

## Identifying the Impact of Immigration on Local Firm Entry and Exit

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### Abstract

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This paper investigates how local firms respond to immigration through capital investment in establishments. Using data from the American Community Surveys from 2002 to 2011, we find that immigration is positively associated with establishment entry level and negatively associated with exits. In particular, high-skill immigration is found to have a greater positive impact on establishment entries, which indicates the importance of considering skill heterogeneity in studying the effects of immigration.

**Key Words** : immigration, labor market, skill heterogeneity, consumption effect,  
American Community Survey

**JEL Classification**: F22, F66

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## I. Introduction

Prior research on immigration has primarily focused the impact to native wages in the labor market by employing the neo-classical labor supply model. A rapid increase in labor supply holding demand constant predicts a lower equilibrium wage. In reality, however, labor demand does not stay constant. Instead, it shifts with labor supply leaving wages relatively constant. In order for this to occur, the capital-to-labor ratio must stay the same. Business establishments represent a form of capital that is indicative of how firms adjust to labor supply shocks from immigration. Building on extant literature, this paper examines the impact of immigration on the entry and exit levels of business establishments in the U.S. at the local level.

The simple general equilibrium model helps us understand the negligible impact of immigration on wages through a compensatory shift in labor demand with labor supply. However, it does not explain how firms manage to absorb the additional workers. In order for wages to stay the same, capital must be increased to maintain a relatively constant capital-to-labor ratio. However, capital tends to be fixed in the short run, but flexible in the long run given a year or more. Expansion of a firm's capital stock can result in the purchase of more machines for production, and or the opening of a new establishment. However, since capital investment can be expensive, it is unlikely that a firm will expand unless it perceives there is sufficient demand.

The immigration literature often fails to take into account the consumption

impact of immigration. Immigrants contribute more than just labor to the economy, they also purchase clothes, food, housing, and many other goods and services natives also consume. The new consumption generated by immigrants within the economy increases the demand for goods and services. A change in consumer demand also influences firm production and expansion. It also can influence a firm's exit decision from the market. Firms operating at the margin can become profitable again through an increase in demand.

A preliminary review of data collected for this research suggests a possible correlation between entry, exit, and immigration. Figure 1 presents the net establishment creation and new immigrants, who have migrated in the last three years, across all metropolitan areas in our data sample from 2002 to 2011. For additional context, we include US annual real gross domestic product (GDP). Net establishment creation and immigration is plotted on the left axis and real GDP on the right. The graph illustrates an informative trend between these two variables. However, at this point, any perceived relationship is merely conjecture; especially once economic conditions are taken into consideration.

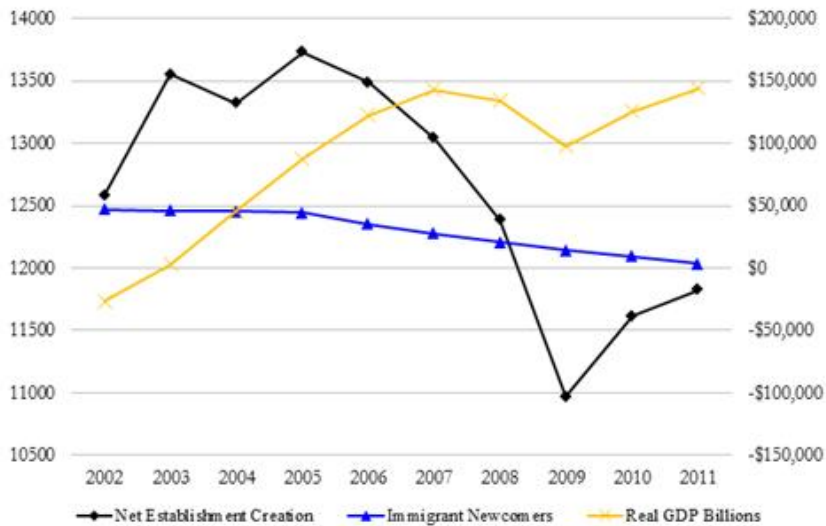
According to the Minneapolis Federal Reserve Bank, as of 2002 the economy was still recovering from the recession of 2001.<sup>1)</sup> The 2001 recession and subsequent slow recovery help explain the moderate decline in new immigrants from 2002 to 2003 even while the level of real GDP continued to increase through 2007. After 2005, the inflow of new immigrants decline steadily through 2011. Migration is typically motivated by economic conditions and employment opportunity, especially for younger unskilled workers. Although real GDP levels are growing, we see net establishment creation also begin to decline after 2005. The rapid decline in establishments means fewer opportunities for immigrants. The decreasing trend is attributable in large part to the recession as the level of immigration and establishment growth exhibit pro-cyclical behavior absent any external shocks. But although these variables are inextricably correlated with the business cycle, Figure 1 illustrates an implicit correlation which may be

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1) Federal Reserve Bank of Minneapolis. The Recession and Recovery in Perspective. Publications, Special Studies. Updated February 27, 2015. Retrieved from <https://www.minneapolisfed.org/publications/special-studies/rip/recession-in-perspective>

illuminated provided an appropriate instrument is used.

FIGURE 1. Aggregate Net Establishment Creation, Immigration and GDP



Source: American Community Surveys, Business Dynamics Statistics

The primary focus of this paper is the effect of immigration on annual establishment entry and exit levels. The expected outcome is a positive correlation with entry levels and a negative correlation with exit levels. The effect of immigration on firms occurs simultaneously through two primary channels, consumer demand and labor supply. The first order impact of immigration is an increase in population. The second order is an increase in consumption. Increased consumption motivates firms to adjust labor and capital stock. Capital stock is fixed in the short run, but labor is not. An increase in the labor supply by a population increase puts downward pressure on wages. Firms can respond to an increase demand by initially increasing the stock of labor to capacity, and then eventually adjust capital in the long run; our paper focuses on the later. Depending on the industry, this can include an increase in machinery and or establishment locations to service the new demand equilibrium. This would mean a response to a population increase from immigration would impact establishment entry in the long run for a given market, say two to three years.

These same two channels, labor supply and consumer demand, also impact establishment exits from a market. Greater consumption could prevent establishments operating in the red from exiting the market. A cheaper labor supply can potentially do the same. However, firms operating at the margin are more likely to be influenced by greater consumption than cheaper labor as it takes considerably time due to wage rigidity and gradual turnover.

However, it is difficult to disentangle the impact of these two channels. To differentiate the consumption effects from the labor supply effects, we use education levels as proxies for skilled and unskilled workers. Specifically, immigrants with an associate degree or higher are considered skilled and all others unskilled. If the consumption channel has a greater impact than the labor supply, we should expect a generally higher correlation between skilled immigrants, who are predominately more educated and possess greater income potential relative to the unskilled.

This paper undertakes the challenge to empirically test these hypotheses and indeed the results do indicate that immigration is positively correlated with establishment entry and negatively correlated with exits. In addition, we find skilled immigrants to have a higher correlation with establishment entry and a relatively higher correlation with exit reduction.

The remainder of this paper is structured as follows: Section II provides a literature review of past research on immigration as well as a discussion of this paper's contribution to it. Section III presents our hypotheses and underlying assumptions for these results based on the extant literature. Section IV provides a walk-through of the empirical approach and data. Section V presents the results of the regression as well as sensitivity exercise. Finally we summarize and conclude in section VI.

## II. Literature review

The impact of immigration on the native labor markets has been the focus of

research among labor economists for decades. Frequently cited examples from the literature include: Borjas, Freeman and Katz (1997); Borjas (2003); Aydemir and Borjas (2011); and Card (1990, 2005, and 2009). To date, the consensus of the literature is that the effect of immigration on native wages is negligible (Borjas, 2013; Peri and Sparber, 2011). Considering this finding, many theories have been put forward to explain it. Card (1990) posits the effect of immigration on the labor supply might be offset by native outflows in response, known as the native displacement hypothesis, but Card (2001) finds no significant relationship between native outflows and immigrant inflows. Borjas (2006) seemingly confirms Card's hypothesis, but an analysis by Peri and Sparber (2011) find his empirical approach suffered from specification bias. Furthermore, Hong and McLaren (2015) find that immigration leads to an increase in native employment. The increased economic opportunity caused by immigrants is attractive to natives and contributes to a "virtuous cycle" of growth; which also disputes the native displacement hypothesis.

More recent studies have begun employing a general equilibrium approach, which takes into account the effect of immigration on labor demand as well as the supply. Re-examining the seminal Mariel Boatlift experiment from Card (1990), Bodvarsson, Lewer, and Van den Berg (2008) conclude that the rightward shift on the labor supply curve was met with an equal shift in the demand curve effectively neutralizing any labor substitution effects from immigration and leaving wages the same. Hong and McLaren (2015) provide evidence of positive wage gains and employment from immigration in the non-traded goods sector. The authors interpret these findings to be consistent with a rightward shift in consumer and labor demand. Bodvarsson, Lewer, and Van den Berg (2008) observe a positive and significant increase in retail sales per capita after the Mariel Boatlift, consistent with a rightward shift in consumer demand. Another aspect is prices. An exogenous increase in local population should have the effect of increasing prices for many goods in the short-run. In response, firms expand to capitalize on the market until the price decreases back to equilibrium.

Demand effects from immigration on prices have proven difficult to isolate due to the countervailing channel of labor supply. Recent research in this area

typically focuses on the impact of low-skill immigrants. Low-skill immigrants, whether assumed substitutable or complementary to natives, decrease prices due to the downward pressure on wages; especially for non-traded goods. Several papers find evidence for the labor supply channel through prices. Using price data, Cortes (2008) finds low-skill immigration decreases prices in the U.S. specifically for “immigrant-intensive” services (e.g. housekeeping, gardening) and non-traded goods and argues that her results are due to downward pressure from wages as immigrants in the U.S. have higher labor force participation rates. But for traded and non-traded sectors in which low-skill immigrants are not very substitutable or complementary to natives, we see the expected increase in prices. An interesting alternative finding for a decrease in prices is provided by Lach (2007), who studied monthly store level prices in cities across Israel after an immigration shock from the former Soviet Union. In tracking 915 products, the author finds no increase in sales of those products until after prices were decreased, implying that stores deliberately decreased prices to attract the new consumers. The author concluded this is because immigrants have higher price elasticity and lower search costs relative to natives. Another example is from Baghdadi and Jansen (2010), who study the effect on prices by temporary and permanent immigrant workers in the U.S. They find temporary immigrants significantly increase the prices of utility services, while low-skill permanent immigrants increase the price of transport and health services. The authors attribute the differences in price effects to immigrant consumption composition. Temporary immigrants consume utility services in the short-run while permanent immigrants are more frequent consumers of transportation and health services. The consumption composition of immigrants is an important factor of demand as it also affects the composition of firms.

Very few studies have examined the impact of immigration on firms and establishments. The closest related research on this relationship is by Olney (2013) who examines the effect of low-skill immigrants on establishments in an effort to understand how firms respond to an influx of low-skill labor at the extensive margin. Olney finds that a 10 percent increase in the share of low-skill immigrants is associated with an increase of 2.06 percent for all establishments

and a 2.4 percent increase in establishments from smaller firms. More importantly, he shows that low-skill immigrants had only a significant impact on mobile industries which he interprets as evidence of the labor supply channel dominating effects from consumption. However, it is possible that a greater impact from consumption in other industries was not detected due to the omission of high-skill immigrants in his dataset.<sup>2)</sup>

This paper contributes to the literature in the following ways: First, we include high-skill immigrants. This is an important consideration since high-skill immigrants are expected to have differential impacts on local businesses relative low-skill due to higher income potential. If high-skill immigrants indeed consume more, then their impact on establishment entry and exit is expected to be greater as long as the rates of labor force participation and employment are not significantly different. Second, we define new immigrants as foreign born persons who have migrated to the U.S. in the last two and three years; we run regressions on both. Incorporating these lags is important to allow sufficient time for immigrants to settle, find employment, housing, etc. as well as for any consumption and labor market changes to be perceived by firms. Finally, we use a fairly extensive panel data sample which includes 251 U.S. metropolitan statistical areas over a ten year period (2002 to 2011).

### III. How immigration influences firms

#### 3.1 Consumption channel

Firm entry into a given market is predicated on expected profitability and

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2) Olney (2013) uses a similar data set constructed from IPUMS and U.S. Census Bureau Statistics on U.S. Businesses for firms which are divided into large, medium, and small. His dependent variable consists of changes in the aggregate of business establishments of all ages and covers establishments in 30 major cities from 1998 to 2008.



requires both capital and labor planning. A business establishment is a form of capital which houses a portion all or a portion of firm operations and most cases are the direct point of sale to consumers. Establishments require considerable financial investment, so firms are unlikely to enter a given market unless there is perceived demand. An increase in the population from immigration would increase demand for goods and service, an increase from immigration would be no different. Bodvarsson, Lewer, and Van den Berg (2008) observe a positive and significant increase in retail sales per capita after the Mariel Boatlift, which they interpret as a rightward shift in consumer demand as would be expected. Another impact of immigration is demographic change. Dellavigna and Pollet (2013) have found a link between investment and changing demographics. Specifically, demand shifts due to changing demographics within a 5 to 10 year horizon are associated with higher investment. An exogenous shock from immigration alters the demographics of the local region, thereby altering the aggregate consumption preference mix. Mazzolari and Neumark (2009) support this assumption as they find immigration to be positively correlated with a greater number of ethnic restaurants. In addition, if immigrants do indeed have higher price elasticity and lower search costs relative to natives as concluded by Lach (2007), they will search longer and harder for specific goods and services they desire and drive up demand for those products. The neo-classical equilibrium model for goods and services predicts a rightward shift in demand from a population increase, putting upward pressure on prices as was found by Cortez (2008) and Baghdadi and Jansen (2010) for non-immigrant intensive industries. The combination of changes in consumption preferences, demand and upward price pressure would theoretically incentivize new firms to enter the market and existing firms to expand to capture producer surplus until equilibrium is achieved. Both new and existing firms will make investments in equipment, land and establishment capital; establishment capital is where we capture firm activity in response to an immigration shock.

Now firm exit from a particular market is predicated on maintaining profitability. If an establishment is operating at the margin, it can choose to leave the market or stay in the hopes of better conditions in the future. A consumer

demand shock from immigration can improve market conditions and profitability, decreasing firm exits.

### 3.2 Labor supply channel

The neo-classical labor market equilibrium model predicts rightward shift in labor supply, resulting in downward pressure on wages. However, as previously indicated in section II, research shows wages tend to be static even in the event of a large immigration shock such as the Mariel Boatlift. The static wage rate after a labor supply shock can be explained by a compensatory shift in labor demand. Labor demand is influenced by production, and production is influenced by consumption and labor market wages. An increase in consumer demand would influence a firm to increase production at intensive margin and eventually the extensive margin to capture economic profit from higher prices. Firm expansion at the intensive margin would consist of pushing existing workforce and capital to work harder to produce more. Expansion at the extensive margin involves hiring more labor and or increasing capital such as additional equipment or machines. If economic conditions are favorable such that firm investment in expansion at extensive margin through capital investment in a new location has foreseeably profitability, then firms will open new establishment locations. An increase in labor demand from consumption puts upward pressure on wages to counterbalance the downward pressure from an increase in the labor supply. But the resulting increase in capital allows firms to absorb the increase in the labor supply. As long the capital to labor ratio stays relatively the same, so will wages.<sup>3)</sup>

### 3.3 Diversification & Entrepreneurship

In addition to impacts on consumption and labor supply, immigration also engenders better economic conditions through diversification and entrepreneurship. Research has found a relationship between cultural diversity

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3) If capital is unable to adjust, then wages will decrease. If capital outpaces labor supply, then an increase in wages will occur.

and the rate entrepreneurship. Sobel, Dutta, and Roy (2010) identify a positive correlation between cultural diversity and entrepreneurship in countries with strong formal institutions and the rule of law. When immigrants flourish, a local economy can become a melting pot where the exchange of mutually beneficial knowledge can encourage entrepreneurship in a given geographical area. And in cities where immigrants tend to succeed, so do natives. Wang (2010) finds white and black natives perform better in newer immigrant gateways (e.g. Miami, Los Angeles, Houston) relative to historic ones (e.g. Baltimore, Detroit, St. Louis); especially when the Hispanic share of immigrant population is higher. Hong and McLaren (2015) also find that in addition to raising total employment by 3 percent, a “shot in the arm effect” from immigration also increases native employment by 2 percent. The increased economic opportunity caused by immigrants is attractive to natives and contributes to a “virtuous cycle” of growth. Therefore, cultural diversity induced by immigration seems to encourage entrepreneurship in general leading to the creation of more firms.

Several studies have also looked at the patterns of immigrant business ownership and self-employment. Using 2010 Current Population Survey and 2007 Survey of Business Owners data, Fairlie (2008, 2012) statically shows that immigrants as a whole are more likely to own a business than natives and exhibit higher rates of business formation.<sup>4)</sup> This is also true of Mexican immigrants in certain parts of the country. Mora and Davila (2006) find that Mexican immigrants along the U.S.–Mexico border have higher rates of self-employment and business ownership than both natives and Mexican immigrants in non-border cities; likely attributable to a greater degree of import-export opportunities. Looking at historic immigrant “gateway” cities, Wang (2010) also finds this to be true of Hispanic immigrants as well as Asian. Van Tubergen (2005) finds immigrants from non-Christian source countries exhibit higher rate of self-employment, especially in high unemployment areas and among smaller immigrant communities. Given these findings, it is expected that immigration would have greater impact on the entry of firms and business establishments

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4) Fairlie (2012) also reports that immigrant owned businesses hire more frequently than native owned businesses.

beyond their contributions to labor supply and consumer demand.

### 3.4 Hypotheses formulation

Given the aforementioned theoretical channels through which immigration may impact firm expansion and contraction, we formulate the following hypotheses:

Hypothesis 1: New immigrants are positively correlated with establishment entry levels.

Hypothesis 2: New immigrants are negatively correlated with establishment exit levels.

## IV. Empirical approach and data

### 4.1 Baseline specification

To test our proposed hypotheses, we use a simple regression. The baseline specification takes the following form:

$$\text{Log}(Est_{m,t}) = \alpha + \beta \text{Log}(I_{m,t}) + \mu_m + \gamma_t + \epsilon_{m,t}. \quad (1)$$

The dependent variable (*Est*) is the entry and exit level of establishments in metropolitan area (*m*) in year (*t*). The independent variable (*I*) represents the stock of new immigrants who have migrated in the past three years. Allowing for this time lag incorporates the fact that it may take a while for new immigrants to settle, establish connections, and attain employment before firms perceive the increase in product demand arising from immigrant consumption. This also allows time for any diversification effects from immigration on the native population and local economy. In order to ensure that our main results do not vary with the choice of the time lag, we also report results with the group of immigrants who have migrated in the past two years. In order to account for any unobserved

metropolitan area characteristics which may influence firm decision to open a new establishment, we include location fixed effects variable ( $\mu$ ). Similarly, a year fixed effects variable ( $\gamma$ ) is added to the equation to control for yearly variations such as recessions, booms, shocks, etc. which may bias the results if omitted. Finally, ( $\epsilon$ ) represents the random error term that captures any other concurrent factors that might affect the linear relationship between the dependent and explanatory variables.

The same specification is used when examining of low and high skilled immigrant groups who have migrated in the past two and three years to the US. The aggregate inflow of each skill group in metro area ( $m$ ) in year ( $t$ ) is regressed separately to study their correlation with new establishments.

#### 4.2 Instrument specification

One major econometric concern is the potential endogeneity associated with immigrants' location decisions. New immigrant inflows to a particular metro area could be correlated with the number of new establishments through unobserved local demand shocks. Immigrants tend to gravitate towards regions with greater employment opportunities, inexpensive housing and other factors which could bias standard OLS results.<sup>5)</sup> We address this issue by constructing an instrument, similar to Card (2009) and Lewis (2003), based on the historical settlement patterns of earlier immigrants captured in the 2000 census. The predicted values of immigrant inflows into each metro area is constructed by calculating the historical distribution of immigrants from the same source country in 2000. Since distributional settlement patterns across the US has been highly persistent over time, this instrumentation approach provides plausibly exogenous variation in the size of immigrant inflows across destination cities.

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5) In his micro theory choice model, Borjas (1990) predicts rational actors decide to migrate based on a cost-benefit analysis of expected future returns. Cadena and Kovak (2013) have confirmed this theory in their findings showing immigrants are attracted to locations with increasing labor demand and avoid ones with decreasing or limited employment opportunities.

Therefore, the adopted “supply–push” instrument assumes that immigrants in flows in the following years after 2001 are distributed according to the same settlement distribution of immigrants in 2000, independent of the concurrent economic conditions.<sup>6)</sup> The predicted inflow distribution is calculated in the first stage regression:

$$\text{Log}(I_{m,t}) = \alpha + \beta \text{Log}\left(\sum_s AI_{s,t} \lambda_{s,m}^{2000}\right) + \epsilon_{m,t}, \quad (2)$$

Where (AI) represents the aggregate of immigrant inflows from the prior two and three years (calculated separately for each regression) from source county (s) in year (t); ( $\lambda$ ) is the fractional distribution of immigrants from source country (s) in metro area (m) from the census of 2000. The instrument is then deployed into a two–stage least squares regression.

### 4.3 Data

Data for this research were extracted from two surveys conducted by the U.S. Census Bureau, the Business Dynamics Statistics (BDS) and the American Community Survey (ACS). Both surveys provide annual data by metropolitan statistical area (MSA). BDS annual data are available from 1976 to 2014 for 365 MSAs. ACS data is available at the MSA level from 2000 to 2014. However, for 2012 data and forward, MSA delineations were updated to 2013 OMB delineations; which if used, would shorten the panel period to nine years instead of ten. This also presents an additional tradeoff as 2002–2011 is more representative of a typical business cycle, whereas 2005–2014 would not be given the US economy’ s prolonged recovery from 2007 to 2011. Thus we have chosen to focus on the 2002–2011 period of data BDS and ACS data available.

Dependent variable data for establishment entry and exit level were obtained from the Business Dynamics Statistics. BDS was constructed from the Census

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6) We consider the 17 dominant countries of origin, which are Brazil, Canada, China, Colombia, Cuba, Dominican Republic, El Salvador, Guatemala, Honduras, India, Japan, Korea, Mexico, Philippines, Puerto Rico, Vietnam, and all others.

Longitudinal Business Database (LBD) across a range of annual measures based on age, size, and industry sector for both firms and establishments. BDS defines an establishment as a single physical location where business is conducted or where services or industrial operations are performed. Establishment entry is defined as the first year the establishment reports positive employment in the LBD. Establishment exit is counted when the establishment reports zero employment within the year counted in the LBD. Establishment data is attractive for several reasons: 1) Establishments are the smallest unit of recoded economic activity available. 2) Although establishments are owned by firms, they can be thought of as miniature firms required to maintain profitability. 3) The level of establishments is an indication of consumer demand for the product or service it provides. Firm decision makers and entrepreneurs typically conduct a considerable amount of market research and planning before putting forth the substantial investment required creating a new business location. Therefore, establishment entry provides an indication consumer demand. 4) Establishments also provide an indication of firm growth at the extensive margin. An additional establishment means more capital and more labor has been invested by the firm, which can account for the ability of firms to absorb labor supply shocks from immigration. Establishments operating at the margin are unlikely to expand at the extensive margin, but a demand shock from immigration may result in an establishment waiting to exit the market due to improved conditions, thereby reducing the exit level.

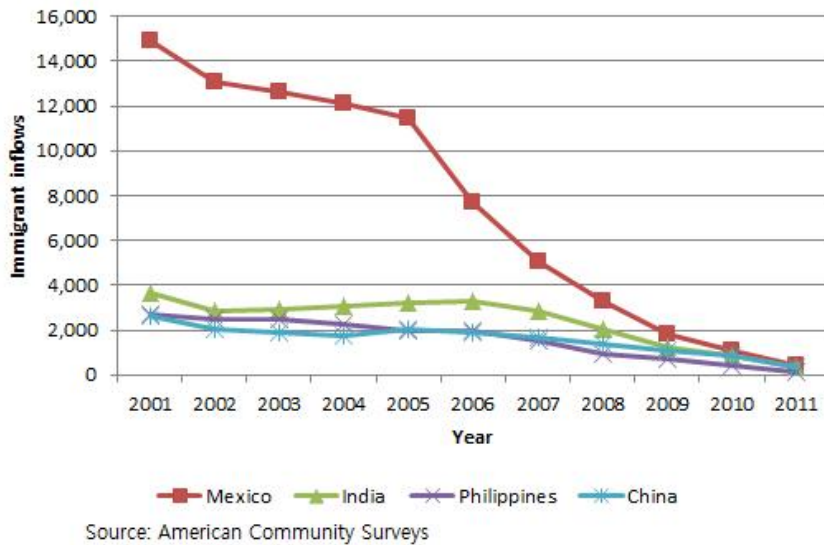
The explanatory variable of new immigrant inflows was extracted from ACS 1% samples provided by the Integrated Public Use Microdata Series (IPUMS) project produced by the Minnesota Population Center of the University of Minnesota (Ruggles, Alexander, Gernadek, Goeken, Schroeder, and Sobek (2010)).<sup>7)</sup> An immigrant is conventionally defined as a foreign born individual that is either a non-citizen or naturalized citizen of the country they have migrated to. ACS was used because it provides annual statistics which include year of entry, source country and migration destination for foreign born persons by MSA. ACS was not fully implemented by the Census Bureau until the early

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7) ACS data from IPUMS is available at <https://usa.ipums.org/usa>.

2000s, so complete data was available only from 2003 to 2014 due to gaps in the samples. In addition, some MSAs within our sample also have gaps for incoming immigrants for certain years, but these gaps do not impact the main results of the study. Figure 2 presents the four major source countries which contributed immigrants from 2001 to 2011. As mentioned prior, immigration has been in steady decline since the turn of the century. The largest numbers of immigrants still come from Mexico, but China and India have not been far behind in recent years.

FIGURE 2. Immigrant Inflows by Source Country (Top 4)



The “supply–push,” or “Card,” instrument was constructed using the 2000 Census and ACS samples. The distribution of immigrants was based on the number of immigrants from each source country. The 2000 Census data was used to calculate the fractional distribution of immigrants by MSA. Source countries which provided over 5,000 immigrants from 2001 to 2011 were aggregated into independent groups. Source countries which provided less than 5,000 immigrants were aggregated into a default group. The fractional distribution, which is fixed, was then multiplied by the aggregate new immigrant population from each source country which migrated in the last three years. The resulting new variable was



then regressed on the new immigrant population to produce weighted estimates and ensure the independent variable was exogenous for the second stage of the regression.

ACS also provides educational attainment information for each immigrant in the survey. This information is useful for distinguishing skilled from unskilled. Skilled immigrants are conventionally defined as those with a college degree and unskilled as having a high school degree, GED or less. Similar to Card (2009), we use a two-skill approach by distinguishing skilled immigrants as those with an associate degree or higher and unskilled as those with less than an associates.

**TABLE 1. Summary Statistics with Second Year Immigrants**

	Entry	Exit	Immigrants	Skilled	Unskilled
Count	1291	1291	1291	1291	1291
Kurtosis	38.392	41.488	80.98	76.253	83.877
Maximum	58905	55205	1998	925	1148
Mean	2951	2725	51	23	28
Median	1072	994	13	6	7
Minimum	100	114	2	1	1
Mode	1002	610	4	1	1
Range	58805	55091	1996	924	1147
Skewness	5.389	5.616	7.901	7.615	8.07
Standard Deviation	5813.921	5400.76	147.626	67.28	81.842

**TABLE 2. Summary Statistics with Third Year Immigrants**

	Entry	Exit	Immigrants	Skilled	Unskilled
Count	1605	1605	1605	1605	1605
Kurtosis	45.656	41.989	80.21	81.495	78.163
Maximum	55205	58905	2757	1301	1489
Mean	2522	2783	66	29	37
Median	926	1013	16	7	9
Minimum	114	100	2	1	1
Mode	288	580	6	1	1
Range	55091	58805	2755	1300	1488
Skewness	5.888	5.634	7.842	7.771	7.838
Standard Deviation	5167.03	5640.173	194.343	86.957	109.191

Tables 1 and 2 present summary statistics for each variable constructed from ACS and BDS. The summaries indicate a significant variation in new immigrants to the U.S. New immigrants also appear to be highly concentrated in certain MSAs based on the mean value being greater than the median, which is consistent with the positive skewness values provided in the tables. This is not the case for the entry and exit level variables, indicating an uneven entry and exit level across our MSA sample.

## V. Estimation Results

### 5.1 First stage results

TABLE 3. First Stage Results

	Second year immigrants	Third year immigrants
Log_SPIV	0.222** (-0.025)	0.368** (-0.021)
MSA FE	Yes	Yes
Year FE	Yes	Yes
Observations	1278	1599
F-Statistic	81.386	291.816

Note: Robust standard errors in parentheses ; \* and \*\* indicate significance at the 5% and 1% levels , respectively.

Table 3 reports first stage regression results. Column 1 for immigrants who have migrated in the last two years, and column 3 in the last three. In both specifications, the coefficients are positive and significant, indicating a positive correlation between new immigrants and their predicted settlement patterns. The F-statistic is 81.39 for second year immigrants and 291.82 for third years. The pool of third year immigrants is significantly larger as it also includes second year and first year immigrants so it is expected to be higher. These results

validate our instrumentation strategy of predicting immigrant inflows based on the geographic distribution of earlier immigrants from the 2000 census. After year and location fixed effects are taken into account, the main results indicate a positive correlation with establishment entry and negative correlation with establishment exits as hypothesized.

**TABLE 4. Impact of Immigration on the Level of Establishments  
(IV Regressions)**

	Establishment Entry	Establishment Exit
Second year immigrants	0.666** (0.084)	-0.109** (0.02)
MSA FE	Yes	Yes
Year FE	Yes	Yes
Observations	1278	1278
Third year immigrants	0.385** (0.028)	-0.090** (0.011)
MSA FE	Yes	Yes
Year FE	Yes	Yes
Observations	1599	1599

Note: Robust standard errors in parentheses ; \* and \*\* indicate significance at the 5% and 1% levels , respectively.

## 5.2 Baseline results

Table 4 present our main results for the impact of immigration on establishment entry and exit. The table is partitioned in two sections, the top half is for immigrants who have migrated in the prior two years and the bottom in the prior three years. Column 1 presents IV regression results for establishment entry, and column 2 for exits. Both regressions include MSA and year fixed effects. The number of observations is determined by the number of immigrants in each group.

Two year immigrant lagged results show higher coefficients. Specifically, the results indicate a 10 percent increase in new immigrants increases the establishment entry level by 6.66 percent. The same increase reduces establishment exits by 1.09

percent. In the bottom section of Table 4, a 10 percent increase in the level of immigrants who migrated in the past three years increases establishment entry by 3.85 percent and decreases exits by 0.90 percent. The results are consistent our hypotheses. Given time to perceive demographic, consumption and labor supply changes, firms react by increasing capital to produce and service more consumers. In addition, the diversification and proclivity of immigrants to become entrepreneurs at higher rates relative natives also influences the entry level. Changes in consumption and labor supply help some businesses operating at the margin. Given immigrants distinct consumption composition, it is expected that immigrants would influence establishment entry more relative to exit, but the result is significant none-the-less.

**TABLE 5. Skill Proxy First Stage Results**

	Skilled, 2nd year	Unskilled, 2nd year	Skilled, 3rd year	Unskilled, 3rd year
Log_SPIV	0.218 (0.028)	0.229 (0.029)	0.338 (0.026)	0.396 (0.025)
MSA FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	1278	1278	1599	1599
F-Statistic	59.742	62.167	175.155	246.832

Note: Robust standard errors in parentheses ; \* and \*\* indicate significance at the 5% and 1% levels , respectively.

### 5.3 Skill differential by education proxy

Table 5 presents first stage regression results for the decomposition of immigrant groups by skill. As with the first and second year groups aggregated, the coefficients of instrument are positive and significant. The F-statistic is lower for each group than when aggregated, but is still well above the threshold for statistical significance which is 10. The F-statistic for skilled and unskilled immigrants who migrated in the past two years is 59.74 and 62.17, respectively. The F-statistic for immigrants who migrated in the prior three years is 175.16 for

skilled and 246.83 for unskilled. In both specifications, the F–statistics are significant, but the lower F–statistic for skilled immigrants is weaker; this is consistent with findings by Gross and Schmitt (2012). Since a greater share of skilled immigrants speak English proficiently and are more highly educated, they are more likely to migrate based on financial incentives, which makes their settlement pattern less predictable. Unskilled immigrants, however, are less likely to speak English proficiently which requires greater reliance on networks of prior settlers from the same country. But despite the relatively weaker instrument, skilled immigrants have a slightly higher correlation with establishment entry and exit.

**TABLE 6. Impact of Immigration by Skill (IV Regressions)**

	Establishment Entry	Establishment Exit
Skilled, 2nd year	0.676** (0.096)	-0.111** (0.022)
Unskilled, 2nd year	0.645** (0.09)	-0.106** (0.02)
MSA FE	Yes	Yes
Year FE	Yes	Yes
Observations	1278	1278
Skilled, 3rd year	0.419** (0.037)	-0.098** (0.013)
Unskilled, 3rd year	0.357** (0.028)	-0.084** (0.01)
MSA FE	Yes	Yes
Year FE	Yes	Yes
Observations	1599	1599

Note: Robust standard errors in parentheses ; \* and \*\* indicate significance at the 5% and 1% levels , respectively.

Presented in Table 6 are IV results by skill composition based on education as a proxy. Immigrants with an associate degree or higher are considered skilled and immigrants with less are considered unskilled. Both two and three groupings have positive and significant correlation with establishment entry and negative correlation with exits.

For skilled immigrants who have migrated in the past two years, the results indicate a 10 percent increase in immigration is correlated with a 6.8 percent increase in establishment entry and a 1.1 percent decrease in exits. The same

increase in three year skilled immigrants, establishment entry increases by 4.19 percent and decreases exits by 0.98 percent. Interestingly, the coefficient is higher for two year lagged immigrants than three year, which indicates firms respond relatively quickly to immigrant inflows, within two years. However, the effect decreases with an additional year despite a larger immigrant pool. Comparatively, a 10 percent increase in two and three year unskilled immigration increases entry by 6.4 and 3.8 percent, respectively. The same increase in two and three year unskilled immigrants decreases establishment exits by 1.1 and 0.84 percent, respectively.

The impact of skilled immigration on establishment entry is consistent with our expectations and hypotheses with a relative difference of 0.31 and 0.62 percent for two and three year cohorts, respectively. Skilled immigration has a relatively higher impact on establishment entry than unskilled immigration likely due to greater earning potential and contribution to consumer demand assuming the same level of labor force participation for both skill groups. However, there is no significant difference in impact between skilled and unskilled immigration for establishment exits. This would indicate that skilled immigrant's consumption impact is relatively the same for firms operating at or below the margin. Another inference might be that their consumption effects are relatively the same, but skilled immigrants have a higher participation rate in the labor market and thus influence firm entry more. However, the consumption impact would be more plausible given the firm's entry decisions into a given market would rely more heavily on the level of demand for most industries.

TABLE 7. Skill Proxy First Stage Results

	Immigrants, 2nd year	Skilled, 2nd year	Unskilled, 2nd year	Immigrants, 3rd year	Skilled, 3rd year	Unskilled, 3rd year
Log_SPIV	0.241	0.197	0.284	0.444	0.385	0.504
	0.044	0.047	0.049	0.038	0.041	0.043
MSA FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	365	365	365	416	416	416
F-Statistic	29.937	17.466	32.899	135.058	86.183	140.548

Note: Robust standard errors in parentheses ; \* and \*\* indicate significance at the 5% and 1% levels , respectively.

TABLE 8. Fifty Largest Cities (IV Regressions)

	Establishment Entry	Establishment Exit
Immigrants, 2nd year	0.455** (0.093)	-0.113** (0.033)
Skilled, 2nd year	0.558* (0.144)	-0.139** (0.047)
Unskilled, 2nd year	0.387** (0.076)	-0.096** (0.027)
MSA FE	Yes	Yes
Year FE	Yes	Yes
Observations	365	365
Immigrants, 3rd year	0.228** (0.025)	-0.087** (0.016)
Skilled, 3rd year	0.264** (0.034)	-0.1** (0.02)
Unskilled, 3rd year	0.201** (0.022)	-0.076** (0.014)
MSA FE	Yes	Yes
Year FE	Yes	Yes
Observations	416	416

Note: Robust standard errors in parentheses ; \* and \*\* indicate significance at the 5% and 1% levels , respectively.

#### 5.4 Fifty largest metro areas

To test the robustness of our results we have conducted a sensitivity analysis. The results are presented in Table 8 and first stage results presented in Table 8. Once again the instrument is validated with positive and significant coefficients and above threshold F-statistics. In order to check whether variation in metro area size plays a role in explaining the main results, we follow the example set in the literature (Card, 2001; Cortez, 2008; Olney, 2013) and limit the sample to larger metro areas.<sup>8)</sup> To ensure sufficient variation in the data, we limit the sample to the 50 largest metro areas by migrant population.<sup>9)</sup> The point of

8) These authors focus on the top 30 largest metro areas. We also find that the results still hold with 30 largest metro areas. The results are available upon request.

9) The cities include: Atlanta, Austin, Bakersfield, Baltimore, Boston, Charlotte, Chicago, Cleveland, Columbus, Dallas-Ft. Worth, Denver-Boulder, Detroit, El

excluding smaller areas is to guard against measurement error in the data. Despite the reduction, Table 5 shows that the impact still holds for both second and third year immigrant cohorts and skill groups. Although the coefficients have changed, their signs are still consistent with our hypotheses as well as significant at the 1 percent level. In large metro areas, a 10 percent increase in the level of immigrants who have migrated in the last two years increases establishment entry by 4.6 percent and decreases exits by 1.1 percent. The same increase in the three year cohort increase entry by 2.3 percent and decrease exits by 0.87 percent. When isolated to the fifty largest metro areas, the relative difference in coefficients between second and third year immigrants on establishment entry and exit is consistent.

Interestingly, the coefficient for immigration on establishment entry decreases while the coefficient on exits is the same. Metropolitan areas such as New York, Chicago, Los Angeles, Miami, etc. house larger populations. Therefore, moderate immigrant inflows do not impact the composition of the population to the same extent as an increase in smaller metro areas would. As a result, firms in larger cities will have a harder time perceiving changes in consumption demand short of larger immigration shocks to the economy.

When separated by skill group, the same 10 percent increase of two skilled immigration increases the entry level by 5.6 percent and decreases exits by 1.4 percent. For the skilled three year cohort, the entry increases 2.6 percent and exits decrease by 1 percent. Two year unskilled immigration increases entry by 3.9 percent and decreases exits by 0.96 percent. And three year unskilled immigration increases entry by 2 percent and decreases exits by 0.76 percent. In this case, the relative difference in coefficients for skilled and unskilled immigration more closely align with our expectations on both entry and exit. The difference in coefficients for second year skilled and unskilled immigrants on

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Paso, Fresno, Green Bay, Hartford, Honolulu, Houston, Indianapolis, Jackson, Kansas City, Las Vegas, Los Angeles, McAllen, Miami, Minneapolis, Nashville, New Orleans, New York, Orlando, Philadelphia, Phoenix, Pittsburgh, Portland, Providence, Raleigh, Richmond, Riverside, Sacramento, St. Louis, Salt Lake City, San Antonio, San Diego, San Francisco, San Jose, Seattle, Syracuse, Tampa, Tucson, Washington D.C.



entry is 1.7 percent, whereas prior, when all metros areas in the data set are considered, the difference was 0.31 percent. But the third year cohort difference stays relatively the same at 0.64 percent. The differential in coefficients between skilled and unskilled immigrants is more pronounced in this set of regressions with a 0.44 percent difference on exits for second year immigrants and 0.24 percent for third year. Again, assuming skilled and unskilled immigrants participate in the labor force at relatively the same the rates, the difference in coefficients can be interpreted as the consumption effect on establishment entry and exits.

## VI. Conclusion

Research on immigration has primarily focused on the effect of unskilled immigrant labor on wages. Recent research has broadened the study to firm behavior. The contribution of this paper is to increase our understanding by examining both establishment entry and exits at the local level. We also expand the immigrant pool of study to all immigrants and incorporate a two and three year lag to provide sufficient time for the impact of immigration to take root in the local economy. Using ACS and BDS, a large sample of U.S. cities were captured over a ten year period.

New immigrants who had migrated in the prior two and three years were positively correlated with establishment entry and negatively correlated with exits. Immigrants who migrated within the prior two years were more highly correlated relative to immigrants in the prior three years. And a robustness check confirms that even when the sample is limited to the fifty largest metro areas by migrant population in the sample, the results remain positive and significant for both groups.

In addition, we exploit educational attainment data as a proxy for skilled and unskilled workers as a means to test the differential impact by skill on establishment levels. As predicted, skilled immigrants have relatively greater

impact on establishment entry and but relatively the same impact on exits. However, when the metros areas are limited to the fifty largest, the results matched our expectation based on our hypotheses. Skilled immigrants in both lag groups were more highly correlated with both establishment entry and exits.

There has been much consternation by the US public regarding about immigrant labor, specifically unauthorized immigrant labor, and its impact on wages and job availability for natives. These results can help explain why the effect of immigration on native wages is negligible in the literature. Firms increase capital in response to changes in consumption and labor supply. The additional capital, such as establishments, allows firms to absorb the additional labor supply from immigration leaving the equilibrium wage unchanged. Furthermore, both skilled and unskilled labor contribute positively to the economy by increasing the level of establishment entries and decreasing exits. While skilled labor appears to have a greater impact on establishment creation, both are contribute to labor market demand and growth.

This paper contributes the mounting body of evidence that immigrants improve economic conditions and should be taken into consideration when it comes to both immigration and economic policy. However, more research in this area is warranted. Understanding how firms respond to changes in consumption and the labor market are crucial for making effective policy, especially in times of downturn or exogenous shocks. Making conditions easier for firms of all sizes and industries to expand capital can help alleviate concerns about immigration and allow labor market tightening to result in wage growth. During downturns and periods of deleveraging by businesses, theory suggests that immigration would decrease wages since capital is hindered from expansion unless interest rates are low enough to encourage further investment. Immigration can improve our economy but only in so far as firms have the space and resources to grow.

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## 이민자가 기업의 진입과 퇴출에 미치는 영향 연구

홍지훈 · Aaron Medlin

### 국문요약

본 논문은 지역 내 기업들이 이민자 수의 증가에 대하여 자본 투자의 확대를 통해 반응하는 과정을 분석한다. 2002년부터 2011년 사이의 미국 지역 조사 (America Community Surveys) 자료를 사용하여 실증 분석한 결과 이민자 수의 증가는 지역 내 기업의 신규진입과 는 양의 상관관계를, 퇴출과는 음의 상관관계를 갖는 것으로 나타났다. 무엇보다 고학력 이민자 수의 증가는 기업의 지역 내 자본 시설 확충에 보다 큰 증가를 가져오는 것으로 나타났는데 이는 이민이 지역 경제에 미치는 영향을 분석함에 있어 이주노동자의 기술 수준의 이질성을 고려하는 것이 중요함을 암시한다.

**핵심주제어:** 이민, 노동시장, 기술의 이질성, 소비효과, 미국 지역 조사