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Do community needs affect the decision to volunteer? The case of refugees in Germany.

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Do community needs affect the decision to volunteer? The case of refugees in Germany.

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Abstract

I study the relationship between changes in community needs and the supply of voluntary work. I present basic theoretical considerations, which suggest that the relationship between voluntary work and an increase in community needs is ambiguous. Then, I test the relationship empirically by proxying community needs with the number of needy people, i.e., refugees, in a county, and by exploiting the quasi-experiment of refugees' allocation within Germany. I find that doubling the number of refugees increases the probability of volunteering by about 2 percentage points. These estimates imply that 1.45 million people additionally volunteered during the refugee crisis, i.e., more than one person per refugee.

JEL-Classifications: *D64, J22, H49*

Keywords: *Voluntary Work; Community Needs; Refugee Crisis; Quasi-experiment*

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1 Introduction

Uncovering motives and mechanisms behind the decision to volunteer has been of particular interest in economics because, in contrast to the supply of work in the labor market, volunteering is typically an uncompensated activity. The supply of voluntary work is thus usually examined through the lenses of time-budget constraints, the opportunity cost of volunteering, and the provision of public goods and services (e.g., Freeman 1997; Andreoni 1990). However, due to its uncompensated nature, conceptualizing and estimating the elasticity of voluntary work has proven challenging.

I set out to investigate the responsiveness (the elasticity) of the supply of voluntary work with respect to the presence of community needs, i.e., needy people at the local level. This is especially relevant given the importance of volunteering in the provision of local public goods and services. Jones (2006, p. 262) argues that "charitable giving is less able than volunteering to quickly and directly respond to community needs" and it is therefore of primary interest to identify volunteering responses independently of other charitable behaviors in this context.[1]

Importantly, volunteering is also not a niche phenomenon; worldwide a large share of the population volunteers. In Germany in 2017, for example, around a third of the population volunteered, and more than half of them were regularly doing so (Burkhardt and Schupp 2019). For comparison, Charities Aid Foundation (2018) has placed Germany 46th on a worldwide ranking of the share of volunteers in the population.

To examine whether volunteers respond to changes in the presence of needy people or not, I present theoretical considerations and an empirical evaluation of the predictions. The conceptual framework relies on the utility maximisation of an agent who can derive warm glow from volunteering (Andreoni 1990). I focus on two main explanations for volunteering activity: the number of people in need and free riding. From the conceptual framework, I predict that the supply of volunteer work is (i) ambiguously related to an increase in the number of needy people, and (ii) negatively related to an increase in the contributions of others.[2] For the empirical part, I use data from the German

[1] Charitable giving is defined as contributions that are eligible for charitable deductions, but also charitable bequests, and any donation of money or goods to a third party (Schervish and Havens 2002). An arising modelling question concerns the degree of substitutability or complementarity between the two above-mentioned types of charitable activity. For more details see, i.e., Freeman (1997); Duncan (1999); Feldman (2010); Hackl et al. (2012); Lancee and Radl (2014); Brown et al. (2019); Voorintholt (2023).

[2] In the conceptual framework it is easily possible to extended the interpretation of "contributions of others" to include government interventions. Previous studies have in fact discussed that the supply of voluntary work can

Socio-Economic Panel (2007-17) combined with other administrative information and data sets. I regress the probability of volunteering on the local number of refugees and on the local population.[3] The first regressor is a proxy for community needs. The second regressor, population, could be a proxy for the contributions of others (Krasteva and Yildirim 2013).

For the empirical strategy, I exploit the exogenous shock in the demand for local public services, related to the inflow of refugees in Germany. As an illustration, during the refugee crisis of 2015-16, around 1 million refugees migrated to Germany (Jacobsen et al. 2017). Refugees needed help for accommodation and administrative procedures, as well as for other services (Nam and Steinhoff 2018). Survey results show that volunteers supported refugees when visiting the authorities, they helped refugees learn German and integrate into the labor market (Kausmann et al. 2022). Methodologically, I resort to panel fixed-effects and fixed-effects instrumental-variable regressions to control for possible self-selection of refugees into German counties despite the strict allocation rules. The instrumental variable mimics the counterfactual allocation of refugees as prescribed by the allocation rules, which first apply between the 16 federal states (based on population and tax revenues) and then across counties within each state, based on different criteria.

The empirical results inform about a positive relationship between volunteering and changes in the number of needy people and support the predicted negative relationship between volunteering and increases in population. With respect to needy people, the main result implies that doubling the number of refugees increases the probability of volunteer work by about 2 percentage points. A back-of-the-envelope calculation suggests that 1.45 million additional volunteers engaged during the refugee crisis, i.e., more than one volunteer per refugee. The 1.45 million additional volunteers also correspond to about a third of the staff employed in the public sector in Germany, who might be substitutes for volunteers. These findings are also in line with reported oversupply of volunteers during social crises, i.e., the refugee crisis in Austria (Simsa et al. 2019) and the COVID-19 crisis in Switzerland (Trautwein et al. 2020), implying a strong response by volunteers.

To the best of my knowledge, there is no previous work trying to establish a causal link between

back government interventions, especially when a prompt response is necessary, or that it can be crowded out, i.e., government interventions may reduce volunteering (e.g., Hackl et al. 2012). More generally, the voluntary sector might develop concomitantly with heterogeneous and undersatisfied demand for public services (Weisbrod 1975). However, due to data limitations, the role of government interventions is explored only in robustness checks in the empirical part.

[3]For brevity, I use the term "refugees", whereas the official wording is "persons in need for protection" (Destatis 2018). These are foreigners who stay in Germany appealing to humanitarian reasons (Destatis 2018).

community needs and the supply of voluntary work at the individual level, especially in the context of a social crisis. Nonetheless, the presence of need has been one of the first mechanisms discussed in the charitable-giving literature (Bekkers and Wiepking 2011). Per capita income and income dispersion, which can be considered indicators for economic need (Unger 1991), have been related to monetary donations in studies dating back to the '70s (Hochman and Rodgers 1971; Reece 1979). Unger (1985) and Unger (1991) are the first studies to explore the relationship between community needs and volunteering. The author provides some evidence of a positive correlation between voluntarism and perceived community needs (measured by asking people if their community would be better off with more volunteers), based on cross-sectional survey data. Other and more recent empirical studies use aggregated data. Grønbjerg and Paarlberg (2001), for example, use cross-sectional data at the county level to test the hypothesis that the density of nonprofit (including charitable) organisations is positively related to community needs, measured by a child poverty rate. They estimate a negative relationship between the two variables, but they suggest that different variables used to measure community needs may deliver different results. Their analysis is relevant to understand volunteering behaviour, nonetheless, as the presence of charities and volunteering are positively related (Mohan and Bennett 2019).

This paper also relates to other studies describing volunteer work during the refugee crisis. Nam and Steinhoff (2018) estimate the value of volunteer work during the refugee crisis in one German district, but they do not present causal evidence for this volunteering response. Simsa et al. (2019) examine the work environment of spontaneous volunteers during the refugee crisis in Austria and highlight the differences between volunteering during social and environmental crises.

More broadly, this work adds evidence to the literature focusing on the outcomes of refugee crises (Bahar et al. 2022; Battisti et al. 2022; Busch et al. 2020; Deole and Huang 2021; El-Bialy et al. 2023; Fremerey et al. 2024; Gehrsitz and Ungerer 2022; Giavazzi et al. 2019; Hangartner et al. 2019; Hilbig and Riaz 2022; Jaschke et al. 2022; Martén et al. 2019; Schilling and Stillman 2024). Many studies focus on employment outcomes or integration in the host country, but especially relevant is Albarosa and Elsner (2023), a study on social cohesion in Germany. The authors document that the inflow of refugees has no effects on trust and perceived fairness in the host country, but it has a small negative effect on attitudes towards migrants.

My contribution with respect to the previous literature is to investigate the effects of actual and

sudden changes in community needs on the decision to volunteer at the individual and at the household level. The identification strategy exploits the quasi-experiment of the refugee allocation to German counties, which helps shed light on the causal relationship between local needs and voluntary work, thus identifying the elasticity of the supply of voluntary work. Moreover, by using a panel data set, I can control for unobserved time-invariant characteristics, which helps deliver more compelling evidence on the relationship of interest. This analysis thus enriches the literature on volunteering as compared to other charitable behaviors,[4] as well as the literature on the outcomes of the inflow of refugees, by focusing on new outcomes, like volunteering.

2 Conceptual framework

Volunteering and monetary donations are typically considered as a way of contributing to public goods or services (Freeman 1997). When considering the individual decision to donate, Andreoni's seminal work shows that people may derive utility from the availability of public goods, from the act of giving itself or both (Andreoni 1989; Andreoni 1990). A person is defined as a pure altruist when he only cares about the total level of the public good, so that others can also benefit from it. This implies that if the public good is delivered at its optimum amount, a pure altruist will not donate. The opposite case is the impure altruist, a person who derives utility exclusively from her own contribution to the public good. The impure altruist does not care about the level of the public good, but she cares about the warm glow she feels from donating. The mixed altruist is the middle case between the two extremes, pure and impure altruist. Mixed altruists care about the level of the public good and their own contribution to it. This is arguably the most common case, with a high degree of heterogeneity among people.

In order to derive predictions on the relationship between changes in the number of people in need and optimal volunteering, we can start with a simple private consumption model (presented in detail in Appendix A). Individuals can derive utility from private consumption, the availability of public goods for needy people, and from the act of volunteering itself. In this framework, the number of needy people can be seen as a crowding parameter, so that the potential volunteers

[4]It seems that volunteering has not received as much attention as charitable (monetary) donations in terms of research. For example a "Google Scholar" search shows about 38,600 results for studies on monetary donations and about 2,850 on volunteering.

(may) care about the availability of the public good relative to the number of people in need.[5] The provision of the public good depends on own and others' contributions, i.e., volunteering, whereby I assume that others' contributions are taken as given by each individual, who in turn best responds to them. The setup allows for separate predictions for the general case of mixed altruism as well as for pure and impure altruists.

Optimal volunteering is determined by the equality between the marginal utility and the opportunity cost of volunteering. Individuals' optimum volunteering may change in response to changes in the number of people in need, depending on their type of altruism. First, impure altruists will not be affected by changes in the number of needy people as they only benefit from the act of giving itself.[6] An increase in the number of needy people, instead, has an ambiguous effect on optimal volunteering for mixed and pure altruists. This ambiguous relationship is based on two counteracting effects. The first is a positive "crowding effect," which relates to the increase in utility from contributing more to the public good as it gets crowded. The second is a negative "productivity effect," which relates to the declining (marginal) returns to the effort exerted by the volunteer. This ambiguous relationship holds by extension for the extensive margin, i.e., the decision to volunteer.

In this basic framework, there are also incentives for free riding in the pure and in the mixed altruist cases, as utility is derived from the overall provision of the public good. If someone else volunteers and contributes to the public good, own contributions may crowd out. In contrast, we do not expect other people's contributions to affect the contributions by impure altruists, as they only derive joy from the act of giving. The services provided by volunteers during the refugee crisis (i.e., help with finding accommodation and with administrative procedures) could also be prone to a free-rider problem. In fact, if someone was concerned that refugees would receive help, she could have volunteered herself or opted to rely on volunteering by others. Because of this free-riding problem, an increase in population not in need, and in turn in expected contributions by others (Krasteva and Yildirim 2013), could be related to the reduction of own contributions. We thus expect a negative relationship between population and the probability of volunteering.

There are, however, other possible explanations that could relate population to the decision to

[5] More precisely, the services provided by volunteers are not "pure" public goods as they can be crowded and are rival in consumption.

[6] The implicit assumption here is that the act of giving itself, the warm glow, is not a function of the number of needy people.

volunteer.[7] These are the career and the social functions of volunteering, reputation, solicitation, and the opportunity cost of time.[8] The career function of volunteering is related to gaining experiences and contacts that are valuable for the labor market (Clary et al. 1998). A larger (and more heterogeneous) population could represent more chances to gain valuable contacts through volunteering and we would observe a positive relationship between population and the probability of volunteering. The social function and reputation are similar mechanisms in the sense that people tend to volunteer with their friends or because they receive rewards in their social environments (Clary et al. 1998; Bekkers and Wiepking 2011). Assuming that a larger population is related to a potentially larger social circle, we would observe a positive relationship between population and volunteering. Solicitation is related to the fact that people tend to volunteer when asked (Bekkers and Wiepking 2011). With a larger population, chances of being asked to volunteer could also be greater due to the presence of associations' and fundraising stands in busy areas (Jay 2001). So, also in this case, we would observe a positive relationship between the two. Another alternative explanation concerns the opportunity cost of time. This explanation is related to the fact that, while volunteering, people are missing out on the opportunity to earn a market wage. The literature documents the existence of an urban wage premium (see for example Edward L. Glaeser and Maré (2001) for the US, and Lehmer and Möller (2010) and Jush (2017) for Germany). The urban wage premium implies that in urban or more densely populated areas, the opportunity cost of volunteering might be higher and we might thus observe a negative relationship between volunteering and population.

In addition to the individual level, it is relevant to examine the volunteering responses to changes in local needs at the household level. This is motivated by the complementarity of volunteering within the household. The most commonly observed patterns are in fact that both partners volunteer or that no one does (Freeman 1997). The intergenerational transmission of volunteering (Bekkers 2007) implies that children tend to volunteer when parents do or did so. Given the complementary nature of volunteering within the household, I expect the relationships at the household level to follow the same direction and be magnified with respect to the individual level. I thus expect the probability of volunteering within the household to be negatively related to population and ambiguously related to the number of needy people.

[7] This discussion is mostly based on the literature rather than exclusively on the model presented in the appendix.

[8] While discussed here, due to data limitations, most of these alternative explanations cannot be tested empirically. In Section 5.2, I provide some tests for the opportunity-cost mechanism.

This conceptual framework has a few limitations. First, this simple conceptual framework does not take into account the interplay between volunteering and monetary donations (as well as other forms of charitable behavior).[9] Second, I assume for simplicity that everyone takes other people's contributions as given, and that optimal volunteering represents a best response to others' volunteering decisions (Hindriks and Myles 2013).

In the next sections, I present the empirical strategy and the data used to study the relationship between volunteering, changes in community needs, and in population.

3 Empirical strategy

To test the hypotheses formulated in the previous section, I regress the probability of volunteering on the number of needy people at the local level (i.e., refugees) and on the local population.

I estimate the linear probability model

$$Y_{ijt} = \beta_0 + \beta_1 log(Refugees_{jt}) + \beta_2 log(Population_{jt}) + \gamma X_{ijt} + \delta_j + \theta_t + u_{ijt}, \quad (1)$$

where Y_{ijt} is an indicator equal to 1 if person i volunteered in county j at time t, equal to 0 otherwise. $Refugees_{jt}$ is the number of refugees in county j and year t. $Population_{jt}$ is the number of inhabitants (excluding refugees) of county j in year t. X_{ijt} is a covariates matrix including socio-demographic and county controls. The included controls are education (10 indicators), marital status (8 indicators), labor force status (7 indicators),[10] age, gender, and unemployment rate in county j. δ_j are the county heterogenous effects, θ_t are the year heterogeneous effects, and u_{ijt} is the idiosyncratic error term. Standard errors are clustered at the county level, i.e., robust to heteroscedasticity and serial correlation.

Proper causal identification relies on the exogeneity of the $Refugees_{jt}$ variable, i.e., Cov($Refugees_{jt}$, u_{ijt}) = 0. There are a few reasons that may make one reject this assumption and wonder if the number of refugees could be endogenous due to selective migration. First, even though the internal distribution of refugees follows rather rigid rules, family reconnections are typically allowed

[9] Because of data availability, I could not test empirically any hypotheses on monetary donations.
[10] More details about the indicators can be found in Table 1 and in Appendix B.2.

(Destatis 2018). Second, asylum applicants are allowed to move within Germany after 3 months since the application, if they expect favorable decision outcomes (Destatis 2018). These arguments imply that the results from Regression 1 could be biased due to self-selection of refugees into county j. I therefore complement the linear probability model with an instrumental variable approach, which relies on refugees' allocation rules within Germany.

At arrival, refugees are distributed among the German federal states, using the EASY system (initial distribution of asylum seekers) (Müller 2013). This first allocation to federal reception centers is based on the so-called Königsteiner key, which is also used for the allocation of research funds in Germany. These distribution quotas among the 16 German federal states are based for two thirds on tax revenues and for one third on population (Geis and Orth 2016); the quotas for the current year t are determined using information (i.e., data) from the period $t-2$. After a short stay in the reception center, refugees are allocated within the state they are registered in.[11] Every state has its own rules regarding internal allocation and is free to set them. The state-level allocation is typically determined by the share of population, the area of the county in squared km or is set by law (see Geis and Orth (2016) and Table A.1 for more details and further resources). Figure 1 shows the distribution quotas at county level in Germany. In the case where the refugee allocation is determined by county j's population share, the allocation formula goes as follows:

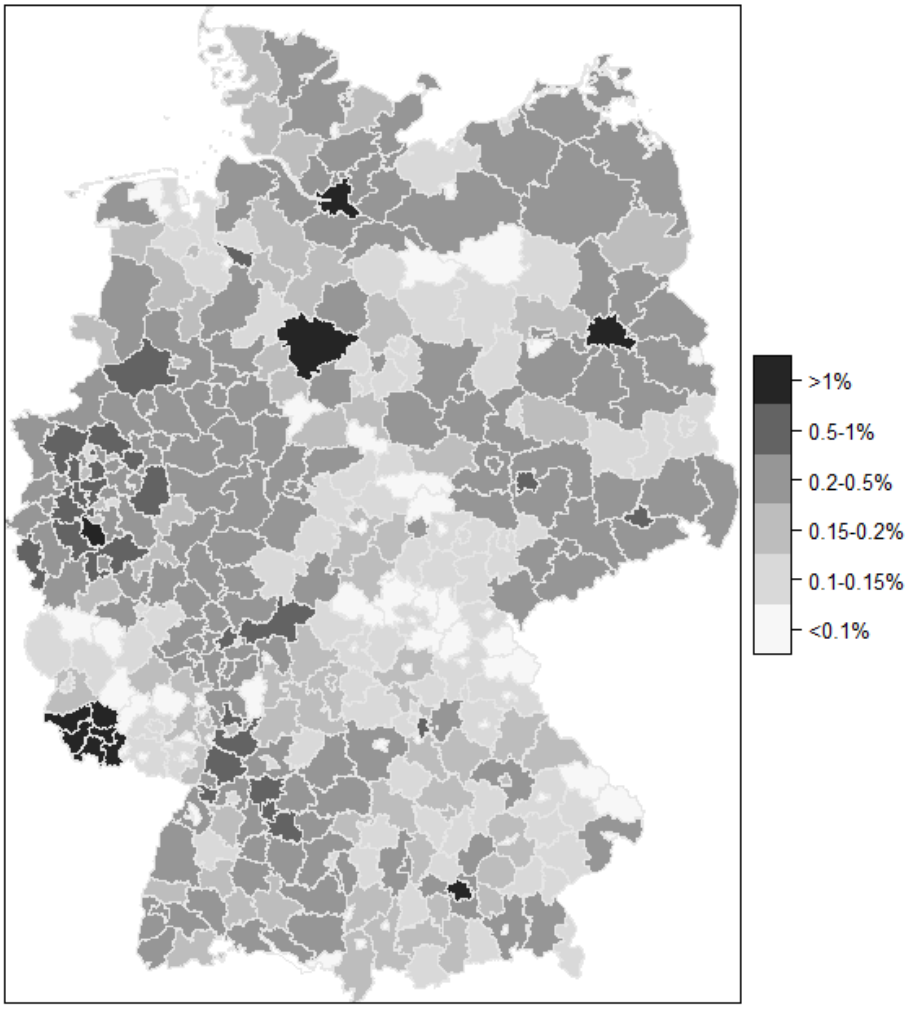
$$Refugees\ quota_j = \underbrace{(\frac{1}{3}\frac{Revenues_s}{Revenues_{DE}} \times \frac{2}{3}\frac{Population_s}{Population_{DE}})}_{\text{Königsteiner key}} \times \frac{Population_j}{Population_s}, \tag{2}$$

where the subscripts s and DE indicate the state and Germany respectively. The thought experiment in this simple case is thus to compare two counties with the same population growth rate, but which receive a different number of refugees due to different tax revenues or population growth rates of their state s. Other sources of variation are given by the last term of the formula if county j's quota is prescribed by law (with unspecified determinants of the quota), if it does not vary over time or if it does not reflect its population share but other parameters.

To construct the instrumental variable, I create the counterfactual number of refugees assigned to a county according to the refugees' distribution quotas, i.e., abstracting from the possible cross-county migration of refugees. The instrumental variable for $Refugees_{jt}$ is given by the sum of

[11] Refugees are required to stay in reception centers up to 6 weeks and no longer than 3 months (Müller 2013).

Figure 1: Refugees' distribution quotas in 2015, as a percentage of the total number of refugees.



Source: Geis and Orth (2016) and related legal documents provided by state bodies, own representation.
Note: The distribution quotas for counties in Saarland correspond to the state distribution quotas.

refugees in county j at $t-1$ and the predicted number of refugees' inflow into county j at time t based on the distribution quotas. I expect the instrumental variable to be positively correlated with $Refugees_{jt}$, such that actual allocation and allocation by the book move in the same direction. Given that the instrumental variable reflects the expected allocation of refugees, and thus a rule, the exclusion restriction is likely to hold, i.e., the instrumental variable only affects the dependent variable through $Refugees_{jt}$.

In their empirical analysis of refugees integration in Germany, Jaschke et al. (2022) express concerns with respect to identification that are similar to those presented here. To account for these self-

selection concerns, they apply a related empirical strategy: to estimate the effects of the local support for anti-immigration parties on refugees integration, they focus on the effects of the county where the refugee first registered instead of their current county of residence.

Importantly, even though refugees have recently been included in the survey data used for the analysis, they are not asked questions about voluntary work, so $Refugees_{j,t-1}$ is unlikely directly and separately related to the probability of volunteering in t thus violating the exclusion restriction. I discuss (threats to) exogeneity further in Section 5.2 with the help of robustness checks.

I also estimate a linear probability model at the household level. The relevant outcome for this analysis is the share of people volunteering within the household. To investigate the outcomes at the household level, this approach seems preferable to the inclusion of controls for spouse's or parent's volunteering in Regression 1, as they are simultaneous outcomes.

In the specification at the household level, Y_{ijt} is the number of volunteers within household i, scaled by the number of household members (i.e., Y_{ijt} is bounded between 0 and 1). In this specification, I control for the unemployment rate in county j, county and year heterogeneities, δ_j and θ_t.

4 Data and descriptive statistics

4.1 Volunteers

Roy and Ziemek (2000) define voluntary work according to five criteria: the free will, the beneficiary, the organizational setting, the frequency or type of commitment, and the presence of rewards. For the purpose of this study, and based on the data at hand, I assume that volunteers can freely decide if they want to engage and that they can be members of a club or association (formal volunteers) or volunteer informally. I also consider volunteers people that engage on a regular or irregular basis.

Data on volunteers come from the German Socio-Economic Panel (SOEP) (Goebel et al. 2019).[12]

[12]The remotely-accessible version of SOEP (SOEPremote) makes available the location of volunteers at small-scale official county codes (called *kkz* in the data set). Over the period I analyze, the number of counties in Saxony, Saxony-Anhalt, and Mecklenburg-Vorpommern was reduced as two or more counties were joined together (following the so-called $Kreisreformen$). Because of how other data at county level used in the analysis is published or made available, I use the county boundaries of 2017, implying that I can study 401 counties. It would require much stronger assumptions to impute data at county level using the initial (2007) borders for the whole time period due to counties

The surveyors ask the following question on volunteering: "Which of the following activities do you take part in during your free time? *Volunteer work in clubs or social services* at least once a week, at least once a month, less often, never." This question was asked in the waves of 2007, 2008, 2009, 2011, 2013, 2015, and 2017.[13] To generate the binary dependent variable, Y_{ijt}, I assign a 1 to everyone volunteering weekly, monthly or less often, and a 0 to those that never volunteer, in a certain year.

After merging the different raw data sets, there are a total of 1,101,457 person-year observations (1984-2018). For the period analysed, from 2007 to 2018, there are 548,977 person-year observations. After removing observations with missing variables (including information on volunteering, education, marital status, etc.), I use an unbalanced panel containing all people answering the survey in the period 2007-2017 (keeping only the years with information on volunteering). The so-defined data set contains 157,263 person-year observations. The number of interviewees is 50,123 (for comparison, a balanced panel would include 7,464 people).

Figure 2 shows the share of volunteers in the sample, over time. Consistently with the results by Burkhardt and Schupp (2019) for Germany, around a third of the interviewees in the sample volunteers each year. Observing the raw data, we can see that during the refugee crisis and in its aftermath (2015 and 2017) the share of people volunteering is by 2-3 percentage points higher as compared to other years (except for 2011).

Table 1 shows the descriptive statistics for the sample. The descriptive statistics are shown for pooled person-year observations. The average volunteering rate is 32%. Around 21% of people have a partner who volunteers. People are on average 50 years old and the majority is female (54%) and German (92%). Looking at the volunteering intensity, we observe that, among those who volunteer, the distribution of people into the three categories (weekly, monthly or rarely) is quite uniform, with people who volunteer rarely (12% of the sample) or weekly (11% of the sample) being more frequent. As far as the marital status is concerned, the majority of people is either married or single. Finally, we can notice that around 52% of the observations in the sample are regularly employed (full- or part-time) and 32% are out of the labor force, being either retired, in education or else.

being merged over time and thus due to missing data for the "discontinued" county borders.

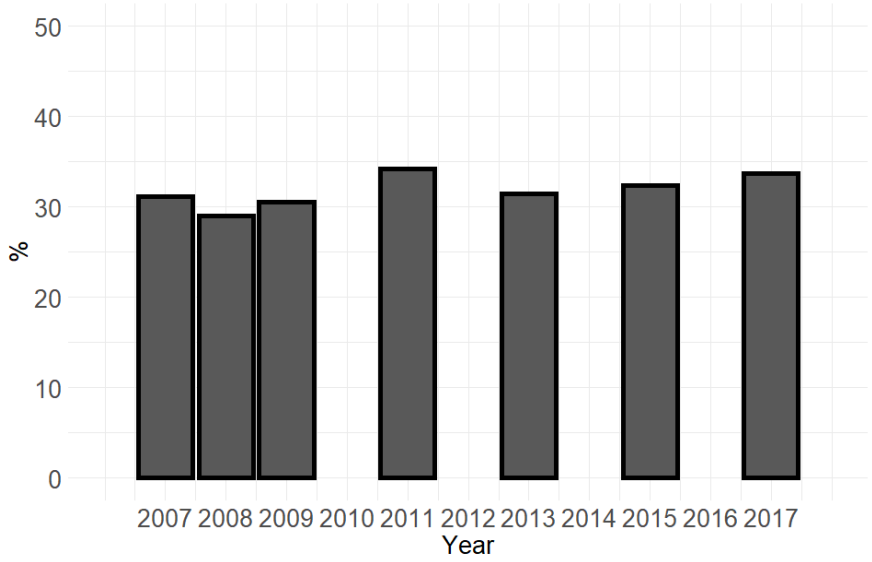
[13] In the years 2008 and 2013 people could also answer that they volunteer on a daily basis. For comparability in the following analyses, I record daily volunteering as weekly volunteering.

Table 1: Descriptive Statistics, individual level.

	Mean	S.d.	Min	Max
Probability of volunteering	.319	.466		
Partner volunteers	.213	.409		
Age	49.624	17.213	16	105
Female	.535	.498		
German national	.921	.269		
Volunteering activity				
Every week	.108	.311		
Every month	.091	.287		
Rarer	.120	.325		
Never	.681	.466		
Education				
In school	.017	.127		
Drop-out	.015	.121		
Elementary school	.082	.274		
Basic vocational	.246	.431		
Intermediate general	.028	.164		
Intermediate vocational	.243	.429		
General maturity	.047	.211		
Vocational maturity	.088	.284		
Lower tertiary	.083	.276		
Higher tertiary	.152	.359		
Marital status				
Married	.600	.490		
Single	.225	.417		
Separated	.024	.154		
Divorced	.088	.283		
Widow(er)	.062	.241		
Partner abroad	.000	.017		
Same-sex partnership	.001	.038		
Same-sex partnership, separated	.000	.014		
Employment status				
Full-time	.386	.487		
Part-time	.134	.341		
Vocational training	.019	.136		
Marginal	.085	.279		
Unemployed	.051	.220		
Sheltered workshop	.001	.032		
OLF	.324	.468		

Source: SOEP, own computations. *Notes*: N = 157,263. OLF stands for out of the labor force; marginal employment corresponds to irregular part-time employment and to the so-called "Minijobs". Except for *Age*, all variables are indicators, therefore their minima and maxima are 0 and 1, respectively.

Figure 2: Share of people volunteering, 2007-17.



Source: SOEP, own computations. *Note: N = 157,263.*

The variables at household level are not displayed in Table 1 for consistence, but the main information is reported here. The sample at the household level includes 53,509 observations (one-person households are not included in the household-level analyses). The median household is composed by two people (the maximum is 7 and the standard deviation is 0.498) and the mean volunteering share within the household is 0.33 (standard deviation 0.382).

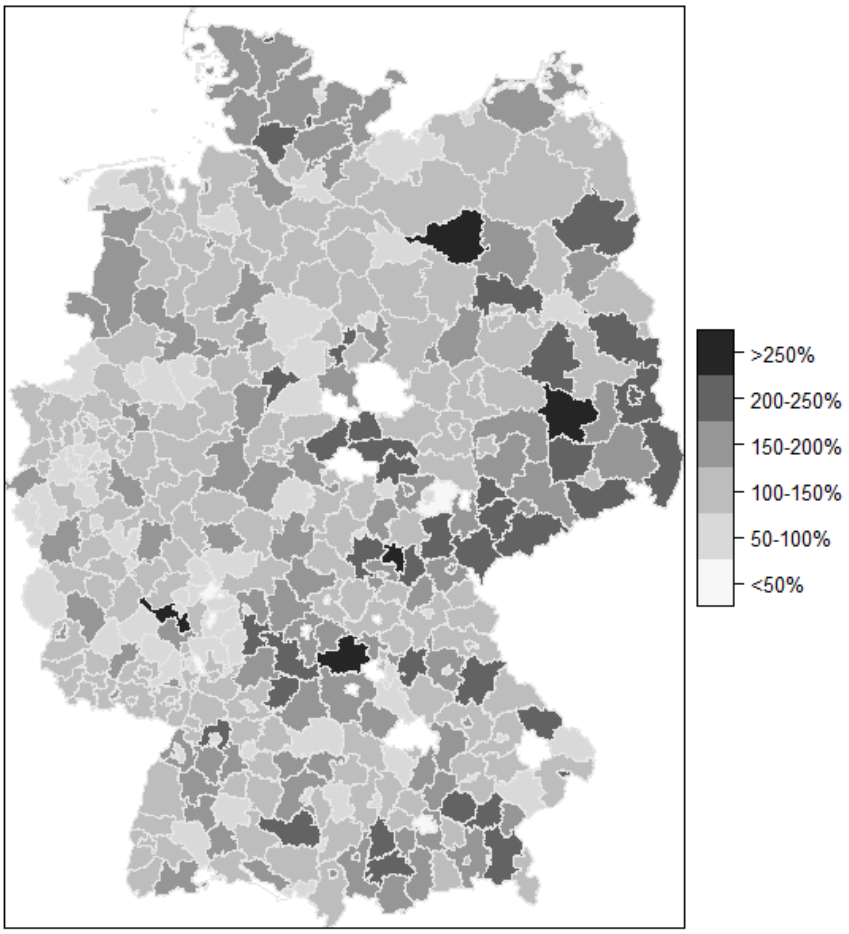
4.2 Refugees

Data on refugees in Germany are provided by the German statistical office since 2007 (Destatis 2020b). The data sets contain detailed information on the number of refugees in each county,[14] so that it is possible to observe their variation over time.[15] As an example, Figure 3 shows the percentage change of refugees in Germany between 2014 and 2016, as a consequence of the refugee crisis. We can see that in many counties the number of refugees has more than doubled during this period.

[14]For Saarland, data are available only at state level. I nonetheless include Saarland in the main analysis as it is a relatively small state with only 6 counties, but I show that the baseline results are robust to the exclusion of Saarland (1,544 observations drop out), see Table A.3 in the Appendix.

[15]The types of refugee's status and the refugees' nationality are also available in the data set. Refugees are assigned one of the following four statuses: protection applicant, temporary protection status, unlimited protection status, and rejected protection status.

Figure 3: Percentage change in the number of refugees in Germany by county, 2014-2016.



Source: Destatis (2018), own representation. *Notes:* For Saarland, data are available only at state level.

Table 2 shows the summary statistics for variables at the county level. We can observe that the average number of refugees is around 2,000. The average population is about a hundred times greater (this figure excludes the number of refugees).[16] The county's unemployment rate is also reported and is 6.88% on average. The bottom half of the table shows the variable used in the first stage of the instrumental variable analysis. The predicted number of refugees according to the allocation quotas is used to instrument the number of refugees present in county j in year t. Its mean value is close to the average number of refugees.

[16]In the original data set (Destatis 2020a), the population figure also includes refugees, so for the analysis I compute a population figure net of the number of refugees.

Table 2: Descriptive Statistics, county level.

Variable	Mean	S.d.	Min	Max	N
Refugees in year t	2,008.943	4,067.236	25	91,950	2,791
Population	202,260.9	229,842	33,510	3,521,545	2,791
Unemployment rate	6.88	3.46	1.3	21.9	2,791
Instrumental variable					
Predicted n. of refugees in t	1,999.333	3,882.99	27.570	86,337.29	2,791

Sources: See Appendix B.1. *Notes*: *Unemployment rate* is reported in percentage.

5 Results

5.1 Main results

Table 3 shows the baseline results, where the regressors are the number of refugees and the population in county j in year t, the unemployment rate, German nationality, marital-status indicators, employment-status indicators, education indicators, age, and gender.[17] In the regressions, I also include county and year fixed effects.[18] Column (1) shows the results from the fixed-effects (FE) regression, column (2) shows the results from the fixed-effects instrumental-variable (FE IV) regression. In column (2), the instrumental variable is the sum of the lagged number of refugees (i.e., at $t-1$) and the predicted inflow of refugees in year t following the allocation rules, as described in Section 3. The instrument's first-stage coefficient is reported at the bottom of the table, together with the (Kleibergen-Paap) first-stage F-statistic.

The two approaches deliver similar results, suggesting that refugees' self-selection may not play a very important role in this context. The refugees' effect is estimated between 0.016 and 0.019. The preferred estimate (column (2)) implies that doubling the number of refugees increases the probability of volunteering by around 1.9 percentage points. Given that the average probability

[17]The coefficients for the covariates are shown in Table A.2. Consistently with the literature, married people are more likely to volunteer (Freeman 1997). Education is also a relevant determinant of volunteering. Consistent with the opportunity-cost rationale, people in full-time employment are less likely to volunteer as compared to people with part-time jobs. Unemployed people and people out of the labor force are less likely to volunteer as compared to full-time employed, though.

[18]The inclusion of year fixed effects is fundamental to control for common shocks, such as events or crises that resonate throughout the country. From Table A.2 we can observe that the probability of volunteering is significantly larger for the years 2015 (during the refugee crisis), as well as for 2011, the year of the abolition of compulsory military and civil services. This is largely consistent with the previous descriptive evidence from Figure 2.

of volunteering is 32%, this effect represents a 6% increase in the probability of volunteering. If we consider that the number of refugees in Germany increased by 114% during the refugee crisis (from 746,380 to 1,597,575, see Destatis (2020b)), the results imply an increase in the probability of volunteering by 2.17 percentage points. To grasp the magnitude of the effect, we can think of the adult population in Germany, which in the middle of the refugee crises (2016) was 69,051,391 (Destatis 2020a). As the estimated effect implies an increase in the likelihood of volunteering by 2.17 percentage points, this translates into 1.450 millions more volunteers, i.e., more than one volunteer per incoming refugee. This figure also compares to around a third of the civil servants employed in 2016 (Destatis 2019), where civil servants can be a measure for the size of the public sector and they can also be imperfect substitutes for volunteers. Considering the average local population (see Table 2), the result implies that about 4,000 more people volunteered at the local level during the refugee crisis. This number is twice as large as the average number of refugees at the local level.

The population coefficient is much larger in absolute terms at around -0.14, though less precisely estimated. This can be interpreted as doubling the number of inhabitants decreases the probability of volunteering by about 14 percentage points. The negative population coefficient is in line with Freeman (1997) and Grønbjerg and Paarlberg (2001), for example.

Table 4 shows the results at household level. As people belonging to the same household are clustered together, the number of observations is reduced to 53,509 (and one-person households are excluded). The dependent variable is defined as the share of people volunteering in the household. The point estimate of the refugees' effect is close to the specification at the individual level. Doubling the number of refugees is related to an increase in household volunteering by around 2.4 percentage points. Considering that the mean of the dependent variable is 0.33, the refugees' effect would represent a 8% increase in the share of people volunteering within the household. Population is also negatively related to household volunteering, and the effect is also larger than for individuals.

Taken together, the main results inform the conceptual framework. In this context, the probability to volunteer increases with the number of needy people, suggesting that the (positive) crowding effect dominates the (negative) productivity effect. The negative relationship between volunteering and population, suggested by the theory, is also observed empirically.

Table 3: Probability of volunteer work.

	FE	FE IV
	(1)	(2)
$log(Refugees_{jt})$	0.016**	0.019**
	(0.007)	(0.008)
$log(Population_{jt})$	-0.140*	-0.136*
	(0.073)	(0.073)
$unemployment\ rate_{jt}$	0.002	0.002
	(0.002)	(0.002)
County FE	X	X
Year FE	X	X
N	157263	157263
F-stat. first stage		3990.825
First stage		
$log(Allocated\ refugees_{jt})$		0.950***
		(0.015)

Note: Robust standard errors clustered at county level in parentheses. Socio-demographic controls include age, an indicator for gender, an indicator for German nationality, eight indicators for marital status, seven indicators for employment status, and ten indicators for education. In column (2), the instrument is the lagged number of refugees ($t-1$) plus the predicted number of refugees in year t following the allocation rules. "X" stands for included. One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.

5.2 Robustness checks and alternative specifications

The empirical method (FE IV) used to estimate the main results tackles the issue of refugees' self-selection into German counties. In this subsection, I discuss other threats to identification and present additional results to rule out alternative explanations underlying the main results. In summary, the robustness checks concern volunteers' characteristics (like volunteer mobility and home ownership), regional trends and county-level characteristics, and the mechanisms underlying the population effect.

5.2.1 Volunteer characteristics and hours volunteered

To address a potential concern for self-selection of volunteers (i.e., people who move to places with a greater number of refugees in order to volunteer), I present some additional results in Table 5. In this specification, I include a control for change of residence within Germany (information available since 2015). The variable $Move$ is equal to one if person i has changed the place of residence in the previous 12 months. We can observe that changing residence is negatively related to the probability

Table 4: Probability of volunteer work: households.

	FE	FE IV
	(1)	(2)
$log(Refugees_{jt})$	0.021**	0.024**
	(0.009)	(0.010)
$log(Population_{jt})$	-0.247***	-0.243**
	(0.095)	(0.094)
$unemployment\ rate_{jt}$	0.004	0.004
	(0.002)	(0.002)
County FE	X	X
Year FE	X	X
N	53509	53509
F-stat. first stage		4035.935
First stage		
$log(Allocated\ refugees_{jt})$		0.950***
		(0.015)

Note: Robust standard errors clustered at county level in parentheses. The dependent variable is defined as the share of people volunteering in the household. In column (2), the instrument is the lagged number of refugees $(t-1)$ plus the predicted number of refugees in year t following the allocation rules. "X" stands for included. One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.

of volunteering, but the refugees' and the population effects are the same as at the baseline. These results suggest that self-selection of volunteers is not a threat to identification.

Somewhat opposite to volunteers' mobility, it is also relevant to consider their attachment to the community. Previous research shows in fact that home ownership is related to investments in local amenities and social capital (DiPasquale and Edward L Glaeser 1999) or to volunteering (Rotolo et al. 2010). The idea is that home owners have a financial stake in their community (Rotolo et al. 2010). As such, they might also care about the arrival and integration of refugees in their community to preserve their property's value. This "self-interest" could also wipe out the altruistic motives underlying the refugees' effect. In light of this argument, I include a control for home ownership and an interaction between home ownership and refugees. The results are presented in Table 6. They show that home ownership is indeed related to a higher probability of volunteering, but this effect does not absorb the altruistic motive of volunteering, i.e., the presence of refugees. The interaction term is very small and not statistically different from zero implying that the refugees' effect is not stronger for home owners, as compared to renters.

I further test the robustness of the main results by investigating an alternative measure of volunteer

Table 5: Probability of volunteer work: controlling for change of residence.

	FE	FE IV
	(1)	(2)
$log(Refugees_{jt})$	0.015**	0.019**
	(0.007)	(0.008)
$log(Population_{jt})$	-0.136*	-0.133*
	(0.074)	(0.074)
Move	-0.052***	-0.052***
	(0.010)	(0.010)
$unemployment\ rate_{jt}$	0.001	0.001
	(0.002)	(0.002)
County FE	X	X
Year FE	X	X
N	157259	157259
F-stat. first stage		3994.289
First stage		
$log(Allocated\ refugees_{jt})$		0.950***
		(0.015)

Note: Robust standard errors clustered at county level in parentheses. Socio-demographic controls include age, an indicator for gender, German nationality, eight indicators for marital status, seven indicators for employment status, and ten indicators for education. In column (2), the instrument is the lagged number of refugees ($t-1$) plus the predicted number of refugees in year t following the allocation rules. "X" stands for included. One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.

work, based on the frequency of, and thus the time spent in, volunteer work. This variable should therefore be informative about the intensive margin of volunteering as compared to the probability thereof. As shown in Section 4.1, people volunteer weekly or less often. I construct a measure of hours volunteered (conditional on volunteering) based on information from the German Survey on Volunteering (German Centre of Gerontology 2014). From this data set, I can retrieve information on the average hours in voluntary work for people who volunteer weekly, monthly or less regularly. I thus assign 416 hours of volunteer work per year to people who volunteer weekly, 144 hours to those volunteering monthly, and 39 hours to those volunteering more rarely.[19] I regress the so-constructed dependent variable on the same independent variables as in the baseline specifications and I report the results in Table 7. We can notice that doubling the number of refugees is related to around four more hours of volunteer work. These results from an alternative outcome variable are thus consistent with the baseline results.

The results are also qualitatively similar to the baseline results when including person fixed effects

[19]To compute these average values, I drop out outliers with more than 20 hours of volunteer work per day, due to possible measurement errors. More details on the construction of these variables are in Appendix B.2.

Table 6: Probability of volunteer work: controlling for homeownership.

	FE	FE IV
	(1)	(2)
$log(Refugees_{jt})$	0.019**	0.022**
	(0.007)	(0.009)
$log(Population_{jt})$	-0.141**	-0.137*
	(0.072)	(0.072)
Homeowner	0.122***	0.122***
	(0.028)	(0.028)
Homeowner $\times$ $log(Refugees_{jt})$	-0.004	-0.004
	(0.004)	(0.004)
$unemployment\ rate_{jt}$	0.001	0.002
	(0.002)	(0.002)
County FE	X	X
Year FE	X	X
N	157259	157259
F-stat. first stage		2003.412
First stage		
$log(Allocated\ refugees_{jt})$		0.952***
		(0.015)

Note: Robust standard errors clustered at county level in parentheses. Socio-demographic controls include age, an indicator for gender, German nationality, eight indicators for marital status, seven indicators for employment status, and ten indicators for education. In column (2), the instrument is the lagged number of refugees ($t-1$) plus the predicted number of refugees in year t following the allocation rules. "X" stands for included. One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.

(see Table A.4 in the Appendix). It should be noted that the refugees' effect is less precisely estimated, and that the sample is slightly different as singletons (15,795 observations) drop out.

5.2.2 The allocation mechanism

A threat to identification is represented by the concern that the refugees' allocation mechanism is endogenous, i.e., that refugees are more likely to be assigned to more populous counties where people are more likely to volunteer. First, the inclusion of county FE and population controls already mitigate this concern as they control for observable and unobservable variables related to the allocation mechanism. Second, I further discuss this concern by reporting other results in Table 8. Column (1) includes state-level controls included in the allocation formula.[20] The inclusion of

[20]The variables in the allocation formula 2 are lagged by one or two years with respect to the outcome variable. I therefore augment Equation 1 to control for state s' current population and tax revenues assuming that, i.e., any effect of $Revenues_{s,t-2}$ on volunteering is captured by the contemporaneous effect of $Revenues_{st}$.

Table 7: Hours of volunteer work.

	FE	FE IV
	(1)	(2)
$log(Refugees_{jt})$	3.600*	4.483**
	(1.842)	(2.168)
$log(Population_{jt})$	-11.908	-10.909
	(19.762)	(19.886)
$unemployment\ rate_{jt}$	-0.204	-0.180
	(0.491)	(0.496)
County FE	X	X
Year FE	X	X
N	157259	157259
F-stat. first stage		3995.011
First stage		
$log(Allocated\ refugees_{jt})$		0.950***
		(0.015)

Note: Robust standard errors clustered at county level in parentheses. The dependent variable is a measure of hours volunteered per year. Socio-demographic controls include age, an indicator for gender, German nationality, eight indicators for marital status, seven indicators for employment status, and ten indicators for education. In column (2), the instrument is the lagged number of refugees $(t-1)$ plus the predicted number of refugees in year t following the allocation rules. "X" stands for included. One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.

these controls does not significantly change the refugees' effect and the included variables are also not significantly related to the probability of volunteering. In a similar vein, columns (2) and (3) include federal-state-specific trends. These are a second-best substitute for county-year fixed effects, to control for state-year variations which might affect the allocation mechanism. With the inclusion of these controls, the refugees' effect is more precisely estimated and larger as compared to the baseline results.

5.2.3 The role of arrival facilities and of civil servants

Next, I test whether other administrative information supports the presumption that volunteers engage with refugees. I include an interaction term between the number of refugees and an indicator for the presence of a facility of the Federal Office for Migration and Refugees (BAMF) related to the arrival of refugees. "General arrival centers" include arrival centers and AnkER facilities: arrival centers are the starting point for carrying out the asylum procedure; AnkER facilities represent the entry point to Germany, where refugees first arrive and are then allocated to the municipalities

Table 8: Probability of volunteer work: including state controls and state-year FE.

	FE IV	FE	FE IV
	(1)	(2)	(3)
$log(Refugees_{jt})$	0.023**	0.023***	0.029***
	(0.009)	(0.008)	(0.009)
$log(Population_{jt})$	-0.084	-0.109	-0.096
	(0.071)	(0.072)	(0.073)
$unemployment\ rate_{jt}$	0.001	0.007**	0.007**
	(0.003)	(0.003)	(0.003)
$log(Revenues_{st})$	-0.042		
	(0.039)		
$log(Population_{st})$	-0.174		
	(0.212)		
County FE	X	X	X
Year FE	X		
State-year FE		X	X
N	157263	157259	157259
F-stat. first stage	2886.229		1338.496
First stage			
$log(Allocated\ refugees_{jt})$	0.929***		0.930***
	(0.017)		(0.025)

Note: Robust standard errors clustered at county level in parentheses. Socio-demographic controls include age, an indicator for gender, German nationality, eight indicators for marital status, seven indicators for employment status, and ten indicators for education. In columns (1) and (3), the instrument is the lagged number of refugees $(t-1)$ plus the predicted number of refugees in year t following the allocation rules. "X" stands for included. One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.

(BAMF 2019). There are 9 AnkER facilities and 27 general arrival centers in the data (BAMF 2019). The prior is that, as AnkER facilities represent the physical entry points to Germany, it is more likely that the refugees' effect is greater in counties with an AnkER facility, since volunteers could help accommodate refugees. The results are presented in Table 9. In columns (1) and (2), the number of refugees is interacted with an indicator for general arrival centers, while in columns (3) and (4), the interaction is with AnkER facilities only. The results show indeed that the presence of an AnkER facility increases the refugees' effect on the probability of volunteering. In these counties, doubling the number of refugees is related to an increase in the probability of volunteering by about 5.5 percentage points. The general arrival center interaction, instead, is small and not statistically different from zero.

In another test, I explore in a basic way if the results are robust to the inclusion of another local variable related to the provision of public goods, namely public interventions. There are in fact

Table 9: Probability of volunteer work: controlling for arrival centers.

	FE	FE IV	FE	FE IV
	(1)	(2)	(3)	(4)
$log(Refugees_{jt})$	0.015**	0.019**	0.014*	0.017**
	(0.007)	(0.008)	(0.007)	(0.009)
$log(Refugees_{jt})$ × General arr. center	0.009	0.007		
	(0.010)	(0.011)		
$log(Refugees_{jt})$ × AnkER facility			0.033**	0.038**
			(0.016)	(0.019)
$log(Population_{jt})$	-0.166**	-0.160**	-0.132*	-0.128*
	(0.078)	(0.078)	(0.076)	(0.076)
$unemployment\ rate_{jt}$	0.002	0.002	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
County FE	X	X	X	X
Year FE	X	X	X	X
N	157259	157259	157259	157259
F-stat. first stage		1679.730		1799.587
First stage				
$log(Allocated\ refugees_{jt})$		0.951***		0.947***
		(0.015)		(0.015)

Note: Robust standard errors clustered at county level in parentheses. Socio-demographic controls include age, an indicator for gender, German nationality, eight indicators for marital status, seven indicators for employment status, and ten indicators for education. In columns (2) and (4), the instrument is the lagged number of refugees $(t-1)$ plus the predicted number of refugees in year t following the allocation rules. "X" stands for included. One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.

some studies documenting that public interventions and public expenditures may be a substitute for volunteering and may crowd it out (see for example Hackl et al. (2012) and Bredtmann (2016)). However, the public administration may also provide additional services to volunteers, such as newsletters or call-centers to get information about volunteering (see for example City of Nuremberg (n.a.)). In this case, public interventions may be complementary to volunteering. Empirically (and due to data availability and comparability), public interventions are proxied with the employment of civil servants per 1,000 inhabitants in county j (Destatis 2019). Civil servants could be employed to assist refugees socially or administratively and, at least in principle, could be a substitute for volunteers. In order to tackle reverse causality concerns (i.e., planning the employment of civil servants based on the willingness to volunteer), I follow the instrumental variable approach proposed by Hackl et al. (2012), who exploit the political cycle variation of government expenditures (here represented by the employment of civil servants). The core idea of their approach is that expenditures can be used to increase the likelihood of being reelected, and the political cycle

is assumed to be exogenous to volunteering (excluding union or political party volunteers). The instrument is equal to 1 if there was a state election in county j in year t and equal to zero otherwise. The results are reported in Table 10. Note that, due to missing data, 6,360 observations drop out. We observe that the refugees' effect is robust to controlling for civil servants. Focusing on Column (2), we observe that the crowding-out effect of civil servants is large, but not precisely estimated: doubling the number of civil servants per 1,000 inhabitants is related to halving the probability of volunteering. Even though the state elections' instrument is correlated with the number of civil servants and its sign is in line with Hackl et al. (2012), the first-stage F-statistic is too small for meaningful inference.

Table 10: Probability of volunteer work: controlling for civil servants.

	FE	FE IV
	(1)	(2)
$log(Refugees_{jt})$	0.015**	0.023*
	(0.007)	(0.012)
$log(Population_{jt})$	-0.132	-0.337
	(0.081)	(0.279)
$log(Civil\ servants_{jt})$	-0.009	-0.548
	(0.037)	(0.658)
$unemployment\ rate_{jt}$	0.000	0.008
	(0.002)	(0.010)
County FE	X	X
Year FE	X	X
N	150899	150899
F-stat. first stage		2.315
First stage		$log(Refugees_{jt})$
$log(Allocated\ refugees_{jt})$		0.940***
		(0.015)
State elections		0.005
		(0.006)
First stage		$log(Civil\ servants_{jt})$
$log(Allocated\ refugees_{jt})$		0.008
		(0.009)
State elections		-0.004**
		(0.002)

Note: Robust standard errors clustered at county level in parentheses. Socio-demographic controls include age, an indicator for gender, German nationality, eight indicators for marital status, seven indicators for employment status, and ten indicators for education. In column (2), the instruments are the lagged number of refugees $(t-1)$ plus the predicted number of refugees in year t following the allocation rules, and an indicator for state elections in county j year t. "X" stands for included. One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.

5.2.4 Alternative mechanisms behind the negative population coefficient

The following discussion is related to the negative population effect, which in Section 2 is mostly explained by altruism and free riding, but alternative explanations are discussed as well. Most of the alternative explanations, like the career and the social functions of volunteering, reputation, and solicitation (Clary et al. 1998; Bekkers and Wiepking 2011), however, would probably underlie a positive relationship between population and the likelihood of volunteering. With the data at hand, however, it is not possible to further test if people volunteer with their friends or if they made valuable contacts for their career while volunteering. It is also not possible to establish if they were asked to volunteer. With the following robustness checks, I further explore the opportunity-cost-of-time explanation. This explanation is related to the fact that, while volunteering, people are missing out on the opportunity to earn a market wage. In the baseline specification, I partly address the opportunity cost of volunteering as I control for labor market status. To further explore the opportunity-cost-of-time mechanism, I include a control for income. In Table 11, we can see the results for a restricted sample for which data on individual income is available (63,504 observations drop out). This income variable is defined as imputed gross labor income in the previous month. This control variable is included in columns (3) and (4), while columns (1) and (2) reproduce the baseline results for this sample. The refugee effect is no longer precisely estimated for this sample, but remains qualitatively similar to the baseline estimates. Income is also positively related to the probability of volunteering, and the inclusion of this variable minimally reduces the point estimate of the population effect (in absolute terms). Overall controlling for income does not affect the interpretation of the baseline results.

The literature also documents the existence of an urban wage premium (Edward L. Glaeser and Maré 2001; Lehmer and Möller 2010; Jush 2017). The urban wage premium implies that in urban or more densely populated areas, the opportunity cost of volunteering might be higher. It is thus useful to examine if the population effect also captures part of the opportunity cost of volunteering. In Table 12, I split the sample into rural and urban counties based on the BBSR (2017) classification, to explore changes in the probability of volunteering and in the population effect by type of county. If population captures part of the opportunity cost of volunteering, the population effect should decline in absolute terms, within each type of county. If the population effect remains different from zero, then part of the population effect seems plausibly related to free riding. Columns (1) and (2)

Table 11: Probability of volunteer work: controlling for gross monthly income.

	FE	FE IV	FE	FE IV
	(1)	(2)	(3)	(4)
$log(Refugees_{jt})$	0.014	0.018*	0.014	0.018
	(0.009)	(0.011)	(0.009)	(0.011)
$log(Population_{jt})$	-0.118	-0.113	-0.116	-0.111
	(0.095)	(0.096)	(0.095)	(0.095)
$unemployment\ rate_{jt}$	0.001	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
$log(income_{jt})$			0.016***	0.016***
			(0.004)	(0.004)
County FE	X	X	X	X
Year FE	X	X	X	X
N	93759	93759	93759	93759
F-stat. first stage		4143.059		4143.405
First stage				
$log(Allocated\ refugees_{jt})$		0.947***		0.947***
		(0.015)		(0.015)

Note: Robust standard errors clustered at county level in parentheses. Socio-demographic controls include age, an indicator for gender, German nationality, eight indicators for marital status, seven indicators for employment status, and ten indicators for education. In columns (2) and (4), the instrument is the lagged number of refugees $(t-1)$ plus the predicted number of refugees in year t following the allocation rules. "X" stands for included. One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.

show the results for urban counties and columns (3) and (4) for the rural ones. We can observe that the point estimate of the population effect is smaller in absolute terms for urban counties (although it is not precisely estimated) as compared to the baseline results. Even though not precisely estimated, the point estimate of the population effect is more negative in rural counties than in the baseline. These results suggest that population may still negatively relate to volunteering because of free riding. In the comparison of urban and rural counties, however, it is also useful to mention the role of salience (Erlinghagen 2003; Gee and Meer 2020). It could be argued that in a small, rural county, it could be the case that refugees are more likely to be seen by the local community. Moreover, the inhabitants might know each other very well, making the status signalled through volunteering more salient. The estimates do suggest that the refugees' effect might actually be stronger in urban counties. To establish whether this result is related to media activity or to different attitudes towards refugees in urban areas (Dustmann et al. 2019) goes beyond the scope of this paper. The point estimates of the population effect are more negative for rural counties, which might be in line with the importance of salience in these counties.

Table 12: Probability of volunteer work in urban and rural counties.

	Urban		Rural	
	FE	FE IV	FE	FE IV
	(1)	(2)	(3)	(4)
$log(Refugees_{jt})$	0.034**	0.034**	0.011	0.019*
	(0.013)	(0.016)	(0.009)	(0.011)
$log(Population_{jt})$	-0.120	-0.119	-0.232	-0.243*
	(0.095)	(0.095)	(0.145)	(0.147)
$unemployment\ rate_{jt}$	0.002	0.002	-0.000	-0.000
	(0.003)	(0.003)	(0.003)	(0.003)
County FE	X	X	X	X
Year FE	X	X	X	X
N	101528	101528	55728	55728
F-stat. first stage		2150.134		1050.988
First stage				
$log(Allocated\ refugees_{jt})$		0.938***		0.948***
		(0.020)		(0.029)

Note: Robust standard errors clustered at county level in parentheses. Socio-demographic controls include age, an indicator for gender, German nationality, eight indicators for marital status, seven indicators for employment status, and ten indicators for education. In columns (2) and (4), the instrument is the lagged number of refugees $(t-1)$ plus the predicted number of refugees in year t following the allocation rules. "X" stands for included. One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.

6 Conclusion

In this paper, I examined whether changes in the number of needy people at the local level are related to changes in individual volunteering behavior or not. From the conceptual framework, I generated the predictions that an increase in the number of needy people is ambiguously related to volunteering, while an increase of the rest of the population is negatively related to volunteering.

In the empirical part, the number of needy people is proxied with the number of refugees in a county. The refugees' effect is positive and sizable: Doubling the number of refugees leads to an increased probability of volunteering by about 2 percentage points, implying that 1.45 million people additionally volunteered during the refugee crisis. This number corresponds to the mobilization of more than one volunteer per refugee. These results are in line with anecdotal evidence of oversupply of volunteers during social crises (Simsa et al. 2019; Trautwein et al. 2020).

The negative population coefficient is greater than the refugees' effect in absolute terms, but it is less precisely estimated: Doubling the population is associated with a reduction in the probability

of volunteering by 14 percentage points. While it is plausible that the negative population effect is related to free riding, the results should be interpreted with caution, since other mechanisms discussed in the paper could be at play.

Overall, the empirical results highlight the role of pure altruism as a motivation to volunteer. First, they shed light on the sign of the relationship between volunteering and the number of needy people, and provide an estimate of the elasticity of voluntary work in this context. Second, the results support the hypothesis of a negative relationship between volunteering and population increases.

Despite the robust findings, it is valuable to mention a few limitations of the study. First, the empirical results are reduced-form results, and further research would be needed to understand the underlying adjustment of own volunteering to other people's decision to volunteer and viceversa. Second, even though I can control for change of residence, I do not observe if people live in a municipality bordering with a different county so that I cannot measure spillover effects, for instance if people commute to a different county to volunteer. Given that refugees have been allocated across the whole country, one could nevertheless argue that there was scope for engagement without moving or commuting. Third, I do not consider the role of non-profit organisations, which might interpose between voluntarism, needy people, and the public sector (Andreoni and Payne 2003).

As with all empirical evidence, it is important to discuss the internal and external validity of the results. The designers of the survey data (SOEP) used in this study use random probability samples, with a stratified sampling procedure (Goebel et al. 2019). The SOEP is therefore representative for the German population and sample weights can be used. As certain groups might be overrepresented in certain counties (for instance, with respect to age, gender, employment status, etc.), however, including sample weights might increase noise and lead to imprecise estimates in regional analyses. For this reason, sample weights are not included in the analyses. The generalization of these results to other countries should also be careful. On the one hand, people in different countries might react similarly, with empathy, to social crises or community needs, as Simsa et al. (2019) show for Austria. On the other hand, different institutions may play a role in shaping formal and informal volunteering (Bredtmann 2016). Similarly, we may wonder if these results are generalizable to other types of crises, such as natural disasters. These results seem in line with the probability of volunteering after a natural disaster, where distance also plays a role in the decision to volunteer

(Maki et al. 2019). However, the extent to which the individual situation is affected might not be strictly comparable in the two cases. Moreover, as Simsa et al. (2019) suggest, the political context, the risks, and the role of volunteers also vary between social crises and natural disasters.

Further research would benefit from variation of community needs at a more microscopic level, as compared to the county level. The relationship between volunteering and community needs might be further explored to understand if helping hands are deployed effectively as, for example, Berbée et al. (2021) suggest that volunteers might facilitate the integration of refugees. It would be relevant to study if other government interventions beyond the employment of civil servants, like public expenditures, crowd out volunteering in this context. Moreover, while this study focuses on individual supply of voluntary work, other strands of the literature consider the more aggregated, social capital aspect of volunteering or associational membership (e.g., Satyanath et al. 2017), whose consequences could be analyzed from a political economy perspective. Another valuable aspect for future research is the role of the media for volunteering. Some studies relate the media and monetary giving to natural disaster relief (Eisensee and Strömberg 2007), but little research is available for volunteering. This would be an interesting venue to explore, given that volunteers can also organise via Apps (Trautwein et al. 2020).

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Appendix

Do community needs affect the decision to volunteer?

The case of refugees in Germany.

Annalisa Tassi, FAU

Contents

A Basic theoretical considerations

Andreoni (1990) distinguishes between three types of utilitarian behavior, which are important to identify the different motives for donating time or money. In Andreoni's framework the representative consumer cares about private consumption, the availability of the public good, and her contribution to the public good.[21] The three cases defined by Andreoni (1990) are

a. The **pure altruist**, a person who only cares about the total level of the public good. If the public good is delivered at its optimum amount, she will not donate.

b. The **impure altruist**, a person who derives utility by her own contribution to the public good. The impure altruist does not care about the total amount of public good, but she cares about the "warm glow".

c. The **mixed altruist**, who is the middle case between the two extremes, pure and impure altruist. The mixed altruist cares about the amount of the public good and her own contribution to it. This is arguably the most common case, with a high degree of heterogeneity among people.

The following private consumption model, largely based on Lilley and Slonim (2014), considers all three types of altruism. This is a simple model of individual choice and, as such, I assume that a person takes some parameters as given.

Let us assume that the utility of an individual depends on the consumption of private goods $\mathbf{x}$, common resources' availability for needy people N, $\frac{G}{N}$,[22] where N can also be interpreted as a crowding parameter, and the warm glow from the hours volunteered h_v. The additively-separable utility function can be written in the following form

[21] Public goods are non-excludable (i.e., everyone can enjoy them) and non-rival (i.e., consumption by one person does not reduce another's).

[22] Common resources are non-excludable but rival goods. This is probably a more appropriate classification of services demanded by refugees, as listed in the introduction. In fact, these services, like help for administrative procedures, are non-excludable, but rival with respect to the time offered by the volunteer.

$$\begin{aligned} \mathrm{U}(\mathrm{x},\, \tfrac{G}{N},\, h_v) = {} & U_x[E + (h_0 - h_v)w_m] \\ & + (1-\alpha)U_G[\frac{G_{-i} + h_v}{N}] \\ & + \alpha U_{h_v}[h_v], \end{aligned}$$

where U_x is the subutility from the private goods, U_G is the subutility from the common resource, U_{h_v} is the subutility from volunteering, h_0 is the total time endowment, E is unearned income, N is the number of needy people, w_m is the market wage, and G_{-i} are others' contributions to the common resource. The subutilities are assumed to have a positive first order derivative and a negative second order derivative. For simplicity, G_{-i} is taken as given by person i and I assume that optimum volunteering is the best response to G_{-i}. Investigating the dynamic determinants of G_{-i} is beyond the scope of this paper. This additively-separable utility function is a general case as the individual preferences for pure versus impure altruism depend on the parameter α, where $\alpha = 0$ represents the pure altruism case, in which the person only cares about the provision of the common resource; $\alpha = 1$ represents the impure altruism case, in which the person cares about her own contribution to the common resource and not at all about its provision. Anything in between the two extreme cases is mixed altruism.

The first order condition with respect to h_v is

$$\frac{\partial U}{\partial h_v} = -U'_x w_m + \frac{(1-\alpha)}{N} U'_G + \alpha U'_{h_v} \stackrel{!}{=} 0.$$

This equation reflects the fact that the marginal utility from volunteering is equal to its opportunity cost.

A.1 Predictions from the first order conditions

In this subsection, I study the effects of changes in N or G_{-i} on optimal volunteering. For the mixed altruist, we get

$$\frac{dh_v}{dN} = \frac{\frac{(1-\alpha)}{N^2}U'_G + \frac{(1-\alpha)}{N^2}U''_G G}{\frac{(1-\alpha)}{N^2}U''_G + \alpha U''_{h_v} + {w_m}^2 U''_x} \gtreqless 0$$

and

$$\frac{dh_v}{dG_{-i}} = \frac{-\frac{(1-\alpha)}{N^2}U''_G}{\frac{(1-\alpha)}{N^2}U''_G + \alpha U''_{h_v} + {w_m}^2 U''_x} < 0.$$

The first result can be interpreted as an ambiguous relationship between hours volunteered and the number of needy people, everything else equal, due to the ambiguous sign of the numerator. In particular, the relative sizes of $U''_G G$ and U'_G determine the sign of the relationship between N and the hours volunteered. The first component reflects a productivity effect, as N and G increase, the individual effort in the provision of G has declining returns. The second component reflects a crowding effect, as the increase in N motivates the volunteer to increase the own contribution to G. This result holds for the intensive margin (i.e., hours volunteered) and the extensive margin (i.e., the decision to volunteer). Secondly, we expect a negative relationship between the contribution of others to the common resource and hours volunteered.

We get the same predictions for the pure altruist, who only cares about the total provision of the common resource ($\alpha = 0$).

$$\frac{dh_v}{dN} = \frac{\frac{1}{N^2}U'_G + \frac{1}{N^2}U''_G G}{\frac{1}{N^2}U''_G + {w_m}^2 U''_x} \gtreqless 0$$

and

$$\frac{dh_v}{dG_{-i}} = \frac{-\frac{1}{N^2}U''_G}{\frac{1}{N^2}U''_G + {w_m}^2 U''_x} < 0.$$

For the impure altruist ($\alpha = 1$), instead, the results are

$$\frac{dh_v}{dN} \equiv 0 \text{ and } \frac{dh_v}{dG_{-i}} \equiv 0.$$

The results imply that the impure altruist does not adapt her supply of voluntary work neither to changes in the number of needy people nor in other's contributions.

As mentioned above, the mixed altruist is arguably the most suitable representation of the average individual, who derives utility from the provision of the common resource and from her own contribution. Given the previous results, we can generate two predictions:

H1 Unless the population is only composed by impure altruists, engagement (and the probability thereof) will be ambiguously affected by an increase in the number of needy people.

H2 Unless the population is only composed by impure altruists, an increase in other's contributions will crowd out volunteering.

A limitation of the model is the fact that G_{-i} is taken as given, while each individual best responds to other people's giving. Nonetheless, this simple model sheds some light on the relationship between own and others' giving.

B Data

B.1 Data sources

- Goebel et al. (2019): data on individuals, county characteristics (unemployment rate).
- German statistical office: data on refugees (Destatis 2020b), data on population (Destatis 2020a), and data on civil servants by county (Destatis 2019).
- Bundesrat (2005) and following years: data on state-level population and tax revenues.
- Geis and Orth (2016) and State ministries of the Interior: data on the refugee allocation mechanism.
- BBSR (2017): data on geographical classification of counties.
- BAMF (2019): data on the location of arrival centers for refugees.
- German Centre of Gerontology (2014): data on hours volunteered.

B.2 Variable definitions

- Probability of volunteering: a binary dependent variable, equal to 1 if person i, in county j, and year t volunteered (every week, every month or less regularly), and equal to zero otherwise.
- Refugees: the number of refugees in county j, year t.
- Allocated refugees: a continuous instrumental variable equal to the sum of the number of refugees in county j in year $t-1$ and the allocated refugees to county j in year t, according to the allocation quotas.
- Population: the number of inhabitants of county j, year t, net of the number of refugees.
- Unemployment rate: a continuous variable reporting the average yearly unemployment rate (number of unemployed over labor force) in county j, year t.
- Population$_s$: the number of inhabitants of state s, in year t.
- Revenues: the value of state-level tax revenues, in year t.
- German: a binary variable, equal to one if person i is a German national.
- Female: a binary variable, equal to one if person i is female.
- Age: a variable that takes up the value of person's i age, computed as the difference between survey's year t and the year of birth.
- Marital status: eight indicators describe the marital status of a person. These are married or in a partnership, separated, single, divorced, widow, married with partner living abroad, in a same-sex partnership, separated and formerly in a same-sex partnership.
- Employment and labor force status: seven indicators describe the employment or labor force status of a person. These are full-time employed, part-time employed, in vocational training, in marginal employment (working 8 hours or less per week), unemployed, employed in a sheltered workshop, and out of the labor force.
- Education: ten indicators describe the educational status of a person. These are in school, drop-out of school (i.e., without finishing any educational cycle), elementary education, basic

vocational qualification, intermediate general qualification, intermediate vocational qualification, general maturity certificate, vocational maturity certificate, lower tertiary education, and higher tertiary education.

- Move: a binary variable equal to one if person i changed place of residence within Germany. The information is available from 2015.

- AnkER facility: a binary variable equal to one if there is an AnKER facility in county j. The AnKER facility represents the entry point to Germany, where refugees first arrive and are then allocated to the municipalities (BAMF 2019).

- General arrival center: a binary variable equal to one if there is an arrival center or an AnKER facility in county j. The arrival center is the place where the asylum procedure is carried out (BAMF 2019). AnKER facilities are described above.

- (Yearly) Hours volunteered: conditional on volunteering, I assign 416 hours to people who volunteer weekly (8 hours $\times$ 52 weeks), 144 to those volunteering monthly (12 hours $\times$ 12 months), and 39 to those volunteering more rarely. The variable has a value of zero for people who do not volunteer. This imputation is based on average values from the FWS (German Centre of Gerontology 2014).

- Urban: a binary variable equal to one if county j is classified as urban and equal to zero if it is classified as rural. The classification is based on the prevailing distribution of the county population in rural and urban areas. This is not a time variant indicator as data is available for 2017.

- Income: imputed gross labor income in the previous month, in Euros. Imputed income means that the surveyor estimates income based on person's reported income in combination with other sources of information.

- Civil servants: the number of civil servants per 1,000 inhabitants in county j, year t.

- State elections: a binary instrumental variable, equal to one if there were state elections in county j and year t.

- Homeowner: a binary variable equal to one if person i is a home owner in year t, equal to zero otherwise.

C Additional tables

Table A.1: Allocation mechanisms and related regulatory basis, by federal state.

State	Principle	Regulatory basis
Baden-Württemberg	Inhabitants	§4 Par. 2 FlüAG
Bavaria	Regulation	§3 DVAsyl
Brandenburg	Inhabitants	§6 Par. 4 LAufnG
Bremen	State Law	§3 Par. 3 AufnG
Hesse	Inhabitants and Regulation	§2 Par. 1 LAufnG
Lower Saxony	Inhabitants	§1 Par. 1 Clause 2 and §2 Par. 1 AufnG
Mecklenburg-Western Pomerania	Inhabitants	§6 Par. 1 ZuwFlAGDLVO M-V
North Rhine Westphalia	Inhabitants and Area	§1 Par. 1 and §3 Par. 1 FlüAG
Rhineland-Palatinate	Inhabitants	§2 Par. 1 Nr. 2 and §6 Par. 1 AufnG RP
Saarland	Inhabitants	§1 and 2 LAG
Saxony	Inhabitants	§6 Sächs FlüAG
Saxony-Anhalt	Inhabitants	§1 Par. 1 and 3 AufnG ST
Schleswig-Holstein	Inhabitants	§3 LAufnG
Thuringia	Regulation	§2 Par. 1 ThürFlüVErtVO
No county-level reallocation for the following city states.		
Berlin	The follow-up accommodation is provided with the help of non-state agents.	
Hamburg	No state law. The Ministry of Interior and Sport is responsible.	

Note: Based on Geis and Orth 2016, translated, and updated.

Table A.2: Probability of volunteer work.

	FE	FE IV
	(1)	(2)
$log(Refugees_{jt})$	0.016**	0.019**
	(0.007)	(0.008)
$log(Population_{jt})$	-0.140*	-0.136*
	(0.073)	(0.073)
2007	0.012*	0.013*
	(0.007)	(0.007)
2008	-0.009*	-0.008
	(0.005)	(0.006)
2009	0.004	0.005
	(0.006)	(0.006)
2011	0.035***	0.036***
	(0.005)	(0.005)
2015	0.016***	0.014**
	(0.006)	(0.007)
2017	0.015	0.011
	(0.010)	(0.011)
German	-0.149***	-0.149***
	(0.008)	(0.008)
$unemployment\ rate_{jt}$	0.002	0.002
	(0.002)	(0.002)
Separated	-0.054***	-0.054***
	(0.011)	(0.011)
Single	-0.059***	-0.059***
	(0.006)	(0.006)
Divorced	-0.073***	-0.073***
	(0.008)	(0.008)
Widow(er)	-0.043***	-0.043***
	(0.009)	(0.009)
Partner abroad	-0.188***	-0.188***
	(0.035)	(0.035)
Same-sex partnership	-0.064	-0.064
	(0.048)	(0.048)
Same-sex partnership, separated	-0.062	-0.062
	(0.072)	(0.072)

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Table A.2 continued

	FE	FE IV
	(1)	(2)
Part-Time Employment	0.062***	0.062***
	(0.006)	(0.006)
Vocational Training	0.014	0.014
	(0.010)	(0.010)
Marginal Employment	0.095***	0.095***
	(0.006)	(0.006)
Unemployed	-0.045***	-0.045***
	(0.007)	(0.007)
Sheltered workshop	-0.142***	-0.142***
	(0.022)	(0.022)
OLF	-0.018***	-0.018***
	(0.006)	(0.006)
Drop-out	-0.226***	-0.225***
	(0.015)	(0.015)
Elementary school	-0.225***	-0.225***
	(0.013)	(0.013)
Basic vocational qualification	-0.157***	-0.157***
	(0.013)	(0.013)
Intermediate general qualification	-0.128***	-0.128***
	(0.014)	(0.014)
Intermediate vocational	-0.094***	-0.094***
	(0.013)	(0.013)
General maturity certificate	-0.047***	-0.047***
	(0.013)	(0.013)
Vocational maturity certificate	-0.064***	-0.064***
	(0.014)	(0.014)
Lower tertiary education	-0.002	-0.002
	(0.013)	(0.013)
Higher tertiary education	0.015	0.015
	(0.013)	(0.013)
Female	-0.045***	-0.045***
	(0.004)	(0.004)
County FE	X	X
N	157263	157263
F-stat. first stage		3990.825
First stage		
$log(Allocated\ refugees_{jt})$		0.950***
		(0.015)

Note: This table expands the baseline results from Table 3, by showing the coefficients of the control variables. Robust standard errors clustered at county level in parentheses. The excluded year indicator is 2013. Socio-demographic controls include an indicator for German nationality, age, an indicator for gender, eight indicators for marital status (excluded category "married"), seven indicators for employment status (excluded category "full-time employed"), and ten indicators for education (excluded category "in school"). In column (2), the instrument is the lagged number of refugees ($t-1$) plus the predicted number of refugees in year t following the allocation rules. "X" stands for included. Tables were created with the help of the Stata command estout (Jann 2005) and the FE IV regressions were estimated with ivreghdfe (Correia 2016). One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.

Table A.3: Probability of volunteer work: excluding Saarland.

	FE	FE IV
	(1)	(2)
$log(Refugees_{jt})$	0.016**	0.019**
	(0.007)	(0.008)
$log(Population_{jt})$	-0.124	-0.120
	(0.078)	(0.078)
$unemployment\ rate_{jt}$	0.001	0.001
	(0.002)	(0.002)
County FE	X	X
Year FE	X	X
N	155715	155715
F-stat. first stage		4031.554
First stage		
$log(Allocated\ refugees_{jt})$		0.952***
		(0.015)

Note: Robust standard errors clustered at county level in parentheses. Socio-demographic controls include age, an indicator for gender, German nationality, eight indicators for marital status, seven indicators for employment status, and ten indicators for education. In column (2), the instrument is the lagged number of refugees $(t-1)$ plus the predicted number of refugees in year t following the allocation rules. "X" stands for included. One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.

Table A.4: Probability of volunteer work: including person FE.

	FE	FE IV
	(1)	(2)
$log(Refugees_{jt})$	0.007	0.014*
	(0.007)	(0.008)
$log(Population_{jt})$	-0.091	-0.081
	(0.075)	(0.077)
$unemployment\ rate_{jt}$	0.001	0.001
	(0.002)	(0.002)
County FE	X	X
Year FE	X	X
N	141465	141465
F-stat. first stage		2272.398
First stage		
$log(Allocated\ refugees_{jt})$		0.924***
		(0.019)

Note: Robust standard errors clustered at county level in parentheses. Socio-demographic controls include age, an indicator for gender, German nationality, eight indicators for marital status, seven indicators for employment status, and ten indicators for education. In column (2), the instrument is the lagged number of refugees $(t-1)$ plus the predicted number of refugees in year t following the allocation rules. "X" stands for included. One (*), two (**), or three stars (***) indicate statistical significance at 10%, 5%, and 1% levels.