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IZA DP No. 14941

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ABSTRACT

Too Cold to Venture There? January Temperature and Immigrant Self-Employment across the United States*

Immigrant entrepreneurs are critical to regional and national economies. Immigrants in the USA have higher self-employment rates than natives, and immigrants have made outsized contributions as founders of numerous highly successful firms. However, we document that immigrant self-employment rates vary considerably across areas of the USA. Our main measure is the percentage of immigrant workers in an area who are self-employed; i.e., the self- employment rate for the foreign-born. Areas with colder winter temperatures have especially low self-employment rates among their immigrant populations compared to other areas of the USA. This relationship holds for numerous sub-samples of immigrants and is not driven by any particular group. The relationship persists after controlling for numerous individual and local area characteristics. Immigrant entrepreneurs appear to be especially forward-looking and responsive to warmer January temperature as a locational amenity. The results have important implications about the location choices of immigrant entrepreneurs.

JEL Classification: J61, L26, R23

Keywords: self-employment, entrepreneurship, immigrants, amenities, temperature

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1. Introduction

Immigrant entrepreneurs are critical to regional and national economies. Immigrants in the USA have higher self-employment rates than natives, and immigrants have made outsized contributions as founders of numerous highly successful firms (Lofstrom and Wang 2019). However, immigrant self-employment rates vary considerably across areas of the United States in ways not well known previously. The current paper documents that immigrant self-employment rates are higher in areas of the USA with warmer January temperatures and lower in colder areas. Our main measure is the percentage of foreign-born workers in an area who are self-employed. Areas in the northern parts of the USA have colder winters and lower self-employment rates among immigrants. This pattern hold for numerous immigrant sub-samples including new arrivals, longer term immigrants, non-citizens, naturalized citizens, men, women, Hispanics, Asians, other races, college graduates, and non-college graduates. The relationship remains strong and significant when we control for numerous local area characteristics and individual characteristics using multivariate regression analysis.[1]

The relationship between immigrant self-employment rates and warmer January temperatures is consistent with a model in which immigrant entrepreneurs choose locations to start businesses based on their preferences for amenities. Immigrant entrepreneurs appear more selective in their location decisions than immigrants working for paid employment. Starting a business is a location-specific investment that ties an individual to an area. Some immigrants are willing to work as paid employees in less preferred locations on a temporary basis, but they are

[1] We also briefly examine self-employment patterns across space for persons born in the USA. Natives often have strong ties to their places of birth and early life residence that increase moving costs and lower future migration (Winters 2011; Bosquet and Overman 2019; Winters 2020). Location decisions of native entrepreneurs may be depend more on their local attachments than local economic conditions. We also separate American-born workers into those residing in their birth state and those not. January temperature is uncorrelated with self-employment rates for workers residing in their birth state. The relationship between January temperature and self-employment for birth-state movers is positive, though the magnitude is smaller than for immigrants.

less willing to start businesses in less preferred locations because of the likely lock-in effect from starting the business.

The strong positive relationship between immigrant self-employment rates and January temperature is a new and important finding that to our knowledge has not been documented in previous literature. Natural amenities are well documented to affect location choices for the general population (Graves 1980; Rappaport 2007; Partridge 2010), but their effect on immigrant entrepreneurs has been largely overlooked. Given the importance of immigrant entrepreneurs for regional economies, our study provides important new insights. Furthermore, we emphasize that winter temperature is an especially important natural amenity for immigrants making entrepreneurial investments.

2. Empirical Motivation

We first document differences in immigrant self-employment rates across the USA. We combine individual years of the American Community Survey (ACS) microdata to compute the immigrant self-employment rate over the 2012-2019 period. We limit the main sample to foreign-born persons ages 18-61 who are either self-employed or working for paid employment. Our main measure for the foreign-born self-employment rate for area a is as follows:

$$ForeignSelfEmplomentRate_a = \frac{\#ForeignSelfEmployed_a}{\#ForeignSelfEmployed_a + \#ForeignPaidEmployed_a} \quad (1)$$

Specifically, $ForeignSelfEmplomentRate_a$ is a ratio with the numerator equal to the number of foreign-born self-employed workers in the area and the denominator is the sum of the number of foreign-born self-employed workers and the number of foreign-born paid-employed workers. Figure 1 maps the percentage of foreign-born workers who are self-employed for each state. Figure 1 exhibits a strong pattern with lower rates in northern states, especially in the middle of

the country, and higher immigrant self-employment rates in states in the South and Southwest regions of the USA.

We next focus on local areas. We define local areas using identifiable geography in the ACS microdata as a combination of metropolitan areas and state-specific non-metropolitan residual areas.[2] Figure 2 maps the foreign-born self-employment rates for metropolitan area-based local areas. Figure 3 includes all local areas. The greater geographic specificity provides additional variation relative to Figure 1, but the same pattern still holds. Immigrant self-employment rates tend to be higher in the northern parts of the USA and lower in the southern parts.

The observed pattern in immigrant self-employment rates is strongly correlated with winter temperature differences across areas. Figure 4 maps mean January temperature (in Fahrenheit) by local area. Winter temperatures are colder in the North and warmer in the South. Figure 5 presents a scatterplot of the relationship between local area foreign-born self-employment rates and mean January temperature. The scatterplot is weighted via the sum of foreign-born worker survey weights for each local area. We also include a line indicating the linear fit of the data. Figure 5 documents that there is a strong positive relationship between January temperature and foreign-born worker self-employment rates. Linear regression indicates that an additional 10 degrees of mean January temperature is associated with a 1.46 percentage point increase in the foreign-born worker self-employment rate, e.g., from 10 percent to 11.46 percent. The bivariate regression has an R-squared of 0.49. Notably, this relationship may not

[2] Geographic identifiers in ACS microdata are such that there is some imperfect mismatch between identifiable metropolitan areas in the ACS and official county-based definitions used by the Census Bureau and Office of Management Budget. Specifically, some of our metropolitan area-based local areas include some portions of surrounding areas outside the metropolitan area. Additionally, a few small areas are unshaded because they cannot be matched over time. These issues are generally minimal and should not greatly affect the results.

represent an unbiased causal effect. Colder and warmer areas differ in many ways besides temperature that could affect immigrant self-employment decisions. However, there are theoretical reasons to expect a positive effect of January temperature on immigrant self-employment that we discuss in the next section below. Furthermore, the magnitude is quite large. The mean January temperature has a weighted standard deviation of 12.9 and ranges from 3.8 to 66.7 in our data. Scaling the Figure 5 coefficient estimate by the dispersion in January temperatures indicates a large influence on immigrant self-employment rates. For example, going from 10 degrees to 60 degrees raises the predicted immigrant self-employment rate from 6.6 percent to 13.9 percent, a more than doubling.

Figures 6 and 7 provide scatterplots of self-employment rates for two groups of natives against mean January temperature. Figure 6 illustrates the relationship for persons ages 18-61 born in the USA and residing in their birth state at the time of the ACS. There is no relationship in Figure 6; the linear fit coefficient estimate is small, negative, and not statistically significant. Figure 7 illustrates the relationship for persons ages 18-61 born in the USA and residing outside their birth state. Figure 7 exhibits a significant positive relationship with a January temperature coefficient of 0.0006 and an R-squared of 0.102; i.e., the slope is about 40 percent as large as that for immigrants in Figure 5. Thus, natives living in their birth-state do not exhibit any relationship between their self-employment rates and January temperature, but Americans who moved away from their home state exhibit a similar, albeit not as strong, pattern as immigrants.

3. Conceptual Framework

The immigrant self-employment rate in a local area depends on immigrant location decisions, self-employment decisions, paid-employment decisions, and their interactions. We

first discuss location decisions independent of self-employment and paid-employment decisions. We then discuss self-employment and paid-employment decisions independent of location decisions. We then synthesize the combined decisions and discuss the observed relationship between January temperatures and immigrant self-employment rates across local areas.

3.1 Location Decisions

A long and notable literature has examined location decisions for workers and firms (Sjaastad 1962; Graves 1980; Roback 1982; Greenwood et al. 1991; Mueser and Graves 1995; Partridge and Rickman 2003; Berry and Glaeser 2005). This literature argues that workers seek to maximize their own well-being subject to their endowments and constraints and firms seek to maximize profits subject to their resources and constraints. Local areas differ in prices and location-specific amenities that affect worker utility and firm profitability. Firms prefer to pay lower input prices for labor, workspace, and physical materials, but they are willing to pay higher input prices to be in areas with productive amenities or better access to consumers (Gabriel and Rosenthal 2004; Chen and Rosenthal 2008). Competition in input and output markets will drive firm profits toward zero for firms making marginal location decisions. Some firm production may require location-specific investments that create barriers to entry and exit and allow their profits to deviate from zero in the short run and medium run.

All else equal, workers prefer higher wages, lower cost of living, and better location specific amenities. Spatial equilibrium forces will cause adjustments to wages and costs of living (prices) so that marginal migrants are indifferent across areas. Better local amenities will lead to compensating differentials in labor and housing markets and result in lower "real wages", i.e., wages adjusted for cost of living. While marginal migrants are indifferent across areas,

heterogeneous endowments and preferences will cause individuals to sort into the local area that gives them the highest possible well-being. Individuals are often strongly influenced by prior residential locations via location-specific human capital and moving costs (Krupka 2009; Kennan and Walker 2011; Krupka and Donaldson 2013; Deryugina et al. 2018; Yu and Artz 2019; Koşar et al. 2021; Ransom 2021). Location decisions for children are chosen by their parents or guardians, and young people often develop attachments to familiar people, places, and activities that increase their preferences for living in or near their home area (Winters 2020).[3]

In making location decisions, rational individuals also internalize that their current decisions will have effects later in life. Individuals can make multiple moves, but future moves involve additional moving costs. Migration is a human capital investment with costs and benefits in both the present and future (Sjaastad 1962). Individuals form expectations about future wages, living costs, amenities, and moving costs and choose their current location to maximize their expected lifetime utility. Potential migrants may be somewhat risk averse and try to avoid the likelihood of getting "stuck" in a less preferred location due to future moving costs.

Foreign-born workers have already left their home area and typically have less attachment to any particular local area of the USA and lower costs of moving within the USA. Thus, foreign-born workers are likely to be especially responsive to differences in local wages, living costs, and amenities (Cadena and Kovak 2016). Immigrants may also have different preferences and skill endowments than native-born workers. In particular, many immigrants come from countries with relatively warmer climates and may have a preference to locate in warmer areas of the USA (Albouy et al. 2021). Furthermore, adverse health effects from vitamin

[3] They may also acquire tacit knowledge about local industries and employment opportunities that either make them more suitable for local employment or more interested in local employment (Marshall 1890; Han and Winters 2020). Furthermore, the physical costs of moving one's belongings create frictions to moving, but the social and psychological costs of leaving family and friends are often even more important costs of moving.

D deficiency may be especially acute for immigrants from warmer and sunnier origin countries locating in areas of the USA with less winter warmth and sunshine (Anderson et al. 2021). Many immigrants also choose to locate in ethnic enclaves, which may enhance access to social, cultural, consumption, and employment opportunities that align with their preferences and endowments (Borjas 2002). Finally, foreign-born college-graduates are especially likely to be educated in science, technology, engineering, and mathematics (STEM) fields and will, therefore, tend to sort into tech hubs where those skills are highly rewarded. Their less educated counterparts may be especially likely to work in less skilled jobs in agriculture, construction, and manufacturing and may sort into areas offering those opportunities.

As regional economies evolve over time, so do prices, employment levels, and population distributions. The last half of the 20th century and early part of the 21st century experienced major population redistribution from the North and Midwest regions of the USA and toward the South and West regions (Graves 1980; McGranahan 1999; Partridge 2010). While preferences vary, there is a general tendency for individuals to prefer moderate temperatures and dislike cold winters and warm summers (Mueser and Graves 1995; Rappaport 2007). Widespread availability and adoption of air conditioning likely made areas with warm summers relatively more attractive than before and encouraged net population flows to warmer areas (Rappaport 2007; Graves 2013). Less housing regulation and more affordable housing in the South have also influenced regional population flows (Glaeser and Tobio 2008). Rising incomes have fueled increased demand for housing and locational amenities (Rappaport 2009). Notably, recent immigrants to the USA have considerably contributed to net population flows to the South and West in recent decades and are especially concentrated in these regions.

3.2 Self-Employment and Paid-Employment Decisions

Workers can choose to work as either a self-employed business owner or a paid employee.[4] Individuals will choose the employment path that offers them the highest expected lifetime utility given their endowments and constraints. In making this decision, individuals weigh the expected relative benefits including pecuniary and non-pecuniary and short-term and long-term. Individuals have heterogeneous skills, preferences, and resources that lead to some people becoming self-employed while others work in paid employment.

Self-employment is often riskier and exhibits more income variance than paid employment (Åstebro et al. 2014). Many businesses fail, and most self-employed workers end up earning less than they could in paid-employment (Hamilton 2000; Acs et al. 2016). However, some businesses are very successful and yield their proprietors substantial income.[5] Many potential and actual small business owners are especially drawn to self-employment for the non-pecuniary benefits. Specifically, they value being their own boss, controlling their own work conditions, and setting their own schedule (Pugsley and Hurst 2011). They are often willing to trade off income for work satisfaction and accept lower income in self-employment than paid-employment for the more enjoyable work environment.

The relative benefits of self-employment and paid employment can also differ over the time horizon. Specifically, some of the benefits of self-employment can occur further into the future relative to paid-employment. While many businesses do not succeed and persist, those that do may be eventually sold at a capital gain or passed on to children many years later. A

[4] Individuals could also choose to not work at all if they can acquire food and shelter from savings, family, government, or non-profits, but we focus on individuals who are working and are making decisions between paid employment and self-employment.

[5] The self-employed are disproportionately at the tails of the income distribution with some "superstars" earning very high incomes but many others earning relatively little (Åstebro et al. 2011). Self-employment may also draw in individuals from the tails of the ability distribution in ways that further increase income inequality among the self-employed.

relatively long time horizon may be necessary to recoup early investments for many small businesses.

Immigrants in the USA have been documented to be especially entrepreneurial compared to natives, and this may reflect a number of factors (Borjas 1986; Yuengert 1995; Fairchild 2010; Liu 2012; Fairlie and Lofstrom 2015; Azoulay et al. 2020).[6] First, immigrants may typically have worse opportunities in paid employment due to factors like discrimination, credentialism, language skills, social connections, and less familiarity with USA employer expectations during job interviews and on the job. If immigrants are undercompensated in paid employment, self-employment may be an especially attractive option because they can make their own way and determine their own success. Second, differing self-employment rates may reflect differences in unobservables and selection into immigration. Immigrants may be on average less risk averse, more ambitious, more experienced with self-employment (in their home country), and more confident in their ability to succeed in self-employment compared to natives, though there is likely substantial heterogeneity within groups. Immigrants may also be more forward-looking; for example, migration to the USA and immigrant investment decisions made in the USA may be chosen in part to provide a better life for their children (Abramitzky et al. 2021). Third, immigrants locating in enclaves may exploit opportunities to provide goods and services targeted to their ethnic group via entrepreneurship. Finally, some immigrants may not be legally authorized to work in the USA and choose to work in self-employment to avoid detection,

[6] Cai and Winters (2017) document that this pattern holds for most education groups, but STEM graduates are an exception. Specifically, foreign-born STEM graduates have especially low self-employment rates compared to native STEM graduates and compared to foreign-born college graduates educated in non-STEM fields. This may partially reflect immigration restrictions, but they provide evidence that earnings opportunities play a particularly strong role. The high earnings for STEM graduates in paid employment make it a very attractive option and discourage self-employment.

apprehension, and deportation (Amuedo-Dorantes et al. 2021). The motives for self-employment undoubtedly vary across individuals among both immigrants and natives.

3.3 Location and Self-Employment Decisions

Self-employment rates across areas depend on numerous factors that affect location, self-employment, and paid-employment decisions independently and jointly. Individuals will choose the combination of location and employment type that offers them the highest utility. Individuals with strong preferences for particular areas or amenities may make location decisions first and then choose among paid-employment and self-employment options after settling in their preferred location. Alternatively, footloose entrepreneurs may be adamant about owning their own business and then seek out the best location to maximize their utility as a business owner. Amenities and access to complementary inputs are likely critical factors in the location decisions of footloose entrepreneurs (Goetz and Rupasingha 2009; McGranahan et al. 2011; Rupasingha and Marré 2018). Other workers may be intent on paid employment and seek out the area paying wages that yield the highest utility for their skillset. Some individuals may make simultaneous decisions; for example their top two options may be self-employment in City A and paid-employment in City B. Furthermore, both location and self-employment decisions are dynamic. Individuals can change locations multiple times and make multiple transitions between paid- and self-employment. Successful self-employment in some industries may benefit from familiarity with the local area and local business practices; individuals may move to these areas and initially work in paid employment but later transition to self-employment after gaining valuable knowledge and skills.

3.4 Self-Employment Rates and January Temperature

Given the above background, we now focus attention on why immigrant self-employment rates across areas likely increase with mean January temperature. Recall that our preferred measure is the percentage of foreign-born workers ages 18-61 in a local area who are self-employed. The percentage is restricted to immigrant workers for both the numerator and denominator in equation (1) above. Thus, a local area will have an especially high immigrant self-employment rate if it is relatively more attractive to self-employed immigrants than paid-employed immigrants. Similarly, a low immigrant self-employment rate indicates the area is relatively less attractive to self-employed immigrants than paid-employed immigrants. Figure 5 documents that areas with colder winter temperatures have lower immigrant self-employment rates, indicating that they are relatively unattractive locations for self-employed immigrants. We propose three hypotheses below that could possibly explain this phenomenon.

Hypothesis 1: Areas with colder winters may offer relatively better income-earning opportunities for paid-employed immigrants than self-employed immigrants.

Hypothesis 1 could occur for multiple reasons including local industry composition and network effects. For example, a local economy may have a strong manufacturing base that pays good wages but has high financial barriers to entry for potential entrepreneurs. More generally, the local industry composition may lead to high wages for employees but result in low profits for potential entrepreneurs. Network effects also may be important in areas where immigrant workers are especially concentrated in a subset of industries and even in a few large firms. This can increase opportunities for newer immigrants to find paid employment in the local area via referrals and information about job openings. However, a thin local network of immigrant

entrepreneurs may make it especially hard for potential immigrant entrepreneurs to make critical connections and succeed in the local business environment. Similarly, immigrant entrepreneurs may depend on a thick network of other immigrants to serve as customers and employees.

Hypothesis 2: Self-employed immigrants may have stronger preferences for warm winters than paid-employed immigrants.

Hypothesis 2 could result if self-employed and paid-employed immigrants come from origin countries with very different climates. Hypothesis 2 could also result if self-employed immigrants have vastly greater wealth and human capital and warmth is a normal good; i.e., greater wealth and income could induce them to accept lower real income (via higher cost of living and lower income) to live in warmer areas. Self-employed and paid-employed immigrants could also differ on other individual characteristics in ways that generate differing preferences for winter temperatures.

Hypothesis 3: Self-employed immigrants may try to avoid getting stuck in less preferred locations.

Starting a business is often a location-specific investment that ties an individual to the local area. Physical capital is often not portable and may have to be sold locally at a loss if the entrepreneur wishes to exit the local market (Yu, Orazem, and Jolly 2011; Chen, Ma, and Orazem 2021). Furthermore, an individual that starts a business will need to build up reputation and relationships with local customers, suppliers, and financing institutions. Paid-employees can more easily pick up and move to a new location and find a new job. Some immigrants may be willing to work temporarily in a less preferred location as a paid employee if it is their best short

run option. But starting a business in an *ex ante* less preferred location may lock the entrepreneur into the area for the long run, with consequences for future generations as well. Untethered foreign-born workers may be especially averse to tethering themselves to less attractive areas and less likely to start a business in places with cold winters.

The three hypotheses motivate our subsequent empirical analysis. Hypothesis 1 implies that local area characteristics should at least partially explain the relationship between January temperature and immigrant self-employment rates. Hypotheses 2 implies that individual level characteristics are critical factors in this relationship. Hypothesis 3 suggests that there are important factors not easily observed in cross-sectional data that explain the relationship. If we include detailed controls for local area characteristics and individual characteristics and a positive relationship between immigrant self-employment rates and January temperature persists, it would lend indirect support to Hypothesis 3. The next section discusses our empirical framework that regresses immigrant self-employment on a number of characteristics of local areas and individuals.

4. Regression Framework and Data

We use multivariate linear regression to examine the factors related to immigrant self-employment differences across areas. Specifically, we are interested in how controlling for numerous local area and individual characteristics affects the relationship between immigrant self-employment and January temperature. We estimate variants of the following linear probability model:

$$SelfEmployed_{iact} = \theta JanTemp_a + \gamma Z_a + \beta X_{iact} + \pi_c + \delta_t + \varepsilon_{iact} \quad (2)$$

The dependent variable, $SelfEmployed_{iact}$, is an indicator for individual i living in local area a born in country c and observed in American Community Survey (ACS) year t that equals one if self-employed and zero if paid-employed; our analysis excludes persons not working in either. The main sample is also limited to individuals ages 18-61 who were born in a foreign country and reside in the continental USA during ACS years 2012-2019.[7] We define local areas as a combination of metropolitan areas and state-specific non-metropolitan residual areas. Our analysis includes 401 local areas. We use survey weights and cluster standard errors by local area.

The main explanatory variable of interest, $JanTemp_a$, is the mean January temperature in the local area. This variable is constructed using the United States Department of Agriculture (USDA) Economic Research Service (ERS) natural amenity scale county-level data; we use 2010 county population data to construct a weighted average for each local area. Z_a is a vector of local area characteristics controls, X_{iact} is a vector of individual characteristics controls, π_c includes origin country fixed effects, δ_t includes survey year fixed effects, and ε_{iact} is a mean zero error term. The local area characteristics include additional data on natural amenities from the USDA ERS and described in McGranahan (1999), labor market characteristics and industry composition computed from the pooled 2000 Census 5% sample and 2005-2011 ACS obtained from IPUMS (Ruggles et al. 2021), the 1980-2010 population growth rate, the natural log of the 2010 Core Based Statistical Area (CBSA) population, log median housing values computed from

[7] Our analytic sample also excludes a small number of observations who report being foreign-born but do not list a specific country and individuals living in a few small metropolitan areas that cannot be linked over time and prevent us from including local area controls for previous years. These exclusions combine to account for a very small portion of the foreign-born sample. Residents of Alaska and Hawaii are excluded from the main analysis due to missing data for natural amenities, but we consider robustness checks that also include these states with different measurement and specification of amenities.

the pooled 2000 Census and 2005-2011 ACS, and three variables measuring urban hierarchy proximity.

We estimate variants of equation (2) without and with individual controls. The regressions without individual controls also exclude year and country of origin fixed effects and are, therefore, equivalent to the following local area level linear regression equation,

$$ForeignSelfEmplomentRate_a = \theta JanTemp_a + \gamma Z_a + \varepsilon_a \quad (3)$$

, where $ForeignSelfEmplomentRate_a$ is computed as in equation (1) above and the regression is weighted using the sum of individual survey weights in each local area as in Figure 5.

Table 1 presents sample means for all local area variables in the main specification. Additional natural amenities from the ERS include mean January sunlight hours, mean July temperature, mean July relative humidity, mean topography score, and percent water area. We pool the 2000 Census and 2005-2011 to compute regression-adjusted relative incomes between the self-employed (SE) and paid-employed (PE), labor force participation (LFP), and unemployment. The latter two variables are local area fixed effects from linear probability model regressions of immigrant LFP and unemployment that control for detailed indicators for survey year, age, sex, race, Hispanic ethnicity, and highest education level. The relative income measure involves regressions of immigrant log annual income on local area fixed effects, survey year, age, sex, race, Hispanic ethnicity, and education level, estimated separately for immigrants working in self-employment and paid employment; we then compute the relative income variable as the local area fixed effects for the self-employed minus the local area fixed effects for the paid employed. We also use the pooled Census/ACS to compute the percentage of foreign-born workers in each local area employed in agriculture, mining, construction, manufacturing, transportation, communications, and utilities (TCU), wholesale trade, retail trade, and services;

the omitted industry category is public administration and national defense. We further use the Census/ACS data to compute median housing values (adjusted over time for inflation via the Consumer Price Index) among owner-occupants and then convert to logs. We use decennial census data to compute 1980-2010 population growth. 2010 CBSA population is obtained from IPUMS; CBSAs include both metropolitan and micropolitan areas and each of our local areas has at least one CBSA. We include three variables measuring proximity to the urban hierarchy: distance to the nearest metropolitan area with population greater than 250 thousand (K), incremental distance to the nearest metropolitan area with population greater than 500K, and incremental distance to the nearest metropolitan area with population greater than 1500K. These proximity variables are included following findings in Partridge et al. (2008, 2009) that proximity to the urban hierarchy influences labor markets via commuting, consumption, and trade flows. Finally, we also include a control variable for the percentage of local area population that is foreign-born in the pooled 2000 Census and 2005-2011 ACS.

These additional local area characteristics are intended primarily as control variables, and the signs for some are difficult to predict. However, we do have clear hypotheses for many of these variables. For example, July temperature and humidity are expected to be disamenities and reduce immigrant self-employment rates, while the other ERS variables are amenities and expected to increase immigrant self-employment rates. The relative income variable increases with self-employment earnings and decreases with paid-employment earnings and should make self-employment more attractive; however, relative incomes are endogenously determined via supply and demand for entrepreneurs and employees, so a positive relationship might not hold. Higher LPF is expected to reflect a stronger local labor market and may reduce the likelihood that immigrants turn to self-employment out of necessity; however, a stronger labor market

should also attract both self-employed and paid-employed migrants to the area, and the relative effect is unclear *a priori*. Local unemployment is expected to have opposite effects as LFP but the expected effect is again somewhat unclear. Industrial structure is likely to be at least a partial factor. For example, an area with relatively high manufacturing employment may be more attractive to paid employees than the self-employed. Alternatively, areas with relatively high retail employment may especially attract self-employed immigrants, who can open their own businesses with relatively low barriers to entry. To the extent that self-employed immigrants are more forward-looking than the paid-employed, one might expect positive effects of prior population growth and CBSA population and negative effects from increasing distance to the urban hierarchy. Housing value effects are largely ambiguous; individual housing wealth could help finance business ventures, but the self-employed may especially seek out areas where they can afford to buy a home. Finally, the share of the local population that are immigrants is expected to increase immigrant self-employment rates because immigrant entrepreneurs can create businesses to provide goods and services targeted to the tastes of other immigrants that are not well served by mainstream businesses.

Table 2 presents bivariate correlation coefficients for the immigrant self-employment rate and mean January temperature between each other and with the other local area characteristic variables. The correlations are computed using local area weights computed as the sum of individual weights for foreign-born workers in the area. The correlation between the immigrant self-employment rate and mean January temperature is 0.703, which is the strongest correlation in the table. As expected these two main variables are also strongly positively correlated with January sunlight and the share of the local population that is foreign born. The correlations with other variables vary in magnitude including some that are negative and others close to zero.

Overall, the correlations suggest a unique and important relationship between the immigrant self-employment rate and mean January temperature, but the multivariate regression results below will provide more rigorous analysis.

Individual controls in equation (2) include a combination of continuous and indicator variables. We first include continuous variables for the natural log of distance from the local area to the immigrant's home country, the share of the local area population that is from the immigrant's home country, and the share of the local population that speaks the same foreign language at home as the immigrant; this last variable is coded as zero for immigrants who only speak English.[8] Immigrant entrepreneurs may prefer to start businesses in local areas closer to their home country, but negative effects of distance may be minimal since immigrants are typically already travelling very long distances. The other two variables are intended to capture different dimensions of enclave effects. Enclave effects may be especially strong for immigrants from the same country, but a common language and similar culture may extend enclave effects. We also include continuous variables for real family income excluding the individual's own income and own housing value for homeowners; the latter variable equals zero for renters.[9] The full model also includes indicator variables for homeownership and sex, and detailed interactions of sex with survey year, origin country, age, race, education level, college major, citizenship status, years in the USA, English ability, marital status, number of children, age of youngest child in the household, and industry.

[8] These three variables are more precisely characterized as interactions of local areas and individual characteristics, but we just refer to them as part of the individual characteristics for conciseness. They do vary within local areas and are thus different than the local area controls.

[9] These are adjusted for average inflation over time using the Consumer Price Index (CPI) and are measured in $1000s.

Table 1 also presents sample means for selected individual variables. Categorical variables for origin country, college major, industry, and age of youngest child are excluded from Table 1 due to limited space and the large number of indicators. Similarly, Table 1 reports means for age, years in the USA, and number of children, but the regression analysis includes detailed indicator variables for these. We also include more detailed indicators for marital status and education level than the variables reported in Table 1. Not surprisingly, there are some notable differences in individual characteristics between self-employed and paid-employed immigrants. For example, the self-employed are older and have lived more years in the USA. They are also more likely to be male, married, and homeowners.

5. Regression Results

5.1 Main Results

Table 3 presents our main regression results. Column (1) reports an individual regression that only includes mean January temperature as an explanatory variable. This yields a coefficient of 0.00146, the same as the linear fit for Figure 5. Column (2) includes local area characteristics controls but not individual controls. Adding the local area controls reduces the coefficient on January temperature to 0.00089 in Column (2), but the coefficient is still statistically significant and has a large and important magnitude. At face value, this suggests that local area characteristics explain 39 percent of the raw relationship between immigrant self-employment rates and January temperature. Adding individual controls further reduces the January temperature coefficient to 0.00082 in Column (3), but it is again significant and still meaningfully large; 56 percent of the raw relationship between immigrant self-employment rates and January temperature remains unexplained.

Results for the local area characteristic controls are suggestive but sometimes inconsistent across the two specifications. The other natural amenity variables all have expected signs except for July humidity, but only percent water area is statistically significant in both Columns (2) and (3). The regression-adjusted labor force participation variable has a consistently negative and significant coefficient consistent with stronger local labor markets being relatively more attractive to the paid-employed or reduce the likelihood of self-employment out of necessity. Employment shares in wholesale and retail both have consistently positive coefficients; the latter may reflect low barriers to entry in retail and the wholesale coefficient may reflect supply linkages between foreign-born retail and wholesale entrepreneurs. Log median housing values has a negative coefficient, consistent with immigrant entrepreneurs especially preferring locations where they can purchase an affordable home. The share of the local population that is foreign born has a positive coefficient in Column (2) that is significant at the ten percent level, but the coefficient shrinks and loses significance in Column (3).

We report results for the three continuous individual control variables related to distance and enclave effects in Column (3). We do not report the other individual characteristic results because they are very numerous, our focus is on spatial variables, and in order to conserve space. The log of distance from the individual's home country to their local area and the share of the local population from their home country are both not statistically significant. However, the share of the local population speaking the same foreign language as the individual has a significant positive effect. These results suggest that positive enclave effects on self-employment are primarily language-based and not based strictly on national origin or very broadly on the share of the population that is foreign born.

5.2 Alternative Samples and Potential Heterogeneity

We next explore several alternative samples of immigrants to assess if the relationship between January temperature and immigrant self-employment rates is broad-based or confined to a narrow set of immigrants. Table 4 reports self-employment probability regression results for numerous sub-samples of immigrants. Each row is from a separate regression. The specification is otherwise the same as Column (3) of Table 3 except limited to the specific sub-sample indicated by the row name in Table 4 and some controls are excluded to prevent perfect collinearity for the particular sub-sample. We report only the coefficient and standard error for mean January temperature. The coefficient estimates are significant at the one percent level for all sub-samples examined in Table 4.

In Table 4, we first examine potential differences among immigrants based on the amount of time living in the USA. Notably, immigrants living in the USA for less than one year have a coefficient that is close in magnitude to the coefficient for the full sample. The coefficient estimates appear somewhat smaller for those 6-10 and 11-15 years in the USA compared to the full sample, but standard errors are such that the confidence intervals largely overlap. The coefficients for those in the USA 16-20 and 21+ years are very similar to the new arrivals and the full sample coefficient. Arguably, the most notable result here is that the self-employment probability of newly arriving immigrants is very responsive to January temperature and at least as responsive as those with more time in the USA. Newly arriving immigrant entrepreneurs are disproportionately drawn to areas with warmer winters.

Table 4 also reports that the relationship between January temperature and the probability of self-employment is large and significant for both non-citizens and naturalized citizens, though the effect appears larger for non-citizens. Additionally, we split the sample into three mutually

exclusive race and ethnic groups comprising Hispanic, non-Hispanic Asian, and persons neither Hispanic nor Asian. The coefficient estimates are again significant for all groups but are largest for persons who are neither Hispanic nor Asian, though these are all very heterogeneous groups.

We next consider heterogeneity by country of origin. We first separately examine immigrants from Canada and Mexico, USA's neighbors to the North and South. We also consider immigrants from China and India, the two most populous countries in the world and important sources of high-skilled immigrants to the USA. Finally, we collected winter temperature for all origin countries and divided immigrants based on whether the winter temperature in their origin country is above or below the median. All of these origin country sub-samples yield positive and statistically significant coefficient estimates for the effect of January temperature on immigrant self-employment probability. However, there is some variation. The coefficient for Canadians is 0.00140, while that for Mexican immigrants is only 0.00052. The coefficient for Chinese is 0.00095, while that for Indian immigrants is only 0.00032. Finally, the coefficient estimates are similar for immigrants with origin country winter temperature above and below the median but perhaps slightly larger for those below the median. We do not have strong explanations for differences by country of origin. However, it is notable that the effect is not simply driven by self-employed immigrants from warmer winter origin countries being especially averse to cold winter temperatures in the USA. If anything, self-employed immigrants from colder countries may exhibit a stronger relative response. For example, Canada is a cold winter country and self-employed immigrants from Canada appear especially attracted to warmer areas of the USA. More generally, it is especially notable that the coefficient is positive and significant for the four individual origin countries and the two winter

temperature groups. Thus, the results are broad-based and not driven by any particular origin country or group.

Table 4 also reports that men and women have similar coefficients with maybe a slightly larger coefficient for women. Non-college graduates have larger coefficients than college graduates, but both are positive and statistically significant. Renters have slightly larger coefficient estimates than homeowners. We next include immigrants residing in Alaska and Hawaii but exclude controls for other natural amenities due to lack of data[10]; results are very similar to the main specification. We also expanded the main sample to include non-workers and code them as not self-employed; this makes the coefficient slightly smaller but does change the qualitative results. We next restrict the main sample to exclude individuals working in agriculture and construction industries, which are both seasonal and may draw different types of immigrants; results are similar to the main sample. Finally, we restrict the sample to ages 25-54, which is sometimes characterized as prime ages for attachment to the workforce; results are very similar to the full sample.

5.3 Additional Analysis

The ACS has only partial information on migration history. For example, we do not know the initial destinations of immigrants in the USA, and we do not generally observe intermediate locations. We observe their country of birth, their current location in the USA, and their location one year prior to the survey. Additionally, we know an individual's self-employment status during the survey period but nothing prior. While limited, this does allow us

[10] The USDA ERS does not provide natural amenity data for Alaska and Hawaii. We obtained January temperature data from the Climates to Travel World Climate Guide online: https://www.climatestotravel.com/
This is also the source for our origin country winter temperature data.

to examine self-employment differences between immigrants who have lived in the same local area for at least a year and those who moved to their current local area in the previous 12 months. We refer to the latter group as recent migrants. Table A1 reports three regression columns using the same immigrant sample as the main analysis. The first column regresses the self-employment dummy on an indicator for being a recent migrant and a constant term with no controls. The recent immigrant indicator is negative and significant indicating that recent migrants are considerably less likely to be self-employed. However, it is important to note that the relationship likely flows in both directions. Starting a business in the past is likely to reduce subsequent migration and also increase the likelihood of future self-employment. Adding detailed additional controls in Column (2) and further adding local controls in Column (3) reduces the magnitude of the negative coefficient for the recent migrant dummy, but it is still negative and significant. These results are admittedly difficult to interpret, so we relegate them to the appendix, but the fact that recent migrants have lower self-employment rates is consistent with self-employment creating frictions that lower migration. Migration frictions from self-employment may deter individuals from pursuing self-employment in a local area unless they are confident they want to be there long term.

As a final exercise, we examined the effects of controlling for state economic freedom measures from the Fraser Institute.[11] Results for the January temperature variable are reported in Appendix Table A2. Consistent with our specification for the local area characteristic controls, we only control for cross-sectional variation in economic freedom prior to our sample period, so we use data for year 2010. This is intended to capture long run differences in economic freedom but not recent changes. Additionally, these economic freedom measures are available by state

[11] The data are from https://www.fraserinstitute.org/economic-freedom/map?geozone=na&year=2010&selectedCountry=USA&page=map

but not for our local areas, so we only account for state-level differences. Thus, our analysis is not intended to rigorously examine the effects of economic freedom on immigrant self-employment; we are simply examining the robustness of our main result to cross-sectional controls for economic freedom. The results in Appendix Table A2 indicate that the main result is very robust to these controls for economic freedom.

5.4 Discussion

Our conceptual framework laid out three potential hypotheses to explain the observed relationship between January temperature and immigrant self-employment rates. Hypothesis 1 was that warmer January temperatures may be correlated with better paid employment opportunities relative to self-employment opportunities. Controlling for a large set of local area characteristics partially explains the January temperature coefficient on immigrant self-employment, but a large portion remains unexplained. Thus, there is some suggestive support for local conditions as a partial explanation, but it is not the main explanation. Hypothesis 2 was that self-employed immigrants may have stronger preferences for warm winters than paid-employed immigrants. We account for this by controlling for numerous individual characteristics including country of origin, education, housing wealth, and enclave effects. While these factors often do affect an individual's likelihood of self-employment, our main results in Table 3 suggest that adding individual characteristics does not substantially alter the relationship between January temperature and immigrant self-employment rates. Thus, much of the observed relationship between January temperature and immigrants self-employment remains unexplained.

Furthermore, the results in Table 4 suggest only moderate heterogeneity in the relationship between January temperature and immigrant self-employment probabilities. The main result is qualitatively robust across numerous samples and all immigrant sub-samples considered have higher self-employment rates in areas with warmer January temperatures. This is useful in general, but it also reinforces the overall importance of climate amenities in attracting immigrant entrepreneurs to an area. Immigrant entrepreneurs strongly prefer areas with warmer areas and this holds across immigrant groups.

Our third hypothesis was that self-employed immigrants may avoid areas with cold winters to avoid getting stuck in a less preferred location. We can only speak to this indirectly, but it is consistent with the empirical results. Self-employment in a local area is a forward-looking decision that can tie the individual to the area. In other words, an individual may only reap the full rewards of self-employment if they stay in the same location for many years. This should cause immigrant entrepreneurs to be especially picky about where they start their businesses. Paid employees can move to a new location much more easily and appear more willing to work in an area with cold winters because they can move in the future when they are ready.

6. Conclusion

This paper documents a new and important relationship between immigrant self-employment rates in a local area and the winter temperature in an area. Immigrant entrepreneurs are disproportionately drawn to areas with warmer winters. This relationship is only partially explained by other local area characteristics and individual characteristics. This relationship holds for numerous immigrant sub-samples and is not just due to any one group. The

relationship is consistent with immigrant entrepreneurs choosing locations to start their businesses based on their preferences for amenities and avoiding areas with colder winters. Immigrant entrepreneurs may be especially averse to starting businesses in areas with colder winters because they may only be able to reap the full benefits of their businesses if they stay in the same area for a long time. Thus, immigrant entrepreneurs may avoid cold areas in part to avoid getting stuck in a local area they *ex ante* perceive as less preferred.

Our findings have important implications for policymakers. Amenities are clearly an important factor in attracting entrepreneurs from outside the local area, with especially strong effects among immigrant entrepreneurs. While local areas cannot easily change their own winter temperatures, they can work to make cold seasons more attractive or at least more tolerable to outsiders. They can also invest more heavily in non-climate amenities that potential residents value.

Potential entrepreneurs in the process of choosing a location often have incomplete information about the bundle of amenities and quality of life that various areas offer. Local amenities are often experience goods, for which an individual cannot assess the quality or their enjoyment of before their consumption experience. Enhanced marketing to potential entrepreneurs is potentially useful for communities with colder winters, but information does not easily substitute for experience. State and regional organizations interested in enhancing economic development in areas with colder winters may need additional efforts focused on having potential entrepreneurs actually visit or temporarily reside in those areas such as during conferences, training programs, networking events, and recreational activities.

To the extent that policy leaders can quantify the benefits of immigrant entrepreneurs to local communities, there is some potential rationale for locational incentives. However, an

abundance of caution is likely warranted. The current study does not provide formal estimates of moving costs, but previous research suggests that these are likely to be substantial (Kennan and Walker 2011; Ransom 2021). A relatively modest locational incentive likely would not solicit a significant migration response and the benefits would flow disproportionately to inframarginal migrants, i.e., immigrants who would start a business there anyway. Nationally administered place-based policies such as immigrant visas for starting businesses in disadvantaged local areas may have more potential, but they also involve important opportunity costs and have potential for unintended consequences. Furthermore, national-level policies are outside the control of local leaders. There is still much unknown about whether and how such policies can be effectively designed and implemented. More research and policy experimentation seems warranted.

Policy leaders in areas with colder winters may find nurturing "home-grown" entrepreneurs to be more effective than trying to attract outside entrepreneurs to the local area. However, home-grown entrepreneurs do not only include persons who have lived their entire life in the area. Persons who move to the area for work or higher education, including immigrants, may develop a taste for the local amenities. The first experience of a very cold winter can be difficult, but people adapt and preferences evolve. People invest in winter gear to stay warm and some learn to love snow sledding, ice skating, and ice fishing. Nurturing home-grown entrepreneurs such as via accelerators, training, and support programs is still an emerging area of interest to research and policy communities. Future research is clearly warranted on the best strategies to nurture home-grown entrepreneurs, but it is also important to recognize that the best strategies may differ across areas. Even home-grown entrepreneurs may eventually leave an area they view as less preferred if they can easily do so. Thus, policymakers nurturing home-grown

entrepreneurs in colder areas should recognize the future mobility of potential entrepreneurs and structure investments and incentives to maximize the return on their investments.

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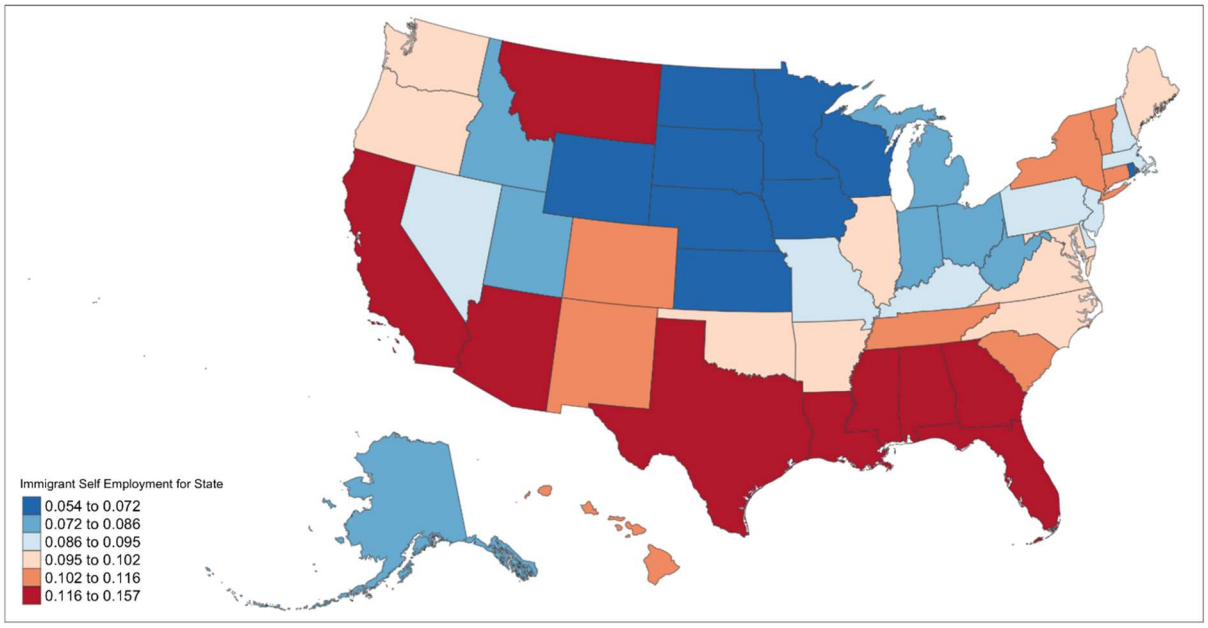
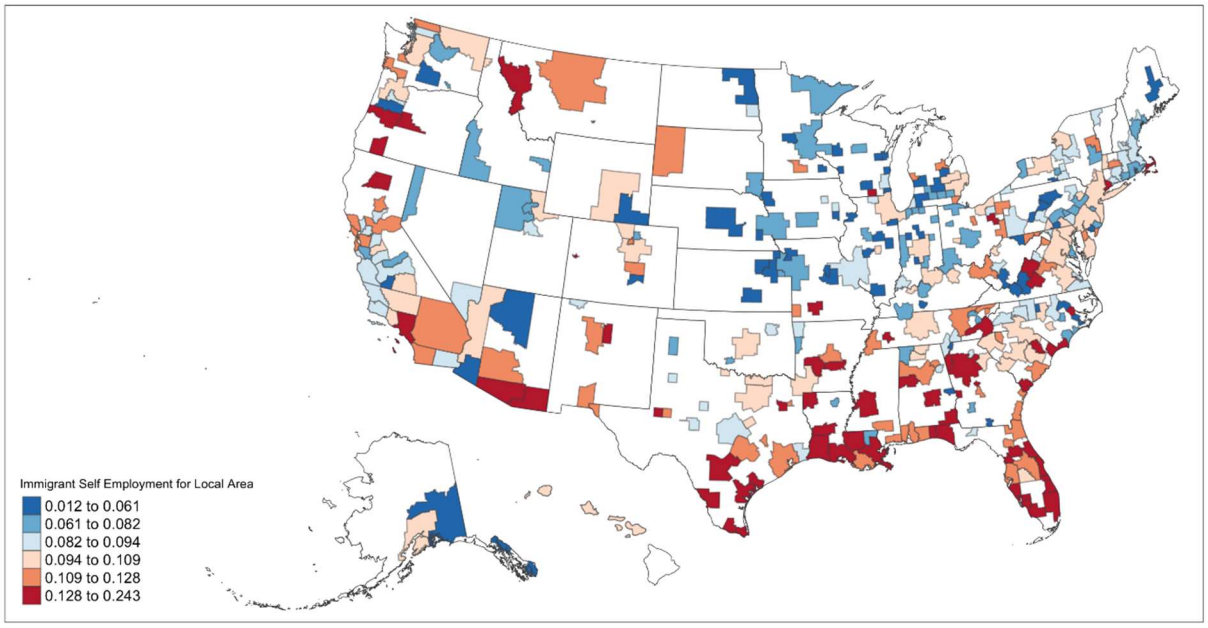
Figure 1: State Map of Immigrant Self-Employment Rate



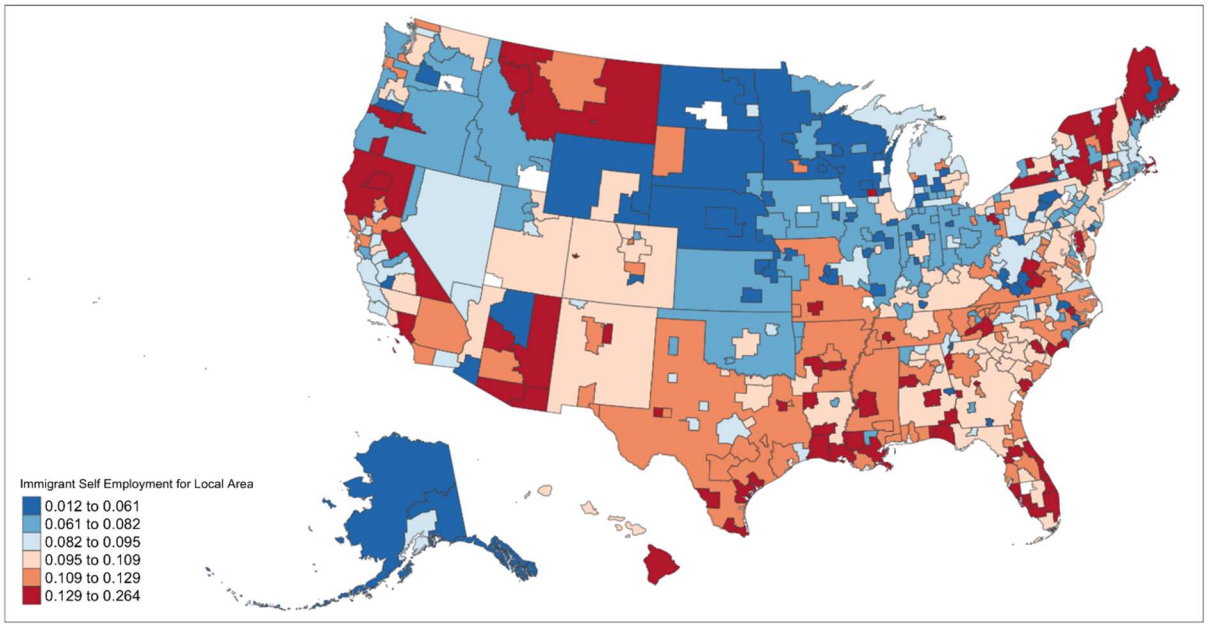
Source: based on authors' estimates from the combined 2012-2019 American Community Survey.

Figure 2: Metropolitan Area Map of Immigrant Self-Employment Rate



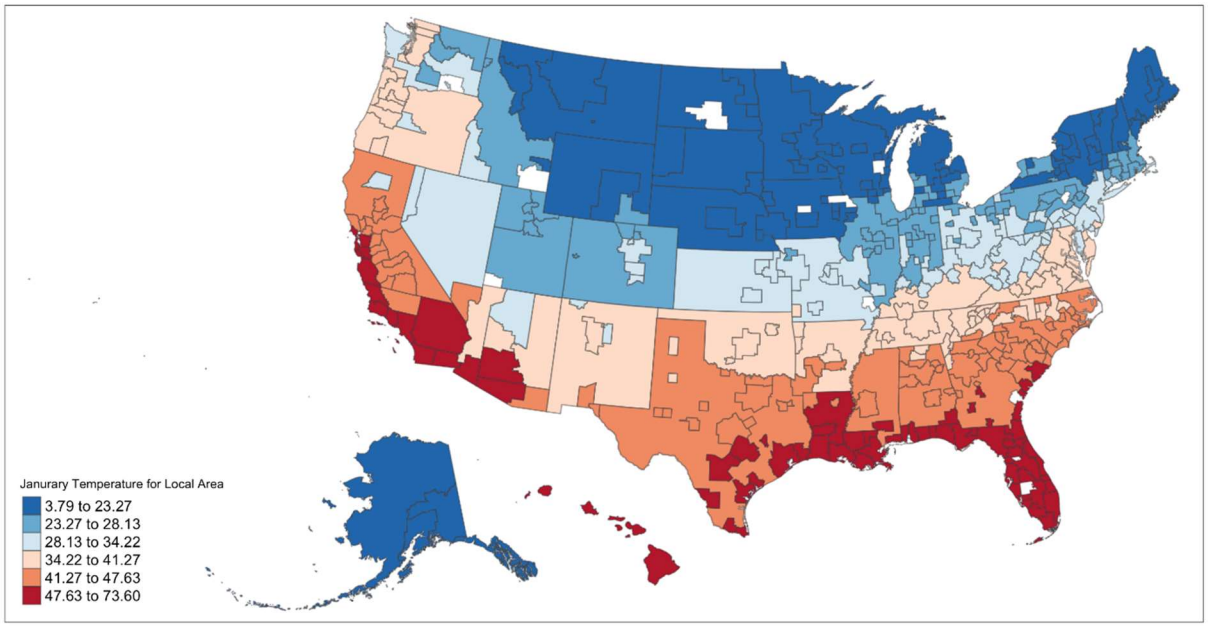
Source: based on authors' estimates from the combined 2012-2019 American Community Survey.

Figure 3: Local Area Map of Immigrant Self-Employment Rate



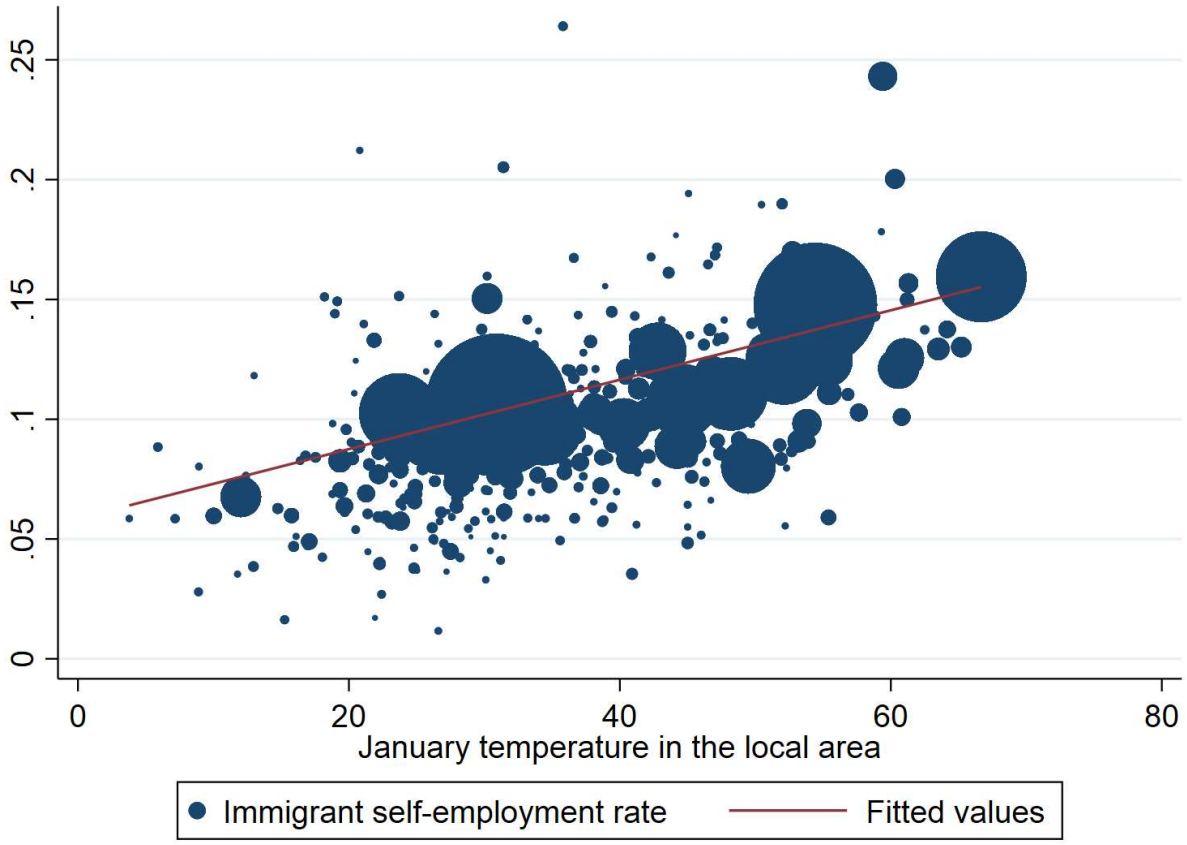
Source: based on authors' estimates from the combined 2012-2019 American Community Survey.

Figure 4: Local Area Map of Mean January Temperature (in Fahrenheit)



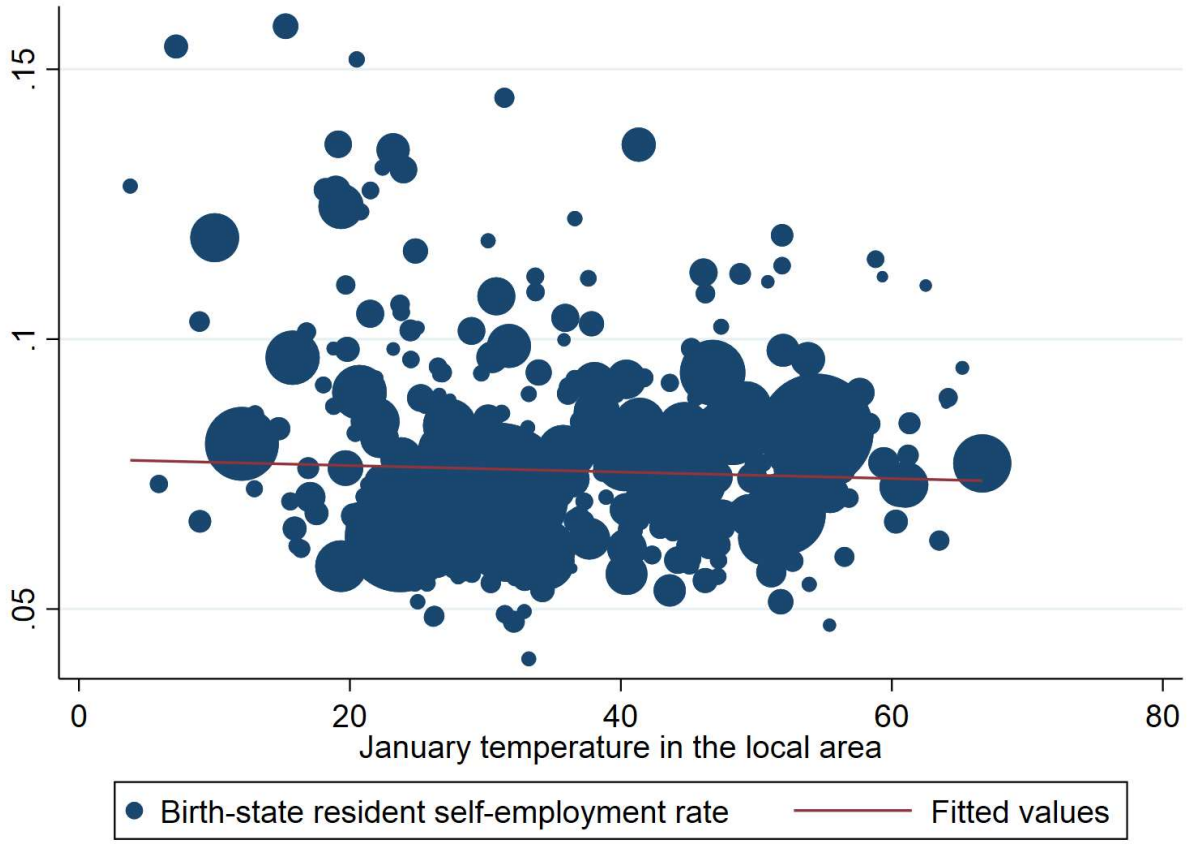
Source: based on authors' analysis of USDA natural amenity data.

Figure 5: Immigrant Self-Employment and January Temperature



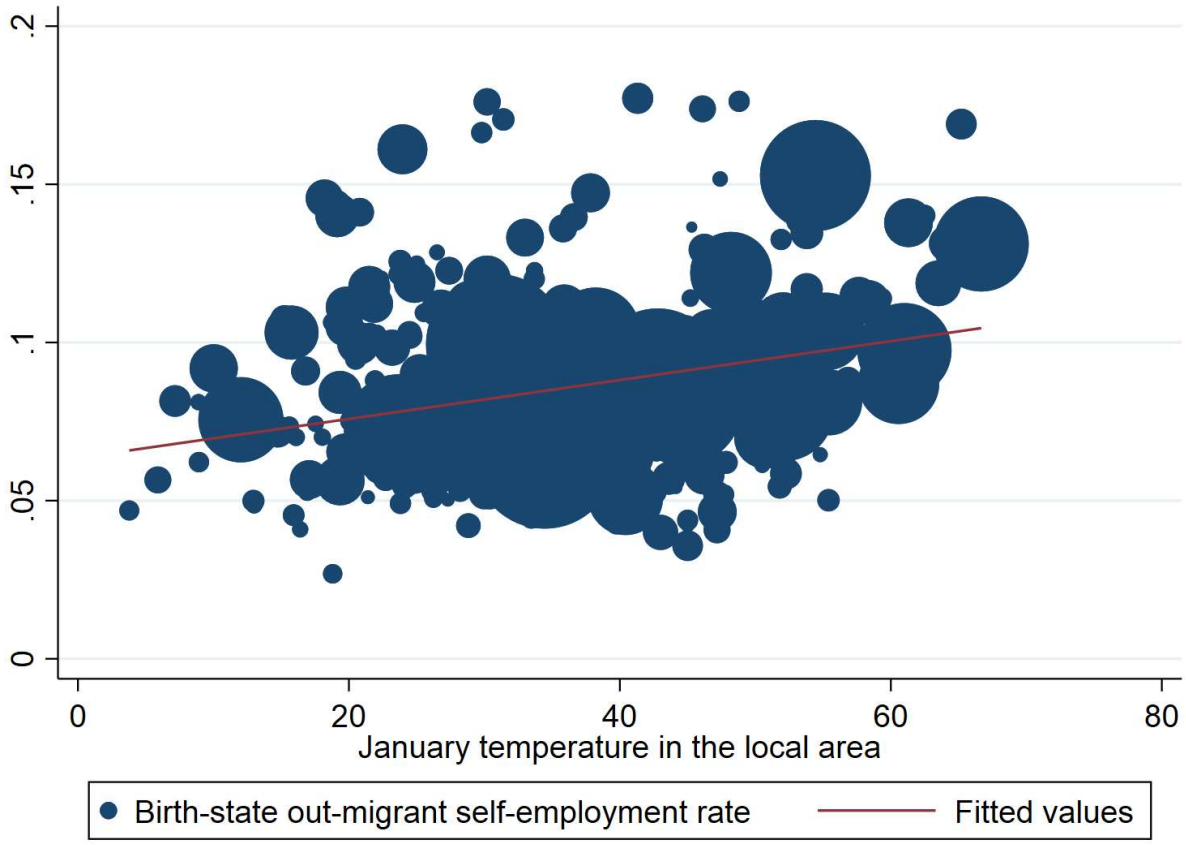
Immigrant Self-Employment Rate = 0.0511 + 0.0015×January Temperature
$R^2 = 0.494$

Figure 6: Native Birth-State Resident Self-Employment and January Temperature



Birth-State Resident SE Rate = 0.0778 − 0.00006×January Temperature (p=0.55)
$R^2 = 0.002$

Figure 7: Birth-State Out-Migrant Current Location Self-Employment and January Temperature



Native Birth-State Out-Migrant SE Rate = 0.0636 + 0.0006×January Temperature (p=0.001)
$R^2 = 0.102$

Table 1: Selected Variable Means for Immigrant Self-Employed and Paid-Employed

	Self-Employed	Paid-Employed
Local Area Characteristics		
Mean January Temperature (Fahrenheit)	43.82	41.38
Mean January Sunlight Hours	173.97	168.35
Mean July Temperature (Fahrenheit)	76.04	75.76
Mean July Relative Humidity	60.39	59.35
Mean ERS Topography Score	9.52	9.44
Percent Water Area	12.53	12.15
Regression-Adjusted SE/PE Relative Income	0.055	0.055
Regression-Adjusted Labor Force Participation	-0.001	0.001
Regression-Adjusted Unemployment	0.016	0.015
Share of Local Employment in Agriculture	0.038	0.040
Share of Local Employment in Mining	0.003	0.002
Share of Local Employment in Construction	0.100	0.097
Share of Local Employment in Manufacturing	0.127	0.132
Share of Local Employment in Trans., Comm. & Util.	0.064	0.062
Share of Local Employment in Wholesale Trade	0.034	0.032
Share of Local Employment in Retail Trade	0.179	0.177
Share of Local Employment in Services	0.428	0.428
Percentage Population Change, 1980-2010	0.624	0.599
Ln CBSA Population, 2010	15.05	14.93
Ln Median Housing Values	12.23	12.22
Distance to Nearest Metro w/ Pop. > 250K	4.07	5.02
Incremental Dist. to Nearest Metro w/ Pop. > 500K	4.71	5.15
Incremental Dist. to Nearest Metro w/ Pop. > 1500K	21.30	21.77
Share of Local Population Foreign Born	0.282	0.263
Selected Individual Characteristics		
Ln Distance from Local Area to Home Country	7.890	7.921
Share of Local Population from Own Home Country	0.053	0.050
Share of Local Population Same Foreign Language	0.123	0.106
Age	44.49	40.57
Years in the USA	21.32	18.85
Naturalized Citizen	0.494	0.471
Female	0.378	0.438
Married	0.679	0.604
Number of Own Children	1.291	1.105
High School Diploma	0.249	0.225
Some College but Less than a Bachelor's Degree	0.203	0.210
Bachelor's Degree	0.166	0.185
Master's Degree	0.065	0.099
Professional Degree	0.033	0.021
Doctorate Degree	0.014	0.025
Black and Not Hispanic	0.055	0.093
Asian and Not Hispanic	0.223	0.261
Other Race and Not Hispanic	0.020	0.018
Hispanic	0.491	0.482
Speaks Only English at Home	0.133	0.150
Speaks Another Language and English Very Well	0.349	0.400
Speaks Another Language and English Well	0.259	0.215
Speaks Another Language and English But Not Well	0.196	0.170
Homeowner	0.486	0.388
Homeowner × Home Value (in $1000s)	235.0	153.3
Family Member Income (in $1000s) Excluding Own Income	43.75	43.47

Notes: The sample includes 1,527,208 individuals ages 18-61 who were born in a foreign country and reside in the USA during ACS years 2012-2019. Local areas are a combination of metropolitan areas and state-specific non-metropolitan residual areas.

Table 2: Local Area Characteristic Correlations with Immigrant Self-Employment Rate and January Temperature

Correlation with:	Immigrant Self-Employment Rate	Mean January Temperature
Mean January Temperature	0.703	
Mean January Sunlight Hours	0.498	0.649
Mean July Temperature	0.169	0.258
Mean July Relative Humidity	0.263	0.217
Mean ERS Topography Score	0.040	0.169
Percent Water Area	0.130	-0.128
Regression-Adjusted SE/PE Relative Income	0.010	0.128
Regression-Adjusted Labor Force Participation	-0.237	-0.174
Regression-Adjusted Unemployment	0.040	0.128
Share of Local Employment in Agriculture	-0.114	0.141
Share of Local Employment in Mining	0.093	0.097
Share of Local Employment in Construction	0.260	0.348
Share of Local Employment in Manufacturing	-0.293	-0.271
Share of Local Employment in TCU	0.315	0.192
Share of Local Employment in Wholesale Trade	0.427	0.375
Share of Local Employment in Retail Trade	0.358	0.176
Share of Local Employment in Services	-0.013	-0.210
Percentage Population Change, 1980-2010	0.170	0.434
Ln CBSA Population, 2010	0.279	0.054
Ln Median Housing Values	0.090	0.074
Distance to Nearest Metro w/ Pop. > 250K	-0.169	-0.155
Incremental Dist. to Metro w/ Pop. > 500K	-0.081	-0.002
Incremental Dist. to Metro w/ Pop. > 1500K	-0.029	-0.079
Share of Local Population Foreign Born	0.519	0.497

Notes: The analysis includes 401 local areas. Local areas are a combination of metropolitan areas and state-specific non-metropolitan residual areas.

Table 3: Individual-Level Regressions of Immigrant Self-Employment Probability

	(1)	(2)	(3)
Mean January Temperature	0.00146***	0.00089***	0.00082***
	(0.00021)	(0.00021)	(0.00013)
Mean January Sunlight Hours		0.00004	0.00005
		(0.00004)	(0.00003)
Mean July Temperature		-0.00057	-0.00080**
		(0.00057)	(0.00032)
Mean July Relative Humidity		0.00018	0.00003
		(0.00013)	(0.00008)
Mean ERS Topography Score		0.00067**	0.00027
		(0.00033)	(0.00019)
Percent Water Area		0.00044***	0.00016*
		(0.00017)	(0.00009)
Regression-Adjusted SE/PE Relative Income		-0.0162	-0.01121
		(0.01172)	(0.00710)
Regression-Adjusted Labor Force Participation		-0.08813*	-0.10216***
		(0.05090)	(0.02898)
Regression-Adjusted Unemployment		0.09368	-0.08106
		(0.10007)	(0.06639)
Share of Local Employment in Agriculture		-0.07793*	-0.01331
		(0.04665)	(0.03191)
Share of Local Employment in Mining		0.01767	0.08074
		(0.17254)	(0.11215)
Share of Local Employment in Construction		0.11881*	-0.03817
		(0.06357)	(0.03575)
Share of Local Employment in Manufacturing		-0.07989	-0.00613
		(0.05164)	(0.02923)
Share of Local Employment in TCU		-0.19918	-0.27087***
		(0.13572)	(0.07626)
Share of Local Employment in Wholesale		0.45637***	0.43105***
		(0.17325)	(0.12035)
Share of Local Employment in Retail		0.24273***	0.12948**
		(0.08335)	(0.05062)
Share of Local Employment in Services		0.02443	0.01607
		(0.04667)	(0.02820)
Percentage Population Change, 1980-2010		-0.00365	0.00095
		(0.00420)	(0.00262)
Ln CBSA Population, 2010		0.00181	-0.00122
		(0.00216)	(0.00118)
Ln Median Housing Values		-0.02188***	-0.02198***
		(0.00803)	(0.00499)
Distance to Nearest Metro w/ Pop. > 250K		0.00005	0.00006
		(0.00006)	(0.00004)
Incremental Dist. to Metro w/ Pop. > 500K		0.00001	1.14E-06
		(0.00005)	(0.00003)
Incremental Dist. to Metro w/ Pop. > 1500K		0.00003	0.00002
		(0.00002)	(0.00001)
Share of Local Population Foreign Born		0.05892*	0.01899
		(0.03530)	(0.01962)
Ln Distance from Local Area to Home Country			0.00151
			(0.00513)
Share of Local Pop. from Own Home Country			-0.01574
			(0.03273)
Share of Local Population Same Foreign Language			0.06689***
			(0.01108)
Additional Controls	No	No	Yes

Notes: Standard errors are clustered by local area. Additional controls include continuous variables for family member income (excluding own income) and housing values for homeowners (zero for renters), and indicator variables for homeownership and sex and interactions of sex with survey year, origin country, age, race, education level, college major, citizenship status, years in the USA, English ability, marital status, number of children, age of youngest child in the household, and industry. *Significant at 10% level; **Significant at 5% level; ***Significant at 1% level.

Table 4: Sub-Sample Results for Immigrant Self-Employment and January Temperature

	Coefficient	St. Error
In the USA < One Year	0.00090***	(0.00035)
In the USA 1-5 Years	0.00082***	(0.00017)
In the USA 6-10 Years	0.00067***	(0.00018)
In the USA 11-15 Years	0.00063***	(0.00020)
In the USA 16-20 Years	0.00090***	(0.00016)
In the USA 21+Years	0.00096***	(0.00014)
Non-Citizens	0.00097***	(0.00014)
Naturalized Citizens	0.00063***	(0.00013)
Hispanic	0.00064***	(0.00015)
Asian (and Not Hispanic)	0.00069***	(0.00013)
Not Hispanic and Not Asian	0.00109***	(0.00016)
Canada Born	0.00140***	(0.00031)
Mexico Born	0.00052***	(0.00022)
China Born	0.00095***	(0.00024)
India Born	0.00032***	(0.00019)
Origin Country Winter Temp > Median	0.00074***	(0.00015)
Origin Country Winter Temp < Median	0.00095***	(0.00014)
Men	0.00090***	(0.00020)
Women	0.00104***	(0.00017)
College Graduates	0.00054***	(0.00012)
Non-College Graduates	0.00103***	(0.00015)
Homeowners	0.00073***	(0.00016)
Renters	0.00082***	(0.00013)
Including Alaska and Hawaii w/ Partial Controls	0.00087***	(0.00011)
Including Non-Workers	0.00063***	(0.00009)
Excluding Agriculture and Construction	0.00075***	(0.00010)
Ages 25-54	0.00081***	(0.00013)

Notes: Each row is from a separate regression for a particular sub-sample and reports the coefficient and standard error for the Mean January Temperature variable on the immigrant probability of self-employment. All regressions include the local area controls and additional controls in the third column of Table 3 except ones excluded to prevent perfect collinearity for the particular sub-sample. Standard errors are clustered by local area. ***Significant at 1% level.

Appendix

Table A1: Immigrant Self-Employment Probability and Recent Migration

	(1)	(2)	(3)
Recent Migrant (past 12 months)	-0.04547***	-0.01279***	-0.00794***
	(0.00358)	(0.00239)	(0.00162)
Mean January Temperature			0.00082***
			(0.00012)
Local Area Controls	No	No	Yes
Additional Controls	No	Yes	Yes

Notes: Standard errors are clustered by local area. Local area controls and additional controls are those in the third column of Table 3. ***Significant at 1% level.

Table A2: Immigrant Self-Employment Probability with Controls for State Economic Freedom

	(1)	(2)
Mean January Temperature	0.00081***	0.00080***
	(0.00012)	(0.00012)
Economic Freedom Score	-0.00121**	-0.0008
	(0.00061)	(0.00216)
Tax Freedom Score		-0.00268**
		(0.00136)
Labor Market Freedom Score		0.00084
		(0.00197)
Local Area Controls	Yes	Yes
Additional Controls	Yes	Yes

Notes: Standard errors are clustered by local area. Local area controls and additional controls are those in the third column of Table 3. ***Significant at 1% level.