The Occupational Share of Foreigners and Attitudes to Equal Opportunities

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Abstract

This paper examines the relationship between Swiss attitudes towards equal opportunities for foreigners and ethnic concentration at the occupational level. Using data from the Swiss Household Panel, ordered probit regressions with standard controls show that: (a) there is a *negative* association between the share of foreigners in one's occupation and positive attitudes to equal opportunities; (b) there is a *positive* association between the share of recently arrived foreigners and positives attitudes to equal opportunities. This suggests that workers are at the same time wary of competition with foreigners and welcome their contribution to overcome labour shortages. Adding the occupational unemployment rate to the model indicates that perceptions of competition may be as relevant as objective competition. Controlling for a set of other occupational characteristics further establishes that the significant associations in (a) and (b) are probably caused by sorting on job quality. All results are robust to potential self-selection of Swiss workers with negative attitudes into occupations with few foreigners and to the endogenous allocation of foreigners into particular segmented labour markets.

Keywords: Immigration, attitudes towards foreigners, labour market, occupational classification, ethnic concentration, unemployment, instrumental variables
JEL Codes: F22, J24, J61

1 Introduction

Migration has been a constant in the history of mankind (Goldin et al., 2011), but recent years have seen a concentration in the receiving countries (Czaika and de Haas, 2014). This has led to a rapid growth of immigrants in Western countries often portrayed in dramatic terms (compare Pecoraro and Ruedin, 2015; Van der Brug et al., 2015). Indeed, some individuals have followed the growth in the share of immigrants with unease, and parties politicizing against immigration have received significant support across Western Europe (Ford and Goodwin, 2014; Green et al., 2015). Policies continue to exclude a significant part of the resident population from full membership in social and political life, which can lead to conflict as recent riots remind us, such as in Paris in 2005 or Sweden in 2013.

Researchers from fields as diverse as economics, sociology, political science, social psychology, and migration studies have examined the covariates of negative attitudes towards immigrants and foreigners (see Hainmueller and Hopkins, 2014; Rustenbach, 2010; Dancygier and Laitin, 2014; Zamora-Kapoor et al., 2013; Hatton, 2014; Pettigrew, 2016, for recent reviews). A naive economic model often serves as the basis, assuming that opposition towards immigrants and foreigners is a direct consequence of unwanted competition in the labour market (Ceobanu and Escandell, 2010; Billiet et al., 2014; Polavieja, 2016). The different contributions seek to refine, extend, even refute this basic model with various success. For instance, some of them emphasize the dominant role of non-economic considerations over labour market concerns by drawing upon identities, values and beliefs (e.g., Hainmueller and Hiscox, 2007; Sides and Citrin, 2007). More recently, Hainmueller et al. (2015) find no evidence for the labour market competition hypothesis using a battery of tests devised to assess different relationships between more detailed economic characteristics of U.S. workers and their opinions about low- and high-skilled immigration.

By focusing on a naive economic model, much of the literature does not pay adequate attention to the segmented nature of the labour market. The reduction of the labour market into low- and high-skilled workers in many existing studies renders these unable to draw valid inferences about actual labour force competition and its impact on attitudes towards immigrants and foreigners.[1] Here we argue that, following standard controls, workers are at the same time wary of competition with foreigners and welcome their contribution to overcome labour shortages. Once a full set of job characteristics are controlled for, it appears that these differences in attitudes towards

[1] To make matters worse, for reasons of data availability, frequently the level of education is used as a proxy of skills level (Ceobanu and Escandell, 2010).

foreigners are due to a sorting of workers into jobs on the basis of skills.

2 Attitudes towards Immigrants and Foreigners

When different groups meet, it is common to reject the other and tread carefully when dealing with members of the other group. This is a universal phenomenon that applies to different ethnic and racial groups, social groups, as well as immigrants and foreigners (e.g. McLaren, 2003; Pasek et al., 2014; Helbling, 2014). It is important to note, however, that individuals differ in their tendency to reject the other. Different reasons have been proposed for this, ranging from simple conservatism to personalities and indeed genetic influence (e.g Gallego and Pardos-Prado, 2014; Hatemi, 2013; Hatemi et al., 2013).

Blumer (1958) provided an important step in the study of attitudes towards different groups by shifting the focus from individual feelings to relations between groups. Today, this position is generally included in group threat theory: prejudice towards other groups and inter-group hostility are primarily regarded as reactions to (perceived) threats by subordinate groups. Empirical studies often draw on a naive economic model focusing exclusively on labour force competition, but group threat theory is formulated without reference to specific threats and can therefore equally be applied to economic threats as to cultural or symbolic threats (Bobo and Hutchings, 1996). In the naive economic model, immigrants threaten the economic position of natives by potentially undercutting wages or 'taking away' the jobs of natives.

While initial contact with new groups is often accompanied by rejection and opposition, it is also a common finding that contact between groups reduces tensions and opposition (Tausch and Hewstone, 2010; Allport, 1954; Ford, 2008). Attitudes towards immigrants and foreigners are therefore necessarily a dynamic phenomenon (DeWaard, 2014; Dancygier and Laitin, 2014), and matters are made more difficult for researchers by the fact that there are new inflows of immigrants at the same time as contact with immigrants takes place. It is particularly at the local level and at times of sudden inflows that attitudes towards immigrants and foreigners seem to be affected (Hopkins, 2010, 2011; Dancygier, 2010). While a focus on the local is surely valuable, we argue that more attention should be paid on the labour market given that the workplace is a place where immigrants and natives often come into contact.

3 Theory and Expectations

As is common in the literature (Ceobanu and Escandell, 2010), this paper draws on competitive threat theory. Attitudes towards foreigners are regarded as a reaction to unwanted competition in the labour market where skills of foreign and native workers are substitutable (Borjas, 2001). The intermediate step – the perception of threat – is not modelled, both because no adequate variable is available in the data used, and so as to give preference to (relatively) parsimonious models. The intuition behind competitive threat in our case is that a higher concentration of foreign workers potentially lowers wages in the sector an individual works in, and could increase the risk of unemployment. This is an economic threat, and the assumption is that this threat is expressed in terms of negative attitudes.

Throughout the paper we use the following notation to allow a formal statement of the hypotheses. The observed dependent variable y_i captures the attitudes towards (equal opportunities for) foreigners of individual i. We consider two groups of variables of interest. $S_{j(i)}$ refers to the composition of foreigners in occupation j of individual i and is therefore shared by all individuals in the same occupation. The corresponding regression coefficient is α. In a further step, $S_{j(i)}$ is decomposed into two components: the occupational share of *early* foreigners (who came to settle in the host country) $S^e_{j(i)}$ and the occupational share of *recent* foreigners (who have recently arrived in the host country) $S^r_{j(i)}$, with corresponding regression coefficients of α^e and α^r, respectively.

The first set of hypotheses is derived from the Heckscher-Ohlin framework (for a complete statement, see Krugman et al., 2012), according to which immigration leads to lower wages for native workers whose skills are substituted by the immigrants (i.e. a negative wage effect) while wages are expected to increase for native workers with complementary skills to those of the immigrants (i.e. positive wage effect). These pressures on wages translate into negative attitudes towards foreigners.

Hypothesis 1A

> *If attitudes towards foreigners are a reaction to competition in the labour market, it is necessary to take into consideration the segmented nature of the labour market. We expect that a larger share of foreigners in an occupation is associated with larger pressures on wages in a particular occupation, which in turn leads to more negative attitudes towards foreigners, formally:* $\alpha < 0$.

Hypothesis 1B

> *Even with a focus on labour market segments, not all foreign workers con-*

stitute unwanted competition: In segments where immigrant and native skills are complementary, foreign workers do not constitute competitors and there are no pressures on wages. This is particularly relevant in sectors with labour shortage, in which case employers frequently resort to immigrant workers. We assume that the share of recently arrived foreigners working in a sector is indicative of a sector with labour shortages. In this situation, a larger share of recent foreign workers is beneficial for native workers in a particular occupation, and attitudes are expected to be positive. Formally, we expect $\alpha^e < 0$ *and* $\alpha^r > 0$.

Arguably, approaching competition solely in terms of ethnic concentration by occupation provides an incomplete test of labour-market competition. Indeed, following the contact hypothesis, it can be expected that interpersonal contact between groups reduces negative feelings. Because competitive threat and contact are likely to occur concurrently, they are empirically difficult to disentangle (Wagner et al., 2006). It follows that estimates of α^e are probably biased downwards while estimates of α^r are likely to be biased upwards.

Following work that highlights that negative attitudes towards foreigners can be a result of *perceived* group threat (Quillian, 1995; Manevska and Achterberg, 2013), we propose to account for the economic situation at the occupational level through the inclusion of the occupational unemployment rate $U_{j(i)}$. This extension allows us to control for objective pressures and formulate a hypothesis about the role played by perceptions of threat in explaining attitudes towards foreigners.[2]

Hypothesis 2

Perceptions of competition may be as relevant as objective competition.

A third hypothesis is taken from Hirsch and Schumacher (1992) and Hirsch and Macpherson (2004). In the latter, the authors indicated a spurious relationship between racial composition of jobs and individual wages due to the omission of occupational skills in the analysis of wage determination. Their study provides support for a *quality sorting* explanation in the sense that the occupational share of black workers is correlated with worker quality and job skill differences that are generally not accounted for in standard models.[3] As a result, wages vary with the racial density of occupations but density may not be a causal determinant of individual wages.

[2] At this stage of writing, we have not formalized the expectations of hypotheses 2 and 3.

[3] Polavieja (2016) includes job-specific variables to capture the degree of exposure to competitive market pressures, but does not address the possibility that workers with negative attitudes towards foreigners choose occupations with few foreign workers.

Hypothesis 3

The ethnic composition of an occupation can serve as a proxy for (unobserved) job skills when there is sorting on labour quality. That is, any correlation between the occupational share of foreigners and the Swiss' attitudes (through wages) may simply reflect differences in the proportion of Swiss and foreign workers with a given set of skills when a match between workers and occupations is based on skills.

The quality sorting hypothesis is a related explanation for the relationship between ethnic composition and attitudes. If foreigners – but not Swiss workers – are crowded into low-paying occupations because of past or present discriminatory barriers due to for example the Swiss immigration policy, then the ethnic composition of a job becomes an index of labour quality for Swiss workers. That is, for instance, relatively *less productive* Swiss workers accept lower-paying jobs in occupations predominantly held by foreigners and that may explain why these Swiss workers appear to have *less positive* attitudes.

4 Data and Methods

4.1 Swiss Household Panel

The empirical analysis in this study is based on data from the Swiss Household Panel (SHP) survey. This data set is an unbalanced panel where respondents may leave the sample due to attrition. Data collection started in 1999 with a random sample of about 5,000 households (SHP_I sample) and a refreshment sample of about 2,500 households has been added in 2004 (SHP_II sample) in order to compensate for attrition in the initial sample. The SHP data are complemented by aggregate/contextual data on foreign workers derived from the Swiss Labour Force Survey (SLFS). Since 2003, the labour force survey includes an additional sample of 15,000 immigrant households, turning the SHP into the only Swiss survey capable of providing reliable information on the labour market outcomes of immigrants.

For the analyses in this paper, we retain individuals from the initial and refreshment samples (i.e. SHP_I and SHP_II) who were interviewed from 2004 to 2009 (6 waves). Since 2010, the question about attitudes towards foreigners is no longer asked in every wave but only in every other wave. The final sample includes Swiss of at least 18 years old who are employed. We only include respondents with valid information for the variables of interest, namely opinion on equal opportunities for foreigners and occupation.

4.2 Analytical Approach

Our modelling strategy is built on Dustmann and Preston (2001) who studied the relationship between attitudes towards foreigners and local (geographical) concentration of ethnic minorities. We modify the *baseline model* proposed by Dustmann and Preston to capture the effects of the concentration of foreigners within occupational categories:

$$y_i^* = \alpha S_{j(i)} + \mathbf{X}_i\boldsymbol{\beta} + \epsilon_i \tag{1}$$

where y_i^* is the unobserved latent variable for positive attitudes towards foreigners of individual i, $S_{j(i)}$ the occupational composition of foreigners of the individual's occupation j, $\mathbf{X}_i$ a vector of observed personal characteristics, namely levels of education, a dummy for gender, age, age squared, canton, sample and year dummies, as well as a constant. A full description of these variables can be found in Table 7 in the appendix. Note that all models control for individual values and beliefs; variables for values and beliefs are *general trust in people* (a 0-to-10 scale that is converted into ten dummy variables, with the highest value "most people can be trust" as the reference category, plus a dummy for missing values) and *political position left–right* (a 0-to-10 scale variable that is converted into ten dummy variables, with the highest value "right" as the reference category, plus three dummy variables for individuals who do not want/cannot place themselves, those without any particular political position, and missing values).[4]

The occupational composition of foreigners variable is calculated as the share of foreign citizens by occupation j. Occupations are classified by the 4-digit International Standard Classification of Occupations (ISCO-88), considering all occupations with at least 30 individuals in a year ($\sum j \approx 250$ occupations). Using this finely disaggregated level of occupation allows us to classify workers into specific skill segments, providing a detailed and realistic picture of labour-force competition with foreigners.

An *extended model* is also considered in which $S_{j(i)}$ is decomposed into two components, the occupational concentration of early foreigners $S^e_{j(i)}$ and the occupational concentration of early foreigners $S^r_{j(i)}$:

$$y_i^* = \alpha^e S^e_{j(i)} + \alpha^r S^r_{j(i)} + \mathbf{X}_i\boldsymbol{\beta} + \epsilon_i. \tag{2}$$

$S^r_{j(i)}$ corresponds to the share of those residing in Switzerland for less than five years among the total worker population by occupation j. By definition,

[4] We are aware of the assumptions introduced by treating missing values as a distinct category and in a future version will test the models by leaving out missing values. We do not expect this to change the results in any substantive way.

$S_{j(i)} \equiv S^e_{j(i)} + S^r_{j(i)}$. Given that residence permits in Switzerland are generally granted to immigrants with a valid employment contract, accounting for the share of recent foreigners by occupational level allows us to identify jobs characterized by labour-market shortages. Put differently, recent immigration to Switzerland stems from the insufficient supply of native workers in some professional fields.

To account for the ordinal nature of the observed dependent variable y_i, we use ordered probit estimations where

$$\epsilon_i|\text{covariates} \sim \text{Normal}(0,1).$$

The continuous latent variable y_i^* can be thought of as the *propensity* to exhibit positive attitudes toward foreigners. Respondents were asked "Are you in favour of Switzerland offering foreigners the same opportunities as those offered to Swiss citizens, or in favour of Switzerland offering Swiss citizens better opportunities?". The observed response categories are tied to the latent variable as follows (where μ_1 and μ_2 are two cut points):

$$y_i = \begin{cases} 1 & \text{In favour of better opportunities for Swiss citizens} & \text{if } y_i^* \leq \mu_1 \\ 2 & \text{Neither of them} & \text{if } \mu_1 < y_i^* \leq \mu_2 \\ 3 & \text{In favour of equal opportunities for foreigners} & \text{if } \mu_2 < y_i^* \end{cases}$$

5 Results

5.1 Negative Attitudes with More Foreigners

Estimation results from equation (1), presented in Table 1, indicate that working in occupations with a higher share of foreigners (S_j) is associated with more negative attitudes towards foreigners. An increase in the occupational concentration of foreigners by ten percentage points reduces the probability of positive attitudes by at least 1 percentage points. This finding is in line with the labour-market competition hypothesis: Swiss workers who are more exposed to competition by foreigners in their occupation are more likely to express negative sentiments towards foreigners. In line with most existing studies, we find a positive relationship between education and positive attitudes towards foreigners (coefficient not shown), but in the present paper education is used as a control variable.

Table 1: Baseline model: Ordered probit results

	Coefficients	Marginal Effects		
		$y = 1$	$y = 2$	$y = 3$
S_j: Share of foreigners	-0.345**	0.101**	0.009**	-0.110**
	(0.100)	(0.029)	(0.003)	(0.032)
Control variables	yes			
Canton, sample and year dummies	yes			
Proxies for values and beliefs	yes			
U_j: Occ. unemployment rate	no			
Q_j: Job (skill) indicators	no			
Observations	23,104			
Percentage correctly predicted	68.83%			
Test for joint significance of values and beliefs				
$> F$ statistic	2123.02**			

Source: Swiss Household Panel 2004-2009, data are unweighted.

Notes: Robust SE in parentheses (clustered by occupation and year), ** p<0.05, * p<0.10. y: positive attitudes towards equal opportunity for foreigners. See Table 7 in the appendix for a list of variables included.

5.2 Positive Attitudes with a Higher Density of *Recent* Foreigners

Table 2 presents the ordered probit estimates of the extended model (equation (2)), in which the occupational share of foreigners is decomposed into the shares of early and recent foreigners. Shown in the table are results where recent foreigners are those arrived in the past 5 years, but equivalent results can be obtained with different definitions of what 'recent' stands for (having a B- or L-permit) as outlined in the appendix.

The results for the occupational share of early foreigners in the first row of Table 2 are broadly similar to those presented in Table 1: the larger the share of early foreigners in the occupation, the more likely individuals are to express negative attitudes towards foreigners. The second row shows that in occupations with a higher share of recent foreign workers (relative to all workers), attitudes towards foreigners are relatively more positive. We argue that these are occupations with labour shortages. A ten percentage points increase in the share of recent foreigners raises the probability of positive attitudes by about 4.2 percentage points. This finding seems to confirm the complementary nature of recent labour migration to Switzerland in the sense that the influx of new workers can be considered as a way to overcome labour shortages.

Taken together, our results are consistent with the Heckscher-Ohlin framework: where individuals are exposed to increased competition with foreign workers, their attitudes are relatively more negative; where there are labour shortages and native workers benefit from immigrant workers, attitudes are relatively more positive.

Table 2: Extended model: Ordered probit results

	Coefficients	Marginal Effects		
		$y = 1$	$y = 2$	$y = 3$
S_j^e: Share of early foreigners	-0.891**	0.260**	0.024**	-0.284**
	(0.143)	(0.042)	(0.004)	(0.045)
S_j^r: Share of recent foreigners	1.310**	-0.382**	-0.035**	0.418**
	(0.276)	(0.081)	(0.008)	(0.088)
Control variables	yes			
Canton, sample and year dummies	yes			
Proxies for values and beliefs	yes			
U_j: Occ. unemployment rate	no			
Q_j: Job (skill) indicators	no			
Observations	23,104			
Percentage correctly predicted	68.93%			
Test for joint significance of values and beliefs				
$> F$ statistic	2036.52**			

Source: Swiss Household Panel 2004-2009, data are unweighted.

Notes: Robust SE in parentheses (clustered by occupation and year), ** p<0.05, * p<0.10. y: positive attitudes towards equal opportunity for foreigners. Recent foreigners are defined as those arrived in the past 5 years; results are qualitatively similar when recent foreigners are defined as those holding a B/L-permit (see the first column, upper panel, of Table 10 in the appendix). See Table 7 in the appendix for a list of variables included.

5.3 Negative Attitudes with More Exposure to Unemployment

According to the results displayed in Table 3, a higher rate of unemployment at the occupational level lowers the propensity to exhibit positive attitudes towards foreigners. In parallel, previous results are still valid, meaning that perceptions of competition seems to be as relevant as objective competition (Quillian, 1995; Polavieja, 2016).

Table 3: Adding occupational unemployment rate: Ordered probit results

	Previous estimates		*With unemployment*	
	Coeff	ME for $y = 3$	Coeff	ME for $y = 3$
S_j^e: Share of early foreigners	-0.891**	-0.284**	-0.751**	-0.239**
	(0.143)	(0.045)	(0.143)	(0.045)
S_j^r: Share of recent foreigners	1.310**	0.418**	1.322**	0.421**
	(0.276)	(0.088)	(0.274)	(0.087)
U_j: Occ. unemployment rate			-1.332**	-0.424**
			(0.473)	(0.150)
Control variables	yes		yes	
Canton, sample and year dummies	yes		yes	
Proxies for values and beliefs	yes		yes	
Q_j: Job (skill) indicators	no		no	
Observations	23,104		23,104	
Percentage correctly predicted	68.93%		68.93%	
Test for joint significance of values and beliefs				
$> F$ statistic	2036.52**		2038.18**	

Source: Swiss Household Panel 2004-2009, data are unweighted.

Notes: Robust SE in parentheses (clustered by occupation and year), ** p<0.05, * p<0.10. y: positive attitudes towards equal opportunity for foreigners. Recent foreigners are defined as those arrived in the past 5 years; results are qualitatively similar when recent foreigners are defined as those holding a B/L-permit (see the first column, upper and middle panels, of Table 10 in the appendix). The occupational unemployment rate calculated at the 4-digit ISCO level. See Table 7 in the appendix for a list of variables included.

5.4 Sorting on Occupational Quality Accounts for Competition

When indicators of job skills/indicators are added to the extended model to capture potential sorting on occupational skills, however, the effects of foreigners' occupational concentration on attitudes towards foreigners outlined in Table 2 are no more statistically significant (see Table 4). The same applies to the negative effect of occupational unemployment rate on positive attitudes. In other words, the quality sorting explanation is supported, that is differences in attitudes towards foreigners seem to be caused by a sorting of Swiss workers in low-quality jobs (i.e. jobs for which skills are in low demand and/or the labour supply is high) or high-quality jobs (i.e. jobs with shortage of professionals).

Table 4: Adding unemployment and job indicators: Ordered probit results

	Previous estimates		*With job indicators*	
	Coeff	ME for $y = 3$	Coeff	ME for $y = 3$
S_j^e: Share of early foreigners	-0.751**	-0.239**	-0.150	-0.047
	(0.143)	(0.045)	(0.206)	(0.065)
S_j^r: Share of recent foreigners	1.322**	0.421**	-0.464	-0.147
	(0.274)	(0.087)	(0.293)	(0.093)
U_j: Occ. unemployment rate	-1.332**	-0.424**	-0.345	-0.109
	(0.473)	(0.150)	(0.477)	(0.151)
Control variables	yes		yes	
Canton, sample and year dummies	yes		yes	
Proxies for values and beliefs	yes		yes	
Q_j: Job (skill) indicators	no		yes	
Observations	23,104		23,104	
Percentage correctly predicted	68.93%		69.10%	
Test for joint significance of values and beliefs				
$> F$ statistic	2038.18**		1805.56**	
Test for joint significance of job indicators				
$> F$ statistic			255.48**	

Source: Swiss Household Panel 2004-2009, data are unweighted.

Notes: Robust SE in parentheses (clustered by occupation and year), ** p<0.05, * p<0.10. y: positive attitudes towards equal opportunity for foreigners. Recent foreigners are defined as those arrived in the past 5 years; results are qualitatively similar when recent foreigners are defined as those holding a B/L-permit (see the first column, middle and lower panels, of Table 10 in the appendix). The occupational unemployment rate calculated at the 4-digit ISCO level. *Job indicators*: occupational means of the control variables, dummies for 1-digit ISCO-88 code and working conditions (stress, noise/dirtiness, tiring posture, computer use). Occupational means for most of the control variables calculated at the 4-digit ISCO level. See Table 7 in the appendix for a list of variables included.

5.5 Causality and Robustness

In this final subsection, we carry out additional tests to ascertain the robustness of the findings reported above. Standard ordered probit results are likely to be biased if Swiss citizens who oppose foreigners choose to work in occupations with few foreigners. As shown by Dustmann and Preston (2001) in terms of location choice, ignoring this simultaneity problem may lead to biased estimates of the attitudinal effects associated with the concentration of foreign citizens. *Instrumental variables* can account for such potential self-selection into occupations with few foreigners. We assume that occupational mobility is limited within a specific job; in other words, foreigner concentrations of more aggregated occupation levels are considered to be beyond the control of individuals – i.e. Swiss citizens do not sort into more aggregated levels of occupation based on their attitudes towards foreigners. For example, an insulation worker (ISCO 7134) is likely to have some possibility to move to a related job like plasterer (ISCO 7133) or painter (ISCO 7141), but is unlikely to be able to leave the building sector (ISCO 71) altogether. At the same time, foreigner concentrations in more aggregated levels of occupation are expected to be a significant predictor of foreigner composition within a specific job and can be regarded as a valid instrument.

Another source of bias may come from the endogenous allocation of foreigners into particular segmented labour markets. To estimate the causal effets of immigration on the labour market outcomes of less-skilled natives, Altonji and Card (1991) has proposed to apply an instrumental variables strategy in which the settlement pattern of previous immigrants is used as an instrument for the location choice of current immigrants. This kind of instrument has been widely adopted in the literature on the effect of immigration on wages (see, e.g., Dustmann et al. (2013) for a recent application). This literature has generally agreed that settlement patterns of previous immigrants are a major determinant of immigrants' location choices. We also follow this approach in this paper and use as instruments the share of previous foreigners in occupations at the 4-, 3- or 2-digit level.

All estimates from instrumental variables ordered probit regressions (see Table 6) are broadly similar to those obtained on the basis of the standard ordered probit model above (Table 1 to Table 4) and yield the same substantive conclusions. As can be generally expected when using instrumental variables, some of the standard errors are larger for all instruments. Both 3-digit and 2-digit codes were used to cater for different potentials to move within sectors. Taken together, the additional analyses in this section support the findings outlined above and suggest that they are robust.

Table 5: Extended model: Standard and IV ordered probit results

	Standard	IV 3-digit at t	IV 2-digit at t	IV 4-digit at $t-1$	IV 3-digit at $t-1$	IV 2-digit at $t-1$
Without both unemployment and job indicators						
S_j^e: Share of early foreigners	-0.891**	-1.042**	-1.446**	-1.023**	-1.167**	-1.462**
	(0.143)	(0.165)	(0.221)	(0.152)	(0.168)	(0.225)
S_j^r: Share of recent foreigners	1.310**	1.801**	3.253**	1.660**	2.188**	3.356**
	(0.276)	(0.330)	(0.421)	(0.318)	(0.363)	(0.457)
Observations	23,104	23,104	23,104	22,973	22,973	22,973
Percentage correctly predicted	68.93%	69.00%	68.84%	68.98%	68.98%	68.87%
Test for joint significance of the excluded instruments in the first stage						
$>F$ statistic (dep. var. $= S_j^e$)		2512.26**	229.41**	3332.11**	1704.34**	222.02**
$>F$ statistic (dep. var. $= S_j^r$)		753.05**	241.69**	806.49**	466.39**	174.92**
With unemployment only						
S_j^e: Share of early foreigners	-0.751**	-0.906**	-1.351**	-0.884**	-1.029**	-1.356**
	(0.143)	(0.170)	(0.241)	(0.153)	(0.172)	(0.247)
S_j^r: Share of recent foreigners	1.322**	1.805**	3.159**	1.669**	2.184**	3.257**
	(0.274)	(0.327)	(0.416)	(0.317)	(0.360)	(0.449)
U_j: Occ. unemployment rate	-1.332**	-1.228**	-0.929*	-1.263**	-1.189**	-1.000*
	(0.473)	(0.482)	(0.550)	(0.484)	(0.490)	(0.560)
Observations	23,104	23,104	23,104	22,973	22,973	22,973
Percentage correctly predicted	68.93%	68.92%	68.93%	68.99%	69.01%	68.9%
Test for joint significance of the excluded instruments in the first stage						
$>F$ statistic (dep. var. $= S_j^e$)		1785.16**	172.59**	2721.21**	1285.79**	163.08**
$>F$ statistic (dep. var. $= S_j^r$)		729.26**	257.21**	775.90**	441.72**	191.82**
With both unemployment and job indicators						
S_j^e: Share of early foreigners	-0.150	0.217	0.020	-0.299	-0.096	-0.074
	(0.206)	(0.329)	(0.676)	(0.253)	(0.387)	(0.851)
S_j^r: Share of recent foreigners	-0.464	-0.607	0.658	-0.362	-0.244	0.519
	(0.293)	(0.399)	(0.763)	(0.379)	(0.448)	(0.952)
U_j: Occ. unemployment rate	-0.345	-0.499	-0.698	-0.283	-0.420	-0.619
	(0.477)	(0.488)	(0.584)	(0.486)	(0.499)	(0.619)
Observations	23,104	23,104	23,104	22,973	22,973	22,973
Percentage correctly predicted	69.10%	69.03%	69.08%	69.08%	69.05%	69.11%
Test for joint significance of the excluded instruments in the first stage						
$>F$ statistic (dep. var. $= S_j^e$)		207.53**	50.01**	673.33**	150.54**	28.86**
$>F$ statistic (dep. var. $= S_j^r$)		313.81**	112.75**	427.04**	167.25**	64.91**

Source: Swiss Household Panel 2004-2009, data are unweighted.

Notes: Coefficient estimates, robust SE in parentheses (clustered by occupation and year), ** p<0.05, * p<0.10. y: positive attitudes towards equal opportunity for foreigners. All specifications include control variables and proxies for values/beliefs together with canton, sample and year dummies. Recent foreigners are defined as those arrived in the past 5 years; results are qualitatively similar when recent foreigners are defined as those holding a B/L-permit (see Table 10 in the appendix). The occupational unemployment rate calculated at the 4-digit ISCO level. *Job indicators*: occupational means, working conditions and 1-digit ISCO-88 code. Occupational means calculated at the 4-digit ISCO level. See Table 7 in the appendix for a list of variables included. *Instruments*: share of current foreigners in more aggregated levels of occupation (at the 3- or 2-digit level) and share of previous foreigners in occupations at the 4-, 3- or 2-digit level. The null hypothesis of weak instruments is always rejected using the F test on excluded instruments.

It should be emphasized that most of the earlier research neglects the problem of omitted variable (one exception is the paper by Lancee and Pardos-Prado, 2013). For instance, unobserved factors such as individual ability or motivation are likely to be negatively (resp. positively) correlated with the propensity to work in an occupation with an important share of early (resp. recent) foreigners. Omitting these variables would lead to biased estimates of α^e and α^r, both derived from the pooled ordered probit model. This type of endogeneity can be addressed by using the panel structure of the data. More specifically, an additional robustness check consists in estimating a Random Effects (RE) ordered probit model in which we add the individual group means of time-variant control variables in order to filter out the correlation between the error term and the right-hand-side variables (Greene, 2010; Mundlak, 1978). The results from this robustness check, presented in Table 6, will be discussed in the next version of this paper.

Table 6: Pooled ordered probit and RE ordered probit with CRE

	Main model		With unemployment		With unemployment and job indicators	
	POP	REOP with CRE	POP	REOP with CRE	POP	REOP with CRE
S_j^e: Share of early foreigners	-0.891**	0.360	-0.751**	0.298	-0.150	0.296
	(0.143)	(0.396)	(0.143)	(0.402)	(0.206)	(0.401)
S_j^r: Share of recent foreigners	1.310**	-0.072	1.322**	-0.092	-0.464	-0.090
	(0.276)	(0.709)	(0.274)	(0.712)	(0.293)	(0.707)
U_j: Occ. unemployment rate			-1.332**	0.927	-0.345	0.930
			(0.473)	(0.854)	(0.477)	(0.852)
Job (skill) indicators	no	no	no	no	yes	yes
Number of i	7,445	7,445	7,445	7,445	7,445	7,445
Observations	23,104	23,104	23,104	23,104	23,104	23,104
Percentage correctly predicted	68.93%	69.53%	68.93%	69.38%	69.10%	69.37%
Test for joint significance of the means of the time-variant explanatory variables						
$> F$ statistic		533.32**		538.39**		588.38**

Source: Swiss Household Panel 2004-2009, data are unweighted.
Notes: Coefficient estimates, robust SE in parentheses (clustered by individual id), ** p<0.05. All specifications include control variables, controls for values and beliefs, canton, sample and year dummies.

6 Conclusion

This paper examined individual attitudes towards (equal opportunities for) foreigners, focusing on the occupational composition of foreigners. The novelty here is that, by so doing, the segmented nature of the labour market is taken into consideration, and we were able to adequately capture labour market competition. We also consider the fact that the relationship between ethnic concentration and attitudes towards foreigners depends on whether an

occupation is marked by labour shortages or not. Following standard controls, our results suggest that workers respond to labour force competition in a nuanced way. On the one hand, they are wary of competition with foreigners, and we observe more negative attitudes towards foreigners where the share of early foreigners is higher. On the other hand, in occupations where the share of recent foreigners is higher – we assume due to labour shortages – attitudes towards foreigners are more positive. These results remain valid even after taking into account the economic situation at the occupational level through the inclusion of the occupational unemployment rate. These findings tend to support the view that *perceptions* of labour force competition as well as actual competition influence attitudes towards foreigners. However, since ethnic concentration serves as a proxy for unmeasured job characteristics, the main mechanism at work can be better described by a sorting of Swiss workers into jobs based on skills.

Despite what some contributions seem to suggest, this paper demonstrated that the quality sorting explanation plays a significant role in shaping attitudes towards foreigners when the nature of the labour market is adequately captured. We fully acknowledge that there are other factors that influence attitudes towards foreigners, such as sociotropic concerns and fears of fiscal threat well-established in the literature (e.g. Rustenbach, 2010; Hatton, 2014; Pettigrew, 2016). The reasons why individuals oppose foreigners are likely to be multifaceted and interacting with one another, and in our view any attempt to reduce them to a single factor is bound to fail.

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8 Appendix

Table 7: Explanatory variables included in the empirical analysis

Continuous variables	Dummy variables	Ref.
Baseline and extended models		
Age in years (at the time of the interview) Age squared	**Levels of education** Compulsory *Upper secondary* Tertiary	 ×
Share of foreign citizens by level of occupation ($S_j = S_j^e + S_j^r$)	**Gender** *Male* Female	 ×
Share of early foreigners by level of occupation (S_j^e) Share of recent foreigners by level of occupation (S_j^r)	**Canton of residence** *1 (AG Argovia)* ... 26 (ZH Zurich)	 ×
	Sample *SHP_I* SHP_II	 ×
	Year *2004* ... 2009	 ×
Adding job indicators		
Share of women by level of occupation	**Working conditions: stress** yes *no*	 ×
Average age by level of occupation	**Working conditions: noise/dirtiness** yes *no*	 ×
Average age squared by level of occupation	**Working conditions: tiring posture** yes *no*	 ×
Share of compulsory-educated by level of occupation	**Working conditions: computer use** yes *no*	 ×
Share of tertiary-educated by level of occupation	**1-digit ISCO-88 code** *1 (Legislators, senior officials, managers)* ... 9 (Elementary occupations)	 ×

Notes: Control variables only include gender, education, age and its square. Occupation disaggregated at the 4-digit level. Recent foreigners can be defined as those arrived in the past 5 years or holding a B/L-permit.

Table 8: Definition for levels of education

Description	Values for the education variable
Compulsory education	
Incomplete compulsory school	0
Compulsory school, elementary vocational training	1
Domestic science course, 1 year school of commerce	2
Upper secondary education	
General training school	3
Apprenticeship	4
Full-time vocational school	5
Maturity (high school)	6
Tertiary education	
Vocational high school with master/federal certificate	7
Technical or vocational school	8
Higher vocational college	9
University, PhD	10

Note: `EDUCAT` is used as the education variable.

Table 9: Summary statistics for 2004

Variables	Mean	Linearized S.E.	95% C.I. Lower	95% C.I. Upper
Attitudes towards foreigners				
In favour of better opportunities for Swiss citizens	0.31	0.01	0.29	0.32
Neither of them	0.09	0.00	0.08	0.09
In favour of equal opportunities for foreigners	0.61	0.01	0.59	0.62
S_j: Share of foreigners	0.19	0.00	0.19	0.19
S^r_{1j}: Share of foreigners with a B-permit	0.29	0.00	0.28	0.30
S^r_{2j}: Share of foreigners arrived in the past 5 years	0.25	0.00	0.24	0.25
Levels of education				
Compulsory education	0.12	0.01	0.11	0.13
Upper secondary education	0.59	0.01	0.57	0.60
Tertiary education	0.29	0.01	0.28	0.31
Female	0.48	0.01	0.47	0.50
Age	42.53	0.23	42.07	42.99
Canton of residence				
1. AG Argovia	0.08	0.00	0.07	0.09
2. AI Appenzell Inner-Rhodes	0.00	0.00	0.00	0.00
3. AR Appenzell Outer-Rhodes	0.01	0.00	0.00	0.01
4. BE Berne	0.14	0.00	0.13	0.15
5. BS Basle-Town	0.02	0.00	0.01	0.02
6. BL Basle-Country	0.03	0.00	0.03	0.04
7. FR Fribourg	0.04	0.00	0.03	0.04
8. GE Geneva	0.04	0.00	0.03	0.04
9. GL Glarus	0.00	0.00	0.00	0.01
10. GR Grisons	0.03	0.00	0.03	0.04
11. JU Jura	0.00	0.00	0.00	0.01
12. LU Lucerne	0.06	0.00	0.05	0.06
13. NE Neuchatel	0.04	0.00	0.04	0.05
14. NW Nidwalden	0.01	0.00	0.00	0.01
15. OW Obwalden	0.01	0.00	0.01	0.01
16. SG St. Gall	0.07	0.00	0.06	0.08
17. SH Schaffhausen	0.01	0.00	0.00	0.01
18. SO Solothurn	0.03	0.00	0.03	0.04
19. SZ Schwyz	0.02	0.00	0.01	0.02
20. TG Thurgovia	0.02	0.00	0.02	0.03
21. TI Ticino	0.03	0.00	0.03	0.03
22. UR Uri	0.00	0.00	0.00	0.01
23. VD Vaud	0.09	0.00	0.08	0.09
24. VS Valais	0.03	0.00	0.03	0.04
25. ZG Zug	0.01	0.00	0.01	0.01
26. ZH Zurich	0.17	0.00	0.17	0.18
Second sample (SHP_II)	0.55	0.00	0.54	0.55
Share of women by 4-digit occupation	0.47	0.00	0.46	0.48
Average age by 4-digit occupation	41.09	0.05	41.00	41.18
Share of compulsory-educated by 4-digit occupation	0.12	0.00	0.12	0.13
Share of tertiary-educated by 4-digit occupation	0.31	0.00	0.30	0.32
Working conditions: Stress	0.33	0.01	0.31	0.35
Working conditions: Noise/dirtiness	0.21	0.01	0.20	0.22
Working conditions: Tiring posture	0.37	0.01	0.36	0.39
Working conditions: Computer use	0.70	0.01	0.68	0.71
1-digit ISCO-88 code				
1. Legislators, senior officials, managers	0.05	0.00	0.04	0.06
2. Professionals	0.20	0.01	0.19	0.21
3. Technicians and associate professionals	0.26	0.01	0.25	0.27
4. Clercs	0.14	0.01	0.13	0.15
5. Service workers, market sales workers	0.12	0.01	0.11	0.13
6. Skilled agricultural and fishery workers	0.04	0.00	0.04	0.05
7. Craft and related trades workers	0.11	0.01	0.10	0.12
8. Plant and machine operater assemblers	0.02	0.00	0.02	0.03
9. Elementary occupations	0.05	0.00	0.04	0.06

Source: Swiss Household Panel 2004.

Notes: Data are weighted; all mean values are calculated based on $N = 4,008$.

Table 10: Extended model: Standard and IV ordered probit results

	Standard	IV 3-digit at t	IV 2-digit at t	IV 4-digit at $t-1$	IV 3-digit at $t-1$	IV 2-digit at $t-1$
Without both unemployment and job indicators						
S_j^e: Share of early foreigners	-1.112**	-1.346**	-1.791**	-1.202**	-1.463**	-1.812**
	(0.163)	(0.188)	(0.237)	(0.173)	(0.194)	(0.239)
S_j^r: Share of recent foreigners	0.997**	1.436**	2.416**	1.105**	1.634**	2.489**
	(0.212)	(0.257)	(0.346)	(0.233)	(0.275)	(0.370)
Observations	23,104	23,104	23,104	22,973	22,973	22,973
Percentage correctly predicted	68.99%	68.89%	68.74%	69.00%	68.91%	68.74%
Test for joint significance of the excluded instruments in the first stage						
$> F$ statistic (dep. var. $= S_j^e$)		2777.56**	323.65**	3670.60**	1706.92**	302.16**
$> F$ statistic (dep. var. $= S_j^r$)		474.13**	178.31**	1484.97**	385.99**	139.89**
With unemployment only						
S_j^e: Share of early foreigners	-0.968**	-1.208**	-1.672**	-1.061**	-1.320**	-1.681**
	(0.160)	(0.190)	(0.254)	(0.172)	(0.197)	(0.257)
S_j^r: Share of recent foreigners	1.044**	1.478**	2.356**	1.164**	1.675**	2.430**
	(0.211)	(0.253)	(0.337)	(0.233)	(0.271)	(0.358)
U_j: Occ. unemployment rate	-1.347**	-1.231**	-1.047*	-1.311**	-1.215**	-1.120**
	(0.468)	(0.476)	(0.538)	(0.475)	(0.484)	(0.548)
Observations	23,104	23,104	23,104	22,973	22,973	22,973
Percentage correctly predicted	68.93%	68.99%	68.72%	69.00%	68.92%	68.75%
Test for joint significance of the excluded instruments in the first stage						
$> F$ statistic (dep. var. $= S_j^e$)		1696.26**	231.42**	2963.34**	1123.70**	210.38**
$> F$ statistic (dep. var. $= S_j^r$)		457.44**	203.00**	1470.03**	363.19**	165.59**
With both unemployment and job indicators						
S_j^e: Share of early foreigners	-0.341	-0.165	-0.392	-0.405	-0.401	-0.472
	(0.222)	(0.349)	(0.665)	(0.266)	(0.400)	(0.775)
S_j^r: Share of recent foreigner	-0.124	0.004	0.997*	-0.157	0.169	0.938
	(0.240)	(0.314)	(0.602)	(0.280)	(0.343)	(0.706)
U_j: Occ. unemployment rate	-0.363	-0.477	-0.693	-0.317	-0.428	-0.646
	(0.478)	(0.486)	(0.569)	(0.485)	(0.495)	(0.594)
Observations	23,104	23,104	23,104	22,973	22,973	22,973
Percentage correctly predicted	69.07%	69.01%	69.04%	69.11%	69.09%	69.11%
Test for joint significance of the excluded instruments in the first stage						
$> F$ statistic (dep. var. $= S_j^e$)		279.67**	72.20**	679.17**	159.43**	43.53**
$> F$ statistic (dep. var. $= S_j^r$)		209.71**	102.56**	694.30**	147.64**	67.12**

Source: Swiss Household Panel 2004-2009, data are unweighted.
Notes: Coefficient estimates, robust SE in parentheses (clustered by occupation and year), ** p<0.05, * p<0.10. y: positive attitudes towards equal opportunity for foreigners. All specifications include control variables and proxies for values/beliefs together with canton, sample and year dummies. Recent foreigners are defined as those holding a B/L-permit. The occupational unemployment rate calculated at the 4-digit ISCO level. *Job indicators*: occupational means, working conditions and 1-digit ISCO-88 code. Occupational means calculated at the 4-digit ISCO level. See Table 7 in the appendix for a list of variables included. *Instruments*: share of current foreigners in more aggregated levels of occupation (at the 3- or 2-digit level) and share of previous foreigners in occupations at the 4-, 3- or 2-digit level. The null hypothesis of weak instruments is always rejected using the F test on excluded instruments.