Immigration and Firm Expansion

William W. Olney[1]

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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 expanding their production activities within a city in order to utilize the abundant supply of low-skilled workers. Using data on immigration and the universe of establishments in U.S. cities, the results indicate that firms respond to immigration at the extensive margin by increasing the number of establishments. Not surprisingly, immigration has a more positive impact on the number of establishments that are small in size and in relatively mobile, low-skill intensive industries. Additional evidence indicates that immigration has little impact on employment within existing establishments, the intensive margin, or on the number of establishments in service industries which may expand simply due to immigrant consumption.

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[1]Department of Economics, Williams College, Williamstown, MA 01267 (email: william.olney@williams.edu). I am grateful to Brian Cadena, Dan Hickman, Wolfgang Keller, Keith Maskus, Stephen Yeaple and seminar participants at the Chicago Federal Reserve Bank and at the University of Colorado International Trade Seminar Series for helpful comments and suggestions.

1 Introduction

Recent research has typically focused on how the rapid increase in low-skilled immigration has affected the wages of American workers. This paper takes a different approach by examining the impact of immigration on domestic firms. Specifically, this analysis will investigate whether firms respond to an immigrant-induced labor supply shock by increasing the number of establishments within a city.

Basic supply and demand suggest that immigration should increase the supply of low-skilled workers and thus depress the equilibrium wage. The fact that research typically finds a minimal impact of low-skilled immigration on the wages of similarly skilled native workers suggests that this story is missing something important.[2] However, if firms expand their production activities within a city in response to immigration, then it is not surprising that wages are relatively unaffected. The excess supply of low-skilled workers are absorbed into the local labor market by an increase in labor demand. An increase in both the supply and demand for low-skilled workers leaves the equilibrium wage unchanged.

The lack of a wage impact in the existing literature suggests that labor demand also responds to immigration, however relatively little is known about the nature of this adjustment. Examining the impact of immigration on employment is not particularly informative since this could be driven by a movement along a relatively elastic demand curve due to an increase in labor supply or a shift of the labor demand curve itself. Instead, this paper will focus on whether firms respond to immigration at the extensive margin by increasing the number of establishments in order to utilize the abundant supply of low-skilled labor. An increase in the number of establishments could be caused by firms creating new establishments or relocating existing establishments to the city. Either scenario will be accompanied by an increase in capital and thus a shift right of the local labor demand curve.

These predictions will be tested by exploiting changes in immigration and the number of establishments over 11 years (1998-2008) within U.S. cities. The immigration data is obtained from the Current Population Survey (CPS). The establishment data comes from the Statistics of U.S. Businesses (SUSB) which uses the Employer Identification Numbers

[2] See, for instance, Friedberg and Hunt 1995, Card 2005, and Ottaviano and Peri 2012.

issued by the Internal Revenue Service to identify the universe of establishments. An establishment is defined as a single location at which production activities are conducted. Focusing on establishments provides a novel way of measuring capital at the city level, since a new establishment is almost certainly accompanied by an increase in capital. The SUSB also provides information on establishments by size and industry which provides additional insight into the types of establishments most affected by immigration.

The empirical specification essentially asks whether an increase in immigration within a city leads to an increase the number of establishments. 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 shocks and allows the impact of immigration on establishments to be identified.

The results indicate that low-skilled immigration leads to a significant increase in the number of establishments within a city. A ten percent increase in the share of low-skilled immigrants leads to a two percent increase in the number of establishments. This indicates that capital, in the form of new establishments, adjusts quickly to the immigration-induced labor supply shock. Furthermore, this positive relationship is driven almost exclusively by an increase in the number of small establishments with fewer than twenty employees. This is not surprising given that new establishments are often small in size.

An industry analysis allows for the possibility that firms may respond to immigration in a different manner depending on their industry. The results confirm the hypothesis that immigration has the strongest impact on the number of establishments in low-skill intensive and relatively mobile industries. These are the industries in which firms are most likely to create or relocate establishments in response to low-skilled immigration. In contrast, immigration has an insignificant impact on the number of establishments in non-traded, service industries. This indicates that the relationship between establishments and immigration is not simply driven by immigrants consuming more goods and services.

Additional results confirm that immigration has an insignificant impact on the wages

of native workers but a significant positive impact on total employment. This increase in employment occurs entirely at the extensive margin with no impact on the intensive margin. Specifically, immigration leads to an increase in the number of establishments but has no impact on the average employment levels within establishments. The lack of a wage effect and the increase in the number of establishments indicates that the labor demand curve increases in response to immigration. These results also imply that this adjustment process occurs quickly which leaves the labor to capital ratio unchanged. As a result, employment per establishment and thus wages remain unaffected but the number of establishments increases. Finally, another extension accounts for the possibility that immigration may lead to an outflow of similarly skilled natives. In this alternate specification, the results are larger and more significant, which confirms that native displacement will, if anything, attenuate the baseline results.

Research on immigration's impact on local labor markets generally focuses on how native wages are affected. There have been two main approaches to answering this question. Exploiting variation across U.S. cities, Card (1990, 2005, and 2009) finds 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.[3] 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 the estimates of immigration's impact on 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 native wages (Card 2005, Lewis 2003). A second potential explanation is that similarly skilled natives respond to immigration

[3] However, Ottaviano and Peri (2012) also use national data but find a less negative impact of immigration on wages when using different estimates of the substitutability of workers.

by moving out of the city. Thus, the overall relative labor supply would be left virtually unchanged which could explain the lack of wage adjustments. While plausible, Card (2001), Card and DiNardo (2000), and Peri and Sparber (2011) find that native outflows have virtually no offsetting effect on labor supply shocks caused by immigration.[4] 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 wages. This paper provides a plausible explanation. The excess supply of low-skilled immigrants are absorbed into the local labor market by firms expanding the number of establishments. Since new establishments lead to an increase in the capital stock, the labor to capital ratio and thus wages are relatively unaffected.

Furthermore, it has been difficult to reconcile the results from these regional studies with the more negative results obtained from national time series analyses. This paper suggest two possible explanations. First, studies using national time series data may be less affected by the relocation of establishments across cities within the U.S. Thus, if the expansion in the number of establishments represents a relocation of production activities across U.S. cities, then this could explain the disparity between regional and national level analyses. A second explanation, is that this paper indicates that capital adjusts quickly to immigration and highlights the importance of allowing for this type of response even in the short run. In fact, using national time series data, Ottaviano and Peri (2012) show that accounting for capital adjustments in the short run reduces the observed negative impact of immigration on wages.

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. Recent empirical studies find evidence that an increase in the supply of

[4]However, Borjas (2006) does find evidence of native outflows in response to immigration.

low-skilled workers affects the skill intensity and technologies adopted within industries but has little impact on the composition of industries (Lewis 2003, Lewis 2005, Gonzalez and Ortega 2008, Dustmann and Glitz 2011). These studies are similar in spirit to this paper in that they highlight how firms' decisions may respond to local labor supplies. However, these others papers tend to focus on the intensive margin of adjustment whereas this paper focuses on the extensive margin by examining the impact of immigration on the number of establishments.

The remainder of the paper is organized as follows. Section 2 provides an overview of the data used in this analysis. The estimation strategy and the instrument used in this analysis are discussed in Section 3. The key results are presented in Section 4, while Section 5 discusses a couple of extensions. Finally, Section 6 concludes.

2 Data

2.1 Immigration

The data set used in this analysis includes information on immigration and establishments in U.S. Metropolitan Statistical Areas (MSA) over 11 years (1998-2008). Data on immigration comes from the Current Population Survey (CPS). Specifically, data on individuals between the age of 18 and 65 is obtained from the monthly CPS extracts via the Integrated Public Use Microdata Series (IPUMS). From this data the share of the population that is low-skilled and foreign born is calculated by MSA and year. Immigrants are defined as low-skilled if they have a high school degree or less. Given the magnitude and controversy surrounding low-skilled immigration in the U.S., this paper and much of the existing literature focuses on the impact of low-skilled immigration.

The CPS data is used because it has annual data for the years in this analysis and it has information at the MSA level.[5] 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. Consistent with the existing literature (Card 2001, Cortes 2008), I focus on the

[5] The American Community Survey is larger in size but it only starts in 2000 with MSA level data begining in 2005.

30 largest MSA which is defined by the number of CPS observations per MSA. This also limits measurement error associated with calculating immigrant shares for relatively small MSA.[6]

The annual unemployment rate for each MSA is obtained from the Bureau of Labor Statistics (BLS). This will capture labor demand shocks specific to particular MSAs and proves to be an important control in the analysis that follows.[7]

2.2 Establishments

Data on the number of establishments within an MSA and year comes from 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.

There are three especially appealing aspects of this data. First, an establishment represents the smallest unit of production activity for which data is available. Data at the establishment or plant level provides much greater detail on production activities within a city than a firm or industry level analysis. Second, this SUSB data includes the universe of establishments within U.S. cities. Establishments are identified using their Employer Identification Number (EIN) which is issued by the Internal Revenue Service. Thus, any establishments with payroll and employment records will be included in the sample.[8]

Third, within an MSA and year, the SUSB also provides information on the number of establishments by industry and size. Industries are defined at the 2-digit NAICS level and size is defined by establishment employment. Specifically, in the analysis that follows, a small establishment is defined as having less than 20 employees, a medium establishment is defined as having between 20 and 500 employees, and large establishment is defined as having more than 500 employees. These additional dimensions to the data set provide an opportunity to examine the types of establishments most affect by immigration.

[6] However, the results that follow are not sensitive to changes in the number of MSA included in the sample. Specifically, including the 50 largest MSA instead generates larger and more signficant results.

[7] An alternate approach is to use changes in national industry employment and MSA industry weights to construct a proxy for local labor demand conditions. Wozniak (2010) finds the two aproaches generate similar results and thus I use the readily available and more reliable MSA unemployment rate as a control.

[8] An establishment without an EIN or with no employees will not be in the SUSB sample.

2.3 Descriptive Statistics

Figure 1 plots the number of establishments against the low-skilled immigrant share over time. Perhaps not surprisingly, both establishments and immigration are increasing over the sample. Specifically, from 1999 to 2007 the number of establishments increased by 440,000 or 14% and the low-skilled immigrant share increased from 11.7% to 12.7% in the 30 largest MSA. The goal of this analysis is to examine to what extent this positive correlation represents a causal impact of immigration on establishments. Figure 1 provides useful insight into how the key variables are changing over time, although year fixed effects will capture much of this variation in the analysis that follows.

The inclusion of MSA fixed effects as well, means that this analysis will be exploiting annual changes over time within an MSA. To get a better sense of this variation in the data, Table 1 reports the number of establishments and the low-skilled immigrant share in 1998 and 2008 for the thirty cities included in the sample. There is substantial variation across cities with New York, Los Angeles, and Chicago having a large number of establishments and Los Angeles and Miami having a large share of low-skilled immigrants.

More relevant for this analysis is that these variables change substantially over time and in very different ways across these cities. For instance, there is a large increase in the number of establishments in Miami but a reduction in the number of establishments in the Midwest cities of Cleveland and Detroit. In addition, Cincinnati, Atlanta, and Denver experienced a large increase in the share of low-skilled immigrants whereas Honolulu and Boston experienced a decrease.[9]

3 Estimation Strategy

3.1 Baseline Specification

The goal of this paper is to examine the impact of low-skilled immigration on the number of establishments. The empirical specification essentially asks whether an increase in immigration within a city leads to an increase the number of establishments. Specifically, the following equation will be estimated:

[9] Great care was taken to ensure that the MSA definitions are consistent over the sample.

$$\ln Est_{c,t} = \alpha_0 + \alpha_1 \ln LS\_Img_{c,t} + \alpha_2^{'} X_{c,t} + \delta_c + \lambda_t + \varepsilon_{c,t}. \quad (1)$$

The dependent variable (Est) is the number of establishments within a city c and year t. The key independent variable (LS_Img) is the share of the working age population that is low-skilled and foreign born. X is a set of control variables, δ are city fixed effects, and λ are time fixed effects.

The central hypothesis of this paper is that the number of establishments increases in response to the immigrant induced labor supply shock. Thus, we would expect that $\alpha_1 > 0$. This increase could be driven by new establishments being created or by existing establishments being relocated from one city to another. In both cases, the motivation would be for the firm to expand production in order to utilize the excess supply of low-skilled workers.

Equation (1) will also be estimated using the different size categories discussed earlier. Specifically, rather than using the total number of establishments, it is possible to estimate separate regressions using the number of small, medium, and large establishments as the dependent variable. Given that new establishments often have relatively few employees, the impact of immigration on the number of small establishments should be positive and significant ($\alpha_1 > 0$) in this first set of results. However the impact of immigration on the number of medium and large establishments is likely to be smaller and less significant.

3.2 Industry Analysis

This paper argues that firms expand their production activities in order to utilize the abundant supply of low-skilled immigrants in the city. An alternate story is that there is an increase in the number of establishments because this new immigrant population is consuming additional goods and services. For instance, Mazzolari and Neumark (2009) find that immigrant's consumption choices affect the number and composition of retail stores and restaurants in California.[10] In order to disentangle an increase in the number of establishments due to firms expanding production activities (production hypothesis) from an

[10] Using a different approach, Olney (2012) finds that variation in immigrant consumption, identified using changes in remittances, can have an important impact on native wages.

increase due to immigrants consuming more goods and services (consumption hypothesis), this paper uses an industry level analysis.

Specifically, the 19 two-digit NAICS industries will be divided into three groups. The first group consists of industries in which the immigrant-induced change in the number establishments is most likely due to the production hypothesis. These are low-skill intensive industries in which production activities are relatively easy to relocate.[11] This includes manufacturing; wholesale trade; and transportation and warehousing which together account for approximately 20% of employment in the sample. Firms in these industries produce tradeable goods and are relatively mobile in the sense that they are not tied to a specific location for production or consumption reasons. Thus, these firms have the ability to expand or relocate production activities in response to a low-skill labor supply shock.

The second group includes industries in which the immigrant-induced change in the number of establishments is due to the consumption hypothesis. In contrast to the first group, these industries produce non-traded goods and services that are more likely to expand in response to an immigration-induced increase in the consumer base. Specifically, this group includes retail trade; educational services; health care; arts, entertainment, and recreation; accommodations and food services; construction; real estate; administrative services; and other services. These industries account for 58% of employment in the sample. Immigration's impact on the number of establishments in these industries will primarily be driven by an increase in local consumption.

The third group consists of industries that are unlikely to respond to a low-skilled labor supply shock. This includes industries that are not mobile because they are tied to specific natural resources (such as agriculture; mining; and utilities). For instance, agriculture is low-skill intensive, but a farmer that relies on arable land is unlikely to be able relocate to New York City in response to an influx of immigrants. This third group also includes skill intensive industries (such as information; finance; professional services; and management). While firms in these industries are relatively mobile, these are the most skill intensive industries and are thus less likely to respond to low-skilled immigration. Together this

[11] Low-skill intensive industries are defined as the ten industries with the lowest average educational attainment in the 2000 census.

third industry group represents 22% of employment among the MSA's in the sample.[12]

Using this additional industry dimension in the data, Equation (1) is re-estimated in the following manner:[13]

$$\ln Est_{c,t,i} = \alpha_0 + \alpha_1 \ln LS\_Img_{c,t} + \alpha_2^{'} X_{c,t} + \delta_c + \lambda_t + \eta_i + \varepsilon_{c,t,i}, \tag{2}$$

where η are industry fixed effects and the the number of establishments varies by industry. Separate estimates of (2) will be obtained using the three different industry groups. 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.

A positive coefficient on α_1 using the first group of industries will provide support for the production hypotheses and a positive coefficient on α_1 using the second group of industries will provide support for the consumption hypothesis. As a useful check on the results, we should see no impact of immigration on establishments among the third group of industries.

3.3 Instrument

One legitimate concern is that establishments and immigration may be correlated with some unobserved city characteristics that are changing over time. For instance, a MSA with a rapidly expanding economy may experience an increase in the number of establishments and may also attract immigrants looking for jobs. Or low-skilled immigrants may be attracted to more affordable cities that are experiencing slower increases in establishments. While the unemployment rate will capture some MSA specific demand shocks, other unobservable factors that are changing over time within a city may not be accounted for and could bias the OLS results.

To alleviate this concern, I use historical settlement patterns of immigrants as an in-

[12] The results that follow are robust to alternate industry groupings.

[13] Due to limited data, it is not possible to calculate immigration by industry. Furthermore, if workers are relatively mobile across industries within a city, then calculating immigrant shares by industry is relatively uninformative.

strument for current settlement patterns of similar immigrants.[14] The 'predicted' number 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 number of low-skilled immigrants is calculated as follows:

$$pred\_LS\_Img_{c,t} = \sum_{r} \left(LS\_Img_{g,t} * \frac{img_{c,g,1980}}{img_{g,1980}} \right),$$

where c indexes MSAs, t indexes years, and g indexes the 17 country groups used by Card (2001).[15] The first term on the right hand side of this equation is the total number of foreign born low-skilled residents from country g in year t. This total is then assigned to MSAs using the share of total immigrants from country g that resided in city c in 1980. Thus, for each year the actual number of foreign born residents from country g is distributed across cities based on where immigrants from the same country were located in 1980. This product is then summed over g to obtain a predicted total number of immigrants. This instrument will capture variation in immigration that is driven by family and cultural reasons rather than by other unobservable factors such as labor demand conditions. This mitigates endogeneity concerns and allows the impact of immigration on establishments to be identified.

Table 2 reports the first stage regressions results. Column 1 does not include the unemployment rate as a control while column 2 does. In both specifications, predicted low-skilled immigration has a large, positive, and significant effect on the actual low-skilled immigrant share. The F-stat on the instrument is 10 and 13 respectively. These results indicate that

[14] This instrument is similar to the one used by Card (2001), Lewis (2003), and in particular Cortes (2008).

[15] The country groups are: Mexico; Central America; Cuba; Carribean countries; South America; Northwest Europe; Canada, UK, Australia, and New Zealand; Southwestern Europe; Russia and Central Europe; China, Hong Kong, and Singapore; Japan and Korea; Cambodia, Laos, Thailand, Vietnam, and Burma; Indonesia and Malaysia; Philippines; India, Pakistan and Central Asia; Middle East and North Africa; and Africa.

historical immigrant enclaves are useful at 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 labor demand conditions. Interestingly, the positive coefficient on the unemployment rate in column 2 indicates that low-skilled immigrants are more likely to settle in cities with higher unemployment rates perhaps because these cities are more affordable. This suggests that the OLS results might be biased down since immigrants are moving to cities with slower economic and establishment growth.

Figure 2 shows a reduced form scatter plot of establishments against predicted immigration after accounting for MSA and year fixed effects. Specifically, both variables are first regressed on MSA and year fixed effects and the residuals from these regressions are plotted in Figure 2. This highlights the variation within an MSA and over time that is exploited in this analysis. A positive relationship is evident in this scatter plot which suggests that an exogenous influx of immigrants leads to an increase in the number of establishments. The subsequent analysis examines this positive relationship in greater detail.

4 Results

4.1 Baseline

The OLS results from estimating equation (1) are reported in the first two columns of Table 3. Column 1 excludes the unemployment rate while column 2 includes this control. All specifications in Table 3 include MSA and year fixed effects and have robust standards errors in brackets. The OLS results in columns 1 and 2 indicate that the low-skilled immigrant share has an insignificant impact on the number of establishments. However, these results should be interpreted with caution due to the endogeneity associated with the immigrant location decision. Specifically, the results from Table 2 suggest that immigrants are attracted to cities with higher unemployment rates which suggests that perhaps the OLS results in Table 3 are biased down. The IV specification will overcome these issues by identifying an exogenous source of variation in the immigrant share using historical immigrant settlement patterns.

The IV results are reported in columns 3 and 4 of Table 3. In both specifications, low-

skilled immigration has a positive and significant impact on the number of establishments. For instance in column 3, a ten percent increase in the share of immigrants leads to a 2.5% increase in the number of establishments. This result supports the key proposition of this paper that firms respond to immigration by increasing the number of establishments. Furthermore, it indicates that this adjustment in capital responds quickly to the increase in the supply of low-skilled labor.

Controlling for the unemployment rate in column 4 does not change the results significantly. This is not surprising since the purpose of the IV is to eliminate the variation in the low-skilled immigration that is driven by labor demand factors. Thus, the inclusion of the unemployment rate, as a way to control for labor demand shocks, does not affect the key relationship between immigration and establishments. However, the unemployment rate is included in the subsequent analysis since this is a more rigorous way of accounting for labor demand shocks and because it generates relatively more conservative estimates. Finally, as expected the IV results are more positive than the OLS results which indicates a spurious negative bias in the OLS results driven by the fact that immigrants seem to be choosing to locate in cities with less robust economic growth over this sample.

4.2 Establishment Size

Table 4 reports the impact of immigration on the number of establishments by size. Column 1 replicates the baseline results from Table 3, while columns 2-4 use as the dependent variable the number of small, medium, and large establishments respectively. Low-skilled immigration has a significant positive impact on the number of small establishments. Specifically, a ten percent increase in the immigrant share leads to a 2.4% increase in the number of small establishments within a city. However, as expected, in columns 3 and 4, low-skilled immigration has an insignificant impact on the number of medium and large establishments. Given that new establishments often have relatively few employees, it is not surprising that immigration has the strongest impact on the number of small establishments. These contrasting results provide an additional piece of evidence that supports the proposition of this paper.

4.3 Establishment Industry

The industry dimension of the SUSB data is examine by separately estimating equation (2) using the different industry groups discussed in section 3.2. These results are reported in Table 5. All specifications include industry fixed effects in addition to MSA and year fixed effects and the standard errors are now clustered at the msa-year level.

In column 1, which includes all 19 industries, we see that immigration has a positive impact on the number of establishments although this coefficient is not significant. Column 2 includes only the relatively mobile, low-skill intensive industries that have the ability to create or relocate establishments in response to immigration. Not surprisingly, low-skilled immigration has a strong positive impact on the number of establishments in these industries. A ten percent increase in immigration increases the number of establishments in these mobile industries by 3.1%. This coefficient is larger in magnitude than the results from the baseline specification and is significant at the one percent level. This supports the 'production hypothesis' in which firms create or relocated establishments in order to utilize the abundant supply of low skilled labor.

Column 3 includes those non-traded, service industries that may expand in order to accommodate the immigrant-induced increase in consumption. This is a very different channel through which immigration may affect the number of establishments. The coefficient on low-skilled immigration is positive in column 3, although it is smaller in magnitude and insignificant. Thus, comparing columns 2 and 3 indicate that the expansion in the number of establishments due to immigration is primarily driven by the production hypothesis rather than the consumption hypothesis.

Finally, column 4 includes those industries that are unlikely to respond to low-skilled immigration because they are tied to a specific geographic location (i.e. mining) or because they are relatively skill-intensive (i.e. management). The results in column 4 confirm these predictions and indicate that low-skilled immigration has no impact on the number of establishments in these industries. Overall, the contrasting results in Table 5 indicate that establishment expansion is most likely to occur in relatively mobile and low-skilled intensive industries.

5 Extensions

5.1 Wages & Employment

The results so far indicate that firms expand the number of establishments within a city in response to an immigrant induced labor supply shock. Thus, not only does the supply of low-skilled workers increase due to immigration but the demand for low-skilled workers also increases. If both the labor supply and labor demand curves shift to the right, then there will be little change in the equilibrium wage and an increase in employment. This section examines these predictions and attempts to verify, using this data set, existing empirical evidence.

Columns 1 and 2 in Table 6 estimate the impact of immigration on the low-skilled native wage and on employment. The wage of low-skilled native workers is obtained from the March CPS extract and employment data is obtained from the SUSB data set. These IV results indicate that immigration has an insignificant impact on the low-skilled native wage, which is consistent with much of the empirical literature, and a positive and significant impact on employment within a city. The fact that immigration does not have a significant negative impact on the low-skilled wage indicates that the labor demand curve is increasing as well. In the absence of a labor demand response, immigration would increase the supply of low-skilled workers and decrease the equilibrium wage.

The immigrant induced increase in employment, observed in column 2, is consistent with a shift of the demand curve or a movement along the demand curve. While the insignificant wage effects suggest that labor demand is increasing, Columns 3 and 4 attempt to further separate these competing hypothesis. Column 3 reports the earlier baseline results using the number of establishments as the dependent variable. This will capture the extensive margin of the firm's response to immigration and is more likely to be accompanied by an increase in capital. Thus, this is more consistent with an increase in labor demand. In contrast, in column 4 the dependent variable is employment per establishment. This measures the intensive margin of firm expansion and is more likely to capture an increase in employment driven by a movement along the demand curve. The results in Table 6 indicate that immigration has a significant positive impact on the number of establishments

in column 3 but an insignificant impact on employment per establishment in column 4.[16] These contrasting results and the insignificant wage results indicate that the labor demand curve is increasing in response to immigration.

The results in Table 4 also indicate that the firm's response to immigration occurs almost entirely at the extensive margin rather than at the intensive margin. This is an interesting finding and complements the existing literature that focuses on the intensive margin. While existing results convincingly show that firms are slower to adopt new technologies in high immigrant cities, the results of this paper indicate that the extensive margin adjustments are even more important.

5.2 Native Displacement

A common concern is that similarly skilled natives may respond to an immigration shock by moving out of the city. Thus, the increase in labor supply will be partially offset by the outflow of native workers. This section examines more carefully whether this type of native displacement is important in this context. However, there seems to be little empirical evidence that this is occurring (Card 2001, Card and DiNardo 2000, and Peri and Sparber 2011) and native displacement should, if anything, attenuate the results in this paper. An immigrant supply shock would be offset by native outflows and thus not have as large an impact on the number of establishments.

Equation (1) is re-estimated using the total low-skilled share of the population, including both natives and immigrants, as the key independent variable rather than just the low-skilled immigrant share of the population. The same instrumental variable, discussed in section 3.3, is used in these regressions.[17] Thus, this empirical strategy examines how changes in the overall low-skilled share, that is driven by the predicted immigration shocks, ultimately affects the number of establishments. This new independent variable will account for changes in the low-skilled immigrant and native populations and thus will control for

[16] One concern, is that the new establishments being created are predominently small, as Table 4 indicates. This could depress employment per establishment simply due to the composition of establishments rather than through an intensive margin adjustment to immigration. However, replicating Table 4 using employment per establishment as the dependent variable generates insignificant coefficients on immigration in all size categories.

[17] See Cortes (2008) who uses and discusses the benefits of this specification.

native displacement.

Table 7 replicates the key IV results using this alternate specification. The new baseline results are reported in column 1 and indicate that a ten percent increase in low-skilled population due to immigration leads to a 4.9% increase in the number of establishments. Not surprisingly, this coefficient is larger than the baseline result since this specification is not attenuated due to native outflow. Columns 2 and 3 estimate the impact of immigration on the establishments that are small in size and establishments that are in relatively mobile industries using this alternate specification. The coefficient on the low-skilled share is large, positive, and significant in both regressions which indicates that immigration has a disproportionate effect on small establishments in relatively mobile industries. The results in Table 7 indicate that the baseline results reported earlier represent a conservative estimate of the impact of immigration on the number of establishments.

6 Conclusion

Research generally focuses on how immigration affects native wages, while the impact of immigration on domestic firms is often overlooked. The primary contribution of this paper is to study whether labor demand responds to immigration and to identify the nature of this adjustment. Specifically, this analysis examines the impact of low-skilled immigration on the universe of establishments in U.S. cities from 1998 to 2008.

The empirical analysis provides three important results. First, firms respond to immigration at the extensive margin by increasing the number of establishments within a city in order to utilize the abundant supply of low-skilled workers. Second, not surprisingly, immigration leads to an increase in the number of relatively small establishments but has little impact on the number of larger establishments. Third, the increase in establishments predominantly occurs in industries that are low-skill intensive and relatively mobile. Immigration has little impact on the number of establishments in non-traded, service industries. This provides evidence that the increase in the demand for low-skilled workers is driven by firms expanding their production activities and not simply by immigrants consuming more goods and services.

This paper identifies an important relationship between immigration and the number of establishments. Furthermore, it provides 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. The excess supply of low-skilled immigrant workers are absorbed into the labor market by firms increasing the number of establishments within a city. In addition, these results may provide insight into why the estimated impact of immigration on wages differs between regional and national level analysis. Both the relocation of production activities within the country and the quick capital adjustments in response to immigration, can explain the disparity between these results.

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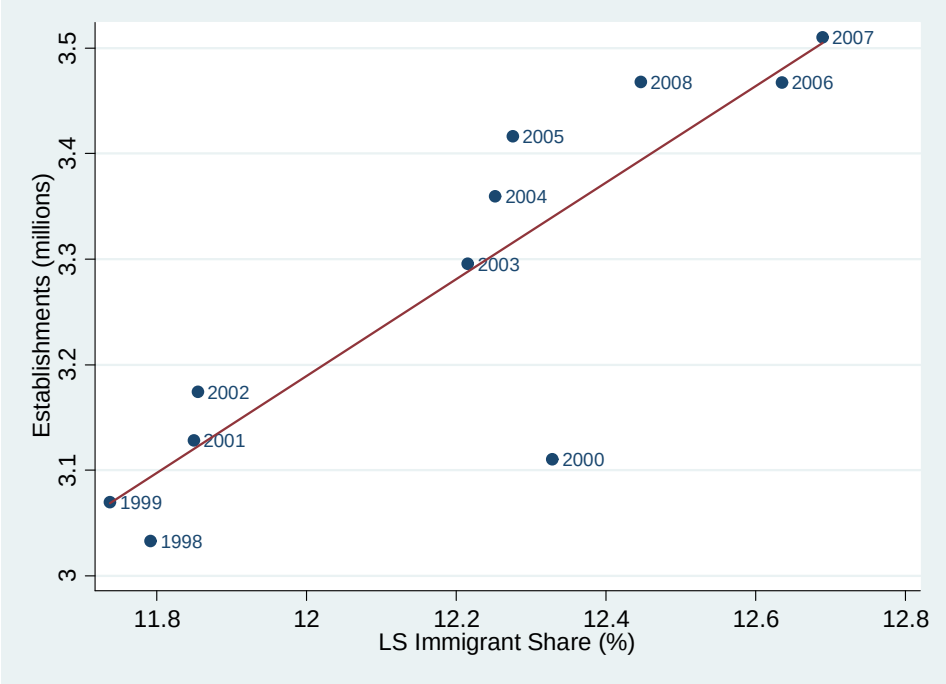
Figure 1
Number of Establishments and Immigrant Shares by Year



The number of establishments in the 30 largest MSA is plotted against the low-skilled immigrant share in the 30 largest MSA.

Table 1
Establishments and Immigration by City

	Establishments		Low-Skilled Immigrant Share	
City	1998	2008	1998	2008
Atlanta	108,111	135,360	3.42	9.59
Boston	113,329	124,928	7.02	5.77
Chicago	219,514	242,595	10.52	13.15
Cincinnati	46,609	48,121	0.39	3.71
Cleveland	59,334	54,229	1.96	2.74
Columbus	36,795	40,173	2.43	4.32
Dallas-Fort Worth	124,382	141,352	10.29	17.14
Denver - Boulder	73,532	86,768	4.11	8.86
Detroit	104,153	102,029	4.46	4.98
Honolulu	20,675	22,044	14.36	9.65
Houston	99,687	121,361	14.58	18.13
Kansas City	47,403	51,921	2.39	4.57
Las Vegas	30,446	41,023	13.82	18.01
Los Angeles	295,087	339,782	30.03	26.20
Miami	116,068	174,036	26.31	24.48
Minneapolis	81,314	92,114	3.66	5.78
New York	477,247	537,840	18.45	17.94
Philadelphia	140,581	148,645	3.42	5.47
Phoenix	70,943	92,818	12.07	14.80
Pittsburgh	59,279	60,252	1.16	1.04
Portland	55,436	64,048	6.04	6.02
Providence	34,708	42,898	11.11	9.43
Riverside	50,949	68,232	14.40	23.35
St. Louis	66,394	71,729	1.94	1.99
Salt Lake	32,966	44,468	4.85	8.28
San Diego	64,413	78,123	15.09	16.28
San Francisco	128,267	127,748	10.41	16.07
Seattle	90,407	99,794	5.26	6.80
Tampa	60,694	71,919	6.47	7.19
Washington	124,335	141,608	6.28	9.82

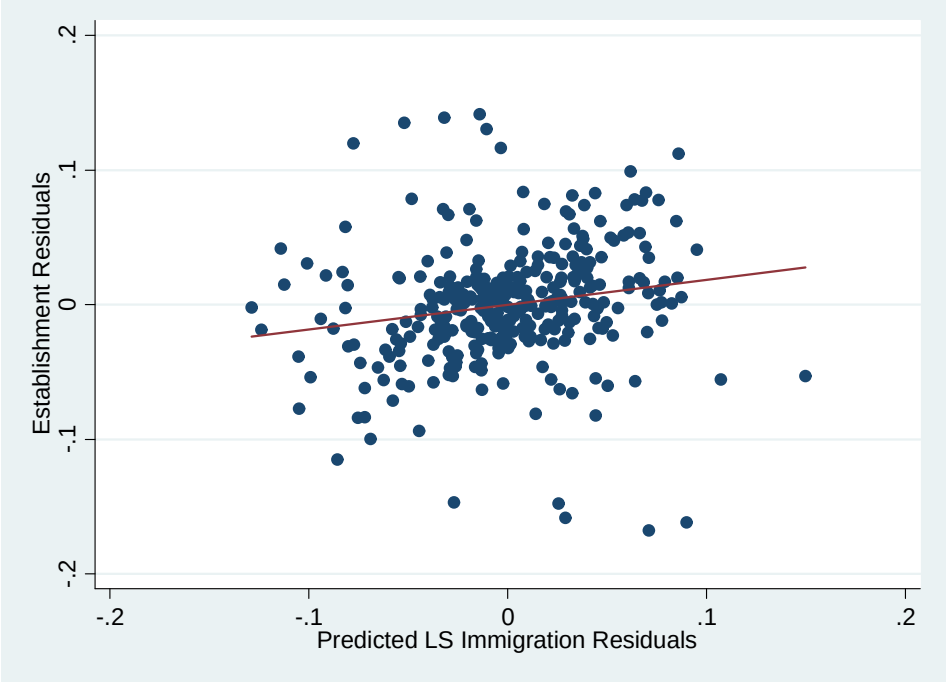
Data on the number of establishments is from U.S. Census Bureau's Statistics of U.S. Businesses (SUSB). Data on the share of low-skilled immigrants in the population is from the Current Population Survey (CPS).

Table 2
First Stage Results

	ln (LS Immigrant Share)	ln (LS Immigrant Share)
ln (Predicted LS Img)	0.735***	0.812***
	[0.237]	[0.225]
ln (Unemployment Rate)		0.354***
		[0.069]
MSA FE	Yes	Yes
Year FE	Yes	Yes
Observations	330	330
R-squared	0.955	0.958
F-stat, Instrument	9.62	13.01

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Figure 2
Establishments and Predicted Immigration



The residuals from regressing ln(establishments) on msa and year fixed effects are plotted against the residuals from regressing ln(predicted LS immigration) on msa and year fixed effects.

Table 3
Impact of Immigration on the Number of Establishments

	OLS		IV	
ln (LS Immigrant Share)	-0.011	0.002	0.251**	0.206**
	[0.013]	[0.014]	[0.128]	[0.102]
ln (Unemployment Rate)		-0.086***		-0.154***
		[0.025]		[0.038]
MSA FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	330	330	330	330
R-squared	0.996	0.996	0.990	0.993

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the ln of the number of establishments.

Table 4
Impact of Immigration on Establishments by Size (IV Regressions)

	All Establishments	Small Establishments	Medium Establishments	Large Establishments
ln (LS Immigrant Share)	0.206**	0.236**	0.091	0.106
	[0.102]	[0.108]	[0.094]	[0.098]
ln (Unemployment Rate)	-0.154***	-0.169***	-0.129***	-0.091**
	[0.038]	[0.041]	[0.036]	[0.036]
MSA FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	330	330	330	330
R-squared	0.993	0.992	0.995	0.994

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the ln of the number of establishments. Small establishments have fewer than 20 employees, medium establishments have between 20 and 500 employees, and large establishments have more than 500 employees.

Table 5
Impact of Immigration on Establishments by Industry (IV Regressions)

	All Industries	Mobile Industries	Non-Traded Industries	Other Industries
ln (LS Immigrant Share)	0.114	0.308***	0.137	0.001
	[0.096]	[0.109]	[0.101]	[0.110]
ln (Unemployment Rate)	-0.135***	-0.182***	-0.129***	-0.123***
	[0.036]	[0.043]	[0.038]	[0.043]
MSA FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	6,270	990	2,970	2,310
R-squared	0.965	0.962	0.979	0.952

Robust standard errors clustered at msa-year level in brackets. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is the ln of the number of establishments by industry. 'Mobile Industries' include manufacturing; wholesale trade; and transportation and warehousing. 'Non-Traded Industries' include retail trade; education services; health care; arts, entertainment, and recreation; accomodations and food services; construction; real estate; administrative services; and other services. 'Other Industries' include agriculture; mining; utilities; information; finance; professional services; and management.

Table 6
Impact of Immigration on Wages and Employment (IV Regressions)

	ln (LS Native Wage)	ln (Employment)	ln (Establishments)	ln (Empl per Est)
ln (LS Immigrant Share)	-0.061	0.249**	0.206**	0.040
	[0.119]	[0.112]	[0.102]	[0.036]
ln (Unemployment Rate)	-0.016	-0.232***	-0.154***	-0.073***
	[0.053]	[0.044]	[0.038]	[0.017]
MSA FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	330	330	330	330
R-squared	0.706	0.991	0.993	0.955

Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable in column 1 is the low-skilled native wage, it column 2 it is total employment, in column 3 it is the number of establishments, and in column 4 it is employment per establishment.

Table 7
Share of Low-Skill Immigrants and Natives (IV Regressions)

	Establishments	Small Establishments	Mobile Industries
ln (LS Share)	0.486**	0.558***	0.728***
	[0.205]	[0.214]	[0.193]
ln (Unemployment Rate)	-0.085***	-0.090***	-0.079***
	[0.022]	[0.024]	[0.017]
MSA FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	No	No	Yes
Observations	330	330	990
R-squared	0.995	0.995	0.965

Robust standard errors in brackets in colums 1 and 2. Robust standard errors clustered at msa-year level in brackets in column 3. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the ln of the number of establishments. The key independent variable is the share of low-skilled immigrants and natives in the population rather than the share of just low-skilled immigrants.