ (10kms)	-0.011
	(0.009)
Age^2	0.000***
	(0.000)
Subjective deprivation	0.110***
	(0.024)
Constant	2.479***
	(0.188)
Law and order	
Age	0.031***
	(0.007)
Female	0.004
	(0.036)
Education - secondary	0.495***
	(0.045)
Education - intermediate	0.843***
	(0.046)
Education - technical / none	0.792***
	(0.066)
Distance (10kms)	0.160***
	(0.037)
$Distance^2$ (10kms)	-0.032***
	(0.008)
Age^2	-0.000**

	(0.000)
Subjective deprivation	0.128***
	(0.023)
Constant	3.051***
	(0.176)
Populism	
Age	0.008*
	(0.004)
Female	0.036
	(0.020)
Education - secondary	0.276***
	(0.025)
Education - intermediate	0.443***
	(0.026)
Education - technical / none	0.428***
	(0.037)
Distance (10kms)	0.077***
	(0.021)
Distance^2 (10kms)	-0.012*
	(0.005)
Age^2	-0.000**
	(0.000)
Subjective deprivation	0.218***
	(0.013)
Constant	3.076***
	(0.099)
Euroscepticism	
Age	0.019***
	(0.003)
Female	0.019
	(0.013)
Education - secondary	0.193***
	(0.016)
Education – intermediate	0.325***
	(0.017)
Education - technical / none	0.331***
	(0.024)
Distance (10kms)	0.085***
	(0.013)
Distance^2 (10kms)	-0.018***
	(0.003)
Age^2	-0.000***
	(0.000)
Subjective deprivation	0.193***
	(0.008)
Constant	-1.380***
	(0.063)
IRIS (Level 2) σ^2	0.902***
	(0.254)
Département (Level 3) σ^2	0.021
	(0.018)
var(e.Cultural)	4.197***
	(0.053)
var(e.Economic)	3.128***
	(0.040)
var(e. Govt. reduces inequality)	2.001***
	(0.025)
var(e. Same-sex marriage)	4.240***
	(0.054)
var(e.Law and order)	3.700***
	(0.047)
var(e.Populism)	1.174***
	(0.015)
var(e.Euroscepticism)	0.479***
	(0.006)
Observations	12414

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A6. Second-Generation immigrants

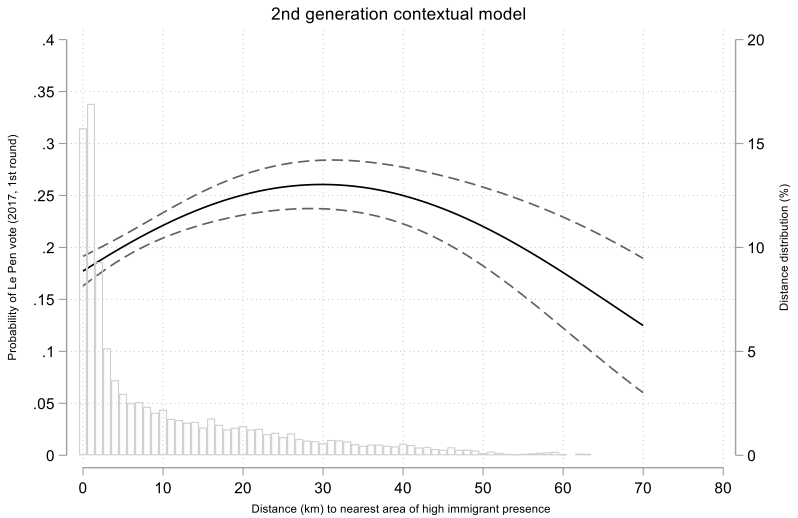
We run our models controlling for second-generation immigrant effects. To do so, we exclude respondents who were born in France but have at least one foreign-born parent. This results in an analytical sample of 11910 respondents. As Table 1 shows, there is a small increase in the distance estimates, visible in the slightly higher probability at the mode of the fitted probability curve than in the original context model. This may be suggestive of voters with no immigrant background across two generations being more susceptible to the halo effect, but the difference is very small. We can conclude, certainly, that there is no evidence of any substantial differential within this smaller subsample.

Table 1. Context model of halo distance effect excluding first and second-generation immigrants

First-round Le Pen vote, 2017	2nd generation context
Female	-0.010
	(0.055)
Age	0.063***
	(0.012)
Age^2	-0.001***
	(0.000)
Education - secondary	0.905***
	(0.076)
Education - intermediate	1.388***
	(0.081)
Education - technical / none	1.472***
	(0.105)
Subjective deprivation	0.443***
	(0.037)
Distance (10kms)	0.410***
	(0.078)
Distance^2 (10kms)	-0.069***
	(0.016)
Urban	-0.017
	(0.072)
Immigrant % IRIS (Level 2)	-0.014*
	(0.007)
Unemployed % IRIS (Level 2)	0.010
	(0.006)
Immigrant % dép. (Level 3)	0.155***
	(0.028)
Immigrant % dép.^{2} (Level 3)	-0.005***
	(0.001)
Unemployed % dép. (Level 3)	0.088***
	(0.019)
Constant	-6.199***
	(0.434)
Department (Level 3) σ^2	0.051**
	(0.018)
IRIS (Level 2) σ^2	0.689***
	(0.170)
AIC	10854.131
Observations	Level 1: 11910
	Level 2: 9484
	Level 3: 96

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1. Fitted probability for distance in context model, Table 1



A7. Non-European and European immigration

We seek to address the issue of White European immigrants at contextual level. To that end, we obtained detailed nationality data from INSEE based on 13 categories (see table 1). To measure the proportion of non-European immigrants, we sum up categories 7 to 12; Europeans are computed as the sum of categories 2 to 6. These are expressed as percentages of the whole population.

Table 1. INSEE classification of nationalities in 13 categories

00	French by birth
01	French by naturalization
02	Portuguese
03	Italian
04	Spanish
05	Other EU
06	Other European
07	Algerian
08	Moroccan
09	Tunisian
10	Other African
11	Turkish
12	Other

Source: https://www.insee.fr/fr/information/1303686

However, there are important limitations on these data, mostly due to national regulations concerning statistical confidentiality and the collection of ethnic statistics in France. First, census data are restricted to nationality of foreigners while our contextual models use the proportion of immigrants as a proxy for ethnic diversity at both local (IRIS) and departmental levels. Second, due to statistical confidentiality, census data are only available at a higher level of aggregation i.e. in statistical units with no less than 5 000 inhabitants. Such units may be small or mid-sized communes, as well as more densely populated neighbourhoods within larger urban areas (TRIRIS). TRIRISs generally consist of three smaller IRISs and they have about 5 000 inhabitants. In conformity with French standards of statistical confidentiality, the dataset that was specifically compiled and provided by INSEE for the purpose of our analysis excluded all communes and TRIRIS with less than 5 000 inhabitants, giving a total of 2339 TRIRIS and 1543 communes. This yielded an analytical sample of 9602.

Initial descriptives of those TRIRIS or communes containing an IRIS with an immigrant population above 17.5% – the cut-point for areas of high immigrant presence – show a markedly lower rate of European nationality inhabitants than non-Europeans. In the 878 TRIRIS / communes within the survey, European nationality inhabitants account for a median of 4.4% of the population, with even the 99th centile only reaching 15.5%. Conversely, for non-European nationalities, the median is 12.1%, with the upper quartile reaching 16.6%. We are of course making the assumption here that European and non-European nationalities and migrant origins will cluster together. On this basis,

there is no evidence that areas of high immigrant presence are associated with high levels of European provenance.

The context model run using a pseudo-Level 2 variable based upon the TRIRIS/commune nationality proportions for European and non-European shows no impact of these nationalities (see table 2). We would simply note an expected directionality to the nationality variables, particularly with higher levels of non-European nationality showing the stronger negative association with Le Pen vote, though not significant. Comparing this with the original context model specification, with the sample constrained to the same cases included in the TRIRIS/commune model, and replacing the nationality figures with the original IRIS immigration variable reveals almost identical parameter estimates for the halo effect. Overall, such evidence as there is suggests no bias from European nationalities, and if anything non-European effects aligning more with halo hypothesis.

Table 2. Model of halo distance effect: Non-European and European immigrants

First-round Le Pen vote, 2017	European / non-European nationality	Context model 2 (constrained sample)
Female	-0.008	-0.008
	(0.063)	(0.063)
Age	0.076***	0.076***
	(0.013)	(0.013)
Age^2	-0.001***	-0.001***
	(0.000)	(0.000)
Secondary school	0.887***	0.887***
	(0.084)	(0.084)
Intermediate	1.303***	1.304***
	(0.089)	(0.089)
Technical / none	1.489***	1.489***
	(0.116)	(0.116)
Subjective deprivation	0.345***	0.344***
	(0.041)	(0.041)
Urban	-0.120	-0.122
	(0.116)	(0.116)
Distance (10kms)	0.340***	0.336***
	(0.094)	(0.094)
Distance^2 (10kms)	-0.050*	-0.049*
	(0.020)	(0.020)
European nationality % (TRIRIS / commune)	-0.270	
	(1.934)	
Non-European nationality % (TRIRIS / commune)	-0.669	
	(0.926)	
Immigrant % IRIS (Level 2)		-0.007
		(0.007)
Unemployed % IRIS (Level 2)	0.003	0.005
	(0.006)	(0.007)
Immigrant % dép. (Level 3)	0.174***	0.179***
	(0.031)	(0.031)
Immigrant % dép.^{2} (Level 3)	-0.007***	-0.007***
	(0.001)	(0.001)
Unemployed % dép. (Level 3)	0.121***	0.119***
	(0.020)	(0.021)

Constant	-6.812***	-6.807***
	(0.491)	(0.490)
Département (Level 3) σ^2	0.043*	0.043*
	(0.020)	(0.020)
IRIS (Level 2) σ^2	0.522**	0.520**
	(0.159)	(0.159)
AIC	8024.102	8021.688
Observations	Level 1: 9602; Level 2: 6568; Level 3: 96	

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A8. Ethnic change model of halo distance effect

We test whether the halo may be picking up ethnic change over a ten-year period. Following Kaufmann (2017), we run our models using the 2006 and 2015 census data to calculate rate of change in the size of immigrant population. Ethnic change is computed as rate of change between 2015 and 2006, with the 2006 proportion of immigrants in the home IRIS as the baseline (see table 1). The 2006 level of immigrants comes close to significance, in the expected direction, with higher levels of immigrants in the home IRIS associated with lower levels of support for Le Pen. However, the rate of immigration has no effect. Reduced samples, excluding very high rates of increase in immigrant population, for example over 500% or 1000%, were run, but this had no effect on model findings.

Table 1. Model of immigration change (2006-2015)

First-round Le Pen vote, 2017	
Female	-0.016
	(0.055)
Age	0.066***
	(0.011)
Age^2	-0.001***
	(0.000)
Education - secondary	0.903***
	(0.075)
Intermediate	1.371***
	(0.079)
Technical / none	1.481***
	(0.103)
Subjective deprivation	0.432***
	(0.036)
Distance (10kms)	0.398***
	(0.076)
Distance^2 (10kms)	-0.066***
	(0.016)
Urban	-0.014
	(0.071)
Immigrant % IRIS, 2006 (Level 2)	-0.014
	(0.007)
Immigrant rate change, 2006-15	-0.000
	(0.000)
Unemployed % IRIS (Level 2)	0.005
	(0.006)
Immigrant % dép. (Level 3)	0.147***
	(0.029)
Immigrant % dép.^{2} (Level 3)	-0.005***
	(0.001)
Unemployed % dép.(Level 3)	0.086***
	(0.019)
Constant	-6.142***
	(0.434)
Département (Level 3) σ^2	0.056**
	(0.019)
IRIS (Level 2) σ^2	0.693***
	(0.167)
AIC	11177.102
Observations	Level 1: 12331
	Level 2: 9415
	Level 3: 96

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

A9. Ethnic segregation model of halo distance effect

We look at the effect of ethnic segregation in the IRIS of residence. We follow the literature emphasizing the effect of residential segregation (e.g. Biggs and Knauss 2012, Enos 2017). Here, the limits on French immigration data noted above pose a challenge. For both our Level 2 and Level 3 spatial units, intra-unit segregation is not measurable or not meaningful, respectively. For IRIS, the area for the vast majority is simply too small to measure internal segregation; for the *département*, heterogeneity across different areas of such large territories will confound any measure of segregation. Instead, we follow a strategy of looking for evidence of segregation across IRIS.

We build upon preliminary work in the UK by Hood et al (2018) on alternative halo specifications of spatial distributions of immigrant populations to look at the ratio of immigrant population in contiguous IRIS to the home IRIS. We calculate the ratio of immigrant proportion in an IRIS to the average of those of all contiguous IRIS[1]. If the ratio is 1 – identical proportions in neighbouring IRIS and the 'home' IRIS – then we use this as an indicator of no segregation. If the ratio is either higher or lower, then we take that as an indication of higher segregation, higher values indicating immigrant communities surrounding a low-population immigrant 'home' area. (A measure of simple segregation, irrespective of community, would take the inverse of the ratio for values below 1, to fold the scale). This is far from perfect as an indicator of segregation – for example, larger-scale segregation may occur with clusters including non-contiguous IRIS. However, we do not have a better operationalisation, given data constraints and spatial level. Using this measure loses 15 IRIS from our data – small offshore islands where there is no land contiguity – and thereby 10 respondents.

The model in table 1 confirms this – we fail to reject the null on this measure of segregation. As best as we can test this, then, we can find no evidence of a segregation effect at this level.

[1] We lose 57 respondents in areas with no immigrant population.

Table 1. Model of contiguity measure of segregation

First-round Le Pen vote, 2017	
Female	-0.022
	(0.055)
Age	0.066***
	(0.011)
Age^2	-0.001***
	(0.000)
Education – secondary school	0.899***
	(0.075)
Education – intermediate	1.368***
	(0.079)
Education – technical / none	1.478***
	(0.103)
Subjective deprivation	0.435***
	(0.036)
Distance (10kms)	0.402***
	(0.077)
Distance^2 (10kms)	-0.066***
	(0.016)
Urban	-0.007
	(0.071)
Contiguity ratio	0.033
	(0.036)
Immigrant % IRIS (Level 2)	-0.013
	(0.007)
Unemployed % IRIS (Level 2)	0.008
	(0.006)
Immigrant % dép. (Level 3)	0.151***
	(0.028)
Immigrant % dép.^{2} (Level 3)	-0.005***
	(0.001)
Unemployed % dép. (Level 3)	0.080***
	(0.019)
Constant	-6.182***
	(0.434)
Département (Level 3) σ^2	0.052**
	(0.018)
IRIS (Level 2) σ^2	0.686***
	(0.166)
AIC	11186.005
Observations	Level 1: 12347
	Level 2: 9427
	Level 3: 96

Standard errors in parentheses; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$