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IZA DP No. 13014

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ABSTRACT

The Effect of Immigration on Business Dynamics and Employment*

Immigration, like any positive labor supply shock, should increase the return to capital and spur business investment. These changes should have a positive impact on business creation and expansion, particularly in areas that receive large immigrant inflows. Despite this clear prediction, there is sparse empirical evidence on the effect of immigration on business dynamics. One reason may be data unavailability since public-access firm-level data are rare. This study examines the impact of immigration on business dynamics and employment by combining U.S. data on immigrant inflows from the Current Population Survey with data on business formation and survival and job creation and destruction from the National Establishment Time Series (NETS) database for the period 1997 to 2013. The results indicate that immigration increases the business growth rate by boosting business survival and raises employment by reducing job destruction. The effects are largely driven by less-educated immigrants.

JEL Classification: J15, J61, L25

Keywords: immigration, business dynamics, firm entry, firm exit, job creation, job destruction

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A voluminous literature examines how immigration affects wages and employment in the United States and other countries. Most studies conclude that immigration has a negligible overall effect on the labor market outcomes of natives but may reduce earnings and employment rates for workers who are the most substitutable for new immigrants, such as earlier immigrants and high school dropouts.[1] Why immigration has little overall effect on wages and employment is an unresolved question. One possibility is that immigration spurs job creation and business formation and expansion, particularly in areas with large immigrant inflows. This would be consistent with economic theory that predicts that positive labor supply shocks boost the return to capital, which should increase business investment. Nevertheless, few studies have examined this possibility since data on businesses are less readily available than data on households. This study examines how immigration affects business dynamics using proprietary establishment-level data that has not been used before to examine the impact of immigration.

The potential interplay between immigration and business dynamics raises many interesting questions: Do businesses add or preserve more jobs in areas where the labor force is growing as a result of immigration? Are businesses more likely to start up and less likely to shut down in areas with more immigrants? Do effects on business dynamics vary with immigrants' skill levels or by industry? This study addresses these questions by combining U.S. data on labor market composition from the Current Population Survey (CPS) with data on business dynamics from the National Establishment Time Series (NETS) database.

The effect of immigration on business formation and survival and job creation and destruction is an important topic. Policy makers and researchers would benefit from knowing whether immigration has little overall effect on U.S. natives' wages and employment because it

[1] For an overview of the literature on the U.S. case and relevant citations, see National Academies (2017).

leads to business expansion and job creation. Local and state economic development officials would benefit from knowing how different sectors are affected by immigrants of various skill groups. More broadly, business dynamics—business formation and closure along with job creation and destruction—are a major factor in the pace of economic growth. Understanding business dynamism is particularly important given that it, along with household mobility, has been on a downward trend in recent decades (Davis and Haltiwanger 2015).

The next section of this paper further discusses business dynamics and why immigration might affect business entry and exit and job creation and destruction. We then explain the data and our empirical methods. To preview our results, we find that immigration contributes positively to growth in the number of businesses in an area. The effect is driven by a reduction in business closures, not an increase in business creation, and by less-skilled immigration. High-skilled immigration, meanwhile, boosts employment growth in an area. This effect is accounted for by reductions in the job destruction rate, an effect observed for all measures of immigration—overall, low- and high-skilled.

Background

The U.S. economy has traditionally experienced high rates of churn. Large-scale job creation and destruction and business formation and closure have been the norm for most of the post-war period (Davis, Haltiwanger, and Shuh 1996). However, labor market fluidity and business dynamism have been slowing since the 1980s. The causes of this slowdown are unclear (Molloy et al. 2016). Amid this slowdown, several stylized facts have emerged. Job destruction and firm closures are counter-cyclical, or increasing when the economy is doing poorly. Surprisingly, job creation appears to be counter-cyclical as well, perhaps because downturns enable businesses to

hire workers more readily at lower wages (Davis, Haltiwanger, and Shuh 1996). New businesses are an important source of job growth in the U.S. economy, although existing businesses also often undergo substantial job creation or destruction (Haltiwanger, Jarmin, and Miranda 2013; Adelino, Ma, and Robinson 2017). Idiosyncratic factors dominate job creation and destruction, with factors like demographic changes, industrial shifts, and international trade unable to account for much of the patterns in data on job reallocation (Davis, Haltiwanger, and Shuh 1996; Molloy et al. 2016).

We focus on the effect of immigration on business dynamics since immigration is central to labor force growth in the U.S., and labor force growth is in turn central to business formation and survival. Immigration accounted for about one-half of the growth in the U.S. working-age population during the period 1995 to 2014.[2] Immigration accounts for an even larger share of labor force growth at the top and bottom of the education distribution. Meanwhile, business startup rates are lower in areas of the U.S. with slower population growth, particularly of the working-age population (Hathaway and Litan 2014; Karahan, Pugsley, and Sahin 2015). Simply put, more immigrants means more workers (and more consumers), potentially leading to more business formation, greater business survival, and fewer business closures.

Immigration also may affect business dynamics via immigrants' own entrepreneurial activities. Immigrants are more likely to be self-employed and to create businesses than U.S. natives (Fairlie and Lofstrom 2015). This could be due to systematic differences between immigrants and U.S. natives, such as greater risk tolerance among immigrants, or to labor market discrimination that prompts immigrants to go out on their own. Further, immigrant inflows may

[2] See http://www.pewresearch.org/fact-tank/2017/03/08/immigration-projected-to-drive-growth-in-u-s-working-age-population-through-at-least-2035/.

create opportunities for international trade that lead to growth at native- or immigrant-owned U.S. businesses. Research indicates that immigration spurs international trade (e.g., Gould 1994).

Few studies have examined the relationship between immigration and business dynamics. Using metro area-level data from the Statistics of U.S. Businesses (SUSB), Olney (2013) finds that an influx of less-skilled immigrants leads to an increase in the number of establishments, particularly in industries that employ large shares of less-skilled workers. Olney does not find, however, that immigration affects employment within existing establishments. The SUSB only reports the number of establishments by industry level and does not contain any information about business dynamics. The SUSB data therefore cannot reveal whether the increase in the number of establishments is due to more business formation or less business closure. Mahajan (2019) uses a variety of Census Bureau data and also finds that immigrants boost the number of establishments in a labor market area. Using confidential demographic and business Census data, Mahajan goes on to demonstrate the underlying mechanism, namely that immigrants increase the entry of small firms while preventing the exit of larger, older firms. The primary contribution of our study is to further examine the relationship between immigration and business expansion, including business formation and closure, by using the NETS data and by differentiating immigrants by skill level.

Data

We combine data from the Current Population Survey (CPS) with the NETS database to examine the relationship between immigration and business dynamics. The CPS is a large-scale household survey conducted monthly by the Census Bureau for the Bureau of Labor Statistics. The CPS is the primary source of labor force statistics in the United States and includes a

representative sample of US workers. The CPS also gathers information on demographic characteristics and geographic location, among other topics. We use the basic monthly CPS to construct the total annual number of working-age adults (ages 16 to 65) and the number of working-age adults who are immigrants.[3] We create these measures for the entire working-age population as well as for those who have at most a high school diploma (less-skilled) and 4-year college graduates (high-skilled).

Following Card and Peri (2016), we measure immigration as the change in the number of immigrants relative to the initial population in an area, or

$$\frac{\text{Immigrants}_{it} - \text{Immigrants}_{it-1}}{\text{U.S.natives}_{it-1} + \text{Immigrants}_{it-1}} = \frac{\Delta\text{Immigrant}_{it}}{\text{Population}_{it-1}}, \quad (1)$$

where *i* indexes areas and *t* indexes years. This measure captures the change in the working-age population as a result of immigration. Card and Peri (2016) recommend using this measure instead of the immigrant share of the population (or of workers) at a point in time because it abstracts from changes in the number of U.S. natives in an area due to immigration.[4] Since our measure is the working-age population rather than the labor force or the number of employed workers, it also avoids any complications due to movement in or out the labor force as a result of immigration.

The NETS database tracks business establishments over time and offers a wealth of information that can be used to measure job creation and destruction and establishment openings and closures, among other topics. The NETS data are constructed by a private-sector firm, Walls

[3] We define immigrants as all U.S. residents who are not U.S. citizens at birth. The CPS does not ask about legal status, although it does ask about naturalized U.S. citizenship status. Using the number of workers instead of the working-age population reduces the precision of our estimates and, in particular, the power of our instrument since CPS sample sizes are smaller if we restrict the sample to either labor force participants or employed workers.
[4] Card and Peri (2016) refer to this as the "immigrant inflow." Borjas refers to it as the "immigration-induced percent increase in the labor supply" (Borjas, 2014: 85) but does not use it in his wage regressions. Rather, he relies on the immigrant share of the labor force.

& Associates, using source data from Dun & Bradstreet. The data are proprietary. An establishment in the NETS data is a business at a specific location; it may be part of a multi-establishment firm or it may be a firm with only one establishment. Employment at an establishment encompasses all workers at that location, potentially including the owner, independent contractors, and any temporary workers hired via staffing firms as well as traditional employees. The NETS database includes private for-profit and non-profit organizations and public-sector organizations. The data are reported annually and are typically a snapshot of businesses in January of a given year.

NETS data have been used in several previous studies and have been benchmarked against other datasets. Researchers have used NETS data to examine topics like the relationship between establishment size and job creation (Neumark, Wall, and Zhang 2011) and whether product markets have become more concentrated (Rossi-Hansberg, Sarte, and Trachter 2018). Kolko, Neumark, and Mejia (2011) conclude that changes in the number of jobs at the state level in the NETS data are similar to those in the government's Quarterly Census of Employment and Wages (QCEW) data.[5] Barnatchez, Crane, and Decker (2017) show that trends in the NETS data are similar to government statistics that track businesses and establishments, such as the Business Dynamics Survey (BDS).[6] Crane and Decker (2019), in contrast, caution that high imputation rates of employment and sales in the NETS data limit the usefulness of certain business dynamics measures. We initially include all establishments when constructing our measures of

[5] However, Kolko and Neumark (2007) conclude that NETS employment levels are rounder than those in the government's Current Employment Statistics (CES) data, reducing the cyclical sensitivity of the NETS employment data.

[6] However, they note that the NETS methodology appears to overcount small employers. We therefore estimate our main specifications on all establishments and establishments that have at least three employees.

business dynamics from the NETS data, then we limit our sample to larger firms, where imputation rates are significantly lower, and conduct other robustness checks.

We construct several measures of business dynamics from the NETS data. These measures can be grouped into two types: establishment and employment. Our establishment variables are the percentage change in the number of establishments, the establishment entry rate, and the establishment exit rate. The percentage change in the number of establishments is constructed as

$$\%\ \text{change in}\ \#\ \text{establishments}_{it} = \ln(\text{establishments}_{it}) - \ln(\text{establishments}_{it-1}). \quad (2)$$

The change in the number of establishments accounts for all changes in firms, including those that move in or out of an area.

Following Davis et al. (1996) and the BDS, the establishment entry rate is the number of establishments created between time *t-1* and *t* divided by the average number of establishments in those two years. The exit rate is the number of establishments that existed at time *t-1* but not at time *t*, divided again by the average number of establishments in those two years. Entries and exits exclude establishments that move into or out of an area, respectively. The NETS data do not include very rapid establishment churn—a business that starts up (post-January) and closes down within the same year would not be captured by the data.

We construct three employment variables using the NETS data: the percentage change in employment, the employment creation rate, and the employment destruction rate. As with establishments, the percentage change in employment is constructed using log differences in total employment levels among all establishments in an area. The change in overall employment accounts for all changes in employment, including establishments that move in or out of an area.

The employment creation rate is the total number of jobs gained across an area's establishments that added employees, relative to average total employment in that area, or

$$\text{Employment creation rate}_{it} = \frac{\sum(\text{Employment}_{fit} - \text{Employment}_{fit-1})}{(\text{Employment}_{it-1} + \text{Employment}_{it})/2}, \quad (3)$$

where *f* indexes establishments that had more employees at time *t* than at time *t-1*. The employment destruction rate is constructed analogously except its numerator is based only on firms that had fewer employees at time *t* than at time *t-1*. Establishments that moved into or out of an area are not included in the construction of the respective employment measures. It bears noting that the employment creation and destruction measures capture net, not gross, flows within establishments. For example, if an establishment laid off some workers but hired an equal number of other workers within the same year, it would not be counted as either creating or destroying jobs. The NETS data do not give a measure of job churn.

We conduct the analysis at the local area level using annual NETS data from 1997 to 2013.[7] Because we look at dynamics, or changes over time, this results in 16 observations per geographic area (1998-2013). Our geographic unit of analysis—which we call labor markets—is based on core-based statistical areas (CBSAs). CBSAs are defined by the Office of Management and Budget and are a county or group of counties around an urban center. They are similar to commuting zones. The boundaries of these areas can cross state lines but exclude distant counties within the same state, making them a better approximation of labor markets than states. We create these labor markets in the NETS data using county codes and in the CPS using metro

[7] We use the following timing convention in applying the NETS data to our measures of business dynamics: the number of establishments in year *t* is best captured by NETS data collected in year *t+1*. The data are collected in January each year, so we take the number of establishments in year *t* to be the stock of establishments measured at the beginning of year *t+1*. We do the same for the employment measures. Thus, although the NETS data are currently available through 2014, we consider those data to be for 2013.

area codes.[8] We focus on larger labor markets in order to reduce noise due to small sample sizes in the CPS data. Our analysis includes 160 labor markets. The average labor market in our data consists of five counties, and the average working-age population is about 922,000.

Table 1 reports descriptive statistics for our samples. The average annual change in the working-age population as a result of immigration is 0.005, or 0.5 percent. This measure captures both inflows and outflows of immigrants, or the net change. In most areas, the inflow is composed mostly of newly arrived immigrants, but the inflow also includes immigrants relocating from elsewhere in the U.S. as well as young immigrants aging into the potential labor force. The outflow is immigrants who relocate within the U.S., return home, or age out of the potential labor force. The average percentage change among the less-skilled population as a result of immigration is also 0.5 percent, while the average change for the high-skilled population is 0.7 percent. The difference reflects the fact that since the mid-2000s, less-educated immigration has slowed while high-skilled immigration has continued to grow.[9] There is considerable variation in the measures both across areas and over time within areas.

The number of establishments in an area rose by about 4 percent annually, on average, during our sample period. Annual entry rates average about 12 percent and exit rates average about 8 percent. The net increase in the number of establishments is equal to the difference in the entry and exit rates. Employment at establishments included in the NETS data rose by about 1.2 percent, on average. Employment creation and destruction rates are significantly higher. There is

[8] The counties belonging to each CBSA are from the July 2015 delineation at https://www.census.gov/geographies/reference-files/time-series/demo/metro-micro/delineation-files.html. We use the CPS data from IPUMS, which adds metro codes to the CPS data released by the BLS public use microdata area codes and makes them as consistent as possible over time. The counties in the CBSAs and NETS data do not necessarily perfectly overlap the boundaries of the metro areas in the CPS IPUMS data, but they both give a measure of the labor market in an area.

[9] https://www.pewhispanic.org/2015/11/19/more-mexicans-leaving-than-coming-to-the-u-s/.

considerable variation within areas in most of these measures since the sample period includes two recessions and the subsequent recoveries with ensuing periods of expansion.

Methods

Our basic regression model is

$$\text{Business dynamics}_{it} = \alpha + \beta\left(\frac{\Delta\text{Immigrants}_{it-1}}{\text{Population}_{it-2}}\right) + \gamma\text{Controls}_{it\text{-}1} + \text{Area}_i + \text{Year}_t + \text{Area trend}_{it} + \varepsilon_{it}. \quad (4)$$

The dependent variable, *Business dynamics*, is one of the six variables created from the NETS database described above, while our immigration measure is one of the variables created from the CPS. We lag the immigration variable since we expect that the effects of immigration on business dynamics occur with a lag. Investment is unlikely to respond immediately to changes in labor supply. Lagging the immigration variables also reduces concerns about endogeneity. The CPS first included questions about immigrant status in 1994, but demographers recommend using those variables starting only in 1996. Our measures of changes in the working-age population as a result of immigration are therefore first available for changes between 1996 and 1997. The first period in the NETS data we examine is thus changes in establishments and employment between 1997 and 1998, and the last is changes between 2012 and 2013. This results in a panel of 16 observations for each area.

The regressions include several controls for underlying economic conditions and population demographics that may affect business dynamics. The controls for economic conditions are the natural log of real personal income per capita and the unemployment rate.[10]

[10]Personal income is from BEA and is deflated using the CPI. Unemployment rates are from BLS. The demographic controls are all created from the CPS IPUMS data.

The demographic controls are the distribution of the adult population across education and marital status groups, and the distribution of the entire population across age groups and the shares that are female, married, Hispanic, black, and other/mixed race. Most of the demographic variables change little within areas over the time frame we examine, but the economic variables change considerably.

The regressions include area fixed effects to control for time-invariant area-specific variables that affect business dynamics, such as location, and year fixed effects to control for factors that are common across all areas, such as the national business cycle. We estimate each model with and without area-specific linear time trends, which control for smooth trends in business dynamics over our sample period. Researchers are divided on whether to include such trends, which can absorb considerable variation in the data (e.g., Wolfers 2006; Neumark, Salas, and Wascher 2014). This is a particular concern given many of our results are sensitive to the inclusion of such trends. We cluster the standard errors on the area to control for area-specific heterogeneity.

We present baseline regression results using OLS regressions weighted by the number of establishments or employment.[11] We also run instrumental variable regressions. Endogenous location choice and the resultant bias is a major concern about OLS results for the effect of immigration. Immigrants may go to areas where the economy is relatively strong and jobs are readily available, creating upwards bias in OLS estimates. We therefore follow a long-standing literature that instruments for immigrant inflows using historical migration patterns. Specifically, we allocate immigrants from 17 different origin countries or regions across labor markets based on their national totals in a given year and the distribution of immigrants by origin across labor

[11] We use the 1996 values as the weights in order to reduce concerns that changes in the weights due to immigration affect the results.

markets in 1980 (Card 2001).[12] This shift-share instrument exploits national-level variation in immigrant inflows, return migration, and changes in the age structure of immigrants and further, when by skill, changes in the education composition of immigrants. It therefore is exogenous to local economic conditions under the assumption that annual changes in local economic conditions during 1996 to 2013 are not systematically related to the distribution of immigrants across areas in 1980.

Results

The results generally indicate that immigration has a positive impact on business dynamics. Table 2 reports the OLS and IV results for the measures of establishments with regard to net formation and entry and exit rates. As the first row of entries indicates, immigration does not have a significant effect on growth in the total number of establishments, entry rate, nor exit rate, regardless of whether area-specific linear time trends are included in the OLS regression. The OLS results in panels B and C of Table 2 show similar null results when looking at low-skilled immigration or at high-skilled immigration. In short, the OLS regressions provide little evidence that immigration affects business dynamics.

The IV results—also contained in Table 2—are considerably different. While the coefficient on overall immigration in the establishment growth rate regression is positive, it does not quite reach statistical significance at conventional levels (p-value of 0.105). The coefficients on low-skilled immigration, however, are statistically significant and indicate that low-skilled immigrants boost the establishment growth rate (row 4, columns 1 and 2). The point estimate

[12] The countries or regions of origin we use are Mexico; Central America; Cuba; the rest of the Caribbean; South America; Canada, the UK, Australia, and New Zealand; northwest Europe; southwest Europe; central and eastern Europe, Russia and Ukraine; China and Singapore; Japan and Korea; the rest of southeast Asia; Indonesia and Malaysia; the Philippines; India, Pakistan, and Central Asia; Middle East and North Africa; and the rest of Africa.

indicates that a 0.5 percentage point increase in the working-age population as a result of low-skilled immigration (the average yearly change over the time period) would increase the pace of growth in the number of establishments by approximately 0.3 percentage points. With a starting point at the average pace of growth in the number of establishments, and controlling for area trends, this effect would result in approximately 4.3 percent growth, from 4 percent. Mahajan (2019) finds similar positive and statistically significant results in IV regressions, namely that an immigrant generates roughly 0.05 firms on net when they enter a commuting zone and industry group.[13] Olney (2013) finds that a 10 percent increase in the share of low-skilled immigrants in a city leads to a 2 percent increase in the number of establishments.

What mechanism accounts for the effect of immigration on the number of businesses? The rest of the results in the second and fourth rows of Table 2 indicate that immigration reduces the number of businesses that close, while it does not increase the number of businesses that open. A 0.5 percentage point increase in the working-age population due to overall immigration reduces the establishment exit rate by about 0.3 percentage points. With a starting point at the average establishment exit rate, this effect would result in a 7.9 percent annual exit rate, down from 8.2 percent. The coefficients on low-skilled immigration, those who have at most completed high school, are slightly smaller in magnitude but highly statistically significant.

High-skilled immigration does not appear to affect the growth in the stock of establishments or establishment entry or exit rates. The results in Table 2 panel C indicate that increases in the working-age population due to immigrants who have at least a four-year college degree have no statistically significant effects on any of the business dynamics, although the signs on the coefficients are consistent with the results for overall and low-skilled immigration.

[13] Mahajan (2019) does not distinguish between immigrants by their education level.

Appendix Table 1 reports the key results from the first-stage regressions. The historical settlement patterns of immigrants are clearly a good predictor of where immigrants settle even many years later. All of the F-statistics in the first-stage regressions are above 10, the usual threshold for a strong instrument.

Turning to employment, the OLS results accord with the earlier OLS results in suggesting few effects of population growth due to immigration on business dynamics. As Table 3 shows, the change in the working-age population due to immigration is not significantly related to the change in employment, to job creation at expanding businesses, or to job destruction at shrinking businesses. These null results hold for immigrants as a whole, low-skilled immigrants, and high-skilled immigrants.

The IV results again differ from the OLS results. High-skilled immigration significantly boosts employment growth. A 0.7 percentage point increase in the working-age population as a result of high-skilled immigration would increase employment growth by over 0.2 percentage points, raising growth from about 1.2 percent to 1.4 percent. The employment coefficients on overall and low-skilled immigration are also positive but do not reach statistical significance. The increase in employment is fully accounted for by declines in the job destruction rate, not increases in the job creation rate.

Immigration significantly reduces the job destruction rate—it helps preserve jobs at shrinking businesses rather than create jobs at expanding businesses. As columns 5 and 6 of Table 3 show, this result holds for overall immigration as well as for low- and high-skilled immigration. A 0.5 percentage point increase in the working-age population as a result of immigration would reduce the job destruction rate by over 0.2 percentage points. Slightly smaller effects occur when there are similarly sized increases in the low- and high-skilled working-age

populations as a result of low- and high-skilled immigration, respectively. The first-stage results again support the strength of the instrument (not shown).

Finding larger effects in the IV regressions than in the OLS ones gives some insight into immigrant settlement patterns. If immigrants settle in areas where business growth is particularly strong and exit rates are unusually low, we would expect to find smaller effects in the IV regressions that use an exogenous measure of immigration. Instead, the pattern of the results suggests that immigrants are going to declining areas, and an exogenous inflow of immigrants, particularly low-skilled ones, helps prop up areas. Olney (2013) reports a similar surprising finding of more-positive IV results. He notes that immigrants disproportionately settle in areas with high unemployment rates and less robust economic growth during the period he examines (1998-2008), which may explain the pattern of the results. To further examine this, we regressed immigrant-driven population change on our economic conditions variables with and without area trends. The results are shown in Appendix Table 2. Higher unemployment rates reduce immigration into an area when looking at the actual change in the immigration variable but have no effect on the predicted measure we use in the first-stage of the IV regressions.

Larger businesses

The effects of immigration on business exit and job destruction are robust to excluding establishments with fewer than three employees, or "mom-and-pop" establishments.[14] When controlling for time trends, low-skilled immigration significantly depresses exit rates (Table 4). Similarly, the effect of overall immigration on job destruction remains significantly negative (Table 5). This effect seems due to low-skilled immigration in particular, although high-skilled immigration also appears to slow job destruction rates among large establishments. In contrast,

[14] For brevity, we only report IV results when excluding very small establishments.

previously significant effects of high-skilled immigration on employment growth lose significance. Previously significant effects of low-skilled immigration on establishment growth also lose significance. In addition, there is an unexpected change in the coefficients on high-skilled immigration in the establishment regressions. Once small firms are excluded, high-skilled immigration appears to reduce the business growth rate by suppressing entry and speeding up exit. There could be a link between high-skilled immigration and greater firm concentration, which has been an ongoing trend in industries where high-skilled immigrants work, such as technology and health care. This is an important area for future research.

By industry

Industry-level IV regressions in Table 6 are largely consistent with the above results. Immigration-induced increases in the working-age population have a positive and statistically significant effect on establishment growth in nearly half of the industries listed. Ordering industry effects from largest to smallest, immigration boosts growth in the number of businesses in transportation and warehousing; real estate; agriculture; wholesale trade; retail trade; arts, entertainment and recreation; professional, scientific, and technical services; and manufacturing. Higher establishment growth is again driven exclusively by declines in the business exit rate, not by increases in the entry rate. Immigration overall is also associated with declines in entry in the construction and arts, entertainment and recreation sectors. This somewhat puzzling result may reflect some ongoing trends. One, increasing industry concentration in these sectors could be driving down business entry rates. Second, the gradual shift from relatively low-skilled to high-skilled immigration in the U.S. during the period we examine could be playing a role as well. In both cases, controlling for linear time trends may not be sufficient. These could be non-linear trends that interact with the business cycle and with other cyclical and transitory changes.

Employment effects, meanwhile, are statistically significant in six of the listed industries, including public administration; retail trade; education; professional, scientific and technical services; manufacturing; and accommodation and food service. In some industries, the impact of immigration may be driven by the demand-side rather than the supply-side. For example, the employment effects on public administration could come from the increased demand for teachers in public schools. The rise in real estate establishments could be due to immigrants' demand for housing. In almost all cases, the results are due to influxes of low-skilled immigrants (see Appendix Tables 3 and 4 for industry-level results by skill).

Discussion

As discussed above, there are a number of mechanisms through which immigrants can affect business dynamics. Our results are consistent with a conventional supply-side effect where immigrant inflows lower firms' labor and search costs, which should disproportionately benefit small, labor-intensive businesses and businesses located in areas with tight labor markets. Spontaneous immigration, such as undocumented or most family-based immigrants (those who do not require employer sponsorship), will also favor small businesses that typically lack the resources to sponsor employment-based immigrants for either temporary or permanent visas. While we do not observe immigrants' legal status or visa type, the fact that low-skilled immigrants drive the bulk of the results is consistent with them having arrived as either undocumented or family-based immigrants.[15] Moreover, the size and industry pattern of results

[15] Undocumented and family-based immigration made up the bulk of immigrant inflows during the time period under consideration. Undocumented immigration, however, is trending down throughout this time period and experienced a sharp falloff during the 2007-2009 recession.

is consistent with larger effects among smaller firms and in labor-intensive sectors, such as agriculture, retail trade, transportation and warehousing and arts, entertainment and recreation.

Increased firm productivity offers another supply-side explanation of the empirical results. There is evidence that immigrants may be imperfect substitutes for native-born workers in the same education group (Ottaviano and Peri 2012). In this case, immigrants would not displace natives and may even make natives more productive, disproportionately benefiting businesses that employ both immigrants and natives. An implication of the decrease in business exit rates, for example, is that natives' jobs are saved along with those of immigrants.

We did not find that immigration induces more business entry. While there is a large established literature on high rates of entrepreneurship and self-employment among immigrants, we do not observe an effect of immigration on business entry using the NETS data. It is possible that we are simply not looking at long enough lags and that business exit responds faster to immigration than business entry. It is also possible that many immigrants who launch their own businesses may buy out native-owned businesses, a transaction which would not show up in our data since we do not have time-varying information on business ownership.

On the demand side, immigrants are consumers as well as workers. They boost demand for housing and public services, such as education and health care (although perhaps burdening local taxpayers). The demand boost spills over to benefit retailers and additional businesses that supply these services. We see evidence of demand-side effects in our industry results, as discussed above, and this is consistent with prior research. Hong and McLaren (2015) find that immigrant inflows lead to spillover job creation, with each immigrant generating 1.2 jobs in the local labor market through this channel.

One possible downside to our results is whether the negative impact of immigration on business exit rates suggests immigrants impede the process of business turnover or 'creative destruction'. After all, we find that immigration slows exit rates and job destruction across the board—for both large and small firms and low- and high-skilled labor.[16] Mahajan (2019), who finds similar overall results, goes a step further. He uses a proxy for firm productivity in the Longitudinal Business Database to see what firms are 'saved' by immigration and finds that immigration increases exit rates among low-productivity firms while suppressing it among high-productivity firms. Mitaritonna et al. (2017), however, do not find that immigration-induced exit effects vary by firm productivity in the French manufacturing sector.

Conclusion

The secular drop in U.S. business dynamics may have serious economic consequences since labor market fluidity—the movement of workers and jobs across employers—leads to higher employment rates and ultimately higher income and GDP. The movement of workers to growing sectors and areas fosters business expansion and job creation, helps alleviate labor shortages and other bottlenecks to investment, and reduces income disparities across regions. Meanwhile, the movement of workers to non-booming areas may help slow business closure and job destruction, also helping to ease economic disparities and disruptions. In the U.S., much of this fluidity is due to immigrant inflows rather than the movement of existing workers. Consistent with this, our results suggest that immigration plays an important role in U.S. business dynamics.

We find that immigration has a positive impact on net business formation primarily by reducing establishment exit rates. Consistent with this, immigration slows job destruction in

[16] There is one exception, namely the impact of high-skilled immigration on business exit in the large-firm sample.

declining firms. We also find that the impacts differ by the skill level of immigrants, with low-skilled immigrants the primary drivers of these effects. Our results are consistent with the premise that immigration lowers labor and search costs, leading to capital investment and economic growth in the medium to long term.

The surprising finding that the results are driven by low-skilled immigrants is consistent with Olney's (2013) finding of a positive effect of low-skill immigrant shares on the number of establishments and also Wozniak and Murray's (2012) finding that exogenous low-skilled immigrant inflows lead to smaller regional outflows of low-skilled U.S. natives in the short run. Immigration by foreign-born workers with similarly low levels of education may help U.S. natives keep their jobs, at least in the short run, by enabling their employers to stay in business longer. Immigration may help prop up or even revitalize low-skilled-labor-intensive businesses, such as food processing and apparel, and slow offshoring in such sectors (Ottaviano, Peri and Wright 2013).

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Table 1: Descriptive statistics

	Mean	Std. dev.
Change in working-age population due to immigration:		
All	0.005	0.018
Low-skilled	0.005	0.030
High-skilled	0.007	0.031
Business dynamics:		
% change in # establishments	0.040	0.088
Establishment entry rate	0.122	0.064
Establishment exit rate	0.082	0.045
% change in employment	0.012	0.035
Job creation rate	0.086	0.026
Job destruction rate	0.074	0.024

Note: Shown are weighted sample means for establishment and employment activity in 160 labor markets during 1997 to 2013, for a sample size of 2,560 observations. Establishment variables are weighted using the number of establishments in 1996; immigrant share and employment variables are weighted using employment in 1996.

Table 2: Estimates of Effect of Immigration on Establishments

	% change in # establishments		Entry rate		Exit rate	
	(1)	(2)	(3)	(4)	(5)	(6)
A. All immigration						
OLS estimate	0.039	0.042	0.048	0.045	0.009	0.004
	(0.034)	(0.033)	(0.030)	(0.031)	(0.023)	(0.024)
IV estimate	0.933	0.709	0.180	0.072	-0.756***	-0.637***
	(0.622)	(0.437)	(0.543)	(0.467)	(0.184)	(0.137)
B. Low-skilled immigration						
OLS estimate	0.006	-0.001	0.010	0.003	0.004	0.004
	(0.019)	(0.018)	(0.020)	(0.021)	(0.018)	(0.019)
IV estimate	0.698*	0.577*	0.125	0.065	-0.582***	-0.518***
	(0.391)	(0.317)	(0.264)	(0.215)	(0.166)	(0.149)
C. High-skilled immigration						
OLS estimate	0.021	0.027	0.024	0.025	0.003	-0.002
	(0.023)	(0.024)	(0.018)	(0.018)	(0.008)	(0.009)
IV estimate	0.252	0.235	0.022	0.023	-0.224	-
0.205	(0.287)	(0.275)	(0.315)	(0.317)	(0.147)	(0.184)
Area-specific linear trends	No	Yes	No	Yes	No	Yes

*** p<0.01, ** p<0.05, * p<0.1

Note: The immigration variable corresponds to the change in the working-age population that is due to immigration. Each entry corresponds to a separate regression. Area and year fixed effects are included in all regressions. Robust standard errors clustered on area are in parentheses.

Table 3: Estimates of Effect of Immigration on Employment

	% change in employment		Job creation rate		Job destruction rate	
	(1)	(2)	(3)	(4)	(5)	(6)
A. All immigration						
OLS estimate	0.015	0.017	0.010	0.017	-0.005	0.0006
	(0.027)	(0.027)	(0.019)	(0.018)	(0.016)	(0.0161)
IV estimate	0.571	0.547	-0.041	0.065	-0.599***	-0.472***
	(0.427)	(0.379)	(0.322)	(0.263)	(0.164)	(0.147)
B. Low-skilled immigration						
OLS estimate	0.008	0.003	-0.000	0.001	-0.008	-0.002
	(0.018)	(0.019)	(0.0127)	(0.0129)	(0.011)	(0.012)
IV estimate	0.322	0.320	-0.1104	-0.038	-0.432***	-0.360***
	(0.284)	(0.270)	(0.236)	(0.199)	(0.108)	(0.110)
C. High-skilled immigration						
OLS estimate	0.005	0.010	0.007	0.015	0.003	0.006
	(0.014)	(0.015)	(0.009)	(0.009)	(0.009)	(0.010)
IV estimate	0.281*	0.332*	0.011	0.116	-0.252**	-0.198*
	(0.159)	(0.178)	(0.105)	(0.102)	(0.100)	(0.117)
Area-specific linear trends	No	Yes	No	Yes	No	Yes

*** p<0.01, ** p<0.05, * p<0.1

Note: Each entry corresponds to a separate regression. Area and year fixed effects are included in all regressions. Robust standard errors clustered on area are in parentheses.

Table 4: Estimates of Effect of Immigration on Establishments, without Small Establishments

	% change in # establishments		Entry rate		Exit rate	
	(1)	(2)	(3)	(4)	(5)	(6)
A. All immigration						
IV estimate	-0.190	-0.469	-0.530	-0.684	-0.218**	-0.162
	(0.518)	(0.582)	(0.488)	(0.482)	(0.106)	(0.147)
B. Low-skilled immigration						
IV estimate	0.088	-0.040	-0.245	-0.309	-0.275**	-0.245*
	(0.301)	(0.290)	(0.252)	(0.210)	(0.109)	(0.131)
C. High-skilled immigration						
IV estimate	-0.384*	-0.740**	-0.378	-0.520*	0.058	0.152**
	(0.228)	(0.323)	(0.231)	(0.276)	(0.044)	(0.064)
Area-specific linear trends	No	Yes	No	Yes	No	Yes

*** p<0.01, ** p<0.05, * p<0.1

Note: Establishments with fewer than three employees are not included. Each entry corresponds to a separate regression. Area and year fixed effects are included in all regressions. Robust standard errors clustered on area are in parentheses.

Table 5: Estimates of Effect of Immigration on Employment, without Small Establishments

	% change in employment		Job creation rate		Job destruction rate	
	(1)	(2)	(3)	(4)	(5)	(6)
A. All immigration						
IV estimate	0.194	0.337	-0.340	-0.093	-0.502***	-0.413***
	(0.458)	(0.345)	(0.386)	(0.294)	(0.148)	(0.119)
B. Low-skilled immigration						
IV estimate	0.089	0.165	-0.269	-0.122	-0.349***	-0.288***
	(0.360)	(0.289)	(0.289)	(0.224)	(0.122)	(0.108)
C. High-skilled immigration						
IV estimate	0.080	0.186	-0.165	0.044	-0.222***	-0.136*
	(0.126)	(0.146)	(0.107)	(0.094)	(0.077)	(0.078)
Area-specific linear trends	No	Yes	No	Yes	No	Yes

*** p<0.01, ** p<0.05, * p<0.1

Note: Establishments with fewer than three employees are not included. Each entry corresponds to a separate regression. Area and year fixed effects are included in all regressions. Robust standard errors clustered on area are in parentheses.

Table 6: Effect of immigration by industry, all skills

	% change in # establishments	Entry rate	Exit rate	% change in employment	Job creation rate	Job destruction rate
Ag (11)	1.078**	0.424	-0.647***	0.536	-0.017	-0.440
Construction (23)	-0.596	-1.324***	-0.782***	0.075	-0.519*	-0.645**
Manufacturing (31-33)	0.462***	0.036	-0.460***	0.546*	-0.353*	-0.997***
Wholesale Trade (42)	0.966***	0.467	-0.515***	0.490	0.177	-0.385*
Retail Trade (44-45)	0.922**	0.234	-0.613***	1.406**	0.736	-0.482***
Transportation and Warehousing (48-49)	1.462***	0.581	-0.874***	0.578	0.067	-0.654*
Information (51)	0.751	0.112	-0.649***	-0.310	-0.457	-0.175
Finance & Insurance (52)	0.543	-0.061	-0.475**	-0.105	0.454	-0.309
Real Estate (53)	1.201**	0.548	-0.620***	0.080	-0.101	-0.362
Professional, Scientific, Technical Services (54)	0.802***	0.253	-0.523***	1.190***	0.210	-0.887***
Management of Companies (55)	0.739	-1.507	-2.768**	11.290	-0.630	-2.028
Admin & Support, Waste Mgmt Services (56)	0.827	0.036	-1.160**	0.831	0.627	-0.132
Education (61)	0.275	0.006	-0.239***	1.219*	0.677**	-0.350
Health Care, Social Assistance (62)	0.444	0.187	-0.230*	0.480	0.130	-0.138
Arts, Entertainment, Recreation (71)	0.859***	-0.595*	-0.818***	-0.654	-0.358	-0.295
Accommodation & Food Services (72)	0.130	-0.065	-0.190	0.403**	0.086	-0.364**
Other Services (81)	0.607	0.108	-0.483***	-0.197	-0.761	-0.472
Public Administration (92)	0.675	0.109	-0.0137	2.288*	0.129	-1.124

*** p<0.01, ** p<0.05, * p<0.1

Note: IV estimates shown. Each entry corresponds to a separate regression. Area and year fixed effects are included in all regressions, as are area trends. Robust standard errors clustered on area are in parentheses. Not shown: mining, utilities (no statistically significant results).

Appendix Table 1: First-stage Results

	(1)	(2)
A. Actual change in working-age population due to immigration		
Predicted change	0.494***	0.577***
	(0.093)	(0.089)
F-stat	28.28	42.36
B. Actual change in low-skilled working-age population due to immigration		
Predicted change	0.493***	0.570***
	(0.125)	(0.156)
F-stat	15.61	13.41
C. Actual change in high-skilled working-age population due to immigration		
Predicted change	0.904***	0.890***
	(0.198)	(0.230)
F-stat	20.76	14.94
Area-specific linear trends	No	Yes

*** p<0.01, ** p<0.05, * p<0.1

Note: Each pair of entries is from a separate regression. Area and year fixed effects are included in all regressions. Robust standard errors clustered on area are in parentheses.

Appendix Table 2: Economic Factors and Change in Population due to Immigration

	Actual change		Predicted change	
	(1)	(2)	(3)	(4)
A. All immigration				
Personal income per capita	-0.001	0.016	-0.016	0.009
	(0.017)	(0.024)	(0.019)	(0.013)
Unemployment rate	-0.002***	-0.002**	0.0005	-0.001
	(0.001)	(0.001)	(0.0009)	(0.001)
B. Low-skilled immigration				
Personal income per capita	0.003	0.008	-0.033	0.011
	(0.027)	(0.042)	(0.036)	(0.022)
Unemployment rate	-0.0015*	-0.0016	-0.001	-0.001
	(0.0008)	(0.0011)	(0.002)	(0.001)
C. High-skilled immigration				
Personal income per capita	0.027	0.058	-0.003	0.012
	(0.022)	(0.042)	(0.008)	(0.009)
Unemployment rate	-0.001	-0.002	0.0002	0.0001
	(0.001)	(0.001)	(0.0005)	(0.0004)
Area-specific linear trends	No	Yes	No	Yes

*** p<0.01, ** p<0.05, * p<0.1

Note: Data are for 1996 to 2012 for a sample size of 2,560 observations. Each pair of estimated coefficients in a panel is from a separate regression. Area and year fixed effects are included in all regressions, and personal per capita income is the natural log of the real value. Robust standard errors clustered on area are in parentheses.

Appendix Table 3: Effect of immigration by industry, low skill

	% change in # establishments	Entry rate	Exit rate	% change in employment	Job creation rate	Job destruction rate
Ag (11)	1.337**	0.545*	-0.757***	0.295	-0.061	-0.342
Construction (23)	-0.004	-0.491*	-0.516***	0.041	-0.182	-0.292
Manufacturing (31-33)	0.426***	0.0347	-0.412***	0.317	-0.330*	-0.703***
Wholesale Trade (42)	0.712***	0.259*	-0.477***	0.415*	0.117	-0.317*
Retail Trade (44-45)	0.743**	0.195	-0.515***	0.647**	0.240	-0.307**
Transportation and Warehousing (48-49)	1.484***	0.680**	-0.805***	0.482	0.163	-0.561**
Information (51)	0.736**	0.082	-0.647***	-0.592	-0.558	-0.030
Finance & Insurance (52)	0.187	-0.127	-0.369	0.201	0.249	-0.279
Real Estate (53)	0.859**	0.311	-0.531***	0.120	-0.053	-0.268
Professional, Scientific, Technical Services (54)	0.504*	0.089	-0.414***	0.686**	-0.031	-0.744***
Management of Companies (55)	1.699*	0.378	-1.589***	6.263	0.070	-0.566
Admin & Support, Waste Mgmt Services (56)	0.472	-0.114	-0.819**	0.409	0.004	-0.383
Education (61)	0.294	0.041	-0.239**	0.713**	0.434**	-0.204
Health Care, Social Assistance (62)	0.227	0.102	-0.118	0.280	0.135	-0.099
Arts, Entertainment, Recreation (71)	1.159***	-0.141	-0.645***	0.127	-0.232	-0.477
Accommodation & Food Services (72)	0.185**	0.094	-0.093	0.161	0.122	-0.122
Other Services (81)	0.555*	0.132	-0.429***	0.120	-0.383	-0.445
Public Administration (92)	0.714**	0.262	0.008	1.177	0.184	-0.464

*** p<0.01, ** p<0.05, * p<0.1

Note: IV estimates shown. Each entry corresponds to a separate regression. Area and year fixed effects are included in all regressions, as are area trends. Robust standard errors clustered on area are in parentheses. Not shown: mining, utilities (no statistically significant results).

Appendix Table 4: Effect of immigration by industry, high skill

	% change in # establishments	Entry rate	Exit rate	% change in employment	Job creation rate	Job destruction rate
Ag (11)	0.177	0.139	-0.005	0.307	0.198	-0.045
Construction (23)	-0.484	-0.823***	-0.363**	-0.037	-0.358**	-0.321*
Manufacturing (31-33)	0.164	0.056	-0.107	0.341	-0.097	-0.458*
Wholesale Trade (42)	0.374*	0.286	-0.088	-0.095	0.026	-0.027
Retail Trade (44-45)	0.296	0.100	-0.152	0.568	0.362	-0.218
Transportation and Warehousing (48-49)	0.171	-0.032	-0.207	0.032	-0.117	-0.208
Information (51)	0.125	0.019	-0.120	0.533	-0.248	-0.568
Finance & Insurance (52)	0.373	0.024	-0.105	-0.402	0.248	0.008
Real Estate (53)	0.724	0.449	-0.271	0.056	0.005	-0.131
Professional, Scientific, Technical Services (54)	0.320	0.174	-0.126	0.587	0.184	-0.129
Management of Companies (55)	-1.531	-2.657	-1.353*	2.562	-2.351	-0.426
Admin & Support, Waste Mgmt Services (56)	0.141	-0.214	-0.549	1.319	1.103	-0.093
Education (61)	-0.045	-0.060	-0.011	0.351	0.108	-0.165
Health Care, Social Assistance (62)	0.303	0.114	-0.153***	0.273	0.039	0.012
Arts, Entertainment, Recreation (71)	-0.423	-0.624***	-0.211	-1.113	-0.038	0.505
Accommodation & Food Services (72)	-0.002	-0.187	-0.178**	0.392**	0.045	-0.315**
Other Services (81)	0.210	0.052	-0.129	-0.204	-0.435	-0.107
Public Administration (92)	0.150	0.027	0.007	2.362	-0.329	-1.817

*** p<0.01, ** p<0.05, * p<0.1

Note: IV estimates shown. Each entry corresponds to a separate regression. Area and year fixed effects are included in all regressions, as are area trends. Robust standard errors clustered on area are in parentheses. Not shown: mining, utilities (no statistically significant results).