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ORIGINAL ARTICLE

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Income, amenities and negative attitudes

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Abstract

We exploit the regional variation in negative attitudes towards immigrants to Sweden in order to analyse the consequences of negative attitudes on refugees' utility from labour income and amenities. We find that attitudes towards immigrants are important: while they affect mainly the refugees' quality of life, they also affect their income. We estimate the utility effects of negative attitudes for refugees with different levels of education and gender. We also analyse how the size of the refugees' networks relate to their quality of life and income as well as how negative attitudes towards immigration and networks interact.

Keywords: Attitudes towards immigration, Geographical mobility, Income, Amenities

JEL codes: J15, J31, J61, J71

1 Introduction

Sweden has gone from being a land of emigration to a land of immigration. Immigration was insignificant until World War II. During the first post-war decades, there was a sharp increase in demand for labour and workers were recruited from other European countries. These early labour immigrants adapted fairly well and gradually became accepted in the cities they settled in.¹ Since the 1970s, when the need for labour shrank substantially, immigration to Sweden has become increasingly restricted to political refugees and their families. No other affluent nation in recent decades has accepted as many political refugees per capita as Sweden. The share of foreign born reached 16.5 % in 2014, with over half of this fraction from non-developed countries.²

Sweden is well known for its longstanding generosity in providing a safe haven to refugees.³ Still, many studies have detected the existence of negative attitudes towards immigrants in the country.⁴ For example, the SOM Institute (University of Gothenburg) has investigated attitudes towards immigration and refugees since 1986, finding growing resistance against receiving refugees until 1992, while thereafter, attitudes have slowly become less resistant. Despite this, by 2005, nearly half the population thought that it was a good suggestion to receive fewer refugees in Sweden (see the evolution of attitudes in the period 1986–2010 in Figure 1 in the Appendix).

Attitudes towards immigration are potentially important for immigrants to get integrated in the labour market. Discrimination is an important aspect to focus on regarding where refugees choose where to live. But do attitudes reflect discrimination? Or are they just something that is said but never acted upon? We explore if discrimination is related to negative attitudes towards immigration: if attitudes do not affect

immigrants' utility from labour income and amenities, then they are not indicative of discrimination and may be less of a concern.

Studies making a comparison across European countries, for example Card et al. (2005), find that Sweden is one of the countries with the most generous attitudes towards immigrants. Therefore, if we find any effect of negative attitudes, then immigrants' utility may potentially be even more affected in other countries.

The aim of this paper is to exploit regional variation in negative attitudes towards immigration in order to analyse whether the mobility decisions and the labour market outcomes of refugees are affected by such attitudes. We recognize that not every native with negative attitudes may discriminate against immigrants, but we conjecture that negative attitudes are systematically related to discrimination. We choose to analyse income as the labour market outcome variable as it is affected by both wages and employment.

We concentrate on a group of refugees for which there is some exogenous source of variation in their first location in Sweden, given by a refugee settlement policy pursued by the government. We interpret the movements away from this first location as indication of better labour market conditions and/or better amenities or quality of life. We account for the fact that the refugees are not a homogeneous group by considering heterogeneity by the level of education and by gender.

Identification fails if some other factor, that we are not considering, determines the level of attitudes and the differences in income and amenities in the region. We test this by including a placebo group in our analysis, immigrants from developed countries, that we expect to be very little affected by negative attitudes. The idea is that, if our estimation of the effect of attitudes on income and amenities is the result of some other factor that produces lower income, we should estimate similar effects on this placebo group. We find that attitudes towards immigrants are of importance for the refugees, but they have no effect on the quality of life or income of immigrants from developed countries.

The income an individual gets is assumed to be a function of negative attitudes and networks, as well as several individual and municipal characteristics. We start by assuming that the residual of this income function for a refugee living where he or she has been placed is uncorrelated with the income residual the same refugee would have if he or she moved to another municipality. Then, in our preferred specification, we introduce a residual correlation that recognizes that high-ability refugees, who have positive residuals upon placement, are likely to also have positive residuals after moving.

Once we recognize that unobservable characteristics of the refugees affect their income in all municipalities, we find that negative attitudes are mainly a problem, in terms of income, for refugees that stayed where they had been placed. The fact that refugees tend to move to municipalities with lower negative attitudes indicates that their quality of life is lower the larger the negative attitudes are. The relationship between negative attitudes and the quality of life of refugees is much stronger than the relationship with their income.

The refugees' choice of where to live also may be affected by the availability of networks. We consider the share of refugees in the municipality as a measure of the potential network. We explore how networks affect the refugees' income and quality of life as well as the interaction between networks and negative attitudes towards immigration.

The relationship between the size of networks and the amenities of refugees is much stronger than the relationship with their income. Larger networks are associated with much larger amenities for all refugees, larger income for the refugees that stayed where they had been

placed and slightly smaller income for those who moved. Refugees who stay where they have been placed may have been luckier and placed where they already had a useful network at arrival. Alternatively, they may have been more attractive for the municipalities and therefore may have been placed according to their choice close to their relatives already in the country. Those who moved after placement may have been less attractive for the municipalities and less capable of benefitting from a network even after moving. Instead, they may suffer from competition from other better-connected refugees in the municipality they choose to move to. Movers still move to municipalities with a much larger share of refugees, which indicates that the increase in the quality of life is much larger than the decrease in income.

The interaction between negative attitudes towards immigration and the size of networks are of importance as well. The negative relationship between negative attitudes and quality of life becomes larger when networks are larger. The same is true about the negative relationship between negative attitudes and stayers' income, while the negative relationship between negative attitudes and movers' income becomes smaller when networks are larger.

2 Related research

Our paper relates to research on the discrimination of immigrants in the labour market, migration decisions and, in particular, empirical research about Sweden.

Our setting relates both to research on individuals' migration decisions (Sjaastad (1962)) and self-selection (Roy (1951)). Nakosteen and Zimmer (1980) and Borjas et al. (1992) apply Roy's self-selection framework to internal migration. Dustmann and Okatenko (2014) study how wealth may impact migrations in the presence of migration cost and credit constraints. Valuing weather's contribution to quality of life has received considerable attention in the compensating differential literature. The value of a weather characteristic can be estimated by the incomes a household is willing to forego to live in a place with that characteristic. Empirical research shows, for example, that US households strongly value weather's contribution to quality of life (Cragg and Kahn 1999; Costa and Kahn 2003; Rappaport 2007). Kennan and Walker (2011) describe a model where, in addition to expected income, migration decisions are influenced by moving costs, by differences in climate and by differences in location size measured by the population in each location. These are variables we also assume to affect the immigrants' decision to move.

Other studies analyse the internal migration decision in Scandinavia. Åslund (2001) finds that immigrants to Sweden are attracted to regions with many immigrants, better labour market opportunities and many welfare recipients. Damm and Rosholm (2005) find that geographical mobility has large positive effects on the hazard rate into the first job, suggesting that restrictions on placed refugees' subsequent out-migration would hamper the labour market integration of refugees. None of these studies considers the effect of different attitudes towards immigrants on their migration decision.

Several papers explain negative attitudes towards immigrants (see, for example Card et al. (2005), Markaki and Longhi (2013) and d'Hombres and Nunziata (2015)). In a companion paper, Larsen and Waisman (2016) examine the impact of discrimination on labour market performance of immigrants in a theoretical setting. In this paper we are instead interested in examining the impact of these attitudes on the immigrants' utility from labour income and amenities.

Henry (2009) shows that the probability of African-American migrants choosing a city in the USA is significantly reduced by the level of race-based crimes by racially intolerant

attitudes held by whites and by the poor evolution of the feelings of whites about racial diversity. In her analysis, she does not study how attitudes affect labour market outcomes.

Knabe et al. (2009) analyse the effects of right-wing extremism on the well-being of immigrants in Germany. They find that the higher vote shares for the extreme right are associated with a lower subjective well-being of immigrants. Moreover, educated immigrants are more strongly affected by right-wing attitudes of the host population than low-skilled immigrants. Compared to our paper, this study uses a different measure of right-wing attitudes in the native population and a subjective measure of life satisfaction, as they do not infer quality of life from migration decisions.

Several empirical studies (for example Bevelander and Skyt Nielsen (1999) and Arai et al. (1999)) have found lower income and employment rates for immigrants than for comparable natives in Sweden. These studies cannot tell us if the differences are caused by ethnic discrimination or differences in unobserved characteristics between the two populations. By analysing the difference in labour market outcomes in regions with different attitudes towards immigrants, we intend to test discrimination in a more direct way.

Other studies perform different types of more direct tests of discrimination in Sweden (for example, Rooth (2001) and Åslund and Rooth (2005)). These studies focus on the labour market outcomes of certain groups of immigrants, while we consider that attitudes may affect their migration decision as well.

3 Empirical background, data and empirical strategy

3.1 Empirical background

3.1.1 Refugee settlement policy

Immigrants' sorting is based on both observable and unobservable factors, which makes it generally difficult to study the effect of negative attitudes on migration decisions and labour market outcomes. We will study a group of immigrants for which there is some exogenous source of variation in their first location in Sweden, given by a refugee settlement policy pursued by the government from 1985 to 1994. The movement from this first location is considered to be endogenous in our analysis and provides information about the quality of life refugees experience in different regions, their expected income gain and their cost of moving.

Edin et al. (2003) describe the refugee settlement process. Newly arrived refugees were placed in different local municipalities according to certain well-defined criteria. The idea of the programme was to get an even distribution of immigrants and facilitate integration. Most refugees, of course, applied for residence in the traditional immigrant cities of Stockholm, Göteborg and Malmö. However, there were very few flat vacancies in these locations, particularly during the second half of the 1980s when the housing market was booming. When the number of applicants exceeded the number of available slots, municipal officers selected the "best" refugees. There was no interaction between municipal officers and refugees. The selection was, hence, purely in terms of observable characteristics; language, formal qualifications and family size seem to have been the governing criteria. When the municipalities could "cream-skim", they selected highly educated individuals and individuals that spoke the same language as some members of the resident immigrant stock. Single individuals were particularly difficult to place, since small flats were extremely scarce. There were no restrictions on ex post

mobility, except that the refugees lost some activities granted in an introduction programme.

The fact that municipalities selected individuals that spoke the same language as some members of the resident immigrant stock may explain why networks are particularly valuable for those who stayed where they had been placed.

3.1.2 Negative attitudes towards immigration

Markaki and Longhi (2013) describe several theories of attitudes formation. According to rational conflict theories, the economic circumstances of the area and the size of the minority group relative to the native population are important sources of threat (Stein et al. 2000). Feelings of threat among natives are expected to be higher in areas that are less affluent and with more immigrants. Intergroup contact theory predicts that higher concentrations of immigrants and exposure to an ethnically diverse environment will foster more positive feelings between the two groups (Marschall and Stolle 2004).

The national unemployment does not seem to be correlated over time with the negative attitudes towards immigrants at the national level, but there seems to be some correlation with the unemployment of immigrants (see Figure 2 in the Appendix). However, in a cross-sectional exercise, when we correlate the average unemployment over the period in each municipality with our measure of negative attitudes towards immigrants, we find a very small negative correlation (-0.08).

It is then not clear that receiving more refugees should increase the population's negative attitudes towards immigration. There is, to our knowledge, no data available on the evolution of municipal attitudes towards immigrants over time, so we cannot directly test this assumption. Hjerm (2009) concludes in a sociological study in Sweden that experience of a recent influx of immigrants to the municipality does not matter for levels of anti-immigrant attitudes. Similarly, Card et al. (2005) find a negative relation between higher immigrant stocks and the fraction of people who want to restrict immigration in Europe, but the relationship is not statistically significant. In the same spirit, the Social Research Institute for Migration Watch, MORI (2003) claims that more or less negative or positive views on multiculturalism, immigration and asylum seem to bear little relation to actual numbers of immigrants or asylum seekers in each region in the UK. Card et al. (2012) find instead that more immigrants are associated with lower amenities or quality of life for natives and produce more negative attitudes about immigration.

In Sweden, at the national level, the attitudes towards immigration have become less negative over the period 1990 to 2010 (see Figure 1 in the Appendix). The share of immigrants has increased from 9.2 to 14.7 % of the population in the same period. The latest SOM Institute rapport (University of Gothenburg) shows that 45 % of the Swedes wanted Sweden to accept fewer refugees in 2013. This is a sharp decrease from 65 % 20 years ago.

Despite the fact that attitudes towards immigrants at the national level do not seem to vary with unemployment or the share of immigrants in the country, we still address this possibility by considering data on attitudes measured prior to the refugee settlement policy. We are in this way assuming that the distribution of attitudes over time is constant across municipalities.

3.2 Data

Data on the labour market performance of refugees is available in the Longitudinal Individual Data Base (LINDA) stored at Statistics Sweden. Income registers and population census data constitute the core of the data set.⁵ It contains information on 300,000 individuals annually plus a non-overlapping sample of 20 % of all immigrants. From this database, we obtain information about the immigrant's income, country of origin, year of immigration, the municipality where he or she lived upon arrival, where the person currently lives, their level of education and factors such as age and civil status. We use an unbalanced panel of data from 1996 (2 years after the latest arrivals) to 2010.

We cannot observe which immigrants in LINDA are refugees, so we restrict the analysis to the countries from which most refugees came while the refugee settlement policy was pursued. Table 1 lists the origin of 99.2 % of the accepted refugees in the period 1990–1994,⁶ that is, those immigrants who were granted residence permits according to the Genève convention, *de facto* refugees, persons in need of protection, humanitarian reasons and special refugee quota.⁷

During this period, almost 23,500 immigrants were granted residence permits as refugees on average every year. But many more, around 40,000 individuals came as asylum seekers from the countries in our sample per year and may have received residence permits in later years; 62.7 % of the immigrants from the countries in our sample that received residence permits were refugees.

Immigrants also received residence permits for family reunion and labour market reasons. Only 64 out of the 218 immigrants who received residence permits for labour market reasons per year came from the countries in our sample. The labour market immigrants came mainly from the UK, Germany, Poland, China, the USA, former Yugoslavia, Holland and Japan (and are not included in our sample).

The remaining 37.1 % of the residence permits in our sample allowed families to reunite. The immigrants receiving permits for family reunion reasons came mainly from former Yugoslavia, Iran, Turkey, Poland, Iraq, Somalia, Lebanon, Thailand, the USA, Ethiopia, the UK, Chile, Philippines, Vietnam and Germany. During this period, 40 % of the immigrants coming to Sweden for family reunion reasons (from any country of origin) were joining a refugee. This share is much larger for those coming from the countries in our sample. When a family joins an immigrant that came to Sweden as a refugee and was placed by the government, it will be indirectly affected by the placement as well.

Our sample contains 3300 individuals that arrived in the period 1985–1994. Table 1 shows that most immigrants coming from the countries in the sample at the arrival period studied were refugees and only 0.1 % of them entered as labour market immigrants. Therefore, we refer to the whole group as refugees in this paper.

We will repeat the analysis on a group of immigrants arriving in the same period from developed countries, that is, countries in the OECD at that point in time⁸ as a placebo. This group of immigrants is unlikely to be affected by negative attitudes to the same degree as refugees are. The advantage of using this group instead of natives as a placebo is that they are more similar in the sense of not knowing the language and culture when they arrive.

We obtain our measure of attitudes towards immigrants from five cross-sectional surveys on Swedish Opinion collected from 1979 to February 1985 by Stiftelsen för Opinionsanalys (SSD 0099, Göteborg University). The data was collected through a mail survey sent to around 2000 individuals aged 17–80. We pool the answers of all

Table 1 Immigrants to Sweden from selected countries

Sample countries	Refugees ^a	Family reunions	Labour market	Total
Ex Yugoslavia	13,860	3080	12	16,952
Poland	47	1356	19	1422
Romania	201	427		627
Russia	172	489	6	667
Ethiopia	623	575		1197
Somalia	1323	819		2142
Uganda	91			91
Cuba	88			88
Chile	135	436		571
Afghanistan	116			116
Bangladesh	86		1	87
Iraq	2663	955		3617
Iran	1542	1532	3	3077
China	78	220	19	317
Lebanon	596	650		1246
Sri Lanka	83	157		240
Syria	416	429		846
Turkey	401	1517		1918
Stateless/unknown ^b	892	1230	6	2128
Total coming from countries in our sample	23,410	13,872	64	37,346
Other countries ^c	69	8101	154	8254
Total all countries	23,479	21,972	218	45,600

Amount of immigrants on average per year during the period 1990–1994. Source: Migrationsverket

^aGranted residence permits according to the Genève convention, de facto refugees, persons in need of protection, humanitarian reasons and special refugee quota

^bStateless and unknown (mainly Palestinians), former Soviet Union and Peru, where many asylum seekers came from in the period

^cFor family reunions: mainly the UK, Germany, the USA, Philippines, Thailand and Vietnam. For labour permits: mainly the UK, Germany, the Netherlands, Greece, Canada, the USA, Brazil, Japan and South Korea.

surveys to get more observations per municipality, in total 11,539 answers. We are interested in the question: “How important do you think less immigration is?”. The possible answers with fractions shown in parenthesis are (1) very important (25.75 %), (2) quite important (23.45 %), (3) not very important (11.35 %), (4) not important at all (fine now) (17.69 %), (5) better with more immigrants (3.13 %), (6) hesitant (13.83 %) and (7) no answer (4.80 %).⁹ We construct a measure of negative attitudes by adding the number of individuals answering (1) or (2) and deducting those answering (5).¹⁰ This variable is normalized to vary between 0 and 1. A map of Sweden in Figure 3 in the Appendix shows how attitudes are distributed throughout the country.

We measure the size of networks available to refugees as the share of immigrants coming from Africa, South America and Asia. We obtain this measure from Statistics Sweden. We also obtain from Statistics Sweden the following municipal characteristics: open unemployment, the municipal tax rates and population. The geographic characteristics included in the analysis are the latitude (which affects how dark it becomes in winter) and the 10-year average minimum temperature in the winter (January to March).

Table 2 includes descriptive statistics of the variables of interest in our study. These include individual characteristics of the refugees and the characteristics of the

Table 2 Summary statistics

	Observations	Mean	Standard deviation	Min.	Max.
Individual characteristics					
Ln income	145,014	11.3	1.5	−0.7	16.2
Share well educated	212,686	0.23	0.4	0	1
Age	212,910	37.0	11.9	15	65
Share women	212,686	0.51	0.5	0	1
Share married	212,686	0.59	0.5	0	1
Municipal characteristics where the stayers live					
Neg. attitudes tow. immigration	94,632	0.338	0.1	0	0.64
Share refugees	94,632	0.075	0.05	0.003	0.264
Open unemployment	94,632	4.54	1.85	0.79	13.65
Municipal tax rate	94,608	31.1	1.27	26.5	34.41
Population	89,383	224.2	256.9	3.6	847.1
Latitude	94,632	58.4	1.69	55.37	67.17
Avg. min. temperature winter	94,632	−4.49	2.28	−18.67	−1.33
Municipal characteristics where the movers live					
Neg. attitudes tow. immigration	118,047	0.332	0.1	0	0.75
Share refugees	118,047	0.073	0.05	0.003	0.264
Open unemployment	118,027	4.44	1.83	0.79	11.40
Municipal tax rate	118,005	31.03	1.22	26.5	34.41
Population (thousands)	110,830	210.9	243.7	3.2	847.1
Latitude	118,047	58.1	1.67	55.37	67.17
Avg. min. temperature winter	118,047	−4.10	2.17	−18.67	−1.33
Municipal characteristics where the movers were placed					
Neg. attitudes tow. immigration	118,054	0.343	0.1	0	0.75
Share refugees	118,054	0.037	0.04	0.003	0.264
Open unemployment	118,054	4.39	1.74	0.79	13.79
Municipal tax rate	117,634	31.81	1.18	26.5	34.41
Population	110,836	75.2	156.6	2.5	847.1
Latitude	118,054	59.32	2.50	55.37	67.85
Avg. min. temperature winter	118,054	−6.35	3.61	−20	−1.33

Sample composed of citizens of the countries listed in Table 1 that immigrated to Sweden in the years 1985–1994. The sample corresponds to the years 1996–2010. Refugees include family reunification. “% high education” is the share of immigrants with more than high-school education. “Avg. min. temperature winter” is the average minimum temperature in winter in a 10-year period

municipality where refugees live and where they were placed. Of the refugees in our sample, 45 % stayed where they had been placed. Low educated stayed more often than well educated where they had been placed (51 versus 46 %) and women more often than men (52 versus 47 %).

If we compare the municipalities of placement, we observe that movers were, on average, placed in municipalities with more severe negative attitudes, lower share of refugees, lower municipal tax rates, much smaller population, lower average temperature in winter and larger latitude than the municipalities where stayers on average had been placed. When they move, they relocate to municipalities with less

negative attitudes, larger share of refugees, lower municipal tax rates, much larger population, warmer weather and brighter winters.

These are the factors we will consider as determining the quality of life and cost of moving of refugees. These are the same factors that affect the refugees' income; we only exclude the geographic conditions from the income equations. The migration decisions of refugees suggested by these mean values are consistent with our theory. However, this is only a comparison of means and we need a deeper analysis of the data to measure the effect of negative attitudes.

3.3 Empirical strategy

First, we estimate a probit regression to analyse how the variables of interest (negative attitudes towards immigration and size of networks available) affect the probability that an immigrant stays where he or she was placed. We control for all the individual and municipal characteristics described in Table 2. We cannot control for fixed effects at the individual level because very few individuals in our sample moved during 1996–2010.¹¹ We also cannot control for fixed effects at the municipal level since attitudes are assumed to be constant over time. We will control for fixed effects at the labour market area level instead. The division of the 290 municipalities into 70 labour market areas is built by Statistics Sweden based on actual commuting conditions. The pattern and intensity of commuting flows decide how the municipalities are combined into these labour market areas. Labour market areas are a good unit for controlling for similar labour market conditions that are constant over time. We control for time trends by including year effects.

Second, we study the effect of the variables of interest on the refugees' income. A problem here is that even if the placement of refugees makes the first location exogenous, many refugees moved from this first location and the choice where to move was, as seen in the probit, affected by the variables of interest. So for the movers, the characteristics of the municipality where they live are endogenous. We therefore begin by studying the income of those refugees who chose to stay where they had been placed. As the decision to move is affected by attitudes and networks, we need to correct for the bias introduced by considering only stayers using Heckman's correction Heckman (1979). We include the same controls as in the probit regressions, except for the geographic conditions (exclusion restriction).

Until now, we have ignored the information we have on the movers' incomes. We can actually make use of all the information we have by studying the migration decision directly which is what we do in the next stages of our analysis. In this way, we exploit the fact that refugees were placed in their first location by the government and that some of them chose to move, providing us with additional information about their preferences by their new location choice.

We study the migration decision for individual i given by Eqs. (1) and (2):

$$\text{If } U_i^G - U_i^P > C_i, \text{ then } i \text{ moves} \quad (1)$$

$$\text{If } U_i^G - U_i^P \leq C_i, \text{ then } i \text{ stays} \quad (2)$$

where U is utility, P is the municipality where the individual has been placed and G is the target municipality, that is, the municipality where the individual considers moving to.

$$U_i^G - U_i^P = (y_i^G - y_i^P) + (Q_i^G - Q_i^P)$$

The individual utility is assumed to be composed by two elements: labour income, y_i^J , $J = G, P$, and amenities or quality of life, Q_i^J , $J = G, P$. The quality of life or amenities in municipality J , Q_i^J , represent the value of living in a certain municipality because of the weather, nature, etc.

For movers, we know where they were placed, P , and where they moved to afterwards, G . But we cannot observe to which municipality a stayer considered moving. We define the target municipality of stayers as the average municipality where all refugees that were placed in a given municipality are living in 2010. This measure reflects both the refugees that stayed where they were placed and the destination of the movers. We assume then that all refugees staying in one municipality of placement had the same target in mind, the target they decided not to move to. In this way, we use the refugees' own revealed preferences when we determine what the potential target would have been.¹²

In our analysis, we collapse the difference in quality of life or amenities and the cost of moving into one variable $Q_i^P - Q_i^G - c_i$. We consider that the individual variables affect mainly the cost of moving, while the difference in municipal characteristics between the placement and the target municipality affects mainly the difference in quality of life.

The income function at placement is assumed to have the form:

$$y_i^P(a^P, N^P) = \alpha' X^P + \beta' Z_i + \mu_i^P,$$

$$\alpha' X^P = \alpha_1 a^P + \alpha_2 N^P + \sum_{l=3}^n \alpha_l' \tilde{X}_l^P,$$

where X^P are municipal characteristics at placement, including negative attitudes, a^P , the size of the networks available, N^P , and other municipal covariates (\tilde{X}_l^P) . Z_i captures the individual characteristics, and μ_i^P is an error term.

Similarly, the income function at the target municipality has the form:

$$y_i^G(a^G, N^G) = \gamma' X^G + \delta' Z_i + \mu_i^G,$$

$$\gamma' X^G = \gamma_1 a^G + \gamma_2 N^G + \sum_{l=3}^n \gamma_l' \tilde{X}_l^G,$$

where X^G are the same characteristics in the target municipality.

The municipal covariates (\tilde{X}_l^G) that characterize the labour market conditions in municipality J are the open unemployment and municipal tax rates. The size of the population is also related to the economic conditions in the municipality and is also included as a control. We include fixed effects at the labour market area level to capture additional labour market differences across regions that are constant during the period of analysis. We control for the following individual characteristics: education, age, age squared, gender and civil status. We control for year effects as well.

We acknowledge that the income the individual has in municipality J , y_i^J ,¹³ depends on the negative attitudes towards immigrants (a^J), potentially due to discrimination, and the

size of the networks available (N^j). Munshi (2003) studies Mexican immigrants in the USA and shows that the network significantly improves labour market outcomes among its members.

The change in amenities and cost of moving is assumed to have the form:

$$(Q_i^P - Q_i^G - c_i) = \eta'(X^P - X^G) + \zeta Z_i + \omega_i,$$

$$\eta'(X^P - X^G) = \eta_1(a^P - a^G) + \eta_2(N^P - N^G) + \sum_{l=3}^n \eta'_l(\tilde{X}_l^P - \tilde{X}_l^G),$$

where $(X^P - X^G)$ is the difference between the municipal characteristics at the placement (P) and those at the target municipality (G).

The amenities or quality of life depend on the same factors that affect income plus additional geographic controls: latitude and the 10-year average minimum temperature in the winter. In the literature on amenities, it is common to hypothesize that people prefer moderate climates. There is evidence of discrimination in other markets than the labour market, notably the housing market, as well as in the education system (OECD 2013). Negative attitudes are then likely to affect the quality of life through the way in which refugees are treated in, for example, schools. Zavodny (1997) shows that new immigrants are attracted to areas with large immigrant populations. Also, Pedersen et al. (2008) find significant network effects in the location decision. Pacheco et al. (2013) analyse immigration flows for a panel of 16 OECD countries from 1991 to 2000 and find that factors such as the stock of immigrants from the source country already living in the OECD destination country, population size, relative incomes and geographic factors all significantly drive the flow of immigration.

The cost of moving is assumed to depend on individual characteristics: education, age, age squared, gender and civil status. It is, for example, likely to be harder for a family with children in school to move, than it is for a single person.

In the structural estimation, the variables of interest (the negative attitudes towards immigrants and the size of the networks) are allowed to affect, as the equations indicated, both the decision to stay or move via the differential effect on the quality of life and the income of the individual. We allow for separate coefficients for stayers and movers, as we see no reason to assume they are identically affected by the variables of interest.

In our base equations, we assume that the residuals in the income and amenity regressions at the placement and target municipalities are independent of each other. This assumption may not be realistic. High-ability refugees that have positive residuals upon placement are likely also to have positive residuals after moving. We incorporate two alternative positive correlations in residuals (0.25 and 0.50) in the estimation in order to see how our results are affected.

Identification rests on the assumption that the effect of the variables of interest on the income and quality of life is independent of the residual terms. Identification fails if some other factor, through its impact on the residual terms, determines both the level of attitudes and the differences in income and quality of life in the region. It could be imagined, for example, that a generally bad labour market causes poor outcomes for recent immigrants as well as negative attitudes among natives. While the attitudes we capture in our measure were collected more than 10 years before the period of analysis,

a bad labour market may be persistent over time. We include covariates to control for the labour market conditions, but acknowledging that this is not sufficient, we proceed as follows. To check whether some other factor determines both the level of attitudes and the differences in income and quality of life in the region, we include in one of the robustness tests another group in our analysis, immigrants from developed countries, that we expect not to be significantly affected by attitudes. The idea is that if our estimation of the effect of attitudes on income and amenities is the result of some other factor that produces lower income, we should estimate the same effect on this placebo group.

There are no considerable differences between these two groups of immigrants with respect to observable individual characteristics. They have on average a similar age (39.5 for immigrants from developed countries versus 38 for the refugees), gender composition (58 versus 55 % are women) and civil status (64 versus 68 % are married). Most importantly, their educational level is not that different. In a measure that scales from 0 (no education at all) to 6 (Ph.D. level), where a value of 3 corresponds to high-school education, the variable “well educated” in our study refers to values 4 to 6. The average level of education of immigrants from developed countries is 3.7 (with a standard deviation of 1.4), while it is 3.3 (with a standard deviation of 1.3) for the refugees in our sample.

3.4 Results

3.4.1 *How do the variables of interest affect income?*

Table 3 shows a simple analysis of the moving decision and how the refugees’ income is affected by the variables of interest, that is, by negative attitudes towards immigration in the municipality and the size of the refugees’ networks. To account for the fact that many refugees have moved from the municipality where they were initially placed by the authorities, we apply a Heckman correction. This means that we only analyse the effect of the variables of interest on the income of stayers and we correct for the bias that arises by considering only stayers.

The first column in Table 3 shows that the refugees’ income is higher in municipalities with lower negative attitudes and smaller networks.¹⁴ The average level of negative attitudes towards immigration in the whole sample is 0.336, with a standard deviation of 0.10. The average level of the share of refugees is 0.075, with a standard deviation of 0.05. A one standard deviation increase in negative attitudes towards immigration is associated with a 1.6 % lower income for the refugees. A one standard deviation increase in the size of the network is associated with a 2.5 % lower income for the refugees.

Low-educated refugees receive 18 % lower incomes than well-educated refugees, and female refugees receive 28 % lower incomes than males.¹⁵ The refugees’ incomes also increase with age. Refugees’ income is higher in municipalities with lower open unemployment and higher municipal taxes.

The effect of the variables of interest seems to be stronger on the decision to stay than on incomes. A one standard deviation decrease in negative attitudes towards immigration is associated with a 6.6 % higher probability that refugees stay where they had been placed. The probability that a refugee stays where he or she has been placed depends strongly on the size of the network, defined as the share of refugees in the

Table 3 Heckman estimation of the probability of staying where placed and the effect on the income of stayers correcting for the selection bias

	Income of stayer		Prob (stay)	
Negative attitudes towards immigration	−0.16	***	−0.66	***
	(0.06)		(0.04)	
Share of refugees	−0.49	**	8.25	***
	(0.24)		(0.14)	
Well educated	0.18	***	−0.11	***
	(0.01)		(0.01)	
Age	0.25	***	0.01	***
	(0.00)		(0.00)	
Age 2	0.00	***	0.00	***
	(0.00)		(0.00)	
Woman	−0.28	***	0.05	***
	(0.01)		(0.01)	
Married/cohabitant	0.02		0.17	***
	(0.02)		(0.01)	
Open unemployment	−0.07	***	0.01	**
	(0.01)		(0.00)	
Municipal tax rate	0.02	**	−0.10	***
	(0.01)		(0.01)	
Population	−0.01		0.48	***
	(0.03)		(0.02)	
Latitude			−0.15	***
			(0.02)	
Average minimum temperature in winter			0.13	***
			(0.00)	
Fixed and year effects	Yes		Yes	
Observations	155,223			

Regional fixed effects at the county level. Standard errors clustered at the labour market area level displayed under the coefficients

*Significant at 10 %; **significant at 5 %; and ***significant at the 1 % level

population. A one standard deviation increase in the size of the network is associated with a 41 % higher probability that refugees stay where they had been placed.

Well-educated refugees are 11 % less likely to stay than low educated, women are 5 % more likely to stay than men and married refugees are 17 % more likely to stay than those that are unmarried. This probably reflects higher costs of moving for low educated, women and families with children. Refugees prefer to stay in municipalities with warmer winters (higher average minimum temperature in winter) and at lower latitudes (more even light distribution over the year). Refugees prefer to stay in municipalities with a large population, low municipal tax rate and higher open unemployment.

In conclusion, we find that more severe negative attitudes towards immigration are associated with a lower probability that a refugee stays where he or she has been placed as well as lower income, while a larger network is associated with a higher probability that a refugee stays where he or she has been placed but lower income. We would a priori expect larger networks to be associated with higher income, as refugees provide

each other information and references that can help in the labour market, but this argument relies on networks that are established in the labour market already.

Until now, we have ignored the information we have on the movers' incomes. We can actually make use of all the information we have by studying the migration decision directly. In this way, we exploit the fact that the refugees were placed in their first location by the government and then many of them chose to move providing us with additional information about their preferences by their new location choice.

In the next section, we proceed then to consider simultaneously the effect of the variables of interest on incomes and amenities (or quality of life), making use of the information on income for all refugees and not just the stayers and extracting additional information from the migration decision of the refugees.

3.4.2 Simultaneous estimation of the effect on income and amenities

In Table 4 and the following tables, the results are presented in three columns that correspond to the coefficients of the income functions of stayers (at the placement municipality), the income functions of movers (at the target municipality) and the amenity function (a combination of difference in quality of life and costs of moving). In the last column, we estimate how the variables of interest and the various controls affect the migration decision of the refugees.

Table 4 contains the results for the whole group of refugees in our sample, assuming that the residuals at the placement and target municipalities are independent of each other. We show the coefficients of all explanatory variables (variables of interest, controls and covariates) except the fixed and year effects. From now on, tables will focus on the variables of interest.

As we allow the coefficients to differ for the income at the placement municipality (incomes received by stayers) and at the target municipality (received by movers), we can examine which of these groups is most affected by the variables of interest.

In Table 4, we find that negative attitudes affect the income of stayers and movers in a very similar way. A one standard deviation increase in negative attitudes is associated with a 4 % lower income of both stayers and movers. Networks affect stayers' income in a positive way, while they do not seem to have much effect on movers' income. A one standard deviation increase in the size of networks is associated with a 16 % higher income for stayers.

The coefficients of covariates and controls have the expected signs. Education seems to pay more for movers than for stayers. Women that moved are punished more for their gender than those who stayed. Marriage affects only the income of stayers. The income of both stayers and movers are lower in municipalities with higher unemployment, and only the income of stayers is higher if the population is larger.

More severe negative attitudes towards immigration in the municipality of placement compared to the target municipality are associated with lower quality of life, while a larger network is associated with higher quality of life. The regression performed allows us to measure how the variables of interest relate to the refugees' quality of life in monetary terms, that is, in terms of income. A one standard deviation difference in negative attitudes towards immigration between the municipality of placement and the target municipality is associated with a lower quality of life equivalent to 18 % of the income. A one standard deviation difference in networks is associated with a higher quality of life equivalent to as

Table 4 Structural estimation—uncorrelated errors

	Income stayers (1)		Income movers (2)		Quality of life/cost of moving (3)	
Neg. attitudes	−0.37	**	−0.38	**	−1.75	***
	(0.16)		(0.18)		(1.11)	
% refugees	3.11	***	0.18		28.68	***
	(0.81)		(0.20)		(5.68)	
Highly educated	0.08	***	0.37	***	−0.41	***
	(0.02)		(0.03)		(0.09)	
Age	0.24	***	0.26	***	−0.08	***
	(0.01)		(0.01)		(0.01)	
Age 2	−0.003	***	0.00	***	0.00	***
	(0.00)		(0.00)		(0.00)	
Woman	−0.23	***	−0.29	***	0.16	***
	(0.02)		(0.02)		(0.03)	
Married	0.10	**	0.00		0.24	***
	(0.04)		(0.03)		(0.08)	
% open unemp.	−0.08	***	−0.10	***	0.06	
	(0.02)		(0.01)		(0.11)	
Mun. tax rate	−0.03		0.00		−0.17	***
	(0.02)		(0.02)		(0.04)	
Population	0.24	***	0.00		2.19	***
	(0.07)		(0.07)		(0.49)	
Latitude					−0.29	
					(0.20)	
Av. min. winter temp.					0.22	**
					(0.10)	
Fixed and year effects obs.	Yes		Yes		Yes	
	122,571					

Regional fixed effects at the county area level. Standard errors clustered at the labour market area level displayed under the coefficients. In column (3), each explanatory variable is defined as the differences in values between the variable at placement and the variable at the target municipality

*Significant at 10 %; **significant at 5 %; and ***significant at the 1 % level

much as 1.43 times their income. We interpret this as a very strong sign of the preference of refugees to live close to other refugees, preferably coming from the same region of origin.

Well-educated and younger individuals have lower cost of moving, while women and married refugees have higher moving costs. Warmer weather, larger population and lower municipal taxes are also associated with higher quality of life.

Until now, we have assumed that the residuals of the income and amenity equations are independent of each other at the placement and target municipalities. This assumption is not realistic. Some refugees in our sample are traumatized by war (something we cannot observe in the data) and will probably have lower income than what we would expect (given all explanatory variables) in the income regressions in both municipalities. We therefore now explore the consequences a correlation of residuals would have on our results.

3.4.3 Simultaneous estimation with correlated residuals

A refugee with low education but very high ability and vast working experience before coming to Sweden is likely to have a higher income at placement than what we would expect in

our regression. Ability and experience cannot be captured by the observable variables in our regression. If he or she moves to another municipality, his or her income is likely to be high there as well. This means that the correlation in residuals is likely to be positive.

If we could observe the income of many refugees before and after moving, then it would be possible to estimate this correlation. But most movers actually did so soon after the placement, long before we observe them in our sample. Because of this, we simply introduce a range of correlations of residuals in our main regression (from 0 to 0.5) and study how the coefficients change with this introduction. In Table 5, we present (for the sake of space) just the coefficients corresponding to the variables of interest, but all regressions include all the covariates and controls shown in Table 4.

With uncorrelated residuals, negative attitudes seemed to affect equally the income of movers and stayers. As we assume a larger correlation of residuals, the coefficient of stayers becomes more negative, while the coefficient of movers becomes insignificantly different from zero. Once we recognize that some characteristics of the refugees, which we do not observe, affect their income in all municipalities, we find that negative attitudes are a problem for the refugees that stayed where they had been placed, while movers seem to escape discrimination somehow.¹⁶ A one standard deviation increase in negative attitudes is associated with a 5.1 % lower income of stayers and a lower quality of life of all refugees (stayers and movers) by an equivalent of 14.3 % of their income.

Larger networks seem to be associated with higher income for stayers but lower income for movers and with much larger quality of life for all refugees. The fact that quality of life is so strongly affected by the size of networks explains why refugees tend to move to municipalities with larger networks even if this could affect their income negatively. A one standard deviation larger network is associated with a 29 % higher

Table 5 Structural estimation—all refugees—different levels of error correlation

	Income stayers (1)		Income movers (2)		Quality of life/cost of moving (3)	
Uncorrelated errors						
Neg. attitudes	−0.37 (0.16)	**	−0.38 (0.18)	**	−1.75 (1.11)	***
% refugees	3.11 (0.81)	***	0.18 (0.20)		28.68 (5.68)	***
Correlated errors—correlation: 0.25						
Neg. attitudes	−0.46 (0.15)	***	−0.34 (0.23)		−1.63 (0.96)	*
% refugees	4.97 (0.33)	***	−0.28 (0.15)	*	27.13 (4.93)	***
Correlated errors—correlation: 0.50						
Neg. attitudes	−0.51 (0.20)	***	−0.31 (0.26)		−1.43 (0.80)	*
% refugees	5.73 (0.52)	***	−0.42 (0.17)	**	23.91 (4.11)	***

The three structural regressions (one for each assumed correlation of residuals) have the same controls and covariates as the regression in Table 4. Standard errors clustered at the labour market area level displayed under the coefficients. In column (3), each explanatory variable is defined as the differences in values between the variable at placement and the variable at the target municipality

*Significant at 10 %; **significant at 5 %; and ***significant at the 1 % level

income for stayers, a 2.1 % lower income for movers and a higher quality of life of all refugees (stayers and movers) by an equivalent of 1.2 times their income.

The explanation behind the asymmetric impact on stayers and movers may be that the stayers were luckier in the sense that they already had a well-established network when they arrived into a municipality. It could be the case that these workers were more attractive for the municipality and therefore were placed according to their choice and close to their acquaintances and relatives already in the country. On the other hand, those who moved may then have been less attractive to the municipality and less capable of benefitting from a network even after moving. On top of that, the less capable refugees may suffer from competition from other better-connected refugees in the municipality they chose to move to. Movers still move to municipalities with a much larger share of refugees, which indicates that the increase in quality of life is much larger than the decrease in income.

We have until now treated all the refugees as a single group. We now study how heterogeneity in terms of education and gender affects our results.

3.4.4 Heterogeneity in terms of education

Table 6 presents the results taking into account the heterogeneity of refugees in terms of education. If we do not take into account any residual correlation, we find that negative attitudes are associated with lower income of low-educated movers and well-educated stayers. The quality of life of well-educated refugees is affected, while the coefficient for low educated is not significantly different from zero (but still has a negative coefficient).

When we introduce residual correlation to recognize that some characteristics of the refugees that we do not observe affect their income in all municipalities, we return to the general result that movers' income is not affected by negative attitudes. When we assume a correlation of 0.5, a one standard deviation increase in negative attitudes is associated with a 4.5 % lower income of stayers with low education and a 6.6 % lower income of well-educated stayers. A one standard deviation increase in negative attitudes is associated with a 19.7 % lower quality of life of well-educated refugees, while the coefficient is negative but not significantly different from zero for low-educated refugees.

Larger networks are associated with higher income of stayers and larger quality of life for all refugees, with slightly larger coefficients for the well-educated refugees. At the same time, larger networks are associated with lower income of low-educated movers, while well-educated movers' income is not negatively affected by the size of networks. A one standard deviation larger network is associated with a 26.7 % larger income for low-educated stayers, a 34.5 % larger income for well-educated stayers, a 3.3 % lower income for low-educated movers, a higher quality of life equivalent to 1.19 times their income for low-educated refugees and 1.21 times their income for well-educated refugees.

3.4.5 Heterogeneity in terms of gender

Table 7 shows the effect of the variables of interest on female and male refugees. The effect of negative attitudes is somehow larger for female refugees, while the effect of networks is somehow larger for male refugees (independently of the residual correlation assumed), but the differences in the coefficients are very small. Attitudes and network effects do not seem to differ much by gender.

3.4.6 Immigrants from developed countries

We now focus on immigrants from developed countries, a group of immigrants who are not refugees and have never been placed. As we explained before, we study them as a

Table 6 Structural estimation—low-educated refugees and well-educated refugees

	Income stayers (1)		Income movers (2)		Quality of life/cost of moving (3)
Low-educated refugees					
Uncorrelated errors					
Neg. attitudes	−0.25 (0.16)		−0.35 (0.15)	**	−1.41 (1.28)
% refugees	2.76 (0.76)	***	−0.03 (0.23)		28.29 (5.71)
Correlated errors—correlation: 0.25					
Neg. attitudes	−0.37 (0.15)	**	−0.29 (0.20)		−1.36 (1.11)
% refugees	4.54 (0.34)	***	−0.51 (0.17)	***	26.86 (4.92)
Correlated errors—correlation: 0.50					
Neg. attitudes	−0.45 (0.20)	**	−0.26 (0.23)		−1.25 (0.92)
% refugees	5.34 (0.52)	***	−0.67 (0.20)	***	23.78 (4.07)
Well-educated refugees					
Uncorrelated errors					
Neg. attitudes	−0.73 (0.22)	***	−0.49 (0.34)		−2.80 (0.91)
% refugees	4.10 (0.98)	***	0.71 (0.39)	*	29.92 (6.07)
Correlated errors—correlation: 0.25					
Neg. attitudes	−0.71 (0.18)	***	−0.48 (0.37)		−2.42 (0.80)
% refugees	6.26 (0.43)	***	0.30 (0.36)		27.98 (5.34)
Correlated errors—correlation: 0.50					
Neg. attitudes	−0.66 (0.22)	***	−0.47 (0.38)		−1.97 (0.67)
% refugees	6.90 (0.69)	***	0.22 (0.31)		24.29 (4.57)

Same controls and covariates as in the regression in Table 4

*Significant at 10 %; **significant at 5 %; and ***significant at the 1 % level

placebo group. If some other factor, which we have not considered in our regressions, determines both an increase in the level of negative attitudes and a reduction in the income and quality of life in the region, then we should estimate the same effect on this group.

Table 8 presents summary statistics and shows that immigrants from developed countries live in a municipality with average negative attitudes of 0.345 (with a standard deviation of 0.1) and average share of refugees of 0.07 (with a standard deviation of 0.06).

Table 9 shows the coefficients of the variables of interest on income and quality of life for this new group. Independently of the assumption about residual correlation, the coefficients for negative attitudes are never significantly different from zero. When

Table 7 Structural estimation—female refugees and male refugees

	Income stayers (1)		Income movers (2)		Quality of life/cost of moving (3)	
Female refugees						
Uncorrelated errors						
Neg. attitudes	−0.41	*	−0.41	**	−1.82	
	(0.21)		(0.19)		(1.12)	
% refugees	2.57	***	0.19		25.32	***
	(0.62)		(0.26)		(5.54)	
Correlated errors—correlation: 0.25						
Neg. attitudes	−0.48	***	−0.37		−1.66	*
	(0.16)		(0.24)		(0.98)	
% refugees	4.32	***	−0.28		23.93	***
	(0.39)		(0.19)		(4.77)	
Correlated errors—correlation: 0.50						
Neg. attitudes	−0.51	***	−0.35		−1.42	*
	(0.19)		(0.28)		(0.81)	
% refugees	5.11	***	−0.42	**	21.07	***
	(0.70)		(0.21)		(3.93)	
Male refugees						
Uncorrelated errors						
Neg. attitudes	−0.30	**	−0.36	*	−1.65	
	(0.15)		(0.19)		(1.14)	
% refugees	3.71	***	0.18		32.42	***
	(1.07)		(0.21)		(5.99)	
Correlated errors—correlation: 0.25						
Neg. attitudes	−0.41	**	−0.31		−1.58	
	(0.18)		(0.23)		(0.99)	
% refugees	5.67	***	−0.29		30.69	***
	(0.48)		(0.21)		(5.25)	
Correlated errors—correlation: 0.50						
Neg. attitudes	−0.48	**	−0.27		−1.43	*
	(0.23)		(0.25)		(0.82)	
% refugees	6.39	***	−0.42	*	27.05	***
	(0.40)		(0.24)		(4.43)	

Same controls and covariates as the regression in Table 4

*Significant at 10 %; **significant at 5 %; and ***significant at the 1 % level

residuals are assumed to be uncorrelated, a one standard deviation increase in the share of refugees is related to a 6.2 % increase of income for stayers from developed countries. At the same time, the same increase in the share of refugees is related to a decrease in the quality of life from immigrants from developed countries equivalent to 4.5 % of their income. In our preferred specification, when we assume a residual correlation of 0.5, the income of immigrants from developed countries is not related to the share of refugees at all, while their quality of life is. A one standard deviation increase in the share of refugees is related to a 2.9 % decrease of their quality of life, a smaller figure than what we found with uncorrelated errors.

Table 8 Summary statistics for immigrants from developed countries

	Observations	Mean	Standard deviation	Min.	Max.
Individual characteristics					
Ln income	19,407	11.7	1.4	0.7	16.2
Share well educated	50,152	0.28	0.4	0	1
Age	50,152	38.6	11.2	15	65
Share women	50,152	0.52	0.5	0	1
Share married	50,152	0.61	0.5	0	1
Municipal characteristics where the stayers live					
Neg. attitudes towards immigration	31,216	0.346	0.1	0	0.75
Share refugees	31,216	0.073	0.06	0.002	0.264
Open unemployment	31,216	4.45	1.91	0.79	13.79
Municipal tax rate	31,211	31.1	1.34	26.5	34.35
Population	29,508	211.8	270.0	3.1	847.1
Latitude	31,216	58.9	2.02	55.37	67.85
Avg. min. temperature in winter	31,216	-5.19	2.89	-20.0	-1.33
Municipal characteristics where the movers live					
Neg. attitudes towards immigration	18,931	0.344	0.1	0	0.75
Share refugees	18,931	0.066	0.05	0.002	0.264
Open unemployment	18,922	4.03	1.79	0.79	13.79
Municipal tax rate	18,908	31.07	1.35	26.5	34.41
Population (thousands)	17,804	155.8	234.8	3.2	847.1
Latitude	18,931	59.0	2.04	55.37	67.85
Avg. min. temperature in winter	18,931	-5.31	2.84	-20.0	-1.33
Municipal characteristics where the movers lived first					
Neg. attitudes towards immigration	18,932	0.337	0.1	0	0.75
Share refugees	18,932	0.067	0.05	0.002	0.264
Open unemployment	18,932	4.31	1.85	0.82	13.79
Municipal tax rate	17,322	31.25	1.37	26.5	34.41
Population	17,804	197.5	271.9	2.7	847.1
Latitude	18,932	59.28	2.16	55.37	67.85
Avg. min. temperature in winter	18,932	-5.75	3.28	-20	-1.33

The sample corresponds to the years 1996–2009

This means that negative attitudes are of no concern at all for immigrants from developed countries. Networks affect their quality of life but in an opposite way than the effect for refugees. We find very different results for immigrants from developed countries and refugees, providing evidence against the idea that some other factor, which we have not considered in our regressions, determines both an increase in our variables of interest and a reduction in the income and quality of life in the region.

3.5 Robustness test

3.5.1 Interaction between negative attitudes and networks

We have assumed that attitudes are constant over time and provided evidence (in Figure 2 in the Appendix) that attitudes in the country as a whole have become less negative at times when the share of refugees have increased strongly. We think of attitudes as

Table 9 Immigrants from developed countries

	Income stayers	Income movers	Quality of life/cost of moving
	(1)	(2)	(3)
Independent errors			
Neg. attitudes	−0.30 (0.28)	−0.12 (0.17)	0.99 (1.30)
% refugees	0.89 (0.45)	0.42 (0.30)	−6.38 (2.76)

Correlation: 0.25			
Neg. attitudes	−0.24 (0.26)	−0.23 (0.18)	0.87 (1.22)
% refugees	1.06 (0.66)	0.50 (0.33)	−5.27 (2.38)
			**
Correlation: 0.50			
Neg. attitudes	−0.20 (0.24)	−0.32 (0.19)	0.76 (1.08)
% refugees	1.18 (0.88)	0.66 (0.41)	−4.12 (1.96)
			**

personal values that do not change over time, but a person may act according to their values in a stronger or weaker way depending on the situation (such as the share of refugees), which does change over time.

To explore this assumption, we introduce an interaction term to analyse whether the same negative attitudes towards immigrants affect the refugees differently depending on the share of refugees in the municipality.

Table 10 shows the coefficients of the two variables of interest and the coefficient of their interaction. In this regression, the total effect of every variable of interest is a sum of a direct effect plus an indirect effect through the interaction term, meaning that we estimate the total effect in a municipality with average variables of interest. All regressions include the same covariates and controls as the regression in Table 4. We present the coefficients for the three assumed residual correlations as before, but will discuss mainly the coefficients of our preferred specification (with a residual correlation of 0.5), where we recognize that some unobservable characteristics of the refugees affect their income in all municipalities.

The interaction term has a negative coefficient in the stayers' income equation, implying that the negative effect we saw in Table 6 is stronger the larger the size of refugees. Similarly, the direct effect of networks is larger than what we found in Table 6, but the total effect is restricted by the negative interaction term. Negative attitudes did not seem to affect the movers' income in Table 6, but they do affect them via a negative direct effect that is counteracted by a positive interaction effect. So larger networks are associated with lower movers' income in municipalities where negative attitudes towards immigrants are small but associated with higher movers' income in municipalities where attitudes are very strong.

Introducing an interaction term means that we can only compute the total effect of an increase in negative attitudes or networks in an average municipality. However, we need to take into account that the average municipalities for stayers and movers are

Table 10 Robustness test I: structural estimation including interaction terms—all refugees

	Income stayers (1)		Income movers (2)		Quality of life/cost of moving (3)
Uncorrelated errors					
Neg. attitudes	−0.53 (0.35)		−0.70 (0.19)	***	−5.45 (2.01)
% refugees	3.18 (1.16)	***	−1.53 (1.26)		30.06 (5.49)
Neg. att. * % refugees	−0.19 (2.76)		4.45 (3.09)		−114.32 (41.31)
Correlated errors—correlation: 0.25					
Neg. attitudes	−0.21 (0.26)		−0.66 (0.26)	***	−5.20 (1.70)
% refugees	3.55 (1.79)	**	−2.54 (1.98)		27.74 (4.67)
Neg. att. * % refugees	−4.09 (3.72)		5.25 (4.77)		−114.77 (36.17)
Correlated errors—correlation: 0.50					
Neg. attitudes	−0.32 (0.26)		−0.86 (0.28)	***	−4.65 (1.43)
% refugees	8.00 (0.98)	***	−3.62 (1.92)	*	25.14 (3.88)
Neg. att. * % refugees	−5.70 (1.69)	***	8.39 (4.45)	*	−102.49 (30.15)

The three structural regressions (one for each assumed correlation of residuals) have the same controls and covariates as the regression in Table 4. Standard errors clustered at the labour market area level displayed under the coefficients. In column (3), each explanatory variable is defined as the differences in values between the variable at placement and the variable at the target municipality

*Significant at 10 %; **significant at 5 %; and ***significant at the 1 % level

different. In order to compute the total effect on the quality of life, we need to compute first the average difference in negative attitudes and networks.¹⁷

A one standard deviation increase in negative attitudes decreases the income of stayers by 4.3 % in a municipality with average networks via the interaction effect,¹⁸ and the movers' income decreases by 2.5 % through both the direct and indirect effects.¹⁹ At the same time, a one standard deviation increase in the size of networks increases the stayers' income by 30 % and decreases the movers' income by 4 % (via both the direct and indirect effects).²⁰

The negative interaction term in the quality of life regression indicates that negative attitudes are more problematic for refugees in municipalities where networks are large. A one standard deviation increase in negative attitudes is related to lower quality of life by an equivalent to 49 % of the refugees' income, given the average difference in the size of networks for stayers and movers.²¹ An increase in the size of the network by one standard deviation increases quality of life by an equivalent of 1.23 times the refugees' income, given the average difference in negative attitudes.²²

Tables 11 and 12 show the same regressions taking into account the heterogeneity by education and gender. In Table 13, we have collected the estimation of the total effects of both negative attitudes towards immigration and networks on

Table 11 Different educational levels

	Income stayers		Income movers		Quality of life/cost of moving	
	(1)		(2)		(3)	
Low-educated refugees						
Uncorrelated errors						
Neg. attitudes	−0.38		−0.57	***	−5.37	**
	(0.39)		(0.22)		(2.52)	
% refugees	3.11	**	−1.28		29.77	***
	(1.36)		(1.33)		(5.62)	
Neg. att. * % refugees	−0.88		3.22		−121.42	**
	(3.50)		(3.36)		(50.00)	
Correlated errors—correlation: 0.25						
Neg. attitudes	−0.06		−0.52	*	−5.20	**
	(0.29)		(0.29)		(2.13)	
% refugees	3.69	*	−2.25		27.63	***
	(2.16)		(2.05)		(4.76)	
Neg. att. * % refugees	−5.16		3.80		−121.85	***
	(4.48)		(5.09)		(43.58)	
Correlated errors—correlation: 0.50						
Neg. attitudes	−0.22		−0.70	**	−4.65	***
	(0.26)		(0.29)		(1.75)	
% refugees	7.96	***	−3.31	*	25.06	***
	(1.22)		(2.03)		(3.89)	
Neg. att. * % refugees	−6.59	***	6.92		−107.40	***
	(2.11)		(4.77)		(35.50)	
Highly educated refugees						
Uncorrelated errors						
Neg. attitudes	−1.16	***	−1.07	**	−5.80	***
	(0.42)		(0.46)		(1.49)	
% refugees	2.59		−2.36		31.12	***
	(1.68)		(1.61)		(5.67)	
Neg. att. * % refugees	3.88		8.06	**	−94.81	**
	(3.48)		(3.65)		(38.39)	
Correlated errors—correlation: 0.25						
Neg. attitudes	−0.73	*	−1.13	***	−5.33	***
	(0.38)		(0.40)		(1.33)	
% refugees	2.80	*	−3.54	*	28.20	***
	(1.62)		(1.94)		(4.89)	
Neg. att. * % refugees	0.07		9.60	**	−96.23	***
	(3.55)		(4.32)		(34.34)	
Correlated errors—correlation: 0.50						
Neg. attitudes	−0.67	*	−1.33	***	−4.68	***
	(0.39)		(0.44)		(1.12)	
% refugees	7.84	***	−4.46	**	25.46	***
	(0.96)		(1.76)		(4.26)	
Neg. att. * % refugees	−2.38		12.29	***	−88.99	***
	(2.89)		(4.05)		(28.20)	

*Significant at 10 %; **significant at 5 %; and ***significant at the 1 % level

Table 12 Different genders

	Income stayers (1)		Income movers (2)		Quality of life/cost of moving (3)	
Female refugees						
Uncorrelated errors						
Neg. attitudes	−0.83 (0.41)	**	−0.64 (0.23)	***	−6.29 (1.86)	***
% refugees	1.48 (1.60)		−1.05 (1.38)		27.07 (5.32)	***
Neg. att. * % refugees	2.80 (3.24)		3.24 (3.54)		−138.37 (34.74)	***
Correlated errors—correlation: 0.25						
Neg. attitudes	−0.45 (0.33)		−0.67 (0.26)	***	−5.87 (1.54)	***
% refugees	2.12 (1.31)		−2.39 (2.03)		24.83 (4.53)	***
Neg. att. * % refugees	−1.49 (2.68)		4.90 (5.05)		−134.64 (29.93)	***
Correlated errors—correlation: 0.50						
Neg. attitudes	−0.50 (0.36)		−0.93 (0.28)	***	−5.19 (1.25)	***
% refugees	6.62 (0.74)	***	−3.75 (2.02)	*	22.56 (3.65)	***
Neg. att. * % refugees	−3.78 (2.93)	***	8.71 (4.89)	*	−120.05 (24.19)	***
Male refugees						
Uncorrelated errors						
Neg. attitudes	−0.21 (0.45)		−0.78 (0.24)	***	−4.59 (2.20)	**
% refugees	5.03 (1.79)	***	−2.19 (1.45)		33.48 (5.85)	***
Neg. att. * % refugees	−3.34 (5.29)		6.16 (3.43)	*	−91.40 (50.63)	*
Correlated errors—correlation: 0.25						
Neg. attitudes	−0.05 (0.39)		−0.69 (0.30)	**	−4.54 (1.90)	**
% refugees	5.15 (3.24)		−2.88 (2.11)		31.07 (4.96)	***
Neg. att. * % refugees	−6.92 (7.20)		6.10 (4.95)		−95.81 (44.99)	**

Table 12 Different genders (Continued)

Correlated errors—correlation: 0.50						
Neg. attitudes	−0.13 (0.33)		−0.83 (0.30)	***	−4.09 (1.64)	**
% refugees	9.44 (2.10)	***	−3.68 (1.95)	*	28.05 (4.23)	***
Neg. att. * % refugees	−7.65 (4.35)	*	8.54 (4.35)	**	−85.04 (38.50)	**

*Significant at 10 %; **significant at 5 %; and ***significant at the 1 % level

the income of stayers and movers and on the quality of life of all refugees in a municipality with average attitudes and networks (for stayers and for movers) and given average differences in the variables of interest.

The total effects estimated are only valid in theoretical municipalities, but the exercise allows us to compare the effects across education levels and gender when interaction is explicitly taken into account as the relationship will be valid in any municipality. The total effect is a combination of the direct effect and the indirect effect through the interaction term. More negative attitudes are in general associated with lower income and with lower quality of life. We focus here on the total effect when residual correlation is assumed to be 0.5.

Negative attitudes affect well-educated stayers' income more than low-educated stayers' income and male more than female stayers' income. Inversely, negative attitudes affect low-educated movers' income more than well-educated movers' income and female more than male movers' income. Negative attitudes also seem to

Table 13 Summary of results including interaction terms

Effect of attitudes	No correlation			Correlation = 0.5		
	Stayers' income	Movers' income	Quality of life	Stayers' income	Movers' income	Quality of life
All workers	0.00	−0.07	−0.57	−0.04	−0.02	−0.49
Low educated	0.00	−0.06	−0.56	−0.05	−0.07	−0.49
Well educated	−0.12	−0.05	−0.60	−0.07	−0.04	−0.49
Women	−0.08	−0.06	−0.66	−0.03	−0.03	−0.54
Men	0.00	−0.03	−0.48	−0.06	−0.02	−0.43
Developed countries	0.00	0.00	0.00	0.00	0.00	0.00
Effect of networks	No correlation			Correlation = 0.5		
	Stayers' income	Movers' income	Quality of life	Stayers' income	Movers' income	Quality of life
All workers	0.16	0.00	1.47	0.30	−0.04	1.23
Low educated	0.16	0.00	1.45	0.29	−0.17	1.22
Well educated	0.00	0.13	1.53	0.39	−0.02	1.25
Women	0.00	−0.04	1.31	0.27	−0.04	1.09
Men	0.34	0.10	1.65	0.34	−0.04	1.38
Developed countries	0.00	0.00	0.50	0.00	0.00	0.32

Total effect (combined direct and indirect effects) in a municipality with average attitudes and networks, taking into account that the average municipality for stayers is different than the average municipality for movers

affect the quality of life of female refugees more than male refugees, while we see no difference by education level.

Larger networks are associated with higher income of stayers and lower income of movers. The fact that movers still, on average, choose to move to municipalities with larger share of refugees determines the larger positive effect of networks on the quality of life of all refugees. The effects are similar to those of negative attitudes in terms of heterogeneity. Networks affect well-educated more than low-educated stayers' income and male more than female stayers' income. Inversely, networks affect low-educated more than well-educated movers' income and female more than male movers' income. Networks seem to affect the quality of life of low-educated more than well-educated refugees and the quality of life of female more than male refugees.

Regressions including the interaction terms lead to the conclusion that the effect of negative attitudes on the stayers' income and on the quality of life is stronger (more negative) in municipalities with a larger share of refugees. At the same time, the effect on the movers' income is weaker in such municipalities. In the case of networks, the interaction term always has the opposite sign than the direct effect.

Attitudes have a negative total effect on stayers and movers' income and on the quality of life of all refugees independently of the size of networks. Networks have a positive effect on the stayers' income and a negative effect on the movers' income, while the total effect on the quality of life is positive and large, as the refugees choose to move to municipalities with larger networks despite the (small) negative effect on their income.

3.5.2 Removing some countries of origin

We have chosen the countries in our sample such that the individuals we study are likely to be refugees. We can increase this likelihood somewhat by removing from the sample individuals originating from Poland. Out of 1422 residence permits obtained by Polish immigrants, only 47 correspond to refugees. No other country in our sample has such a low proportion of refugees as a share of all residence permits. However, recall that almost all the rest of the immigrants getting a residence permit are due to family reunion and therefore indirectly will be affected by the placement as well.

We present in Tables 14 and 15 the results of our regressions, first excluding and then including an interaction term and assuming in both cases three different possible error correlations (0, 0.25 and 0.50). The exclusion of immigrants from Poland hardly changes the regression results. In our preferred specification with an error correlation of 0.5, negative attitudes are associated with lower stayers' income and lower quality of life of all refugees, while a larger network is related to larger stayers' income, lower movers' income and an increase in the quality of life of all refugees which is large enough to compensate movers for the income reduction when they choose a municipality with a large share of refugees.

4 Conclusions

The main result in our study is that negative attitudes in a municipality are problematic for all refugees. These findings may be evidence of discrimination of refugees. Most

Table 14 Robustness test II: Polish immigrants excluded from the sample

	Income stayers (1)		Income movers (2)		Quality of life/cost of moving (3)	
Independent errors						
Neg. attitudes	−0.34 (0.18)	* 	−0.39 (0.19)	** 	−1.78 (1.22)	
% refugees	3.19 (0.87)	*** 	0.13 (0.22)		30.13 (5.93)	***
Correlation: 0.25						
Neg. attitudes	−0.45 (0.16)	*** 	−0.34 (0.24)		−1.66 (1.06)	
% refugees	5.12 (0.30)	*** 	−0.34 (0.16)	** 	28.53 (5.14)	***
Correlation: 0.50						
Neg. attitudes	−0.51 (0.19)	*** 	−0.31 (0.27)		−1.46 (0.88)	*
% refugees	5.93 (0.50)	*** 	−0.49 (0.18)	*** 	25.20 (4.28)	***

*Significant at 10 %; **significant at 5 %; and ***significant at the 1 % level

Table 15 Robustness test II: Polish immigrants excluded from the sample—including interaction term

	Income stayers (1)		Income movers (2)		Quality of life/cost of moving (3)	
Independent errors						
Neg. attitudes	−0.47 (0.35)		−0.71 (0.22)	***	−5.75 (2.30)	**
% refugees	3.54 (1.10)	***	−1.66 (1.33)		31.61 (3.13)	***
Neg. att. * % refugees	−0.89 (2.36)		4.63 (3.34)		−121.88 (46.75)	***
Correlation: 0.25						
Neg. attitudes	−0.36 (0.26)		−0.80 (0.27)	***	−5.42 (1.99)	***
% refugees	6.86 (0.64)	***	−2.92 (1.80)		29.96 (4.99)	***
Neg. att. * % refugees	−4.35 (1.70)	***	6.71 (4.27)		−117.50 (41.29)	***
Correlation: 0.50						
Neg. attitudes	−0.29 (0.26)		−0.84 (0.32)	***	−4.89 (1.63)	***
% refugees	8.54 (0.86)	***	−3.52 (2.10)	*	26.50 (4.09)	***
Neg. att. * % refugees	−6.52 (1.78)	***	7.96 (4.89)		−108.36 (34.23)	***

*Significant at 10 %; **significant at 5 %; and ***significant at the 1 % level

affected is the quality of life of refugees, indicating that discrimination is a more serious problem in areas other than the labour market. We also find some evidence of discrimination in the labour market. When we recognize that some unobservable characteristics of the refugees affect their income in all municipalities, we find that only the stayers' income is negatively related to negative attitudes towards immigration. The effect is not large but may indicate that stayers are held back by high costs of moving.

The refugees' choice of where to live is also strongly affected by the availability of networks. Larger networks are associated with a much larger quality of life, higher income for stayers and lower income for movers. We would expect the movers to be able to relocate to a municipality where networks can be most helpful. However, an explanation for this can be that stayers have been luckier in their placement in the sense that they already had a well-established network when they arrived into a municipality. These workers may have been more attractive for the municipality and therefore may have been placed according to their choice—close to their acquaintances and relatives already in the country. On the other hand, those who moved may have been less attractive to the municipality and less capable of benefitting from a network even after moving. Additionally, the less capable refugees may suffer from competition from other better-connected refugees in the municipality they chose to move to. Movers still move to municipalities with a much larger share of refugees, which indicates that the increase in amenities is much larger than the decrease in income.

The interaction between negative attitudes towards immigration and the size of networks are of importance as well. The negative relationship between negative attitudes and quality of life becomes larger when networks are larger. The same is true about the negative relationship between negative attitudes and stayers' income, while the negative relationship between negative attitudes and movers' income becomes smaller when networks are larger.

When we consider heterogeneity in terms of education, we observe that more negative attitudes reduce the income of all stayers, but it reduces the amenities of well-educated refugees only. Larger networks are associated with higher income of stayers and larger quality of life for all refugees, with slightly larger coefficients for the well-educated refugees. At the same time, larger networks are associated with lower income of low-educated movers, while well-educated movers' income is not negatively affected by the size of networks.

When we consider heterogeneity in terms of gender, we observe that the effect of negative attitudes is somehow larger for female refugees, while the effect of networks is somehow larger for male refugees, but the differences in the coefficients are very small. Attitudes and network effects do not seem to differ much by gender.

The income and the quality of life of immigrants from developed countries, our placebo group, are not affected by negative attitudes towards immigrants. Furthermore, their quality of life is affected in an opposite way than the refugees' quality of life by the share of refugees. This is an indication that we are not capturing the effect of omitted variables that affect both our variables of interest and the income or amenities for all workers in a region.

Endnotes

¹Westin (2000).

²Source: Statistics Sweden.

³Seventy percent of the Swedish population take a positive view of the immigration of people from outside the EU in Sweden according to the Eurobarometer in Autumn 2015, the highest share in the EU. Also, Sweden has the highest Migrant Integration Policy Index (MIPEX) in all EU Member States, Australia, Canada, Iceland, Japan, South Korea, New Zealand, Norway, Switzerland, Turkey and the USA.

⁴Some examples are the Intolerance Report (BRÅ 2004) and Westin (2000).

⁵See Edin and Fredriksson (2000) for a presentation of this data set.

⁶We do not have this data separated for the period 1984–1989, only the total figures for 1980–1989.

⁷The countries in our sample are former Yugoslavia, Poland, Romania, Russia, Ethiopia, Somalia, Uganda, Cuba, Chile, Peru, Afghanistan, Bangladesh, Iraq, Iran, China, Lebanon, Sri Lanka, Syria, Turkey and Palestine.

⁸Except for Turkey, as many refugees came from this country during the period studied.

⁹This is the variable depicted in Figure 2 in the Appendix for a later period.

¹⁰We have also considered alternative measures, such as just adding (1) and (2), with no significant changes in the results.

¹¹Most refugees that moved did so relatively soon after placement.

¹²We have performed the estimation using other potential targets, for example, an average of the ten most preferred municipalities (as revealed by immigrants' choices). There were no substantial changes in the results.

¹³The regression is performed on the natural logarithm of income, which facilitates the interpretation of the coefficients.

¹⁴The coefficients indicate the change in this probability for an infinitesimal change in a continuous explanatory variable and the discrete change when dummies change from 0 to 1.

¹⁵The positive effect of open unemployment on the probability that refugees stay where placed is counterintuitive and seems to be explained by a correlation with the geographical variables (latitude and temperature). If we run the same regression excluding the geographical variables, then open unemployment has a negative effect on the probability to stay that is significantly different from zero.

¹⁶The coefficients continue to be negative, but they are not significantly different from zero.

¹⁷Table 2 shows the average negative attitudes and networks for stayers and movers.

¹⁸ $\Delta \text{Income stayer: } -5.70 * 0.075 * \Delta a = -0.43 \Delta a$

¹⁹ $\Delta \text{Income mover: } -0.86 * \Delta a + 8.39 * 0.073 * \Delta a = -0.25 \Delta a$

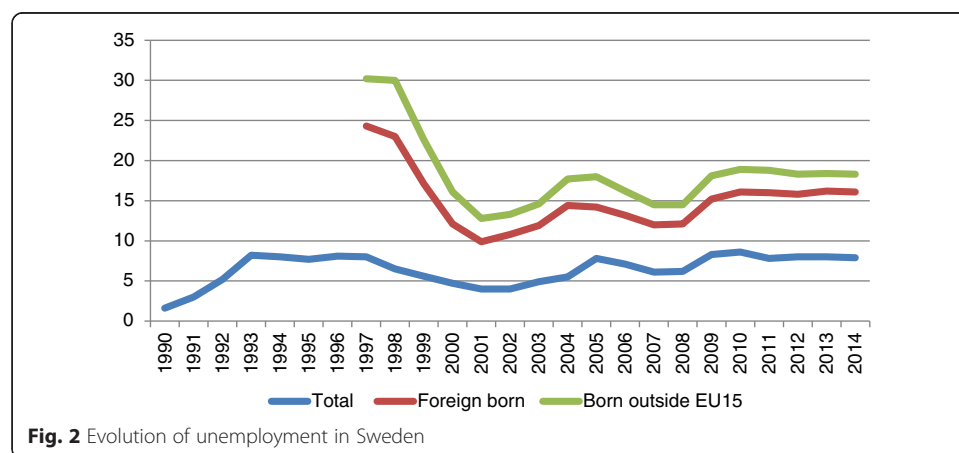
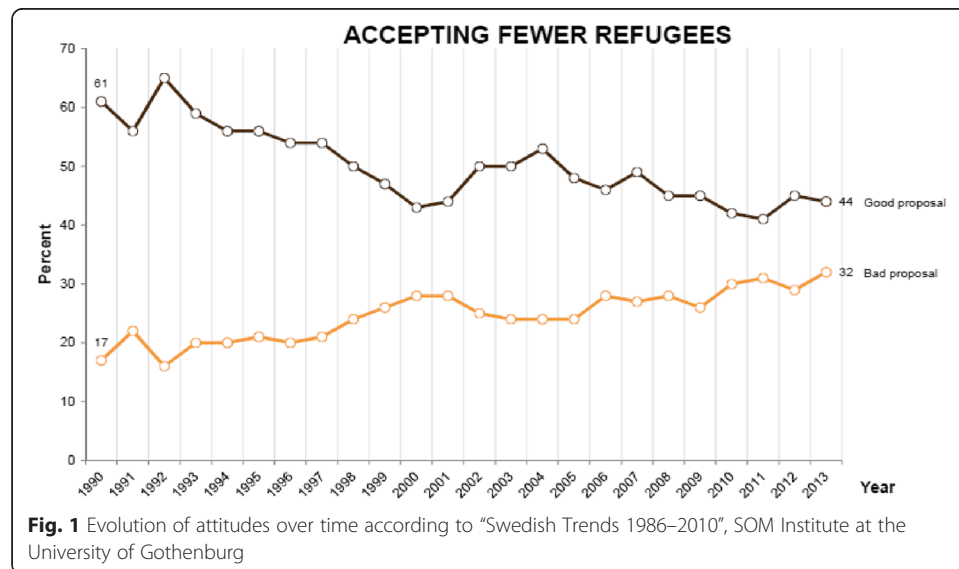
²⁰ $\Delta \text{Income stayer: } +8.00 * \Delta N - 5.7 * 0.338 * \Delta N = 6.07 \Delta N$
 $\Delta \text{Income mover: } -3.62 * \Delta N + 8.39 * 0.332 * \Delta N = -0.83 \Delta N$

²¹ $\Delta \text{Quality of life: } -4.65 * \Delta a - 102.49 * (0.075 - 0.073) * \Delta a = -4.85 \Delta a$

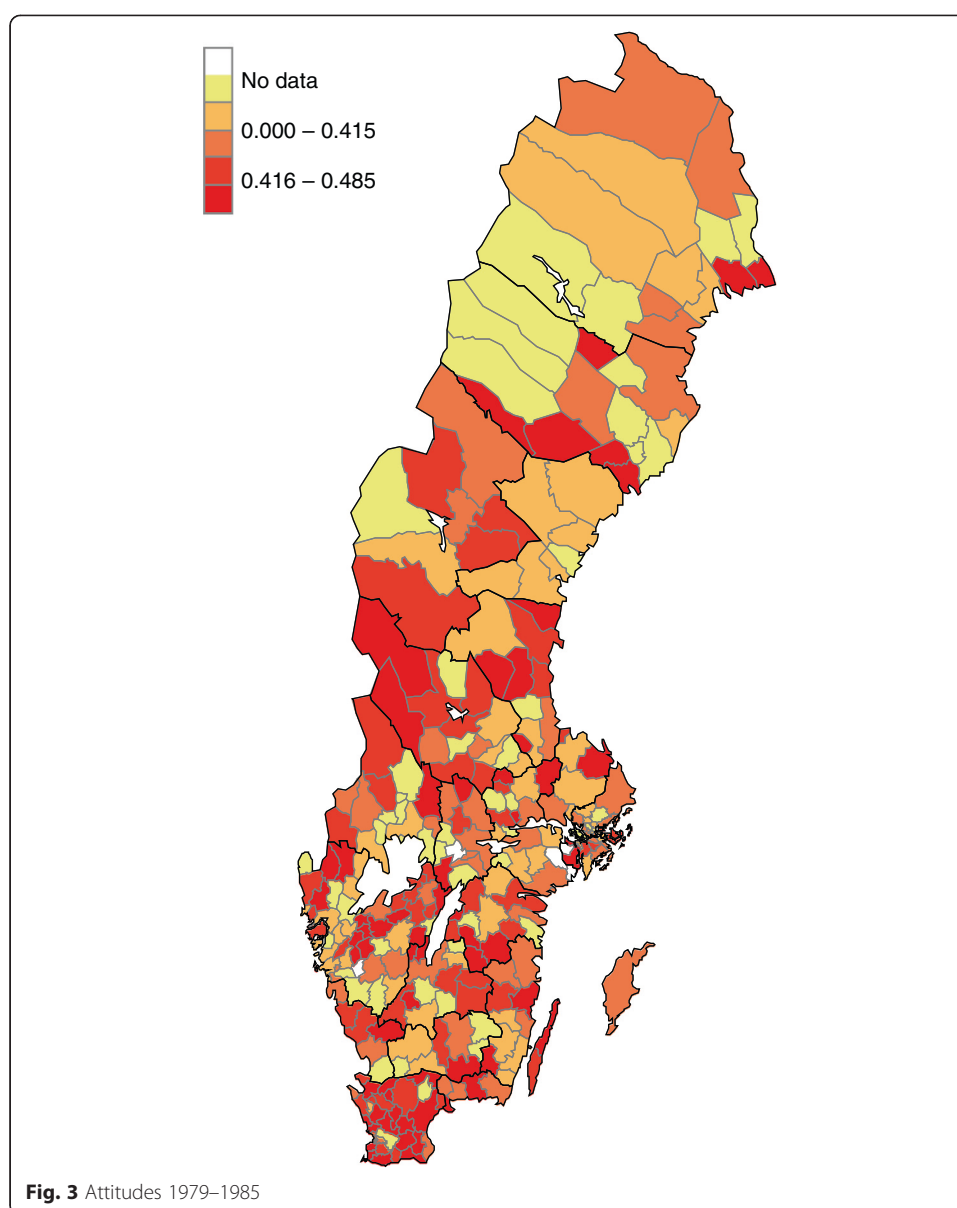
²² $\Delta \text{Quality of life: } 25.14 * \Delta N - 102.49 * (0.338 - 0.332) * \Delta N = 24.53 \Delta N$

²³We can only calculate the correlation with approximate values of attitudes as we see them on the graph.

Appendix



Attitudes are much less negative today than when the analysed group of refugees arrived. The share of refugees in the country has increased a lot since then. The fluctuations in attitudes do not seem to be correlated with the fluctuations in total unemployment, but there seems to be some correlation with the unemployment of those who are foreign born.²³ Source: Total unemployment rate: Statistics Sweden. Foreign-born unemployment rates: Eurostat.



Competing interests

The IZA Journal of Migration is committed to the IZA Guiding Principles of Research Integrity. The authors declare that they have observed these principles.

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