



# Do concerns about labor market competition shape attitudes toward immigration? New evidence☆



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## ABSTRACT

Are concerns about labor market competition a powerful source of anti-immigrant sentiment? Several prominent studies have examined survey data on voters and concluded that fears about the negative effects of immigration on wages and employment play a major role generating anti-immigrant attitudes. We examine new data from a targeted survey of U.S. employees in 12 different industries. In contrast with previous studies, the findings indicate that fears about labor market competition do not appear to have substantial effects on attitudes toward immigration, and preferences with regard to immigration policy, among this large and diverse set of voters.

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## 1. Introduction

Are concerns about labor market competition a powerful source of anti-immigrant sentiment? Several prominent studies have examined survey data on voters and concluded that fears about the negative effects of immigration on wages and employment play a major role in generating anti-immigrant attitudes (Scheve and Slaughter, 2001; Mayda, 2006). The core claim made in these studies is that, to a large degree, voters form attitudes about immigration based upon expectations about the labor market impacts of immigration.

The conclusions drawn in these previous studies are not obvious, since the main theoretical models used to study the impact of immigration generate divergent predictions about its likely effects on the wages and employment of native workers, predictions that depend upon certain assumptions and parameter values. Empirical research on the labor market impacts of past immigration flows into the American and European labor markets has also produced ambiguous estimates that

vary in terms of both magnitude and direction of the effects of such flows on the income and employment of native workers. Examining voter attitudes toward immigration may help inform the debates about the issue while also improving our understanding of public opposition to immigration.

An important constraint hampering studies examining voter attitudes toward immigration is that most opinion surveys are blunt instruments that fail to gather detailed data on the economic characteristics of the respondents and their views about specific types of immigrants. In particular, the most prominent (and frequently used) surveys ask few or no questions about respondents' employment experience, job training, and willingness and ability to find new jobs, and rarely identify the specific industries in which respondents are employed. In addition, these surveys ask respondents to describe their attitudes toward immigration in general, without allowing for any differentiation in their views about specific types of immigrants (e.g., high-skilled versus low-skilled), types which may be associated with different expectations about labor market impacts. Lastly, these surveys are typically quite limited in sample size and therefore do not provide sizable samples of workers in different industries. As a consequence of these data constraints, previous studies that examine the importance of concerns about labor market competition in shaping anti-immigrant sentiments have been limited to the application of fairly crude and indirect tests.

We address several of these data constraints by conducting a large targeted survey of current employees in 12 industries in the United States. We examine potential relationships between the skill levels, industry locations, occupations, and mobility of these individual

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employees and their attitudes toward different types of immigrants. In contrast with previous studies, our tests indicate that fears about labor market competition do not have substantial effects on voter attitudes toward immigration.

Specifically, we find no evidence that individuals are systematically more likely to oppose the immigration of workers that possess skills similar to their own. Rather, workers of all types express greater support for inflows of high-skilled rather than low-skilled immigrants. This preference is evident among respondents in almost all segments of the labor force that one compares, including both high and low skilled workers. While support for immigration does vary across industries, this variation is mostly explained by individual characteristics of respondents rather than by features of the industries such as their skill-intensity of production, the degree to which the industries rely upon immigrant labor in general, or upon high-skilled or low-skilled immigrants in particular.

We replicate all our main results based on stated attitudes toward immigration among survey respondents using a new, quasi-behavioral measure of the willingness of survey respondents to sign up to have an email message about their views on immigration policy sent on their behalf to their Member of Congress (which includes the respondent's name and city). The results from the analysis using this quasi-behavioral measure of attitudes confirm the main conclusions. Overall, the results indicate that fears about labor market competition do not appear to be powerful determinants of anti-immigrant sentiment.

Our results indicate that high-skilled immigrants are preferred over low-skilled immigrants by all types of native workers and support for both high-skilled and low-skilled immigration is strongly increasing in natives' skill levels (measured by educational attainment). These results seem broadly consistent with accounts that emphasize how non-economic concerns among voters – e.g., those associated with ethnocentrism or sociotropic considerations about the effects of immigration on the country as a whole – shape the attitudes of voters toward immigration. We discuss these accounts in the concluding section, noting that our survey experiment was not designed to provide direct tests of these alternative arguments.

## 2. Labor market competition and immigration

A large literature on attitudes toward immigration attributes anti-immigrant sentiments to a range of sources, including concerns about negative cultural, social, and economic effects among voters (for a review see Hainmueller and Hopkins (2014a)). Several prominent studies have recently emphasized considerations involving material self-interest, and in particular, people's concerns about immigrants threatening their earning capacities and employment opportunities (Scheve and Slaughter, 2001; Mayda, 2006). According to these accounts, individuals are substantially more opposed to immigration the more they perceive the incoming immigrants as harming their own earning prospects, and these material concerns play an important role in shaping general attitudes toward immigration policy. This claim, while *ex ante* plausible, raises the question of what underlies assessments of the labor market impacts of immigration.

### 2.1. Theoretical models

Standard theoretical models of the labor market effects of immigration focus on the impact that immigration has on relative supplies of factors of production in the local economy. These models generally predict that immigration has negligible or ambiguous effects on the wages and employment of most native workers, although there is an ongoing debate (Friedberg and Hunt, 1995; Gaston and Nelson, 2000).

Closed-economy models predict the largest impacts of immigration for native workers. In these models immigrants simply price themselves into employment by lowering the wages of native workers with similar

skills.<sup>1</sup> The simplest of these types of models are sometimes referred to as “factor-proportions” (FP) analysis. In addition to the closed-economy restriction, these models also assume that immigrants are perfect substitutes for native workers in each skill category defined by education and experience (Borjas, 1997, 1999, 2003, 2006a). This model renders the distributive effects of immigrants in the starkest possible terms: immigration generates negative wage effects for similarly skilled natives, while natives with different skills benefit due to complementarities.

If we relax the assumption of perfect substitutability between immigrants and native workers, however, the predictions become more ambiguous, even in this closed-economy approach. Ottaviano and Peri (2012) develop a closed-economy model with labor – differentiated by education, age, and place of birth – as an input in a nested aggregate production function. Given a high degree of substitutability between immigrants and natives, immigrants mostly depress the demand for natives in any specific education-age group and augment the demand for natives in other skill groups; at low levels of substitutability, however, immigrants in a specific education-age category have a negligible effect on the demand for similarly skilled natives while still increasing the demand for natives with dissimilar skills. If the elasticity of substitution between immigrants and native workers is higher within some particular skill groups than others, the negative effects of immigration on wages of natives should be larger in those groups than among others (Orrenius and Zavodny, 2007).<sup>2</sup>

In an open-economy Heckscher–Ohlin (HO) model, trade offsets the impact of immigration as the economy adjusts to any change in factor supplies by importing less of the goods that can now be produced locally at a lower cost (in line with the Rybczynski theorem). Wages will not change at all as long as the economy is not so large that a change in its output mix affects world prices – a result known as “factor price insensitivity” (Leamer and Levinsohn, 1995). This result holds for any number of factors ( $n$ ) used in the production of any number of traded commodities ( $m$ ), and allowing for production of any number of non-traded commodities (as long as  $n \leq m$ ). The fixity of the prices of traded goods pins down the prices of the factors and non-traded goods. The HO model's basic prediction is that immigration has negligible effects on wages of local workers.<sup>3</sup>

The HO model assumes that factors of production are mobile between local industries. The open-economy “specific factors” (SF) model assumes instead that some factors ( $n > m$ ) are employable only in specific industries (Jones, 1971). If each good is produced using human capital (high-skilled labor) specific to it, along with low-skilled

<sup>1</sup> The simplest models assume full employment and wage flexibility, so that the distributional effects are reflected in wages. Relaxing these assumptions allows that the effects of immigration can take the form of changes in local unemployment rates (Razin and Sadka, 1995; Angrist and Kugler, 2003). More complex models also allow for geographic differences within national labor markets so that the wage and employment effects of immigration may be concentrated in the short-term in “gateway communities” where immigrants tend to settle in large numbers and may be dissipated over time by internal migration of workers to other communities (Card and DiNardo, 2000; Card, 2001; Borjas, 1999).

<sup>2</sup> Orrenius and Zavodny (2007) hypothesize that the elasticity of substitution may be greater among unskilled workers than among skilled workers, as the need for native language proficiency, institutional knowledge, and professional licenses may make it difficult for employers to substitute immigrants for native workers in higher skill categories. Peri and Sparber (2009) argue just the opposite: that is, since immigrants with low levels of education tend to have less native language proficiency and institutional knowledge, they tend to specialize more in manual-intensive tasks than do natives; college-educated immigrants, on the other hand, are more likely to be proficient in the native language and thus similar to native workers. Evidence provided by Ottaviano and Peri (2012) suggests that the latter view is more accurate (see discussion below).

<sup>3</sup> There are two possible (seemingly exceptional) sets of conditions under which the HO model anticipates concerns among natives about labor market competition due to immigration. If the local economy is exceptionally large relative to the rest of the world, a change in its output mix brought about by inflows of immigrants could alter world prices of traded goods and thereby reduce the real wages of some native workers. Alternatively, factor price insensitivity could also be upset if we allow that the country specializes in producing a limited set of traded goods, and if immigration is large enough to induce a change in the set of goods produced locally, eliminating entire industries.

labor that is mobile between industries, and if all goods are traded so that prices are fixed in world markets, then immigration has effects on real wages for natives. Inflows of low-skilled labor will lower real wages for low-skilled natives while raising real wages for high-skilled natives of *all* types—and these latter wage gains are increasing in the low-skilled labor intensity of the high-skilled native's industry. Meanwhile, inflows of any type of high-skilled labor will raise real wages of low-skilled natives while reducing real wages of *all* high-skilled natives—again, the latter wage losses are increasing in the low-skilled labor intensity of the industry of the high-skilled native.<sup>4</sup>

The SF model predicts that real wages of high (low)-skilled local workers will rise with inflows of low (high)-skilled immigrants. Local workers should fear competition effects from immigrants with similar skill levels, but they can anticipate positive effects when immigrants have different skill levels. This basic result approximates the simple prediction in the one-commodity, closed-economy FP model, which may now be regarded as a special case. In the multiple-commodity, open-economy SF model, the anticipated real wage effects vary in magnitude in a systematic fashion among the high-skilled depending upon factor-intensities in their industries. In particular, high-skilled natives should be more (less) concerned about inflows of high-skilled immigrants if they are in industries that use low-skilled labor more (less) intensively. Unlike the general insensitivity result in the HO model, however, these distributional effects in the SF model are compromised once we allow for non-traded goods and the predicted wage effects become ambiguous without further restrictions.<sup>5</sup>

Overall, the prevailing models allow for a range of different predictions about the effects of immigration on the wages and employment of native workers. It is also important to note that virtually all of the models of immigration described above are “partial” equilibrium models in that they treat capital endowments as fixed. If we consider immigration as a component in the growth of the labor supply in a dynamic model of the economy, the impact on wages over the long term will depend on the rate of capital accumulation (Bhagwati, 2002). Investors can respond to any changes in the marginal productivity of capital caused by immigration flows. Ottaviano and Peri (2012) allow that capital stocks adjust to immigration to maintain a constant real return in their closed-economy model and show that this adjustment mitigates negative impacts of immigration on wages.<sup>6</sup>

## 2.2. Research on labor market impacts and voter attitudes

Empirical research on the labor market impacts of immigration flows into European and American labor markets has generated a variety of contrasting findings.<sup>7</sup> Some studies report evidence of substantial adverse wage and employment effects for local workers as a consequence of immigration (Borjas et al., 1996; Borjas, 1997, 1999, 2003, 2006b), but many other studies conclude that the impacts of immigration are fleetingly small (Card, 1990, 2001, 2005, 2007; Lewis, 2005), and some studies even report overall positive long-term effects for local workers Ottaviano and Peri (2012).

Meanwhile, several studies using public opinion data have reported finding strong evidence that concerns about labor market competition are a major determinant of attitudes toward immigration among voters.

Most prominently, perhaps, Scheve and Slaughter (2001) drew upon data from the National Election Studies (NES) surveys of U.S. voters in the 1990s and highlighted the positive correlation between the skill levels of respondents (as measured by education levels) and their support for immigration. Scheve and Slaughter interpreted this correlation as evidence that low skilled (less educated) local workers feared being forced to compete for jobs with low skilled immigrants, in line with predictions from a simple FP model. More recently Mayda (2006) examined cross-national survey data from the 1995 National Identity Module of the International Social Survey Programme (ISSP), as well as data collected between 1995 and 1997 by the World Value Survey (WVS). Mayda contends that the correlation between individual skill and support for immigration is related to the skill composition of the immigrants relative to the natives in the destination country; support for immigration among skilled workers is highest in those countries where natives are more skilled relative to immigrants and thus stand to benefit more in material terms from immigration compared to skilled workers elsewhere. Again, the empirical relationship between the proxies of individual skill (measured by education or by categories of occupational skills) and support for immigration is seen as consistent with predictions from a simple FP model and interpreted as confirmation that natives' concerns about labor market competition play “a key and robust role in preference formation over immigration policy” (Mayda, 2006, p. 526).

These studies are novel attempts to use survey data to link theoretical claims about the labor market impact of immigration to people's views about immigration policy. Yet these studies are constrained in important ways by the data available from existing opinion surveys, which tend to be quite blunt instruments. The surveys used in these studies gather only limited data on the economic characteristics of the respondents and their views about immigrants, making it difficult to reliably estimate the effects of concerns about labor market competition. For example, neither the ISSP nor the WVS surveys (used by Mayda) asked detailed questions about respondents' employment experience, job training, willingness to move for a new job, or any direct questions that would identify the industries in which respondents were employed. The NES surveys (used by Scheve and Slaughter) elicit more detailed personal economic information than the other surveys, using an open-ended question about the “type of business” in which employed respondents are working to identify their industry location using 3-digit Census of Industry Codes, but did not gather information on job training or willingness to pursue a different job.<sup>8</sup>

Even more constraining, these surveys only ask respondents to describe their attitudes toward immigration in general without allowing for any differentiation in their views about different types of immigrants (e.g., high-skilled versus low-skilled).<sup>9</sup> This poses a major constraint on the ability to empirically test the main theoretical models, because the key prediction from the simplest version of the SF model (and the special-case factor proportions analysis) is that native workers should oppose inflows of immigrants with similar skills to their own but support inflows of immigrants with different skills. The interpretations made in previous studies using the existing survey data thus rest on a questionable assumption that all survey respondents have low skilled immigrants in mind when answering questions about immigration in

<sup>4</sup> See Jones (1971, 2002) for an extended discussion of the effects of factor intensities in mediating the effects of exogenous changes in factor endowments (and commodity prices) in the SF model.

<sup>5</sup> If immigration can lead to a reduction in the price of non-traded goods (i.e., if it raises the output of such goods more rapidly than it raises aggregate demand for them), it is unclear whether native workers with skills similar to those of immigrants will be worse off in real terms (the outcome will depend in part on their consumption tastes).

<sup>6</sup> Also note that the standard models assume competitive markets. In alternative types of models that allow for economies of scale in production in the industries employing immigrants, a wide variety of outcomes become possible: immigration can generate higher real wages for native workers with similar skills, for instance (Brezis and Krugman, 1996).

<sup>7</sup> For general reviews see, for example, Friedberg and Hunt (1995); Bhagwati (2002); Card (2005); Borjas (1999); and Longhi et al. (2005).

<sup>8</sup> See Blonigen (2011) for a detailed explanation of the relevant survey items available in the NES data.

<sup>9</sup> Scheve and Slaughter (2001) used responses to the NES immigration question: “Do you think the number of immigrants from foreign countries who are permitted to come to the United States to live should be increased a little, increased a lot, decreased a little, decreased a lot, or left the same as it is now?” Mayda (2006) examined answers to the ISSP question: “Do you think the number of immigrants to (respondents country) nowadays should be: (a) reduced a lot, (b) reduced a little, (c) remain the same as it is, (d) increased a little, or (e) increased a lot.” The WVS asked the following question: “How about people from other countries coming here to work. Which one of the following do you think the government should do (a) Let anyone come who wants to (b) Let people come as long as there are jobs available (c) Place strict limits on the number of foreigners who can come here (d) Prohibit people coming here from other countries? (e) Don't know.”

general. Yet even permitting this assumption, the data does not allow one to examine whether local workers possess different views about low-skilled and high-skilled immigrants that are consistent with the anticipated labor-market effects and individuals' calculations of their material self interest.<sup>10</sup> Finally, existing surveys have limited samples that are typically only designed to be representative at the country level, but they do not provide sizable samples of workers in different industries. Due to these constraints, previous studies that examine the importance of concerns about labor market competition in shaping anti-immigrant sentiments among voters have relied on very imprecise measures and indirect tests.

### 3. Data

To address several of the empirical limitations described above, we administered a large-scale survey that measured attitudes toward different types of immigrants among a sample of U.S. workers in selected industries.

The survey design followed a customized two-stage sampling approach in which we first selected a set of 12 key industries, five in the manufacturing sector and the rest in services. Selection of industries was based on a number of criteria reflecting variability in their exposure to the impacts of globalization and size. We plotted all major industries along several relevant dimensions: dependence on immigrant labor, value-added per worker, offshoring activity, trade balance, and total employment. Based on these plots we identified the set of 12 industries that provided suitably broad variation along the dimensions of interest. The manufacturing industries selected for the survey include: food manufacturing, chemical manufacturing, computer and electronic product manufacturing, transportation equipment manufacturing, and fabricated metal product manufacturing. The selected service industries include: construction, telecommunications, educational services, ambulatory health care services, nursing and residential care, financial services, and internet and data processing services.

Fig. 1 compares the 12 selected industries with the industries that we did not select with respect to their reliance on foreign-born workers.<sup>11</sup> The figure indicates that our selected industries are quite representative of the universe of industries with respect to dependence on immigrant labor. Our selection spans the range of industries from those with a relatively small share of immigrant workers, such as educational services and fabricated metal production (7% and 8%, respectively), to those with much larger shares, including the computer electronics and food manufacturing industries (21% and 27%, respectively).

Fig. 2 compares selected and non-selected industries according to value added per worker (a basic indicator of capital and skill intensity) and their score on Blinder's offshorability index.<sup>12</sup> The size of the bubbles indicates the size of the industry as measured by total employment. As the figure indicates, our selection of industries for the survey includes a representative sample of the universe of industries. With respect to skill intensity, our selected industries cover the range from highly skill-intensive industries (e.g., chemical manufacturing and financial services), industries characterized by mid-range skill intensity (e.g., transportation equipment and computer electronics manufacturing), as well as industries with low levels of value added per worker (e.g., construction and nursing).

<sup>10</sup> Exceptions are studies such as Sniderman et al. (2004); Hainmueller and Hiscox (2010), and Hainmueller and Hopkins (2014b) that ask respondents specifically and separately about their attitudes toward high-skilled and low-skilled immigrants. These studies find that, contrary to previous claims that local workers are most concerned about immigrants who have similar skill levels to their own, both low skilled and highly skilled workers strongly prefer highly skilled immigrants over low skilled immigrants.

<sup>11</sup> Industries are classified at the 3 digit NAICS level.

<sup>12</sup> The "offshorability index" is a subjective ranking that was constructed by Alan Blinder to measure the potential offshorability of occupations. The index measures the offshorability of a job on a 100 point scale, where 100 equals most offshorable (see Blinder (2009)). We summarize the offshorability of each industry based on a weighted average of the offshorability scores of the five most important occupations in each industry (weighted by their relative shares on total industry employment).

Similarly, our selected industries cover the range of industries along the offshorability scale, from those with the most offshorable occupations (internet and data processing services) to the least offshorable (nursing and education).<sup>13</sup>

In the second sampling stage we recruited a sizeable sample of currently employed respondents from each of the target industries. The sample sizes we obtained were roughly proportional to the size of each industry. The survey was fielded with online survey firm YouGov/Polimetrix between September 2010 and February 2011. Table 1 provides the descriptive statistics.<sup>14</sup>

The survey includes a variety of questions that measure workers' preferences over immigration policy. For the main part of the analysis we focus on a survey experiment that measures the preferences of workers with respect to potential immigrants that differ on two key dimensions: they are described as being either highly skilled or low skilled and as being either familiar or not familiar with American values and traditions. Respondents were thus asked about their support for one of four possible types of potential immigrants.<sup>15</sup> This differentiation allows for a nuanced examination of the role of concerns about labor market competition in the broad – cultural as well as economic – context in which the immigration issue is typically debated. The question we use to gauge people's attitudes on the different types of immigration reads as follows:

Immigrants to the U.S. differ in terms of their professional skill levels as well as their degree of familiarity with American values and tradition. Consider the group of [*highly-skilled/low skilled*] immigrants that are [*well familiar/not familiar*] with American values and traditions. Do you think the U.S. should allow more or less of these immigrants to come and live here?

The answer categories included a five point scale that ranged from "Allow a lot more of these immigrants" to "Allow a lot less of these immigrants." Both the skill frame (i.e., *highly-skilled vs. low skilled*) and the values frame (i.e., *well familiar vs. not familiar* with U.S. values and tradition) were randomly assigned in their order across respondents, with each respondent being asked about all four categories of immigrants in random order.

We code a binary indicator PRO IMMIGRATION that takes the value 1 for respondents that support allowing a lot or somewhat more immigrants, and 0 otherwise. In addition to the test using the variable described above, we also replicated the subsequent analyses using a variety of other immigration questions and answer codings; the results are similar to the ones presented below.<sup>16</sup>

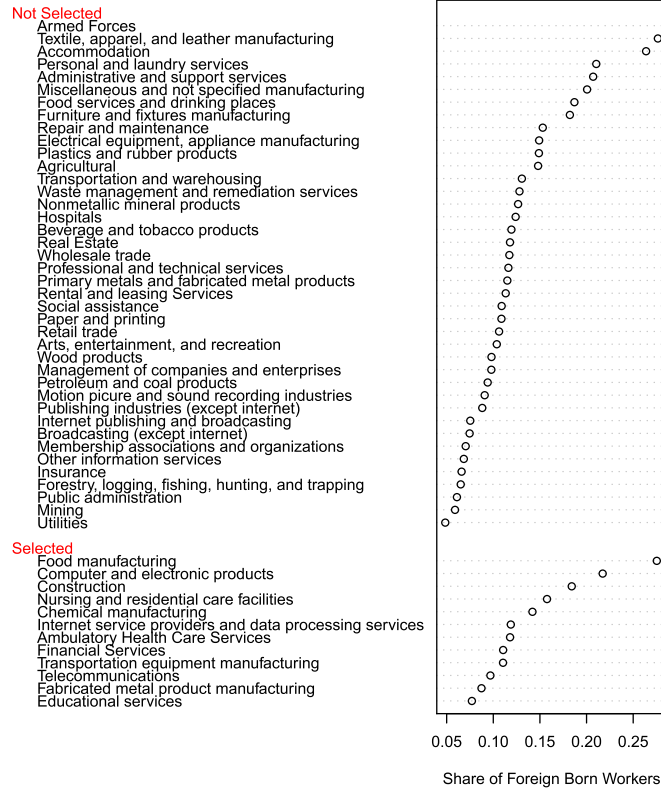
In order to differentiate between the randomized skill levels of the immigrants in question, we code a binary variable for the question frame labeled HIGHSK IMMIGRANTS which takes the value 1 if the immigrants are described as "highly skilled" and 0 if the immigrants are

<sup>13</sup> Note that the omitted industries which are more extreme on these dimensions are very small in terms of their overall employment, such as the oil and gas extraction industry. We did not include those industries because of the inherent difficulty in sampling them properly.

<sup>14</sup> To address potential non-response bias, here and in all other analysis the results are weighted by post-stratification weights which ensure that the industry samples in our survey match the population level characteristics in each industry as measured by the 2009 March Supplement of the Current Population survey. The weighting adjustment includes brackets for the age, race, and education distributions of the workers employed in each industry.

<sup>15</sup> The four types are: (i) highly skilled immigrants that are well familiar with U.S. customs and traditions; (ii) highly skilled immigrants that are not familiar with U.S. customs and traditions; (iii) low skilled immigrants that are well familiar with U.S. customs and traditions; and (iv) low skilled immigrants that are not familiar with U.S. customs and traditions.

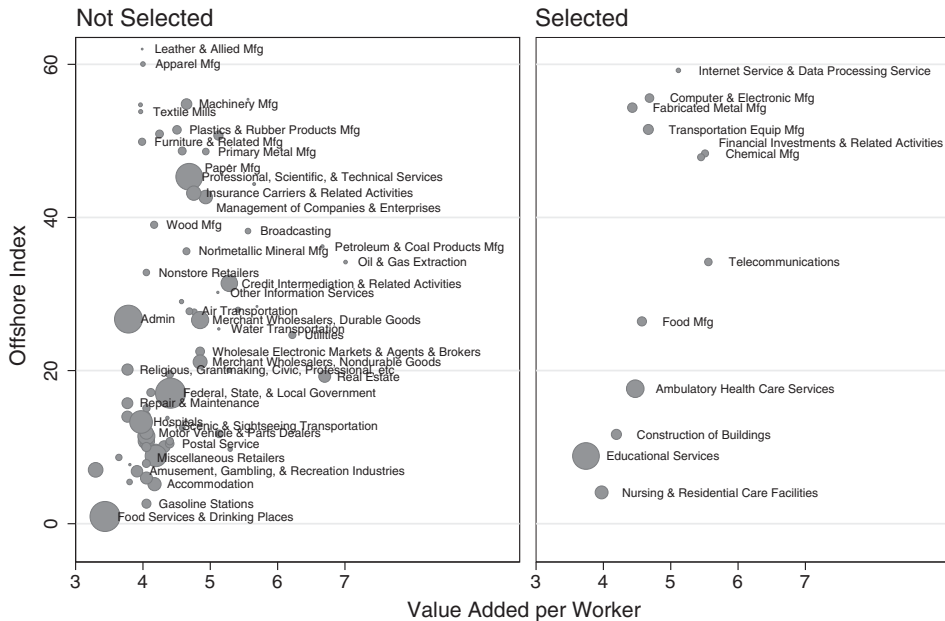
<sup>16</sup> In particular, the results are substantively similar if we use ordered probit regressions on the 5 point answer scale or alternative questions such as "Overall, do you think the number of immigrants allowed into the United States should be increased, decreased, or kept at the current level?", with responses again ranging on a five-point scale.



**Fig. 1.** Selection of target industries based on exposure to immigration. *Note:* Share of Foreign Born Workers is measured in 2008. Source: March Supplement of the Current Population Survey.

described as “low skilled.” In addition, we code a similar binary variable for the cultural frame called FAMILIAR IMMIGRANTS which is coded as 1 if the immigrants are described as “well familiar” and 0 if described as “not familiar” with American values and traditions.

To test how the skill levels of natives affect attitudes toward highly skilled and low skilled immigration, we follow previous research and employ the highest educational attainment as our measure of the respondent skill level. This measure, which we label EDUCATION, is



**Fig. 2.** Selection of industries based on offshore index and log value added per worker (size of the bubbles corresponds to total employment in each industry). Source: Offshore index is computed based on a weighted average of Blinder’s 2009 offshorability scores for the five most important occupations in each industry (weighted by their relative shares on total industry employment) as measured by the Bureau of Labor Statistics Occupational Employment Statistic. Data on value added per worker and total industry employment is from the Current Industry Analysis Division, Bureau of Economic Analysis and measured in 2006.

**Table 1**  
Descriptive statistics for selected industries.

Sources: Current Population Survey 2009 and Bureau of Economic Analysis 2008.

Industry:	Sample size (#)	Total employed (1000s)	Total output (B\$)	Output per worker (\$)	Trade balance (B\$)	Share foreign born	Share BA degree	Median income (\$)
<i>Manufacturing</i>								
Food products	218	1485	434	292,093	8435	32%	15%	51,000
Chemical	225	850	464	546,482	−3144	16%	45%	88,945
Transportation equipment	270	1607	583	362,878	−14,411	12%	34%	76,005
Computer electronics	349	1248	515	412,519	−106,023	27%	51%	96,004
Fabricated metal products	352	1528	251	163,973	−9947	13%	15%	61,570
<i>Services</i>								
Data processing and internet	320	395	142	359,059	0	12%	49%	82,557
Telecommunications	375	1022	480	470,191	2	12%	39%	83,000
Financial	375	858	436	507,517	41	14%	75%	110,067
Nursing and residential care	382	3008	131	43,584	0	16%	18%	46,590
Construction	393	7215	861	119,281	0	23%	14%	55,197
Ambulatory health care	446	5661	636	112,263	0	14%	39%	73,067
Education	607	3037	156	51,309	13	9%	64%	79,235

Note: Samples restricted to native workers that are currently employed. Industry characteristic are measured for 2009, except total employment and total output which are measured for 2008.

coded as follow: 1 = High school degree or less; 2 = Some college; 3 = Bachelor degree or similar; and 4 = graduate degree (MA, JD, PhD).

## 4. Results

### 4.1. Natives' skill levels and attitudes toward highly skilled and low skilled immigration

Recall that the main prediction from the (restricted) SF model and the simpler FP analysis is that, if labor market concerns are an influential source of attitudes, workers should oppose immigrants with similar skills to their own but support immigrants with different skills. We begin the analysis by testing this prediction that low- (high-) skilled natives are more concerned about the inflow of low- (high-) skilled migrants than they are about the entry of high- (low-) skilled migrants. We estimate a probit regression with the following specification for the latent support for immigration:

$$\text{PRO IMMIGRATION}_i^* = \alpha + \delta \text{ EDUCATION}_i + \gamma(\text{ EDUCATION}_i \times \text{ HIGHSK IMMIGRANTS}_i) + \theta \text{ HIGHSK IMMIGRANTS}_i + \mathbf{X}_i\beta + \varepsilon_i.$$

The key interest is in the  $\gamma$  parameter on the interaction term that measures how the difference in the support for highly skilled and low skilled immigration varies across the skill level of natives.  $\mathbf{X}_i$  is a vector of control variables with coefficient vector  $\beta$ , and  $\varepsilon$  is the error term.

The key prediction from the (restricted) SF model and the simpler FP analysis is that an increase in native workers' skills should have a positive effect on attitudes toward low skilled immigration, and a negative effect on attitudes toward highly skilled immigration. In terms of the model, we would expect that  $\gamma$  would be negative and large enough in magnitude to offset the expected positive effect of natives' skill on attitudes toward low skilled immigration. In other words, we would expect that native workers with low levels of education would exhibit a clear preference for highly skilled over low skill immigration, but we would expect to observe the opposite preference-ordering among highly skilled native workers.

To increase comparability with previous research, we also enter a set of common control variables in  $\mathbf{X}$ , including measures of respondents' age (classified into 9 age groups), gender, household income (5 levels of income quintiles) and indicator variables for census region (Midwest, South, West, Northeast), union membership, race (White, Black, Hispanic, Other), and marital status (Married, Divorced, Single, Other). We also include among the controls the FAMILIAR IMMIGRANTS variable which denotes whether the migrants in question were described

in the survey item as well familiar or not with American tradition and values. Together these form our basic set of covariates. For robustness tests we later also add additional covariates to the basic set. Note, however, that given the random assignment of HIGHSK IMMIGRANTS, the precise choice of covariates is expected to have little effect on the main results. Throughout all the analyses we cluster the standard errors by the respondent.

The regression results are presented in Table 2. The first column refers to the benchmark model with the set of basic covariates. In stark contrast to the prediction from the (restricted) SF model and the simplified FP model, we find that higher levels of education mean greater support for both highly skilled and low skilled immigration. Instead of the expected negative sign, we find that the interaction term between the skill of the natives and the immigrants is positive and highly significant in statistical terms ( $t$ -value  $> 3.1$ ). This indicates that the positive education effect is even stronger with respect to highly skilled immigrants as compared to low skilled immigrants. In other words, it is the most skilled natives that attach the largest premium to highly skilled over low skilled immigration.

Since the magnitude of probit coefficients are difficult to interpret, Fig. 3 graphically presents the predicted level of support for increased immigration as a function of natives' skill level, based on Model 1 in Table 2. For each educational level we report separately the predicted level of support for an increase in highly skilled immigration (black squares) and low skilled immigration (gray dots), while fixing the other covariates at the values of the median worker in the sample. The vertical lines denote the 95% confidence intervals. Fig. 3 highlights several notable patterns. First, in line with previous studies, we find that anti-immigrant sentiments run high among U.S. workers. On average, only about 21% of workers are in favor of increasing immigration beyond its current level. Among native workers with only high school education, support for expanded immigration of low skilled workers drops as low as 10%, while rising to a maximum of 53% in the case of natives with post-graduate education.

A second pattern that the graph reveals is the one noted above, namely a strong positive relationship between the skill level of the natives and the corresponding level of support for immigration. The differences across the skill groups are statistically significant and sizable in terms of economic significance: mean support for increased immigration is 10% [8%, 13%] among natives with less than high school education and rising up to 35% [32%, 39%] among natives with graduate education. Third, the graph shows that native workers at all levels of skill are more supportive of high skilled immigration than of low skilled immigration (on average, only 15% [14%, 17%] of native workers are in favor of increasing low skilled immigration while 27% [25%, 28%] are in favor of increasing highly skilled immigration). This pattern is clearly at odds with

**Table 2**  
Education and attitudes toward highly skilled and low skilled immigration.

Model no.	(1)	(2)	(3)	(4)	(5)
Outcome:	In favor of immigration (PRO IMMIGRATION)				
EDUCATION	0.283 (0.031)	0.281 (0.036)	0.236 (0.035)	0.227 (0.035)	0.228 (0.035)
HIGHSK IMMIGRANTS	0.237 (0.072)	0.237 (0.072)	0.185 (0.067)	0.191 (0.067)	0.193 (0.067)
EDUCATION × HIGHSK IMMIGRANTS	0.078 (0.025)	0.078 (0.025)	0.098 (0.024)	0.097 (0.024)	0.098 (0.024)
Region Midwest	−0.104 (0.077)	−0.104 (0.077)	−0.081 (0.075)	−0.115 (0.075)	
Region South	−0.187 (0.074)	−0.187 (0.073)	−0.178 (0.070)	−0.199 (0.070)	
Region West	−0.054 (0.074)	−0.054 (0.074)	−0.073 (0.070)	−0.087 (0.070)	
Union member	−0.119 (0.080)	−0.119 (0.080)	−0.086 (0.076)	−0.095 (0.076)	−0.095 (0.076)
Female	−0.189 (0.054)	−0.189 (0.054)	−0.179 (0.052)	−0.180 (0.052)	−0.187 (0.051)
Married	−0.022 (0.091)	−0.022 (0.091)	0.009 (0.089)	0.018 (0.089)	0.013 (0.088)
Divorced	−0.004 (0.122)	−0.004 (0.121)	0.023 (0.119)	0.020 (0.117)	0.016 (0.116)
Single	0.006 (0.107)	0.006 (0.107)	0.051 (0.103)	0.011 (0.102)	0.005 (0.102)
White	0.047 (0.095)	0.047 (0.095)	0.113 (0.087)	0.102 (0.086)	0.104 (0.086)
Black	−0.057 (0.147)	−0.057 (0.147)	0.014 (0.137)	0.011 (0.136)	0.009 (0.134)
Hispanic	0.192 (0.162)	0.192 (0.162)	0.239 (0.136)	0.232 (0.134)	0.240 (0.134)
Household income	0.011 (0.022)	0.011 (0.022)	0.017 (0.021)	−0.008 (0.022)	−0.006 (0.022)
Age	−0.038 (0.009)	−0.038 (0.009)	−0.041 (0.009)	−0.037 (0.008)	−0.036 (0.008)
FAMILIAR IMMIGRANTS	0.425 (0.021)	0.417 (0.064)	0.393 (0.063)	0.398 (0.064)	0.406 (0.064)
EDUCATION × FAMILIAR IMMIGRANTS		0.003 (0.022)	0.013 (0.021)	0.013 (0.022)	0.012 (0.022)
Foreign born			0.505 (0.105)	0.493 (0.104)	0.490 (0.104)
Subjective household income				0.139 (0.029)	0.145 (0.029)
Home ownership				−0.079 (0.065)	−0.093 (0.065)
Constant	−1.463 (0.176)	−1.458 (0.181)	−1.463 (0.174)	−1.739 (0.185)	−2.308 (0.373)
State fixed effects					✓
Respondents	4071	4071	4312	4304	4304
Observations	16,284	16,284	17,248	17,216	17,216

Note: Probit coefficients show with robust standard errors (clustered by respondent) in parenthesis. The dependent variable, PRO IMMIGRATION, is coded 1 if in favor of increasing immigration and zero otherwise. HIGHLY SKILLED IMMIGRANTS is coded 1 for “highly skilled” and 0 for “low skilled” immigrants. FAMILIAR IMMIGRANTS is coded 1 for immigrants that are “well familiar” and zero for immigrants that are “not familiar” with American values and traditions. See text for details.

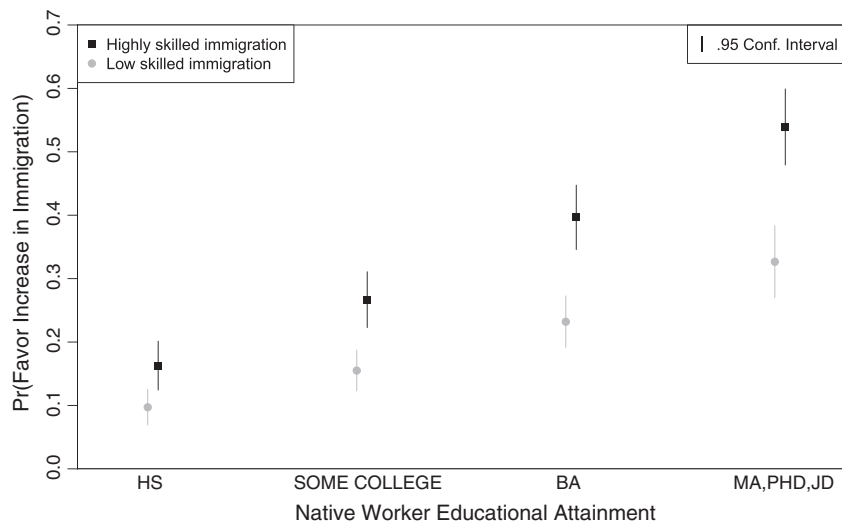
the basic prediction derived from the FP and the restricted SF model, which suggests that highly skilled natives should oppose inflows of highly skilled immigrants but be less concerned about the inflow of low-skilled immigrants.

Finally, as evidenced by the positive coefficient on the interaction term, the analysis reveals that the “premium” that natives attach to the skill level of the immigrants (i.e., the gap in support for high versus low skilled immigration) is consistently increasing as a function of the natives' own level of skill. This is the case in both relative and absolute terms. Among workers with less than high school education, 9% are in favor of low skilled immigration while 16% are in favor of highly skilled immigration. Among workers with graduate education, 32% are in favor of low skilled immigration while 53% are in favor of highly skilled immigration.

The results pertaining to the control variables are in line with findings in most previous studies. In particular, we find that female workers are on average less supportive of increasing immigration than male workers. The same holds true when we compare older to younger

workers, where the former exhibit greater opposition to immigration. Finally, we find that native workers are much more (less) favorable of immigrants described as well (not) familiar with American values and traditions.

To explore the robustness of the main finding of a positive association between education and support for both low and high skilled immigration, we conduct a set of robustness checks presented in Models 2–5 in Table 2. One possible concern might be that the effect we observe of natives' skill on their immigration attitudes varies as a function of whether the question respondents received referred to immigrants who are well familiar or not familiar with American values and traditions. To address this possibility, in Model 2 we allow the effect of education to vary across these cultural conditions. We find that the interaction term (EDUCATION × FAMILIAR IMMIGRANTS) is insignificant statistically and substantively very close to zero, indicating that the effect of natives' skills on attitudes does not differ across different types of immigrants. Notably, the coefficient on the interaction term between natives' education and the immigrants' skill level remains virtually unaffected.



**Fig. 3.** Natives' educational attainment and support for high and low skilled immigration. *Note:* Results show predicted probability of supporting an increase of highly skilled and low skill immigration at different levels of natives' educational attainment (based on the regression reported in Model 1 in Table 2; all variables but education are held at the medians).

A second concern might be that our analysis so far excludes foreign born workers, which today make up a sizable portion of the workforce. Model 3 addresses this issue by including the foreign born workers in the sample as well as adding an indicator variable denoting whether a respondent is foreign born. Again, the main results pertaining to the education effects remain unchanged.

Some have argued that attitudes toward immigration reflect citizens' concerns about the potential fiscal burden imposed by immigration (Hanson et al. (2007); Facchini and Mayda (2009), but see Hainmueller and Hiscox (2010) and Tingley (2013)). According to this argument, the welfare-state channel operates through individual income rather than skill (or education), the variable through which the labor-market channel is presumed to operate. While the welfare-state channel is not the focus of this study, it is important to check that accounting for this alternative channel in the analysis does not significantly alter the results we obtained regarding the weak effect of labor market concerns. For one, it should be noted that the baseline model already controls for household income. However, since income is likely measured with some degree of noise, as well as the fact that education and income are somewhat correlated, not properly accounting for respondents' income might bias the results regarding the effect of education. To further address this concern, we add two additional measures of income to the specification. The first is a subjective measure that asks respondents how well they are coping with their current household income, the second is a binary measure denoting whether the respondents are homeowners. Again, as Model 4 shows, including these additional measures of income does not alter the main results regarding the effects of education on attitudes toward highly skilled and low skilled immigration.

Another variable through which the welfare channel might operate is the respondent's state of residence, because of the differences in the welfare generosity and income taxes across U.S. states (Hanson et al., 2007). While our previous tests controlled for census region to alleviate this concern, the last specification presented in Model 5 includes state fixed effects to control for unobserved state characteristics. Again, the education results remain virtually unaffected. In Appendix Table A.1 we have also replicated the models separately for the groups of states that are coded as having a high or low fiscal exposure to immigrants based on the fiscal exposure measures used in Hanson et al. (2007) and Hainmueller and Hiscox (2010). The results are robust across high and low fiscal exposure states. If anything, the positive interaction term between natives' and immigrants' skills is slightly larger in low

exposure states. This pattern is inconsistent with the welfare state channel, which implies that highly skilled immigrants that bring in tax revenue would be more valuable to highly skilled natives that reside in states with a high degree of fiscal exposure to immigrants (as compared to high skilled natives residing in states with low exposure).

Overall, the various robustness checks strongly corroborate the basic findings: across all models, higher native skills means greater support for both highly skilled and low skilled immigration, and the premium for highly skilled immigration is significantly larger among the most highly skilled natives. These results are difficult to square with the key predictions of the (restricted) SF model and the simpler FP model.

#### 4.2. Test for industry specific effects

By imposing the constraint that the anticipated skill effects are constant across industries, we are not allowing for a complete test of the SF model. Recall that in the multiple-commodity, open-economy SF model (in contrast to the simple FP analysis), the anticipated effects of immigration may vary in magnitude among high-skilled natives depending upon factor-intensities in their industries. The model anticipates that high-skilled natives will be more (less) concerned about inflows of high-skilled immigrants if they are in industries that use low-skilled labor more (less) intensively. In essence, if workers have skills that are specific to particular industries, their policy preferences may vary significantly as a function of how immigration affects the demand for labor within their industry. To test this proposition, we use value added per worker as a basic indicator of the capital and skill intensity of an industry. This measure, which we label SKILL INTENSITY, ranges from highly skill-intensive industries (chemical manufacturing, financial services, or telecommunications) to those with low levels of value added per worker (construction, nursing, or educational services). Using this measure, we return to the benchmark model but this time allow the effect of EDUCATION to vary as a function of the skill intensity of the industry. We separately examine attitudes toward highly skilled and low skilled immigration and in each case fit a probit regression for the latent support:

$$\begin{aligned} \text{PRO IMMIGRATION}_i^* = & \alpha + \delta \text{ EDUCATION}_i \\ & + \gamma (\text{EDUCATION}_i \times \text{SKILL INTENSITY}_{ij}) \\ & + \theta \text{ SKILL INTENSITY}_{ij} + \mathbf{X}_i \beta + \varepsilon_i \end{aligned}$$



where  $\gamma$  captures how the education effect varies as a function of the industry's level of skill intensity. The key predictions from the multiple-commodity, open-economy SF model are as follows: For attitudes toward low skilled immigration, we expect the education effect to be positive and to decrease in magnitude with higher skill intensity in the industry, such that  $\gamma$  is expected to be negative. For attitudes toward highly skilled immigration, we expect the education effect to be negative and to decrease in magnitude with higher skill intensity in the industry, such that  $\gamma$  is expected to be positive.

The results for this estimation are reported in Table 3. Models 1 and 2 refer to the estimates of the benchmark model with the basic set of control variables for attitudes toward highly skilled and low skilled immigration respectively. The results are inconsistent with the predictions from the multiple-commodity, open-economy SF model. We find that the effect of increasing natives' skill level is positive with respect to supporting both highly skilled and low skilled immigration and the education effect does not depend on the skill intensity of the industry; the  $\gamma$  coefficient on the interaction term

**Table 3**  
Education and attitudes toward highly skilled and low skilled immigration by industry skill intensity.

Model no.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Outcome:	In favor of immigration (PRO IMMIGRATION)									
Skill level of immigrants:	Low	High	Low	High	Low	High	Low	High	Low	High
EDUCATION	0.323 (0.053)	0.389 (0.046)	0.326 (0.056)	0.382 (0.049)	0.286 (0.054)	0.360 (0.048)	0.280 (0.053)	0.352 (0.048)	0.283 (0.053)	0.361 (0.047)
EDUCATION × SKILL INTENSITY	-0.178 (0.170)	-0.093 (0.150)	-0.178 (0.170)	-0.092 (0.150)	-0.184 (0.162)	-0.110 (0.144)	-0.193 (0.161)	-0.120 (0.145)	-0.217 (0.162)	-0.153 (0.144)
SKILL INTENSITY	0.672 (0.494)	0.511 (0.435)	0.672 (0.494)	0.509 (0.434)	0.780 (0.468)	0.579 (0.418)	0.779 (0.467)	0.585 (0.421)	0.813 (0.468)	0.678 (0.420)
Region Midwest	-0.091 (0.091)	-0.111 (0.081)	-0.091 (0.091)	-0.111 (0.081)	-0.073 (0.088)	-0.085 (0.078)	-0.108 (0.088)	-0.117 (0.079)		
Region South	-0.147 (0.087)	-0.218 (0.077)	-0.147 (0.087)	-0.218 (0.077)	-0.150 (0.082)	-0.199 (0.073)	-0.174 (0.082)	-0.217 (0.074)		
Region West	-0.013 (0.087)	-0.076 (0.078)	-0.013 (0.087)	-0.076 (0.078)	-0.043 (0.083)	-0.084 (0.075)	-0.053 (0.083)	-0.102 (0.075)		
Union member	-0.084 (0.099)	-0.131 (0.082)	-0.084 (0.099)	-0.131 (0.082)	-0.013 (0.092)	-0.123 (0.078)	-0.028 (0.092)	-0.133 (0.079)	-0.038 (0.091)	-0.143 (0.080)
Female	-0.074 (0.067)	-0.251 (0.058)	-0.074 (0.067)	-0.251 (0.058)	-0.059 (0.063)	-0.239 (0.056)	-0.059 (0.063)	-0.244 (0.056)	-0.063 (0.062)	-0.247 (0.056)
Married	-0.036 (0.107)	-0.010 (0.101)	-0.036 (0.107)	-0.010 (0.101)	-0.018 (0.103)	0.030 (0.098)	-0.023 (0.104)	0.051 (0.096)	-0.030 (0.104)	0.054 (0.094)
Divorced	-0.075 (0.146)	0.042 (0.130)	-0.075 (0.146)	0.042 (0.130)	-0.043 (0.140)	0.066 (0.127)	-0.050 (0.139)	0.064 (0.125)	-0.069 (0.137)	0.070 (0.125)
Single	-0.011 (0.125)	0.010 (0.117)	-0.011 (0.125)	0.010 (0.117)	0.017 (0.120)	0.069 (0.113)	-0.020 (0.120)	0.028 (0.111)	-0.033 (0.120)	0.021 (0.109)
White	0.028 (0.109)	0.062 (0.096)	0.028 (0.109)	0.062 (0.096)	0.141 (0.103)	0.091 (0.088)	0.135 (0.102)	0.077 (0.088)	0.144 (0.102)	0.084 (0.090)
Black	-0.037 (0.172)	-0.066 (0.151)	-0.037 (0.172)	-0.066 (0.150)	0.109 (0.160)	-0.056 (0.140)	0.113 (0.159)	-0.065 (0.141)	0.114 (0.157)	-0.060 (0.140)
Hispanic	0.256 (0.183)	0.148 (0.168)	0.256 (0.183)	0.148 (0.168)	0.372 (0.152)	0.144 (0.141)	0.370 (0.150)	0.132 (0.141)	0.358 (0.151)	0.156 (0.142)
Household income	0.009 (0.026)	0.004 (0.022)	0.009 (0.026)	0.004 (0.022)	0.015 (0.025)	0.007 (0.021)	-0.014 (0.026)	-0.014 (0.023)	-0.012 (0.023)	-0.012 (0.023)
Age	-0.047 (0.010)	-0.030 (0.009)	-0.047 (0.010)	-0.030 (0.009)	-0.050 (0.010)	-0.032 (0.009)	-0.048 (0.010)	-0.027 (0.009)	-0.048 (0.010)	-0.026 (0.009)
FAMILIAR IMMIGRANTS	0.328 (0.026)	0.506 (0.025)	0.339 (0.080)	0.475 (0.076)	0.324 (0.076)	0.450 (0.076)	0.331 (0.077)	0.453 (0.076)	0.333 (0.077)	0.463 (0.077)
EDUCATION × FAMILIAR IMMIGRANTS			-0.004 (0.027)	0.012 (0.026)	0.002 (0.026)	0.024 (0.026)	0.001 (0.026)	0.024 (0.026)	0.002 (0.026)	0.023 (0.026)
Foreign born					0.482 (0.120)	0.522 (0.107)	0.474 (0.119)	0.509 (0.106)	0.465 (0.119)	0.516 (0.106)
Subjective household income							0.135 (0.034)	0.139 (0.030)	0.145 (0.034)	0.145 (0.029)
Home ownership							-0.007 (0.076)	-0.145 (0.067)	-0.011 (0.076)	-0.152 (0.066)
Constant	-1.688 (0.235)	-1.351 (0.219)	-1.695 (0.238)	-1.333 (0.223)	-1.783 (0.229)	-1.376 (0.216)	-2.083 (0.235)	-1.610 (0.224)	-2.374 (0.290)	-1.830 (0.253)
State fixed effects									✓	✓
Respondents	4071	4071	4071	4071	4312	4312	4304	4304	4304	4304
Observations	8142	8142	8142	8142	8624	8624	8608	8608	8608	8608
Effect of EDUCATION at: 25th %ile of SKILL INTENSITY	0.17	0.29	0.17	0.29	0.14	0.27	0.14	0.26	0.11	0.25
95% Confidence Interval	[0.12 0.22]	[0.23 0.34]	[0.12 0.22]	[0.23 0.34]	[0.09 0.19]	[0.22 0.32]	[0.09 0.19]	[0.21 0.32]	[0.06 0.16]	[0.20 0.31]
75th %ile of SKILL INTENSITY	0.14	0.27	0.14	0.27	0.12	0.25	0.12	0.24	0.09	0.23
95% Confidence Interval	[0.09 0.20]	[0.22 0.33]	[0.09 0.20]	[0.21 0.33]	[0.07 0.17]	[0.20 0.30]	[0.07 0.17]	[0.19 0.3]	[0.03 0.14]	[0.17 0.29]

Note: Probit coefficients show with robust standard errors (clustered by respondent) in parenthesis. The dependent variable, PRO IMMIGRATION, is coded 1 if in favor of increasing immigration and zero otherwise. HIGHLY SKILLED IMMIGRANTS is coded 1 for "highly skilled" and 0 for "low skilled" immigrants. FAMILIAR IMMIGRANTS is coded 1 for immigrants that are "well familiar" and zero for immigrants that are "not familiar" with American values and traditions. Lower panel shows the simulated effect of EDUCATION (level 2 to level 4) at the 25th and 75th percentile of industry SKILL INTENSITY. See text for details.

between education and skill intensity is close to zero and insignificant for both types of immigration.

To help facilitate the interpretation of these coefficients, the lower panel in Table 3 reports the simulated effect of moving from low to high levels of natives' education at both the 25th and the 75th percentile of industry skill intensity. The results demonstrate that the education effect does not differ systematically across levels of skill intensity. The effect of increasing education on the probability of supporting low skilled immigration is 0.17 [0.12, 0.22] in industries with low skill intensity, and 0.14 [0.09, 0.20] in industries with high skill intensity. When examining support for highly skilled immigration, the education effect is 0.29 [0.23, 0.34] in industries with low skill intensity, and 0.27 [0.22, 0.33] in industries with high skill intensity. In both cases, the differences in estimates between the effects at low and high skill intensities are not significantly different as the confidence intervals overlap widely. These results are difficult to square with the idea that the immigration preferences of workers depend on how immigration affects the demand for labor within their own industry.

How robust are these findings? Models 3–10 in Table 3 show the results for the same set of robustness checks described earlier: Models 3 and 4 allow the education effect to vary also across the cultural (well/not familiar) frame; Models 5 and 6 add the foreign born workers to the sample; Models 7 and 8 add additional proxies of household income, and finally Models 9 and 10 replace the region with state fixed effects. The main results are robust across all these models: in each case the interaction term between education and industry skill intensity is not close to statistical significance and the simulated education effects are very similar at low and high levels of skill intensity. Crucially, this is the case with respect to attitudes toward both low and highly skilled immigration.

Since our survey design provides sizable samples of workers in each industry, we can construct an even more flexible test of the theoretical predictions from the multiple-commodity, open-economy SF model. More specifically, we replicate the same models as in Table 3 above (the benchmark models and the robustness checks), but instead of the interaction between EDUCATION and SKILL INTENSITY, we now include a full set of dummy variables for each industry and a full set of interaction terms between EDUCATION and each of the industry dummies. Compared to the previous models, this specification relaxes the linearity assumption on the interaction effect and instead allows the education effect to vary freely in each industry.

The results from this specification are reported in Appendix Table A.2. To ease the interpretation, Fig. 4 visualizes the results from this test based on Models 1 and 2 with the basic set of covariates. The plots in the top panel show the predicted probability of supporting an increase in immigration among low and high skilled native workers in each industry (gray dots and black squares respectively, with 95% confidence intervals). All other covariates are held at their medians. The industry-specific estimates of support are plotted against the level of skill-intensity in the industry. The plot on the left refers to estimated support for highly skilled immigration and the plot on the right to the estimated support for low skilled immigration.

The results from this flexible specification confirm the previous finding. In contrast to the prediction of the multiple-commodity, open-economy SF model, variation in support for immigration among high versus low-skilled workers bears no clear relation with the industry's skill intensity. Apart from some variation not related to industry skill intensity, the estimated levels of support for both highly skilled and low skilled immigration remain very similar across industries (note that many of the confidence intervals overlap widely).

The plots in the lower panel show the estimates of the industry specific education effects (i.e., the difference in support for immigration between native workers with low and high levels of educational attainment). These plots confirm the lack of supporting evidence for the SF model. For attitudes toward both highly skilled and low skilled immigration, all but one of the point estimates of the education effect are

positive, indicating that higher education among natives is consistently associated with increased support for immigration, regardless of the industry in which one is employed. And as with the previous analysis, we again observe that the education effect is, if anything, stronger for high as opposed to low skilled immigration, an empirical relationship that holds true in a large majority of the industries.

Lastly, in contrast to the model's prediction, the education effect does not vary systematically with the level of the industry's skill intensity. As a more formal test of this finding, we regress the industry specific education effects on the level of skill intensity in the industry. The dashed lines in the plots show the regression fits for highly skilled and low skilled immigration, respectively. Both lines are essentially flat; the slope estimates of 0.03 (SE = 0.23) for highly skilled immigration and  $-0.01$  (SE = 0.19) for low skilled immigration, are insignificant both statistically and substantively. For example, according to these estimates, even for the extreme counterfactual of moving from the industry with the lowest skill intensity (nursing) to the one with the highest (chemical manufacturing) would increase the magnitude of the education effect on attitudes toward highly skilled immigration by a mere 0.015. This effect, which is substantively zero, goes in the opposite direction than the one anticipated by the theory which holds that the education effect should be smallest in the most skill intensive industry. For attitudes toward low skilled immigration, going from the lowest to highest level of skill intensity in an industry decreases the magnitude of the education effect by merely 0.005. These results do not change materially across the various robustness checks (Models 3–10).

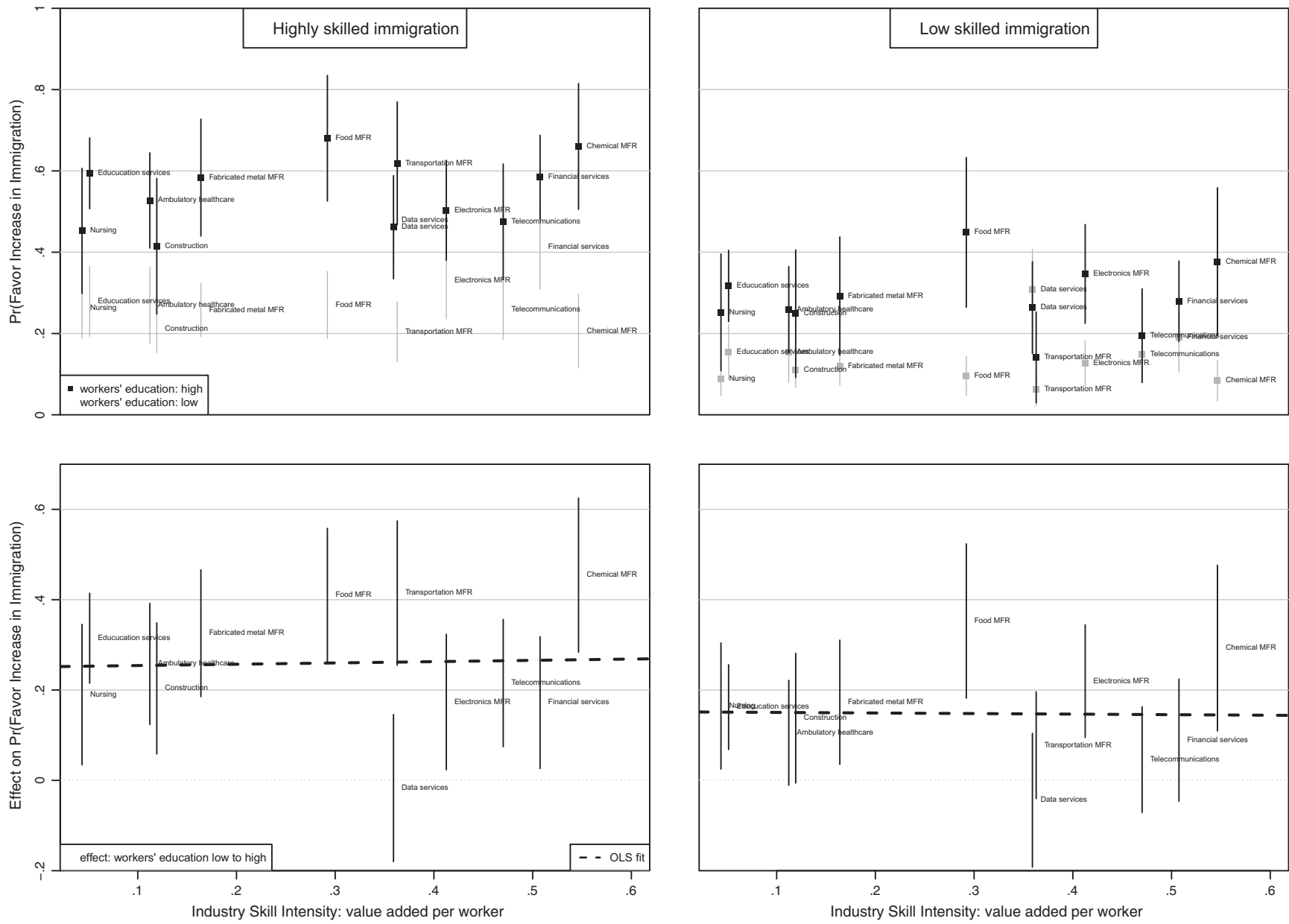
Taken together, these results are difficult to reconcile with the conjecture that self-interested concerns about the wage or employment effects of immigrants are an important source of the wide-spread public opposition to immigration. We have replicated these tests using a variety of other industry characteristics including the industry's share of foreign born workers, the relative skill ratio of the industry,<sup>17</sup> a measure of inter-industry mobility,<sup>18</sup> a measure of intra-industry mobility,<sup>19</sup> and the share of workers with union membership. It is important to emphasize that these additional tests lack a clear theoretical foundation because these industry characteristics are not part of the standard general equilibrium models. We simply computed them for exploratory purposes to see if they might pick up other ad hoc labor market concerns that are outside of the standard models.<sup>20</sup> Appendix Figure. A.1 reports the effect of education on attitudes toward highly skilled and low skilled immigration at the 25th and 75th percentile of each of the different industry characteristics (based on replications of the benchmark model specifications in Models 1 and 2 in Table 3). The findings indicate that the skill effect on attitudes toward both highly skilled and low skilled immigration is again very similar across these various industry characteristics. There is little difference when we compare industries with high and low reliance on foreign labor, high and low relative skill

<sup>17</sup> Let NR be the share of native workers that are highly skilled and MR be the share of foreign born workers that are highly skilled. The relative skill ratio is measured as NR/MR, i.e., the share of highly-skilled natives relative to the share of highly-skilled immigrants employed in the industry. We defined the highly skilled as workers with at least a college degree and computed the relative skill ratios from the March supplement of the Current Population Survey.

<sup>18</sup> The measure is based on respondents' response to the question: "If for some reason you were to lose your job, how easy or difficult would it be for you to find a job in another industry that pays as well or better than the job you currently have?". Responses ranged on a five-point scale from (1) "very easy" to (5) "very difficult". A separate measure of mobility was calculated for highly skilled and low-skilled native workers in each industry. For this reason, the industries are sorted differently along the horizontal axis in the two graphs.

<sup>19</sup> This measure is based on respondents' answer to a question: "If for some reason you were to lose your job, how easy or difficult would it be for you to find another job in the same industry that pays as well or better than the job you currently have?", with responses again ranging on a five-point scale.

<sup>20</sup> For example, perhaps native workers in industries in which there is a high share of immigrants feel more concerned about competition for jobs as a result of immigration. Of course, the opposite is also possible: perhaps workers in industries that already rely upon immigrant workers expect positive impacts from increased immigration as a result of (industry-specific) complementarities between themselves and immigrant workers.



**Fig. 4.** Natives' educational attainment and support for high and low skilled immigration, by industry skill intensity. *Note:* Plots in the top panel show the predicted probability of supporting an increase of immigration for native workers with low and high levels of educational attainment in each industry (gray dots and black squares respectively), where industries are plotted according to their level of skill intensity. Plots in the lower panel show the marginal effect of a change from low to a high level of education on the probability of supporting immigration (black squares). The dashed lines represent the OLS regression line of the marginal effects on the values of industry skill intensity. The plots on the left refer to support for highly skilled immigration and the plots on the right to support for low skilled immigration, respectively. Results are based on the regressions reported in Models 1 and 2 in Table A.2. The estimates hold all variables (other than education and industry) at their respective medians.

mixes of natives to immigrants, high and low inter and or intra mobility prospects, and high and low degrees of unionization. This lack of any consistent pattern suggests that variation in support for immigration has little to do with any of these industry characteristics.<sup>21</sup>

#### 4.3. An alternative (quasi-behavioral) dependent variable

The findings presented above provide strong evidence that the expressed views of workers toward immigration do not correspond with extant arguments about the importance of concerns about labor market competition in shaping immigration attitudes. Regardless of whether one analyzes the preferences of all workers as a whole, subsets the analysis by the skill endowments of the native workers, focuses on attitudes toward low skilled or highly skilled immigrants, allows for differences in factor intensities (and other characteristics) among industries, none of the analyses lends support to the notion that self-interested concerns about labor market competition systematically and substantially affect attitudes toward immigration.

To what extent might this (null) finding reflect the fact that workers are answering a hypothetical question about immigration in a survey context that poses no costs or consequences? Perhaps when people's preferences necessitate the taking of some form of costly (and potentially consequential) action, be it participation in a demonstration, casting a vote for a candidate in an election, or contacting one's elected officials to lobby for a certain policy, perhaps then people's views better correspond with the predictions of the labor market competition model?

In considering this possibility, one might first note that the previous studies which have purported to find evidence of the role of concerns about labor market competition have themselves relied on exactly this same type of "costless" measure – namely, people's responses to a hypothetical question about their views in a survey context. Nonetheless, in order to test this proposition more seriously, we also carried out an experiment which was embedded into our cross-industry study. The experiment was designed as follows: when nearing the end of the survey, respondents were asked whether they would like to communicate their position on immigration in an email to their Member of Congress which will be sent via the online platform of the survey company. If respondents answered in the affirmative, they then had the option of choosing whether they wished to express support or opposition to a more restrictive immigration policy. Yet not all respondents were asked the same immigration question. Instead, respondents were randomly assigned to receive one of two different versions of the question: some were asked whether they wished to send an email expressing their views on the entry of low skilled immigration while others were asked the same question only about high-skilled immigration. The exact wording of the experiment read as follows:

Would you like us to send an email message to Members of Congress indicating either your support or opposition to pending immigration laws that propose to decrease the number of {*highly skilled/low skilled*} immigrants allowed into the United States? The email will contain your name, city, and opinion on the issue.

Overall, 34% of respondents requested to use this option to send the email to their elected official. Among those that requested to do so, 68% asked to express their support for placing restrictions on immigration and 32% to express their opposition. Utilizing these responses we create a new dependent variable IMMIGRATION PETITION that is coded as 1 for workers that chose to send an email to their Member of Congress in support of placing more restrictions on immigration, and 0 otherwise. We then replicate the test of the (restricted) SF model and the simpler PF

analysis using the same benchmark model as in Table 2 above. As reported in Table 4 and Appendix Figure A.2, the results from this replication are very similar to the findings obtained from the purely attitudinal measure. The interaction term between natives' and immigrants' skill is negative, i.e., the opposite of the relationship predicted by the theory. Again, highly skilled natives are less likely to send the email expressing their opposition to both highly skilled and low skilled immigration. These results are consistent across the various robustness checks (Models 2–4).

Finally, we replicated the test of the multiple-commodity, open-economy SF model using the same specification as in Table 3 where the effect of EDUCATION is allowed to vary across industry skill intensity. The results are reported in Table 5. Again, the results show no support for the theoretical predictions. For both highly skilled and low skilled immigration, the effect of education is almost exactly the same in industries with high and low levels of skill intensity, a result that is robust across the various checks (Models 3–8). Overall, these findings indicate that the patterns presented earlier using the hypothetical survey

**Table 4**

Education and request to email member of congress to express opposition to highly skilled and low skilled immigration.

Model no.	(1)	(2)	(3)	(4)
Outcome:	Email member to oppose immigration			
	(IMMIGRATION PETITION)			
EDUCATION	-0.139 (0.039)	-0.153 (0.038)	-0.145 (0.038)	-0.140 (0.039)
HIGHSK IMMIGRANTS	-0.256 (0.152)	-0.306 (0.149)	-0.307 (0.150)	-0.299 (0.150)
EDUCATION × HIGHSK IMMIGRANTS	-0.025 (0.058)	-0.015 (0.056)	-0.013 (0.057)	-0.018 (0.057)
Region Midwest	-0.069 (0.089)	-0.096 (0.086)	-0.064 (0.087)	
Region South	-0.038 (0.088)	-0.052 (0.084)	-0.026 (0.085)	
Region West	-0.026 (0.090)	-0.042 (0.087)	-0.022 (0.087)	
Union member	0.179 (0.088)	0.203 (0.086)	0.203 (0.087)	0.190 (0.088)
Female	-0.108 (0.061)	-0.097 (0.059)	-0.097 (0.059)	-0.088 (0.059)
Married	0.100 (0.119)	0.109 (0.115)	0.091 (0.116)	0.090 (0.114)
Divorced	0.068 (0.142)	0.090 (0.138)	0.086 (0.139)	0.089 (0.138)
Single	-0.036 (0.137)	-0.013 (0.133)	0.027 (0.134)	0.021 (0.133)
White	-0.210 (0.116)	-0.199 (0.108)	-0.198 (0.109)	-0.200 (0.107)
Black	-0.452 (0.171)	-0.435 (0.164)	-0.440 (0.165)	-0.469 (0.165)
Hispanic	-0.447 (0.203)	-0.531 (0.181)	-0.533 (0.182)	-0.590 (0.180)
Household income	0.009 (0.026)	0.015 (0.025)	0.032 (0.027)	0.028 (0.028)
Age	0.028 (0.010)	0.029 (0.010)	0.026 (0.010)	0.028 (0.010)
Foreign born		-0.255 (0.131)	-0.237 (0.132)	-0.238 (0.131)
Subjective household income			-0.115 (0.033)	-0.116 (0.034)
Home ownership			0.126 (0.079)	0.125 (0.078)
Constant	-0.118 (0.220)	-0.115 (0.212)	0.069 (0.230)	-0.280 (0.282)
State fixed effects				✓
Respondents	4071	4312	4304	4286

Note: Probit coefficients show with robust standard errors (clustered by respondent) in parenthesis. The dependent variable, IMMIGRATION PETITION, is coded 1 for respondents that chose to have an email sent to their Member of Congress on their behalf to support a decrease in immigration and zero otherwise. HIGHLY SKILLED IMMIGRANTS is coded 1 for "highly skilled" and 0 for "low skilled" immigrants. See text for details.

<sup>21</sup> This result is consistent with the pattern shown in Fig. 4 that the industry specific levels of support are fairly similar across industries. We therefore would not expect to find a robust pattern in the magnitude of the skill effect even if the industries are differentiated based on characteristics other than the level of skill intensity.

**Table 5**  
Education and request to email member of congress to express opposition to highly skilled and low skilled immigration by industry skill intensity.

Model no.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Outcome:	Email member to oppose immigration (IMMIGRATION PETITION)							
Skill level of immigrants:	Low	High	Low	High	Low	High	Low	High
EDUCATION	-0.137 (0.064)	-0.159 (0.076)	-0.162 (0.062)	-0.158 (0.074)	-0.149 (0.063)	-0.160 (0.074)	-0.147 (0.063)	-0.155 (0.073)
EDUCATION × SKILL INTENSITY	0.013 (0.222)	-0.070 (0.260)	0.035 (0.213)	-0.054 (0.253)	0.022 (0.215)	-0.026 (0.253)	0.048 (0.212)	0.001 (0.247)
SKILL INTENSITY	0.086 (0.606)	0.305 (0.676)	0.020 (0.587)	0.295 (0.665)	0.082 (0.593)	0.236 (0.667)	-0.005 (0.588)	0.031 (0.650)
Region Midwest	-0.072 (0.119)	-0.049 (0.136)	-0.103 (0.114)	-0.059 (0.134)	-0.038 (0.116)	-0.054 (0.134)		
Region South	-0.149 (0.118)	0.113 (0.132)	-0.150 (0.112)	0.103 (0.129)	-0.119 (0.113)	0.119 (0.129)		
Region West	-0.062 (0.121)	0.021 (0.139)	-0.081 (0.116)	0.023 (0.135)	-0.053 (0.116)	0.031 (0.136)		
Union member	0.305 (0.122)	0.054 (0.140)	0.336 (0.118)	0.060 (0.137)	0.354 (0.119)	0.056 (0.138)	0.329 (0.120)	0.019 (0.139)
Female	-0.145 (0.084)	-0.074 (0.097)	-0.134 (0.082)	-0.059 (0.094)	-0.129 (0.083)	-0.062 (0.094)	-0.130 (0.083)	-0.083 (0.094)
Married	0.345 (0.149)	-0.156 (0.174)	0.328 (0.144)	-0.130 (0.170)	0.288 (0.146)	-0.135 (0.170)	0.291 (0.142)	-0.108 (0.167)
Divorced	0.251 (0.189)	-0.085 (0.201)	0.268 (0.182)	-0.085 (0.197)	0.247 (0.184)	-0.076 (0.197)	0.244 (0.182)	-0.036 (0.193)
Single	0.264 (0.177)	-0.330 (0.199)	0.269 (0.169)	-0.317 (0.196)	0.340 (0.170)	-0.298 (0.196)	0.321 (0.167)	-0.281 (0.197)
White	-0.280 (0.150)	-0.126 (0.178)	-0.217 (0.140)	-0.188 (0.164)	-0.188 (0.142)	-0.215 (0.165)	-0.160 (0.141)	-0.214 (0.163)
Black	-0.528 (0.234)	-0.405 (0.255)	-0.465 (0.223)	-0.473 (0.243)	-0.480 (0.225)	-0.492 (0.243)	-0.526 (0.225)	-0.530 (0.244)
Hispanic	-0.650 (0.279)	-0.261 (0.285)	-0.682 (0.241)	-0.393 (0.265)	-0.657 (0.248)	-0.421 (0.265)	-0.719 (0.247)	-0.487 (0.261)
Household income	0.001 (0.034)	0.023 (0.040)	0.007 (0.033)	0.020 (0.039)	0.033 (0.035)	0.028 (0.042)	0.018 (0.036)	0.033 (0.042)
Age	0.051 (0.014)	-0.000 (0.015)	0.053 (0.013)	0.001 (0.015)	0.048 (0.014)	0.000 (0.016)	0.050 (0.014)	0.004 (0.016)
Foreign born			0.036 (0.171)	-0.810 (0.190)	0.079 (0.174)	-0.815 (0.190)	0.084 (0.177)	-0.741 (0.190)
Subjective household income					-0.172 (0.044)	-0.062 (0.050)	-0.173 (0.044)	-0.065 (0.050)
Home ownership					0.215 (0.102)	0.074 (0.118)	0.209 (0.103)	0.031 (0.116)
Constant	-0.318 (0.317)	-0.279 (0.350)	-0.335 (0.306)	-0.265 (0.339)	-0.114 (0.321)	-0.126 (0.358)	-0.293 (0.352)	-0.891 (0.419)
State fixed effects							✓	✓
Respondents	2066	2005	2183	2129	2180	2124	2180	2124
Effect of EDUCATION at:								
25th %ile of SKILL INTENSITY	-0.08	-0.08	-0.1	-0.07	-0.09	-0.07	-0.09	-0.07
95% Confidence Interval	[-0.14, -0.03]	[-0.12, -0.03]	[-0.15, -0.04]	[-0.11, -0.03]	[-0.14, -0.04]	[-0.11, -0.03]	[-0.14, -0.03]	[-0.11, -0.02]
75th %ile of SKILL INTENSITY	-0.08	-0.09	-0.09	-0.08	-0.09	-0.08	-0.08	-0.07
95% Confidence Interval	[-0.15, -0.02]	[-0.14, -0.03]	[-0.16, -0.03]	[-0.14, -0.03]	[-0.16, -0.02]	[-0.13, -0.02]	[-0.15, -0.01]	[-0.12, -0.02]

Note: Probit coefficients show with robust standard errors (clustered by respondent) in parenthesis. The dependent variable, IMMIGRATION PETITION, is coded 1 for respondents that chose to have an email sent to their Member of Congress on their behalf to support a decrease in immigration and zero otherwise. HIGHLY SKILLED IMMIGRANTS is coded 1 for “highly skilled” and 0 for “low skilled” immigrants. The lower panel shows the simulated effect of EDUCATION (level 2 to level 4) at the 25th and 75th percentile of industry SKILL INTENSITY. See text for details.

questions are substantively unchanged when using instead a more “behavioral” measure of workers’ immigration attitudes.

### 5. Discussion

Taken together, our results suggest that fears about labor market competition do not have substantial effects on voter attitudes toward immigration. We examine potential relationships between the skill levels, industry locations, occupations, and mobility of native workers and their attitudes toward different types of immigrants. We find no evidence that individuals are systematically more likely to oppose the immigration of workers that have skills similar to their own. Rather, workers of all types express greater support for inflows of high-skilled rather than low-skilled immigrants. This preference is almost identical

among high-skilled and low-skilled workers located in all the industries we studied. This pattern is at odds with the basic prediction derived from the FP and (restricted) SF models which anticipate that highly skilled natives should oppose inflows of highly skilled immigrants but be less concerned about the inflow of low-skilled immigrants, if labor-market concerns are an important determinant of attitudes.

While we do find that support for immigration varies across industries, this variation is predominantly explained by individual characteristics of respondents and not by the features of the industries in which they work, such as industries’ reliance on immigrant labor, whether high or low skilled. We replicate all our main results based on stated attitudes toward immigration also using a quasi-behavioral measure of the willingness of survey respondents to sign up to have their views conveyed to their Member of Congress via an email message.

Could the finding that workers *at all levels of skill* are more supportive of high-skilled than of low skilled immigration be interpreted in some alternative way that is more consistent with labor-market concerns shaping immigration attitudes? Perhaps one could argue that the elasticity of substitution between immigrants and natives is quite low among highly skilled workers but high among unskilled workers. If substitutability between high-skilled immigrants and natives is low enough, complementarities in production may imply that inflows of highly skilled foreign workers would generate a positive effect on the wages of highly skilled natives. [Orrenius and Zavodny \(2007\)](#) have suggested that the substitution between immigrant and native workers may be easier in low skilled categories than among highly skilled workers where proficiency in the native language is more likely to be required for satisfactory performance on the job. However, [Ottaviano and Peri \(2012\)](#) provide estimates of the elasticities of substitution between natives and immigrants of similar education and experience levels and find just the opposite: lower elasticities of substitution among less skilled categories of workers. They conclude that imperfect substitutability between immigrants and natives derives from somewhat different skills among these groups leading to different kinds of occupational specialization, especially among less skilled workers. Precisely because low skilled immigrants tend to have lower proficiency in the native language, they are more likely to differentiate themselves from natives in the same skill category by specializing more in manual-intensive tasks. In contrast, well-educated immigrants are more likely to be proficient in the native language and thus can serve more easily as a substitute for native counterparts. If anything, then, negative wage effects from competition with immigrants should be *more* of a concern among high skilled natives contemplating inflows of highly skilled immigrants than among the low skilled natives contemplating low skilled immigration – the opposite of the pattern we observe in our data.

Finally, it is important to note that in this analysis we have focused on the distinction between high-skilled and low-skilled immigrants as the key characteristic shaping divergent expectations about the labor market effects of immigration. In doing so we are keeping the analysis closely in line with the standard theoretical treatments (in the FP, HO, and SF models), and with the previous studies of attitudes toward immigration that focus on voters' concerns about labor market competition ([Scheve and Slaughter, 2001](#); [Mayda, 2006](#)). But why not make more fine-grained distinctions between various specific types of skills that potential immigrants could possess? Why not ask respondents for their views about whether the U.S. should allow more or less doctors to come and live here, or lawyers, or aeronautical engineers, or plumbers, welders, electricians, teachers, and so on? Or why not ask respondents about allowing in more or less immigrants who have exactly the same professional skills as their own? One could ask professional mathematicians, for example, whether they would like more or less foreign mathematicians be allowed to enter ([Borjas and Doran, 2012](#)). Surely, if questions were framed in such ways, respondents might be better able to identify a specific set of potential immigrants with whom they could expect to compete for jobs and who they may thus prefer not be allowed into the country.

If the question is whether or not individuals anticipate labor market competition from some – that is, *any* – specific sets of potential immigrants, and are thus inclined to oppose entry for those specific immigrants, such fine-grained survey questions could be quite useful, although evidence from recent studies that pursue this direction have been mixed. [Malhotra et al. \(2013\)](#) find that when asked specifically about the expansion of H1-B visas – temporary entry permits for predominantly high-technology workers – native workers in the high technology sector are more likely to be opposed than other similarly-skilled natives employed in other sectors. In contrast, [Hainmueller and Hopkins \(2014b\)](#) utilize a conjoint experiment administered to a population-based U.S. survey that randomly varies many different immigrants attributes, including the immigrant's profession, job experiences, and work plans, and find that natives are not less likely to support admission of

an immigrant even if that immigrants shares the same profession as the respondent.

But the core question with which we are concerned here is quite different. This study focuses on the central question addressed in previous scholarship: whether material concerns about labor market competition play an important role in shaping voters' attitudes toward immigration in general – that is, at the level at which immigration policy is publicly debated. Policy debates typically frame the immigration issue in very general terms: whether the country should allow more immigration or less, in total, or whether to try to attract highly skilled immigrants and limit inflows of low skilled (and often also undocumented) immigrants. Rarely do policymakers identify specific types of potential immigrants according to their particular professional skills (doctors, lawyers, plumbers, etc.) and debate how many of each category should be allowed to come and live in the country. The simple framing of the immigration issue in public debates reflects the blunt structure of immigration law and policy. In most countries immigration laws draw only broad distinctions between different types of potential immigrants.<sup>22</sup> U.S. immigration law, for example, defines categories of immigrants (and temporary foreign visitors) according to the general purpose for their entry and the associated eligibility requirements. For foreigners seeking entry to work in the U.S., the existing tracks of entry for permanent residence distinguish “skilled workers” and “priority workers” (including executives, outstanding researchers, and those with extraordinary skills) and eligibility for consideration in these tracks requires proof of educational degrees, work experience, and professional achievements; applicants who do not fit in these categories can apply as “unskilled workers.”<sup>23</sup> In a review of all thirty-two bills voted for in Congress which dealt with immigration in the period from 2000 to 2010, we found that not a single one of them discussed immigration with reference to any specific category of occupation or industry.<sup>24</sup> The political discussions are focused instead on the broader distinction between highly-skilled immigrants and others. This is the politically salient distinction on which we focus on here.

Overall, our results show that concerns about the personal labor market effects of immigration do not appear to be powerful determinants of anti-immigrant sentiment. This is consistent with expectations based upon the standard open-economy HO model and with empirical studies that find negligible labor impacts due to immigration. But it stands in marked contrast to conclusions drawn in previous, prominent studies of voter attitudes toward immigration.

It is worth pointing out that two core findings we report here, that high-skilled immigrants are preferred over low-skilled immigrants by all types of native workers and that support for both high-skilled and low-skilled immigration is strongly increasing in natives' skill levels (measured by educational attainment), seem broadly consistent with alternative accounts of voter attitudes toward immigration that emphasize ethnocentrism and sociotropic considerations about the effects of immigration on the country as a whole (for a review of these accounts see [Hainmueller and Hopkins, 2014a](#)).

For example, many previous studies have examined cultural and ideological factors, including ethnocentrism and nationalism, and how they affect attitudes toward immigration (e.g., [Burns and Gimpel \(2000\)](#); [Chandler and Tsai \(2001\)](#); [Dustmann and Preston \(2007\)](#); [Hainmueller and Hopkins \(2014b\)](#)). In these studies the positive relationship between support for (all types) of immigration and education

<sup>22</sup> Canada and Australia are perhaps the main recent exceptions, both having adopted elaborate point-based systems for selecting immigrant workers in specific occupational categories based upon calculations about local labor market supply and demand and the qualifications and professional experience of the individual applicants.

<sup>23</sup> For foreigners seeking entry to work in the U.S. on a temporary basis, the existing visa categories distinguish those with “extraordinary ability” (the O-1 visa) or who are otherwise “highly skilled” (H-1B) from agricultural workers (H-2A), other seasonal workers (H-2B), and trainees (H-3). The only category of entry for work that is related to skills for a specific industry or occupation is the temporary work visa for nurses (H-1C).

<sup>24</sup> See [Challen \(2011\)](#) for a comprehensive review of U.S. immigration law since 1965.

levels among individuals is attributed to cultural and ideological mechanisms (e.g., Citrin et al. (1997)), since education is strongly associated with greater racial tolerance and stronger preferences for cultural diversity (Chandler and Tsai, 2001; Hainmueller and Hiscox, 2007). Indeed, school and college curricula often explicitly promote tolerance and appreciation for foreign cultures and create inter-ethnic and international social networks, thereby fostering more pro-immigrant attitudes among more educated individuals. Card et al. (2012) have recently examined responses to a large range of questions about the impacts of immigration included in the 2002 European Social Survey and concluded that concerns about cultural effects are 2–5 times more important in explaining variation in attitudes toward immigration than concerns about wages and taxes, and cultural concerns are most acute among respondents with lower levels of education.

An alternative approach to accounting for voters' attitudes toward immigration argues that these attitudes largely reflect perceptions of aggregate effects for the country as a whole. Several studies have suggested that such sociotropic or collective-level information is critical in shaping the views of voters (Kinder and Kiewiet, 1981; Mansfield and Mutz, 2009). If voters commonly perceive that high-skilled immigrants contribute more to the host country than do low skilled immigrants, perhaps in both economic and non-economic ways, these perceptions may account for the observed general preference for high-skilled immigrants. Our survey experiment was not designed to test these alternative accounts of voter attitudes toward immigrants, however, so the conclusions in this regard must be cautious and await additional tests.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.jinteco.2014.12.010>.

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