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Do Firms Respond to Immigration?

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Abstract

Research generally focuses on how immigration affects native workers, while the impact of immigration on domestic firms is often overlooked. This paper addresses this important omission by examining whether firms respond to immigration by adjusting the location of their production activities. Consistent with the predictions of the model, the results indicate that low-skilled immigration decreases and high-skilled immigration increases the relocation of production activities at both the extensive and intensive margins. These results explain why the impact of immigration on the wages of native workers is often found to be quite small.

Keywords: immigration, firm structure, establishment births & deaths, offshoring

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1 Introduction

The share of the U.S. population that is foreign born increased from 9.8% in 1994 to 13.5% in 2008. This increase in immigration and its impact on domestic labor markets has ignited a fierce debate among economists, politicians, and the general public. While research generally focuses on how immigration impacts native workers, the effect of immigration on domestic firms and their organizational structure is seldom studied but is of equal importance. This paper examines whether firms respond to immigration by adjusting the location of their production activities. A simple model is constructed that examines the relationship between immigration and the firms' organizational structure and the predictions of the model are tested using a comprehensive data set of U.S. cities.

Advances in transportation and communication have revolutionized the production process. It is no longer necessary to have the point of production near the point of consumption nor is it necessary to have various stages of the production process located in close proximity to one another. Thus, firms are increasingly locating tasks in other cities and countries in order to take advantage of differences in factor endowments. Low-skilled production activities have been particularly susceptible to domestic relocation and offshoring.[2] However, labor supply shocks due to immigration may affect the firm's decision to relocate production activities. For instance, an influx of low-skilled immigrants will limit the firm's need to relocate low-skilled production activities to another city or country. There is a natural tradeoff between workers migrating into a city and jobs being relocated out of a city. While this reasoning is intuitively appealing, to date there has been little empirical evidence supporting this hypothesis.

This paper presents a simple model that highlights two ways in which immigrants

[2] Offshoring refers to the relocation of domestic jobs to foreign countries.

can be absorbed into a local labor market. Either relative wages can adjust or firms can respond by changing the location of their production activities. The fact that research shows that the impact of immigration on relative wages is minimal (Card 2005, Borjas 1994, Friedberg and Hunt 1995) suggests that this latter component may be particularly important. Furthermore, the model generates sharp predictions on how low-skilled and high-skilled immigration will impact the location decision of firms. It is shown that an influx of low-skilled immigrants reduces the need for firms to relocate low-skilled jobs. However, high-skilled immigration will increase relocations since the relatively limited supply of domestic low-skilled workers forces firms to shift low-skilled production activities elsewhere.

The predictions of the model will be tested by exploiting differences in immigration across U.S. Metropolitan Statistical Areas (MSAs or cities). The endogeneity of the immigrant location decision is addressed by taking advantage of the fact that current immigrants often locate in cities where previous immigrants from the same country already live. Thus, a city's historical share of foreign born residents is used as an instrument for the current settlement patterns of immigrants from that particular country. This captures the variation in immigration that is exogenous to local labor demand and allows the impact of immigration on the firm's organizational structure to be identified.

The relocation of production activities is captured at the extensive margin by calculating the net birth rate of establishments in a city and at the intensive margin by calculating the net expansion rate of establishments in a city. Consistent with the predictions of the model, the results show that low-skilled immigration reduces the firm's relocation of production activities at both the extensive and intensive margins. Also consistent with the model, the results show that high-skilled immigration increases the relocation of production activities at both the extensive and intensive margins. In contrast, I find that low-skilled immigration and high-skilled immigra-

tion have a minimal impact on relative wages. Thus, this paper provides compelling evidence that immigrants are absorbed into local labor markets through changes in the location of production activities rather than through changes in relative wages.

An additional industry level analysis allows for the possibility that not all industries respond to immigration in a similar manner. Certain industries that are reliant on natural resources (i.e. agriculture) or that need to be close to consumers (i.e. retail trade) have less ability to adjust the location of their production activities in response to immigration. The results suggest that there is no relationship between immigration and the net birth and expansion rates in these non-mobile industries but there is a strong, significant relationship in the remaining mobile industries. These results provide additional evidence that firms respond to immigration by adjusting their organizational structure.

Research on immigration's impact on local labor markets generally focuses on how native relative wages are affected. There have been two main approaches for answering this question. Exploiting variation across U.S. cities, Card (1990) and Card (2005) find that there is virtually no effect of immigration on native wages. In contrast, Borjas, Freeman, and Katz (1997) and Borjas (2003) use national time series data and find that immigration does lead to a significant decrease in the wages of native workers. These conflicting results have been difficult to reconcile. Specifically, how can large influxes of immigrants have virtually no impact on local wages in these regional analyses? Why do studies using these two approaches generate such different results?

There have been a host of potential explanations and yet the answers to these questions remain elusive. First, it was argued that estimates of immigration's effect on relative wages using the regional approach were biased toward zero due to the endogeneity of the immigrant location decision. However, recent analyses using the historical immigrant share as an instrument for current settlement patterns alleviate

these endogeneity concerns and still find a weak relationship between immigration and relative wages (Card 2005, Lewis 2003). A second potential explanation is that similarly skilled natives respond to immigration by moving out of a city. Thus, the overall relative labor supply would be left virtually unchanged which could explain the lack of relative wage adjustments. While plausible, Card (2001) and Card and DiNardo (2000) find that native outflows have virtually no offsetting effect on labor supply shocks caused by immigration. Finally, it is possible that the industry composition within a city adjusts to accommodate immigrants and thus there is no effect on relative wages. However, recent studies suggest that there is little evidence of this type of industry adjustment across cities (Lewis 2003, Card and Lewis 2005).

Therefore, it remains unclear how large influxes of immigrants can be absorbed into local labor markets without accompanying changes in relative wages. Furthermore, it has been difficult to reconcile the results from these regional studies with the more negative results from time series analyses. This paper provides a plausible explanation to both puzzles. Immigrants are absorbed into local labor markets through changes in firms' organization structure rather than through changes in relative wages. However, national time series studies are relatively unaffected by firm mobility. Thus, the shifting of production activities across U.S. cities explains the disparity between regional and national level analyses. By focusing on domestic firm mobility, this paper is able to explain both existing puzzles in the literature.

This paper is also related to the literature on how firms respond to changes in the local labor supply. These models typically show that the types of jobs (Acemoglu 1999) or the technologies adopted (Acemoglu 1998, Beaudry and Green 2003) depend on the local factor supplies. Lewis (2005) finds evidence that cities with less-skilled labor supplies are more likely to adopt less automated technologies. This paper is similar in spirit to this research in that it highlights how firms' decisions may respond to local labor supplies. However, none of these papers investigate whether changes

in factor supplies affect the production location decisions facing domestic firms. This paper contributes to this literature by examining whether immigration affects the organizational structure of firms.

The remainder of the paper is organized as follows. Section 2 presents two simple models that highlight the ways in which immigrants can be absorbed into local labor markets. Section 3 gives an overview of the data used in this analysis. The estimation strategy and the instrument used in this analysis are outlined in Section 4. The relative wage, net birth rate, net expansion rate, and industry results are presented in Section 5. Finally, Section 6 concludes.

2 Model

This section provides insight into the relationship between immigration and a firm's organizational structure. First, a simple model is presented in which it is not possible to relocate jobs. Thus, labor supply shocks due to immigration are absorbed through changes in relative wages. The model is then extended to allow for the possibility that firms may choose to relocate low-skilled jobs. Thus, labor supply shocks due to immigration are absorbed by changes in firms' organizational structure rather than changes in relative wages. This generates testable predictions for the implications of low-skilled and high-skilled immigration on the location of production activities.

2.1 Relative Wages

Suppose a perfectly competitive firm uses low-skilled labor (L) and high-skilled labor (H) to produce a good (Y). Domestic low-skilled and high-skilled labor consists of native and immigrant workers. Conditional on skill, native and immigrant workers are equally productive in the production process. For the time being, it is assumed that firms do not have the ability to relocate production activities. Thus, the firm

faces the following profit maximizing decision:

$$(1) \qquad \max \pi = A(L_N + L_I)^{\alpha}(H_N + H_I)^{1-\alpha} - w_L(L_N + L_I) - w_H(H_N + H_I),$$

where the subscript N indicates native workers, subscript I indicates immigrant workers, w_L is the wage paid to low-skilled workers, and w_H is the wage paid to high-skilled workers. The standard first order condition is

$$(2) \qquad \frac{1-\alpha}{\alpha}\frac{(L_N + L_I)}{(H_N + H_I)} = \frac{w_H}{w_L}.$$

Totally differentiating (2), assuming that native labor supplies do not change[3], generates the following relationship between immigration and relative wages,

$$(3) \qquad \hat{w}_H - \hat{w}_L = \frac{dL_I}{L} - \frac{dH_I}{H}.$$

Equation (3) highlights the textbook relationship between wages and immigration. An increase in low-skilled immigrants should increase the relative wage gap, while an increase in high-skilled immigrants should decrease the relative wage gap. Thus, labor supply shocks due to immigration are fully absorbed by changes in the relative wage. While intuitively appealing, this hypothesis has found little empirical support. Numerous careful regional studies have determined that, at most, immigration has a small impact on native wages. Thus, it is unclear how local labor markets are able to absorb these labor supply shocks. A firm's ability to relocate production activities in response to immigration may provide an answer.

[3] This is consistent with Card (2001) and Card and DiNardo's (2000) findings that native workers do not relocate in response to immigration.

2.2 Mobile Production

Assume that it is now possible for domestic firms to relocate low-skilled jobs, while all high-skilled jobs must be performed locally.[4] Therefore, domestic firms have the option of hiring a native low-skilled worker, hiring an immigrant low-skilled worker, or relocating the low-skilled job to another city or country. Thus, the firm maximizes profits,

(4)
$$\max \pi = A(L_N+L_I+L_O)^{\alpha}(H_N+H_I)^{1-\alpha}-w_L(L_N+L_I)-(w_L^*+\gamma)(L_O)-w_H(H_N+H_I),$$

where the subscript O indicates jobs performed in another location, w_L^* is the wage paid to these low-skilled workers, and γ is the cost associated with relocating these jobs. This framework captures the movement of jobs within the country or to another foreign country. Thus, the analysis in this paper can account for firm mobility within the domestic country and also offshoring. The first order condition is now:

(5)
$$\frac{1-\alpha}{\alpha}\frac{(L_N+L_I+L_O)}{(H_N+H_I)}=\frac{w_H}{w_L}.$$

Following the empirical evidence, I assume that immigration has little impact on wages and focus on the implications for the firm's organizational structure. Totally differentiating (5) yields the following relationship between changes in immigration and changes in the location of low-skilled jobs:

(6)
$$\frac{dL_O}{L}=-\frac{dL_I}{L}+\frac{dH_I}{H}.$$

[4]It is generally agreed that the relocation or offshoring of white-collar, service jobs is still quite small (Amiti and Wei 2009, Blinder 2005).

Equation (6) highlights the ways in which the firm's decision to relocate jobs depends on different labor supply shocks. An increase in low-skilled immigration ($dL_I > 0$) leads to a reduction in the relocation of jobs ($dL_O < 0$). Domestic firms no longer need to relocate production activities elsewhere in order to access low-skilled labor. These foreign low-skilled workers are migrating to the firms. Thus, low-skilled immigration and the relocation of jobs are substitutes in the production process. However, an increase in high-skilled immigration ($dH_I > 0$) leads to an increase in the relocation of jobs ($dL_O > 0$). The relatively limited supply of domestic low-skilled workers forces firms to shift low-skilled production activities elsewhere. As a result high-skilled immigration and the relocation of jobs are complements in the production process.

This simple framework identifies a way in which local labor markets can absorb immigrants without any persistent effect on relative wages. Domestic firms adjust the location of their production activities in response to immigration. This provides a mechanism for domestic firms to adapt to changes in local labor supplies. As a result, relative wages are left unchanged which is consistent with much of the empirical evidence. This simple model generates clear predictions for the relationship between immigration and the firm's organizational structure. High-skilled immigration will increase the relocation of jobs while low-skilled immigration will decrease the relocation of jobs. The remainder of the paper will examine whether firm's organization structure adjusts to immigration in the manner predicted in (6).

3 Data

The data set used in this analysis spans 192 U.S. Metropolitan Statistical Areas and 7 years (1998-2004). Using an MSA as the unit of analysis is appealing because it represents a reasonably closed labor market while introducing a substantial amount of variation. Current Population Survey (CPS) data on individuals between the age of 18 and 65 is obtained from the Integrated Public Use Microdata Series (IPUMS). From this dataset the share of the population that is foreign born by skill level, MSA, and year is calculated. Immigrants are categorized as low-skilled if they have a high school degree or less and categorized as high-skilled if they have more than a high school degree.

The top two panels in Figure 1 show the distributions of low-skilled and high-skilled immigrant shares along with the top five and bottom five MSAs in each category. There is substantial variation in the share of low-skilled and high-skilled immigrants across MSAs. Not surprisingly, the share of low-skilled immigrants is highest in Miami, FL and in cities located in California and Texas while the share of high-skilled immigrants is particularly large in high-tech cities such as San Jose, CA (Silicon Valley), San Francisco, CA, and Stamford, CT. The CPS data is also used to calculate a variety of other demographic characteristics, such as the age, gender, race, and educational attainment of the native population in each MSA.

The relocation of production activities is measured using data on the universe of establishments provided by the U.S. Census Bureau's Statistics of U.S. Businesses (SUSB). An establishment is defined as a single location at which business, services, or industrial operations are conducted. A firm may own and operate many establishments. Thus, an establishment represents the smallest unit of production activity for which data is available.

One particularly appealing aspect of this data is that the SUSB constructs a longitudinal dataset by linking establishments across years. Although data on specific

establishments and firms is withheld for confidentiality reasons, the SUSB does provide aggregate data on the number of establishment births, deaths, expansions, and contractions by county, year, and establishment industry. Counties are then assigned to the appropriate MSA which alleviates the problem that MSA definitions have changed over the sample.

From this SUSB data two relevant measures of relocations are constructed. First, the rate of net establishment births measures the extensive margin of establishment relocation. The net birth rate is calculated in the following manner:

$$net\_birth\_rate_{c,t} = \frac{est\_births_{c,t} - est\_deaths_{c,t}}{est_{c,t}},$$

where c indexes MSAs and t indexes years. This measure controls for the natural churning of establishments by taking the difference between births and deaths and accounts for the fact that some MSAs are larger than others by taking the ratio of net births to the number of establishments at the beginning of the year. Thus, for example, an increase in the net birth rate could reflect a higher propensity of establishment births or a reduction in establishment deaths. The third panel of Figure 1 shows the distribution of net birth rates and lists the MSAs with the highest and lowest rates. Not surprisingly, MSAs in the west and in Florida have particularly high establishment birth rates while midwestern rust-belt MSAs experienced a decrease in establishments.

Second, the rate of net establishment expansions measures the intensive margin of establishment relocation. The SUSB provides data on the number of establishments whose employment expanded and the number whose employment contracted in the past year. However, they do not provide data on the size of these employment gains or losses. Thus, the net expansion rate is calculated in the following manner:

$$net\_\exp ansion\_rate_{c,t} = \frac{est\_\exp anding_{c,t} - est\_contracting_{c,t}}{est_{c,t}},$$

where c indexes MSAs and t indexes years. In contrast to the net birth rate which captures the opening or closing of an entire establishment, the net expansion rate captures changes in employment within an establishment. If firms need to carry out production jobs in close proximity to one another then the entire establishment would need to be relocated which would be reflected in changes in the net birth rate. However, if the relocation of jobs takes a more continuous form, then the establishment will not close but rather specific jobs will be moved. This will be reflected in changes in the net expansion rate. The bottom panel of Figure 1 shows the distribution of the net expansion rate and lists the MSAs with the highest and lowest rates. Cities in Florida and on the west coast have high net expansion rates while cities in the midwest experienced negative net expansion rates.

Table 1 reports the annual averages of dependent and independent variables of interest. Overall, low-skilled immigration, high-skilled immigration, and the net birth rate increased over the sample. The net expansion rate is more volatile which is not surprising given that it is easier to adjust employment levels within an establishment than to open a new establishment or close an existing establishment.

Another appealing aspect of the SUSB dataset is that it is possible to construct the net birth rate and net expansion rate by 2-digit NAICS industries. This will prove useful in the analysis that follows. Figure 2 plots the net birth rate against the net expansion rate for the 19 NAICS industries. Manufacturing, for instance, saw a decrease in the net birth rate and net expansion rate while Health Care and Education saw relatively substantial increases in both rates over the sample.

4 Estimation Strategy

4.1 Specification

The models discussed in Section 2 present two alternative theories on how local labor markets can absorb immigrants. Immigration may lead to changes in the relative wage, changes in firms' organizational structure, or some combination of the two. While not the focus of this paper, I begin by examining the impact of low-skilled and high-skilled immigration on relative wages. Specifically, the following equation is estimated:

$$(7) \qquad relative\_wage_{c,t} = \theta_0 + \theta_1 L\_img_{c,t} + \theta_2 H\_img_{c,t} + \theta_3' X_{c,t} + \tau_t + \epsilon_{c,t}.$$

The dependent variable is the difference between the log median wage of high-skilled and low-skilled workers. The independent variables of interest are the share of low-skilled immigrants in the total population (L_img) and the share of high-skilled immigrants in the total population (H_img). X is a vector of control variables including the age, gender, race, and educational attainment of the native population. Finally, τ_t are year fixed effects.[5] Equation (3) from the model suggests that low-skilled immigration increases the relative wage ($\theta_1 > 0$) and high-skilled immigration decreases the relative wage ($\theta_2 < 0$). However, if previous research is any indication, it is likely that this effect is small.

While research generally assumes that immigration will primarily affect the wages of native workers, the model outlined in Section 2.2 provides an alternate theory. Immigration may lead to changes in the organizational structure of domestic firms. Specifically, the goal of this analysis is to test whether firms' relocation decisions

[5] Given the instrument used in this analysis it is not possible to also include MSA fixed effects (see footnote 10).

respond to immigration in the manner predicted in (6). Thus, the following two equations will be estimated:

$$(8) \quad net\_birth\_rate_{c,t} = \beta_0 + \beta_1 L\_img_{c,t} + \beta_2 H\_img_{c,t} + \beta_3^{'} X_{c,t} + \tau_t + \epsilon_{c,t}$$

$$(9) \quad net\_\exp ansion\_rate_{c,t} = \delta_0 + \delta_1 L\_img_{c,t} + \delta_2 H\_img_{c,t} + \delta_3^{'} X_{c,t} + \tau_t + \epsilon_{c,t}.$$

Equation (8) captures the firm's response to immigration at the extensive margin while Equation (9) captures the firm's response to immigration at the intensive margin. Given the predictions of the model in (6), we expect that $\beta_1 > 0$ and $\delta_1 > 0$ because low-skilled immigration reduces the need to relocate jobs and thus the net birth rate and the net expansion rate will increase. Conversely, we expect that $\beta_2 < 0$ and $\delta_2 < 0$ because, according to the model, high-skilled immigration increases the relocation of production activities and thus reduces the net birth rate and the net expansion rate. Certainly, immigration need not affect establishment relocations at both the extensive and intensive margins. The results that follow will provide insight into which, if either, of these margins is important.

It would be naïve to think that all industries responded to immigration in a similar manner. It is likely that some industries would have less ability to relocate jobs in response to labor supply shocks than others. For instance, industries (such as Agriculture, Mining, and Utilities) that require specific natural resources would be restricted in their ability to relocate production activities in response to immigration. Similarly, industries (such as Construction, Retail Trade, Real Estate, Education, Health Care, Arts & Entertainment, Accommodations, and Other Services) that need

to be located in close proximity to the consumer will have limited ability to respond to immigration. These industries will be classified as "non-mobile" industries. The remaining industries (Manufacturing, Wholesale Trade, Transportation, Information, Finance, Professional, Management, and Administrative) will be classified as "mobile" industries.[6]

Given this additional industry dimension, equations (8) and (9) are re-estimated in the following manner:[7]

$$(10)\quad net\_birth\_rate_{c,t,i} = \beta_0 + \beta_1 L\_img_{c,t} + \beta_2 H\_img_{c,t} + \beta_3^{'} X_{c,t} + \tau_t + \eta_i + \epsilon_{c,t,i}$$

$$(11)\quad net\_\exp ansion\_rate_{c,t,i} = \delta_0 + \delta_1 L\_img_{c,t} + \delta_2 H\_img_{c,t} + \delta_3^{'} X_{c,t} + \tau_t + \eta_i + \epsilon_{c,t,i},$$

where η_i are industry fixed effects and the dependent variables vary by industry. Separate estimates of (10) and (11) will be obtained using the mobile and non-mobile industries. The coefficients on the immigration variables should be significant and of the expected sign among the mobile industries but insignificant for the non-mobile industries. Finally, the standard errors in these regressions are clustered at the MSA*year level. This corrects for any correlation in the error term that arises from the fact that the independent variables are measured at the MSA-year level while the dependent variables are at the MSA-year-industry level. Specifically, there may be some unobserved shock in MSA c in year t that may be affecting the net birth rate and the net expansion rate in all industries in that MSA in a similar manner.

[6] The results that follow are robust to alternate classifications of mobile and non-mobile industries.

[7] Due to limited data, it is not possible to calculate relative wages or immigration by industry.

4.2 Instrument

One legitimate concern is that immigration and the dependent variables in (7) through (11) are correlated with city characteristics that are not controlled for. For instance, a MSA with a rapidly expanding economy would likely experience a faster net establishment birth rate and may also attract immigrants looking for jobs. To alleviate these concerns, I use historical settlement patterns of immigrants as an instrument for current settlement patterns of similar immigrants.[8] The 'predicted' share of immigrants is constructed by assigning actual immigrants in the current year to the cities where their countrymen were located in 1980. This instrument takes advantage of the fact that current immigrants often settle in cities where previous immigrants from the same country already live (Bartel 1989). Immigrants likely find it appealing to settle in cities with enclaves of residents who share their language, religion, or culture. Furthermore, in order to reunite families, the United States mainly awards visas to applicants who have relatives already residing in the country.

The predicted shares of low-skilled and high-skilled immigrants are calculated as follows:

$$pred\_L\_img_{c,t} = \frac{\sum_r \left(L\_img_{r,t} * \frac{img_{c,r,1980}}{img_{r,1980}} \right)}{pop_{c,t}}$$

$$pred\_H\_img_{c,t} = \frac{\sum_r \left(H\_img_{r,t} * \frac{img_{c,r,1980}}{img_{r,1980}} \right)}{pop_{c,t}},$$

where c indexes MSAs, t indexes years, and r indexes 8 regions of the world.[9] The first term in the numerator of these equations is the total number of foreign born low-skilled and high-skilled residents from region r in year t. This total is then assigned to MSAs using the share of total immigrants from region r that resided

[8] This instrument is similar to the one used by Card (2001) and Lewis (2003).

[9] The regions are U.S. Areas, North America, Central America, South America, Europe, Asia, Africa, and Oceania.

in city c in 1980 (the second term in the numerator of these equations). Thus, for each year the actual number of foreign born residents from region r is distributed across cities based on where immigrants from the same region of the world were located in 1980. This product is then summed over regions r and divided by the population to obtain a predicted immigrant share for both skill groups.[10] Using the predicted share of immigrants as an instrument will capture variation in immigration that is driven by family and cultural reasons rather than by labor demand factors. This mitigates endogeneity concerns and allows the impact of immigration on the relocation of production activities to be identified.

Table 2 reports the first stage regressions results. The instruments do a remarkable job of predicting actual immigrant shares. The predicted low-skilled immigrant share has a large, positive, and significant effect on actual low-skilled immigration. Similarly, the predicted high-skilled immigrant share has a large, positive, and significant effect on actual high-skilled immigration. The F-stat in both regressions is above 200. These results indicate that historical immigrant enclaves are useful in predicting immigrant settlement patterns more than 20 years later. Given the length of this lag, it is unlikely that the instrument is correlated with current local labor demand conditions.

5 Results

This section includes three sets of empirical results. First, the impact of immigration on native relative wages is examined. While not the focus of this paper, these results provide a point of reference for the analysis that follows. Second, I estimate the effect of immigration on the organizational structure of firms. In particular, the

[10] Given the short panel dataset (only 7 years), it is not possible to include MSA fixed effects in this analysis. If year and MSA fixed effects were included then the only variation in this instrument would come from the compositional shift of immigrants from various regions which would affect some MSAs more than others. Since this does not change substantially over my sample period, including MSA fixed effects is not possible.

impact of low-skilled and high-skilled immigration on the net birth rate and the net expansion rate is examined. This will provide insight into how immigration affects the establishment location decision at the extensive and intensive margins. Finally, the net birth rate and net expansion rate are calculated for each industry. The results should be stronger among mobile industries that have the ability to respond to local labor supply shocks by relocating production activities.

5.1 Relative Wages

The OLS estimates of the impact of low-skilled and high-skilled immigration on native relative wages (Equation 7) are reported in the first column of Table 3. The results indicate that high-skilled immigration has a positive and significant effect on relative wages. This contradicts the prediction of the model that high-skilled immigration leads to a reduction in relative wages. However, high-skilled immigrants may be relatively mobile and thus move to MSAs that are paying higher wages. This would lead to a spurious positive correlation between high-skilled immigration and relative wages and may explain the results in the first column. To control for these labor demand factors, I instrument current immigrant shares with the predicted immigrant shares constructed using historical settlement patterns. These IV results are reported in the second column. While the coefficients are of the expected sign, neither is significant at the 5% level. Overall, these results suggest that immigration has a minimal impact on native relative wages. These findings are consistent with previous research but are somewhat puzzling. How are local labor markets able to accommodate influxes of immigrants without local relative wages changing? One potential answer is that firms adjust the location of their production activities in response to immigration.

5.2 Net Births & Net Expansions

As outlined in Section 2.2, firms may respond to immigration by adjusting their organizational structure. Specifically, immigration may lead to changes in the location of firms' production activities with no persistent effect on local relative wages. To test this hypothesis, the impact of immigration on the net birth rate (Equation 8) and on the net expansion rate (Equation 9) is estimated.

In the first column (OLS) of Table 4, low-skilled immigration has a positive impact on the net birth rate while high-skilled immigration has no impact on the net birth rate. However, these results should be interpreted with caution due to the endogeneity of the immigrant location decision. The second column of Table 4 presents the IV results. Low-skilled immigration has a significant positive effect and high-skilled immigration has a significant negative effect on the net establishment birth rate. A one percentage point increase in the share of low-skilled immigrants leads to a 0.133 percentage point increase in the net birth rate while a one percentage point increase in the share of high-skilled immigrants leads to 0.297 percentage point decrease in the net birth rate. Thus, based on average levels, a one percent increase in L_Img leads to a 1.0% increase in the net birth rate while a one percent increase in H_Img leads to a 1.5% decrease in the net birth rate.

In the first column (OLS) of Table 5, low-skilled immigration increases the net expansion rate while high-skilled immigration has no impact on the net expansion rate. Yet these results may be biased due to endogeneity. The second column presents the results when using the historical settlement patterns as an instrument for current settlement patterns. A one percentage point increase in the share of low-skilled immigrants increases the net expansion rate by 0.179 percentage points while a one percentage point increase in the share of high-skilled immigrants decreases the net expansion rate by 0.371 percentage points. On average, a one percent increase in L_Img leads to a 0.7% increase in the net expansion rate while a one percent increase

in H_Img leads to a 1.0% decrease in the net expansion rate.

The difference between the OLS results and the IV results in Tables 4 and 5 indicate that the OLS estimation strategy is plagued by endogeneity. A city with a growing economy may experience faster establishment growth and may attract high-skilled immigrants, which would explain the upward bias in the OLS coefficient on high-skilled immigration. Conversely, low-skilled immigrants may be attracted to more affordable cities with a less robust economy and slower establishment growth, which would lead to the downward bias in the OLS coefficient on low-skilled immigration. Table 4 and 5 emphasize the importance of focusing on a component of immigration that is unrelated to local labor demand factors.

The IV results in Table 4 and 5 are consistent with the prediction of the model from Section 2.2. As low-skilled immigration increases, the firm has less need to relocate low-skilled jobs elsewhere. Thus, the net birth rate and the net expansion rate increase. As high-skilled immigration increases, the firm relocates more low-skilled jobs and thus the net birth rate and the net expansion rate decrease. Furthermore, the negative coefficients on H_Img imply that the relationship between immigration and production activities is not driven simply by population growth. The findings in Table 4 and 5 provide strong empirical support for the predictions of the model.

Overall, the results in Table 4 and 5 support the assertion that firms respond to immigration by adjusting the location of their production activities. Together with the relative wage results in Table 3, these findings indicate that immigrants are absorbed into local labor markets through adjustments in the location of firms' production activities rather than through significant changes in relative wages. This occurs at both the extensive margins through changes in the number of establishment (Table 4) and at the intensive margin through changes in employment within establishments (Table 5). These results explain the lack of significant wage effects typically found in regional analysis. Firms adjust their production activities in response to immigration

leaving wages relatively unaffected. In addition, the mobility of production activities explains the different results generated by regional and national analysis. National time series analyses are less sensitive to the relocation of establishments and jobs within the U.S.

5.3 Industry Analysis

While the previous tables reported aggregated results, it is possible to calculate the net birth rate and the net expansions rate by 2-digit NAICS industry. This is particularly appealing since the ability of firms to relocate production activities in response to immigration likely depends on the industry. Thus, separate regressions are run for the mobile and non-mobile industry groups discussed earlier. The results from estimating the impact of immigration on the net birth rate and the net expansion rate using this additional industry variation are reported in Table 6 and 7 respectively.

Table 6 presents the IV results from estimating the impact of immigration on the net birth rate (Equation 10). The first column of Table 6 reports the results using all 19 industries. The coefficients on L_Img and H_Img are very similar to the aggregate results reported in Table 4. Consistent with the predictions of the model, low-skilled immigration increases the net birth rate while high-skilled immigration decreases the net birth rate. Columns 2 and 3 report the results from separately estimating the impact of immigration on the net birth rate for the non-mobile and mobile industries respectively. Not surprisingly, immigration has no significant impact on the net birth rate in non-mobile industries. However, immigration has a large significant effect on the net birth rate in the mobile industries. When focusing on industries that have the greatest ability to adjust to labor supply shocks, low-skilled immigration leads to a significant increase in the net birth rate and high-skilled immigration leads to a significant decrease in the net birth rate.

Table 7 presents the IV results from estimating the impact of immigration on

the net expansion rate (Equation 11). The coefficients on L_Img and H_Img in the first column, which incorporates all 19 industries, are similar to the aggregate results reported in Table 5. Again, columns 2 and 3 report the non-mobile and mobile results. There is no significant relationship between immigration and the net expansion rate among non-mobile industries. Firms in these industries do not respond to labor supply shocks because they need to be located in close proximity to natural resources or consumers. However, there is a strong relationship between immigration and the net expansion rate in mobile industries. Consistent with the predictions of the model, low-skilled immigration increases while high-skilled immigration decreases the net expansion rate.

Overall, the results in Table 6 and 7 provide further evidence that firms respond to influxes of immigrants by relocating their production activities. This occurs both at the extensive margin (net birth rate) and at the intensive margin (net expansion rate). Not surprisingly, these relationships are particularly strong in industries that are relatively more mobile. Industries that are tied to specific locations have less ability to relocate production activities in response to labor supply shocks.

The net birth rate and the net expansion rate capture shifts of production activities within the U.S. and to other countries. While it would be appealing to distinguish between these two types of relocations, the SUSB dataset does not provide this information. However, the results of this paper suggest that there is an important relationship between immigration and offshoring. Given the increasing prevalence of offshoring over the sample period, it is likely that a significant portion of the observed relationship between immigration and net births and net expansions is a result of offshoring. In addition, the industries that are defined as mobile are also industries in which offshoring is particularly prevalent. Thus, the relationship between immigration and firm relocation is strongest in industries in which offshoring is relatively more common. Finally, jobs that can easily be performed at a remote location within

the U.S. are the jobs that are most at risk of being offshored in the future (Jensen and Kletzer 2005). Understanding the forces that lead a firm to relocate production facilities across cities will offer important clues into the decision to offshore. Overall, the results presented in this paper indicate that there is an important relationship between offshoring and immigration. Specifically, low-skilled immigration likely substitutes for offshoring while high-skilled immigration likely complements offshoring.

6 Conclusion

Research generally focuses on how immigration affects native workers, while the impact of immigration on domestic firms is often overlooked. This paper presents a simple model that highlights how immigrants are absorbed into local labor markets either through changes in the relative wage or through changes in firms' organizational structure. The model predicts that low-skilled immigration decreases and high-skilled immigration increases the relocation of production activities. These predictions are tested using a comprehensive dataset of nearly two hundred U.S. cities.

The empirical analysis provides three important results. First, consistent with previous findings, this paper shows that immigration has a minimal impact on relative wages. Second, immigration has a significant effect on the location of production activities both at the extensive and intensive margins. Low-skilled immigration increases the establishment birth rate and expansion rate while high-skilled immigration decreases the establishment birth rate and expansion rate. Together these results provide compelling evidence that labor supply shocks due to immigration are absorbed through changes in firms' organizational structure rather than through adjustments in relative wages. Third, the relationship between immigration and the net birth rate and the net expansion rate are stronger in industries that are relatively more mobile. Firms in industries that rely on natural resources or need to be close to

consumers have less ability to adjust their production activities in response to labor supply shocks

The results of this paper improve our understanding of immigration and firm mobility and provide answers to prominent puzzles in the literature. These results explain why research often finds that immigration has a relatively small impact on the wages of native workers. Rather than relative wages absorbing labor supply shocks, firms adjust the location of their production activities in response to immigration. In addition, these results explain why the estimated impact of immigration on relative wages differs between regional and national level analysis.

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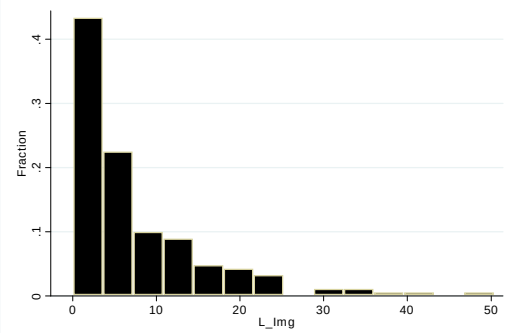
FIGURE 1

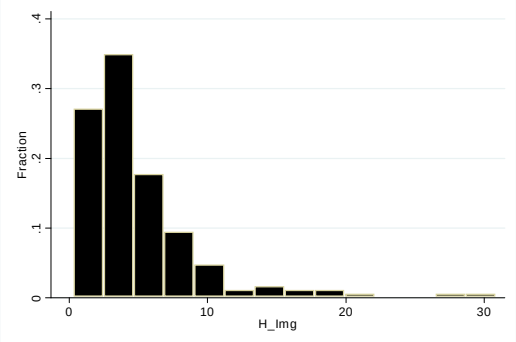
Low Skilled Immigration (1998-2004 Average)



MSA with Highest Percent:	L_Img
Visalia-Tulare-Porterville, CA	46.9
Miami, FL	40.9
Salinas, CA	39.2
Los Angeles, CA	35.1
El Paso, TX	33.8

MSA with Smallest Percent:	L_Img
Canton, OH	0.5
Lafayette, LA	0.5
Saginaw-Bay City-Midland, MI	0.2
Charleston, WV	0.2
Jackson, MS	0.2

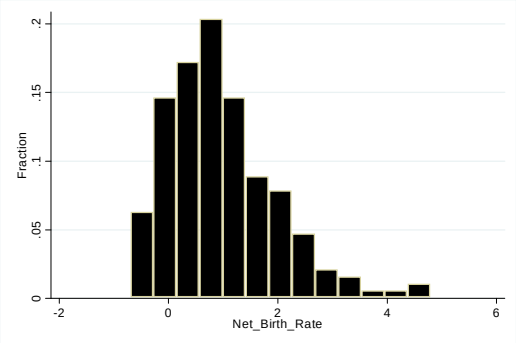
High Skilled Immigration (1998-2004 Average)



MSA with Highest Percent:	H_Img
Miami, FL	28.7
San Jose, CA	28.2
Fort Lauderdale, FL	21.0
San Francisco, CA	18.2
Stamford, CT	17.8

MSA with Smallest Percent:	H_Img
Youngstown-Warren, OH	0.7
Topeka, KS	0.7
Lake Charles, LA	0.5
York, PA	0.4
Pueblo, CO	0.4

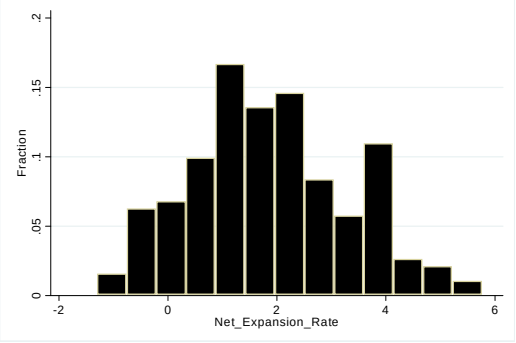
Net Establishment Birth Rate (1998-2004 Average)



MSA with Highest Rate:	Net_Birth_Rate
Las Vegas, NV	4.8
Provo-Orem, UT	4.6
Fayetteville-Springdale, AR	4.0
Fort Myers-Cape Coral, FL	3.8
Orlando, FL	3.4

MSA with Smallest Rate:	Net_Birth_Rate
Flint, MI	-0.6
Youngstown-Warren, OH	-0.6
Saginaw-Bay City-Midland, MI	-0.6
Decatur, IL	-0.7
South Bend, IN	-0.7

Net Establishment Expansion Rate (1998-2004 Average)



MSA with Highest Rate:	Net_Expansion_Rate
Fort Myers-Cape Coral, FL	5.8
Fayetteville-Springdale, AR	5.3
Medford, OR	5.1
Ocala, FL	5.1
Riverside-San Bernadino, CA	4.9

MSA with Smallest Rate:	Net_Expansion_Rate
Cleveland, OH	-0.7
Youngstown-Warren, OH	-0.7
Detroit, MI	-1.0
Toledo, OH	-1.2
Flint, MI	-1.3

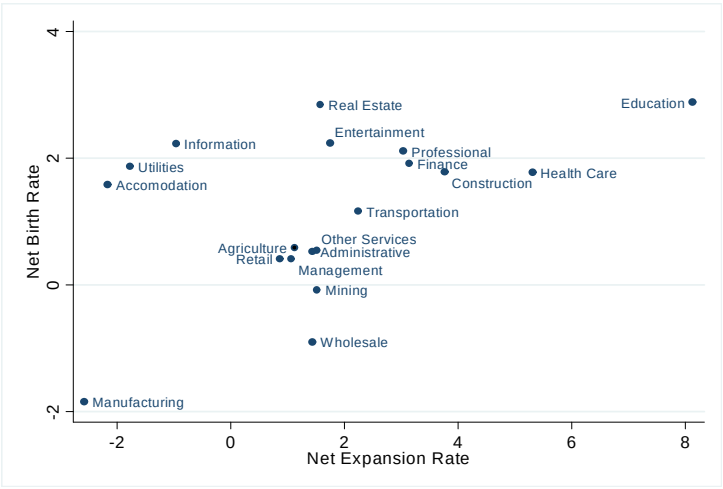
TABLE 1
Annual Averages

Year	L_Img	H_Img	Net Birth Rate	Net Expansion Rate
1998	6.9	4.6	0.9	3.3
1999	7.2	4.6	0.6	4.4
2000	7.6	4.7	0.7	1.0
2001	8.0	5.1	0.8	-1.0
2002	7.7	5.2	1.2	2.0
2003	7.5	5.4	1.4	2.9
2004	7.9	5.6	1.4	0.6

Annual average of low skilled immigrant share, high skilled immigrant share, net establishment expansion rate, net establishment expansion rate weighted by the sample size.

FIGURE 2

Net Birth Rate & Net Expansion Rate by Industry



Net establishment birth rate and net establishment expansion rate by 2-digit NAICS industries.

TABLE 2
First Stage Regressions

	L_Img	H_Img
Predicted L_Img	0.409***	0.090***
	[0.038]	[0.022]
Predicted H_Img	0.085	0.292***
	[0.071]	[0.041]
Observations	1344	1344
R-squared	0.56	0.51
F-Stat, Instruments	279	243

Standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions include year fixed effects and the following controls: the average age of natives, the average educational attainment of natives, the native unemployment rate, and the share of the native population that is male, black, asian, and hispanic.

TABLE 3
Native Relative Wages

	OLS	IV
L_Img	0.000	0.016*
	[0.002]	[0.009]
H_Img	0.006**	-0.025
	[0.002]	[0.018]
Observations	1344	1344

Standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions include year fixed effects and the following controls: the average age of natives, the average educational attainment of natives, the native unemployment rate, and the share of the native population that is male, black, asian, and hispanic.

TABLE 4
Net Birth Rate

	OLS	IV
L_Img	0.021***	0.133**
	[0.007]	[0.054]
H_Img	0.019	-0.297***
	[0.013]	[0.101]
Observations	1344	1344

Standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions include year fixed effects and the following controls: the average age of natives, the average educational attainment of natives, the native unemployment rate, and the share of the native population that is male, black, asian, and hispanic.

TABLE 5
Net Expansion Rate

	OLS	IV
L_Img	0.055***	0.179**
	[0.011]	[0.078]
H_Img	-0.019	-0.371**
	[0.023]	[0.146]
Observations	1344	1344

Standard errors in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions include year fixed effects and the following controls: the average age of natives, the average educational attainment of natives, the native unemployment rate, and the share of the native population that is male, black, asian, and hispanic.

TABLE 6
Net Birth Rate by Industries (IV Regressions)

	All Industries	Non-Mobile Industries	Mobile Industries
L_Img	0.121*	0.046	0.225**
	[0.073]	[0.094]	[0.091]
H_Img	-0.282**	-0.115	-0.513***
	[0.133]	[0.167]	[0.170]
Observations	25526	14774	10752

Standard errors clustered at the msa*year level in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions include year and industry fixed effects and the following controls: the average age of natives, the average educational attainment of natives, the native unemployment rate, and the share of the native population that is male, black, asian, and hispanic.

TABLE 7
Net Expansion Rate by Industries (IV Regressions)

	All Industries	Non-Mobile Industries	Mobile Industries
L_Img	0.152*	0.129	0.185**
	[0.086]	[0.101]	[0.092]
H_Img	-0.324**	-0.248	-0.429**
	[0.158]	[0.188]	[0.169]
Observations	25526	14774	10752

Standard errors clustered at the msa*year level in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. All regressions include year and industry fixed effects and the following controls: the average age of natives, the average educational attainment of natives, the native unemployment rate, and the share of the native population that is male, black, asian, and hispanic.