

Ethnic diversity of the micro-context and generalized trust: Evidence from Denmark

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The present paper is still very much work in progress. In its present form, the paper serves two purposes: to present describe the Danish data we have at hand and present some preliminary analyses of ethnic diversity on trust. We hope this can provide the backdrop for comments on the paper and all suggestions and feedback are warmly welcomed!

Abstract

The question about how ethnic diversity affects generalized trust has been a hot topic in recent years. To this point, within-country analyses of this question have been limited by only having data on contextual ethnic diversity at relatively high levels of aggregation. Consequently, the previous analyses suffer from the problem that aggregate contextual diversity likely conceals substantial variation in the ethnic diversity actually experienced at the micro-level in which people live and interact, thereby rendering the estimate of ethnic diversity on trust both imprecise and potentially biased. In the present paper we add to the literature by analyzing, as the first study ever, how ethnic diversity of the immediate micro-context affects people's trust in others. In addition, we compare the effect in the micro context to the impact of ethnic diversity at higher levels of aggregation in order to scrutinize how the relationship varies according to the contextual unit in which ethnic diversity is measured. We analyze the question about the impact of ethnic diversity on trust using Danish data from the European Social Survey, which are linked with data from the national Danish registers. The latter data contain detailed information about the ethnic background and the address of everyone living in Denmark. This enables us to obtain precise measures of ethnic diversity of the immediate surroundings in which each respondent lives. In the analysis we include measures of ethnic diversity in contextual units ranging from a radius of 75 meters up to 2500 meters within the address of a given respondent. The results show that increased ethnic diversity in the immediate surroundings affects generalized trust negatively, while the effect becomes insignificant in larger contextual units.

Keywords: Trust; Ethnic diversity; National Registers; Micro-level; Denmark.

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Introduction

The question whether ethnic diversity has detrimental consequences for social trust has recently risen to academic prominence (e.g. Putnam 2007 and Uslaner [forthcoming]). It draws attention as a consequence of increased immigration and ethnic diversity in Western societies and because social trust has several positive societal effects. Social trust reflects a positive perception of the generalized other, and it has been associated with high levels of civic duty, cooperation and pro-social behavior (Almond & Verba 1963; Sønderskov 2011). Thus, the question has repercussions far beyond academic circles as it basically concerns whether increased immigration and concomitant increasing ethnic diversity result in decreased public-spiritedness and widespread withdrawal from the public sphere, thereby making the provision of public goods more difficult and democratic government less successful.

In the slipstream of the debate over the consequences of increasingly multiethnic societies, the analysis of the relationship between ethnic diversity and trust has been a downright growth industry. The first analyses of the impact of ethnic diversity on generalized trust focused on the relationship across countries (LaPorta, 1997; Knack & Keefer, 1997) and subsequently, the relationship has been extensively studied in communities within countries (Alesina & Ferarra, 2002; Dincer, 2011; Dinesen & Sønderskov, 2011; Fieldhouse & Cutts, 2010; Gijsberts et al., forthcoming; Laurence, 2011; Leigh, 2006; Letki 2008; Marschall & Stolle, 2004; Phan 2008; Putnam, 2007; Stolle et al., 2008; Sturgis et al., 2011; Uslaner, forthcoming). The intra-country analyses have examine the relationship at different levels of aggregation varying from highly aggregated contextual levels such as states or regions to more intermediate levels of aggregation in terms of municipalities, census-tracts or “neighborhoods”, however defined. The findings vary across countries and contextual units, but common for these intra-country analyses, however, is that they have so far only looked at the relationship between ethnic diversity and trust at intermediate and higher levels of aggregation, using data on ethnic diversity from various administrative units (e.g., municipalities or census tracts). No studies have examined the relationship between ethnic diversity and trust at lower contextual levels, arguably because no suitable data for creating meaningful contextual units at the micro-level have been available previously. Focusing exclusively on diversity in more aggregate contextual units is unfortunate as these measures will inevitably conceal substantial variation at lower contextual levels and are therefore imprecise and potentially biased indicators of exposure to ethnic diversity actually experienced by people. Clearly, measures of ethnic diversity in the micro-context of people’s immediate surroundings are more likely to

reflect their every-day experiences of diversity and as such provide a more direct test of how exposure to diversity affects trust in others.

The central contribution of this paper is overcoming the earlier data limitations by merging Danish survey data to the national Danish registers, thereby enabling us, as the first study to our knowledge, to examine how exposure to immigrants in the immediate micro-context affects people's level of trust in others. Specifically, we utilize the first four rounds of the Danish version of the European Social Survey (ESS), which contains questions about our dependent variable; trust in others, and for which the civil registration number of each respondent was retained by the data-collection agency. This is essential for our analysis as the civil registration number enables us to link socio-demographic information (including the address, geographical location and ethnic background of everyone in the country) from the national Danish registers to each respondent in the ESS. This information enables us to create flexible contextual units for the respondents in the survey by drawing circles of a given radius (down to 75 meters) around each respondent and calculating measures of contextual ethnic diversity (and other contextual measures) based on everyone living within this radius. Consequently, we are able to systematically analyze how ethnic diversity at various levels of aggregation affects trust in others by means of expanding the size (radius) of the context of each respondent and hereby contribute to a fuller understanding of how ethnic diversity at various levels of aggregation shapes people's outlook on the trustworthiness of others.

In the following we first shortly describe the proposed theoretical link between ethnic diversity and trust. Then we explain in detail how using contextual ethnic diversity based on the national Danish registers can substantially improve our knowledge about how ethnic diversity shapes trust. Subsequently, we turn to describing the measures used in the analysis before reporting our findings from this analysis. We wrap up by discussing the implications of our findings for further research as well as the public debate about the consequences of ethnic diversity.

Theoretical linkages

Theoretically, the notion that contextual ethnic diversity affect individuals' trust in other people can be said to reflect *experiential* theories of trust emphasizing how people's trust in the generalized other is formed by their experiences in the environment in which they live (Dinesen, 2010; Glanville & Paxton, 2007). This stands in contrast to *cultural* theories of trust, which argues that trust is a stable trait formed early on in life by cultural transmission, primarily from parents to children, and largely immune to later influences (Uslaner, 2002). Hence, the general underlying

idea behind the diversity-trust nexus is that our notion of the trustworthiness of other people in general is, at least in part, flexible and informed by the people we are exposed to in our daily surroundings. If we, based on our experiences, perceive people in our surroundings to be less trustworthy this will spill over to our overall estimate of the trustworthiness of other people in general when running tally.

While not empirically tested, various broadly conceived mechanisms have been put forward in the literature to explain the negative impact of ethnic diversity on trust and lower social cohesion more generally. One perspective emphasizes homophily; the notion that people are more comfortable around people like themselves – socially as well as ethnically (McPherson et al. 2001). In ethnically homogeneous settings, communication is easier and cultural distance lower as most people are alike and this, in turn, makes it easier for people to make the leap of faith and trust most other people (Alesina & Ferrara 2005; Forbes 1997; Messick & Kramer 2001). Another related perspective emphasizes how living in ethnically diverse settings, through exposure to other ethnic groups, is likely to spur ethnic group conflict and competition over material resources, social status and/or cultural identity (Blumer 1958; Bobo & Hutchings 1996; Forbes 1997; Paxton & Mughan 2006; Quillian 1995). Specifically, in the case of immigration-related diversity, natives are likely to perceive immigrants as an economic and cultural threat (Citrin & Sides, 2007; Sniderman & Hagendorn, 2004) and respond by hostility. This may also extend to lowered trust in the generalized other, who is more likely to be ethnically different (i.e. immigrant) the greater the level of ethnic diversity.

While the relationship between ethnic diversity and generalized trust has, to our knowledge, exclusively been shown to be negative or non-significant, it should be mentioned that another line of research has shown how interethnic contact diminishes ethnic and racial prejudice (Allport 1954; Pettigrew 1998; Pettigrew & Tropp 2006). This has led some to examine how interethnic contact may moderate the impact of ethnic diversity on social trust (Marschall & Stolle 2004; Stolle et al. 2008) or even turn the relationship into a positive one under the right circumstances (Uslaner [nd]).

Estimating the impact of contextual ethnic diversity on trust: A register-based approach

As noted in the introduction, we utilize first four rounds of the Danish version of the European Social Survey (ESS) conducted in 2002/3, 2004/5, 2006/7, 2008/9. The ESS is generally held to be a highly valid and reliable data source for comparative survey data on political and social values in Europe (Stoop et al., 2002), including the dependent variables of this study, generalized trust, as

well as its most important correlates at the individual level (see below). The respondents in the Danish version of the ESS were sampled from the national civil registry and their civil registration numbers were retained by the data collection agency (SFI-survey). This enables us to link socio-demographic information from the elaborate Danish national registers to each respondent in the survey as these data are identified by the civil registration number. For our purposes, the national registers contain two important types of information, which allow us to flexibly create contextual units of various sizes for each respondent in the ESS and calculate measures of ethnic diversity within these units. First of all, the registers contain the addresses of all individuals in Denmark at any given point in time and the exact geographical location of these addresses. This means that we can localize the address of residence of all respondents in the ESS, and, in addition, their distance to all other addresses in the country. Secondly, because the civil registration number of the individuals living on all addresses in the country is known, we can merge the socio-demographic information from the registers to all addresses. Consequently, given that we know where each respondent lived and who lived around them in a given point in time, we can, based on the socio-demographic information about people living within a given proximity of the respondents, calculate aggregate contextual measures of ethnic diversity (and other socio-economic characteristics) within any given radius (down to 75 meters) of each respondent in the ESS.³ Hence, we can flexibly define the neighborhood of each respondent and calculate ethnic diversity and other contextual measures based on the respondents' neighbors living within this radius.

Analyzing the relationship between ethnic diversity and trust using data from the national Danish registers provides a methodological improvement over earlier studies, which allow us to estimate the impact of ethnic diversity with greater precision, as well as contributes to our theoretical understanding of the relationship between ethnic diversity and trust. Methodologically speaking, linking survey data with the national Danish registers provide an important improvement with regard to the location of each respondent in the survey within meaningful contextual units. In previous intra-country studies using municipalities or census tracts as contextual units, it is not possible to locate each respondent within that contextual unit. This means that we have no chance of knowing whether each respondent lives in the center of this unit or on the border of another contextual unit. This is non-trivial – especially in more heavily populated areas, where the boundaries of administrative units are likely to be more arbitrary – because in the latter case, the level of ethnic diversity (or any other contextual variable) attached to each respondent does not

³ Note that we have socio-demographic data for all years of the ESS.

accurately reflect the exposure to ethnic diversity that a given respondent actually experience.⁴ Hence, being agnostic about the location of a given individual within a contextual unit will lead to greater measurement error in gauging the level of diversity experienced by that person, which in turns renders it more difficult to detect an impact of ethnic diversity on trust. In our data, given that we know the exact place of residence of each respondent in the survey and everyone living around them, we do not have to rely on their location in larger contextual units, but can instead freely create contextual units for each respondent as noted above. This allow us to obtain a much more accurate measure of the ethnic diversity experienced by people and therefore estimate the impact of living in diverse contexts on trust in others with higher precision.

The fact that we are can define context flexibly enables us to study systematically how ethnic diversity in contexts of different sizes affects trust in others and thereby answer the larger theoretical question in the literature about which contextual units (if any) are most relevant when analyzing how ethnic diversity affects trust. To our knowledge, no previous studies have been able to study systematically how ethnic diversity in contextual units of different sizes affect trust in others, but have instead had to rely on respondents being nested within administrative units of various sizes, of which some are typically quite aggregate (see, e.g., Phan, 2008; Putnam, 2007). The question of specifying the correct contextual unit when analyzing the impact of diversity on trust has received increasing attention within the literature on trust as well as related areas of research focusing on out-group attitudes.⁵ Indeed, Putnam reports findings that substantiate the idea that the impact of ethnic diversity on trust is more likely to emerge when measured in more fine-grained contextual units, where less measurement error exist. In his analysis in the US, he finds that the impact of ethnic diversity measured at lower contextual levels (census-tracts) is more precisely estimated than diversity measured at higher contextual levels (counties).

Specifying the correct contextual units is not only a matter of estimating the relationship between ethnic diversity and trust with less measurement error, but is also likely to be related to the estimation of an unbiased effect of ethnic diversity on trust. In this regard, the criticism voiced by Eric Uslaner against most of the existing studies of the relationship between

⁴ It should be noted that while most of the literature implicitly suggests that exposure to and experiences of ethnic diversity is the main mechanism linking ethnic diversity and trust, contextual diversity may also influence generalized trust in other ways (e.g., indirectly as a reaction to political responses to increased ethnic diversity).

⁵ In the words of two leading scholars of out-group attitudes (Sides & Citrin, 2007: 497) commenting on the phenomenon of a differential impact of ethnic diversity at various level of aggregation on attitudes toward immigration in different studies: “Specifying the correct contextual unit and isolating its effect is a significant task for future research.”

ethnic diversity and trust is instructive. Uslaner argues that it is not ethnic diversity per se that matters for trust, but instead the level of segregation between different ethnic groups. The argument is that ethnic diversity at any given level of aggregation may conceal considerable variation in the proximity in which people of different ethnic background live to each other within that geographical unit (how segregated/integrated different ethnic groups are within that geographical unit). Thus, it also relates to the discussion about the appropriate contextual unit for analyzing the relationship between ethnic diversity and trust. In an impressive number of analyses across different countries, Uslaner (forthcoming) shows that when including measures of both ethnic diversity and segregation, the impact of the latter trumps that of the former and hence provides an important potential reinterpretation of earlier analyses showing a negative relationship between ethnic diversity and trust. The point is that at higher levels of aggregation, ethnic diversity is more likely to proxy for other related factors, which may potentially confound the impact of ethnic diversity on trust. However, lowering the level of aggregation to very low levels of aggregation, we argue that this form of confounding is much less likely to occur and hence allow for an estimation of the real effect of ethnic diversity on trust. Consider the phenomenon of segregation suggested by Uslaner to confound the relationship between ethnic diversity and trust. While Uslaner is clearly right that ethnic diversity at higher levels of aggregation such as municipalities or metropolitan statistical areas may conceal considerable variation in how proximate people of different ethnic backgrounds live to each other at lower contextual levels, this is essentially a problem of not being able to measure ethnic diversity at sufficiently disaggregate levels. In the micro-contexts that we analyze, which are defined to be down to a radius of 75 meters within the respondent – slightly less than two thirds of the length of an American football field – it hardly makes sense to speak of more or less segregated contexts. Within this micro-context, exposure to ethnic diversity is essentially unavoidable independent of how residence is structured along ethnic lines. However, given the results by Uslaner it is very instructive to compare the impact of ethnic diversity on trust across different levels of aggregation. This provides an indication about the extent to which the size of the contextual unit appears to affect the estimate of impact of ethnic diversity in trust and hence whether there is reason to believe that other factors are confounding this relationship at higher levels of aggregation.

From the above, it should be clear that a more complete specification of the contextual levels is paramount when disentangling the effect of ethnic diversity on trust. Our contextual data are nearly ideally suited for this purpose as they enable us to obtain measures of ethnic diversity in

contexts of various sizes ranging from the micro-context to the wider neighborhood for each respondent.

Measures and specifications

The dependent variable: Generalized trust

The dependent variable, social trust, is measured using the widely used and validated three-item scale (Dinesen (forthcoming); Reeskens and Hooghe 2008; Zmerli and Newton 2008). The trust scale consists of the following three questions: “Generally speaking would you say that most people can be trusted, or that you can’t be too careful in dealing with people”, “Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?” and “Would you say that most of the time people try to be helpful or that they are mostly looking out for themselves?”. All questions were measured on an eleven-point scale ranging from 0 (“You can’t be too careful”/“Most people would try to take advantage of me”/“ People mostly look out for themselves”) to 10 (“Most people can be trusted”/“Most people would try to be fair ”/“ People mostly try to be helpful”). In the Danish data, the three items offer a reliable scale of generalized trust with reasonably strong internal coherence across the four surveys ($\alpha=0.71$). While conventional wisdom within survey research would suggest that using a multiple item scale would more validly and reliably capture a complex phenomenon such as trust, and recent methodological studies support this contention (Reeskens & Hooghe, 2008; Zmerli & Newton, 2008), Uslaner (2002, ch. 3) argues in favour of using only the first of the three survey questions (“Generally speaking would you say that most people can be trusted, or that you can’t be too careful in dealing with people”). He argues that the two items regarding helpfulness and fairness of others capture different and more experience-based aspects of dealing with other people, which is different from his conception of generalized trust as largely independent of experience. Generally, we see no reason that generalized trust in other people should be immune to experience; indeed, the fundamental idea behind the alleged relationship between ethnic diversity and trust is that our experiences with people of different ethnic background informs our judgment of the trustworthiness of the generalized other as noted above. However, in order to ascertain that our results are not driven by our operationalization of the dependent variable, we reran all analyses with the single-item trust question, but the results were essentially identical to those with the three-item trust scale, which we have reported.⁶

⁶ Results with the single-item trust question are available upon request.

Scaled from 0 to 10, and including only respondents having answered at least two questions, the mean score on the trust scale is 6.78 (sd=1.59) across the four ESS waves. Comparatively speaking, this is a very high level of trust, which confirms earlier results showing that Denmark is a one of the countries in the world with the highest level of trust (Dinesen & Sønderskov, forthcoming; Hooghe et al., 2009).

The independent variable: Ethnic diversity

As noted earlier, the national registers contain information about addresses and the ethnic background of everyone living in Denmark and therefore allow us to generate flexible contextual measures of our independent variable, ethnic diversity. In the registers, each individual is classified as either native Danish, immigrant (i.e. first-generation immigrants) or descendants of immigrants (i.e. second-generation immigrants) according to the definition by Statistics Denmark (2009). A person having at least one parent who were born in Denmark and holds a Danish citizenship, is classified as being “native Danish” regardless of whether the person is her-/himself born in Denmark and/or holds Danish citizenship. For people who do not meet these criteria, individuals born outside of Denmark are considered (first-generation) “immigrants”, whereas individuals with parents born outside of Denmark are classified as “descendants” (second-generation immigrants).⁷ Furthermore, the registers also contain information about the country of origin of immigrants and the country of origin of the parents of descendants (i.e., Turkey is indicated as the country of origin for individuals born in Turkey or descending from parents born in Turkey). Hence, the registers enable us to distinguish not only between the general categories of native Danes, immigrants and descendants, but also to differentiate between the specific countries of origin of immigrants and descendants. Consequently, because we are able to go beyond the crude classification of people as immigrants or descendants, we can examine how specific ethnic compositions of the environment of respondents in the survey influence their level of trust in other people.

In the present version of the paper we operationalize ethnic diversity in two ways: the share of immigrants and descendants in general and the share of non-Western immigrants and descendants in a given contextual unit. ‘Non-Western’ is defined as people from outside EU-15, Iceland, Norway, the European microstates, North America, Australia and New Zealand. Although not measuring ethnic diversity per se, the Western/non-Western distinction is arguably the most

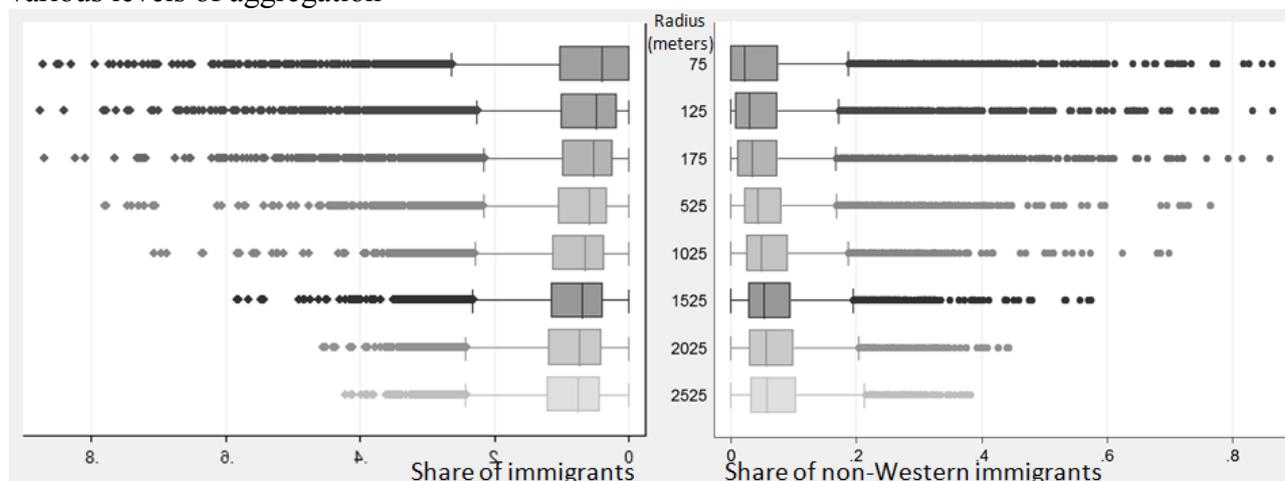
⁷ It should be noted that the definition of immigrants and descendants employed by Statistics Denmark also includes refugees and asylum seekers granted permanent residency in Denmark. Hence, throughout this paper, the term “immigrant” also refers to the latter two groups.

salient ethnic dividing line in Denmark, both in terms of visibility and in the public debate. In future versions of the paper it is our ambition to analyze a number of other measures of ethnic diversity, including ethnic fragmentation (1- the Herfindahl-index), to assess whether it is mainly ethnic fragmentation rather than the size of the immigrant group or specific immigrant groups from certain countries of origin that affect trust.

A few restrictions applied when constructing measures of ethnic diversity (and other aggregate measures) of the contextual units in which the respondents in the survey live. While the distance between each individual in the survey and the 20,000 people living in the greatest proximity of that person was calculated by Statistics Denmark (who administer the national registers), they made the restriction, to preserve the anonymity of the respondents, that the distance between the 50 households nearest to a given respondent were rounded according to the following scheme (with the rounded distance in parenthesis): 0-24.99 meters (0 meters), 25-74.99 meters (50 meters), 75-124.99 meters (100 meters) and so forth. For households outside the 50 nearest households, the distance is rounded down to the nearest 10 meters. Because of this limitation, the lowest geographical unit, for which we can calculate precise contextual measures of ethnic diversity (and other variables), is within 75 meters of the respondent. Expanding the context of each individual, we added a 50 meters to the radius of each context in order to capture the wider context of each individual (i.e., the second context for which we calculated the ethnic diversity measure was within a radius of 125 meters of each respondent, the third context one of 175 meters and so on up to 2525 meters). To avoid marked fluctuations in ethnic diversity induced by a few observations, we made the restriction that at least 20 persons should be living within a radius of a given respondent in order for us to calculate ethnic diversity within that unit. Respondents with fewer than 20 persons with valid data living within any given radius were excluded from the analyses, which imply that respondents living in very sparsely populated areas were excluded from the analyses.⁸

⁸ Excluding respondents living in very sparsely populated areas may induce bias and/or loss of precision. In later versions of the paper we plan to compare our results with results obtained without excluding these respondents to check the robustness of our results.

Figure 1: The distribution of immigrants and non-Western immigrants in respondents' context at various levels of aggregation



Note: N=4738

Hence, we have measures of contextual ethnic diversity from within circles with a radius of 75 meters up to 2525 meters around each respondent. Figure 1 shows the distribution of ethnic diversity in areas of varying sizes around the respondents. The distribution of diversity is quite similar across the two operationalizations of diversity ($.97 < r < .99$), with the only notable difference being that the level of immigrants is marginally higher when using all immigrants compared to non-Western immigrants. The similarity and the minor difference can be ascribed to the fact that non-Western immigrants are a subset of all immigrants. The similarity implies that we probably will not be able to call if any effect of diversity is caused by immigrants in general or by non-Western immigrants in particular.⁹ Both distributions show that most respondents' geographical micro-context is not particularly diverse and that average/median ethnic diversity increases with the level of aggregation. In the immediate micro-context of the respondents (a circle form the respondent with a radius of 75 meters), the median share of non-Western immigrants is .02 and 75% of the respondents live in a micro-context with less than 8% non-Western immigrants. However, the variation in ethnic diversity across the micro-context is large and a number of respondents even live in a micro-context with a majority of non-Western immigrants. When expanding the size of the context this is no longer the case; the maximum share of non-Western immigrants is .38 when looking at a context with a radius of 2525 meters around the respondents. Hence, expanding the size of context implies that the average/median ethnic diversity rises and that the variation in diversity diminishes.

⁹ We plan to explore this issue further in future analyses. As noted above, we are able to identify the country of origin for all immigrants, which enable us to test if the effect of diversity varies across context with different compositions with respect to country of origin.

Control variables

In addition to our main independent variable of interest, contextual ethnic diversity, we include several control variables at the individual and the contextual level in order to rule out confounding of the relationship between contextual ethnic diversity and trust. As emphasized in recent studies (Letki, 2008; Phan, 2008; Sturgis et al., 2011), ethnic diversity and generalized trust covary with the broader socioeconomic environment in terms of wealth and socio-economic deprivation more generally. Consequently, controlling for various socioeconomic factors is paramount in order to isolate the impact of ethnic diversity on trust. Therefore we include the following two socioeconomic variables at the same contextual level as ethnic diversity in order to examine whether it is socioeconomic deprivation rather than ethnic diversity (or both) that shapes trust: average disposable income and unemployment rate.^{10,11} Similar to the ethnic diversity measure, both variables were derived from the national registers based on information about the people living within a given radius of a respondent in the survey. Contrary to the measure for ethnic diversity, which is based on all individuals within a given radius of a given respondent, we only base the contextual measures of income and unemployment on data about adults. In subsequent analyses we plan to include additional indicators of the socioeconomic environment including the level of crime, the number of single-parent families etc. In addition to the indicators of the socioeconomic environment, we also include the population density of a given contextual unit. As immigrants generally live in larger cities with higher population density, we include this variable to ascertain that any observed effect of ethnic diversity on trust cannot be attributed to ethnically diverse contexts being more populous than less diverse contexts.

In addition to the control variable at the contextual level, we also include a range of standard predictors of trust at the individual level (see e.g. Alesina & Ferrara, 2002; Delhey & Newton, 2003; Li, Pickles and Savage, 2005). Specifically, we include education (measured in years), unemployment¹², personal disposable income¹³, institutional trust¹⁴, life satisfaction (scaled

¹⁰ Income is indexed at 2000-level to adjust for inflation and is measured in millions of Danish kroner.

¹¹ The unemployment rate was measured as the fraction of the adult population in the workforce who were unemployed for more than half a year in either 2002, 2004, 2006, or 2008 (depending on which year the respondent was surveyed).

¹² This is coded as a dummy variable indicating whether the respondent was unemployed during the previous 7 days before being interviewed.

¹³ The income variable is based on register data and measures the disposable income measured in millions of Danish kroner (indexed at 2000 level). As an alternative to the register based personal income measure, we have also used self-reported disposable household income. The coding of household income varies across the four surveys and we therefore converted the measure into a relative one by differentiating between respondents with a household income below the 25th percentile, between the 25th and the median, between the median and the 75th percentile, and above the 75th percentile within each survey. We also included a category containing respondents who did not reveal their income.

from 0 to 10), gender, age, and place of birth (native Danish/Western immigrant vs. non-Western immigrant).¹⁵ Although some of these predictors, especially attitudinal variables such as life satisfaction, may be endogenous to trust, we opted for including them in the model in order to provide a conservative test of the impact of ethnic diversity on trust (i.e. avoid confounding by any individual-level variables). Finally, we also include dummies to indicate in which waves of the ESS a given respondent participated in order to remove autocorrelation and take into account any differences between the four waves not captured by the other variables in the model.

Analysis

Table 1 shows the results of four linear regression analyses using diversity measured as either share of immigrants (Model I and II) or share of nonwestern immigrants (Model III and IV) as the main independent variable. In Models I and III, diversity is measured at the level of the immediate micro-context (a circle around the respondent with a radius of 75 meter), while Model II and IV shows the results when measuring diversity at the highest level of aggregation analyzed (radius = 2525 meters). The results show that diversity in the micro-context affects generalized trust negatively, while the effect decreases and becomes insignificant at the higher level of aggregation. In the micro-context, the predicted level of trust is – all else being equal – roughly 0.5 points lower among individuals living in a micro-context with 50% percent immigrants than among individuals living in a context with 0% immigrants. As the trust measure is scaled from 0 to 10, the difference suggests a non-trivial effect of diversity. However, a change over the inter quartile range – the middle of the distribution – of the diversity variable (measured as the share of immigrants in general) is predicted to decrease generalized trust with 0.11 points, which points to a more limited effect of diversity. Nevertheless, the effect of a change over the inter quartile range corresponds to the effect of approximately three years of education, which cannot be dismissed as trivial.

Using this measure instead of the personal income measure yields almost identical results, both in terms of the effect of diversity and in respect to the overall effect of income.

¹⁴ The measure is a scale consisting of four items about trust in parliament, politicians, the legal system and the police. The scale has a reliability-coefficient of .78 and is scaled from 0-10.

¹⁵ This coding corresponds to the coding of non-Western immigrants used to measure diversity (see above) and it is also based on register data. We have also tried alternative codings, e.g. native vs. all immigrant, but the results are substantially similar. Furthermore, because the effect of diversity may differ between natives and immigrant, we tried out models that included interaction terms between place of birth and diversity. However, the interaction term is insignificant in all models, and we therefore only report models without the interaction term.

Table 1: Regression results

Model	I	II	III	IV
Measure of diversity	Share of immigrants		Share of non-Western immigrants	
Radius	75	2525	75	2525
Individual characteristics				
Gender (male)	-.45*** (-11.00)	-.45*** (-11.06)	-.45*** (-10.97)	-.45*** (-11.06)
Age (years)	.01*** (5.25)	.01*** (5.50)	.01*** (5.26)	.01*** (5.49)
Education (years)	.04*** (7.33)	.04*** (7.44)	.04*** (7.26)	.04*** (7.45)
Income (mil. Danish kroner)	-.11 (-.45)	.04 (.19)	-.11 (-0.47)	.04 (.19)
Place of birth (native)	.33*** (3.35)	.43*** (4.32)	.34*** (3.38)	.43*** (4.30)
Unemployed (yes)	.00 (.01)	-.00 (-.01)	0.00 (0.01)	-.00 (-.01)
Institutional trust (1-10)	.36*** (22.88)	.36*** (22.90)	.36*** (22.86)	.36*** (22.89)
Life satisfaction (1-10)	.17*** (10.40)	.17*** (10.47)	.17*** (10.41)	.17*** (10.46)
Contextual characteristics				
Ethnic diversity	-.98*** (-3.60)	.03 0.05	-1.00*** (-3.36)	-.11 (-.19)
Unemployment rate (share unemployed)	.65 (1.21)	-2.64 (-1.48)	.69 (1.26)	-2.36 (-1.30)
Mean income (mil. kroner)	1.67** (3.13)	.64 (.56)	1.65** (3.08)	.71 (-.63)
Population density (number of persons within context)	.00*** (3.75)	.00** (3.14)	.00*** (3.49)	.00*** (3.41)
ESS round				
2002/3			Reference	
2004/5	-.22*** (-3.76)	-.19** (-2.91)	-.22*** (-3.76)	-.19** (-2.96)
2006/7	-.09 (-1.58)	-.11 (-1.78)	-.09 (-1.60)	-.11 (-1.75)
2008/9	-.05 (-.79)	-.12 (-1.74)	-.05 (-0.81)	-.11 (-1.63)
Constant	2.21*** (11.82)	2.41*** (9.48)	2.20*** (11.80)	2.40*** (9.43)
N	4738	4738	4738	4738
R-square	.24	.24	.24	.24

Notes: t-statistics (based on white corrected standard errors) in parentheses. Observations are weighted by a weight (*dweight*) that (somewhat) corrects for sampling error. The results are, however, insensitive to weighting.

As noted, the effect of ethnic diversity differs markedly when measured at the lowest and the highest level of aggregation in our data. In order to investigate the difference in impact of ethnic diversity across contextual units of varying size more systematically, we have illustrated the effect of ethnic diversity on trust across different levels of aggregation in Figure 2 and 3 below (with our two different measures of diversity). The effects are based on regressions with similar specifications as in Table 1, with contextual variables measured in contexts at the same size as the diversity variables.

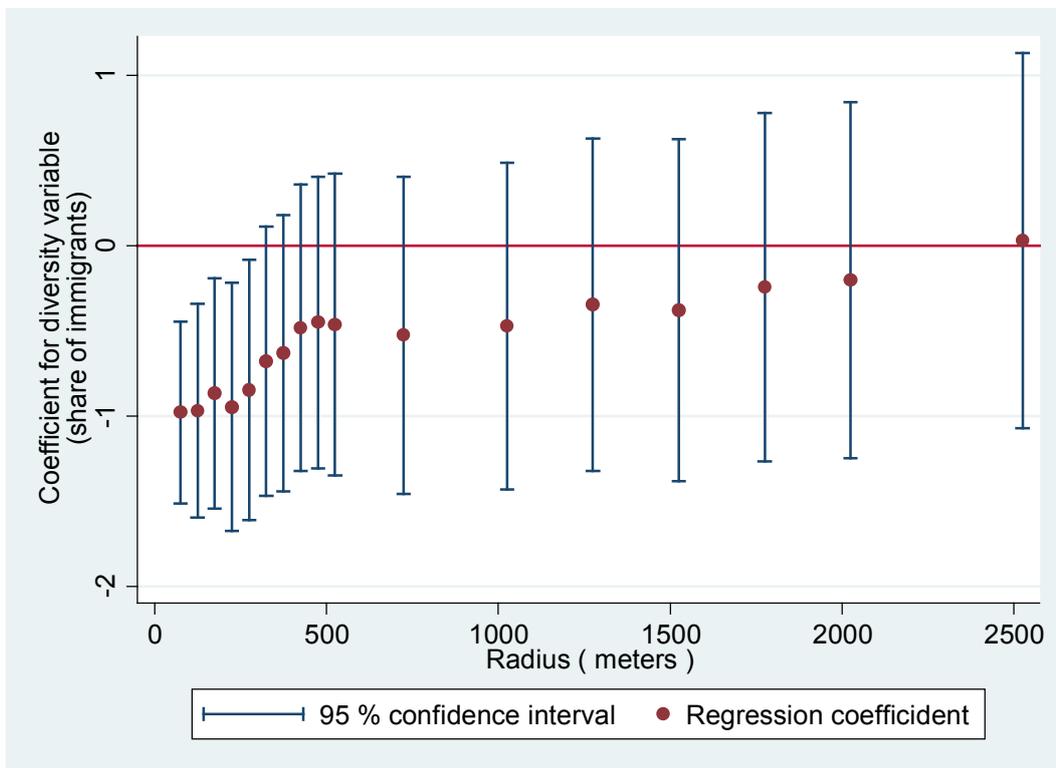


Figure 2: Effect of diversity (share of immigrants) estimated at different contextual sizes

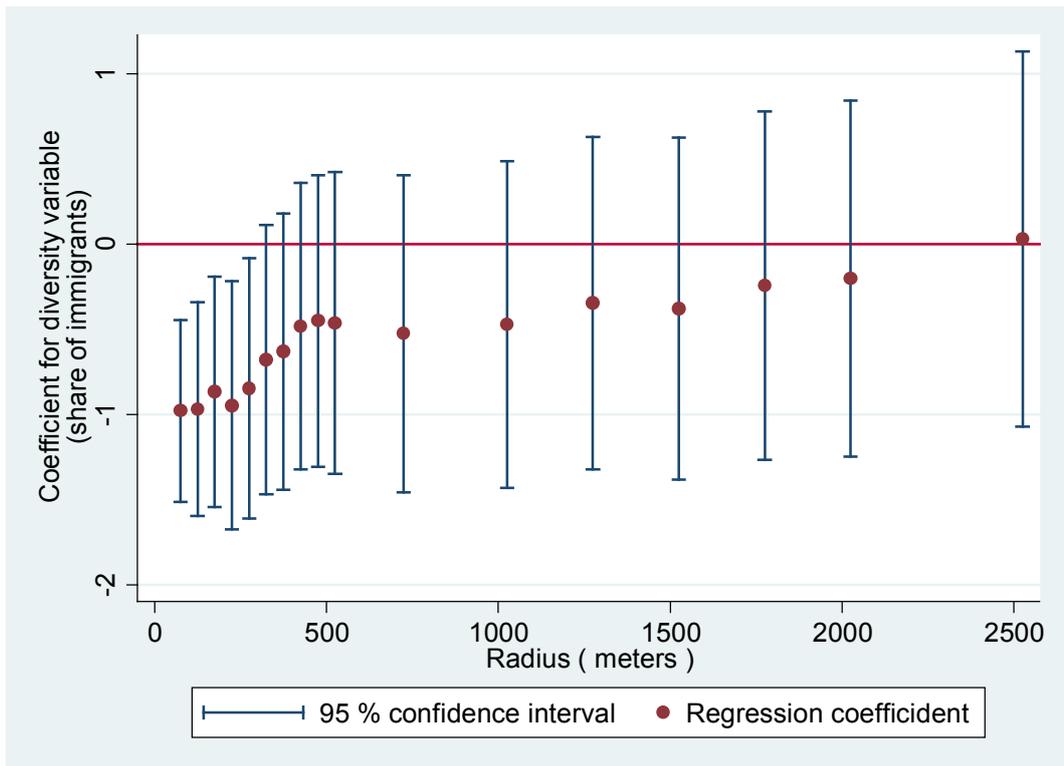


Figure 3: Effect of diversity (share of non-Western immigrants) estimated at different contextual sizes

The patterns in both figures show that the impact of ethnic diversity on trust varies markedly across the level of aggregation and clearly supports the picture from Table 1; the impact of ethnic diversity on trust diminishes and becomes less precise (as indicated by the larger standard errors of the estimate) when diversity is measured at higher levels of aggregation. Specifically, the impact of ethnic diversity fails to reach significance (at the .05-level), when measured in contextual units of a radius of more than approximately 300 meters within the respondent. Hence, it is ethnic diversity of the immediate surroundings that matters for individuals' trust in others, and our results show that the contextual threshold for detecting a negative effect of ethnic diversity is within few hundred meters of the individual. In contextual units of larger size, the impact of ethnic diversity on trust is washed out and estimated with less precision. This finding supports Putnam's (2007) results from the US and substantiates our contention about the consequence of being able to measure ethnic diversity more precisely at various levels of aggregation. Moreover, the systematic differences in the effect the effect of ethnic diversity across contextual units of different size may also suggest that various confounding influences operate to suppress the impact of ethnic diversity on trust at higher levels of aggregation.

Conclusion and discussion

[Yet to be written]

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