Immigrant population and entrepreneurship in U.S. metropolitan areas

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Abstract

This paper studies the relationship between the immigrant population and entrepreneurial development in the U.S. metropolitan area. By applying a two-way fixed effects model on U.S. Census individual-level microdata from 2000 to 2017, which was then aggregated to represent metropolitan statistical areas (MSAs), we see that at the MSA-level higher proportions of the immigrant population are significantly associated with higher overall self-employment. This relationship is clearer for unincorporated self-employment than incorporated self-employment. Our analysis adds systematic evidence to the policy debate related to the impact of immigration on economic opportunities for the native-born population. We see that immigrants are more likely to be entrepreneurs, which implies that they may create greater opportunities for the native-born rather than taking opportunities from them. We also placed our discussion in the context of the COVID-19 pandemic, which has hit small businesses disproportionately, particularly those that are operated by immigrants.

Keywords: Self-employment, foreign-born, migrant, metropolitan area, English proficiency

JEL codes: J61, F22, M13, J82, J31, J21, J22, I24

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1. Introduction

For about a decade comprehensive, federal immigration reform in the United States has stalled, while piecemeal executive action and orders, primarily aimed at limiting immigration—legal as well as unauthorized—remain tied up in protracted court battles. In this political context many immigration advocates, elected officials, and community economic development offices at the state and local level have sought to attract foreign-born individuals already in the United States to their jurisdictions. Some of these efforts—such such as English language instruction, expanded driver license eligibility, and in-state tuition for some undocumented immigrants—have sought to facilitate immigrant integregation. Other initiatives including a willingness to cooperate with federal immigration efforts, may serve to limit a metropolitan area's immigrant population. In the wake of of the COVID-19 crisis, there is likely to be increased variability in local areas' willingness to attract and retain the foreign born as different areas may experience the downturn and recovery in different ways.

We answer an essential research question of whether the foreign-born population living in the U.S. is more likely to be self-employed than the native-born population. If the foreign-born population is more likely to be self-employed, the question remains, what accounts for the difference in self-employment between these two populations. If they cannot compete with natives in the traditional job market, they may enter self-employment out of necessity. On the other hand, if they are more competent than natives to start a new business, they take self-employment as an opportunity. Therefore, we analyze that if there is a significant difference in the self-employment rate between foreign-born and native, whether it is driven by necessity or opportunity. Specifically, we identify who takes self-employment as a last available option and who takes entrepreneurship as a career strategy to leap forward. We proxy incorporated self-employment for opportunity entrepreneurship and unincorporated self-employment for necessity entrepreneurship.

It has been noted that the presumed case for immigrant entrepreneurship as an engine of economic growth and job creation rests primarily on anecdotal evidence, rather than academic research (Kerr and Kerr 2016). This is particularly so in today's economy, where native and foreign-born entrepreneurs alike are a diverse and varied lot, found in all sectors of the economy, varying greatly in scale, and operating from coast to coast, and from the southern border with Mexico to the northern border with Canada. A handful of powerful stories of immigrant entrepreneurs may be individually compelling and insightful, but can scarcely cover the full gamut of experience and influence of immigrant entrepreneurship.

Academic research may have had little influence on the design and implementation of immigration policy, particularly at the state and local level. But there is, in fact, an extensive academic literature on

entrepreneurship, and specifically on immigrant entrepreneurship. As detailed in this paper's literature review, research on immigrant entrepreneurship tends to focus either on specific individual characteristics such as gender, education, country of origin, or personality traits, or on features of the socio-economic environment such as the business cycle or political context. This paper, by contrast, simultaneously considers the impact of the metropolitan area environment and the temporal changes in the economy, as well as the characteristics (both demographic and socio-economic) of individuals living in each MSA.

This paper is based on individual-level microdata from the 2000 decennial census, and files from the Census Bureau's 2007, 2011, 2017 American Community Survey Census which was then aggregated to represent metropolitan statistical areas (MSAs). The paper then uses these MSAs as the primary unit of analysis. With percentages of total self-employment, incorporated self-employment, and unincorporated self-employment as dependent variables, this data is then used to estimate two-way fixed-effect models. We aggregate household-level data to match MSA level factors and create a longitudinal data dataset so that we can control for all time-invariant observable and unobservable factors that may influence entrepreneurship development. We calculated the shares of the metropolitan area population that are foreign-born, as our main independent variables of interest. We also control for a number of characteris of the population living in each MSA. Our analysis shows that a one percentage point increase in the foreign-born population will increase self-employment by approximately 0.1 percentage points.

The following section selectively reviews relevant literature emphasizing the importance and origins of entrepreneurship, followed by a discussion of immigrant entrepreneurship. Subsequent sections further detail the research questions and hypotheses, as well as the data and methods used in the analyses. Then, we discuss the empirical evidence emanating from our analysis. After presenting findings the paper concludes with a discussion of the evidence found and possible policy implications, particularly in light of the reshaping of the U.S. economy and labor market due to the COVID-19 pandemic.

2. Review of the Literature

Before turning attention to immigrant entrepreneurship in particular, it is worthwhile to highlight key points in the entrepreneurship literature more broadly, as these certainly carry through to the understanding of immigrant entrepreneurship. The paper returns to the relationship between perspectives on immigrant entrepreneurship and entrepreneurship in general in the concluding section.

2.1 Relevant key themes in the general entrepreneurship literature

Beginning with the work of Schumpeter, entrepreneurship, whether as a process, a resource or as a state of being, has been recognized as essential to economic development and as fundamentally driven by innovation in goods, production methods, markets, sources of materials, and organizational structures (Collins 2003; Fairlie and Lofstrom 2015; Shane 1996; Teixeira, Lo, and Truelove 2007; Toma, Grigore, and Marinescu 2014). The notion of "creative destruction" entrenched in Schumpeter's view of economic growth posits that as startups displace incumbents and destroy their monopolistic rents, they generate economic development (Schumpeter 1942). There is ongoing interest among academics, policymakers, and private sector business leaders in entrepreneurship as a source of economic growth (Audretsch, Keilbach, and Lehmann 2006; Wennekers and Thurik 1999) that extends beyond the benefits to individual entrepreneurs but also to economic progress more broadly including benefits to the community (Holcombe 2007).

Surveying the academic literature on entrepreneurship, three themes are particularly relevant to the study of immigrant entrepreneurship.

First, small businesses figure prominently in studies of entrepreneurship as they account for approximately 40 percent of the U.S. gross national product and create two-thirds of all new jobs (Yallapragada and Bhuiyan 2011). Relatively little attention has been given to the multitude and diversity of small businesses at the heart of entrepreneurship (Aldrich and Ruef 2018; Welter et al. 2017) with far greater attention given to initial public offerings (IPOs) and venture capital (VC) investment, especially in the tech sector. Recent research shows that the effect of small business on net job creation initially in the United States is limited, as most of small businesses eventually fail, and is primarily driven over time by the small firms that grow to between 20 and 499 employees (Dilger 2018). Accordingly, attention ought to be given to factors, including the local business ecosystem that support the success of small businesses.

The second important theme is the distinction between necessity and opportunity entrepreneurship, which is based on why an individual pursues entrepreneurship (Desai 2017; Gedeon 2008). Necessity entrepreneurship occurs when individuals resort to self-employment when they are unable to find desirable wage or salary employment within existing firms. Opportunity entrepreneurship is pursued when an individual innovates in response to a perceived opportunity to create new or greater value. Necessity entrepreneurship is most prevalent during an economic downturn and opportunity entrepreneurship tends to arise when the economy is improving (Fairlie and Fossen 2018). The propensity towards necessity entrepreneurship may be high for certain groups, even in times of macroeconomic prosperity, if they face barriers to gain stable employment. Opportunity entrepreneurship is generally recognized as more

beneficial for the economy and local community – in terms of both innovation and job creation –because it is growth oriented (Turkina and Thai 2015).

In the analyses presented below, unincorporated self-employment is used as a proxy for necessity entrepreneurship and incorporated self-employment as a proxy for opportunity entrepreneurship. Our analyses seek to determine if variation in the nature of a metropolitan area's socio-economic landscape differently influence rates of necessity and opportunity entrepreneurship. Another key aspect linked to entrepreneurship is access to credit markets. In this sense, immigrants are at a clear disadvantage due to potential barriers to access finance for someone without credit history and without collateral, in addition to potential credit discrimination. Therefore, other financial resources can be key as direct sources to leverage finance as well as partly cover the fixed costs of a startup, including physical capital outlays and working capital for the wage bill while revenues cover operating costs. Fixed assets can also be important as collateral to break credit constraints. Therefore, a factor tied to entrepreneurship is home ownership, as home equity may be an important resource for initial or ongoing small business expenses, particularly when home prices are rising rapidly (Harding and Rosenthal 2017). This aspect is particularly salient for incorporated entrepreneurs, who operate at a larger scale and have more expenses. Therefore, this credit channel is consistent with the fact that immigrant entrepreneurs have a higher propensity to be unincorporated, when self-employed.

This then leads to a third broad theme in the entrepreneurship literature that is particularly relevant for the study of immigrant entrepreneurship, and guides the analyses presented in this paper: the distinction between individual characteristics and socio-economic context as determinants of entrepreneurial behavior and outcomes. Patterns of economic activity do not emerge in a vacuum but influenced by the socio-economic environment and business ecosystem that then vary over time and across one metropolitan area to the next. This environment includes each local area's demographic characteristics and the extent and nature of its foreign-born population is a critical component of an area's composition. Though the primary emphasis in the literature has been on individual and environmental factors that spur entrepreneurial innovation, more recent literature has called attention to negative circumstance and labor market challenges that lead to adaptive behavior that fosters entrepreneurial effort (Miller and Le Breton-Miller 2017).

2.2 Individual influences on entrepreneurship

A first important topic in the literature is the importance of *gender*. Most notably as with overall labor force participation, despite recent increases in female entrepreneurship worldwide, including the United States, the current number of female entrepreneurs lags far behind that of males, women often lack the critical

resources needed to launch and scale businesses, and the pipeline of female entrepreneurs is weak (Wang 2019; Wilson, Kickul, and Marlino 2007). A study of both unincorporated and incorporated self-employment in the United States, found that self-employment rates and earnings for women and minorities have increased, but continue to lag behind those of men and non-minorities across the economy and in construction in particular, where high rates of self-employment are found (Blanchflower 2007). Female entrepreneurs have reduced access to private investment when seeking to develop new technology (Gicheva and Link 2015).

A critical gender perspective on gender and entrepreneurship argues that empirical and theoretical studies of entrepreneurship have been based on male models of entrepreneurship. Those studies of female entrepreneurship that do exist focus primarily on contrasts with male entrepreneurship and do not fully understand how the processes and practices of gender are interwoven with entrepreneurship such that female entrepreneurship is a wholly different matter (Gunnerud 1997; Wang 2019). For example, viewing the geographic location of entrepreneurship based on a male-oriented profit seeking model of entrepreneurship is not adequate to comprehending female entrepreneurs. As a result, the dominant policy narrative, focusing for example on risk-taking behavior, has a tendency to reinforce women's secondary labor market status rather than improve upon it (Ahl and Nelson 2015).

Education is a second individual characteristic typically tied to entrepreneurship. Studies find that the average educational attainment in the country of origin was found to be significantly positively associated with self-employment among immigrants (Vinogradov and Kolvereid 2007). Individuals with a college education are more likely to be self-employed and have higher annual incomes than the self-employed without a college education, however the impact is stronger for men than women (Guo, Chen, and Yu 2016). Thus, Self-employed individuals are more likely to be better educated and male (Lusardi, Christelis, and de Bassa Scheresberg 2017).

A third important demographic factor raised in studies of entrepreneurship looks at its relationship to individual age. Studies find an inverted U relationship between age and starting a business, though the relationship shifts over time and from region to region (Backman and Karlsson 2018; Hatak, Harms, and Fink 2015; Thorgren et al. 2016). An increase in entrepreneurship with age makes sense as successful entrepreneurs typically require both physical capital (leveraged through savings accumulation) as well as human capital (acquired through education and or experience) so that older individuals are better positioned to set up their own business. Indeed, recent evidence from the United States comparing entrepreneurs in 2012 to 1998 finds that a growing proportion of entrepreneurs are older (Lusardi et al. 2017).

A fourth important factor, emphasized by Zimmermann (2007), is the intergenerational dimension. He mentions that "in Germany, …, overall, the probability of self-employment increases significantly for those workers whose parents are self-employed, indicating an intergenerational link." This is an important factor influencing both native entrepreneurs and foreign-born as parental influence can operate through a number of channels in shaping self-employment choices.

Another key to understanding entrepreneurship is the level of income in metro areas. The evidence presented by Kugler et al. (2017) on entrepreneurship in low-income areas shows that it is more attractive to start a new business in a more affluent area. There are both demand- and supply-side reasons for this phenomenon. On the one hand, a critical mass for a customer base can be more easily elicited in a location with higher mean income and less inequality. On the other hand, a larger and better off middle class in a metropolitan area will often be associated a skilled workforce nearby facilitating business expansion.

2.3 Immigrants as entrepreneurs

As the U.S. developed into and remained a global engine of economic growth, influential foreign-born entrepreneurs have had a major impact on the U.S. economy. Overall, considerable evidence shows that rates of self-employment among the foreign-born are not only higher than the native-born but also higher than their non-immigrant co-ethnics (Barakat and Parhizgar 2013; Hanson 2005). By 2017 the foreign-born[2] population stood at 13.7%[3] of the adult civilian population with total population, including 6.1% of whom were naturalized citizens and 7.6% were non-citizens. Further, looking specifically at the adult civilian population 7.2% were self-employed (6.8% of the native-born, 10.3% among naturalized citizens, as was 8.5% of the non-citizen adult population.)

Distinguishing between unincorporated and incorporated self-employment, which we are seeing as proxies for necessity and opportunity entrepreneurship, in the adult civilian population non-citizens (6.4%) are slightly more likely than naturalized citizens (6.0%) to be found in unincorporated self-employment. However, naturalized citizens (4.2%) are more than twice as likely to be engaged in incorporated self-employment than non-citizens (2.0%).

[2] Foreign-born refers to individuals who are not a U.S. citizen at birth or who were born outside the U.S., Puerto Rico or other US territories and whose parents are not U.S. citizens. The foreign-born may include naturalized U.S. citizens, Legal Permanent Residents, temporary residents, refugees and asylees, and others. Additionally, native-born includes those who are U.S. citizens at birth, those born in the United States, Puerto Rico, or other U.S. territories, and those born abroad to a parent who is a U.S. citizen. Please note that the terms "foreign-born" and "immigrant" are used interchangeably throughout this paper.

[3] Authors' calculations. This and all findings reported below are based on Ruggles et al., (2019).

There is early literature in the USA that showed substantial differences in self-employment rates and country of origin with higher rates of self-employment among migrants from China, Korea, and some European countries and lower rates among migrants from Mexico, Puerto Rico, and some African countries (Borjas 1986; Yuengert 1995). Recent studies by Portes & Martinez (2020) reported that although the largest absolute number of firms belong to African-Americans and Mexican-Americans, on a per capita basis, both groups exhibit the lowest levels of entrepreneurship. The most entrepreneurial in terms of firms per 100,000 population are Koreans, closely followed by the Japanese, and then Chinese and Cubans. In terms of average receipts per firm, Asian Indians far outperform any other group. This pattern reflects the high level of human capital brought along by Indian immigrants that enable them to engage in business activities in high-tech sectors. A study also showed that the level of self-employment varies significantly among immigrants from different countries of origin. Different immigrant communities have different ways of accumulating and using social capital in starting business and these variations can partly be explained by the differences in their national cultures (Chand and Ghorbani 2011).

Fairlie and Meyer (2003) reported that immigrants and natives have similar industry distributions with some exceptions. Native men are more likely than immigrant men to be in construction and professional services and less likely to be in retail trade. Native women are more likely than immigrant women to be located in professional services and less likely to be in retail trade. They also found that immigrant men are concentrated in restaurants, grocery stores, and taxicabs with immigrant women in restaurants, cleaning services, grocery stores, and laundries. However, besides these exceptions, the differences between immigrants and natives are not large, so that self-employed immigrant men and women have fairly similar industry distributions (Fairlie and Meyer 2003).

There are two main lines of argumentation as to why immigrants are more likely to pursue entrepreneurship; these may be seen as special cases of views on entrepreneurship more generally.[4]

From the first perspective, immigrants are risk-takers, so a broad willingness to take risks may promote entrepreneurship. In addition, immigrants may possess unobservable or difficult to measure traits favorable to entrepreneurship skills (Kahn, La Mattina, and J. MacGarvie 2017), including cross-cultural experiences that increase their capacity to identify and pursue new business opportunities and markets (Vandor and

[4] The literature presented here is situated in the tradition of the studies of the ethnic economy, as opposed to that of the ethnic enclave economy, which is a subset of the ethnic economy and excludes important components of the ethnic economy. The characteristic features of the ethnic economy, as it was originally developed by Alejandro Portes in his work on the Cuban economy of Little Havana in Miami, are not representative of ethnic economies across the country (Light and Bonacich 1988)

Franke 2016) . At the same time, once immigrants have taken the initial risk of moving to a new land many prefer a life of stability and predictability only gravitating to entrepreneurship when confronted by barriers to regular employment (McCarthy and Naumov 2000). Some have noted a gender gap in risk-taking tolerance and attitudes and the fact that self-employment rates in the U.S. have been historically higher for White men compared with those of women has been sometimes linked to this purported disparity (Loscocco and Robinson 1991; Sonfield et al. 2001).

According to the second, immigrants face labor market barriers that then promote entrepreneurship as employment opportunities with established firms are limited (Bergson-Shilcock and Witte 2015). Even Asian Americans, the so-called "Model Minorities" face barriers in the U.S. labor market, including language, cultural differences, personality traits, social capital and discrimination (Cheng 1997:280; Sabharwal and Varma 2015:56–60). Facing these limits, self-employment presents itself as a way to penetrate the glass ceiling (Sabharwal and Varma 2015:51). Some of the impediments to labor market participation have to do with the constraints from living in low-income areas. To the extent that immigrants are likely to transition into life in the U.S.A. by first relocating to a low-income neighborhood, they have to deal with such challenges to join the workforce as remoteness, lack of infrastructure, scarce transportation options, limited job center locations, etc. – beyond those mentioned above. In many cases, employment in low-income MSAs, including for immigrants, is not a viable option leading to higher necessity entrepreneurship (i.e. unincorporated self-employment). This pattern is documented by Kugler, et al. (2017).

While the social capital, support, and assistance immigrants may find when settling in an immigrant enclave upon arrival in the United States, in a perspective advanced by Portes and others the rich social capital found in an ethnic enclave has disadvantages as well advantages (Portes 1998). For example, in a study of foreign-born immigrant professionals in the United States Bergson-Shilcock and Witte (2015) found that those who said they had many friends and family they could rely on for success when they first arrived were significantly less likely to be economically successful than those with fewer social ties. They may then compensate for their lack of social and institutional capital[5] by displaying a strong determination to succeed in the mainstream economy, making up for other resources they lack.

[5] The concept of social capital is defined by many social scientists such as Coleman and Putnam. Putnam states that "Social Capital refers to connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them" (Putnam 2000:19). Coleman refers to social capital as "a variety of entities with two elements in common: they all consist of some aspect of social structure, and they facilitate certain actions of actors...within the structure" (Portes 1998).

A lack of certification[6] accepted and recognized in the United States may be another barrier leading to higher rates of entrepreneurship among immigrants. Studies show that immigrant may face obstacles gaining recognition for foreign education. Some foreign-educated immigrants may have degrees that are not recognized in the United States if the grading systems are different than those used in the United States. Others believe that knowledge and credentials of immigrants, particular those from developing countries are incompatible or invalid due to misperceptions of differences in knowledge and experience (Guo 2009). The pursuit of self-employment may also be tied to the obstacles to wage or salary employment in the job market, particular for immigrants with lower level of schooling (Mata and Pendakur 1999). All of these individual factors might force immigrants to start their own business.

At a structural level, Stinchcombe (1990) talks about two labor markets, the primary and secondary. People on the primary labor market are often employed by large companies and have contracts with all benefits included. People on the secondary labor market, on the contrary, have few privileges and they might easily find themselves unemployed. One of the main reasons for landing in the secondary labor market can be, "… little opportunity to provide certification that will satisfy an employer with a good job on offer that they can be predicted to do well in that job" (Stinchcombe 1990:270).

Accordingly, early studies of immigrant entrepreneurs in the 20th century found they were typically "necessity entrepreneurs," who created small businesses, often within their own ethnic enclaves, in response to barriers to wage or salary employment (Borjas 1986). More recent studies, e.g., (Achidi Ndofor and Priem 2011; OECD and Hunt 2010) emphasize the extent to which immigrant entrepreneurs voluntarily make use of their unique human and social capital and so may best be characterized as "opportunity entrepreneurs." However, recent work on immigrant entrepreneurship indicates that immigrant business create fewer jobs than those owned by native-born entrepreneurs, though this varies by industry and location and while they offer comparable wages are less likely to offer benefits than businesses owned by the native born (Kerr and Kerr 2018).

Based on this body of research, immigrant entrepreneurship is of central policy interest and a frequent theme in the popular press. Many believe that immigrant founders are an important and under-utilized lever for the revival of U.S. job growth and continued recovery from the Great Recession. (Fairlie and Lofstrom 2015; Kerr and Kerr 2016). In the United States in 2004 immigrants made up 13.2% of the total population

[6] Certification includes both school transcripts and employer references.

but made up 20.6% of the nation's entrepreneurs, owning 3 million businesses yielding $65 billion in annual income (Dheer 2018).

2.4 Socio-economic context and entrepreneurship

Early studies of entrepreneurship tended to focus on the individual characteristics of entrepreneurs, an approach that is inherently limited due to selection bias, focusing on individuals who become entrepreneurs without considering those who do not. These early studies also typically emphasized a single industrial sector, and generally were based on cross-sectional data. These limitations have led to a growing number of studies that view entrepreneurship as an environmentally determined phenomenon (Carree and Thurik 2010; Chell and Karataş-Özkan 2014; Fortunato and Alter 2015; Landström 2005; Shane 1996). Often described as social embeddedness, since the 1980s there has been an increased interest in "… the social structures, processes and mechanisms through which economic actions take place and entrepreneurial outcomes are achieved" (McKeever, Anderson, and Jack 2014).

The importance of social relationships for entrepreneurship implies that entrepreneurial activities will *cluster geographically*, even if this does not economically benefit the individual firm (Sorenson 2018). In a study of the manufacturing sector it was found that apart from local costs and other natural advantages (e.g., proximity to raw materials and transportation routes), the density of small suppliers was critical to the emergence of new firms (Glaeser and Kerr 2009). Another study concluded that the presence of complementary economic activity …"creates externalities that enhance incentives and reduce barriers for new business creation (Delgado, Porter, and Stern 2010).

Analyses of newly arrived immigrants based on U.S. Census data indicates that beginning in the late 1990s economic restructuring played a greater role in the destinations choices of new arrivals than in the previous decade (Liaw and Frey 2007). Further evidence suggests that economic restructuring affects internal labor movements of white collar workers as well as immigrants (Walker, Ellis, and Barff 2016).

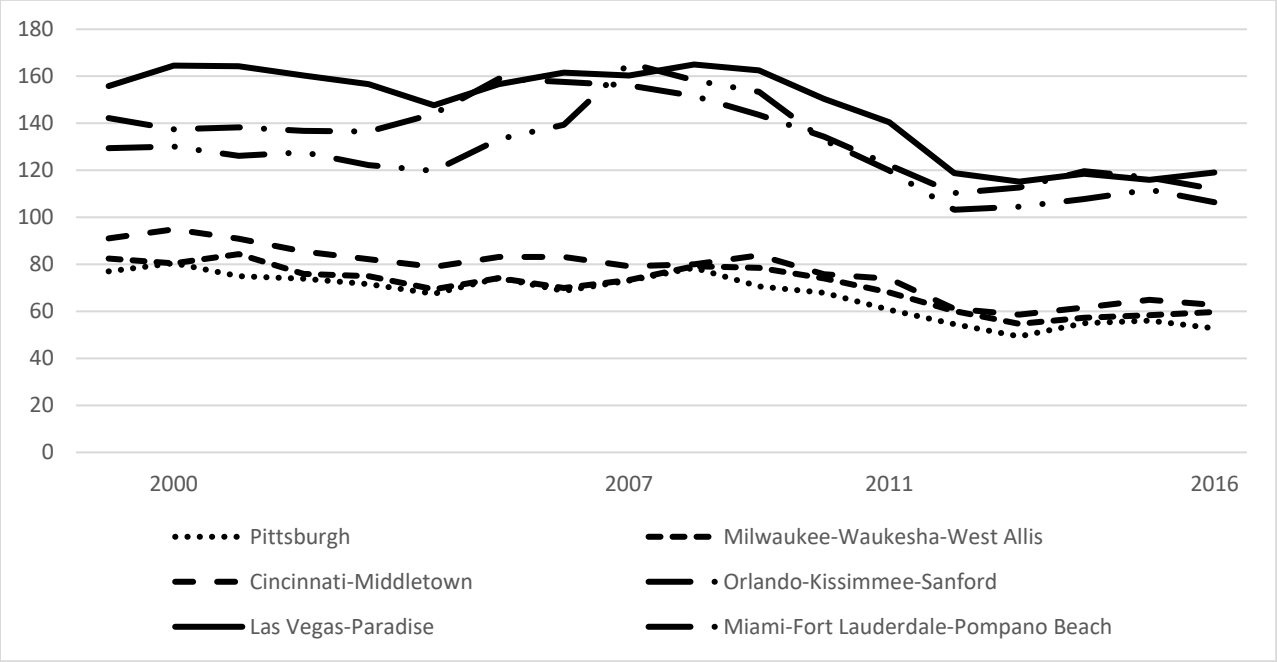
Business cycles have ambiguous effects on the rate of new firm formation. On the one hand economic downturns discourage opportunity entrepreneurship, by reducing the profitability of good ideas. On the other hand, downturns induce increases in the rate of necessity entrepreneurship, where individuals create businesses primarily because of involuntary job loss and the scarcity of vacancies (Thompson 2011). In other words: "… "opportunity" entrepreneurship is pro-cyclical and "necessity" entrepreneurship is counter-cyclical. We also find that "opportunity" vs. "necessity" entrepreneurship is associated with the creation of more growth-oriented businesses" (Fairlie and Fossen 2018). In summary, though there is

general agreement on the positive impact of successful entrepreneurship on job growth; however, evidence suggests that the timing of the impact is region and sector dependent and may take between three and seven years to materialize (Carree and Thurik 2010).

Taken together Figure 1 and Figure 2 demonstrate the social dynamics of entrepreneurship and how these vary with the business cycle and from city to city. In Figure 1 the Kaufmann Foundation's Index of startup density is plotted with each line representing the level of startup density in a specific MSA between 1999 and 2916. Six MSAs are represented: Las Vegas-Paradise, Orlando-Kissimmee-Sanford, and Miami-Fort Lauderdale-Pompano Beach were selected as MSAs with particularly high startup densities and Pittsburgh, Cincinnati-Middletown, and Milwaukee-Waukesha-West Allis were identified as MSAs with low rates of startup density. The other thirty-four MSAs on the Kaufmann Index fell between these bounds with their figures for startup density following a similar path over time. Two trends stand out in this figure: 1) a gradual *decrease over time* in startup density for all MSAs, and 2) each MSA tends to follow its own unique trajectory over time: those with lower levels of startup density in 1999 tend to have low levels in 2016, while those with higher levels of startup density in 1999 tend to also have higher levels in 2016. The MSA with the highest startup density in 1999 and 2016 is the Las Vegas-Paradise MSA, while Pittsburgh is the MSA with lowest startup density at both points in time.

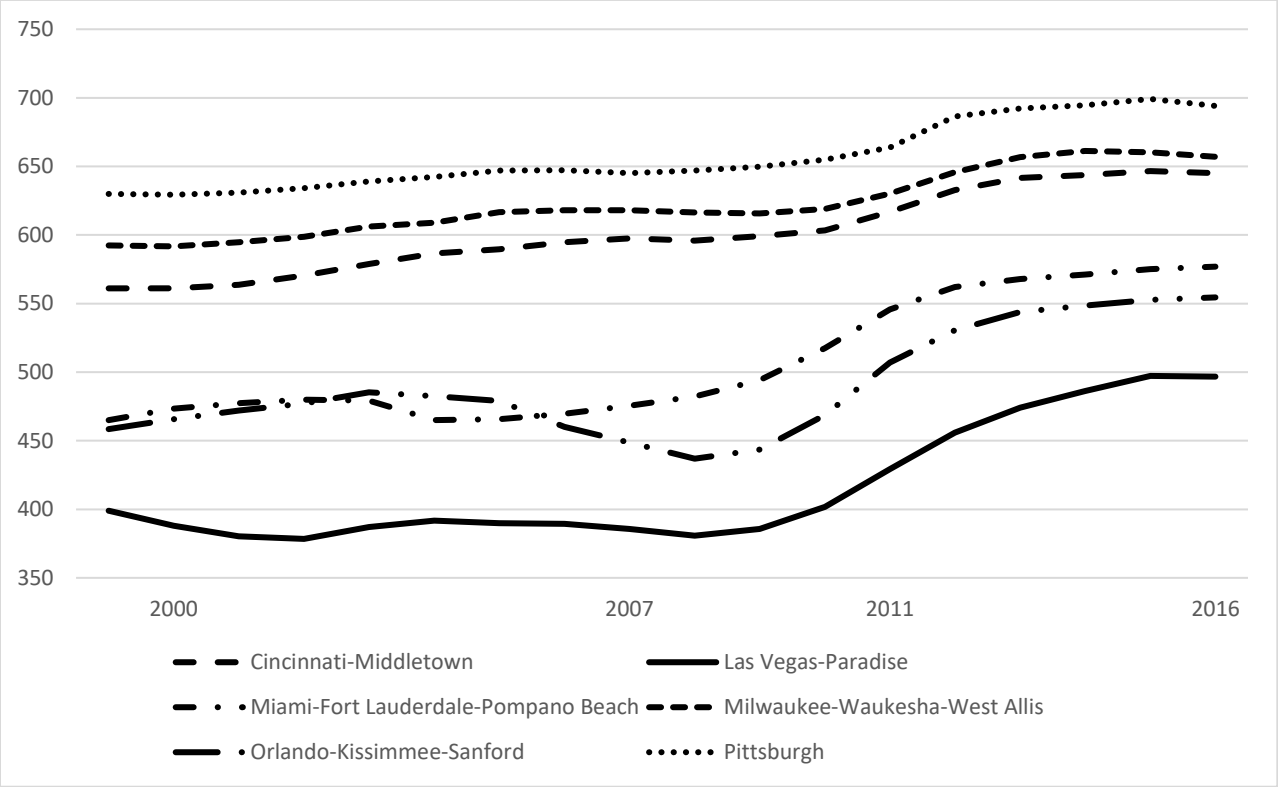
To appreciate the dynamics of the small business environment at the local level we can compare Figure 1 to Figure 2. Figure 2 offers a similar graph based on the Kauffman Established Small Business Density Index (KESBDI). The KESBDI in each MSA is based on the number of businesses five years old and older with fewer than fifty employees, normalized by MSA population. In Figure 2 there are also two broad trends: 1) the established small business density is *increasing over time*, and 2) each MSA continues to follow its own trajectory. However, in this case the ranking of the MSAs changes compared to Figuer1. In fact, Pittsburgh is now the MSA with the highest ranking and Las Vegas-Paradise has the lowest ranking. Taking the two figures together, on the one hand, Las Vegas-Paradise is an MSA with a high degree of small business startups, but also a relatively low level of small businesses that survive at least five years. Pittsburgh on the other hand, is characterized by a low level of small business startups, but relatively many of these survive for five years or longer. Thinking of the economic context for entrepreneurship: one is an environment of small business churn and the other one of relative stability.

Figure 1: Startup Density by MSA by Year



Note: *The number of businesses five years old and or with less than 50 employees, normalized by population

Figure 2: Established Small Business Density by Year



Note: * The number of businesses five years old and or with less than 50 employees, normalized by population

3. Research Questions and Hypotheses

Building on the existing literature the research presented in this paper addresses the question of how socio-economic characteristics, including but not limited to age, sex, income and educational background, influence entrepreneurship, particularly immigrant entrepreneurship at the metropolitan level. Based on the holistic nature of labor markets, immigrant entrepreneurship ought not be studied in isolation but rather must include the native-born population, as well as working for wages or salary, unemployment, and being outside the labor market as alternatives to entrepreneurship (Carree and Thurik 2010). In addition, the analyses distinguish between naturalized citizens and non-citizens as they experience the labor market in very different ways, as well as between unincorporated self-employment and incorporated self-employment as proxies for necessity and opportunity entrepreneurship.

Given the modelling approach used and overall complexity of the research question, three specific hypotheses are implied

Foreign Born and self-employment

H1: Foreign born are more likely to be self-employed than the native born.

H2: Foreign born are more likely to be unincorporated self-employed than the native born.

H3: Foreign born are less likely to be incorporated self-employed than the native born.

4. Data and Methods

4.1 Data Description

Table 1 presents the descriptive statistics of data. MSA-level data used in this paper is aggregated from individual level data from the 2000 decennial census and the 2007, 2011, and 2017 American Community surveys[7] downloaded from the IPUMS USA. Using this data, a series of analyses using fixed-effect models are conducted on 290 metropolitan areas[8] in the United States. Census data are used to account for MSA-level aggregates of individual characteristics associated with entrepreneurship as well-established in the

[7] The decennial census data is the 5% sample, the 2011 and 2017 data are five-year pooled data (2011-2007 and 2017-2013 respectively), and the 2007 data is three-year pooled data (2007-2005). All data were downloaded from the IPUMS USA database: Steven Ruggles, Sarah Flood, Ronald Goeken, Josiah Grover, Erin Meyer, Jose Pacas and Matthew Sobek. IPUMS USA: Version 9.0 [dataset]. Minneapolis, MN: IPUMS, 2019. https://doi.org/10.18128/D010.V9.0

[8] A list of metro areas is provided in the Appendix.

literature review above. These include but are not limited to age, gender, citizenship status, education attainment, employment status, household income, English speaking proficiency, home ownership status. Specifically, this aggregated dataset consists of 32 variables that depict the socio-demographic composition of each metropolitan area. The analysis differentiates citizenship by foreign-born population and native-born population because the census data does not allow for further status distinctions among foreign born populations, such as between those with legal permanent residency, temporary residents, or the unauthorized. The analysis counts those who self-reported that they "speak only English" or "Speak English well or very well" as the population "who are proficient in English". In terms of educational attainment, the analysis distinguishes between those with a Bachelor's degree or higher and those without lower levels of educational attainment.

Given the conceptual complexity associated with entrepreneurship and the fact that this cannot be captured with data such as the decennial census and the ACS, self-employment will be used as a proxy for entrepreneurship. Further, the Census data breaks down self-employment between unincorporated self-employment and incorporated self-employment; the analyses use the former to represent necessity self-employment and the latter as an indicator of opportunity self-employment, to capture the important distinction between those for whom self-employment is a last resort and those who purposefully enter self-employment as a career improvement betterment strategy.

With unincorporated and incorporated self-employment as proxies for necessity and opportunity self-employment, we are able to examine the forces that driving self-employment and account for certain aspects of trends in self-employment patterns by looking at repeated cross-sections over time, in this case for the years 2000, 2007, 2011, and 2017, at the aggregate level. Census data are used to account for individual characteristics associated with entrepreneurship as well-established in the literature. These include gender and education, where the latter distinguishes between those with a Bachelor's degree or higher and those without lower levels of educational attainment.

Using the greatest level of disaggregation available in the Census data, the analyses differentiates citizens by birth[9], naturalized citizens, and non-citizens. The Census data does not allow for further status distinctions among non-citizens, such between those with legal permanent residency, temporary residents, or the unauthorized. In addition, to consider the extent to which migration within the United States is

[9] Citizens by birth includes those who were born in the United States and its territories, as well as those born elsewhere with at least one parent who is a U.S. citizen.

associated with entrepreneurship, data on whether an individual moved to their current state of residence in the past year.[10]

Given the conceptual complexity associated with entrepreneurship and the fact that this cannot be captured with data such as the decennial census and the ACS, self-employment will be used as a proxy for entrepreneurship. Further, the Census data breaks down self-employment between unincorporated self-employment and incorporated self-employment; the analyses use the former to represent necessity self-employment and the latter as an indicator of opportunity self-employment, to capture the important distinction between those for whom self-employment is a last resort and those who purposefully enter self-employment.

[10] This information was obtained in a different way in the 2000 decennial Census (moved in the past five years) than in the 2007, 2011, 2017 ACS questionnaire (moved in the past year).

Table 1: Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max
Dependent variables				
Self-employment (total) (%)	9.32	2.15	4.94	18.47
Self-employment, incorporated (%)	2.99	1.05	1.31	9.82
Self-employment, not incorporated (%)	6.33	1.58	3.14	13.43
Independent variable				
Foreign born population (%)	12.50	7.30	0.59	40.12
Control variables				
Female population (%)	50.83	1.09	42.19	53.09
Population aged 16 to 65 (%)	65.97	2.96	52.64	75.98
Log of population size	12.95	1.13	11.48	18.05
Total population (1000)	1148.09	4502.16	97.23	69118.23
Unemployment rate	7.08	2.21	1.59	16.11
Household median income ($1000)	58.39	12.42	27.00	122.66
Household mean income ($1000)	386.91	193.34	98.12	1696.86
Homeowner (%)	68.88	6.20	48.29	85.17
Proficient in English (%)	87.48	6.78	42.08	94.46
Education (high school) %	66.80	6.64	36.42	83.76
Education (Bachelor) %	18.31	5.91	6.50	38.39

Note: N = 1,052. Std. Dev.=Standard deviation, Min=Minimum, Max=Maximum.

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deally, even with unincorporated and incorporated self-employment as proxies for necessity and opportunistic self-employment, one would have to have longitudinal data to consider one's employment status—self-employed, employed working for someone else, or unemployed—prior to the observed employment status. Individual level Census data does not include such longitudinal information. However, at the aggregate level we account for certain aspects of trends in self-employment patterns by looking at repeated cross-sections over time, in this case for the years 2000, 2007, 2011, and 2017. These cross sections were chosen to represent key macro-economic moments in the U.S. economy: the bursting of the dot.com bubble (2000), the run up to the Great Recession (2007), the beginning of the recovery from the Great Recession (2011), and a U.S. economy in a period of sustained economic growth (2017).

Table 1 also demonstrates that there is wide variation in each of the independent variables used in the regression results below. Most notably, the foreign-born population among our observations ranges from under 1 percent to over 40 percent and there is a high degree of variation in each of the control variables used in our models.

4.2 Methodological Approach

To determine if the foreign-born population is more entrepreneurial than the native born, we estimate the following equation (i) using a two-way fixed effects (FE) specification for our panel dataset:

$$Y_{mt} = \alpha_0 + \beta Foreign\_born_{mt} + \gamma X_{mt} + \delta_m + \mu_t + \varepsilon_{mt} \text{.....(i)}$$

Where Y_{mt} stands for the proportion of self-employment in the US metropolitan statistical area (MSA) *i* in year *t*. The $Foreign\_born_{mt}$ is the percentage of the foreign-born population in MSA *i* in year *t*. X_{mt} is a vector of time-varying characteristics at the MSA-level, including demographic characteristics such as gender and age composition, population size, economic factors such as unemployment rate, household incomes, rate of homeownership, and human capital factors such as educational attainment and English language proficiency level. δ_i and μ_t are the MSA and year fixed effects, respectively. Finallly, ε_{it} is the random error term. By applying the two-way FE method, we capture the within-MSA and within time-period variation to estimate the impact of the foreign-born population on the level of self-employment. While MSA-level FE estimation controls for both observable and unobservable time-invariant factors such as spatial features, historical factors, and other metropolitan area features that may impact self-employment rates, the year FE effect captures all time-trends, such as a financial crisis, that may also influence rates of self-employment. Our model estimates are based on the 1,052 of U.S. metro areas over four different times

with 259observations in 2000, 266 observations in 2007, 266 observations in 2011, and 261 observations in 2017, as metro areas defined by the U.S. Census Bureau change slightly over time.

5. **Results**

Descriptive statistics for our sample of metro areas, combined across all four time periods are presented in Table 1. Looking at total self-employment across all observations just over 9% of the labor force is engaged in self-employment, but there is considerable variation ranging from just under 5% to over 18% in specific metro areas in a given year. Just under one-third (2.99%) of workers are found in incorporated self-employment and just over two-thirds (6.33%) in non-incorporated self-employment. Here, too, we see even greater variation across observations as the maximum proportion for incorporated self-employment is more than seven times higher than the minimum, while the maximum for un-incorporated self-employment is more than four times higher than the lowest percentage.

5.1 Determinants of Metropolitan Self-Employment

Table 2 presents the FE estimates of the effects of the foreign-born population and control variables on the self-employment rate. Figure 3 presents the marginal effects of foreing-born population. Both the self-employment and foreign-born population are measured in percentage scale (i.e., percentage of foreign-born population). So, the estimated coefficient is a percentage point estimate of the impact of the foreign-born population on the proportion self-employed, i.e., in model 2.1 a one percentage point increase in the foreign-born population leads to a rise in self-employment by 0.05 percentage point. The size of the coefficient increases up to 0.10 percentage points (model 2.3) as we control for additional variables and correct for omitted biases in the subsequent models. To represent what this means for an MSA, we can extend this interpretation, consider that the mean values of the foreign-born population and self-employment are 8.67 and 9.32, respectively, in Table 1. So, a one percentage point increase in the foreign-born population, for example moving from 8.67 to 9.67, will increase self-employment from 9.32 to 9.42 based on the estimates in model 2.3.

Note that each model specification includes both MSA and year fixed effects, which means observable and unobservable MSA factors that are time-invariant and any cyclical trends that may have an influence on self-employment rate in an MSA have been controlled. We also controlled for several time-varying MSA-level factors that are likely to influence entrepreneurship development. While population size and age group composition do not matter for the self-employment rate, the proportion of the female population is

associated with higher self-employment rate. However, statistical significance disappeared for the female population after controlling for interactions of educational attainment and English language proficiency.

While the median household income is negatively associated with self-employment (models 2.3 and 2.4), the unemployment rate is not in any of the models in Table 2. However, as shown later in this section where we separately model unincorporated and incorporated self-employment, the effect of the unemployment rate is likely to depend on whether the self-employment was pursued out of necessity or as an opportunity. Mean household income and homeownership are not statistically significant. English language proficiency, an essential component of human capital, is a statistically significant determinant of self-employment in models 2.3 and 2.4. Although the proportion of residents with a high-school level education is not associated with greater levels of self-employment, the proportion with a bachelor's degree or higher is tied to higher levels of self-employment. The coefficient of human capital measures like English language ability and bachelor's degree is substantially large. However, a combination of higher education and English language proficiency is negatively associated with self-employment, which suggests that concentrations of individuals with both higher education and competence in the English language favors people to be in the traditional labor market, and thus, are negatively associated with self-employment.

Table 2: MSA level fixed effects (FE) estimates (self-employment)

	Model 2.1 Self-employment	Model 2.2 Self-employment	Model 2.3 Self-employment	Model 2.4 Self-employment
Foreign born population (%)	0.048*	0.056**	0.100***	0.078**
	(0.026)	(0.027)	(0.033)	(0.033)
Female population (%)	0.176***	0.161**	0.122*	0.103
	(0.061)	(0.063)	(0.064)	(0.064)
Population aged 16 to 65 (%)	-0.021	-0.009	-0.024	-0.040
	(0.028)	(0.029)	(0.032)	(0.032)
Log of population size	-0.089	0.042	0.023	-0.230
	(0.351)	(0.358)	(0.367)	(0.378)
Unemployment rate		0.027	0.023	0.025
		(0.017)	(0.017)	(0.018)
Household median income		-0.011	-0.017**	-0.021**
($1000)		(0.008)	(0.009)	(0.009)
Household mean income ($1000)		0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)
Homeowner (%)		0.003	-0.001	0.002
		(0.017)	(0.017)	(0.017)
Proficient in English (%)			0.071***	0.126**
			(0.025)	(0.049)
Education (high school) %			-0.003	-0.055
			(0.024)	(0.113)
Education (Bachelor) %			0.050*	0.733***
			(0.029)	(0.260)
English*Bachelor %				-0.008***
				(0.003)
English*High school %				0.001
				(0.001)
Year FE	Yes	Yes	Yes	Yes
MSA FE	Yes	Yes	Yes	Yes
Constant	2.303	0.582	-2.748	-2.776
	(6.222)	(6.615)	(6.832)	(7.128)
Within R^2	0.28	0.29	0.30	0.31
N	1,052	1,052	1,052	1,052

Note: Standard errors are in parenthesis. * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Separate models are presented in Tables 3 and 4, distinguishing between incorporated and non-incorporated, respectively, to consider self-employment as an opportunity or necessity option. Table 3 presents results on incorporated self-employment, while Table 4 presents results on non-incorporated self-employment. We see that the foreign-born population increases self-employment in incorporated sectors in models 3.1 and 3.2. however, the effects disappear as we address omitted variable biases in the subsequent models.

The opposite pattern is found in Table 4 for self-employment in the non-incorporated sectors. After controlling for economic and human capital-related variables, the impact of the foreign-born population became statistically significant. The interpretation of the estimated coefficients in Tables 3 and 4 is identical to the results in Table 2. For example, a one percentage point increase in the foreign-born population leads to a rise in self-employment in non-incorporated sectors by about 0.085 to 0.065 percentage points, as shown in models 4.3 to 4.5 in Table 4. Noteworthy is that for incorporated self-employment the coefficient for the percentage of foreign-born in the fully specified model while positive not significant.

These results suggest that the findings in Table 2 for total self-employment were driven by self-employment in the non-incorporated sectors. Further insights into differences in the processes underlying these two forms of self-employment are suggested by looking at the overall goodness of fit of the models in Tables 3 and 4 and by comparing coefficients for the control variables in models 3.5 and 4.5. The R^2 in the two models—representing the percentage of variation in self-employment that can be explained by the models—is relatively similar: 0.30 for model 3.5 and 0.27 for model 4.5. In model 3.5, looking at incorporated self-employment, this relationship is driven primarily by the fixed effects for MSA and year. Here, not only is the percentage of foreign-born not significant but among the control variables, only the unemployment rate and the percentage of not-incorporated are significant. Looking at model 4.5, by contrast, not only is there a positive and significant relationship with the percentage of foreign-born in an MSA, but also household median income, as well as English proficiency and the percentage of residents with a Bachelor's degree or higher, are also significantly related to not-incorporated self-employment.

Table 3: MSA level fixed effects (FE) estimates (self-employment, incorporated)

	Model 3.1	Model 3.2	Model 3.3	Model 3.4	Model 3.5
	Self-employment, incorporated				
Foreign born population (%)	0.046***	0.035**	0.015	0.016	0.022
	(0.016)	(0.016)	(0.020)	(0.020)	(0.020)
Female population (%)	0.064*	0.049	0.048	0.048	0.053
	(0.037)	(0.038)	(0.039)	(0.039)	(0.039)
Population aged 16 to 65 (%)	-0.022	-0.020	-0.011	-0.008	-0.011
	(0.017)	(0.018)	(0.019)	(0.019)	(0.019)
Log of population size	0.228	0.242	0.335	0.394*	0.336
	(0.213)	(0.216)	(0.222)	(0.231)	(0.230)
Unemployment rate		0.037***	0.034***	0.031***	0.030***
		(0.010)	(0.011)	(0.011)	(0.011)
Household median income ($1000)		0.006	0.002	0.002	-0.000
		(0.005)	(0.005)	(0.005)	(0.005)
Household mean income ($1000)		-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
Homeowner (%)		-0.009	-0.009	-0.008	-0.007
		(0.010)	(0.010)	(0.010)	(0.010)
Proficient in English (%)			-0.023	-0.048	-0.032
			(0.015)	(0.030)	(0.030)
Education (high school) %			-0.004	-0.063	-0.062
			(0.015)	(0.069)	(0.068)
Education (Bachelor) %			0.029*	0.097	0.156
			(0.017)	(0.159)	(0.159)
English*Bachelor %				-0.001	-0.001
				(0.002)	(0.002)
English*High school %				0.001	0.001
				(0.001)	(0.001)
Self-employment, not incorporated					-0.093***
					(0.025)
Year FE	Yes	Yes	Yes	Yes	Yes
MSA FE	Yes	Yes	Yes	Yes	Yes
Constant	-2.442	-1.595	-1.258	-0.004	-0.261
	(3.772)	(3.991)	(4.141)	(4.360)	(4.325)
Within R^2	0.27	0.28	0.29	0.29	0.30
N	1,052	1,052	1,052	1,052	1,052

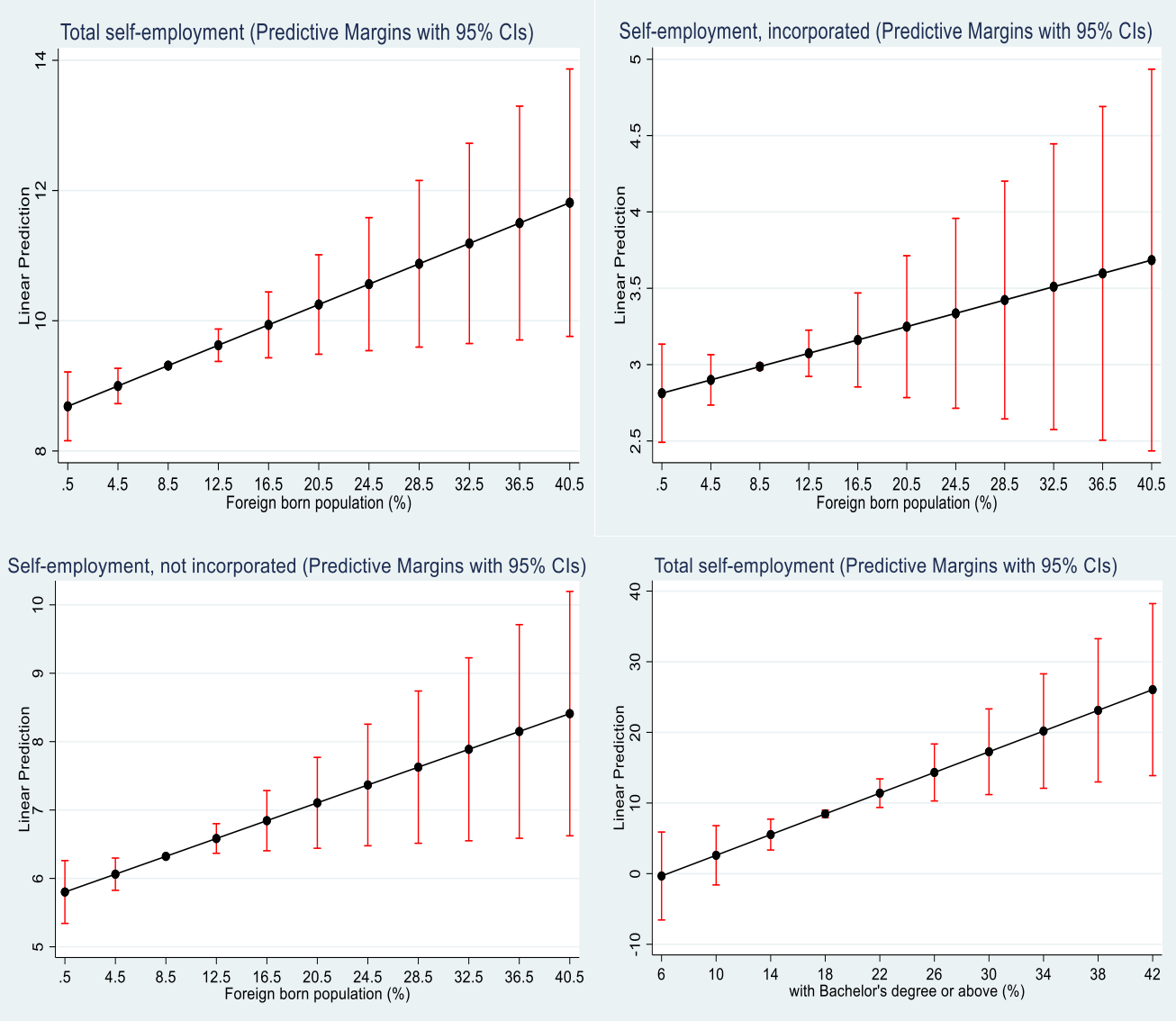
Note: Standard errors are in parenthesis. * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Table 4: MSA level fixed effects (FE) estimates (self-employment, non-incorporated)

	Model 4.1	Model 4.2	Model 4.3	Model 4.4	Model 4.5
	Self-employment, non-incorporated				
Foreign born population (%)	0.002	0.022	0.085***	0.062**	0.065**
	(0.023)	(0.024)	(0.029)	(0.029)	(0.029)
Female population (%)	0.111**	0.112**	0.075	0.055	0.064
	(0.054)	(0.056)	(0.056)	(0.056)	(0.055)
Population aged 16 to 65 (%)	0.000	0.011	-0.012	-0.032	-0.034
	(0.025)	(0.026)	(0.028)	(0.028)	(0.028)
Log of population size	-0.317	-0.200	-0.312	-0.623*	-0.548*
	(0.310)	(0.317)	(0.323)	(0.331)	(0.329)
Unemployment rate		-0.010	-0.010	-0.006	-0.000
		(0.015)	(0.015)	(0.016)	(0.016)
Household median income ($1000)		-0.017**	-0.020***	-0.023***	-0.023***
		(0.007)	(0.008)	(0.008)	(0.008)
Household mean income ($1000)		0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)
Homeowner (%)		0.012	0.008	0.010	0.008
		(0.015)	(0.015)	(0.015)	(0.014)
Proficient in English (%)			0.094***	0.174***	0.165***
			(0.022)	(0.043)	(0.043)
Education (high school) %			0.001	0.008	-0.004
			(0.021)	(0.099)	(0.098)
Education (Bachelor) %			0.021	0.636***	0.655***
			(0.025)	(0.228)	(0.226)
English*Bachelor				-0.007***	-0.007***
				(0.003)	(0.003)
English*High school				-0.000	0.000
				(0.001)	(0.001)
Self-employment, incorporated					-0.191***
					(0.052)
Year FE	Yes	Yes	Yes	Yes	Yes
MSA FE	Yes	Yes	Yes	Yes	Yes
Constant	4.744	2.177	-1.490	-2.772	-2.773
	(5.509)	(5.855)	(6.017)	(6.249)	(6.198)
R^2	0.21	0.22	0.24	0.26	0.27
N	1,052	1,052	1,052	1,052	1,052

Note: Standard errors are in parenthesis. * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Figure 3: Marginal effect of foreign-born population on self-employment



5.2 Comparing the Impact of Foreign-born Population between Large and Small MSA

To understand if the benefits of self-employment that result from an increasing share of the foreign-born population are evenly distributed across the USA we created four groups of MSAs by the distribution of foreign-born population: lower = lowest 25%, lower medium = 25% to 50%, upper-medium = 50% to 75%, and higher = highest 25% of MSA. We compared the larger three groups with the lower group by interacting the percentage of the foreign-born population with the group dummy and see, compared to MSAs with the lowest share of the foreign-born population, that the upper three groups of MSAs were associated with higher levels of self-employment. This is true for total self-employment and self-employment in the incorporated sectors (model 5.2 and 5.4), while in the not-incorporated sector, only MSAs with the largest share of foregin-born have a positive and significant impact (model 5.6). These results indicate that along with a consistent increase in the rate of self-employment as the foreign-born population increases, there may also be qualitative shifts in the likelihood of certain types of self-employment as the proportion of foreign-born crosses certain threshholds. Such findings would be consistent with the enthnic enclave and ethnic economy discussion, though the delineation of appropriate threshholds warrants further study.

From a policy perspective, these results suggest that the United States did not enjoy the full benefits of the foreign-born population in terms of self-employment by not evenly allocating the immigrant population across the country. This insight may offer guidance for future policies aimed as redistributing the immigrant population evenly across the United States to maximize the benefits of self-employment. Figure 3 shows how as the number of MSAs with larger shares of foreign-born diminish the precision of the coefficients of how migrants impact self-employment sequentially drops but does not affect the overall reliability and robustness of our estimates.

Table 5: Comparing the impact of the foreign-born population between large and small MSA

	5.1	5.2	5.3	5.4	5.5	5.6
	Total self-employment	Total self-employment	Self-employment (incorporated)	Self-employment (incorporated)	Self-employment (not incorporated)	Self-employment (not incorporated)
Foreign born population (%)	0.100***	-0.192**	0.023	-0.148**	0.088***	-0.078
	(0.033)	(0.096)	(0.020)	(0.058)	(0.029)	(0.085)
Female population (%)	0.122*	0.095	0.055	0.047	0.084	0.061
	(0.064)	(0.064)	(0.038)	(0.038)	(0.056)	(0.056)
Population aged 16 to 65 (%)	-0.024	-0.038	-0.012	-0.021	-0.015	-0.023
	(0.032)	(0.032)	(0.019)	(0.019)	(0.028)	(0.028)
Log of population size	0.023	-0.226	0.306	0.138	-0.247	-0.367
	(0.367)	(0.376)	(0.221)	(0.227)	(0.321)	(0.330)
Unemployment rate	0.023	0.019	0.033***	0.031***	-0.004	-0.006
	(0.017)	(0.017)	(0.010)	(0.010)	(0.015)	(0.015)
Household median income ($1000)	-0.017**	-0.020**	0.001	0.000	-0.019**	-0.022***
	(0.009)	(0.009)	(0.005)	(0.005)	(0.008)	(0.008)
Household mean income ($1000)	0.000	0.000	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Homeowner (%)	-0.001	-0.005	-0.008	-0.012	0.006	0.005
	(0.017)	(0.017)	(0.010)	(0.010)	(0.015)	(0.015)
Proficient in English (%)	0.071***	0.068***	-0.014	-0.014	0.089***	0.086***
	(0.025)	(0.025)	(0.015)	(0.015)	(0.022)	(0.022)
Education (high school) %	-0.003	0.008	-0.004	0.003	-0.000	0.006
	(0.024)	(0.025)	(0.015)	(0.015)	(0.021)	(0.022)
Education (Bachelor) %	0.050*	0.057**	0.031*	0.031*	0.026	0.035
	(0.029)	(0.029)	(0.017)	(0.017)	(0.025)	(0.025)
Foreign-born (four categories 1 to 4)		-0.625***		-0.176*		-0.523***
		(0.172)		(0.104)		(0.151)
Lower medium foreign-born population		-0.321		-0.432*		0.032
		(0.374)		(0.225)		(0.328)
Upper medium foreign-born population		0.161		-0.509*		0.623
		(0.433)		(0.261)		(0.380)
Lower medium group*foreign-born population %		**0.246****		**0.162****		**0.124**
		(0.106)		(0.064)		(0.093)
Upper medium group*foreign-born population %		**0.270*****		**0.204*****		**0.113**
		(0.098)		(0.059)		(0.087)
Higher group*foreign-born population %		**0.329*****		**0.168*****		**0.209****
		(0.096)		(0.058)		(0.084)
Self-employment (not incorporated)			-0.092***	-0.096***		

			(0.025)	(0.025)		
Self-employment (incorporated)					-0.195***	-0.204***
					(0.053)	(0.053)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
MSA FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.748	4.378	-1.395	2.329	-1.735	2.697
	(6.832)	(7.084)	(4.106)	(4.263)	(5.967)	(6.207)
R^2	0.30	0.31	0.30	0.31	0.25	0.26
N	1,052	1,052	1,052	1,052	1,052	1,052

Note: Standard errors are in parenthesis. * $p<0.1$; ** $p<0.05$; *** $p<0.01$. The comparison group is lower group of MSA by foreign born population.

6. Conclusion and Discussion

Comparing our results with existing evidence corroborates that our estimates are in line with the literature, but we provide a more disaggregated picture by conditioning on both aggregated individual-level data and environmental characteristics. From earlier literature, we calculated the propensity of being self-employed by native and foreign-born population using Fairlie & Lofstrom (2015) reported estimates from the 2006-10 ACS. They report that 18.2% of all business owners are immigrants, while they constitute only 16.3% of the total U.S. workforce. From their estimates, we see that the propensity of being self-employed for a native person is 44.17%, and for a foreign-born person is 55.83%, which implies a foreign-born person has approximately 11.6 percentage points higher propensity of being self-employed than a native person. Our own evidence shows that a one percentage point increase in the foreign-born population will increase self-employment by approximately 0.1 percentage point (Table 2). If we translate our results to the propensity of being self-employed by native and foreign-born population, we see the difference is the foreign-born population has approximately 5% higher propensity of being self-employed.

So, our findings are within the bounds of earlier coefficients in the literature. This difference may be due to the fact that estimates reported in Fairlie & Lofstrom (2015) represent raw averages that do not account for other important differences between native and foreign-born population such as education, gender, unemployment rate, family income, and others.

However, we must place this evidence in context that our measurement of migrant entrepreneurship appears lower than earlier findings. Indeed, differences in the rate of being self-employed by native and foreign-born population is driven also by a trade-off between self-employment opportunities. For example, Fairlie & Meyer (2003) found, using 1980 and 1990 Census microdata, that immigration has a large negative effect on the probability of self-employment among native non-blacks. Using various estimation techniques and measures of self-employment and immigration, their first-difference estimates indicate that from 0.37 to 0.85 self-employed native men and from 0.09 to 0.19 self-employed native women are displaced by each self-employed immigrant.

On the other hand, it is necessary to keep in mind that immigrants encounter much grater challenges than natives to start a new business, either incorporated or non-incorporated. Therefore, we observe fewer entrepreneurial activities among immigrants than their true potentials. Immigrants have limited access to capital, which takes different forms, such as financial, social, and cultural capital, all of which are important for initiating business. In addition to market discrimination, immigrants face limited access to necessary financial resources for new businesses due to little to no credit history and social networks as mentioned

earlier in the paper. Similarly, economic crises including the current COVID-19 pandemic disproportionately impact businesses of immigrants and they face more hurdles to recover from the crises (Fairlie 2020a).

We make several contributions relative to earlier studies in terms of uncovering the dynamics and nature of entrepreneurship in the US economy. First, we provide longitudinal evidence about self-employment across metropolitan areas using fixed effects models, and therefore our estimations are not driven by unobserved heterogeneity that may be a confounding factor to the extent that metropolitan areas may be both magnets for foreigners and entrepreneurs, even foreign-born not particularly prone to self-employment. As mentioned above, consistent with earlier studies we find a higher likelihood of entrepreneurship among migrants that is not driven by unobserved time-invariant differentials across locations.

Second, we disaggregate entrepreneurship according to whether businesses are incorporated or not. We think of corporations as embodying opportunity entrepreneurship and unincorporated self-employment as reflecting necessity entrepreneurship. Indeed, we find that across MSAs higher unemployment is associated with higher opportunity entrepreneurship and lower median income with higher necessity entrepreneurship. Overall migrant entrepreneurs tend to focus on necessity entrepreneurship and for them self-employment may be an alternative due to barriers in labor markets, e.g. due to language difficulties or foreign credentials. At the same time, there is a narrative relating to the ability of migrants to undertake new ventures and this may facilitate self-employment, but not in a way that is conducive to incorporation.

Third, we compared immigrants and natives to estimate which group is more entrepreneurial using ACS data at the MSA-level. We found that overall immigrants engage in more entrepreneurial activities. Our results should shed light on the policy debates regarding whether immigrants take away jobs from natives or provide them more jobs. Therefore, policymakers can be less skeptical about the potentially harmful consequences of immigration on native workers; instead, they can make more informed policy decisions that benefit the native born as well as immigrants.

The coefficients for human capital measures, such as English language ability and bachelor's degree, are substantial. However, a combination of higher education and English language proficiency is negatively associated with self-employment, which suggests that concentrations of individuals with both higher education and competence in the English language are associated with employment in established firms. Most highly educated people who also tend to be good at the English language are oriented to rational education systems that do not promote creativity, opportunity recognition, and problem-solving abilities

(Lautenschläger and Haase 2011). Moreover, a combination of higher education and proficiency in the English language increases returns from formal employment, and thus, reduces incentives for self-employment (Van Praag, van Witteloostuijn, and van der Sluis 2013).

A higher median income is negatively associated with the self-employment rate in the non-incorporated areas, but it has no significant correlation with incorporated self-employment - a higher concentration of self-employment in the non-incorporated areas lowers the median household income (Summers 2015). Higher unemployment is positively associated with higher incorporated self-employment rates, while it is not significant for unincorporated self-employment.

COVID-19 has hit small businesses especially hard. Fairlie (2020b) assesses changes during the pandemic in the number of active small businesses in the United States with nationally representative data from the April 2020 CPS, the first data fully capturing early COVID-19 effects in the U.S.. The number of active business owners dropped by 3.3 million or 22 percent over the crucial two-month window from February to April 2020 – the largest on record for a two-month spell. Losses affected virtually all sectors, including incorporated firms. Among these, immigrant business owners suffered losses of 36 percent. Losses for African-American, Latinx and Asian business owners were respectively 45, 32 percent, and 26 percent. These large early-stage losses to small businesses indicate substantial longer-run policy challenges. First, the overall impact on small and medium enterprises will exacerbate inequality as large firms' consolidation of monopolistic power concentrates wealth further. Second, there can be a slowdown in job creation as medium-sized firms account for much employment growth. Third, the businesses taking the brunt of the financial hit with mounting profit losses are owned by immigrants and minorities whose income generation capacity has been severely diminished. These businesses are disproportionately located in low-income areas and when they are forced to shut down there are ripple effects across communities. An important aspect in early fiscal stimulus packages in response to COVID-19 was to furnish liquidity to small firms, and it will be key to sustain this efforts in a way that helps immigrant and minority entrepreneurs navigate the pandemic so that business networks may survive and thrive after the crisis.

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Appendix A: List of Metropolitan Areas

Akron, OH	Greensboro-High Point, NC	Pensacola-Ferry Pass-Brent, FL
Albany-Schenectady-Troy, NY	Greenville, NC	Peoria, IL
Albuquerque, NM	Greenville-Anderson-Mauldin, SC	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD
Alexandria, LA	Gulfport-Biloxi-Pascagoula, MS	Phoenix-Mesa-Scottsdale, AZ
Allentown-Bethlehem-Easton, PA-NJ	Hammond, LA	Pittsburgh, PA
Altoona, PA	Hanford-Corcoran, CA	Pittsfield, MA
Amarillo, TX	Harrisburg-Carlisle, PA	Portland-South Portland, ME
Anchorage, AK	Harrisonburg, VA	Portland-Vancouver-Hillsboro, OR-WA
Ann Arbor, MI	Hartford-West Hartford-East Hartford, CT	Port St. Lucie, FL
Anniston-Oxford-Jacksonville, AL	Hattiesburg, MS	Prescott, AZ
Asheville, NC	Hickory-Lenoir-Morganton, NC	Providence-Warwick, RI-MA
Athens-Clarke County, GA	Hilton Head Island-Bluffton-Beaufort, SC	Provo-Orem, UT
Atlanta-Sandy Springs-Roswell, GA	Homosassa Springs, FL	Pueblo, CO
Atlantic City-Hammonton, NJ	Houma-Thibodaux, LA	Punta Gorda, FL
Auburn-Opelika, AL	Houston-The Woodlands-Sugar Land, TX	Racine, WI
Augusta-Richmond County, GA-SC	Huntsville, AL	Raleigh, NC
Austin-Round Rock, TX	Indianapolis-Carmel-Anderson, IN	Reading, PA
Bakersfield, CA	Iowa City, IA	Redding, CA
Baltimore-Columbia-Towson, MD	Ithaca, NY	Reno, NV
Bangor, ME	Jackson, MI	Richmond, VA
Barnstable Town, MA	Jackson, MS	Riverside-San Bernardino-Ontario, CA
Baton Rouge, LA	Jackson, TN	Roanoke, VA
Battle Creek, MI	Jacksonville, FL	Rochester, NY
Beaumont-Port Arthur, TX	Jacksonville, NC	Rockford, IL
Bellingham, WA	Janesville-Beloit, WI	Rocky Mount, NC
Bend-Redmond, OR	Jefferson City, MO	Sacramento--Roseville--Arden-Arcade, CA
Billings, MT	Johnstown, PA	Saginaw, MI
Binghamton, NY	Joplin, MO	St. Cloud, MN
Birmingham-Hoover, AL	Kalamazoo-Portage, MI	St. George, UT
Bismarck, ND	Kankakee, IL	St. Joseph, MO-KS
Blacksburg-Christiansburg-Radford, VA	Kansas City, MO-KS	St. Louis, MO-IL
Bloomington, IL	Kennewick-Richland, WA	Salinas, CA
Bloomington, IN	Killeen-Temple, TX	Salisbury, MD-DE
Boise City, ID	Kingsport-Bristol-Bristol, TN-VA	Salt Lake City, UT
Boston-Cambridge-Newton, MA-NH	Knoxville, TN	San Angelo, TX
Bremerton-Silverdale, WA	La Crosse-Onalaska, WI-MN	San Antonio-New Braunfels, TX
Bridgeport-Stamford-Norwalk, CT	Lafayette, LA	San Diego-Carlsbad, CA
Brownsville-Harlingen, TX	Lafayette-West Lafayette, IN	San Francisco-Oakland-Hayward, CA
Buffalo-Cheektowaga-Niagara Falls, NY	Lake Charles, LA	San Jose-Sunnyvale-Santa Clara, CA
Burlington, NC	Lake Havasu City-Kingman, AZ	San Luis Obispo-Paso Robles-Arroyo Grande, CA
Burlington-South Burlington, VT	Lakeland-Winter Haven, FL	Santa Cruz-Watsonville, CA
Canton-Massillon, OH	Lancaster, PA	Santa Fe, NM
Cape Coral-Fort Myers, FL	Lansing-East Lansing, MI	Santa Maria-Santa Barbara, CA
Champaign-Urbana, IL	Laredo, TX	Santa Rosa, CA
Charleston, WV	Las Cruces, NM	Scranton--Wilkes-Barre--Hazleton, PA
Charleston-North Charleston, SC	Las Vegas-Henderson-Paradise, NV	Seattle-Tacoma-Bellevue, WA
Charlotte-Concord-Gastonia, NC-SC	Lawrence, KS	Sebastian-Vero Beach, FL
Charlottesville, VA	Lebanon, PA	Sheboygan, WI
Chattanooga, TN-GA	Lewiston-Auburn, ME	Shreveport-Bossier City, LA
Chicago-Naperville-Elgin, IL-IN-WI	Lima, OH	Spartanburg, SC
Chico, CA	Lincoln, NE	Spokane-Spokane Valley, WA
Cincinnati, OH-KY-IN	Little Rock-North Little Rock-Conway, AR	Springfield, IL
Clarksville, TN-KY	Los Angeles-Long Beach-Anaheim, CA	Springfield, MA
Cleveland-Elyria, OH	Louisville/Jefferson County, KY-IN	Springfield, MO
Coeur d'Alene, ID	Lubbock, TX	Springfield, OH
College Station-Bryan, TX	Lynchburg, VA	State College, PA
Colorado Springs, CO	Madera, CA	Stockton-Lodi, CA
Columbia, MO	Manchester-Nashua, NH	Sumter, SC
Columbia, SC	Mansfield, OH	Syracuse, NY
Columbus, OH	McAllen-Edinburg-Mission, TX	Tallahassee, FL
Corpus Christi, TX	Medford, OR	Tampa-St. Petersburg-Clearwater, FL
Dallas-Fort Worth-Arlington, TX	Memphis, TN-MS-AR	Terre Haute, IN
Daphne-Fairhope-Foley, AL	Merced, CA	Toledo, OH
Davenport-Moline-Rock Island, IA-IL	Miami-Fort Lauderdale-West Palm Beach, FL	Topeka, KS

Dayton, OH	Michigan City-La Porte, IN	Trenton, NJ
Decatur, AL	Midland, TX	Tucson, AZ
Decatur, IL	Milwaukee-Waukesha-West Allis, WI	Tuscaloosa, AL
Deltona-Daytona Beach-Ormond Beach, FL	Minneapolis-St. Paul-Bloomington, MN-WI	Tyler, TX
Denver-Aurora-Lakewood, CO	Mobile, AL	Urban Honolulu, HI
Des Moines-West Des Moines, IA	Modesto, CA	Utica-Rome, NY
Detroit-Warren-Dearborn, MI	Monroe, LA	Valdosta, GA
Dover, DE	Monroe, MI	Vallejo-Fairfield, CA
Durham-Chapel Hill, NC	Montgomery, AL	Vineland-Bridgeton, NJ
East Stroudsburg, PA	Morgantown, WV	Virginia Beach-Norfolk-Newport News, VA-NC
Eau Claire, WI	Muncie, IN	Visalia-Porterville, CA
El Centro, CA	Muskegon, MI	Waco, TX
Elizabethtown-Fort Knox, KY	Myrtle Beach-Conway-North Myrtle Beach, SC-NC	Washington-Arlington-Alexandria, DC-VA-MD-WV
Elkhart-Goshen, IN	Napa, CA	Wausau, WI
El Paso, TX	Naples-Immokalee-Marco Island, FL	Wenatchee, WA
Erie, PA	Nashville-Davidson--Murfreesboro--Franklin, TN	Wichita, KS
Eugene, OR	New Haven-Milford, CT	Wichita Falls, TX
Evansville, IN-KY	New Orleans-Metairie, LA	Williamsport, PA
Farmington, NM	New York-Newark-Jersey City, NY-NJ-PA	Wilmington, NC
Fayetteville, NC	Niles-Benton Harbor, MI	Winston-Salem, NC
Fayetteville-Springdale-Rogers, AR-MO	North Port-Sarasota-Bradenton, FL	Worcester, MA-CT
Flagstaff, AZ	Norwich-New London, CT	Yakima, WA
Flint, MI	Ocala, FL	York-Hanover, PA
Florence, SC	Ocean City, NJ	Youngstown-Warren-Boardman, OH-PA
Florence-Muscle Shoals, AL	Odessa, TX	Yuba City, CA
Fort Collins, CO	Ogden-Clearfield, UT	Yuma, AZ
Fort Wayne, IN	Oklahoma City, OK	
Fresno, CA	Olympia-Tumwater, WA	
Gadsden, AL	Omaha-Council Bluffs, NE-IA	
Gainesville, FL	Orlando-Kissimmee-Sanford, FL	
Gainesville, GA	Oshkosh-Neenah, WI	
Glens Falls, NY	Owensboro, KY	
Goldsboro, NC	Oxnard-Thousand Oaks-Ventura, CA	
Grand Junction, CO	Palm Bay-Melbourne-Titusville, FL	
Grand Rapids-Wyoming, MI	Panama City, FL	
Greeley, CO	Parkersburg-Vienna, WV	

Appendix B: Diagnostic tests

Concerning the influence of out-liers, we winsorized the percentage of foreing-born population, however, it does not alter the results of our regressions. Although winsorization did not change the mean value of percentage of foreing-born population, it trimmed the minimum and maximum value of the variable. For example, minimum value increased from 0.58 to 1.13 percent and the maximum value droped from 40.12 to 34.09 percent.

Figure B.1 Histogram for winsorized percentage of foreign-born population

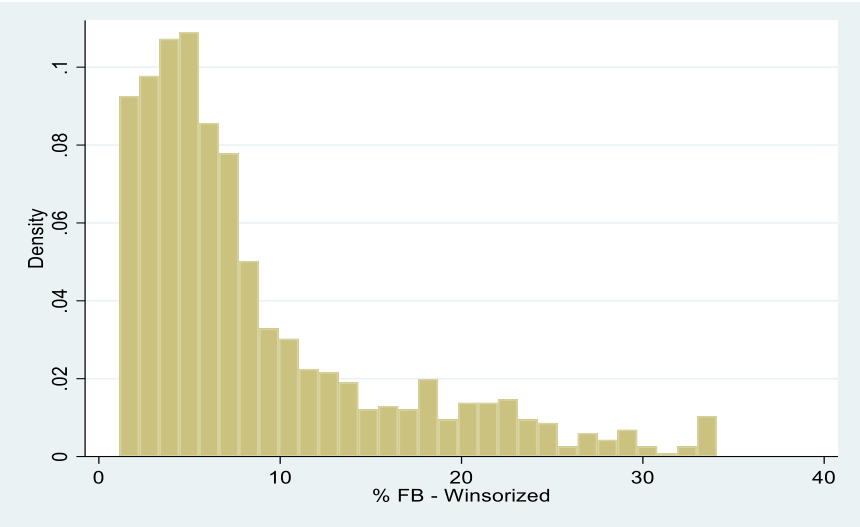

Figure B.2: Histogram of not winsorized percentage of foreign-born population

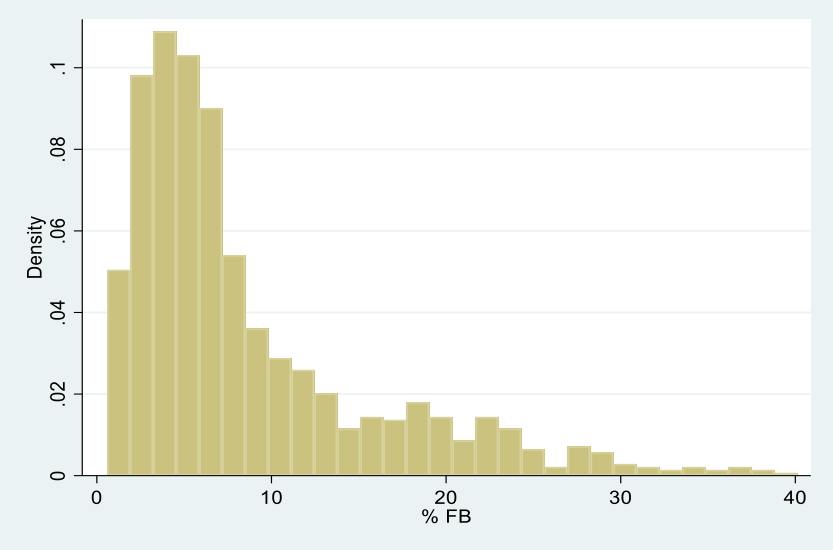

Figure B.3: Kernet density estimate of percentage of foreing-born population

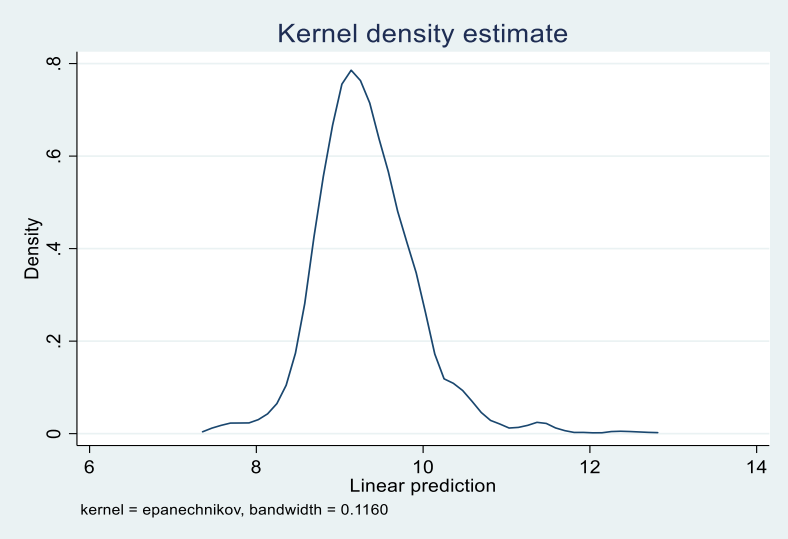

Figure B.4: Residual predictions