

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 relative share of recently arrived foreigners and positive 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. Controlling for occupational characteristics further establishes that the negative association in (a) is probably caused by sorting on job quality and is unrelated to labour market competition. Regarding the positive association in (b), the quality sorting explanation is partially supported, suggesting that the immigrant-native complementarity also plays a role. All results are robust to potential self-selection of Swiss workers with negative attitudes into occupations with few foreigners and also to the endogenous allocation of foreigners into particular segmented labour markets.

Keywords: Immigration, attitudes towards foreigners, labour market, occupational classification, ethnic concentration, 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. 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, 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, 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). The different contributions seek to refine, extend, even refute this basic model with various success.

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 highly-skilled and low-skilled workers in many existing studies renders these unable to make 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 job characteristics are controlled for, it appears that anti-foreigner attitudes are caused by sorting on job quality while Swiss workers are still more likely to favour immigrants when there is a significant labour shortage within their occupation.

2 Attitudes toward 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,

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).

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 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. 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. $R_{j(i)}$ 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 . A derived measure is $\tilde{R}_{j(i)}$: the relative share of foreigners who have recently arrived in the country, with a corresponding regression coefficient of $\tilde{\alpha}$.

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).

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 more negative attitudes towards foreigners, formally: $\alpha < 0$.

Hypothesis 1B

Even with a focus on labour market segments, not all foreign workers constitute unwanted competition: In segments where immigrant and native skills are complementary, foreign workers do not constitute competitors. This is particularly relevant in sectors with labour shortage, in which case employers frequently resort to immigrant workers. We assume that the relative 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 (relative to all foreign workers) is beneficial for the native workers, and attitudes are expected to be positive. Formally, we expect $\tilde{\alpha} > 0$.

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 interper-

sonal 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 are probably biased downwards while estimates of $\tilde{\alpha}$ are likely to be biased upwards.

The second 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. Thus 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. As a result, wages vary with the racial density of occupations but density may not be a causal determinant of individual wages.

Hypothesis 2

The demographic composition of an occupation can serve as a proxy for (uncontrolled) 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 attitude-ethnic composition relationship. If foreigners but not Swiss workers are crowded into low-paying occupations because of past or present discriminatory barriers due to the Swiss immigration policy, then the ethnic composition of a job becomes an index of labour quality for Swiss workers. That is, 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 since 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, it includes an additional sample of 15,000 immigrant individuals, 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 since 2004. 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 (see Table 7). Given the high attrition among selected individuals over time, mainly the wave in 2004 is considered for analysis. We demonstrate below that our results are robust to the case where a pooled sample from 2004 to 2009 is retained.

4.2 Analytical Approach

Our modelling strategy is built on Dustmann and Preston (2001) who studied the relationship between attitudes 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:

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

where y_i^* is the unobserved latent variable for positive attitudes towards foreigners of individual i , $R_{j(i)}$ the occupational composition of foreigners, \mathbf{X}_i a vector of observed personal characteristics that includes a constant term, levels of actual education, a dummy for gender, age, age squared, canton and sample dummies. A full description of these variables can be found in Table 8 in the appendix.

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 the relative occupational concentration of recently arrived foreigners, denoted $\tilde{R}_{j(i)}$, is added to the

baseline model:

$$y_i^* = \alpha R_{j(i)} + \tilde{\alpha} \tilde{R}_{j(i)} + \mathbf{X}_i \boldsymbol{\beta} + \epsilon_i. \quad (2)$$

$\tilde{R}_{j(i)}$ corresponds to the share of those having a B-permit (i.e. a residence permit, renewable yearly, as opposed to permanent residence) among the foreign worker population by occupation j . Given that residence permits in Switzerland are generally granted to immigrants with a valid employment contract, accounting for the relative 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 Some stylized facts

Table 1: The top 10 occupations according to average share of the foreign worker population

Ranking		% foreigners	% compulsory	% tertiary	% unemployed
1.	Insulation workers	0.83	0.56	0.09	0.08
2.	Mining and construction labourers (nec)	0.78	0.55	0.03	0.03
3.	Welders and flamecutters	0.67	0.60	0.10	0.12
4.	Plasterers	0.64	0.43	0.04	0.10
5.	Metal wheel-grinders, polishers and tool sharpeners	0.61	0.51	0.00	0.09
6.	Helpers and cleaners in offices, hotels and other establishments	0.57	0.62	0.08	0.08
7.	Physicists and astronomers	0.56	0.00	0.97	0.00
8.	Biologists, botanists, zoologists and related professionals	0.53	0.00	0.96	0.07
9.	Bricklayers and stonemasons	0.53	0.38	0.09	0.03
10.	Cooks	0.52	0.35	0.11	0.07

Source: Swiss Labour Force Survey 2004, data are weighted.

Notes: ISCO-88 classification disaggregated at the 4-digit level. % foreigners: average share of the foreign worker population. % compulsory: average percentage of compulsory-educated workers. % tertiary: average percentage of tertiary-educated workers. % unemployed: average rate of unemployed workers. $\text{Corr}(\% \text{ foreigners}, \% \text{ compulsory}) = 0.62$; $\text{Corr}(\% \text{ foreigners}, \% \text{ tertiary}) = -0.18$; $\text{Corr}(\% \text{ foreigners}, \% \text{ unemployed}) = 0.43$.

Table 2: The top 10 occupations according to average relative share of B-permit holders among the foreign worker population

Ranking		rel. % B-permit	% compulsory	% tertiary	% unemployed
1.	Locomotive-engine drivers	1.00	0.04	0.09	0.03
2.	Biologists, botanists, zoologists and related professionals	0.85	0.00	0.96	0.07
3.	Other teaching professionals (nec)	0.81	0.00	0.72	0.01
4.	Physicists and astronomers	0.77	0.00	0.97	0.00
5.	Athletes, sportspersons and related associate professionals	0.73	0.12	0.44	0.05
6.	Medical doctors	0.71	0.00	0.97	0.02
7.	Dentists	0.70	0.00	0.98	0.00
8.	Chemists	0.68	0.02	0.92	0.02
9.	Lawyers	0.64	0.00	0.98	0.02
10.	Accountants	0.61	0.02	0.70	0.01

Source: Swiss Labour Force Survey 2004, data are weighted.

Notes: ISCO-88 classification disaggregated at the 4-digit level. rel. % B-permit: average relative share of recent foreigners. % compulsory: average percentage of compulsory-educated workers. % tertiary: average percentage of tertiary-educated workers. % unemployed: average rate of unemployed workers. $\text{Corr}(\text{rel. } \% \text{ B-permit}, \% \text{ compulsory}) = -0.32$; $\text{Corr}(\text{rel. } \% \text{ B-permit}, \% \text{ tertiary}) = 0.57$; $\text{Corr}(\text{rel. } \% \text{ B-permit}, \% \text{ unemployed}) = -0.24$.

5.2 Negative Attitudes with More Foreigners

Estimation results from equation (1), presented in Table 3, indicate that working in occupations with a higher share of foreigners (R_j) is associated with more negative attitudes. An increase in the occupational concentration of foreigners of ten percentage points reduces the probability of positive attitudes by at least 3 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 3: Baseline model: Ordered probit results

	Coefficients	Marginal Effects		
		$y = 1$	$y = 2$	$y = 3$
R_j : Share of foreigners	-0.887** (0.190)	0.307** (0.066)	0.032** (0.007)	-0.339** (0.073)
Control variables	yes			
Canton and sample dummies	yes			
Observations	4,008			
Percentage correctly predicted	63.4%			

Source: Swiss Household Panel 2004, data are weighted.

Notes: Linearized standard errors in parentheses, ** $p < 0.05$, * $p < 0.10$. y : positive attitudes towards equal opportunity for foreigners. See Table 8 in the appendix for a list of control variables included.

5.3 Positive Attitudes with More *Recent* Foreigners

Table 4 presents the ordered probit estimates of the extended model (equation (2)). The model is identical to that presented in Table 3, but includes a variable with the relative share of recently arrived foreigners in each occupation considered (\tilde{R}_j). Shown in the table are results where recent foreigners are those having a B-permit, but equivalent results can be obtained with different definitions of what ‘recent’ stands for (i.e. arrived in the past 5 years), as outlined in the appendix.

The results for the occupational share of foreigners in the first row of Table 4 are broadly similar to those presented in Table 3: the larger the share of foreigners in their 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 foreigners), attitudes towards foreigners are relatively more positive. We argue that these are occupations with labour shortages. A ten percentage points increase in the relative share of recent foreigners raises the probability of positive attitudes by about 3.5 percentage points. This finding confirms 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 4: Extended model: Ordered probit results

	Coefficients	Marginal Effects		
		$y = 1$	$y = 2$	$y = 3$
R_j : Share of foreigners	-1.016** (0.192)	0.351** (0.066)	0.037** (0.008)	-0.388** (0.073)
\tilde{R}_j : Relative share of recent foreigners	0.913** (0.154)	-0.316** (0.053)	-0.034** (0.006)	0.349** (0.059)
Control variables	yes			
Canton and sample dummies	yes			
Observations	4,008			
Percentage correctly predicted	63.7%			

Source: Swiss Household Panel 2004, data are weighted.

Notes: Linearized standard errors in parentheses, ** $p < 0.05$, * $p < 0.10$. y : positive attitudes towards equal opportunity for foreigners. Recent foreigners are defined as those holding a B-permit; results are qualitatively similar when recent foreigners are defined as those arrived in the past 5 years (see Table 12 in the appendix). Models including an interaction between R_j and \tilde{R}_j reveal that such interaction is not significant at a level of 10% (see Table 13 in the appendix). See Table 8 in the appendix for a list of control variables included.

5.4 Sorting on Occupational Quality?

When indicators of job skills/indicators are added to the extended model, however, the negative effect of foreigners' occupational concentration on positive attitudes outlined in Table 4 is no more significant (see Table 5). In other words, the quality sorting explanation is supported, i.e. less positive attitudes seem to be caused by a sorting of Swiss workers in low-quality jobs. Note that the relative concentration of recent foreigners by occupation has still a positive effect on positive attitudes. That is, the quality sorting explanation is partially supported, suggesting that the complementarity of immigrant and native workers in the labour market also plays a role.

Table 5: Adding job indicators to the extended model: Ordered probit results

	<i>Previous estimates</i>		<i>With job indicators</i>	
	Coeff	ME	Coeff	ME
	for $y = 3$		for $y = 3$	
R_j : Share of foreigners	-1.016**	-0.388**	-0.533	-0.203
	(0.192)	(0.073)	(0.356)	(0.136)
\tilde{R}_j : Relative share of recent foreigners	0.913**	0.349**	0.353*	0.135*
	(0.154)	(0.059)	(0.192)	(0.073)
Control variables	yes		yes	
Canton and sample dummies	yes		yes	
Job indicators	no		yes	
Observations	4,008		4,008	
Percentage correctly predicted	63.7%		63.8%	

Source: Swiss Household Panel 2004, data are weighted.

Notes: Linearized standard errors in parentheses, ** $p < 0.05$, * $p < 0.10$. y : positive attitudes towards equal opportunity for foreigners. Recent foreigners are defined as those holding a B-permit; results are qualitatively similar when recent foreigners are defined as those arrived in the past 5 years (see the first column of Table 14 in the appendix).

Job indicators: occupational means of the control variables, working conditions (stress, noise/dirtiness, tiring posture, computer use) and dummies for 1-digit ISCO-88 code. Occupational means for the control variables calculated at the 4-digit ISCO level. See Table 8 in the appendix for a list of control 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 effects 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 main 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 3 to Table 5). As expected, some standard errors are somewhat 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 6: 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 job indicators						
R_j : Share of foreigners	-1.016** (0.192)	-1.127** (0.212)	-0.745** (0.320)	-0.976** (0.195)	-1.093** (0.216)	-0.693** (0.320)
\tilde{R}_j : Relative share of recent foreigners	0.913** (0.154)	1.351** (0.178)	1.687** (0.217)	1.320** (0.173)	1.743** (0.202)	1.754** (0.218)
Percentage correctly predicted	63.7%	63.7%	63.6%	64.0%	68.6%	63.5%
Test for joint significance of the excluded instruments in the first stage						
> F statistic (dep. var. = R_j)		4282.3**	593.8**	4538.2**	368.1**	58.2**
> F statistic (dep. var. = \tilde{R}_j)		6667.8**	1984.7**	870.6**	505.6**	268.9**
With job indicators						
R_j : Share of foreigners	-0.533 (0.356)	-0.726 (0.544)	2.524 (1.782)	-0.389 (0.387)	-0.898 (0.581)	2.684 (1.778)
\tilde{R}_j : Relative share of recent foreigners	0.353* (0.192)	0.553** (0.277)	1.381** (0.410)	0.532** (0.243)	0.845** (0.357)	1.361** (0.434)
Percentage correctly predicted	63.8%	63.9%	63.3%	63.8%	63.9%	63.2%
Test for joint significance of the excluded instruments in the first stage						
> F statistic (dep. var. = R_j)		368.1**	58.2**	4538.2**	368.1**	58.2**
> F statistic (dep. var. = \tilde{R}_j)		505.6**	268.9**	870.6**	505.6**	268.9**

Source: Swiss Household Panel 2004, data are weighted.

Notes: Coefficient estimates, linearized standard errors in parentheses, ** $p < 0.05$, * $p < 0.10$. $N = 4,008$. y : positive attitudes towards equal opportunity for foreigners. All specifications include control variables together with canton and sample dummies. Recent foreigners are defined as those holding a B-permit; results are qualitatively similar when recent foreigners are defined as those arrived in the past 5 years (see Table 14 in the appendix). *Job indicators*: occupational means, working conditions and 1-digit ISCO-88 code. Occupational means calculated at the 4-digit ISCO level. *Instruments*: (relative) share of current foreigners in more aggregated levels of occupation (at the 3- or 2-digit level) and (relative) 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. See Table 8 in the appendix for a list of control variables included.

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 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 all foreigners is higher. On the other hand, in occupations where the relative share of recent foreigners is higher – we assume due to labour shortages – attitudes towards foreigners are more positive. These findings tend to support

the view that labour force competition influence attitudes towards foreigners. However, since ethnic concentration serves as a proxy for unmeasured job characteristics, the main mechanism at work has little to do with labour market competition and instead can be better described by a sorting of Swiss workers into lower- or higher-quality jobs.

Despite what some contributions seem to suggest, this paper demonstrated that both the quality sorting explanation and the immigrant-native complementarity play some 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 cultural threat well-established in the literature. 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: Employed individuals from 2004 retained in the empirical analysis

Selection criteria	No. of i	%
Individual interview completed	5,537	100.0
Swiss of at least 18 years old	4,808	86.8
Valid information on attitudes towards foreigners	4,618	83.4
Valid information on occupational category	4,541	82.0
4-digit occupation cell with at least 10 individuals	4,277	77.2
4-digit occupation cell with at least 30 individuals	4,011	72.4
Valid information on cross-sectional individual weights	4,008	72.4

Source : Swiss Household Panel 2004, data are unweighted.

Note : Individuals who reported being unemployed or out of the labour force are excluded.

Table 8: 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 <i>Upper secondary</i> Tertiary	×
Share of foreign citizens by level of occupation (R_j)	Gender <i>Male</i> <i>Female</i>	×
Share of recent foreigners among the foreign worker population by level of occupation (\tilde{R}_j)	Canton of residence <i>1 (AG Argovia)</i> ... <i>26 (ZH Zurich)</i>	×
	Sample <i>SHP_I</i> <i>SHP_II</i>	×
Adding job indicators		
Share of women by level of occupation	Working conditions: stress <i>yes</i> <i>no</i>	×
Average age by level of occupation	Working conditions: noise/dirtiness <i>yes</i> <i>no</i>	×
Average age squared by level of occupation	Working conditions: tiring posture <i>yes</i> <i>no</i>	×
Share of compulsory-educated by level of occupation	Working conditions: computer use <i>yes</i> <i>no</i>	×
Share of tertiary-educated by level of occupation	1-digit ISCO-88 code <i>1 (Legislators, senior officials, managers)</i> ... <i>9 (Elementary occupations)</i>	×

Notes: Occupation disaggregated at the 4-digit level. Recent foreigners can be defined as those holding a B-permit or arrived in the past 5 years.

Table 9: 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 10: Summary statistics for 2004

Variables	Mean	Linearized S.E.	95% C.I.	
			Lower	Upper
<i>Attitudes towards foreigners</i>				
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
R_j : Share of foreigners	0.19	0.00	0.19	0.19
\tilde{R}_{1j} : Relative share of foreigners with a B-permit	0.29	0.00	0.28	0.30
\tilde{R}_{2j} : Relative share of foreigners arrived in the past 5 years	0.25	0.00	0.24	0.25
<i>Levels of education</i>				
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
<i>Canton of residence</i>				
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
<i>1-digit ISCO-88 code</i>				
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. Clerks	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 operator 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 11: The top 10 occupations according to average relative share of foreigners arrived in the past 5 years among the foreign worker population

Ranking		rel. % <5-years	% compulsory	% tertiary	% unemployed
1.	Locomotive-engine drivers	1.00	0.04	0.09	0.03
2.	Physicists and astronomers	0.70	0.00	0.97	0.00
3.	Biologists, botanists, zoologists and related professionals	0.69	0.00	0.96	0.07
4.	Other teaching professionals (nec)	0.67	0.00	0.72	0.01
5.	Medical doctors	0.66	0.00	0.97	0.02
6.	Lawyers	0.64	0.00	0.98	0.02
7.	Primary education teaching associate professionals	0.61	0.01	0.21	0.01
8.	Accountants	0.60	0.02	0.70	0.01
9.	Librarians and related information professionals	0.60	0.05	0.40	0.02
10.	Chemists	0.57	0.02	0.92	0.02

Source: Swiss Labour Force Survey 2004, data are weighted.

Notes: ISCO-88 classification disaggregated at the 4-digit level. rel. % 5<-years: average relative share of recent foreigners. % compulsory: average percentage of compulsory-educated workers. % tertiary: average percentage of tertiary-educated workers. % unemployed: average rate of unemployed workers. Corr(rel. % 5<-years,% compulsory) = -0.38; Corr(rel. % 5<-years,% tertiary) = 0.57; Corr(rel. % 5<-years,% unemployed) = -0.31.

Table 12: Extended model: Ordered probit results

	Coefficients	Marginal Effects		
		$y = 1$	$y = 2$	$y = 3$
R_j : Share of foreigners	-0.813** (0.192)	0.281** (0.066)	0.030** (0.007)	-0.311** (0.073)
\tilde{R}_j : Relative share of recent foreigners	0.818** (0.157)	-0.283** (0.054)	-0.030** (0.006)	0.313** (0.060)
Control variables	yes			
Canton and sample dummies	yes			
Observations	4,008			
Percentage correctly predicted	63.9%			

Source: Swiss Household Panel 2004, data are weighted.

Notes: Linearized standard errors in parentheses, ** 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. See Table 8 in the appendix for a list of control variables included.

Table 13: Adding interactions between R_j and \tilde{R}_j : Ordered probit results

	Coefficient Estimates	
R_j : Share of foreigners	-0.952** (0.384)	-0.936** (0.347)
\tilde{R}_{1j} : Relative share of foreigners with a B-permit	0.954** (0.271)	
$R_j \times \tilde{R}_{1j}$	-0.224 (1.167)	
\tilde{R}_{2j} : Relative share of foreigners arrived in the past 5 years		0.725** (0.267)
$R_j \times \tilde{R}_{2j}$		0.554 (1.236)
Control variables	yes	yes
Canton and sample dummies	yes	yes
Observations	4,008	4,008
Percentage correctly predicted	63.8%	63.6%

Source: Swiss Household Panel 2004, data are weighted.

Notes: Linearized standard errors in parentheses, ** $p < 0.05$, * $p < 0.10$. y : positive attitudes towards equal opportunity for foreigners. See Table 8 in the appendix for a list of control variables included.

Table 14: 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 job indicators						
R_j : Share of foreigners	-0.813** (0.192)	-0.848** (0.217)	-0.164 (0.348)	-0.622** (0.199)	-0.582** (0.227)	-0.048 (0.351)
\tilde{R}_j : Relative share of recent foreigners	0.818** (0.157)	1.124** (0.180)	1.749** (0.226)	1.483** (0.193)	1.918** (0.219)	1.855** (0.238)
Percentage correctly predicted	63.7%	63.8%	63.0%	63.5%	63.1%	62.9%
Test for joint significance of the excluded instruments in the first stage						
> F statistic (dep. var. = R_j)		4077.4**	586.1**	4521.5**	369.1**	54.2**
> F statistic (dep. var. = \tilde{R}_j)		8658.4**	2086.1**	462.5**	347.8**	214.4**
With job indicators						
R_j : Share of foreigners	-0.442 (0.349)	-0.574 (0.536)	2.780 (1.823)	-0.282 (0.382)	-0.718 (0.574)	2.119 (1.694)
\tilde{R}_j : Relative share of recent foreigners	0.280 (0.196)	0.271 (0.260)	1.336** (0.422)	0.612** (0.281)	1.002** (0.397)	0.875** (0.431)
Percentage correctly predicted	63.7%	63.7%	63.3%	63.8%	63.5%	63.8%
Test for joint significance of the excluded instruments in the first stage						
> F statistic (dep. var. = R_j)		372.6**	72.9**	4521.5**	369.1**	54.2**
> F statistic (dep. var. = \tilde{R}_j)		1915.3**	388.6**	462.5**	347.8**	214.4**

Source: Swiss Household Panel 2004, data are weighted.

Notes: Coefficient estimates, linearized standard errors in parentheses, ** $p < 0.05$, * $p < 0.10$. $N = 4,008$. y : positive attitudes towards equal opportunity for foreigners. All specifications include control variables together with canton and sample dummies. Recent foreigners are defined as those arrived in the past 5 years. *Job indicators*: occupational means, working conditions and 1-digit ISCO-88 code. Occupational means calculated at the 4-digit ISCO level. *Instruments*: (relative) share of current foreigners in more aggregated levels of occupation (at the 3- or 2-digit level) and (relative) 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. See Table 8 in the appendix for a list of control variables included.