

Attitudes Towards Highly Skilled and Low Skilled Immigration: Evidence from a Survey Experiment

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ABSTRACT

Past research has emphasized two critical economic concerns that appear to generate anti-immigrant sentiment among native citizens: concerns about labor market competition and concerns about the fiscal burden on public services. We provide direct tests of both models of attitude formation using an original survey experiment embedded in a nationwide U.S. survey. The labor market competition model predicts that natives will be most opposed to immigrants who have similar skill levels to their own. We find instead that both low skilled and highly skilled natives strongly prefer highly skilled immigrants over low skilled immigrants, and this preference is not decreasing in natives' skill levels. The fiscal burden model anticipates that rich natives oppose low skilled immigration more than poor natives, and that this gap is larger in states with greater fiscal exposure (in terms of immigrant access to public services). We find instead that rich and poor natives are equally opposed to low skilled immigration, and rich natives are actually less opposed to low skilled immigration in states with more fiscal exposure than they are elsewhere. We do find that poor natives are more opposed to low skilled immigration in states with greater fiscal exposure than elsewhere, suggesting that concerns about access to or overcrowding of public services contributes to anti-immigrant attitudes.

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I. INTRODUCTION

Why do people oppose or favor immigration? Recent scholarly work examining survey data on individual attitudes towards immigration has generated inconsistent findings and no clear consensus view. Some studies suggest that opposition to immigration is primarily driven by non-economic concerns associated with cultural and ethnic differences between native and immigrant populations (Dustmann and Preston, 2007; Dustmann and Preston, 2006; Espenshade and Hempstead, 1996; Chandler and Tsai, 2001; Citrin, Green, Muste and Wong, 1997; Bauer, Lofstrom and Zimmerman, 2000; Burns and Gimpel, 2000; Fetzer, 2000; Gang, Rivera-Batiz and Yun, 2002). Others argue that economic concerns lie at the heart of anti-immigrant sentiment and that individual attitudes towards immigration are profoundly shaped by fears about labor market competition (Scheve and Slaughter, 2001; Kessler, 2001; Mayda, 2006) and the fiscal burden on public services (Facchini and Mayda, 2007; Hanson, 2005; Hanson, Scheve and Slaughter, 2007). Borjas (1999) identifies these as the two economic issues that have dominated the debate over immigration policy in the United States. But there is no agreement among scholars about the relative impact of these types of concerns or how they compare in importance with non-economic considerations that also motivate anti-immigrant sentiment. These issues are critical for understanding public opposition to immigration and the growth of extremist, often violent, anti-immigrant political movements.

One reason there is no consensus on why people support or oppose immigration is that the data on individual attitudes is ill-suited to testing the theoretical relationships at issue. Studies examining economic concerns about immigration typically begin with a general equilibrium model that generates predictions about how native citizens who own different productive factors and who have different levels of income will view different types of immigrants (highly skilled versus low skilled) (Scheve and Slaughter, 2001; Mayda, 2006; Facchini and Mayda, 2007; Hanson et al., 2007). However, due to data constraints, none of these studies have actually been able to test these specific predictions directly. Instead they have fallen back on indirect tests that leave the interpretation of the results wide open. In

particular, no study to date has actually been able to distinguish between attitudes towards highly skilled immigrants and attitudes towards low skilled immigrants, even though this distinction is a critical feature of the theoretical story about how economic concerns affect attitude formation and policy preferences with respect to immigration.

We conducted a unique survey experiment that, for the first time, explicitly and separately examines individuals' attitudes towards highly skilled and low skilled immigrants. In a nationwide U.S. survey, we randomly assigned respondents to answer questions about immigrants with different skill levels, thereby obtaining an unbiased comparison between the distributions of attitudes towards highly skilled and low skilled immigrants. This comparison, and how it varies with respondent characteristics, allows us to directly test the predictions from the theoretical models about how economic concerns affect attitudes towards immigration.

The experiment yields results that challenge the conclusions reached by previous studies. The labor market competition model predicts that natives will be most opposed to immigrants who have similar skill levels to their own. This is rejected by the data. We find that *both* highly skilled and low skilled respondents strongly prefer highly skilled immigrants over low skilled immigrants, and this preference is not decreasing in respondents' skill levels. Support for *both* highly skilled and low skilled immigration is strongly increasing in respondents' skill levels. In addition, these relationships are similar for the sub-samples of respondents that are currently in or currently out of the labor force. The results suggest that, among native citizens generally, labor market competition is not a significant motivator of anti-immigrant sentiment.

The fiscal burden model anticipates that rich (high income) natives oppose low skilled immigration more than do poor (low income) natives, and that this gap is larger in states with greater fiscal exposure in terms of immigrant access to public services. We find instead that rich and poor natives are *equally* opposed to low skilled immigration, and rich natives are actually less opposed to low skilled immigration in states with more fiscal exposure than they are elsewhere. These results are inconsistent with claims that rich natives are opposed

to low skilled immigrants because they anticipate a heavier tax burden associated with the provision of public services. We do find evidence that poor natives are more opposed to low skilled immigration in states with greater fiscal exposure than they are elsewhere, suggesting that concerns about access to or overcrowding of public services contributes to anti-immigrant attitudes, at least among poorer citizens.

II. ECONOMIC CONCERNS AND ATTITUDES TOWARDS IMMIGRATION

Although immigration may impact the native economy in many ways, recent research has emphasized two critical economic concerns that could generate anti-immigrant sentiment among native citizens: concerns about labor market competition and fears about the fiscal burden on public services. General equilibrium models of the native economy generate a variety of predictions about how natives with particular skill and income characteristics should be affected by inflows of immigrants.

A. Labor Market Competition

Analysis of the income effects of immigration typically begins with a closed-economy general equilibrium “factor-proportions” (FP) analysis (Borjas, Freeman and Katz, 1996; Borjas, 1997; Borjas, 1999). The FP model derives the distributional effects in the native economy from the impact that immigration has on the relative supplies of factors of production. If immigrants have low skill endowments compared with natives, immigration will raise the supply of low skilled labor relative to other factors (including highly skilled labor). These changes in relative factor supplies translate into changes in real factor returns: wages of native low skilled workers will fall as new (low skilled) immigrants price themselves into employment; and, as more low-skilled labor is applied to fixed amounts of the other factors, the real wages of highly skilled workers will rise. The reverse effects are expected in the case of inflows of highly skilled immigrants, which will drive up the real wages of low skilled natives while reducing real returns for highly skilled natives. Depending on what one assumes about wage flexibility, the impact of competition with similarly-skilled

immigrants may also be manifest in higher rates of unemployment among natives.¹ The FP model generates a clear prediction about attitudes towards immigration: natives should oppose immigrants with similar skill levels but favor immigrants with different skill levels. (See appendix A for formal derivations of these relationships).

Empirical studies have found mixed results when testing this model (Harwood, 1986; Gang et al., 2002; Fetzer, 2000; Burns and Gimpel, 2000; Citrin et al., 1997; Dustmann and Preston, 2006), although two prominent articles have recently reported strong supporting evidence. Drawing upon data from the National Election Studies (NES) surveys in the United States in the 1990s Scheve and Slaughter (2001) find a strong positive correlation between respondents' skill levels, as measured by years of education, and stated support for immigration. This correlation is interpreted as evidence that low skilled (less-educated) natives fear being forced to compete for jobs with low skilled immigrants. In a similar study 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), and finds that the probability of voicing pro-immigration opinions is positively associated with the skill levels of survey respondents (again, measured by years of education). Again, this correlation is presented as confirmation that concerns about labor market competition are a powerful motivator of attitudes towards immigrants.

There are several reasons to be wary of these reported findings. First, it is unclear whether respondents can plausibly observe and correctly attribute the income effects of immigration that are anticipated in the FP model. A growing set of empirical studies has examined the effect of immigration on native wages and unemployment, but the evidence remains hotly debated.² Some studies claim large, adverse wage and employment effects

¹Alternative models also allow for geographic concentration of wage and employment effects. See Card (1990) or Borjas (1999).

²For general reviews about the impact of immigration on wages and employment see for example Friedberg and Hunt (1995), Bhagwati (2002), Card (2005), Borjas (1999), and Longhi, Nijkamp and Poot (2005). In a recent study Borjas (2003) summarizes the evidence observing that "the measured impact of immigration on the wage of native workers fluctuates widely from study to study (and sometimes even within the same study) but seems to cluster around zero."

of immigration on less educated workers (Borjas et al., 1996; Borjas, 1997; Borjas, 1999; Borjas, 2003; Borjas, 2005), while others conclude that the immigration effects are at most very small, and possibly insignificant (Card, 1990; Card, 2001; Card, 2007; Lewis, 2005). In a recent study Ottaviano and Peri (2008) find a net positive long-term effect of immigration on average wages of natives. The inconclusiveness of the empirical research on the labor market effects of immigration suggests the need for caution when applying the simple FP to make predictions about attitude formation and interpreting the evidence on attitudes.

Second, in line with the mixed empirical evidence on the impact of immigration, many scholars have pointed out that when we move away from the FP analysis and consider more sophisticated economic models, it becomes very difficult to make clear predictions about the equilibrium effects of immigration on wages and employment opportunities among native workers (see Friedberg and Hunt (1995); Scheve and Slaughter (2001), 135-7). In an open-economy Heckscher-Ohlin model, trade can offset the impact of immigration as the mix of output of tradable goods changes in line with changes in factor supplies. Assuming that the local economy is not large relative to the rest of the world and/or inflows of immigrants are small relative to the local labor supply, local wages will not be affected - the “factor price insensitivity” result (Leamer and Levinsohn, 1995). In an amended open-economy model in which skills of workers are highly “specific” to particular industries (Jones, 1971; Grossman and Helpman, 1994), real income effects are sensitive to the inclusion of non-traded goods. Immigration can lead to a reduction in the price of non-traded goods (by raising the output of such goods more rapidly than it raises aggregate demand for them) and so it becomes unclear whether native workers with skills similar to those of immigrants will be worse off in real terms (this will depend in part on their consumption tastes). In alternative types of open-economy models which allow for economies of scale in production in the industries employing immigrants, inflows of new workers can be shown to generate higher real wages for native workers with similar skills (Brezis and Krugman, 1993). There is, in short, a great deal of theoretical ambiguity about the labor market effects of immigration and the related concerns we should expect to observe among native citizens.

Third, a variety of alternative explanations can readily account for the positive correlation between education and pro-immigration attitudes. Several studies have shown that more educated respondents tend to exhibit higher levels of ethnic and racial tolerance, stronger preferences for cultural diversity, and more economic knowledge, all of which can lead them to favor immigration more than their less educated counterparts (Hainmueller and Hiscox, 2007; Gang et al., 2002; Fetzer, 2000; Chandler and Tsai, 2001; Dustmann and Preston, 2007; Citrin et al., 1997). Existing tests are not equipped to discriminate between these claims and the argument that the association between education and views about immigrants is due to concerns about labor market competition.

Fourth and finally, all the above-mentioned tests that have examined attitudes towards immigration and tried to link them to concerns about labor market competition have relied upon data on responses to survey questions that ask individuals about their attitudes toward immigration *in general* and do not differentiate between highly skilled or low skilled immigrants.³ This is highly problematic because the key prediction of the simple FP model is that natives should oppose immigrants with similar skill levels to their own but support immigrants with different skill levels. Previous tests rely on an assumption that respondents have *low* skilled immigrants in mind when answering questions about immigration in general. This assumption is questionable given that respondents are likely to have systematically varying information and perceptions about the skill attributes of immigrants. More educated respondents may be better informed about current immigration flows, for instance, and are likely to recognize the considerable share of inflows accounted for by skilled foreigners entering many Western nations (often because immigration policies are aimed explicitly at selecting immigrants based on their skill levels). It is well known that

³Scheve 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.”

such varying perceptions can lead to biased estimates in survey research (King, Murray, Salomon and Tandon, 2004; Bertrand and Mullainathan, 2001). And of course, employing this questionable assumption still does not allow one to examine whether the skill levels of natives affects their attitudes towards *highly* skilled immigrants in the expected way. A complete and direct test would ask respondents about their attitudes towards low skilled immigrants and highly skilled immigrants specifically and separately.

The only previous study that comes close to such a test actually reports results at odds with the recent claims that labor market concerns are powerful shapers of attitudes. Hainmueller and Hiscox (2007) investigate survey data for 22 European countries from the European Social Survey (ESS), in which respondents were asked about their attitudes towards immigration from “richer” and “poorer” countries, a difference that bears upon the expected average skill levels of immigrants. They find that in all 22 countries people with higher education levels (and/or higher levels of occupational skills) are more likely to favor immigration regardless of where the immigrants come from and their likely skill attributes. In addition, the positive link between education and support for (all types of) immigration is almost identical among those in the labor force and those not in the labor force.

Taken together, the existing theory and evidence on whether concerns about labor market competition are a strong motivator of anti-immigrant sentiment remain ambiguous. At the very least, more complete and direct empirical tests are necessary.

B. The Fiscal Burden of Public Services

The second critical economic concern associated with immigration involves the immigrants’ use of public services (including public education and health services, and various types of welfare assistance, as well as basic services like police and fire protection, roads, and parks and amenities) and their contribution to tax revenues. The standard approach to the analysis is to incorporate a simple model of public finance into the FP analysis of immigration (Facchini and Mayda, 2007; Hanson, 2005; Hanson et al., 2007). This approach allows that immigration can affect not only the pre-tax incomes of native individuals, it

can separately affect after-tax incomes via taxes and transfers. The predictions depend on two key assumptions about (1) the net contribution of low and highly skilled immigrants to the tax coffers and (2) the institutional mechanism in place to adjust taxes and transfers in response to fiscal imbalances. It is assumed that low skilled immigrants impose a substantial net burden on public finance, while highly skilled immigrants are net contributors in terms of taxes. There are two plausible institutional mechanisms that have been considered, assuming the government must balance its budget: a change in tax rates or a change in per capita transfers (see Facchini and Mayda (2007)).⁴ In the most commonly studied scenario, assuming the government adjusts tax rates while keeping per capita transfers constant, the prediction is that rich (high income) natives should prefer highly skilled over low skilled immigrants more than do poor (low income) natives, since the skill levels of immigrants determine their fiscal impact and progressivity in taxation implies that the rich benefit (lose) more from any associated reduction (increase) in taxes. In the alternative scenario, assuming the government adjusts per capita transfers but holds tax rates constant, the prediction is the opposite: poor natives prefer highly skilled over low skilled immigrants more than rich natives, since low skilled immigrants tend to crowd out poor natives in terms of access to public services while rich natives are unaffected. (See appendix A for formal derivations of these relationships).

Two recent empirical studies have examined these claims. Hanson et al. (2007) use NES survey data to compare individual attitudes towards immigration in different U.S. states and find that rich individuals are less likely to support immigration in states that are highly exposed to fiscal costs as a result of immigration (i.e., states with generous public services and high rates of immigrant settlement) than in states with lower exposure. This finding is interpreted as confirmation that, as expected in the scenario in which the government adjusts taxes to meet new spending obligations, rich natives fear being burdened with higher taxes as a consequence of low skilled immigrants drawing on public services

⁴Borrowing would be a third option, but as there are constitutional constraints on borrowing by state governments in the United States, and the underlying model is static, standard analyses do not consider this possibility (Hanson et al., 2007; Facchini and Mayda, 2007).

and draining government coffers. Facchini and Mayda (2007) examine the cross-national survey data from the ISSP and find that respondent income is negatively correlated with support for immigration in countries where low skilled immigrants are a larger share of total immigration inflows. This finding is also regarded as evidence that fears about higher taxes among rich natives, linked to use of public services by low skilled immigrants, leads to anti-immigrant sentiments.

Again, there are reasons to treat these findings with considerable caution. There is clear evidence that immigrants rely more on welfare programs than do native citizens (Borjas, 1999; Zimmerman and Tumlin, 1999; Fix and Passel, 2002; Hanson, 2005), as immigrant households tend to be larger and poorer than native households. There is more disagreement, however, over the extent to which immigrant inflows increase net tax burdens on natives (Fix, Passel and Enchautegui, 1994; Smith and Edmonston, 1997). A U.S. study conducted by the National Research Council (NRC) reported that the average immigrant to the United States could be expected to impose a tax burden on natives in the short term, but would be a net contributor to tax coffers in the long term, to the tune of \$80,000 (see Smith and Edmonston (1997)).⁵ Estimating the long term fiscal consequences of immigration in a dynamic model of public finance is very difficult, of course, and requires taking into account fiscal contributions made by successive generations of immigrant and native families. For rich countries with aging workforces, in particular, the long term public finance gains from importing young workers likely outweigh the costs (Krugman and Obstfeld, 2000). Perhaps short term fiscal effects dominate longer term effects in shaping attitudes among native citizens, but the evidence is complicated enough to suggest caution when claiming that fears about the tax effects of immigration are a strong motivation for anti-immigrant sentiments.

Quite separately, the finding that tax considerations among natives play a strong role, and actually trump concerns about cuts in per capita welfare benefits, seems especially

⁵The study reports findings in 1996 dollars. The NRC study did report that tax affects vary depending on the skill levels of immigrants: immigrants with an education beyond high school contribute an average of \$105,000 to U.S. tax coffers over their lifetime, while the least educated immigrants create a net deficit of \$89,000 per person (Smith and Edmonston, 1997).

surprising in the United States. Evidence on recent fiscal experiences of U.S. states seems inconsistent with this claim. While states gained broad discretion over welfare policies following the welfare reform of 1996, they have not systematically raised taxes in recent years even though immigration has increased. In fact, as shown in Figure 1, looking across the states there exists, if anything, a negative correlation between changes in state income tax rates and levels of immigration. States that experienced higher increases in their foreign born populations between 1990 and 2004 had smaller increases (or larger cuts) in the average marginal tax rates than states with smaller immigrant inflows over the same time period.⁶ It seems unlikely, then, that U.S. survey respondents could be drawing on personal experience to attribute tax hikes to immigration.

On the other hand, a recent study that looks at the link between immigration and U.S. state welfare expenditures in particular, finds strong support for the so called “erosion hypothesis.” Hero and Preuhs (2007) examine data on welfare spending for all U.S. states in 1998 and find that states with larger noncitizen populations tend to provide smaller cash benefits in their welfare programs, and this effect is larger the more accessible the welfare programs are to immigrants. In Figure 2 we plot changes in state public welfare expenditures per capita against changes in the immigrant population. There is a negative correlation between the two. While all states have expanded per capita welfare expenditures over time, the increases have been smaller in states that experienced larger increases in the share of immigrants in their population.⁷ This pattern, taken together with the evidence on state taxes discussed above, suggests that fears about the erosion of welfare benefits as a result of immigration may actually be more relevant and plausible than worries about tax hikes.

⁶For both tax rates and the percent foreign born population, changes are computed as the level in 2004 minus the level in 1990. Tax rates are average marginal state tax rates on wages taken from the NBER state tax database (Feenberg and Coutts, 1993) available at <http://www.nber.org/~taxsim/state-marginal/>. Income taxes are dollar weighted average marginal income tax rates as calculated by the NBER TAXSIM model from micro data for a sample of US taxpayers. The results are very similar if tax rates on other sources of income are used (i.e., taxes on interest received, dividends, pensions, or property tax, etc.). Data on the percent foreign born is taken from the US Census 1990 and the American Community Survey 2004.

⁷Public welfare expenditures are taken from the U.S. Census of Governments (see appendix B for more details on the welfare spending measures).

Finally, it should be noted again that the survey-based tests summarized above are indirect and incomplete. Like the studies that examine concerns about labor market competition, these tests rely upon data on responses to NES and ISSP survey questions that ask individuals about their attitudes toward immigration *in general*, not about their attitudes toward highly skilled or low skilled immigrants specifically. They rest on the problematic assumption that all respondents actually have low skilled immigrants in mind when answering these survey questions about immigration. And employing this assumption still only allows a partial test of the theory: it does not allow one to test whether the incomes of natives affects their attitudes towards *highly* skilled immigrants in the expected way. Again, a complete and appropriate test would ask people about their views on low skilled immigrants and high skilled immigrants specifically.

In sum the existing research examining whether attitudes towards immigrants are strongly shaped by concerns about labor market competition and fears about the fiscal burden on public services does not provide convincing conclusions. Most importantly, as a result of data constraints, these studies have not been able to provide direct tests of the relevant theoretical propositions. Instead they rely upon indirect tests that leave the interpretation of the results in doubt. No study to date has been able to distinguish between attitudes towards highly skilled immigrants and attitudes towards low skilled immigrants, even though this distinction is a critical feature of the theoretical story. Below we describe our experiment aimed at addressing this shortcoming.

III. THE SURVEY EXPERIMENT

A. Design

Our experiment was embedded in the Cognitive Styles Survey (CSS), a survey instrument designed to study opinions regarding trade and immigration. The CSS was administered by the research firm Knowledge Networks (KN) and fielded as an internet based questionnaire to a randomly selected sample of 2,285 panel members between December 2007 and January 2008. KN recruits members for its research panel based on probability sampling that

covers both the online and offline U.S. populations aged 18 years and older.⁸ The sampling procedure for the CSS thus constitutes a two-stage equal probability design. The completion rate for the CSS was about 70 percent, yielding 1,600 completed interviews. The final respondent data was adjusted for the common sources of survey error (non-response, coverage error, etc.) using post-stratification weights.⁹ The rate of item non-response was very low, below 1 percent for the questions we use in the analysis below.

For the core experiment, we randomly allocated respondents to two groups of equal size and presented each group with one of two versions of the survey question about immigration:

Version 1: *Do you agree or disagree that the US should allow more highly skilled immigrants from other countries to come and live here?*

Version 2: *Do you agree or disagree that the US should allow more low skilled immigrants from other countries to come and live here?*

Answer options (both versions):

Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
1	2	3	4	5

The two question versions differed only in that they described the immigrants’ skill level as either “*highly skilled*” or “*low skilled*.”¹⁰ Accordingly, for half the respondents, referred to as the treatment group, we measured preferences over highly skilled immigration while for the other half, referred to as the control group, we measured preferences over

⁸Panel members are randomly selected using list-assisted random digit dialing (RDD) sampling techniques on the sample frame consisting of the entire U.S. residential telephone population. Households are provided with access to the Internet and hardware if needed. Unselected volunteers are not allowed to join the KN panel.

⁹Poststratification also serves the purpose of improving precision of the estimates. Weights are raked to adjust to the demographic and geographic distributions from the March Supplement of the 2007 Current Population Survey (CPS).

¹⁰In order to improve precision the random assignment to the two different versions of the question was blocked on four education levels (the four levels are described below).

low skilled immigration. Randomization ensured that the two groups of respondents are (in expectation) identical in all other observed and unobserved characteristics that may confound a comparison across groups.¹¹

The general distribution of preferences over both highly skilled and low skilled immigrants is displayed in Figure 3. For both types of immigration the barplots show the fraction of respondents answering each of the five answer categories; the superimposed whiskers decode the upper .95 confidence interval derived from the design based variance estimator. Two features stand out in this graph. First, in line with previous studies, our survey once again confirms the profound divide among the American public in opinions on immigration. Pooling over both types of immigration, about 50 percent of the respondents oppose an increase in immigration, while about 25 percent favor it. Second and more importantly, our findings for the first time document the fact that preferences over immigration vary rather dramatically depending on the immigrants' skill levels. While more than 60 percent of the respondents (in the control group) state that they strongly disagree or somewhat disagree with an increase in low skilled immigration, only 40 percent of the respondents (in the treatment group) are opposed to an increase in high skilled immigration. Due to the randomization we know that this statistically significant difference between the two distributions is entirely driven by the perceived differences in the skill attributes of the immigrants.

IV. EMPIRICAL TEST I: THE LABOR MARKET COMPETITION MODEL

A. *Skill Levels of Natives*

If concerns about labor market competition are important in shaping attitudes towards immigration we expect, in line with the FP model of attitude formation, that natives should oppose immigrants with similar skill levels but favor immigrants with different skill levels. That is, we should expect that the skill levels of our survey respondents should have a large and *positive* relationship with support for *low skilled* immigrants and a large and

¹¹We conducted balance tests by comparing the means and variances in both groups for a large set of covariates and they all confirmed that (as expected given the large sample size) randomization balanced the distributions evenly. Results are available upon request.

negative effect on support for *highly skilled* immigrants.

In order to conduct an explicit test of this argument we follow previous studies and employ educational attainment as our measure of respondent skill levels (Mayda and Rodrik, 2005; Facchini and Mayda, 2007; Scheve and Slaughter, 2001; Hanson, Scheve and Slaughter, 2008; Hanson et al., 2007). This measure, which we label EDUCATION, is a categorical indicator of the highest level of education attained by the respondent. The coding is: 1=Not completed high school education, 2=High school graduate, 3=Some college, 4=Bachelor's degree or higher. Alternatively, we also use a set of binary indicator variables called HS DROPOUT, HIGH SCHOOL, SOME COLLEGE, BA DEGREE that are coded one if a respondent belongs to the respective category of EDUCATION and zero otherwise. Summary statistics for all variables used in the analysis are provided in appendix C.

B. Attitudes towards Highly and Low Skilled Immigrants and Natives' Skill Levels

Figure 4 plots the distributions of preferences conditional on respondents' skill levels. The results suggest two key findings. First, regardless of the respondents' skill level, highly skilled immigrants are strongly preferred over low skilled immigrants. Second, in stark contrast to the predictions based on the theoretical model, we find that support for both types of immigration is increasing (at a roughly similar rate) with respondents' skill level. For example, while only 7 percent of the least skilled respondents (those who did not finish high school) favor an increase in low skilled immigration, 29 percent favor an increase in highly skilled immigration. However, we find a similar preference differential among the most highly skilled respondents (those with at least a bachelor's degree): only 31 percent prefer an increase in low skilled immigration but more than 50 percent prefer an increase in highly skilled immigration.

Taken together these results are at odds with the claim that concerns about labor market competition are a driving force in shaping attitudes towards immigration. Instead, the results are consistent with previous findings indicating that people with levels of higher education are more likely to favor immigration (for a variety of other economic and non-economic reasons) regardless of immigrants' skill attributes (Hainmueller and Hiscox, 2007).

C. Formal Tests of the Labor Market Competition Model

We created a binary indicator variable, HSKFRAME, coded one if the respondent i received the question about *highly skilled* immigrants and zero if he or she received the question about *low skilled* immigrants. The observed support for immigration is measured by the categorical variable PROIMIG which takes on the integer value associated with one of the five answer categories $j = (1, 2, \dots, 5)$ from “strongly disagree” to “strongly agree” respectively. Let PROIMIG* be an unobserved continuous variable (with $-\infty \leq \text{PROIMIG}^* \leq \infty$) that represents a respondent’s latent support for allowing in more immigrants. Both PROIMIG and PROIMIG* measure support for highly skilled or low skilled immigration depending on a respondent’s assignment given by HSKFRAME. We model latent support for immigration by an ordinal probit model:

$$\text{PROIMIG}_i^* \sim N(\mu_i, 1) \quad \text{where} \quad \mu_i = X_i\beta \quad (1)$$

and X_i is the row vector of observed respondent characteristics. The mapping of PROIMIG_i^* to PROIMIG_i is $\text{PROIMIG}_i = j$ if $\lambda_{j-1} \leq \text{PROIMIG}_i^* \leq \lambda_j$, with thresholds $\lambda_l \in \{(\lambda_0, \dots, \lambda_5) | \lambda_0 = -\infty \wedge \lambda_5 = \infty \wedge \lambda_l < \lambda_{l+1}\} \forall l = (0, \dots, 5)$. Therefore, $p_{ij} = P(\text{PROIMIG}_i = j) = \Phi(\lambda_j | \mu_i) - \Phi(\lambda_{j-1} | \mu_i)$ where $\Phi(\cdot)$ is the normal cumulative density function with unit variance and mean μ_i . We estimate the coefficient vector β and the thresholds λ_1 through λ_{j-1} by maximising the log pseudolikelihood function:

$$\ln L = \sum_{i=1}^N w_i \sum_{j=1}^J \mathbf{1}\{\text{PROIMIG}_i = j\} \ln p_{ij} \quad (2)$$

where w_i is the poststratification weight and $\mathbf{1}\{\}$ is the indicator function. For all uncertainty estimates we employ the robust linearized variance estimator that yields the valid design based inferences.¹²

¹²Let $S(\beta) = \frac{\partial \ln L}{\partial \beta}$ be the score function where $\hat{\beta}$ is estimated by solving $\hat{S}(\beta) = 0$. Following a first order Taylor series expansion the linearized variance estimator is then given by $\hat{V}(\hat{\beta}) = DV\{\hat{S}(\beta)\}|_{\beta=\hat{\beta}}D'$ where $D = \{\frac{\partial \hat{S}(\beta)}{\partial \beta}\}^{-1}$.

To explicitly test the labor market competition argument, we estimate the following specification:

$$\mu_i = \alpha + \gamma \text{HSKFRAME}_i + \delta (\text{HSKFRAME}_i \cdot \text{EDUCATION}_i) + \theta \text{EDUCATION}_i + Z_i \psi \quad (3)$$

where the parameter γ directly identifies the premium that natives attach to highly skilled immigrants relative to low skilled immigrants. If γ is positive this indicates that highly skilled immigrants are preferred relative to low skilled immigrants. If γ is negative this indicates that low skilled immigrants are preferred relative to highly skilled immigrants. The parameter δ captures how the premium for highly skilled immigration varies conditional on the skill level of the respondent.

The key predictions based on the standard model of labor market competition are as follows: For the least skilled respondents with $\text{EDUCATION}_i = 1$ (those who did not finish high school) we expect strong support for highly skilled over low skilled immigration so that $\gamma + \delta \cdot 1 > 0$. For the most highly skilled respondents with $\text{EDUCATION}_i = 4$ (those with bachelor's degree or higher) we expect the exact opposite $\gamma + \delta \cdot 4 < 0$. In other words, low skilled immigration is preferred over highly skilled immigration. Taken together this implies that δ is negative, fairly large in magnitude ($|\gamma| > \delta/4$), and statistically significant.

In our second test specification we relax the assumption of linearity in the premium for highly skilled immigration and estimate:

$$\mu_i = \alpha + \gamma \text{HSKFRAME}_i + \sum_{k \in \{1,2,4\}} \delta_k (\text{HSKFRAME}_i \cdot \mathbf{1}\{\text{EDUCATION}_i = k\}) + \sum_{k \in \{1,2,4\}} \theta_k \mathbf{1}\{\text{EDUCATION}_i = k\} + Z_i \psi \quad (4)$$

This specification allows for a different premium conditional on each of the four skill categories HS DROPOUT, HIGH SCHOOL, SOME COLLEGE, BA DEGREE. Notice that we use SOME COLLEGE (respondents that have some college education but did not graduate) as our reference category so that γ identifies the premium estimated for this skill level. Accordingly, $\gamma + \delta_1$, $\gamma + \delta_2$, and $\gamma + \delta_4$ identify the premia estimated for those respondents

in the categories HS DROPOUT, HIGH SCHOOL, and BA DEGREE. The key prediction is that $\gamma + \delta_1$ is positive and significant while $\gamma + \delta_4$ should be negative and significant.

We also enter a basic set of socio-demographic covariates Z including the respondent's age (in 7 age brackets), gender (female=1,male=0), and race (four dummies for White, Hispanic, Black, and Other) in all specifications. The covariates are simply included here to increase the comparability of some of the coefficients with previous studies. Notice that thanks to the randomization (and the large sample size) the exact covariate choice does not affect the results of the main coefficients of interest.¹³

D. Results for Tests of the Labor Market Competition Model

Results for the tests are shown in Table 1. In the first two columns we separately regress attitudes towards highly skilled and low skilled immigration on respondents' skill level (measured by educational attainment) and the set of covariates. Following the labor market hypothesis we would expect that the support for low skilled (highly skilled) immigration should increase (decrease) in respondents' skill level. In contrast we find that the correlation between respondents' skill level and support for immigration is positive and significant for both types of immigration (columns one and two). In fact, we cannot reject the null hypothesis that the effect of respondents' skill on support for increased immigration is identical for highly skilled and low skilled immigrants ($p=0.21$).

The next three models implement our main experimental tests. To identify the premium attached to highly skilled relative to low skilled immigrants we use PROIMIG as our dependent variable and regress it on the indicator HSKFRAME that denotes whether a respondent received the frame about highly skilled immigrants rather than the question about low skilled immigrants. Results are shown in column three. The high skill frame indicator enters positive and highly significant indicating that on average highly skilled immigrants are strongly preferred to low skilled immigrants. Column four includes the interaction of HSKFRAME with respondents' skill level, measured by EDUCATION. The

¹³All results are substantively identical if additional (pre-treatment) covariates (like marital status, geographic indicators, etc.) or no covariates at all are used. Results available upon request.

interaction term enters with the expected negative sign, but it is statistically insignificant and the point estimate is very small in substantive terms. This result suggests that, in contrast to expectations based on the labor market competition model, the premium attached to highly skilled immigration does *not* vary significantly with respondents' skill level. In column five we also drop the linearity assumption regarding the effect of respondents' skill level and replace EDUCATION with our set of dummy variables that indicate the highest level of educational attainment (SOME COLLEGE is the reference category) plus all interactions with the high skill question frame. We find that not one of the interaction terms is significantly different from zero. A Wald test against the null that all interaction terms are jointly zero yields a p-value of (0.61) indicating that the variation in the premium attached to highly skilled immigration among differently skilled respondents is not significant.

Taken together these results reveal several striking features regarding the dynamic of respondents skill levels' and immigration preferences. In order to give some sense of the substantive magnitudes involved we simulate the predicted probability of supporting an increase in immigration (answers "somewhat agree" and "strongly agree" that the U.S. should allow more immigration) for the median respondent (white women aged 45) for all four skill levels and both immigration types based on the least restrictive model (model five in Table 1). Figure 5 shows the results and summarizes our key findings for the tests of the labor market competition argument.

First, in contrast to the predictions from the labor market competition model, support for both low and highly skilled immigration is steeply increasing in respondents' skill levels. This increase in the probability of supporting immigration is very large in substantive terms. For example, for highly skilled immigration it ranges from 0.23 [0.18; 0.26] among respondents who did not finish high school to 0.40 [0.35; 0.45] among college graduates (the numbers in square brackets give the .95 percent confidence interval). Furthermore, the increase is not linear, but instead is particularly pronounced for the gap between respondents who have a college education and those who do not. This plateau effect is in line with findings in some previous studies (Hainmueller and Hiscox, 2007; Chandler and Tsai, 2001)

showing that exposure to university education seems to be the critical contributor to the generally positive relationship between education and support for immigration.

Second, regardless of the respondents' skill level, highly skilled immigrants are much preferred over low skilled immigrants. This finding is at odds with the expectation from the standard model of labor market competition that highly skilled natives should oppose inflows of highly skilled immigrants and support inflows of low skilled immigrants. On average (i.e., across the four skill levels), the predicted probability of supporting highly skilled immigration is about 0.15 higher than the probability of supporting low skilled immigration and this difference is highly statistically significant.

Third, and again in contrast to expectations based on the labor market competition argument, there seems to be no systematic variation in the premium attached to highly skilled immigrants across respondents' skill level. As clearly indicated by the dashed lines that connect the predicted probabilities for each type of immigration, the step function that describes increased support for immigration with rising skill levels among respondents is quite similar for the two types of immigration. The relative differences in predicted probabilities of supporting highly skilled versus low skilled immigration are 0.17 [0.13; 0.20] for respondents who did not complete high school, 0.12 [0.10; 0.14] for high school graduates, 0.15 [0.12; 0.18] for those with some college education, and 0.17 [0.13; 0.21] for college graduates. The differences are not significantly different and do not have opposite signs, as predicted by the labour market competition model. This is most evident when considering the two dotted lines that connect the predicted support for the lowest and highest skill levels. The lines are almost exactly parallel in slope. This suggests that there is very little interaction between respondents' and immigrants' skill type in accounting for immigration preferences, and the results are sharply at odds from the expectation if labor market concerns were exercising a powerful influence (we would see a scissoring of these two slope lines).

Finally, columns 7 and 8 in Table 1 present the results for the split sample tests that compare the relationship between respondents' skill levels and attitudes towards highly

skilled and low skilled immigrants in the in-labor-force and the out-of-labour-force samples. Previous tests of the labor market competition model (Scheve and Slaughter, 2001; Mayda, 2006; Hainmueller and Hiscox, 2007) have relied on similar tests, based on the idea that if labor market concerns are a driving factor in attitudes towards immigration, we should see marked differences across the two samples.¹⁴ We find that the results are almost identical across the two sub-samples; in both cases highly skilled immigrants are preferred over their low skilled counterparts and this premium does not vary significantly with respondent skill level. This pattern is again inconsistent with what we would expect if concerns about labor market competition are shaping attitudes towards immigration.

V. EMPIRICAL TEST II: THE FISCAL BURDEN MODEL

A. *Income and Fiscal Exposure to Immigration Across U.S. States*

While the effect of immigration on natives via the labor market is modeled as a function of natives' skill levels, the impact of immigration via public finance is modeled as a function of natives' income (Facchini and Mayda, 2007; Hanson et al., 2007). Progressivity in tax systems means that high-income natives pay more as a result of tax hikes (or benefit more from tax cuts) than do low-income natives; in addition, many types of public services and assistance are means-tested programs accessible only to low-income individuals. We construct a categorical variable called INCOME, which indicates a respondent's position in the income distribution. This coding ranges from 1 to 4 depending on whether a respondent belongs to the first, second, third, or fourth quartile of the household income distribution.¹⁵

To test the predictions of the standard fiscal burden model we also need a measure of natives' potential exposure to the effects of immigration on government taxes and expenditures. In the case of U.S. natives, this will depend upon the state in which they reside (and pay taxes). We follow Hanson et al. (2007) and examine variation in fiscal exposure

¹⁴Consistent with these previous tests, our in-labour-force sample consists of full time, part time, and self employed respondents. The out-of-labour-force sample includes homemakers, retired, disabled, and other and those unemployed but looking for work. Alternative codings, such as including the unemployed in the in-labour force sample, leads to similar results (available upon request).

¹⁵Notice that our measure of household income has no missing data and is presumably fairly accurate because it is obtained from all KN panel members directly as part of the panel recruitment process.

to immigration across the U.S. states. In general, the fiscal impact of immigrants should be strongest in states that have both a relatively large share of welfare reliant immigrants and a relatively generous welfare system. Hanson et al. (2007) note that measuring fiscal exposure to immigration is difficult, however, because individuals use public services in many forms: they use public safety, roads, parks, transportation, education, and healthcare, for example, as well as welfare programs. Furthermore, immigrants will contribute taxes and use public services and assistance to various degrees depending on both state policies and the characteristics of the immigrant population (e.g., income levels, family size, age, legal status, etc.). Hanson et al. (2007) construct two simple measures of fiscal exposure that focus only on state-level welfare spending, setting aside other types of spending and also immigrant tax contributions. In order to keep the analysis consistent with previous work we have reconstructed these two measures. We use the same data sources and the same coding approach, but employ data for the most recent years available (the 2006 American Community Service and the 2006 U.S. Census of Governments) to stay as close as possible to the time when our survey was fielded. Here we briefly describe the two measures (see appendix B for details).

Their first measure, FISCAL EXPOSURE I is equal to one for all states that meet two conditions: first, a high *total public welfare spending* per native household by state and local governments (states are coded as high welfare spending if they are above the national median on this measure); second, a high ratio of immigrant to native households (states are code as high if they exceed the mean ratio across all the states). Our reconstructed measure for 2006 is summarized in the left panel of Figure 6 where the super-imposed dotted lines indicate the cutoff values for both axes. The nine states in the upper right corner are classified as having a high level of fiscal exposure to immigration.¹⁶ Following Hanson et al. (2007) we also code a binary indicator called IMMIGHIGH that just identifies states that have a high ratio of immigrant to native households: IMMIGHIGH is coded

¹⁶Notice that we slightly refine the original measure by using the mean instead of the median welfare spending per native household as the cutoff for the first condition because it provides a much more natural cutoff in the data for 2006. All results are substantially identical if the median rate is used instead. Results available upon request

as a one if the ratio is above the mean state immigrant-to-native household ratio and zero otherwise.¹⁷ Notice that (by definition of FISCAL EXPOSURE I) all high fiscal exposure states are also high immigration states, but there are a few states with high immigration that are coded as having low fiscal exposure.

The second measure used by Hanson et al. (2007), FISCAL EXPOSURE II, is equal to one for states in which the ratio of immigrant households receiving cash forms of public assistance relative to the total number of native households exceeds a specified threshold (0.012). Our measure for 2006 is reported in the right panel of Figure 6. In our data, the exact same threshold (0.012) provides the natural break in the distribution. Seven states are marked as facing high fiscal pressure; Texas is the state just below the cutoff point. Overall the two fiscal exposure measures are highly correlated ($r=.64$) and agree on 46 of the 51 states. The classifications are almost identical to the ones originally used by Hanson et al. (2007).¹⁸ Notice that conceptually FISCAL EXPOSURE I is the preferred measure of Hanson et al. (2007) because in contrast to FISCAL EXPOSURE II it includes non-cash benefits. However, it is important to note that FISCAL EXPOSURE I is based on a measure of general welfare spending and does not account for actual welfare uptake by immigrants and natives (captured, at least in part, by FISCAL EXPOSURE II).

B. Attitudes towards Highly and Low Skilled Immigrants, Natives' Income, and Fiscal Exposure

Figure 7 plots the distribution of attitudes towards both highly skilled and low skilled immigration conditional on respondent income and the first measure of immigrant fiscal exposure (FISCAL EXPOSURE I).¹⁹ To avoid a cluttering of the plot we focus on the fraction of respondents that is opposed to immigration (answers “somewhat disagree” and “strongly disagree” that the U.S. should allow more immigration) in each of the subsets

¹⁷In Figure 6 these are all states to the right of the dotted vertical line.

¹⁸For example, regarding FISCAL EXPOSURE II the list of states marked as high exposure differ by only a single state. For FISCAL EXPOSURE I all but six states seem to agree with certainty and for the others we cannot determine this with certainty as information on the cutoff values is missing in Hanson et al. (2007).

¹⁹The results are virtually identical if we use FISCAL EXPOSURE II instead.

defined by income, fiscal exposure, and immigration type. Two main findings emerge from the data.

First, the relationship between natives' income levels and attitudes towards highly skilled immigration is quite similar in high and low fiscal exposure states. Opposition to highly skilled immigration seems to be slightly lower among the richest natives than among the poorest natives, but this is true for both high and low fiscal exposure states. This finding seems at odds with what one would expect based upon the standard fiscal burden model, as opposition to highly skilled immigration should fall at a faster rate with income in those states that face a high fiscal exposure (given that highly skilled immigrants would relax the budget constraint through their net contributions to the tax coffers).

Second, the relationship between natives' income levels and attitudes towards low skilled immigration does vary dramatically between high and low fiscal exposure states. Opposition to low skilled immigration is increasing with respondent income in low exposure states, but the opposite is true for high fiscal exposure states where the richest natives are more welcoming of low skilled immigration than the poorest natives. This pattern is fundamentally inconsistent with the conventional wisdom that rich natives fear being burdened with higher taxes as a consequence of low skilled immigrants drawing on public services and draining government coffers. Instead, the results are more consistent with the alternative argument that poor natives should be the most vocal opponents of low skilled immigration in high fiscal exposure states because they fear increasing competition for public services and the erosion of welfare benefits.

C. Formal Tests of the Fiscal Burden Model

In order to formally test the fiscal burden model we estimate a series of ordered probit estimations with the following specification:

$$\mu_i = \alpha + \gamma \text{HSKFRAME}_i + \phi (\text{HSKFRAME}_i \cdot \text{INCOME}_i) + \tau \text{INCOME}_i + Z_i\psi \quad (5)$$

where the parameter γ directly identifies the premium that natives attach to highly skilled over low skilled immigration and ϕ captures how the premium for highly skilled immigration

varies conditional on the income level of the respondent. We estimate the models separately for the high and low fiscal exposure states and enter our basic set of socio-demographic covariates including the respondents age (in 7 age brackets), gender (female=1,male=0), and race (four dummies for White, Hispanic, Black, and Other) in all specifications. We also include respondent's education to each model, although the results are substantially identical if education is excluded.²⁰

The key prediction from the standard fiscal burden model is that rich (high income) natives should attach a larger premium to highly skilled relative to low skilled immigrants than do poor natives, and the difference should be larger in states with high fiscal exposure to immigration than in states with low exposure. This means that we should expect ϕ to be positive and significant in states with a high fiscal exposure to immigrants and significantly smaller (perhaps zero) in low fiscal exposure states. This standard model assumes that taxes are adjusted to balance budgets, so natives attitudes reflect their concerns about tax rates. The alternative type of argument assumes that states adjust per capita transfers but hold tax rates constant, and makes an opposite prediction: rich natives prefer highly skilled over low skilled immigrants *less* than poor natives, and the difference should be larger in states with high fiscal exposure to immigrants than in states with low exposure. Accordingly we would instead expect ϕ to be negative and significant in the states with a high fiscal exposure to immigrants and significantly smaller (perhaps zero) in low fiscal exposure states.

Finally, we also re-estimate all models relaxing the linearity assumption using the following specification:

$$\begin{aligned} \mu_i = & \alpha + \gamma \text{HSKFRAME}_i + \sum_{k \in \{1,2,4\}} \phi_k (\text{HSKFRAME}_i \cdot \mathbf{1}\{\text{INCOME}_i = k\}) + \\ & \sum_{k \in \{1,2,4\}} \tau_k \mathbf{1}\{\text{INCOME}_i = k\} + Z_i \psi \end{aligned} \quad (6)$$

This specification allows for a different premium conditional on each of the four income quartiles, which we label INCOMEQ1 to INCOMEQ4. Notice that we use INCOMEQ3

²⁰Results available upon request.

(respondents that fall in the third quartile of the income distribution) as our reference category.

D. Results for the Tests of the Fiscal Burden Model

The upper panel in Table 2 presents the estimation results. In the first column we estimate the model for all states. We find that income is associated with increased support for immigration. However, the premium attached to highly skilled over low skilled immigrants does not systematically vary across respondents' income levels; the coefficient for the interaction term between the high skill frame and the income variable enters insignificant and small in magnitude. In columns 2 and 3 we restrict the estimation to the sub-samples of states that are characterised by a high level of fiscal immigrant exposure according to the two measures FISCAL EXPOSURE I and II. Strikingly, the interaction terms in both subsamples now enter negative, fairly large in magnitude, and significant at conventional levels. This indicates that in high fiscal exposure states the premium attached to highly skilled immigration relative to low skilled immigration is decreasing in respondents' income level. This finding is clearly inconsistent with the conventional fiscal burden argument and the findings reported in previous studies. The finding is consistent, however, with the alternative argument according to which low income natives in high fiscal exposure states are likely to fear the erosion of welfare benefits as a consequence of low skilled immigration.

We find no such interaction in low fiscal exposure states, as shown in columns 4 and 5. In fact the interaction terms are almost exactly zero. In the last two columns 6 and 7 we further restrict the sub-samples to states with low fiscal exposure but high levels of immigration (as measured by the IMMIGHIGH variable). Again we find no interaction between the high skilled question frame and respondents' income levels. Taken together these two results suggest that the negative relationship between respondent income and the premium attached to highly skilled immigrants relative to low skilled immigrants is indeed driven by the levels of fiscal exposure and not by levels of immigration per se.

The lower panel of Table 2 presents the results when we also relax the linearity assumption in the interaction between respondents' income and preferences towards highly skilled

and low skilled immigration. The findings are broadly similar to our previous findings, although they suggest that the main dividing line in attitudes towards highly skilled relative to low skilled immigrants seems to be the transition from the second to the third quartile of the income distribution. In the high fiscal exposure states (models no 9 and 10) the interaction terms for both the lowest and the second lowest income dummies enter positive and with large magnitudes and are (jointly) highly significant, indicating that these two groups of respondents attach a larger premium to highly skilled relative to low skilled immigrants than respondents in the third quartile (the reference category). The interaction for the highest income dummy is almost zero indicating that for the richest respondents the premium is roughly similar to the premium for those in the third quartile. Again we find no such interaction in the states with low fiscal exposure (columns 11 and 12) and the subset of states with low exposure but high levels of immigration (columns 13 and 14).

In order to give a substantive interpretation to the results we simulate predicted probabilities for supporting an increase in immigration (answers “somewhat agree” and “strongly agree” that the US should allow more immigration) for the median respondent (white women aged 45 with some college education). We compute the predicted probabilities for all four income levels, both immigration types, and for both high and low fiscal exposure states (based on FISCAL EXPOSURE I) using our least restrictive models (models 10 and 12, respectively, in of Table 2.²¹ Figure 8 shows the results and summarizes our key findings regarding the fiscal burden model.

The figure suggests that the way in which fiscal concerns interact with respondents’ income in forming attitudes towards highly skilled and low skilled immigrants is inconsistent with the conventional wisdom. In states with high fiscal exposure to immigration, poor respondents are less likely to support low skilled immigrants than they are in states with low exposure. Moreover, in high exposure states, poor natives attach a much larger premium to highly skilled relative to low skilled immigrants than they do in low exposure states. Taken together these results are much more consistent with the alternative type of argument about

²¹Results are substantively identical if FISCAL EXPOSURE II is used instead. Results available upon request.

the fiscal concerns raised by immigration according to which poor natives fear competition with low skilled immigrants for access to public services. Rich respondents, meanwhile, are if anything more supportive of low skilled immigrants in high fiscal exposure states than they are states with low exposure, and the premium they attach to highly skilled immigrants is unaffected by fiscal exposure, findings that are completely at odds with the standard argument that rich natives are primarily concerned about tax hikes that could be triggered by low skilled immigration.

VI. CONCLUSION

To date, no empirical study has been able to distinguish between the attitudes that native citizens have towards highly skilled immigrants and their attitudes towards low skilled immigrants. This distinction is a critical feature of the theoretical models that link economic concerns with attitude formation and policy preferences with respect to immigration. In our survey experiment we were able to explicitly and separately examine individuals' attitudes towards highly skilled and low skilled immigrants, randomly assigning respondents to answer questions about immigrants with different skill levels.

The results from the survey experiment challenge the predictions made by the standard theoretical models and the conclusions reached in recent empirical studies. The labor market competition model predicts that natives will be most opposed to immigrants who have similar skill levels to their own. We find instead that *both* highly skilled and low skilled respondents strongly prefer highly skilled immigrants over low skilled immigrants, and this preference is not decreasing in respondents' skill levels. Support for *both* highly skilled and low skilled immigration is strongly increasing in respondents' skill levels. We also find that these relationships are similar for respondents currently in or currently out of the labor force. Overall, the results indicate that, in general, concerns about labor market competition are not a powerful driver of anti-immigrant sentiment in the United States – or, at least, not in the simple ways so far imagined.

According to the standard fiscal burden model, rich natives oppose low skilled immigration more than do poor natives, and this difference should be larger in states with greater

fiscal exposure in terms of immigrant access to public services. We find instead that rich and poor natives are *equally* opposed to low skilled immigration in general, and rich natives are actually less opposed to low skilled immigration in high exposure states than in low exposure states. These results are clearly inconsistent with claims that concerns about a heavier tax burden associated with the provision of public services are driving rich natives to oppose low skilled immigration.

We find evidence, however, that supports an alternative argument about public finance and immigration. We find that poor natives are markedly more opposed to low skilled immigration in states with high fiscal exposure than in states with low fiscal exposure. This supports an argument that concerns about access to or overcrowding of public services contributes to anti-immigrant attitudes among poorer citizens. Across the states over the past 25 years or so, while immigration has had no discernable impact on tax rates, per capita welfare expenditures have grown the slowest in states that experienced larger increases in the share of immigrants in their population. The evidence suggests that fears among poor natives about constraints on welfare benefits as a result of immigration are far more relevant than concerns among the rich about increased taxes.

APPENDIX A: THEORETICAL FRAMEWORK

We incorporate a simple model of public finance with the standard factor-proportions (FP) analysis of immigration to derive the basic propositions about natives' attitudes towards highly skilled and low skilled immigrants. We build on similar analysis by Dustman and Preston (2006) and Facchini and Mayda (2007), and where possible use matching notation. Assume a nondiversified economy producing one commodity, with constant returns to scale, using two factors of production: highly skilled labor (L_S) and low skilled labor (L_U). The native population is made up of $N = L_S + L_U$ individuals, each owning one unit of labor (either highly skilled or low skilled) and an endowment e^n of the commodity (where n indexes natives). Equilibrium is described by full employment of each factor and competitive profits:

$$a_S Q = L_S \tag{7}$$

$$a_U Q = L_U \tag{8}$$

$$a_S w_S + a_U w_U = 1 \tag{9}$$

where a_S and a_U are the quantities of each factor required per unit of output Q , w_S and w_U are wages for highly skilled and low skilled labor, and the commodity price is fixed in the world market and normalized to 1. After total differentiation, given cost minimizing values for a_S and a_U , we can derive solutions that express changes in wages as a function of different types of immigration:

$$\hat{w}_S = \frac{(1 - \theta_S)}{\sigma} (\hat{L}_U - \hat{L}_S) \tag{10}$$

$$\hat{w}_U = -\frac{(1 - \theta_U)}{\sigma} (\hat{L}_U - \hat{L}_S) \tag{11}$$

where hats indicate proportional changes, θ_j is the distributive share of L_j in total output ($j \in \{S, U\}$), and σ is the elasticity of substitution between factors. It is clear that any increase in the supply of highly skilled labor ($\hat{L}_S > 0$), ceteris paribus, implies a reduction in real wages for highly skilled natives ($\hat{w}_S < 0$) and a rise in real wages for low skilled

natives ($\hat{w}_U > 0$). Alternatively, inflows of low skilled labor ($\hat{L}_U > 0$), ceteris paribus, will raise real wages of highly skilled natives ($\hat{w}_S > 0$) and reduce real wages of low skilled natives ($\hat{w}_U < 0$). These are the two scenarios presented in the survey experiment. Of course, if there are inflows of both highly skilled and low skilled immigrants, the wage effects will depend on the impact of the inflows on relative factor supplies ($\hat{L}_S - \hat{L}_U$).

Assume that the government provides public services to all individuals residing in the country and that these services are consumed in equal amounts by all and valued at b per person (so that they are, in effect, a lump sum transfer of b to each resident). Government spending is financed by a proportional income tax, set at rate τ , so that the government budget constraint is:

$$\tau (w_S L_S + w_U L_U + E) = b (L_S + L_U) \quad (12)$$

where $E = \sum e^n$. The after-tax income of the n -th native is:

$$I_j^n = (1 - \tau) (w_j + e^n) + b \quad (13)$$

Immigration can affect the after-tax income of a native by altering wage rates, but also by affecting the tax rate or the provision of government services (or both).

In line with previous approaches, we assume that the government will adjust to any change in fiscal circumstances by *either* adjusting the tax rate *or* by adjusting spending. In the first case, holding b constant and totally differentiating equation 12 yields:

$$\hat{\tau} = (\lambda_S - \phi_S) \hat{L}_S + (\lambda_U - \phi_U) \hat{L}_U - \phi_E \hat{E} \quad (14)$$

where λ_j is the share of L_j in the population and ϕ_j is the distributive share of L_j in total income ($Q + E$). Assuming $w_S > w_U$, then $\lambda_U - \phi_U > 0$ and it is clear that inflows of low skilled immigrants ($\hat{L}_U > 0$) necessitate raising the tax rate, all else equal, as taxes on their wages (at the current rate) will not cover the additional spending on the government services they consume. It is possible that such immigrants could arrive with endowments ($\hat{E} > 0$) enough to generate an offsetting increase in tax revenues, but the standard assumption is that low skilled immigrants have zero taxable assets. The arrival

of highly skilled immigrants ($\hat{L}_S > 0$) will lead to a reduction in the tax rate, all else equal, if $\lambda_S - \phi_S < 0$, which is the case when $E < L_U(w_S - w_U)$. The intuition here is that highly skilled immigrants will raise per capita before-tax income, which at the fixed levels of per capita government spending allows a reduction in the tax rate (as long as endowments do not represent a large proportion of national income). This tax relief affect is accentuated to the extent that highly skilled immigrants bring taxable endowments.

After totally differentiating equation 13, we can describe the impact of immigration on native n 's after-tax income:

$$\hat{I}_j^n = \frac{w_j(1 - \tau)\hat{w}_j - \tau G_j^n \hat{\tau}}{(1 - \tau)G_j^n + b} \quad (15)$$

where gross (before-tax) income $G_j^n = (w_j + e^n)$. What can we now say about the impact of different types of immigration on the net income of natives? Holding aside the wage effect, which we know (from equations 10 and 11 above) will hinge on the skill level of the particular native, it is easy to see that the impact will vary with income. Combining 14 and 15, and assuming for simplicity that $\hat{E} = 0$, it is straightforward to show that with inflows of low skilled immigrants ($\hat{L}_U > 0$), the tax rate must rise ($\hat{\tau} > 0$), net incomes fall ($\hat{I}_j^n < 0$), and the losses are magnified for natives with higher gross incomes ($\partial \hat{I}_j^n / \partial G_j^n < 0$). Conversely, with inflows of highly skilled immigrants ($\hat{L}_S > 0$), the tax rate falls ($\hat{\tau} < 0$) as long as $E < L_U(w_S - w_U)$, net incomes rise ($\hat{I}_j^n > 0$), and the gains are greater for those with higher before-tax incomes ($\partial \hat{I}_j^n / \partial G_j^n > 0$). In sum, richer natives lose more than poorer counterparts from the entry of low skilled immigrants, and they gain more with the arrival of highly skilled immigrants.

The overall effect of immigration on the net income of native n , with skill level j , will depend on the combination of wage and tax effects. For low skilled natives, these effects are always in the same direction: inflows of low skilled immigrants will reduce wages ($\hat{w}_U < 0$) and raises taxes, while inflows of highly skilled workers raises wages ($\hat{w}_U > 0$) and reduces taxes. Highly skilled natives have a more complicated calculation: low skilled immigrants raise their wages ($\hat{w}_S > 0$) but also increase the tax burden; highly skilled immigrants push down wages ($\hat{w}_S < 0$) but also decrease taxes.

What if the government adjusts to the change in fiscal circumstances by adjusting spending while keeping the tax rate fixed? In this second case, holding τ constant and totally differentiating equation 12 yields:

$$\hat{b} = -(\lambda_S - \phi_S) \hat{L}_S - (\lambda_U - \phi_U) \hat{L}_U + \phi_E \hat{E} \quad (16)$$

The impact of immigration on the per-capita provision of government services when taxes are fixed is just the exact reverse of the effect on the tax rate when spending is fixed. Inflows of low skilled immigrants ($\hat{L}_U > 0$) necessitate a reduction in per-person services ($\hat{b} < 0$), assuming such immigrants bring no taxable endowments. Highly skilled immigrants ($\hat{L}_S > 0$) generate an expansion in services ($\hat{b} > 0$).

Totally differentiating equation 13, this time assuming no change in the tax rate but an adjustment in spending, we get:

$$\hat{I}_j^n = \frac{w_j(1 - \tau)\hat{w}_j + b\hat{b}}{(1 - \tau)G_j^n + b} \quad (17)$$

Controlling for the wage effect, and assuming $\hat{E} = 0$, it is easy to show that with inflows of low skilled immigrants ($\hat{L}_U > 0$) per-capita services must be cut ($\hat{b} < 0$) and net incomes fall ($\hat{I}_j^n < 0$); these losses are smaller for natives with higher gross incomes ($\partial \hat{I}_j^n / \partial G_j^n > 0$). Inflows of highly skilled immigrants ($\hat{L}_S > 0$) result in an expansion of services ($\hat{b} > 0$) and an increase in net incomes ($\hat{I}_j^n > 0$), but these gains are smaller for those with higher incomes ($\partial \hat{I}_j^n / \partial G_j^n < 0$). In this case, the stakes are largest for the poorest natives: poor natives are hurt more than richer natives by low skilled immigration, and they benefit more than richer counterparts from highly skilled immigration.

APPENDIX B: MEASURES OF IMMIGRANT FISCAL EXPOSURE

Below we briefly describe both welfare spending measures used by Hanson et al. (2007) to classify states as high or low fiscal exposure to immigrants. FISCAL EXPOSURE I and II rely on two different sources of welfare spending data. FISCAL EXPOSURE I is based on *total public welfare spending* by state and local governments; available from the US Census of Governments 2006 (for the fiscal year 2005). This measure includes most

welfare benefits including cash, non-cash and medical assistance; it accounts for all expenditures associated with Supplemental Security Income (SSI), Temporary Assistance for Needy Families (TANF), Medicaid (including Title XIX), food stamps, and all expenditures for welfare activities not classified elsewhere. It excludes state spending on other public services such as public education, public safety, and public spaces. Unfortunately, this public welfare spending measure is not separately recorded for immigrants and natives household, so one cannot isolate the value of public assistance received by immigrants.

FISCAL EXPOSURE II is based on the *fraction of immigrant households receiving cash forms of public assistance*; available from the 2006 American Community Survey. This measure is separately available for both immigrant and native households, but it is limited to public assistance income including general assistance, TANF, and SSI. Compared to *total public welfare spending* it excludes non-cash benefits (eg. food stamps, separate payments received for hospital, other medical care, etc.). Another disadvantage is that it merely measures the number of immigrant households receiving cash assistance and not the actual value of the assistance spending itself. We confirm that the two welfare spending measures are positively correlated, $r=.28$ in our data for 2006 compared to $r=.24$ in Hanson et al. (2007). Based on this correlation, Hanson et al. (2007) argue that *total public welfare spending* serves as a reasonable proxy for welfare spending on immigrants only.

Finally, notice that both measures are computed on a household basis, where an immigrant household is defined as one whose head was not a U.S. citizen at birth. This definition of immigrants includes foreign born naturalized citizens and U.S. born children of immigrants. The census and survey data do not distinguish the legal status of foreign-born respondents. This may affect public welfare measures, because in most states illegal immigrants are ineligible for most public services.

APPENDIX C: DESCRIPTIVE STATISTICS

variable	obs	mean	sd	min	max
PROIMIG	1589	2.57	1.25	1	5
FEMALE	1601	0.51	0.50	0	1
WHITE	1601	0.73	0.45	0	1
BLACK	1601	0.10	0.30	0	1
HISPANIC	1601	0.03	0.17	0	1
AGE CATEGORY	1601	3.85	1.68	1	7
HSKFRAME	1601	0.50	0.50	0	1
EDUCATION	1601	2.76	1.00	1	4
HS DROPOUT	1601	0.11	0.31	0	1
HIGH SCHOOL	1601	0.32	0.47	0	1
SOME COLLEGE	1601	0.28	0.45	0	1
BA DEGREE	1601	0.30	0.46	0	1
INCOME	1601	2.54	1.11	1	4
INCOMEQ1	1601	0.25	0.43	0	1
INCOMEQ2	1601	0.20	0.40	0	1
INCOMEQ3	1601	0.31	0.46	0	1
INCOMEQ4	1601	0.24	0.43	0	1
FISCAL EXPOSURE I	1601	0.25	0.43	0	1
FISCAL EXPOSURE II	1601	0.30	0.46	0	1
IMMIGHIGH	1601	0.52	0.50	0	1

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TABLES

Table 1: Individual Support for Increasing Highly Skilled and Low Skilled Immigration - Test of the Labour Market Competition Hypothesis

Dependent Variable	In Favor of:		In Favor of:				
	High Skilled Immigration	Low Skilled Immigration	Immigration				
Model No	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Sub-sample						labour force	
						in	out
EDUCATION	0.21 (0.05)	0.27 (0.05)		0.27 (0.05)		0.33 (0.06)	0.19 (0.07)
HSKFRAME			0.54 (0.07)	0.73 (0.20)	0.56 (0.12)	0.73 (0.28)	0.64 (.29)
HSKFRAME·EDUCATION				-0.07 (0.07)		-0.08 (0.09)	0.00 (0.11)
HS DROPOUT					-0.41 (0.18)		
HSKFRAME·HS DROPOUT					0.24 (0.25)		
HIGH SCHOOL					-0.16 (0.12)		
HSKFRAME·HIGH SCHOOL					-0.05 (0.17)		
BA DEGREE					0.41 (0.12)		
HSKFRAME·BA DEGREE					-0.08 (0.16)		
<i>N</i>	798	791	1589	1589	1589	946	643
Covariates	x	x	x	x	x	x	x

Note: Order Probit Coefficients shown with standard errors in parenthesis. All models include a set of the covariates age, gender, and race (coefficients not shown here). The reference category for the set of education dummies is SOME COLLEGE (respondents with some college education).

Table 2: Individual Support for Increasing Highly Skilled and Low Skilled Immigration - Test of the Welfare State Hypothesis

Dependent Variable	In Favor of Increasing Immigration						
	Both	High		Low		Low	
Measure of Fiscal Exposure		I	II	I	II	I	II
Level of Immigration	Both	Both		Both		High	
Model No	(1)	(2)	(3)	(4)	(5)	(6)	(7)
HSKFRAME	0.62 (0.17)	1.22 (0.34)	1.18 (0.29)	0.43 (0.19)	0.44 (0.20)	0.33 (0.31)	0.39 (0.34)
HSKFRAME·INCOME	-0.03 (0.06)	-0.18 (0.12)	-0.20 (0.10)	0.03 (0.07)	0.04 (0.07)	0.05 (0.11)	0.08 (0.12)
INCOME	0.11 (0.04)	0.22 (0.08)	0.26 (0.08)	-0.03 (0.05)	-0.05 (0.05)	0.02 (0.09)	-0.01 (0.09)
<i>N</i>	1589	397	470	1192	1119	431	358
Covariates	x	x	x	x	x	x	x
Model No	(8)	(9)	(10)	(11)	(12)	(13)	(14)
HSKFRAME	0.57 (0.11)	0.54 (0.23)	0.46 (0.22)	0.60 (0.13)	0.64 (0.13)	0.54 (0.25)	0.72 (0.27)
INCOMEQ1	0.17 (0.13)	-0.39 (0.26)	-0.45 (0.26)	0.35 (0.14)	0.36 (0.15)	0.11 (0.27)	0.20 (0.27)
HSKFRAME·INCOMEQ1	-0.14 (0.18)	0.39 (0.37)	0.39 (0.33)	-0.30 (0.20)	-0.30 (0.21)	-0.00 (0.35)	0.05 (0.39)
INCOMEQ2	-0.03 (0.14)	-0.52 (0.29)	-0.44 (0.24)	0.12 (0.16)	0.16 (0.16)	0.22 (0.22)	0.39 (0.26)
HSKFRAME·INCOMEQ2	0.30 (0.18)	0.69 (0.36)	0.65 (0.32)	0.17 (0.21)	0.12 (0.22)	-0.36 (0.34)	-0.62 (0.38)
INCOMEQ4	0.34 (0.12)	0.24 (0.23)	0.28 (0.21)	0.33 (0.14)	0.33 (0.15)	0.24 (0.23)	0.26 (0.27)
HSKFRAME·INCOMEQ4	-0.18 (0.17)	-0.04 (0.31)	-0.08 (0.30)	-0.20 (0.20)	-0.20 (0.20)	0.06 (0.33)	0.04 (0.36)
<i>N</i>	1589	397	470	1192	1119	431	358
Covariates	x	x	x	x	x	x	x

Note: Order Probit Coefficients shown with standard errors in parenthesis. All models include a set of the covariates age, gender, and race, and education (coefficients not shown here). The reference category for the set of income quartile dummies is INCOMEQ3 (respondents in the third quartile of the income distribution).

FIGURES

Figure 1: Changes in Average Marginal State Income Tax Rate on Wages and Percent Foreign Born Population: 2004 to 1990.

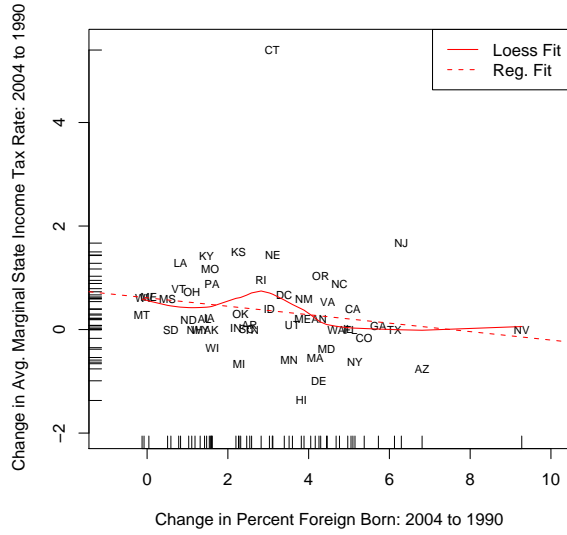


Figure 2: Changes in Public Welfare Spending Per Capita and Percent Foreign Born Population: 2004 to 1990

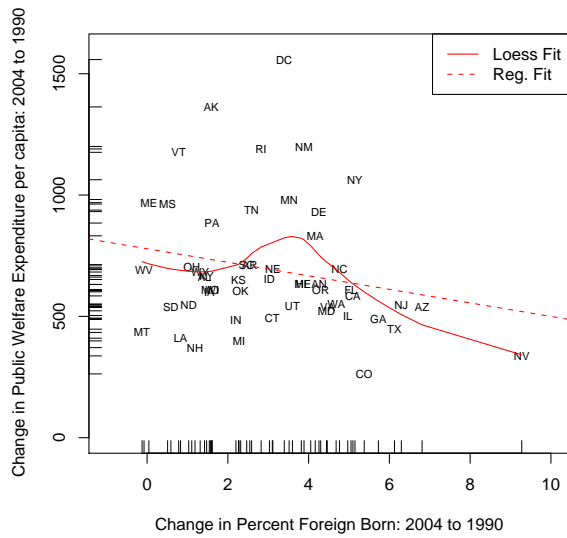


Figure 3: Distribution of Attitudes Toward Highly Skilled and Low Skilled Immigration.

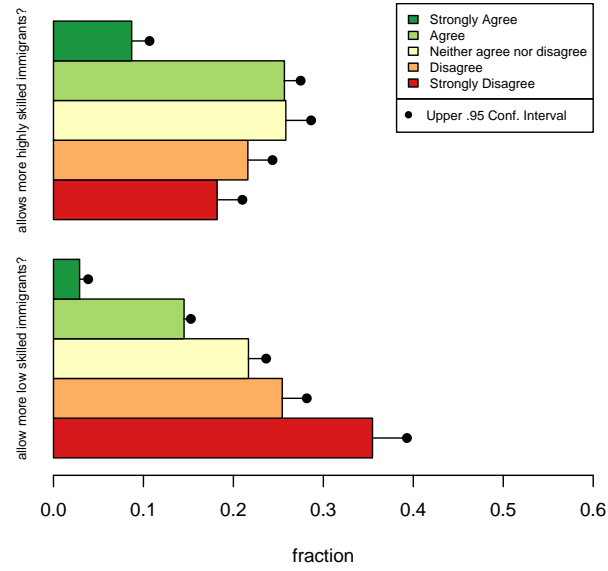


Figure 4: Distribution of Attitudes Toward Highly Skilled and Low Skilled Immigration by Respondents Skill Level

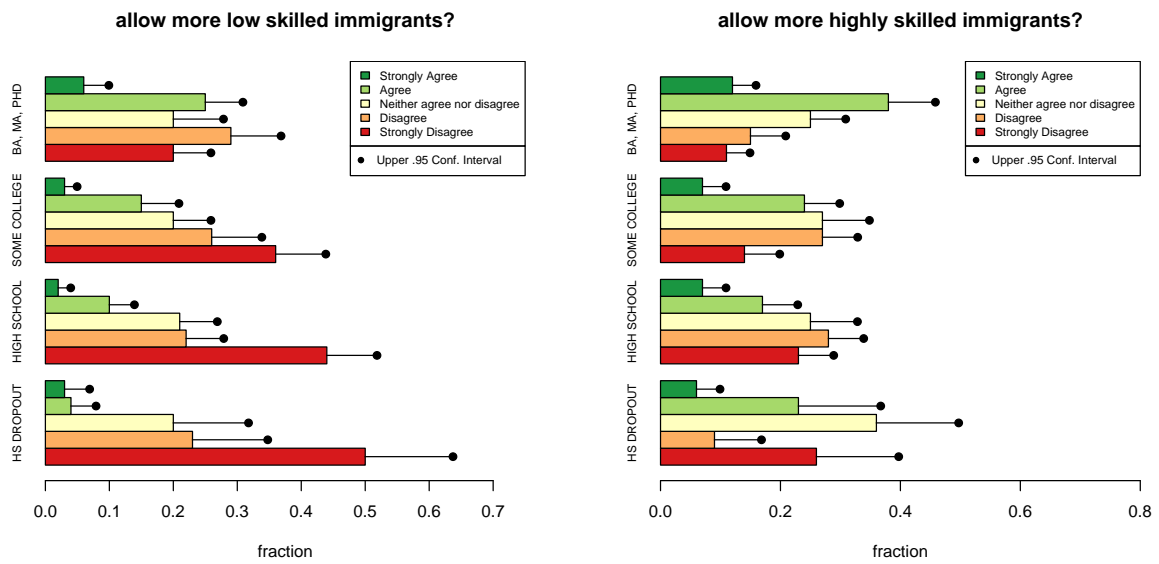


Figure 5: Support for Highly Skilled and Low Skilled Immigration by Respondents' Skill Level

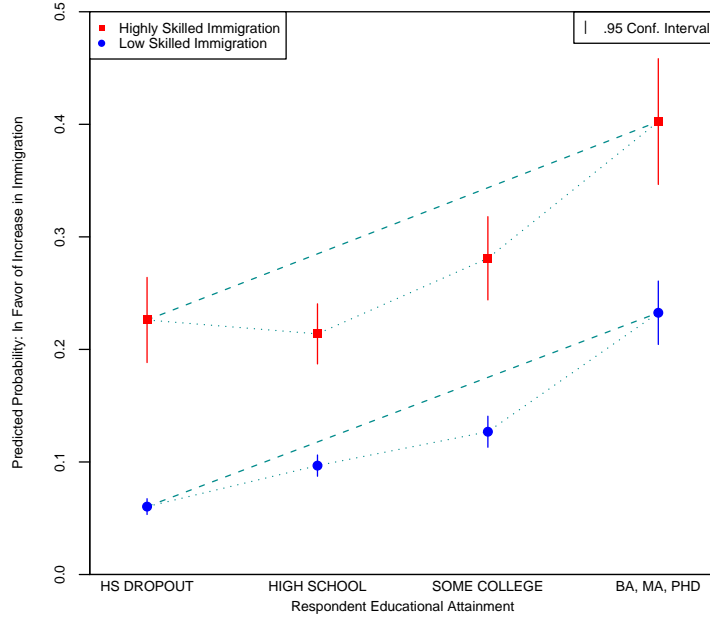


Figure 6: Measures of Fiscal Exposure

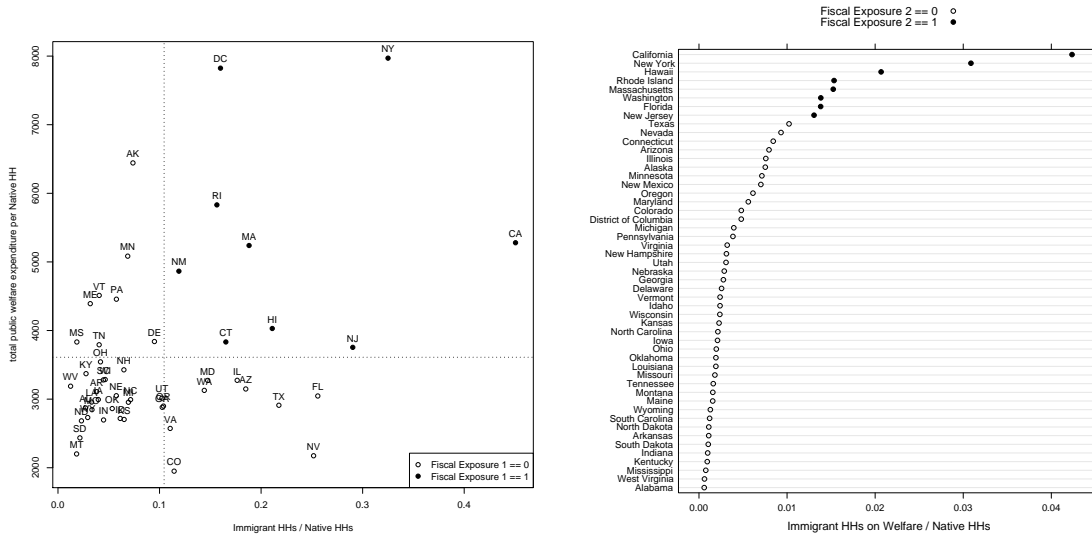


Figure 7: Distribution of Attitudes Toward Highly Skilled and Low Skilled Immigration by Respondents Income Level and Immigrant Fiscal Exposure of Respondents' State

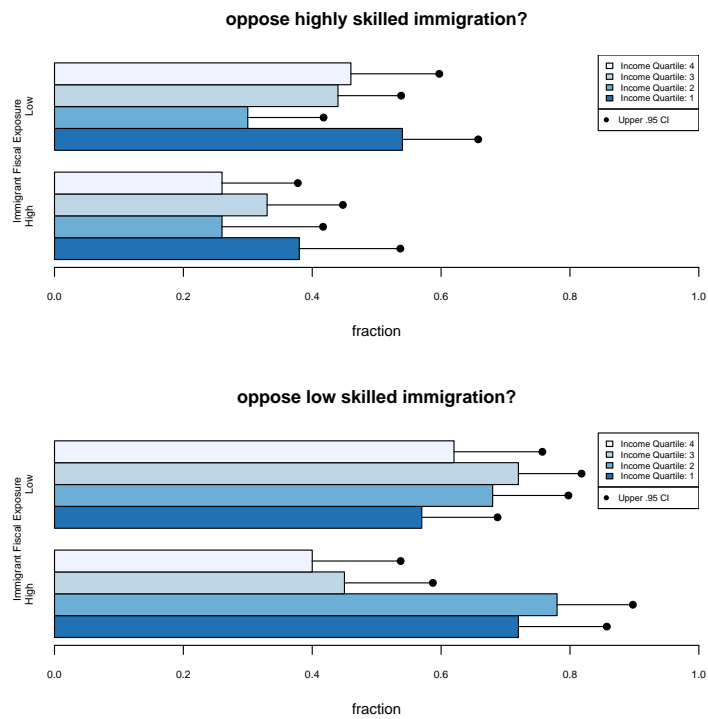


Figure 8: Support for Highly Skilled and Low Skilled Immigration by Respondents' Income Level and Immigrant Fiscal Exposure of Respondents' State

