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# Drawbridges Down: Altruism and Immigration Preferences

## Abstract

This paper advances and empirically establishes the idea that altruism is an important determinant of individual preferences over immigration. Using data from the European Social Survey from 2014 and 2015, our results document that individual norms and values strongly shape preferences over immigration, even when controlling for expected costs and benefits from immigration. In particular, we find that altruistic attitudes significantly raise the support for all types of immigration while xenophobic views lower the support. A newly developed latent-factor model allows us to quantify and compare the relative importance of each determinant of immigration policy preferences.

JEL-Codes: F220, H200, O150.

Keywords: altruism, Europe, immigration, racism, xenophobia.

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# 1 Introduction

The 2015 Eurobarometer, a survey conducted regularly on behalf of the European Commission, found immigration to be at the top of voters’ concerns for the first time in the survey’s 42-year history. Even prior to the most recent influx of refugees from Syria and other countries, the level of immigration to Europe was at a high level. Among European voters, there has been strong support for immigration and refugees in several countries. This is reflected most prominently by the *Willkommenskultur* (welcome culture) in Germany. At the same time, the construction of fences along the Balkan route and the rise of right-wing parties show the presence of strong opposition to immigration. The division between open- and closed-borders politics has become the core of political debates in Europe.<sup>1</sup> Meanwhile, economists debate the economic effects of immigration and highlight the difficulty to explain the high level of migration if said effects are negative for the native population.<sup>2</sup>

In this paper, we argue that individual norms and values represent a key factor shaping preferences over immigration policies. Our results show in particular that altruistic attitudes raise support for immigration even when controlling for expectations about the costs and benefits of immigrants. To establish this relationship, we use the most recent wave of the European Social Survey (ESS). It includes seven questions which ask participants about how they evaluate the impact of immigration on their country. This covers both economic as well as non-economic aspects such as the cultural life or crime. Among those participants who choose the most negative answer (zero on a scale from 0 to 10) for *every* single of these seven questions, only 73–91% want to ban all types of immigration. Even in the most negative case —immigration from poor countries outside Europe— about 9% still favor a positive level of migrants. In a less restrictive sample with participants who consider the impact of immigration to be more negative than positive (choosing 0–4 on all questions), a large majority of 81–93% of individuals favors a positive level of immigration.

Exploring this observation, we show that altruistic attitudes significantly increase support for immigration. This helps to understand why voters might support immigration despite having dim expectations about its economic and non-economic effects. To investigate in detail

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<sup>1</sup>This divide is described as replacing the typical left- and right-wing division in an article entitled “Draw-bridges up” published in *The Economist* on July 30, 2016.

<sup>2</sup>Card and Peri (2016, p.23) ask whether “immigration policies [are] manipulated by an elite who benefit from these policies at the expense of others [or whether the] balance of benefits versus costs — even for native workers who are most directly in competition with immigrants — [is] more positive than one might be led to believe”.

which factors shape immigration preferences, we develop a novel five-way latent factor model. This allows us to identify individual preferences for immigration, concerns over economic impacts, concerns over compositional amenities, racism, and altruism. We use a multitude of questions from the ESS to estimate these individual-level parameters while explicitly taking into account the structure and difficulty of each survey question. Using these individual-level latent factors, we quantify the influence each factor has on immigration preferences. The results show that worries about the economic impact such as employment or fiscal effects play a significant role. Furthermore, we find evidence in line with Card, Dustmann and Preston (2012) that concerns about compositional amenities —how immigration affects the cultural life or crime rate— are important in shaping preferences. Our findings further document that both racist and altruistic attitudes have a significant effect on the preferred level of immigration. In particular, survey participants who care more about the well-being of others (i.e. are more altruistic) want a higher level of immigration, *conditional* on how they think about immigration’s effects. Importantly, we show that altruism is not just the mirror image of racism but that the two attitudes are separate factors shaping preferences over immigration.

These findings complement a large body of research on attitudes towards immigrants. The literature has attempted to explain differences in preferences over immigration across individuals by their observable characteristics. Empirical evidence has been interpreted as reflecting both economic and non-economic expectations shaping policy preferences. However, there is an ongoing debate over to what extent preferences are shaped by self-interest and sociotropic concerns (Hatton, 2016). Many studies have focused on attributing deviations from a *homo oeconomicus* behavior as reflecting xenophobic views (Hainmueller and Hiscox, 2007). In contrast to this literature asking the question why many natives *oppose* immigration, we intend to address the opposite question: why do so many natives *support* immigration even despite their dim expectations about the effects of migrants.

Much of prior research is puzzled by finding many voters objecting to immigration despite lack of clear evidence of substantial negative wage or employment effects. Extensive research on how natives’ employment and wage rates are affected by immigration has provided mixed evidence on both the sign and the magnitude of the impact. While some studies find negative effects on wages (Borjas, 2003; Aydemir and Borjas, 2007; Borjas, 2013; Borjas and Monras, 2016) and employment (Glitz, 2012; Dustmann, Schönberg and Stuhler, 2016*a*),

others do not find such effects (Card, 2012; Ottaviano and Peri, 2012; Manacorda, Manning and Wadsworth, 2012; Dustmann, Frattini and Preston, 2013; Card and Peri, 2016; Foged and Peri, 2016), especially when taking into account other benefits of immigration such as innovation (Kerr and Lincoln, 2010; Peri, 2012). Furthermore, it remains unclear whether fears of labor market effects from immigrants actually shape policy preferences (Scheve and Slaughter, 2001; Hainmueller, Hiscox and Margalit, 2015). Furthermore, voters choose their preferred level of immigration based on how they think migrants affect taxes and welfare benefits. This fiscal effect of immigration has been estimated in a number of studies, yielding inconclusive results. Preston (2014) describes the difficulty of accounting for the total fiscal effect given immigrants' diversity in demographics, skills, and customs. Dustmann and Frattini (2014) find that migrants from outside the European Economic Area generally have made a negative contribution. However, this impact is not found for more recent immigrants. Expecting immigrants to come at a fiscal cost is often justified by their poor labor market performance (Storesletten, 2003). For France, Germany, and the United Kingdom, Algan et al. (2010) find substantially lower employment rates among both first- and second-generation immigrants from Turkey and African countries. Nevertheless, in the context of population aging, some point out potential fiscal benefits from immigration. Prior research has emphasized that it matters whether natives think of migrants as recipients of welfare benefits or as providing complementary labor (Mayda, 2006; Facchini and Mayda, 2009). In addition, perceptions about migrants in Europe are significantly shaped by concerns about fiscal effects of immigration (Boeri, 2010). A third significant factor shaping attitudes towards immigration is based on non-economic arguments.<sup>3</sup> In a study by Hainmueller and Hiscox (2007), the authors use the European Social Survey and find that education has strong explanatory power, partly because it reduces racism and increases demand for cultural diversity. Similarly, Dustmann and Preston (2007) document that racial or cultural prejudice is an important determinant of attitudes towards immigration. Related to this research, exposure to migrants has been found to increase support for right-wing parties (Markaki and Longhi, 2013; Halla, Wagner and Zweimüller, 2015; Barone et al., 2016). With respect to the recent influx of refugees, however, Steinmayr (2016) finds evidence in line with the contact hypothesis, stating that the presence of refugees reduces support for the political right.

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<sup>3</sup>Note that both economic and non-economic factors shape preferences over immigration. Bridges and Mateut (2014) find that economic variables are more important with respect to immigration of the same race, a finding that is not confirmed by our results.

We contribute to the literature by documenting that altruistic attitudes shape individual preferences, while controlling for other determinants of policy preferences including expected labor market effects or xenophobia. In line with Bridges and Mateut (2014) as well as Murard (2015), our findings show that attitudes towards immigration are affected by expectations about how immigration affects the economy and life in the domestic country. However, we show that individuals deviate from a purely ‘rational’ preference that is only determined by the expected costs and benefits of immigration. While prior research has established racism as one factor causing such deviations, we add altruism to the determinants of preferences over immigration.

The remainder of the paper is organized as follows. In Section 2, we present a simple model to explain how preferences over immigration are determined and how altruism affects preferred immigration policies. Section 3 provides information on the construction of our data set as well as several descriptive statistics. Section 4 describes the econometric approach. In Section 5, we show our main empirical results. Section 6 investigates the robustness of our findings. Finally, Section 7 concludes.

## 2 Theoretical Considerations

The economic and non-economic effects of immigration are debated not only in the public but also among economists. In particular, people differ substantially on how they expect immigration to affect wages and employment rates of natives (Borjas, 2014; Card and Peri, 2016), the fiscal budget (Dustmann and Frattini, 2014; Hatton, 2014), the cultural life, crime, as well as other compositional amenities (Card, Dustmann and Preston, 2012).

### 2.1 Model

In order to fix ideas, we consider a simple theoretical model. Suppose individuals choose their preferred level of immigration solely on how their own utility is affected by immigration. We assume that migrants affect the utility of natives in two ways. First, migrants affect the level of consumption ( $c$ ) of natives through labor market or fiscal effects. Furthermore, the utility that natives receive from public goods such as schools or parks can be altered by the presences of migrants (Card, Dustmann and Preston, 2012). Second, immigration may have a direct impact on utility through sociotropic concerns. These sociotropic concerns consist

of both altruism and racism. Hence, when choosing their preferred level of immigration ( $l^*$ ), natives maximize their utility function

$$U = u(c) + v(l) \quad \text{with} \quad c = f(l) \quad (1)$$

where  $u'(c) > 0$  but are agnostic about whether the first derivatives of  $v(l)$  and  $f(l)$  are positive or negative. Essentially,  $v'(l) > 0$  implies that individuals are predominantly altruistic, i.e. that the “net” effect of altruism and racism is such that the individual attains a higher utility level with higher immigration — over and beyond any economic effects of immigration. The opposite holds if  $v'(l) < 0$ , which implies that the individual is predominately xenophobic or racist.<sup>4</sup> If immigration increases individuals’ utility from consumption, we have  $f'(l) > 0$ . Vice versa, natives who face negative effects of immigration see their utility from consumption decrease with the level of migrants:  $f'(l) < 0$ . Individuals do not know the ‘true’ form of  $f(l)$  but have some prior which henceforth we denote by  $\tilde{f}(l)$ . Thus, their preferred level of immigration depends on how they expect immigration to affect their own level of consumption. If they think immigration has detrimental wage or fiscal effects, the first derivative of  $\tilde{f}(l)$  is negative. For an interior solution, at the optimum  $l^*$  it must hold that  $u'(c)\tilde{f}'(l) + v'(l) = 0$ . In other words, since  $u' > 0$  it must be that the signs of  $\tilde{f}'$  and  $v'$  are opposite. For example, if an individual expects the effects of additional immigration (beyond  $l^*$ ) to be negative ( $\tilde{f}'(l^*) < 0$ ), altruistic motives ( $v'(l^*) > 0$ ) explain why that individual chooses a level of immigration larger than  $l^*$ . This is in line with Cambridge Dictionary’s definition of altruism as the ‘willingness to do things that bring advantages to others, even if it results in disadvantage for yourself’.<sup>5</sup>

It is important to note that altruism and conversely xenophobia affect equation (1) twofold. First, altruistic people will have a ‘warm glow’ from allowing people to migrate to their country. This implies that  $v'(l) > 0$  and that immigration *directly* increases an individual’s utility. Secondly, altruistic views with respect to immigration might improve an individual’s expected costs and benefits from immigration. In other words, for altruistic individuals we expect  $\tilde{f}(l)$  to be superior compared to  $f(l)$  among non-altruistic people. In

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<sup>4</sup>Throughout the paper we use the terms xenophobia and racism equally as representing direct disutility from the presence of foreigners. Note that the ESS questionnaire captures both xenophobia and racism separately and we use the respective answers in the empirical part.

<sup>5</sup>This description of altruism in accordance with an alternative definition by Merriam-Webster as ‘unselfish regard for or devotion to the welfare of others’.

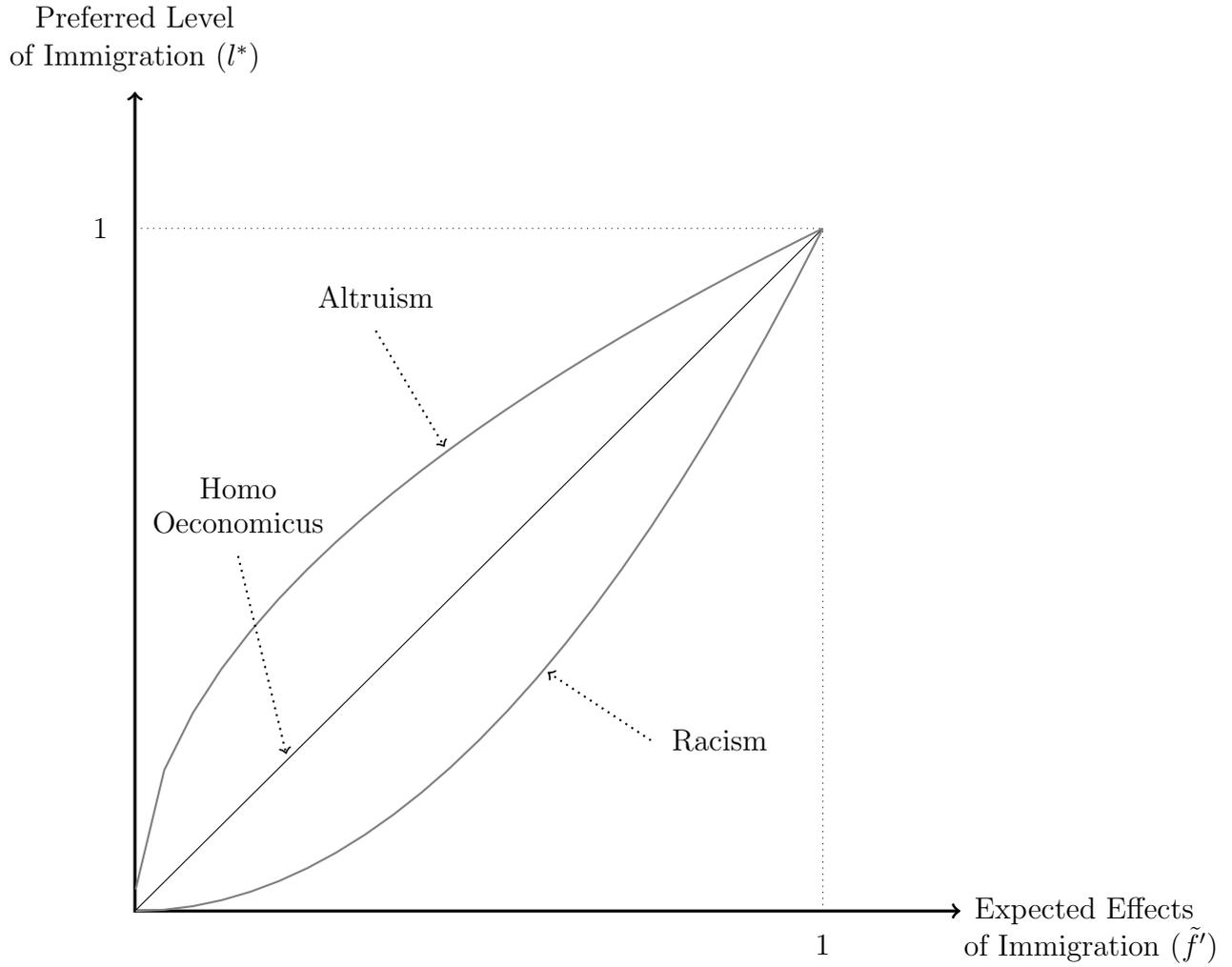
a broader sense, no native knows exactly how immigration affects his own consumption. As we discussed above, the ‘true’ effects of immigration on the labor market, on crime, or on the fiscal budget are subject to fierce debates even among experts (Dustmann, Schönberg and Stuhler, 2016*b*). At the individual level, we think that optimistic views, wishful thinking, or the benefit of doubt will lead altruistic people to have more positive views on how immigration affects their own consumption. In contrast, xenophobic natives might exaggerate the negative impact of immigration, for example due to selective media consumption (DellaVigna and Kaplan, 2007; Mastrorocco and Minale, 2016). All this would *indirectly* affect voter preferences over immigration. To summarize these considerations, we can state the following expression

$$\partial l^* / \partial \tilde{f}' > 0 \tag{2}$$

which implies that individuals with more positive expectations about how immigrants affect their own consumption (i.e. with  $\tilde{f}' > 0$ ) will rationally want a larger amount of immigration. Deviating from this ‘rational’ behavior requires additional considerations with respect to immigration. In this paper, we focus on how both altruism increases and xenophobia reduces the support for immigration *conditional* on the expected effects of immigration.

We illustrate these considerations in Figure 1 where we assume linear relationship with zero intercept and unit slope for how the non-altruistic, non-racist homo oeconomicus chooses a preferred level of immigration given his expectations about the effects of migrants. A large body of literature has examined why individuals deviate from this ‘rational’ behavior. Particular emphasis in this research has been placed on those individuals who oppose immigration altogether. If an individual chooses  $l^*$  near zero, this is usually due to high expected costs of immigration ( $\tilde{f}'$ ) for them. In the absence of such costs, the preferred policy can be explained by racist views. We illustrate this by means of the lowest curve. In contrast to this literature, we focus on those individuals who support immigration. For these people the benefits of immigration must outweigh the costs to rationalize their policy preference. Since immigration levels are fairly high in reality but the effects on natives are subject to fierce debates, Card and Peri (2016, p.23) ask whether “immigration policies [are] manipulated by an elite who benefit from these policies at the expense of others [or whether the] balance of benefits versus costs — even for native workers who are most directly in competition with immigrants — [is] more positive than one might be led to believe”. In this paper, we argue that altruism is another explanation for why individuals support immigration despite having

Figure 1: Illustration of the Theoretical Model



*Note:* The figure illustrates how expectations about the effects of immigration ( $\tilde{f}'$ ) map into preferred levels of immigration ( $l^*$ ). Both dimensions are scaled from zero to one with higher values indicating more positive views on the effects of immigration as well as higher support for immigration. A 'rational' homo oeconomicus shows one-for-one mapping of  $\tilde{f}'$  into  $l^*$  if we assume linearity. While altruism shifts the preferred level of immigration upwards, racist attitudes lower support for immigration for every given expectation about the effects.

dim expectations about its effects. In Figure 1, individuals with altruistic motives support high levels of immigration ( $l^*$ ) even if they expect the effects of immigration ( $\tilde{f}'$ ) to be fairly negative.

## 2.2 Motivational Evidence

It is an empirical question whether or not individuals' preferred level of immigration differs from what would be expected given their expectations on the effects of immigration. In order to test this, one would need data on both what people think about the effects of immigration and how much immigration they prefer. The European Social Survey (ESS) includes such questions in its biannually released data. We explain the details on this data set in Section 3 and use it here to provide initial evidence that many individuals' immigration preferences differ from what would be expected given their views on how immigrants affect their country.

In Table 1, we show both the distribution of views on immigration and distribution of preferred levels of immigration. We observe that the expected costs and benefits of immigration have strong explanatory power for preferred immigration policies. Those who hold positive views on how immigrants affect their country show substantially more support for immigration. This positive gradient is clearly visible in Figure 2.

On the horizontal axis, we plot an index of individual expectation about the effects of immigration. This index comprises answers to seven questions on the effects of immigration (ECO1-ECO3 and COM1-COM4 as shown in Table 2). Higher values indicate positive expectations while low values reflect a detrimental expected impact. The vertical axis also shows an index. We combine answers to four questions on how many immigrants survey participants want to allow to come to their country (listed in table 1). Again, higher values reflect a more positive attitude towards immigration.

There are two important observations with respect to Figure 2. First, there is a strong positive relationship between the expected impact of immigration and how much immigration is preferred.<sup>6</sup> Second and more important for our paper, there is a lot of variation in preferred immigration policies for each given level of expected costs of immigration. For example, those individuals with very negative views on the effects of immigration (values of 0 or 0.1 on the x-axis) want on average a low level of immigration. However, among them there is a sizable

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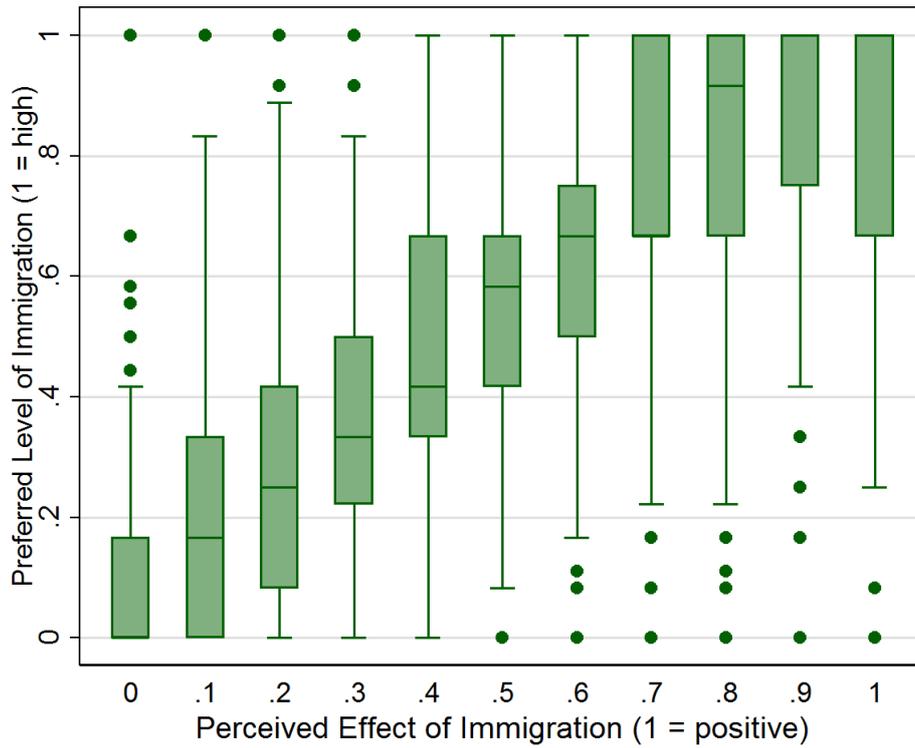
<sup>6</sup>When regressing preferences over immigration on expected costs and benefits, we obtain a coefficient near unity (cf. Table 4). As expected, this coefficient is much smaller (around 0.7) when using support for refugees on the left-hand side in the regression.

**Table 1: Distribution of Expectations and Preferences**

	Expected Benefits of Immigration									
	Low					High				
<u>I. Refugee Applications</u>										
Agree Strongly	349	521	593	532	441	228	73	21	5	10
Agree	263	702	1,321	1,863	1,858	995	291	71	11	3
Neither Nor	194	484	1,217	2,289	3,337	2,127	773	176	27	10
Disagree	140	272	830	1,695	3,252	3,415	1,692	536	92	14
Disagree Strongly	47	89	148	321	632	955	818	461	151	21
<u>II. Immigration of Same Race</u>										
Allow many	55	175	353	928	2,029	2,757	1,913	841	226	48
Allow some	221	578	1,615	3,272	5,351	4,040	1,487	363	52	5
Allow few	364	836	1,648	2,187	1,962	824	209	49	11	4
Allow none	372	509	572	390	214	86	32	16	1	2
<u>III. Immigration of Different Race</u>										
Allow many	7	29	49	248	839	1,683	1,456	728	206	36
Allow some	99	321	980	2,509	5,017	4,270	1,731	411	63	11
Allow few	332	861	2,070	3,089	3,126	1,485	357	92	15	5
Allow none	577	889	1,069	915	561	279	97	32	4	5
<u>IV. Immigration From Poor Countries in Europe</u>										
Allow many	10	32	69	263	829	1,539	1,333	681	198	36
Allow some	101	277	929	2,223	4,446	3,998	1,723	442	56	7
Allow few	275	734	1,684	2,701	3,090	1,655	431	94	22	6
Allow none	502	824	1,044	1,004	700	358	118	38	5	6
<u>V. Immigration From Poor Countries outside Europe</u>										
Allow many	10	20	55	211	681	1,341	1,186	635	187	33
Allow some	82	234	736	1,885	3,979	3,780	1,694	442	69	9
Allow few	246	708	1,863	3,109	3,705	2,003	594	143	24	5
Allow none	676	1,126	1,505	1,514	1,142	550	163	41	10	7

*Note:* The table presents the numbers of observation for all possible values of expectations of costs of immigration as well as preferred levels of immigration of different type.

Figure 2: Perceived Effect and Preferred Immigration Level



*Note:* The figure shows the positive correlation between expected benefits of immigration and preferred levels of immigration. On the horizontal axis, we show expectations on the economic and non-economic effects of immigration with higher values indicating more positive views. The vertical axis reflects support for immigration of four different types as shown by questions II-V of Table 1. Each box indicates the range from the 25th to the 75th percentile, the horizontal line within each box shows the median.

number of people who want positive levels of immigration.

### 3 Data

For the empirical part of this paper, we employ the most recent survey data from the European Social Survey (ESS). Interviews took place in twenty European countries in the years 2014 and 2015.<sup>7</sup> Importantly, the questionnaire includes a series of questions on individual attitudes towards immigration and expected effects of immigration. This allows us to examine how expectations about immigration ( $\tilde{f}(l)$  in our theoretical model) map into immigration preferences ( $l^*$ ). Furthermore, the ESS provides answers to numerous questions that reflect altruism and racism. In addition, survey participants are asked a large set of questions on their characteristics, economic situation, or political views. Using this wealth of data, we can explore whether altruism shapes preferences over immigration. Notably, we are not the first to use the European Social Survey (ESS) to study attitudes towards immigration. Card, Dustmann and Preston (2012) use the 2002 ESS and show that concerns about compositional amenities are highly important in shaping individual immigration preferences, more so than concerns about wages and taxes.

**Immigration Preferences** — For preferences over immigration, we mainly rely on four questions: Each survey participant is asked how many immigrants he or she wants to allow to migrate to his or her country. This question is asked for four different types of migrants: (i) of the same race, (ii) of a different race, (iii) from poor countries in Europe, and (iv) from poor countries outside Europe. With respect to each question, participants can choose from a set of four possible answers: many, some, few, or none.<sup>8</sup> For our main analysis, we combine each individual’s answers on all four questions into one variable that ranges from zero to one with higher values indicating a higher preferred level of immigration.

The ESS includes further questions that we can use in order to measure individuals’ preferences over immigration. First of all, each participant is asked whether the government

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<sup>7</sup>The sample includes all countries that participated in the 7th wave of the ESS: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Israel, Lithuania, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland, United Kingdom. We omit Estonia due to lack of data on control variables. For Austria, we do not have data on question V of Table 1, for the Czech Republic RAC5 is missing.

<sup>8</sup>Note that we remove all individuals who refuse to answer, do not answer, or say they do not know how to answer the question.

should be generous judging applications for refugee status. There are five possible answers to choose from: agree strongly, agree, neither agree nor disagree, disagree, or disagree strongly. Second, the ESS asks specifically how many Jews, Muslims, or Gypsies should be allowed to immigrate. We use answers to these questions in the robustness tests.

**Expected Costs and Benefits** — In order to measure how individuals perceive the impact of immigration, we use a set of seven questions from the ESS. Both the questions and the possible answers are summarized in Table 2. We follow Card, Dustmann and Preston (2012) and separate them into economic and compositional effects. The former include three questions asking whether a survey participant thinks immigrants take away jobs, have a negative fiscal effect, and are generally bad for the economy. With respect to compositional amenities, we use four questions that ask whether immigrants undermine the cultural life, undermine religious beliefs and practices, worsen crime problems, and make the country generally a worse place to live.

**Table 2: Questions and Possible Answers in the ESS**

Code	Question	Possible Answers
ECO1	Would you say that people who come to live here generally take jobs away from workers in [your country], or generally help to create new jobs?	0 (take away) ... 10 (create jobs)
ECO2	Most people who come to live here work and pay taxes. They also use health and welfare services. On balance, do you think people who come here take out more than they put in or put in more than they take out?	0 (take out more) ... 10 (put in more)
ECO3	Would you say it is generally bad or good for [your country]'s economy that people come to live here from other countries?	0 (bad) ... 10 (good)
COM1	Would you say that [your country]'s cultural life is generally undermined or enriched by people coming to live here from other countries?	0 (undermined) ... 10 (enriched)
COM2	Do you think the religious beliefs and practices in [your country] are generally undermined or enriched by people coming to live here from other countries?	0 (undermined) ... 10 (enriched)
COM3	Are [your country]'s crime problems made worse or better by people coming to live here from other countries?	0 (worse) ... 10 (better)
COM4	Is [your country] made a worse or a better place to live by people coming to live here from other countries?	0 (worse) ... 10 (better)
RAC1	Do you think some races or ethnic groups are born less intelligent than others?	0 (no) 1 (yes)
RAC2	Do you think some races or ethnic groups are born harder working than others?	0 (no) 1 (yes)
RAC3	Thinking about the world today, would you say that some cultures are much better than others or that all cultures are equal?	1 (much better) 2 (all equal)
RAC4	In deciding whether someone born, brought up and living outside [your country] should be able to come and live here, how important should it be for them to be white?	0 (extremely unimportant) ... 10 (extremely important)
RAC5	Thinking of people who have come to live in [your country] from another country who are of a different race or ethnic group from most [your country] people. How much you would mind or not mind if someone like this was appointed as your boss?	0 (not mind at all) ... ... ... 10 (mind a lot)
ALT1	It is very important to her/him to help the people around her/him. She/he wants to care for their well-being.	1 (very much like me) ... 6 (not at all like me)
ALT2	She/he thinks it is important that every person in the world should be treated equally. She/he believes everyone should have equal opportunities in life.	1 (very much like me) ... 6 (not at all like me)
ALT3	It is important to her/him to listen to people who are different from her/him. Even when she/he disagrees with them, she/he still wants to understand them.	1 (very much like me) ... 6 (not at all like me)

*Note:* The table shows the questions from the 2014 European Social Survey that we use in our empirical analysis. In the third column, we show the range of possible answers that each survey participant is provided. For those questions where there is an integer number larger than two of answers, we show [...] between the most extreme answer options.

Using this set of questions, we create several indices. First, we combine the answers to all seven questions into a single measure of how an individual expects immigration to affect his or her home country. Second, we create an index for the economic effects that combine the first three questions into a single variable. Finally, we merge together each individual’s answers to the four questions on compositional amenities. Each index is created to range from zero to one with higher values indicating more positive expectations about the effects of immigration.

**Altruism and Racism** — For testing our main hypothesis, we need a measure of individual-level altruism and racism. In the ESS there are several questions that we exploit for this. We follow Cambridge Dictionary’s definition of altruism as the ‘willingness to do things that bring advantages to others, even if it results in disadvantage for yourself’.<sup>9</sup> For measuring the level of altruism, we use four questions. The first one asks whether participants think it is important to help people and care for others’ well-being. The interviewer describes a person and asks on a scale from 1 (very much like me) to 6 (not at all like me) whether the survey participant thinks the person is similar to him/her. The statement reads “It is very important to her/him to help the people around her/him. She/he wants to care for their well-being.” We define this question as ALT1 in Table 2. Second, we use a question on whether a survey participant thinks it is important that every person in the world is treated equally and should have equal opportunities in life, denoted ALT2. Finally, each individual is asked whether it is important to listen to people who are different, even if he or she disagrees with them. We code this question ALT3. For both ALT2 and ALT3, the participants can answer in the same way as to ALT1.

To identify racist attitudes, we again follow the Merriam-Webster textbook definition: “a belief that race is the primary determinant of human traits and capacities and that racial differences produce an inherent superiority of a particular race”. The ESS questionnaire contains a question that reflects this concept. For our main analysis, we rely on this question (labeled RAC1 in Table 2) which asks whether the participant thinks some races or ethnic groups are born less intelligent. Answering this question with yes (as opposed to no) is coded

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<sup>9</sup>Different types of altruism might play a role in shaping attitudes towards immigrants. We can think of pure altruism where individuals act in a way that benefits others without getting anything in return. Alternatively, attitudes towards immigration might be affected by impure altruism (Andreoni, 1989) or a warm-glow motive where individuals at the very least receive satisfaction from having a desire to help fulfilled.

as racism. In order to account for a broader definition of racism (or xenophobia), we make use of several questions in the ESS. Particularly, we take respondents' answers to the question whether they think some races or ethnic groups are born harder working than others. Again, individuals can choose to answer either yes or no. Furthermore, the ESS asks participants to say whether they think all cultures are equal or whether some are much better than others. The fourth question we use to measure racist attitudes for each individual asks whether it is important for migrants to white. Finally, each survey participant is asked whether he or she would mind if someone from another country and of a different race was appointed as his or her boss.<sup>10</sup> Note that we code all variables such that their values are between zero and one with higher values indicating a more racist or xenophobic attitude.

It is important to emphasize the relationship between altruism and racism in the ESS survey. In particular, we examine the correlation between individual answers to questions on both attitudes. Table A.2 in the Appendix provides both the raw as well as adjusted correlations. We observe that individuals respond similarly to different questions on the same attitude. However, the correlation between individual answers on altruism and racism is very small. For example, ALT1 ('it is important to help people around you and to care for their well-being') is barely correlated with any of the questions on racism. Furthermore, allowing for a correlation between altruism and racism in the latent-factor model yields very similar results to those presented in the Table 5. This rules out the idea that altruism is just the mirror image of racism. Instead, the two attitudes are separate factors shaping preferences over immigration.

**Descriptive Statistics** — We provide descriptive statistics on all variables in our data set by means of Table 3. In total, we have more than 38,000 interviews from twenty European countries. These interviews took place between August 2014 and December 2015.

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<sup>10</sup>There is a very similar question in the ESS that asks whether the participant would mind if a migrant of a different race married a close relative. Since the answers to both questions are highly correlated we decided to focus on one question.

**Table 3: Descriptive Statistics**

Variable	Mean	Std. Dev.	Min.	Max.	N
Age	49.23	18.72	14	114	38,041
Year of Birth	1965.22	18.74	1900	2000	38,041
Male	0.47	0.50	0	1	38,134
Children at Home	0.36	0.48	0	1	38,134
High Education	0.30	0.46	0	1	38,134
Religious	0.56	0.31	0	1	37,859
Household Income Decile	5.32	2.78	1	10	31,889
Happiness with Income	0.69	0.28	0	1	37,760
Being a Citizen	0.96	0.20	0	1	38,112
Belong to Minority	0.05	0.23	0	1	37,641
Wage Earner	0.57	0.49	0	1	38,134
Retired	0.26	0.44	0	1	38,134
Unemployed (currently)	0.04	0.20	0	1	38,134
Left-Right Scale (1=left)	0.49	0.22	0	1	34,130
Interest in Politics	0.48	0.31	0	1	38,031
People can be Trusted	0.52	0.24	0	1	38,063
Satisfied with State of Economy	0.48	0.25	0	1	37,517
Native Father	0.83	0.37	0	1	38,134
Native Mother	0.84	0.36	0	1	38,134
High Education Partner	0.19	0.39	0	1	38,134
High Education Father	0.15	0.36	0	1	38,134
High Education Mother	0.12	0.33	0	1	38,134
Risk Aversion	0.57	0.29	0	1	37,042
Preferred Level of Immigration (1 = high)	0.53	0.26	0	1	37,573
Many/Few Immigrants: Same Race	0.63	0.29	0	1	37,159
Many/Few Immigrants: Different Race	0.52	0.30	0	1	37,108
Many/Few Immigrants: Poor Countries in Europe	0.52	0.30	0	1	34,958
Many/Few Immigrants: Poor Countries outside Europe	0.46	0.31	0	1	36,956
Government Should be Generous with Refugees	0.54	0.28	0	1	36,898
Many/Few Immigrants: Jews	0.60	0.31	0	1	36,517
Many/Few Immigrants: Muslims	0.44	0.33	0	1	36,676
Many/Few Immigrants: Gypsies	0.38	0.33	0	1	36,568
Immigration Effects (ECO1 - ECO3, COM1 - COM4)	0.48	0.17	0	1	38,032
Economic Effects Index (ECO1 - ECO3)	0.47	0.19	0	1	37,878
Compositional Effects Index (COM1 - COM4)	0.48	0.18	0	1	37,921
Racism Index (RAC1 - RAC5)	0.30	0.24	0	1	38,134
Altruism Index (ALT1 - ALT3)	0.77	0.16	0	1	37,230
ECO1: Jobs	0.48	0.23	0	1	36,763
ECO2: Fiscal Effect	0.45	0.22	0	1	35,938
ECO3: Bad for Economy	0.49	0.24	0	1	36,806
COM1: Cultural Life	0.56	0.25	0	1	36,833
COM2: Religious Beliefs	0.49	0.21	0	1	35,302
COM3: Crime Problems	0.37	0.20	0	1	36,146
COM4: Country Worse Place to Live	0.50	0.23	0	1	36,701
RAC 1: Some Races Born Less Intelligent	0.16	0.37	0	1	38,134
RAC 2: Some Races born Harder Working	0.39	0.49	0	1	36,241
RAC 3: Some Cultures Better	0.44	0.50	0	1	35,576
RAC 4: Immigrants must be White	0.22	0.29	0	1	37,507
RAC 5: Would Mind if Boss was Different Race	0.28	0.31	0	1	35,066
ALT 1: Important to Help Others	0.77	0.20	0	1	37,099
ALT 2: Important People are Treated Equally	0.80	0.21	0	1	37,088
ALT 3: Important to Understand Different People	0.73	0.22	0	1	37,032
ALT 4: Looking After Others	0.32	0.47	0	1	37,987
Immigrants are Treated Better	0.52	0.25	0	1	31,916
Racial Experience Index	0.47	0.23	0	1	38,069
Immigrants must have Skills	0.65	0.28	0	1	37,639
Immigrants must Integrate	0.59	0.19	0	1	38,019

*Note:* The table presents descriptive statistics for all variables used in the empirical analysis. All variables are taken from the European Social Survey with interviews from twenty countries conducted in 2014 and 2015.

The data in Table 3 shows that the average participant in these survey was about forty-

nine years old and there are about as many male as female participants. Almost 36 percent have children at home, 30 percent have a higher education, 96 percent are a citizen in their country of residence, about a quarter is retired, and only four percent are self-reported as currently unemployed. Using the definitions outline above, we obtain an index for altruistic views that has a mean value of 0.77 on a range from zero to one. For the racism index, the average is 0.30 and thus much lower. There are substantial differences, however, across countries. We show them in Table A.1 in the Appendix.

An interesting finding from the survey data is that Europeans are not positive to immigration because they think immigration economically good. On a scale from zero to one with higher values indicating more positive views, the average expectations about immigration's impact on the economy (mean of 0.49), the labor market (0.48), or the fiscal budget (0.45) are fairly mixed. With respect to other effects of immigration, the views are much more negative. For example, the average survey participant expects more crime due to immigration. On the other hand, a majority support the notion that the cultural life in their country is enriched by migrants. At the country-level we see that, for example, Swedish survey participants show the lowest amount of racism, one of highest levels of altruism, and the most positive expectations about the effects of immigration. Given these numbers, it is not surprising to find that Sweden is listed as the country in our sample with the strongest support for immigration.

## 4 Econometric Approach

We use the data set to investigate whether altruism is an important determinant of preferences over immigration. In this section, we briefly describe our econometric approaches.

### 4.1 Selection on Observables

The survey data from the ESS allows us to examine how expectations, xenophobia, and altruism affect individual preferences over immigration. Using Tobit regressions, we investigate —conditional on thinking migration is good or bad— what makes individuals more altruistic and support a higher level of immigration?

The dependent variable is individual preferred level of immigration, measured as the mean of responses to all four immigration questions listed in table 1. Our primary interest

is in how individual perceptions of costs of immigration, (ECO1-ECO3 and COM1-COM4) as well as altruism (ALT1-ALT3) and racism (RAC1-RAC5) influence this preferred level of immigration. We fit the empirical model

$$L_{n,c,t} = \alpha_0 + \alpha_1 F_{n,c,t} + \alpha_2 A_{n,c,t} + \alpha_3 R_{n,c,t} + \mathbf{X}_{n,c,t} \boldsymbol{\beta} + \gamma_c + \delta_t + \varepsilon_{n,c,t} \quad (3)$$

where  $L_{n,c,t}$  denotes individual  $n$ 's preferred level of immigration in country  $c$  at the interview date  $t$  (month and year). The explanatory variables include individual  $n$ 's expected costs and benefits of immigration ( $F_{n,c,t}$ ), her level of altruism ( $A_{n,c,t}$ ) and racism ( $R_{n,c,t}$ ), a vector of control variables ( $\mathbf{X}_{n,c,t}$ ) as well as country- and time-fixed effects. We cluster the standard error ( $\varepsilon_{n,c,t}$ ) at the country of residence level. For  $L_{n,c,t}$ , we use the average of individual  $n$ 's answers to the immigration questions II-V of Table 1. Expectations about costs and benefits ( $F_{n,c,t}$ ) are measured by answers to questions ECO1 - ECO3 as well as COM1 - COM5 as shown in Table 2. Finally, for altruism and racism we use questions ALT1 - ALT3 as well as RAC1 - RAC5.

Since preferences over immigration are affected by several individual characteristics, we exploit the wealth of information in the ESS on individual traits. In the empirical model, we can include control variables for gender, age, education, having children, household income, happiness with income, employment status, being retired, having citizenship, belonging to a minority, self-identified political position, interest in politics, trust, satisfaction with the state of the economy, migration background of father and mother, education of partner and parents, as well as a measure of risk aversion.<sup>11</sup> Furthermore, we can test the exposure (or contact) hypothesis as discussed by Halla, Wagner and Zweimüller (2015) or Steinmayr (2016). Three questions from the survey ask participants about their experiences with people of a different race.<sup>12</sup> We add individual answers to these questions as control variables to the right-hand side of the regression. Finally, we include country and time fixed effects, and cluster standard errors at the country level.

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<sup>11</sup>In Appendix B we provide detailed information on which questions are used for each control variable.

<sup>12</sup>The questions are: (1) Do you have any close friends who are of a different race or ethnic group from most [in your country] people? (2) How often do you have any contact with people who are of a different race or ethnic group from most [in your country] people when you are out and about? (3) Thinking about this contact, in general how bad or good is it?

## 4.2 Five-Way Latent Factor Model

Estimating our model with ordinary least squares allows us to investigate which factors are significantly correlated with preferences over immigration. However, given the crude measurements of covariates where we take averages of relevant questions, we cannot quantify the relative role each factor plays. In other words, we need another method to establish how important altruism is in shaping policy preferences relative to other factors including expected costs and benefits as well as racism. Item response models (IRT) are designed to handle the ordinal structure of our data.<sup>13</sup> Suppose each individual  $n$  can be characterized by the following five latent factors: (i) how he thinks about the costs and benefits of immigration, (ii) how much he worries about compositional amenities, (iii) his degree of racist attitudes, (iv) his level of altruism, and (v) his preference over immigration. We denote these factors by  $\alpha_{n,ECO}$ ,  $\alpha_{n,COM}$ ,  $\alpha_{n,RAC}$ ,  $\alpha_{n,ALT}$ , and  $\alpha_{n,IMM}$ . To be precise, the five dimensions have the following meaning:

$\alpha_{n,ECO}$	LATENT WORRIES ABOUT ECONOMIC EFFECTS
$\alpha_{n,COM}$	LATENT WORRIES ABOUT COMPOSITIONAL AMENTITIES
$\alpha_{n,RAC}$	LATENT RACISM
$\alpha_{n,ALT}$	LATENT ALTRUISM
$\alpha_{n,IMM}$	LATENT PREFERENCE FOR IMMIGRATION

Using this set of latent factors, we want to quantify how important each of the first four factors is in influencing preferences for immigration. The data we will use to identify the model are all the questions listed in Table 2. This implies we have to address several issues. First, note that the questions are structured such that the number of possible responses differs between questions. As an example, RAC1 has a binary response option (yes, no) while COM1 offers a total of eleven possible ordinal responses. Second, some questions are “tougher” than others. In IRT literature, this phenomenon is often called the *difficulty* of questions. To illustrate this, consider the two questions RAC1 and RAC2, both of which are used to measure racism. Table 3 shows that only 16 percent of survey participants think some races are born less intelligent (RAC1) while 39 percent agree with the statement that some race are born harder working (RAC2). We use both questions to learn something about

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<sup>13</sup>For an introduction to item response models, we refer to Gelman and Hill (2007, p.314-320).

individuals' latent racism. In this regard, RAC1 is the tougher question. Answering 'yes' on RAC1 is more indicative of racist attitudes as it takes a higher level of racism to state that some races are born less intelligent.<sup>14</sup> The goal of our model is to be able to take both the *structure* and *difficulty* of the questions into account.

In the first step, we denote the dimensions as  $D = \{\text{ECO}, \text{COM}, \text{RAC}, \text{ALT}\}$  and the number of questions as  $K_{\text{ECO}} = \{1, 2, 3\}$ ,  $K_{\text{COM}} = \{1, 2, 3, 4\}$ ,  $K_{\text{RAC}} = \{1, 2, 3, 4, 5\}$ ,  $K_{\text{ALT}} = \{1, 2, 3\}$ , and  $K_{\text{IMM}} = \{1, 2, 3, 4\}$ . Let  $R_{d,q}$  denote the number of possible responses to question  $j$  on dimension  $k$ , and  $\chi_{k,j}$  denote an *ordered* vector of length  $r_{d,q} - 1$ , where ordered means increasing. The integer response of individual  $i$  to question  $k$  on dimension  $d$  is denoted by  $1 \leq r_{d,q,n} \leq r_{d,q}$ .<sup>15</sup> This could be that a survey participant answers the question whether immigrants take away more jobs (value of one) or create more jobs (value of eleven) with, for example,  $r_{d,q,n} = 5$ .

Respondents might interpret each question differently. Hence, there is no deterministic relationship between latent preferences and the response of an individual to a given question. In order to capture this, we assume the response of individual  $n$  to question  $q$  on dimension  $d$  is given by

$$\alpha_{n,d,q} = \alpha_{n,d} + \varepsilon_{n,d,q}$$

where  $\varepsilon$  has a mean zero Gumbel distribution with a unit scale. Furthermore, we let  $\lambda(z) \equiv \exp(-\exp(-z))$  denote the cumulative distribution function (CDF) of the standard Gumbel.<sup>16</sup> The individual will then choose the answer that most closely matches his or her preferences, that is the response that lies in the appropriate range of the cutoffs  $\chi_{d,q}$ . As an example, consider a question with a binary outcome like Rac1 (some races born more intelligent than others). Assume the cutoff was at 0.5. The individual will then choose to answer "Yes" if  $\alpha_{n,d,q} > 0.5$ . It follows that if we observe an individual answering the question with "Yes", the likelihood of this answer, conditional on the cutoff and individual preference is  $1 - \lambda(\alpha_{\text{RAC1},n} - 0.5)$ .

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<sup>14</sup>To illustrate this point further, take the example of a math test in school with easy and difficult exercises. The teacher wants to use the test in order to infer students' unobserved ability. Most students will get the easy exercises in the test right but only few will manage to answer correctly the tough questions. Hence, if some student gets a tough question right the teacher can infer the student must have a high ability. On the other hand, if a student fails to answer a simple question his ability is likely low.

<sup>15</sup>We transform each question such that the "lowest" response is always unity. Thereafter, each higher possible response is coded as the lower response plus one.

<sup>16</sup>IRT-models are generally not identified and require several normalizations to be estimable. One of the standard normalizations is setting the scale of the Gumbel to unity.

More generally, the likelihood of individual  $i$  responding with answer  $r_{d,q,n}$  to question  $q$ , given his latent factor  $\alpha_{d,q}$ , the structure of the question  $R_{d,q}$  as well as the “difficulty” of the question  $\chi_{d,q}$  is given by

$$\Lambda(r_{d,q,n}|\alpha_{n,q}, R_{d,q}, \boldsymbol{\chi}_{d,q}) = \begin{cases} 1 - \lambda(\alpha_{n,q} - \chi_{d,q}[1]) & \text{if } r_{d,q,n} = 1 \\ \lambda(\alpha_{n,q} - \chi_{d,q}[r_{d,q,n} - 1]) - \lambda(\alpha_{n,q} - \chi_{d,q}[r_{d,q,n}]) & \text{if } 1 < r < R_{d,q} \\ \lambda(\alpha_{n,q} - \chi_{d,q}[r_{d,q} - 1]) & \text{if } r_{d,q,n} = R_{d,q} \end{cases}$$

We are imposing a normal prior on the latent factors:  $\alpha_{n,d} \sim N(\mu_d, \sigma_d^2)$  with  $\sigma_d \sim N(0, 4)T(0, \cdot)$  having a truncated normal prior. For the first four latent factors (ECO, COM, RAC, and ALT), we set the hypermean to zero ( $\mu_k = 0$ ). This is an innocuous normalization as mean effects will be captured by the cutoffs or, in other words, by the difficulty parameters  $\boldsymbol{\chi}_{d,q}$ .

We are now able to specify the relationship of interest. Let  $\beta_{\text{ECO}}$ ,  $\beta_{\text{COM}}$ ,  $\beta_{\text{RAC}}$ , and  $\beta_{\text{ALT}}$  be parameters with improper, flat priors. Then the preferred level of immigration of individual  $n$  is given by

$$\mu_{\text{IMM},n} = \beta_{\text{ECO}} \frac{\alpha_{n,\text{ECO}}}{\sigma_{\text{ECO}}} + \beta_{\text{COM}} \frac{\alpha_{n,\text{COM}}}{\sigma_{\text{COM}}} + \beta_{\text{RAC}} \frac{\alpha_{n,\text{RAC}}}{\sigma_{\text{RAC}}} + \beta_{\text{ALT}} \frac{\alpha_{n,\text{ALT}}}{\sigma_{\text{ALT}}} \quad (4)$$

with the prior mean for the latent preference for immigration given by a normal distribution:  $\alpha_{\text{IMM},n} \sim N(\mu_{\text{IMM},n}, \sigma_{\text{IMM}}^2)$ . We scale all the latent factors on the right hand side of (4) by the corresponding standard deviation of each latent factor. By doing this, we ensure that the coefficients  $\beta_{\text{ECO}}$ ,  $\beta_{\text{COM}}$ ,  $\beta_{\text{RAC}}$  and  $\beta_{\text{ALT}}$  are directly comparable in terms of quantifying the importance of each latent factor’s influence on preferences over immigration. Denoting the collection of all parameters as  $\boldsymbol{\Theta}$ , we have that the conditional likelihood of the data is

$$p(y|\boldsymbol{\Theta}) = \sum_{n \in N} \sum_{d \in D} \sum_{q \in Q_d} \Lambda(r_{d,q,n}|\alpha_{n,q}, R_{d,q}, \boldsymbol{\chi}_{d,q}) \quad (5)$$

Note that we do not weight the data for the main results shown in the paper. However, weighting all results with the poststratification weights provided by the ESS yields very similar coefficient estimates.

## 5 Empirical Findings

In the first step, we examine whether the preferred level of immigration is determined by expectations about the effects of immigration as well as altruistic and xenophobic attitudes. Afterwards, we test the hypothesis that altruistic and xenophobic attitudes also affect how individuals perceive the costs and benefits of immigration. Finally, we present the results of the five-factor latent model.

### 5.1 Determinants of Immigration Preferences

Fitting the Tobit model outlined in section 4.1, we obtain the results shown in Table 4. The estimates reveal that the perception of costs and benefits has a coefficient of 0.972 that is very close to one. Since we standardized both  $L$  and  $F$  to be between zero and one, the unitary coefficient is reassuring that individuals in the ESS ‘rationally’ answer the questions on how many immigrants they want to allow. Table 4 further shows that preferences over immigration are shaped both by worries about economic effects and compositional amenities. Furthermore, both altruism and racism affect the preferred level of immigration in the expected way. In column (2), we split individual expectations about the effects of immigration into the economic and non-economic parts. Both show a coefficient that is highly significant and positive with compositional effects being quantitatively more important. Being altruistic is associated with a statistically and economically significantly higher support for immigration. Conversely, racist attitudes lower the preferred level of immigration.

As we discussed in Section 2, altruism is likely to affect immigration preferences twofold. First, it directly increases support for immigration. In addition, altruistic attitudes might improve how individuals perceive the costs and benefits of immigration. Hence, in column (3), we remove expectations about the effects of immigration (as well as racism) from the estimation. The coefficient on altruism then gives us the total effect of altruism on immigration preferences. We discuss this in more detail in the subsection below. Columns (4) to (6) show that irrespective of which question we use to measure altruism, we find that such attitudes significantly increase the preferred level of immigration. When adding all questions to the model, column (7) shows that ALT2—the idea that all people should be treated equally and have equal opportunities—dominates the other two altruism questions.

**Table 4: Determinants of Preferred Immigration Policy**

Mean of dep. variable	Preferred Level of Immigration						
	0.531						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Immigration Effects (ECO1 - ECO3, COM1 - COM4)	0.956*** (0.035)						
Economic Effects Index (ECO1 - ECO3)		0.387*** (0.022)					
Compositional Effects Index (COM1 - COM4)		0.497*** (0.022)					
Racism Index (RAC1 - RAC5)		-0.129*** (0.012)					
Altruism Index (ALT1 - ALT3)		0.127*** (0.022)	0.277*** (0.037)				
ALT 1: Important to Help Others				0.027** (0.013)			0.011 (0.013)
ALT 2: Important People are Treated Equally					0.067*** (0.015)		0.057*** (0.012)
ALT 3: Important to Understand Different People						0.034** (0.013)	0.015 (0.012)
ECO1: Jobs				0.081*** (0.016)	0.081*** (0.016)	0.080*** (0.016)	0.087*** (0.015)
ECO2: Fiscal Effect				0.057*** (0.013)	0.056*** (0.013)	0.058*** (0.013)	0.049*** (0.012)
ECO3: Bad for Economy				0.218*** (0.017)	0.215*** (0.017)	0.216*** (0.017)	0.204*** (0.016)
COM1: Cultural Life				0.131*** (0.014)	0.127*** (0.015)	0.130*** (0.014)	0.109*** (0.014)
COM2: Religious Beliefs				0.049*** (0.009)	0.047*** (0.009)	0.049*** (0.009)	0.031*** (0.009)
COM3: Crime Problems				0.072*** (0.012)	0.070*** (0.011)	0.070*** (0.012)	0.061*** (0.010)
COM4: Country Worse Place to Live				0.203*** (0.022)	0.202*** (0.022)	0.203*** (0.022)	0.180*** (0.020)
RAC 1: Some Races Born Less Intelligent				-0.011** (0.004)	-0.009** (0.004)	-0.010** (0.004)	-0.007* (0.004)
RAC 2: Some Races born Harder Working				-0.014*** (0.004)	-0.013*** (0.005)	-0.014*** (0.004)	-0.010** (0.004)
RAC 3: Some Cultures Better				-0.007** (0.003)	-0.006* (0.003)	-0.007** (0.003)	-0.003 (0.003)
RAC 4: Immigrants must be White				-0.104*** (0.013)	-0.100*** (0.014)	-0.103*** (0.014)	-0.063*** (0.015)
RAC 5: Would Mind if Boss was Different Race				-0.092*** (0.009)	-0.088*** (0.009)	-0.090*** (0.009)	-0.068*** (0.010)
Racial Experience Index							0.071*** (0.016)
Immigrants must have Skills							-0.108*** (0.009)
Immigrants must Integrate							-0.104*** (0.015)
Male	-0.017*** (0.004)	-0.009** (0.004)	-0.010* (0.005)	-0.012** (0.005)	-0.012*** (0.004)	-0.012*** (0.005)	-0.006 (0.005)
Age	-0.001*** (0.000)	-0.001*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
High Education	0.021*** (0.004)	0.018*** (0.004)	0.057*** (0.004)	0.012*** (0.004)	0.013*** (0.004)	0.012*** (0.004)	0.010*** (0.003)
Left-Right Scale (1=left)	0.112*** (0.011)	0.091*** (0.010)	0.189*** (0.025)	0.085*** (0.011)	0.080*** (0.011)	0.083*** (0.011)	0.060*** (0.010)
Happiness with Income	0.031*** (0.008)	0.032*** (0.008)	0.065*** (0.008)	0.030*** (0.009)	0.031*** (0.009)	0.030*** (0.008)	0.034*** (0.009)
Interest in Politics	0.044*** (0.008)	0.038*** (0.008)	0.096*** (0.008)	0.027*** (0.008)	0.027*** (0.008)	0.026*** (0.008)	0.024*** (0.008)
People can be Trusted	0.032*** (0.009)	0.025*** (0.009)	0.152*** (0.013)	0.035*** (0.007)	0.033*** (0.007)	0.034*** (0.007)	0.028*** (0.007)
Additional Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27,743	27,677	27,750	22,076	22,079	22,086	21,987

*Note:* The table shows the marginal effects at means from seven Tobit Regressions using the preferred level of immigration as dependent variable. Additional control variables include 'household income decile', 'currently unemployed', 'having children', 'being a wage earner', 'being a citizen', 'belonging to a minority', 'being retired', 'being satisfied with the state of the economy', 'migration background of parents', 'education of partner', 'education of parents', and 'risk aversion'. The post-stratification weights supplied by the ESS are used in all estimations. Numbers in brackets indicate standard errors clustered at the country level. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

Concerning the control variables, our estimates are in line with the literature. Older and less educated survey participants want a lower level of immigration. Conversely, those that

position themselves on the political left are more open to migrants entering their country. In addition, we find some evidence supporting the study by Hoffman (2011) which shows that the level of altruism is increasing with individual income. Moreover, we can confirm that individuals who are happier with their own financial position support a higher level of immigration (Poutvaara and Steinhardt, 2015).<sup>17</sup> Finally, the estimates in column (7) show that positive experiences with people of a different race increase support for immigration. In contrast, skeptical views on immigrants like ‘they must have skills’ or ‘they must integrate’ are associated with lower preferred immigration levels.

## 5.2 Latent-Factor Model

Having documented that altruism positively correlates with preferred immigration levels both directly and indirectly, we now turn to estimating the latent-factor model described above. This allows us to examine how important altruism is in shaping preferences over immigration relative to other factors such as worries about economic and non-economic effects or racism.<sup>18</sup> We first estimate the model using latent worries for the economic effects of immigration, as shown in column (1) of table 5. We then observe a strong relationship between the latent economic worries and latent preferences for immigration. Adding the latent factor of worries of compositional amenities to the model, shown in column (2), we firstly note that the estimated coefficient on economic concerns decreases by over 40%, even if the standard deviation of the latent factor for immigration preferences remains of a similar size. Second, we obtain similar results as in Card, Dustmann and Preston (2012) in that compositional amenities are more important than economic concerns in shaping individual preferences over immigration. Column (2) shows the model with both economic and compositional effects included. While Card, Dustmann and Preston find that in the 2002 ESS compositional amenities are two to five times more important than economic concerns, our estimate is somewhat larger than one.

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<sup>17</sup>Poutvaara and Steinhardt (2015) uses data from the German Socio-Economic Panel and finds that people who think they have not got in life what they deserve oppose immigration for spiteful reasons.

<sup>18</sup>Using the ESS data set and poststratification weights to weight the likelihood, we obtain the results shown in Table 5. Further, explicitly allowing for the latent variables  $\alpha_{n,ECO}$ ,  $\alpha_{n,COM}$ ,  $\alpha_{n,RAC}$  and  $\alpha_{n,ALT}$  to be drawn from a multivariate normal where we estimate the covariance matrix yields very similar results to those presented in the paper.

**Table 5: Five Factor Latent Model**

	Latent Preference for Immigration			
	(1)	(2)	(3)	(4)
Economic Effects	2.5752 (0.0303)	1.3585 (0.0335)	1.2533 (0.0322)	1.2519 (0.0323)
Compositional Effects		1.6936 (0.0321)	1.3047 (0.0331)	1.2849 (0.0323)
Racism			-1.3141 (0.0303)	-1.2471 (0.031)
Altruism				0.2717 (0.0243)
$\sigma_{\text{IMM}}$	2.8873 (0.0232)	2.7819 (0.0223)	2.5436 (0.0226)	2.5515 (0.0220)
Observations	25,225	25,225	25,225	25,225

*Note:* The table shows the posterior densities of the coefficients in equation 4, linking latent expectations about the economic effects, latent expectations about compositional effects, latent racism, and latent altruism to latent preferences over immigration. The coefficients can be interpreted as the increase in latent preferences for immigration when the corresponding latent factor increases by one standard deviation. The last row shows the standard deviation of latent preferences for immigration. Numbers in brackets indicate standard errors of posterior distributions. All coefficients are highly significant, in the sense that the posterior densities have a negligible mass with opposite signs as the mean.

More interestingly, however, is that compositional amenities as captured by questions COM1 to COM5 pick up some aspects of xenophobia. When we include racism as third factor in column (3), the magnitude of  $\beta_{\text{COM}}$  is reduced by about 23 percent (scaled by the mean of  $\sigma_{\text{IMM}}$ ). This is not surprising given that individuals with racist attitudes are more likely to think that their country’s culture is undermined by foreigners. However, latent worries over compositional concerns remains a separate, strong effect over latent preferences for immigration. The results therefore show that worries over compositional effects for the most part, but not entirely, are not related to racism. Finally, column (4) shows that altruism has a positive effect on latent preferences for immigration. The effect is around 22% of the effect of economic concerns, whereas coefficients on latent racism and worries of compositional concerns are similar as in column (3).

### 5.3 Quantitative Impact of Altruism

The results in Tables 4 and 5 show that both altruism and racism have a strong effect on preferred immigration levels. This gives rise to the question how different preferences over immigration would be in the aggregate if altruistic or racist attitudes were more prevalent.

In general, there are different ways to address this question. First, we can interpret the coefficients from column (3) of Table 4 and calculate the impact of increasing altruism by, for example, one standard deviation. A one standard deviation increase in altruism raises the dependent variable by up to 5.2 percentage points, depending on the specification. Given the coding of the immigration questions in the zero to one space, we can assess how the distribution of policy preferences would then change. While in the baseline distribution there are 19.5% of individuals who want zero immigration, this number would increase by up to five percentage points if the increased altruism only moved individuals from choosing ‘many’ immigrants to zero migration. Such an estimate, however, imposes ad hoc assumptions on how exactly the distribution of preferences would change. In other words, we do not know whether mainly people move from ‘few’ to ‘none’ or from ‘many’ to ‘some’ immigrants in a scenario with reduced altruism.

**Table 6: Predicted Changes in the Distribution of Preferences**

	How many immigrants from poor countries outside Europe should be allowed?			
	None	Few	Some	Many
Baseline Distribution	0.15	0.33	0.39	0.13
Improved Economic Expectations	0.09	0.27	0.45	0.18
Improved Compositional Expectations	0.09	0.27	0.46	0.19
Higher Racism	0.24	0.37	0.30	0.09
Higher Altruism	0.14	0.32	0.40	0.14

*Note:* The table shows the predicted responses to the question ‘How many immigrants from poor countries outside of Europe should be allowed to enter your country?’. All predictions are simulated from the mean estimates of parameters  $\alpha_{\text{IMM}}$ ,  $\beta_k$ ,  $\chi_k$  and  $\sigma_k$  in the latent-factor model. The five cases are the following: The first row, ‘Baseline’, is the in-sample predicted responses, and the next four rows show predicted distributions following a one standard deviation increase in the corresponding latent trait.

A more appropriate way to assess the quantitative impact of altruism —both in absolute terms but also relative to other factors— is to use the results from the latent-factor model. Table 6 shows how the distribution of preferences over immigration would change due to a one standard deviation increase in the four determinants: economic concerns, compositional concerns, racism, and altruism. For altruism, we find that a one-standard deviation increase in altruism would raise the preferred level of immigration by about a tenth of a standard deviation. In order to illustrate the magnitude of this change, Table 6 shows the complete predicted changes in preferences for all the latent factors. With improved expectations about

the economic and non-economic effects of immigration, the share of extreme anti-immigration voters drops from 15 percent to 9 percent. Conversely, a one standard deviation increase in racism would raise the share of anti-immigration voters to 24 percent. For altruism, we find a more modest yet significant effect in favor of immigration.

## 6 Robustness Tests

In the previous section, we established a positive effect of altruistic attitudes on support for immigration. In what follows we provide a discussion of this finding. First, we explore different types of immigration in order to test whether altruism's impact differs between support for immigration of, for example, people of a different race or religion. Second, we draw on the 2002 European Social Survey and use three questions that directly link immigration to altruism. Finally, we examine whether altruistic motives have an indirect positive effect on support for immigration by affecting perceived costs and benefits.

### 6.1 Different Types of Immigration

The European Social Survey asks participants about how much immigration they prefer depending on immigrants' characteristics and country of origin. We can use these questions and explore whether altruism (or racism) play a different role for various types of immigration. In order to test this, we apply the empirical model outlined in section 4.1 and replace the index for the preferred level of immigration on the left-hand side. Table A.4 shows how perceived costs and benefits from immigration, altruism, and racism affect preferences over immigration of five types: refugees, immigrants of the same race, of a different race, from poor European countries, and from poor non-European countries. The estimates show that perceived costs and benefits are much less important when individuals are asked about refugees. This confirms our prior that voters do not apply the same cost-benefit analysis when admitting refugees compared to other immigrants. The second observation is that altruism affects positively the preferred level of all types of immigrants. Similarly, racist attitudes reduce the support for immigration irrespective of the characteristics or origin of immigrants. These findings support our main results and also justify using an index for the preferred level of immigration which combines the different types of migrants.

The ESS also asks about participants' preferences over immigration of Jews, Muslims, and

Gypsies. We can use these questions and examine whether altruism also increases support for such immigration. The estimates in Table A.4 confirm this. Irrespective of the type of migrants, we find that altruistic attitudes increase the support for immigration.

## 6.2 Altruistic Preferences and Immigration

We measure altruistic traits based on questions that are not directly linked to immigration. We can, however, also follow Card, Dustmann and Preston (2012, p.104) and use two questions from the 2002 European Social Survey (ESS) that focus on altruistic motives in the context of immigration. They ask survey participants whether richer countries have a responsibility to accept people from poorer countries and whether all countries benefit if people can move where their skills are most needed. About 55 percent agree or strongly agree that rich countries have a responsibility while 71 percent agree with the second statement.

Unfortunately, these questions are only included in the 2002 ESS.<sup>19</sup> Nevertheless, we can use them to investigate the relationship between altruism and immigration preferences. Table A.5 in the Appendix shows the estimation results. We find that both measures of altruism positively and significantly increase the support for immigration. Moreover, they improve how individuals perceive the costs and benefits of migration.

An alternative measure for altruistic attitudes that we can use is included in the 2006 and 2012 edition of the ESS. Survey participants are asked whether they do charitable work at least once a month. As we show in Hansen and Legge (2015), such work is positively correlated with support for immigration. We find the same when using a question from the 2002 ESS that asks whether the survey participant donates money to a humanitarian organization. All this confirms that various measures of individual-level altruism are positively and significantly correlated with support for immigration.

## 6.3 Altruism and Perceived Costs of Immigration

As discussed above, we expect altruistic attitudes to affect preferences over immigration twofold. The direct effect of altruism (or xenophobia) on how individuals think about immigration is discussed in section 4.1. In addition, altruism can have an indirect positive effect

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<sup>19</sup>Note that the set of countries differs slightly from the 2014 sample in that Czech Republic, Greece, and Italy are included. We obtain almost identical result when omitting those three countries from the estimation.

on preferred levels of immigration. Following our discussion in Section 2, altruistic people might overestimate the beneficial effects of immigration. This idea can be tested using the ESS data to fit the following model:

$$F_{n,c,t} = \beta_A A_{n,c,t} + \beta_X X_{n,c,t} + \mathbf{X}_{n,c,t} \boldsymbol{\beta} + \beta_c + \beta_t + \epsilon_{n,c,t} \quad (6)$$

where  $F_{n,c,t}$  represents  $\tilde{f}'$  from the model in Section 2. Those individuals who *want* to help others might be inclined to exaggerate the benefits or downplay the costs. If  $\beta_A$  in equation 6 is positive, it would increase  $F_{n,c,t}$  and thus the preferred level of immigration  $L_{n,c,t}$ . In column (2) of Table A.4 in the Appendix, we regress perceptions about the effect of immigration on altruism, racism, and various control variables. We find that irrespective of the model specification altruistic attitudes improve how individuals think immigration to affect their country. In contrast, racist or xenophobic views are associated with more negative perceptions about the effects of immigration.

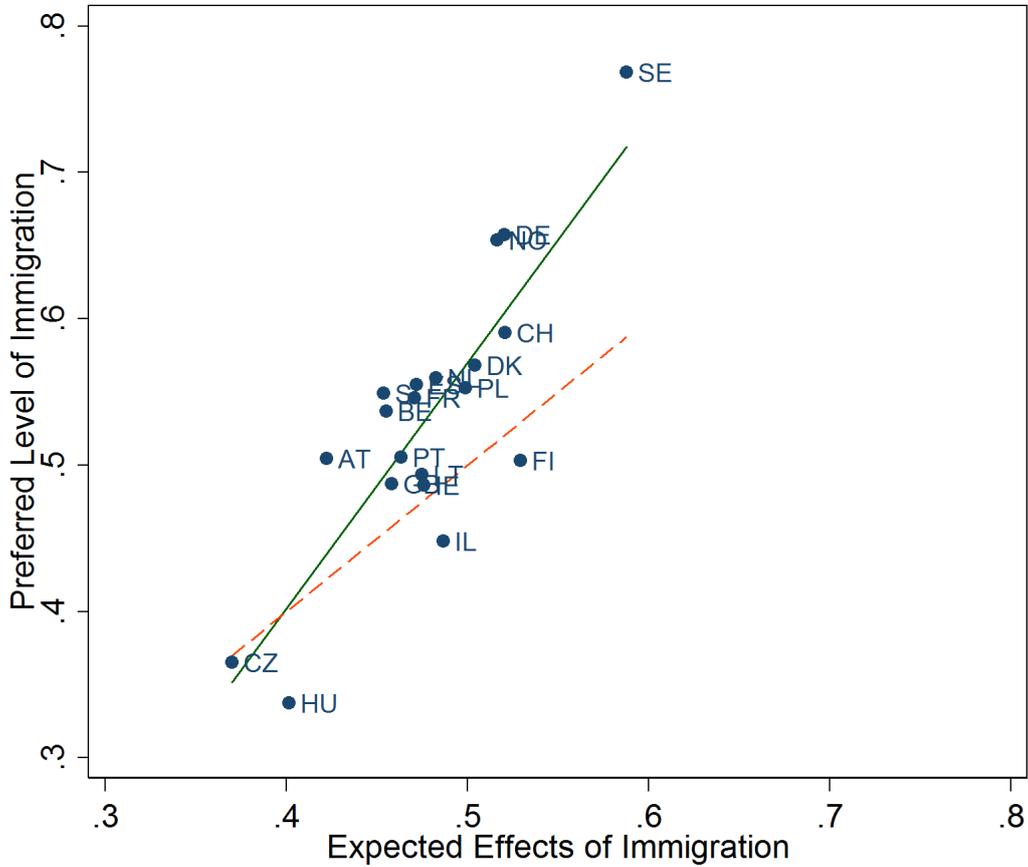
## 6.4 Country-Level Analysis

The entire analysis thus far has been based on the pooled responses to the ESS questions from all twenty countries. We included country-fixed effects to adjust for differences across countries. This raises the question whether fixed effects capture the full spectrum of differences across European countries in their history or the salience of economic and non-economic concerns (Card, Dustmann and Preston, 2012). To address this question, we perform our analysis for each country separately and compare the results with those we obtained from the pooled sample.

Prior to this, we can explore country-level differences in more detail. As we show in Figure 3, the countries in our data set differ substantially in how their citizens view immigration. While Swedish survey participants have the most positive expectations about the effects of immigration, individuals from the Czech Republic and Hungary have on average very dim expectations. Thus it is not surprising to find Sweden with the highest support for immigration while survey participants from Hungary and the Czech Republic are least supportive. Overall, there is a highly significant positive correlation between expectations and policy preferences ( $\beta = 1.68$  with  $t = 6.27$ ). More interestingly, most countries show a greater level of support for immigration than expected, given how their citizens think about the effects of immigrants. In fact, only four countries in our sample (Czech Republic, Hungary, Israel,

and Finland) are below the 45° line.

**Figure 3: Country-Level Expectations and Immigration Preferences**



*Note:* The figure shows each country’s average expected benefits of immigration (horizontal axis) and preferred level of immigration (vertical axis). Expectations include economic and non-economic effects of immigration with higher values indicating more positive views. Support for immigration is based on questions II-V in Table 1. The dashed line shows a 45° Line, the solid line a linear fit.

This is in line with the finding that countries with higher levels of altruism (or lower levels of racism) show greater support for immigration, as we illustrate in Figure A.1 in the Appendix. We also estimate the factor model separately for each country, with estimates shown in Table A.6 of the Appendix.<sup>20</sup> Although the magnitudes of coefficients vary somewhat across countries, signs are the same as in the factor model for all countries. The only exception are two coefficients on altruism for Lithuania and Israel where the point estimates are close to zero. The largest impact of altruism is found in Ireland, Denmark, Sweden, and the United Kingdom.

<sup>20</sup>To ensure we avoid so-called “cutpoint collapse”, we impose the prior that the distance between two adjacent cutoffs are given by a  $N(1, 1)$ -distribution, truncated for positive values.

## 7 Conclusion

This paper argues that altruism is a significant determinant of individual preference over immigration policies. We advance and empirically establish the hypothesis that European voters who hold altruistic views show greater support for immigration conditional on their expectations about the effects of immigration on the domestic labor market, fiscal budget, or crime rates. Using data from the most recent European Social Survey, we find that various measures of altruism have a statistically and economically significant effect on preferences over immigration. While confirming and controlling for other determinants of policy preferences — including expected labor market effects, worries about compositional amenities, or racism — we contribute to the literature by documenting that altruistic attitudes shape individual preferences. Hence, our findings complement prior research that has largely focused on the negative effects of racist attitudes on preferred immigration levels.

In addition, we develop a novel five-way latent factor model which allows us to quantify the relative importance of various factors in shaping preferences over immigration. Our analysis reveals that —in line with previous research by Card, Dustmann and Preston (2012)—worries about compositional amenities are the single most important factor. Its influence, however, is mitigated once we add racism as additional factor. Furthermore, the estimates indicate that altruistic attitudes have a sizable impact on the preferred level of immigration. While this establishes for the first time that altruism is a significant determinant of policy preferences, exploring how altruistic traits can be altered appears to be a fruitful question for future research. This would point to significant policy implications if we think that altruistic behavior can be taught in the sense of warm-glow motives similar to how attitudes toward trade and globalization can be altered (Hainmueller and Hiscox, 2006). Individual experiences and acknowledging concerns have been found to affect attitudes towards migrants and refugees (Stöhr and Wichardt, 2016). Hence, future studies could investigate how determinants of preferences over immigration, including altruism, can be altered.

## References

- Algan, Yann, Christian Dustmann, Albrecht Glitz, and Alan Manning.** 2010. "The Economic Situation of First and Second Generation Immigrants in France, Germany and the United Kingdom." *Economic Journal*, 120(542): F4–F30.
- Andreoni, James.** 1989. "Giving with Impure Altruism: Applications to Charity and Ricardian Equivalence." *Journal of Political Economy*, 97(6): 1447.
- Aydemir, Abdurrahman, and George J. Borjas.** 2007. "Cross-Country Variation in the Impact of International Migration: Canada, Mexico, and the United States." *Journal of the European Economic Association*, 5(4): 663–708.
- Barone, Guglielmo, Alessio D'Ignazio, Guido de Blasio, and Paolo Naticchioni.** 2016. "Mr. Rossi, Mr. Hu and politics. The role of immigration in shaping natives' voting behavior." *Journal of Public Economics*, 136: 1–13.
- Boeri, Tito.** 2010. "Immigration to the Land of Redistribution." *Economica*, 77(308): 651–687.
- Borjas, George.** 2013. "Immigration and the American Worker: A Review of the Academic Literature." *Center for Immigration Studies*, , (April): 1–26.
- Borjas, George J.** 2003. "The Labor Demand Curve is Downward Sloping: Reexamining the Impact of Immigration on the Labor Market." *Quarterly Journal of Economics*, 118(4): 1335–1374.
- Borjas, George J.** 2014. *Immigration Economics*. Cambridge, Mass.:Harvard University Press.
- Borjas, George J., and Joan Monras.** 2016. "The Labor Market Consequences of Refugee Supply Shocks." *NBER Working Paper #22656*.
- Bridges, Sarah, and Simona Mateut.** 2014. "Should They Stay or Should They Go? Attitudes Towards Immigration in Europe." *Scottish Journal of Political Economy*, 61(4): 397–429.
- Card, David.** 2012. "Comment: The Elusive Search for Negative Wage Impacts of Immigration." *Journal of the European Economic Association*, 10(1): 211–215.
- Card, David, and Giovanni Peri.** 2016. "Immigration Economics: A Review."
- Card, David, Christian Dustmann, and Ian Preston.** 2012. "Immigration, Wages, and Compositional Amenities." *Journal of the European Economic Association*, 10(1): 78–119.
- Carpenter, Bob, Andrew Gelman, Matt Hoffman, Daniel Lee, Ben Goodrich, Michael Betancourt, Michael A. Brubaker, Jiqiang Guo, Peter Li, and Allen Riddell.** 2016. "Stan: A probabilistic programming language." *Journal of Statistical Software (in press)*.
- DellaVigna, Stefano, and Ethan Kaplan.** 2007. "The Fox News Effect: Media Bias and Voting." *The Quarterly Journal of Economics*, 3(122): 1187–1234.
- Dustmann, Christian, and Ian P. Preston.** 2007. "Racial and Economic Factors in Attitudes to Immigration." *The B.E. Journal of Economic Analysis and Policy*, 7(1): Article 62.
- Dustmann, Christian, and Tommaso Frattini.** 2014. "The Fiscal Effects of Immigration to the UK." *Economic Journal*, 124(580): F593–F643.
- Dustmann, Christian, Tommaso Frattini, and Ian P. Preston.** 2013. "The Effect of Immigration along the Distribution of Wages." *The Review of Economic Studies*, 80(1): 145–173.
- Dustmann, Christian, Uta Schönberg, and Jan Stuhler.** 2016a. "Labor Supply Shocks and the Dynamics of Local Wages and Employment." *Quarterly Journal of Economics*, forthcoming.
- Dustmann, Christian, Uta Schönberg, and Jan Stuhler.** 2016b. "The Impact of Immigration: Why Do Studies Reach Such Different Results?" *Journal of Economic Perspectives*, 30(4): 31–56.
- Facchini, Giovanni, and Anna Maria Mayda.** 2009. "Does the Welfare State Affect Individual Attitudes toward Immigrants? Evidence across Countries." *Review of Economics and Statistics*, 91(2): 295–314.
- Foged, Mette, and Giovanni Peri.** 2016. "Immigrants' Effect on Native Workers: New Analysis on Longitudinal Data." *American Economic Journal: Applied Economics*, 8(2): 1–34.
- Gelman, Andrew, and Jennifer Hill.** 2007. *Data Analysis Using Regression and Multilevel/Hierarchical Models*. Cambridge:Cambridge University Press.

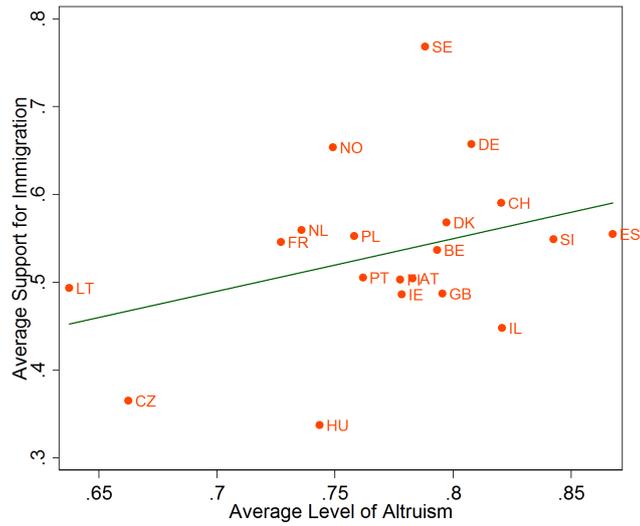
- Gelman, Andrew, John B. Carlin, Hal S. Stern, David B. Dunson, Aki Vehtari, and Donald B. Rubin.** 2014. *Bayesian Data Analysis*. 3 ed., Boca Raton FL: Taylor and Francis.
- Glitz, Albrecht.** 2012. "The Labor Market Impact of Immigration: A Quasi-Experiment Exploiting Immigrant Location Rules in Germany." *Journal of Labor Economics*, 30(1): 175–213.
- Hainmueller, Jens, and Michael J. Hiscox.** 2006. "Learning to Love Globalization: Education and Individual Attitudes toward International Trade." *International Organization VO - 60*, (2): 469.
- Hainmueller, Jens, and Michael J. Hiscox.** 2007. "Educated Preferences: Explaining Attitudes Toward Immigration in Europe." *International Organization*, 61(02): 399–442.
- Hainmueller, Jens, Michael J. Hiscox, and Yotam Margalit.** 2015. "Do Concerns About Labor Market Competition Shape Attitudes Toward Immigration? New Evidence." *Journal of International Economics*, 97(1): 193–207.
- Halla, Martin, Alexander F. Wagner, and Josef Zweimüller.** 2015. "Immigration and Voting for the Far Right."
- Hansen, Ole-Petter Moe, and Stefan Legge.** 2015. "Trading off Welfare and Immigration in Europe." *Norwegian School of Economics (NHH) Discussion Paper 22-2015*.
- Hatton, Timothy J.** 2014. "The economics of international migration: A short history of the debate." *Labour Economics*, 30: 43–50.
- Hatton, Timothy J.** 2016. "Immigration, public opinion and the recession in Europe." *Economic Policy*, 31(86): 205–246.
- Hoffman, Mitchell.** 2011. "Does Higher Income Make You More Altruistic? Evidence from the Holocaust." *Review of Economics and Statistics*, 93(3): 876–887.
- Kerr, William R., and William F. Lincoln.** 2010. "The Supply Side of Innovation: H-1B Visa Reforms and U.S. Ethnic Invention." *Journal of Labor Economics*, 28(3): 473–508.
- Manacorda, Marco, Alan Manning, and Jonathan Wadsworth.** 2012. "The Impact of Immigration on the Structure of Wages: Theory and Evidence from Britain." *Journal of the European Economic Association*, 10(February): 120–151.
- Markaki, Yvonne, and Simonetta Longhi.** 2013. "What Determines Attitudes to Immigration in European Countries? An Analysis at the Regional Level." *Migration Studies*, 1(3): 311–337.
- Mastrococco, Nicola, and Luigi Minale.** 2016. "Information and Crime Perceptions: Evidence from a Natural Experiment." *CREAM Discussion Paper CPD 01/16*.
- Mayda, Anna Maria.** 2006. "Who Is Against Immigration? A Cross-Country Investigation of Individual Attitudes toward Immigrants." *The Review of Economics and Statistics*, 88(3): 510–530.
- Murard, Elie.** 2015. "Less welfare or fewer foreigners? Immigrant inflows and public opinion towards redistribution and migration policy."
- Ottaviano, Gianmarco I. P., and Giovanni Peri.** 2012. "Rethinking the effect of immigration on wages." *Journal of the European Economic Association*, 10(February): 152–197.
- Peri, Giovanni.** 2012. "The Effect Of Immigration On Productivity: Evidence From U.S. States." *Review of Economics and Statistics*, 94(1): 348–358.
- Poutvaara, Panu, and Max Friedrich Steinhardt.** 2015. "Bitterness in Life and Attitudes Towards Immigration." *CESifo Working Paper No. 5661*.
- Preston, Ian.** 2014. "The Effect of Immigration on Public Finances." *The Economic Journal*, 124(580): F569–F592.
- Scheve, Kenneth F., and Matthew J. Slaughter.** 2001. "Labor Market Competition and Individual Preferences Over Immigration Policy." *Review of Economics and Statistics*, 83(1): 133–145.
- Steinmayr, Andreas.** 2016. "Exposure to Refugees and Voting for the Far-Right: (Unexpected) Results from Austria." *IZA Discussion Paper No. 9790*.
- Stöhr, Tobias, and Philipp C. Wichardt.** 2016. "Conflicting Identities: Cosmopolitan or Anxious? Appreciating Concerns of Host Country Population Improves Attitudes Towards Immigrants." *Kiel Working Papers No. 2045*.
- Storesletten, Kjetil.** 2003. "Fiscal Implications of Immigration: A Net Present Value Calculation." *The Scandinavian Journal of Economics*, 105(3): 487–506.

# Appendix

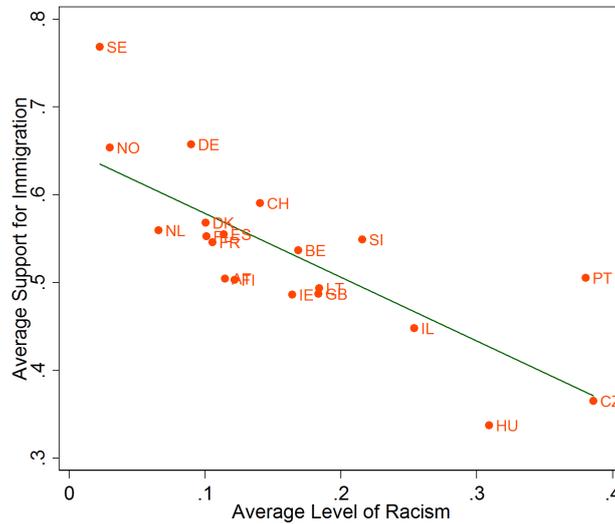
## Appendix A: Additional Figures and Tables

Figure A.1: Country-Level Correlations with Altruism and Racism

(a) Altruism and Support for Immigration



(b) Racism and Support for Immigration



*Note:* The figures show on the horizontal axis each country's average level of altruism (Plot a) or average level of racism (Plot b). On the vertical axis, we plot the countries' average preferred level of immigration. Altruism is measured using ALT1 while racism is proxied by RAC1. Support for immigration is based on questions II-V in Table 1. The solid provides line a linear fit.

**Table A.1: Country-Level Averages**

Country	Mean Value of					
	Immigration Level	Immigration Effects	Economic Effects	Compositional Effects	Racism	Altruism
AT	0.505	0.422	0.437	0.411	0.263	0.779
BE	0.537	0.455	0.439	0.467	0.285	0.773
CH	0.590	0.521	0.538	0.508	0.279	0.809
CZ	0.365	0.370	0.358	0.380	0.472	0.669
DE	0.658	0.520	0.537	0.507	0.226	0.806
DK	0.568	0.504	0.499	0.507	0.286	0.773
ES	0.555	0.472	0.448	0.489	0.251	0.843
FI	0.503	0.529	0.508	0.545	0.290	0.788
FR	0.546	0.471	0.466	0.475	0.264	0.764
GB	0.487	0.458	0.469	0.450	0.326	0.776
HU	0.338	0.401	0.360	0.433	0.384	0.742
IE	0.486	0.476	0.453	0.495	0.328	0.762
IL	0.448	0.487	0.490	0.484	0.350	0.801
LT	0.493	0.475	0.477	0.477	0.357	0.631
NL	0.560	0.483	0.470	0.492	0.188	0.742
NO	0.654	0.516	0.554	0.488	0.242	0.748
PL	0.553	0.499	0.463	0.532	0.267	0.771
PT	0.506	0.463	0.469	0.460	0.427	0.730
SE	0.768	0.588	0.587	0.589	0.153	0.799
SI	0.549	0.454	0.434	0.469	0.267	0.823

*Note:* The table shows country-level averages of the respective indices for six variables: preferred level of immigration, expected effects of immigration (ECO1 - ECO3, COM1 - COM4), expected economic effects (ECO1 - ECO3), expected compositional effects (COM1 - COM4), racism (RAC - RAC5), and altruism (ALT1 - ALT3).

**Table A.2: Correlation of Altruism and Racism**

	Correlation with Variable Number							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) ALT1	1.0000							
(2) ALT2	0.3209 <i>0.3112</i>	1.0000						
(3) ALT3	0.3961 <i>0.3900</i>	0.3671 <i>0.3533</i>	1.0000					
(4) RAC1	-0.0284 <i>-0.0146</i>	-0.1252 <i>-0.1668</i>	-0.0809 <i>-0.0773</i>	1.0000				
(5) RAC2	0.0040 <i>-0.0016</i>	-0.0749 <i>-0.1676</i>	-0.0314 <i>-0.0759</i>	0.3754 <i>0.4876</i>	1.0000			
(6) RAC3	-0.0176 <i>-0.0613</i>	-0.1059 <i>-0.2329</i>	-0.0491 <i>-0.1197</i>	0.2222 <i>0.3066</i>	0.2034 <i>0.2336</i>	1.0000		
(7) RAC4	-0.1586 <i>-0.1187</i>	-0.2199 <i>-0.2255</i>	-0.2350 <i>-0.1988</i>	0.2505 <i>0.1287</i>	0.1233 <i>0.0658</i>	0.0840 <i>0.0540</i>	1.0000	
(8) RAC5	-0.1210 <i>-0.1144</i>	-0.2222 <i>-0.2702</i>	-0.2034 <i>-0.2265</i>	0.2131 <i>0.1171</i>	0.1189 <i>0.0643</i>	0.1125 <i>0.0695</i>	0.4576 <i>0.4258</i>	1.0000

*Note:* The table shows unweighted correlations of responses to eight questions across all respondents in 2002 ESS. The first three questions are on altruism while the last five questions cover racism. All questions are described in Table 2 and standardized between zero and one. Numbers shown in italics are adjusted correlations, based on regressions with country-fixed effects.

**Table A.3: Determinants of Altruism, Racism, and Expected Effects**

	(1)	(2)	(3)	(4)	(5)	(6)
	Immigration Effects		ECO 1-3	COM 1-4	RAC 1-5	ALT 1-3
Mean of dep. variable	0.479	0.479	0.474	0.483	0.296	0.767
Male	0.004 (0.004)	0.013*** (0.004)	0.014*** (0.004)	-0.003 (0.004)	0.018*** (0.005)	-0.034*** (0.002)
Age	-0.000** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.001*** (0.000)	0.002*** (0.000)	-0.000* (0.000)
High Education	0.072*** (0.004)	0.059*** (0.003)	0.075*** (0.004)	0.070*** (0.004)	-0.057*** (0.007)	0.020*** (0.003)
Household Income Decile	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.002** (0.001)	-0.000 (0.002)	0.002*** (0.000)
Unemployed (currently)	-0.008 (0.005)	-0.008 (0.005)	-0.018*** (0.005)	-0.001 (0.006)	0.002 (0.008)	0.005 (0.004)
Left-Right Scale (1=left)	0.083*** (0.024)	0.047** (0.021)	0.067*** (0.023)	0.096*** (0.025)	-0.143*** (0.013)	0.071*** (0.010)
Children at Home	-0.008** (0.003)	-0.007** (0.003)	-0.009** (0.004)	-0.008** (0.003)	0.002 (0.004)	-0.001 (0.002)
Happiness with Income	0.082*** (0.010)	0.073*** (0.010)	0.092*** (0.011)	0.074*** (0.010)	-0.037** (0.013)	0.002 (0.007)
Wage Earner	-0.011** (0.005)	-0.012** (0.005)	-0.014** (0.006)	-0.009* (0.005)	-0.004 (0.006)	-0.002 (0.005)
Being a Citizen	-0.084*** (0.014)	-0.077*** (0.014)	-0.099*** (0.017)	-0.073*** (0.013)	0.030*** (0.008)	-0.010 (0.008)
Belong to Minority	0.017 (0.026)	0.016 (0.024)	0.016 (0.027)	0.017 (0.025)	0.007 (0.016)	0.016** (0.007)
Retired	-0.013** (0.006)	-0.012* (0.006)	-0.010 (0.006)	-0.016** (0.007)	0.005 (0.007)	0.004 (0.007)
Racism Index (RAC1 - RAC5)		-0.180*** (0.010)				
Altruism Index (ALT1 - ALT3)		0.143*** (0.018)				
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	28,746	28,346	28,683	28,711	28,774	28,369
R-squared	0.172	0.253	0.162	0.154	0.147	0.119

*Note:* The table shows the results of six separate ordinary least squares regressions using five different dependent variables as indicated by the first row. Numbers in brackets indicate standard errors clustered at the country level. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

**Table A.4: Preferences for Different Types of Immigration**

	Preferred Level of Immigration							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Refugees	Same Race	Different Race	Poor European Countries	Poor Non-European Countries	Jews	Muslims	Gypsies
Mean of dep. variable	0.539	0.632	0.523	0.517	0.464	0.602	0.440	0.378
Economic Effects (ECO1 - ECO3)	0.150*** (0.020)	0.428*** (0.033)	0.295*** (0.027)	0.298*** (0.034)	0.233*** (0.034)	0.342*** (0.036)	0.181*** (0.029)	0.149*** (0.022)
Comp. Effects (COM1 - COM4)	0.270*** (0.033)	0.456*** (0.048)	0.405*** (0.048)	0.370*** (0.041)	0.337*** (0.040)	0.409*** (0.043)	0.378*** (0.061)	0.301*** (0.045)
Racism Index (RAC1 - RAC5)	-0.050*** (0.008)	-0.064*** (0.011)	-0.116*** (0.013)	-0.103*** (0.014)	-0.117*** (0.015)	-0.110*** (0.024)	-0.149*** (0.020)	-0.134*** (0.019)
Altruism Index (ALT1 - ALT3)	0.118*** (0.017)	0.146*** (0.027)	0.098*** (0.021)	0.099*** (0.028)	0.094*** (0.023)	0.153*** (0.029)	0.089*** (0.019)	0.093*** (0.022)
Male	-0.007*** (0.003)	-0.004 (0.004)	-0.003 (0.003)	-0.005 (0.004)	-0.008*** (0.003)	0.007* (0.004)	0.012*** (0.004)	0.005* (0.003)
Age	0.000 (0.000)	-0.000 (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.000 (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
High Education	0.001 (0.003)	0.042*** (0.005)	0.025*** (0.003)	0.016*** (0.003)	0.016*** (0.003)	0.053*** (0.007)	0.026*** (0.004)	0.021*** (0.004)
Household Income Decile	-0.001 (0.001)	0.004*** (0.001)	0.002* (0.001)	0.000 (0.001)	0.000 (0.001)	0.006*** (0.002)	0.002** (0.001)	0.000 (0.001)
Left-Right Scale (1=left)	0.082*** (0.017)	0.025 (0.037)	0.089*** (0.015)	0.086*** (0.012)	0.080*** (0.014)	-0.009 (0.050)	0.086*** (0.022)	0.081*** (0.015)
Happiness with Income	-0.003 (0.007)	0.032** (0.013)	0.015*** (0.005)	0.033*** (0.012)	0.027*** (0.009)	0.025 (0.021)	0.015* (0.008)	0.009 (0.006)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	27,737	27,838	27,823	26,600	27,756	27,539	27,609	27,558

*Note:* The table shows the results of ordinal probit regressions. We report marginal effects on the probability of choosing the highest level of immigration. Further control variables include being unemployed, having children, being a wage earner, being a citizen, and being retired. Numbers in brackets indicate standard errors clustered at the country level. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

**Table A.5: Alternative Altruism Questions in the 2002 ESS**

Mean of dep. variable	Preferred Level of Immigration		Exp. Effects of Immigration	
	(1)	(2)	(3)	(4)
Immigration Effects (ECO1 - ECO3, COM1 - COM4)	0.687*** (0.027)	0.747*** (0.030)		
Richer Countries Have Responsibility (ALT IMM 1)	0.177*** (0.014)		0.162*** (0.016)	
All Benefit if People can Move (ALT IMM 2)		0.084*** (0.012)		0.104*** (0.011)
Male	-0.010** (0.005)	-0.014*** (0.004)	0.004 (0.003)	-0.000 (0.004)
Age	-0.002*** (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	-0.000*** (0.000)
High Education	0.053*** (0.005)	0.050*** (0.005)	0.068*** (0.005)	0.069*** (0.005)
Household Income Decile	0.005*** (0.001)	0.005*** (0.001)	0.002*** (0.001)	0.002*** (0.001)
Left-Right Scale (1=left)	0.062*** (0.017)	0.083*** (0.020)	0.055*** (0.014)	0.078*** (0.018)
Happiness with Income	0.018 (0.012)	0.014 (0.013)	0.060*** (0.007)	0.061*** (0.006)
Country Fixed Effects		Yes	Yes	Yes
Time Fixed Effects		Yes	Yes	Yes
Observations		24,961	24,724	25,314

*Note:* The table shows the results of six separate Tobit regressions. In columns (1)-(2) the dependent variable is the preferred level of immigration while in columns (3)-(4) it is the expected effects of immigration (ECO1, ECO2, ECO3, COM1, COM3, COM4). Note that COM2 is not available in the 2002 questionnaire. Further control variables include being unemployed, having children, being a wage earner, being a citizen, and being retired. Numbers in brackets indicate standard errors clustered at the country level. Significance at the 10% level is represented by \*, at the 5% level by \*\*, and at the 1% level by \*\*\*.

**Table A.6: Estimates of Latent-Factor Model by Country**

	$\beta_{\text{ECO}}$	$\beta_{\text{COM}}$	$\beta_{\text{RAC}}$	$\beta_{\text{ALT}}$
BE	1.16 (0.12)	1.37 (0.11)	-0.87 (0.12)	0.28 (0.10)
CH	0.69 (0.13)	1.38 (0.15)	-1.09 (0.14)	0.17 (0.12)
DE	1.06 (0.09)	1.57 (0.09)	-0.65 (0.08)	0.37 (0.08)
DK	0.66 (0.11)	1.47 (0.13)	-1.14 (0.13)	0.54 (0.10)
ES	2.05 (0.2)	1.97 (0.2)	-0.64 (0.17)	0.44 (0.14)
FI	0.73 (0.11)	1.54 (0.12)	-1.32 (0.1)	0.28 (0.09)
FR	1.20 (0.13)	1.55 (0.13)	-1.25 (0.11)	0.27 (0.10)
GB	1.36 (0.14)	1.74 (0.15)	-0.83 (0.12)	0.52 (0.11)
HU	0.92 (0.13)	0.93 (0.12)	-0.51 (0.10)	0.27 (0.08)
IE	1.12 (0.14)	1.14 (0.14)	-1.23 (0.12)	0.80 (0.10)
IL	0.53 (0.10)	0.88 (0.10)	-0.72 (0.09)	-0.02 (0.08)
LT	1.14 (0.16)	1.26 (0.16)	-0.91 (0.13)	-0.05 (0.11)
NL	1.39 (0.13)	1.59 (0.15)	-1.04 (0.14)	0.19 (0.12)
NO	0.84 (0.15)	1.38 (0.14)	-0.89 (0.14)	0.46 (0.12)
PL	0.98 (0.2)	1.35 (0.22)	-1.17 (0.18)	0.30 (0.14)
PT	1.17 (0.15)	1.31 (0.16)	-0.99 (0.14)	0.17 (0.11)
SE	1.51 (0.19)	1.98 (0.22)	-1.20 (0.19)	0.49 (0.15)
SI	1.35 (0.18)	1.14 (0.17)	-0.87 (0.15)	0.12 (0.14)

*Note:* The table shows the coefficients of the five-way latent factor model, estimated on countries separately. Rows indicates countries, and estimates of coefficients are given in the columns. Numbers in parenthesis indicate the standard deviation of the posterior distribution of coefficients.

## Appendix B: Additional Questions from the ESS

In our empirical analysis, we employ data provided by the European Social Survey (ESS) from 2014 and 2015. Below we explain in more detail which questions are used for several of the control variables. In addition, we indicate the possible answers to each question. Note that we recode all variables to range from zero to one as shown in Table 3.

**Education** — We rely on the International Standard Classification of Education (ISCED) and code everyone with ISCED 5A, 5B, and 6 (short, medium, or long) as highly educated. This includes the first and second stage of tertiary education. Notably, the same coding is used for the education of partners and parents.

**Household Income** — The ESS provides data on households' total net income from all sources. This is grouped into ten country-specific deciles.

**Employment Status** — We distinguish three different types of employment status, each one with a separate dummy variable. Based on an individual's main source of household income, we define those as wage earners who answer with 'wages or salaries' as main source. We codify as retired all those who choose 'pensions' as answer. Finally, we mark all individuals as unemployed who say that they have been unemployed in the last 7 days and actively looking for a job.

**Political Position** — Each survey participant is asked to place him- or herself on a left-right scale in terms of political views. The ESS provides a range from 0 (extremely left) to 10 (extremely right).

**Interest in Politics** — Facing the question how interested they are in politics, individuals can choose from four different answers: very interested, quite interested, hardly interested, and not interested at all.

**Satisfaction with the State of the Economy** — The ESS asks how satisfied an individual is with the present state of the economy in their country of residence. Possible answers range from 0 (extremely dissatisfied) to 10 (extremely satisfied).

**Trust** — Every survey participant is asked to what extent other people can be trusted. Answers can range from 0 (you can't be too careful) to 10 (most people can be trusted).

**Migration Background of Parents** — For both mother and father, each individual in the ESS is asked whether the parents were born in their country of current residence. We use two variables to capture whether either parent is born outside the current country.

**Happiness with Income** — We use a question on how individuals feel about their household's current income. There are four answer options to choose from: living comfortably on present income, coping on present income, difficult on present income, and very difficult on present income.

**Risk Aversion** — Following the literature, we measure risk preference using a question that asks participants whether they agree with a hypothetical person who thinks it is important to seek adventures and have an exciting life. There are six possible answers: [this person is] very much like me, like me, somewhat like me, a little like me, not like me, or not like me at all.

## Appendix C: Estimation of the Latent-Factor Model

In order to provide more details on how we estimate the latent-factor model, we restate the entire model in this appendix. Each individual  $n \in \{1, \dots, N\}$  in the ESS can be characterized along five dimensions:

$\alpha_{n,ECO}$	LATENT WORRIES ABOUT ECONOMIC EFFECTS
$\alpha_{n,COM}$	LATENT WORRIES ABOUT COMPOSITIONAL AMENITIES
$\alpha_{n,RAC}$	LATENT RACISM
$\alpha_{n,ALT}$	LATENT ALTRUISM
$\alpha_{n,IMM}$	LATENT PREFERENCE FOR IMMIGRATION

Furthermore, define the following items:

- Denote the dimensions as  $D = \{ECO, COM, RAC, ALT\}$
- Denote questions as  $D_{ECO} = \{1, 2, 3\}$ ,  $D_{COM} = \{1, 2, 3, 4\}$ ,  $D_{RAC} = \{1, 2, 3, 4, 5\}$ ,  $D_{ALT} = \{1, 2, 3\}$ , and  $D_{IMM} = \{1, 2, 3, 4\}$ .
- $R_{d,q}$  denote the number of possible responses to question  $q$  on dimension  $d$
- $\chi_{q,d}$  denote an *ordered* vector of length  $R_{d,q} - 1$ , where ordered means increasing.
- $1 \leq r_{d,q,n} \leq R_{d,q}$  is the *observed* integer response of individual  $n$  to question  $q$  on dimension  $d$ . We transform each question such that the “lowest” response is always unity. Thereafter, each higher possible response is coded as the lower response plus one.
- $\lambda(z) \equiv e^{e^{-z}}$  denotes the CDF of the standard Gumbel distribution.

Next, we define the function:

$$\Lambda(r_{d,q,n} | \alpha_{n,q}, R_{d,q}, \chi_{d,q}) = \begin{cases} 1 - \lambda(\alpha_{n,q} - \chi_{d,q}[1]) & \text{if } r_{d,q,n} = 1 \\ \lambda(\alpha_{n,q} - \chi_{d,q}[r_{d,q,n} - 1]) - \lambda(\alpha_{n,q} - \chi_{d,q}[r_{d,q,n}]) & \text{if } 1 < r < R_{d,q} \\ \lambda(\alpha_{n,q} - \chi_{d,q}[r_{d,q} - 1]) & \text{if } r = R_{d,q} \end{cases} \quad (7)$$

which implies that the latent response to each question is standard Gumbel distributed around the preferred individual level  $\alpha_{n,q}$ . With these definitions in place, we can define the model:

$$\begin{aligned}
\sigma_d &\sim N(0, 4)T(0, \cdot), \quad d \in D \\
\beta_d &\sim U(-\infty, \infty), \quad d \in \{ECO, COM, RAC, ALT\} \\
\chi_{d,q,c} &\sim U(\chi_{j,k,c-1}, \infty), \quad \chi_{d,q,0} = -\infty, d \in D, q \in Q_d, c \in R_{d,q} \\
\alpha_{n,ECO} &\sim N(0, \sigma_{ECO}^2) \\
\alpha_{n,COM} &\sim N(0, \sigma_{COM}^2) \\
\alpha_{n,RAC} &\sim N(0, \sigma_{RAC}^2) \\
\alpha_{n,ALT} &\sim N(0, \sigma_{ALT}^2) \\
\alpha_{n,IMM} &\sim N\left(\beta_{ECO} \frac{\alpha_{n,ECO}}{\sigma_{ECO}} + \beta_{COM} \frac{\alpha_{n,COM}}{\sigma_{COM}} + \beta_{RAC} \frac{\alpha_{n,RAC}}{\sigma_{RAC}} + \beta_{ALT} \frac{\alpha_{n,ALT}}{\sigma_{ALT}}, \sigma_{IMM}^2\right)
\end{aligned} \tag{8}$$

Denoting the collection of all parameters as  $\Theta$ , we have that the conditional likelihood of the data is given by

$$p(y|\Theta) = \sum_{n \in N} \sum_{d \in D} \sum_{q \in Q_d} \Lambda(r_{d,q,n} | \alpha_{n,q}, N_{d,q}, \chi_{d,q}). \tag{9}$$

The posterior densities of the parameters can then be found using Bayes rule:

$$p(\Theta|y) \propto p(y|\Theta)p(\Theta) \tag{10}$$

where  $p(\Theta)$  is given by the set of priors in (8). We estimate the model using Stan (cf. <http://mc-stan.org/>, or Carpenter et al. (2016)), following the convention of using four MCMC-chains, each initialized with random draws. We then assess convergence of posterior distributions using the  $\hat{R}$ -criterion (Gelman et al., 2014, p284-285). All parameters have converged in the sense of having an  $\hat{R}$  close to unity.