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Dwelling Value and Foreign-born Population Distribution: A Look at American Housing Market

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Abstract

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Depending on the data from American Community Survey from 2007 to 2015, this paper tests the relationship between the dwelling value on metropolitan statistical areas and the total number of foreign-born population. The coming foreign-born population stimulates the demand for dwelling, but however, it also encourages the natives to out-migrate in the area. The foreign-born population reallocates the population on foreign-born and local natives and thus change the demand group for housing market. This paper examines the response of median housing value on American metropolitan statistical areas towards the increasing foreign-born population and alternation of changing of demand group for dwellings. This paper finds out that 1 percent coming immigration population is consistent with 0.04 percent increase in dwelling value for the metropolitan statistical areas from 2007 to 2015.

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I. Introduction

Residential investment is one of the most closely related economic activities in people's daily life. Every person needs to find a shelter to resident. Each family is facing a choice between either rent a house or own a house. Data in various countries evident that whether purchasing a new house becomes a relevant problem for all the families, and housing investments directly affect household's total wealth and expenditure (Gabriele Galati, Fedeirca Teppa, and Rob Alessie, 2011). On the other hand, the housing market directly influences the national economy since its strong effect on output growth, financial stability and the monetary policy transmission mechanism (Mishkin, 2007). For instance, the market value of the residential property stock approximately equates the annual average GDP in American economy (Davis and Heathcote, 2005). Furthermore, the housing market brings out a more convoluted mortgage market, which creates a new liability category for each family and leverages the profits from residential trading. Netherlands, for example, holding the most residential related debts in the European countries, its housing market wealth increase from 31 percent of total household wealth in 1993 to 43 percent in 2009 (Gabriele Galati, Fedeirca Teppa, and Rob Alessie, 2011).

The importance of housing market grabs policy maker's attention. Before 2008 American Financial Meltdown, Alan Greenspan, the chair of Federal Reserve, loosed the monetary policy regulation of housing market through subprime borrowers whose credit was not qualified for mortgage borrowing. It boosted American stagnant economy after 2001 but also fueled the housing bubble and brought hidden threat during the time (Bernake, 2013). After 2007 the housing bubble burst, the subprime borrowers were not able to pay back. Because of the high default rate, the cash became illiquid and

economics market went crash. Due to the serious credit crisis and the unstable housing sector, governors have become more concerned about the housing market dynamics, and put more effort on controlling the dwelling price. Accompanied with globalization nowadays, many policy makers believe that the housing market is closely associated with foreign-born population.

Foreign-born population reform results in the growth of total national population directly (Winkler, 2013). Logically, it should fuel the demand for dwelling in housing sector. However, the coming foreign-born population also encourages the natives to out-migrate because of the more competitive economic market. Still, part of the demanding group for dwellings is changing, from the local natives to foreign-born people. This alteration may leave an influence on the housing market by estimation.

This paper will put focus only on American housing market and foreign-born population's effect on it. It is known that the United States of America is one of the countries possess the most foreign-born population, and immigration is one of the most important factors in the demographic evolution of the United States (Albert Saiz, 2006). Providing with the shock of immigration, American economic market seems to become more crowded. According to the data from American Community Survey (ACS), by 2015, immigrants in the United Stated has arrived at 43.3 million, which accounts for 13.5 percent, of the total national population of 321.4 million. Among the immigrants, naturalized American citizens account for 48 percent (around 20.7 million), and 52 percent others included permanent residents or temporary residents on temporary visas (students or business). According to the previous research, the increase in foreign-born population influences the migrant counties' national economy. Labor market (Gross,

2002; Hum and Simpson, 2007), international trade (White,2007), capital market and many others are facing structures change due to the arriving of the immigrants. Housing market, in particular, is also affected because of the sudden arrival of off-shore investment in real estate. Start from 1980s, cities like London (King, 1990), New York (Sassen, 1991), housing value happened to be continuously rise related to the mounting immigrant population. Japan received over $3 billion international real estate investment in 1988 alone (Davis, 1992). In brief, the immigrants are expected to be eligible to leave a profound effect on the economy of migration country (Choi, 2004).

Figure 1 shows the owner-occupied houses and median house value for those dwellings on American metropolitan statistical area by 2015, while figure 2 tells the foreign-born population distribution also in American metropolitan areas in 2015. The most expensive area appears around California, and the median housing price is as high as $823,700. Other similar top-expensive areas are near New Jersey, Washington and Florida respectively. The cheapest area among all the metropolitan areas is around New Mexico, which values only $55,000. Therefore, by 2015, the housing value across all the metropolitan statistical areas presents to be a big price gap, ranging from $55,000 to $823,700. The following figure (see figure 2) describes the distribution of foreign-born population spreading over the metropolitan statistical area in America. Surprisingly, when we compare figure 1 and figure 2 altogether, we can find out that most immigrants dense-populated metropolitan areas are relatively possessing a higher dwelling price market. California, New Jersey, Washington and Florida all present to have larger foreign-born population resident in the area. Moreover, we gather all the median housing value and immigrant population together and generate a two-way graph in figure 3. It

shows an upwards sharp line and a positive relationship between the two variables. We thus can have a preliminary assumption that the foreign-born population increase will incline the area's dwelling value. The mechanism behind it is complex: the coming immigrant population influence the economic market structure, since it provides more labor supply and dwelling demand. However, responding to the increasing growth on population, natives may choose move out the area because of the more competitive market. It is hard to foresee how the dwelling changes because of the foreign-born population. Therefore, in order to test whether the assumption is true that the immigrant population do have a push-up effect to the dwelling market, we put median housing value as dependent variable and foreign-born population as independent variable respectively, along with other variables which may affect the dwelling value, and generate OLS regression to test the significances and coefficients between the variables.

This paper will answer the following question: first, do the immigrants leave a positive effect on the dwelling values? Second, is it a big effect, and do we need to worry about the increasing foreign-born population.

This paper makes some different contributions than other similar literatures. First, since America is one of the most immigrants-occupied country in the world, the foreign-born population should be a concerned group who contributes to the economy. Second, year 2007 to 2015 is a complicated episode for the United States because it underwent housing bubble and credit crisis. Both the housing price and the immigrant population experienced swing during the time. Third, unlike previous similar researches which commonly use foreign-born population's inflow as independent variable, this paper adopts the immigrant population distribution by year by metropolitan statistical area

instead. According to Akbari and Aydede (2012), recent immigrants actually do not affect the housing sector. Only the immigrants who move into the area ten years ago have strong influence on dwelling value. Therefore, there exists a time lag between the immigrants migrate into the area and the time that they do affect the housing market. Considering the complexity to measure this time lag, this paper chooses foreign-born population distribution over population inflow. Finally, instead of considering the problem of foreign-born population and housing price as a demand-supply problem, this paper believes the increasing foreign-born population in the United States of America facilitates the reallocation on population of natives and immigrants. Thus, the demanding group for dwelling alternates, and sequentially changes the price. This will be discussed more in section 5, conclusion and discussion part.

In the results, it is shown that the foreign-born population do incline the housing demand and dwelling value overall. In details, foreign-born population do affect the price of dwelling market. Specifically, 1 percent more foreign-born population coming into the area will push up 0.04 percent higher the local housing price in American metropolitan areas through 2007 to 2015.

II. Literature Review

There exits an abundant stock of literature on the similar topic observed in global housing markets, including countries Spain, United Kingdom, America, Canada and etc.

Many researchers believe that immigration do help encourage the increase of housing price. For example, Libertad Gonzalez and Francesc Ortega in their paper

illustrate that in Spain, immigration leads to sizeable increases in both the price of dwellings and construction activity (2006). More precisely, a migration-driven 1 percent increase in population corresponds to 1 to 1.6 percent housing price increase and 0.8 to 1 percent increase in dwelling construction in the following yearn. Moreover, there are surprisingly many authors who are interested in Canada, since the immigrant population growth, 13.6 percent, is about four times higher than the natives' population growth in Canada (Akbari and Aydede, 2012). Ley and Tutchener (2001) show that immigration was the most important correlated factor of changes in residential dwelling value from 1986 to 1996 in Vancouver. Bourassa & Hendershott (1995) found net overseas migration to be significantly associated with house price gains in six Australian state capitals. Compared to small cities, large cities, Vancouver and Toronto, accepted more foreign-born immigrants. Carter (2005) discovered that the immigrant families are more likely to have a family structure, which contains a husband, a wife and children. 20 percent of the foreign-born families has average household over five. He prospects further changes in Canadian cities, such as "the growth of exclusive, prosperous immigrant neighborhoods, the development of monster homes, new architectural designs, ethnic businesses and changing household growth patterns."

For American housing market specifically, Albert Saiz (2007), using instrumental-variable estimates, observes the housing price in the United States from 1995-1998 on metropolitan statistical area(MSA) level, and he also found out a positive relation between the rising immigration and booming housing price. His result shows that 1 percent more immigration population is correlated with 1 percent increase in average rents and 3 percent increase in housing values. Bohn, Magnus, and Raphael (2011) focus

on the low-educated, male Hispanic population's influence on rental housing. Their results show that the out-migration of the immigrants substantially increases the rental vacancies. Ottaviano and Peri (2008) study the relationship between the immigrant population on labor and rental market on state level, and they find out the rental elasticity of immigrants is about 0.7, while housing elasticity is between 1and 2. Albert Saiz (2003) also does a study on housing price in Miami influenced by the Cuban immigrants after Mariel Boatlift in 1980. He finds out that because of Mariel Boatlift, renter population increases 9 percent, and there is 8 percent to 11 percent more in Miami than in the cities of Florida states (comparison groups) between 1979 and 1981. Rental units of high quality were not affected. However, units occupied by low-income Hispanic residents in 1979 experienced an extra 8 percent differential hike with respect to other low-income units.

However, few researches stand on the opposite way and argue that the immigration might cause dwelling value drop, with considering the natives out-migration possibility (Filipa Sa, 2015; Painter, Gabriel, and Myers, 2001; Albert Saiz, 2006). In her observation of British real estate on city level from 2000 to 2010, natives' out-migration rate exceeds the immigrants in-migration rate. Moreover, most of the out-migration population is ascribed as the top of wage distribution. 1 percent increase in immigration to total population ratio brings up native out-migration rate by 0.078 percent. Her result therefore, shows the immigrants bring up a negative income effect, and pushes down housing demand and housing price accordingly. To explain the moving decision made by natives, both wages and housing price and rents have to be taken into account within an economics spatial equilibrium (Roback, 1982). Because of the more competitive market

after immigrants arrive, natives prefer to move out the area and choose another area in which the utility is higher to resident. Therefore, foreign-born population's effect on the housing market is unpredictable than we expected.

Many researches believed it is necessary to introduce instrumental variable in the model because of existing endogeneity problem. This analysis intends to only focus on and discuss how immigration affects housing price in a given area, but housing price immigration has reverse casual effect on immigration as well. The lower housing price might attract more immigration to the area, while higher housing price will scare away the immigrants. Therefore, in order to exclude the endogeneity in regression model, analysis should introduce instrumental variable. Therefore, many literatures involve instrumental variable in their methods. The most common instrumental variable is "Gateway City" and "Ethnicity Network". Ethnic networks instrument is first introduced by Card in 2001. He assumes the recent immigrants' moving decision will be mainly affected by the previous immigrants of the same origin who moved into the area 10 years ago. Therefore, his model also observes the population inflow 10 years ago. By the contrary, the immigrants 10 years ago shouldn't affect the housing demand and housing price, because their geographical settlement was far back enough decided in time. The idea was developed by Saiz (2007) and Ottaviano and Peri (2008). Recent applications of this instrumental-variable are Lewis (2003), Corts (2008), Frattini (2009), Cortes and Tessada (2011), Farré, González, and Ortega (2011), Dustmann and Glitz (2011), Libertad and Francesc (2011) and etc.

Another instrumental variable is "Gateway City," which is more often used for cross sectional analysis. The model suggests immigrants enter into the country either by

land, sea or air, therefore it introduces a three-dimension of accessibility (Libertad and Francesc, 2011). When a region has more airports, yards or highways, it is expected to have larger immigration inflow. For instance, state California, Arizona, New Mexico, and Texas are most accessible from Mexico in the United States, and therefore, they are expected to accept most Mexican immigrants than any other states. This idea was first inspired in Hunt (1992), who uses distance from Algeria to French provinces (plus other variables) as an instrument for the location choices of the 1962 Lagerian repatriates.

Other common instruments used in similar literatures also refers political affiliates. Political affiliation is a similar idea compared to the attitude to the immigrants from natives. Since two parties in the United States have fairly different policies toward immigration, we can calculate the proportion of each party's support rate of each state approximately as how much the local natives support the immigration. Considering the coming immigrants alter the capital market and distort the labor market, the natives may have a negative taste toward the immigration (Sa, 2015). Sequentially, the native's tastes may affect the immigrants' settlement decision. Logically, if a state's higher the Democratic support rate, larger the population of immigrants.

The remainder of the paper is constructed as below: section 3 will introduce the methodology the regression adopts, including the methods, and variables. Section 4 summarizes the median and standard deviation of each variable, and presents the OLS regression results between the variables, and section 5 concludes and discusses the further step that can be taken in the future.

III. Methodology

i. Model

The paper uses panel data from American Community Survey (ACS) based on metropolitan statistical area level (MSA) from year 2007 to 2015. MSA is a unique geographical classification only in America. It only includes dense-populated areas, along with its core and close economic ties throughout the area (Nussle Jim, 2008). Metropolitan statistical area does not need to be a legal administrative division, but and not requires to be centered on a single city. The standard only depends on whether the area has a large population over 50,000. MSA level helps minimize the gap between the geographies, such as environment and other unmeasurable factors. Also, metropolitan area's dwelling value experience more turbulence through the years and is easy to observe in the data. The most updated metropolitan statistical area map is shown in figure 4.

Empirical analysis adopts simple and standard linear regression model and supply-demand model for both median value of housing price and total housing units with their determinants. Following by the previous literature review, housing market is assumed to be clear that the equilibrium price can be determined by demand, such as foreign-born population, household income, employment rate and other endogenous determinants, accompanied with supply for the dwellings, dummy variables and other exogenous socioeconomic factors. Formally, the main equation is modeled below:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 W_{it} + \beta_3 Z_{it} + a_i + b_t + \mu_{it} \quad (1)$$

where D_{it} is the demand for owning a house by metropolitan area by year. X_{it} is the time-varying and geographical-varying foreign born population, consisting of both naturalized

and U.S. noncitizens. W_{it} describes other time- and area-specific but household-invariant regressors, which include housing stock, employment, number of households who own the houses, median household income and etc. Z_{it} captures household-variant regressors, such as householder's education. a_t is the year variable which range from 2007 to 2015, while b_i is the geographical dummy variable which captures all the metropolitan statistical area of the United States. The last term, μ_{it} is the error of linear regression model.

The second demand-supply model for is based on perfect and non-biased price quantity market. P_{it} is the equilibrium median housing price, dependent variable, by year by metropolitan statistical area, while Q_{it} is the equilibrium quantity of total housing units in the area during the time.

The data source is American Community Survey (ACS). It is an annual household survey by U.S. Census Bureau in the United States. It was fully implemented in 2005, and therefore, only short data history can be traced back. However, ACS approaches approximately 3.5 million households and group quarters in the United States, with sample selected from all counties and county-equivalents. The geography includes American Indian and Alaska Native area, and Hawaiian Homeland, and in Puerto Rico annually. Its questionnaires include household economic status related to population, race, family structure, housing, occupation, transportation, poverty, and etc. Moreover, because of geographic resolution and statistical significance, ACS sums up its data and releases in three different calendar year: 1-year estimate, 3-year estimate and 5-year estimate. This paper is based on 1-year estimate, considering short-term changes in median to large geographical distribution.

ii. Variables

1. Dependent variable
    a. Housing price

In order to measure the housing price, and avoid that inflation hampers the accuracy of data, the analysis chooses inflation-adjusted median value of owner-occupied house units (Table T101) from ACS as its dependent variable. The median divides the value distribution into two equal parts. One-half of the cases falls below the median value of the property, including house and lot, mobile home and lot, or condominium unit. And the other case is the other one-half above the median. However, since the distribution of the median housing price is strongly skewed, we take the log on the housing price, *houseprice*, as our final dependent variable.

2. Independent variable

In many researches about housing price and immigration, authors focus on the foreign-born population inflow. However, considering that immigration inflow has a lag effect on the dwelling value, and recent immigration wouldn't largely affect the housing market timely (Ather H. Akbari & Yigit Aydede), this paper chooses immigration distribution over population inflow for independent variable. Final data of independent variable comes from B07407 survey of American Community Survey (ACS). B07407 questionnaires if the residents stay in the same house, move to another county, or move to another states compared to one year ago. It also provides the total native and foreign born population on metropolitan statistical level. Foreign-born population is further divided

into “naturalized U.S citizen” group and “not a U.S citizen” group. In the model, we focus on total foreign-born population and natives as well. In order to match the log value on the housing price, we also put log before the independent variables, *totlforeignborn* and *totlnatives*.

3. Other distributes

    a. Median household income

Median household income is able to measure the basic purchasing power of households (David Ley & Judith Tutchener, 2001). The analysis also uses the log value on median household income data captured from ACS, which is already adjusted by inflation in each year, and put variable *medianhouseholdincome* as a potential attribute to the housing price.

    b. Unemployment

Unemployment is an important index to the macroeconomics of market, and it also decides average financial level in a given area. Giving a high employment rate in the area, the dwelling value is expected to comparably high. Thu, the model introduces variable of log value on employed population on metropolitan statistical area, *employed*. The unemployment information comes from Table T37 in ACS data pool.

    c. House Stock

The number of houses available for sale also matters the the house price, and we may consider it as house supply. In the supply-demand model, it will directly affect the housing market. The model uses variable, *forsaleonly*, to indicate he the log value on the number of dwelling stock in the housing market. The data is extracted from vacancy of

houses by tenure, survey T96 in ACS, and it is divided from the total housing units in Table 93. Since the table specifies the reasons why the housing units are vacant at the time, including for sale, for rent, for business, and etc. The analysis only captures the houses which are vacant for the purpose of sales.

d. Total number of households

In order to measure the potential demand in a given area, we introduce the total number of household. It is appeared as *totlhousehold* in the model. However, the data in Table T94 of total number of households include both the number of families who own a house and also those who rent a house. Therefore, we need to introduce another variable, *owners*.

e. Total households who own the house

To choose a shelter, most families face two choices, purchasing a house to own or rent a house and pay the rents. Since only the house owners will care about the house price, while the renters care the housing rents more than dwelling value, the analysis introduces *owners*, which only represent the households who own the dwelling, and no matter whether the family is under mortgage or not. Compared to total number of households, the previous variable, the number of owners measures the existing number of house owners in the analysis. Similarly, the model also uses the log value on the owners, and *owners* to be an observing variable. The data is also available in Table T94 in ACS dataset.

f. Householder's Education (Owners only)

Householder is the head of the household the one who has the biggest power to do economics-related decision for the family. Householder's education may impact its household income and decide if purchase a new house. Therefore, the model introduces householder's education variables, including *ownerbeforehighschool*. *ownercollege*, and *ownerbeyondcollege*. The information is gathered from survey B25013 from ACS.

g. Total housing units

The other dependent variable of this analysis is the total housing number of the areas, expected as the quantity of houses. The number of housing units is offered in survey B25001 of American Community Survey. It includes occupied houses, both owner-occupied and renter-occupied, and vacant houses at the time. The analysis also uses log value of this dependent variable, *housingunits*, to test OLS regression.

IV. Results

i. Data Summarization

Table 1 provides sample means and standard deviation for all the variables by selected year (2007, 2009, 2011, 2013 and 2015). As seen in the table, economy in 2007 to 2009 was experiencing a trough of a business cycle. The housing price suffered a large drop after 2007, and the market began to recover after 2011 but slowly. The median housing price returned normally and increase steadily until 2013. Similarly, the foreign-born population also experienced a swing from 2007 to 2011. However, the foreign-born population in America began to respond to financial crisis only after 2009. Before that

the foreign-born population still presented to be incline. Two years after, the foreign-born population returned to increase.

However, the growth of local natives in America exceeds largely compared to the coming foreign-born population. A corresponding drop also happened in natives' population, but it recovered after 2011 and again became steadily after 2013. Moreover, by looking at the total number of household and the total number of owners who own a house, it is easily to find that after credit crisis, the total number of households declined, largely result from the decrease in number of house owners. In the recovery state of American economy, the total number of households began to increase, but most result from the rising house renters. Median household income is steadily incline during the years, even after the financial crisis. However, the median household income largely improved after 2011. Furthermore, the summary of householder's education describes a trend that the education level of householders who own a house is improving. The total number of owners who have education beyond college is rising after the recovery of housing market, while the total number of owners who have high school education is declining. The total number of employed citizens are largely impacted by the Financial Meltdown in 2007. Unemployed population dramatically inclined during 2007 and 2011. From 2011, the crisis shock effect waned and unemployment rate began to return steadily. Surprisingly, the house stock for purchasing is declining all the times. Still, the most violent decrease happened after 2009, the crisis of housing market. By estimation, the supply for houses is declining because of the limitation on the land for construction activities.

ii. OLS Regression

Based on variables and regression model, I obtained the data from American Society Survey and merged them altogether. However, one deficiency of ASC data pool is that it doesn't conclude the static metropolitan statistical area code and those areas changed name in both years 2009 and 2012. It takes effort to alternate the names of areas in order to put in uniform, but most importantly, the new-added metropolitan statistical area, which only include housing information only for 3 to 5 years, might distort the test. Thus, I excluded the areas whose number of observations is less than five.

After I recollected all data, and then generated a histogram of median housing price for all the areas through 2007 to 2015 (see figure 4). The histogram (Figure 4) presents not to be normal, strongly skewed. It tells us that although the analysis already tests the relationship on metropolitan statistical area level, it still cannot exclude geographical difference which may cause house value to be varied through the years. Therefore, this paper tries using log value of house price instead of regular dwelling value in order to get a better-distributed data. Correspondingly, because of the large population base of metropolitan statistical area, the OLS regression tests the log value on proportion of foreign-born population over total population and the log value of median housing price. Since the analysis more focuses on the reallocation on the population of foreign-born and natives, the proportion is more easily to show the population distribution. Then I also hit another histogram on the log value, and the graph (see figure 5) shows to be better but it is still little skewed and has a short tail on the right. The skewed histogram might influence the regression test if the high-valued areas dominate the whole test. In other words, if expensive areas show positively with foreign-born

population while low-valued areas present a negative one, we are not eligible to observe the negative relationship. Thus in order to get a better regression, I subdivided the metropolitan statistical area into two groups according to their median dwelling price, the low-priced area whose log value is above 12 (subgroup 1), expensive group above 12 (subgroup 2), and super-expensive area exceeding 13.

Table 2 presents the OLS regression of estimates of how foreign-born population and other related variables affect the house value. The first column tests all the areas' median dwelling value with their immigrant population, while second, third and fourth columns are testing the subgroup separately.

By looking at the coefficients of immigrants of housing price in all metropolitan statistical areas, it is shown that there 1 percent in the total foreign-born population will result in 0.4 percent rise in the median dwelling price in that area. The significance of foreign-born population, *lgtotlforeignborn*, is at 1 percent significance for all the metropolitan statistical areas. Also, foreign-born population has effect of 5 percent significance on super-expensive areas whose log house value exceeds 13, but the foreign-born population leads to a decline effect on the price of dwelling market. The housing price in the excessive expensive area is pushed back 0.4 percent after 1 more percent on foreign-born population over total population. For the relatively low-priced metropolitan areas, foreign-born population have a positive relation with the median housing price. 1 percent more foreign-born over total population is about to incline the median housing price 0.03% within the area. Another observation is between the total households and total number of house owners. Both variables present to be significantly important to the median housing price, and both have positive relations. However, the coefficient for total

households is less than the coefficient of total number of house owners. Since the total number of households includes house renters and house owners, we can conclude that the rental house is a substitute for owner-occupied a house. 1 percent increase in the total number of rental household will decline 1 percent value of median house value. It is also a significant variable in the model as well. Furthermore, employment seems to be the most essential factor to the housing price in total areas with highly significance. 1 percent more employed population bring up 0.8 percent more the median price of dwelling value.

For the super-expensive areas whose log house price exceeds 13, the relationship between foreign-born population and housing price present in an opposite way. 1 percent more immigrant population lower about 0.38 percent of the house value. And also, natives push down affect much more than the immigrants to the expensive housing market. 1 percent more of total natives' population pushes down 1 percent median housing value. However, in this super-expensive housing market, there exist more renters than the house owners. Therefore, for the metropolitan statistical areas whose dwelling price is superior valued, immigrants are more likely to rent a house instead of purchasing one. Therefore, the coming foreign-born population wouldn't boom the owner-occupied house value.

Moreover, depending on the comparison between the median-above house market and median-below housing market, foreign-born population has more effect on the lower-price market. 1 percent more immigrants raises 0.033 percent on median housing value in the relatively low-priced house market, while 1 percent immigrants only increase 0.017 percent on dwelling value for the above-median hose market. Therefore, the information fully explains that the immigrants prefer to choose less expensive area to resident instead.

V. Discussion and Conclusion

As we can see from the data, the total numbers of house-owners and households are increasing after immigrant population swarm into America. However, the number of total households is not increasing as many as the total number of house-owners. Since the total households is composed of house-owners and house-renters, we can easily find out that the total number of house-renters is actually dropping during the immigrant population shock. On the other side, the American-born natives population's increase only push down the dwelling value in a insignificant level. Based on all the information, the data is telling that after foreign-born population come into the area, the total demand of a house is incline, and thus stimulate dwelling value. In other words, foreigners prefer to possess a house rather than rent it. Because of that, the ownership is rising because of the increasing immigrants. Moreover, through OLS regression, rental houses present to be substitute of owner-occupied houses.

As most policy makers believe, the foreign-born population is closely associated with national economy. In order to monitor the housing market in the future, governors should consider the foreign-born population also as the housing sector's dynamics.

However, the model in this paper exists several limitations. This analysis excludes the endogeneity problem. As mentioned in section 2, literature review, this topic involves endogeneity, because housing price has a reverse effect on foreign-born population distribution. However, since there is limited data depending on metropolitan level, including both political affiliates and immigrant population ten years ago, the model is unable to introduce a direct instrumental variable. Further analysis can be explored on the IV two stage regression of the dwelling value and existing variables.

In further step, the analysis can trace back the country that foreign-born people come from. Therefore, instead of only focusing on the migration countries which accept the move-in immigrants, the analysis is also able to look at which country export the immigrants leave most profound effect on American economics market.

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Table 1: Sample Means and Standard Deviation of All Variables by Year

Table 1: Sample Means and Standard Deviations of All Variables by Year

	2007 N=384	2009 N=384	2011 N=384	2013 N=384	2015 N=384
Outcomes					
house value	194763.1 (118825.3)	182997.3 (88020.3)	173728.1 (80099.3)	176638.8 (84122.0)	190339.8 (97743.6)
independent variable					
foreign born population	117128.1 (456365.0)	118405.3 (452171.8)	115035.4 (464827.7)	121944.8 (461740.6)	127045 (478500.0)
Other variables					
native population	682569.8 (1290619.9)	685244.9 (1310724.4)	641561.7 (1243014.2)	696069.8 (1318619.5)	705733.2 (1335831.2)
total household	300553 (610371)	298602.8 (612736.0)	281687.5 (597587.4)	303588.1 (622411.0)	309235.7 (631841.3)
total owners	197690.1 (367064.9)	191922.3 (359474.6)	176686.7 (334349.4)	188117.8 (351634.1)	190189.9 (352928.9)
employed	391074.6 (830535.7)	381235.4 (824937.1)	353337.6 (789885.3)	389126.4 (842576.6)	404753.2 (878086.9)
housing stock for purchasing	5144.4 (9737.9)	4926.6 (9148.1)	4311.4 (8170.5)	3415.6 (5954.0)	3390.8 (6305.2)
median household income	60903.6 (10841.3)	61467.2 (11482.0)	62062.7 (11903.1)	64712.3 (12525.5)	68024.2 (13416.9)
owner less than high school	19784 (36650.3)	17749.8 (33801.6)	15333.2 (30272.4)	15198 (29547.4)	14621.2 (28528.3)
owner high school and college degree	49026.4 (84841.7)	44257.6 (76842.3)	40775.9 (70824.6)	42011 (72580.4)	41792.6 (70713.4)
owner beyond college	72654.7 (155349.1)	72270.8 (155729.3)	67948 (150046.6)	74752.1 (160290.4)	77844.6 (165926.6)

Table 2: OLS Regression on Median Housing Price by all Metropolitan Statistical Area from 2007 to 2015

	(Group 1)	(Group 2)	(Group 3)	(Group 4)
	All metropolitan area (N = 384)	Metropolitan area whose lghousevalue >= 13 (N = 133)	Metropolitan area whose lghousevalue <= 12 (N = 183)	Metropolitan area whose lghousevalue >= 12 (N = 201)
lgtotlforeignborn	.03905982**	-.37648977*	.03093776**	0.01726018
lgtotlnative	-.21440027*	-1.0291411	0.01434283	-.51330154***
lgtotlowner	.28835005*	1.2483886	-0.06464946	.83474518***
lgtotlhousehold	0.18211261	1.7551114	-0.0480519	.49709636***
lgmedianhouseholdincome	.6672162***	0.37732141	.53977477***	.70278841***
lgownerlesshighschool	.05524602***	.15080121*	0.01338155	.06459314***
lgownerhighschool	.1218547***	0.09507502	0.02023791	.09266628*
lgownerbeyondcollege	0.02477298	-0.36711906	.07944797**	-.10621292*
lgemployed	.80127938***	3.3926977***	-0.14716679	1.5351774***
lgforsaleonly	.02972401***	0.0005492	.00856247*	.03569113***

legend: * p<.05; ** p<.01; *** p<.001

Appendix

Figure 1: Median house value by 2015 on MSA level in U.S.A

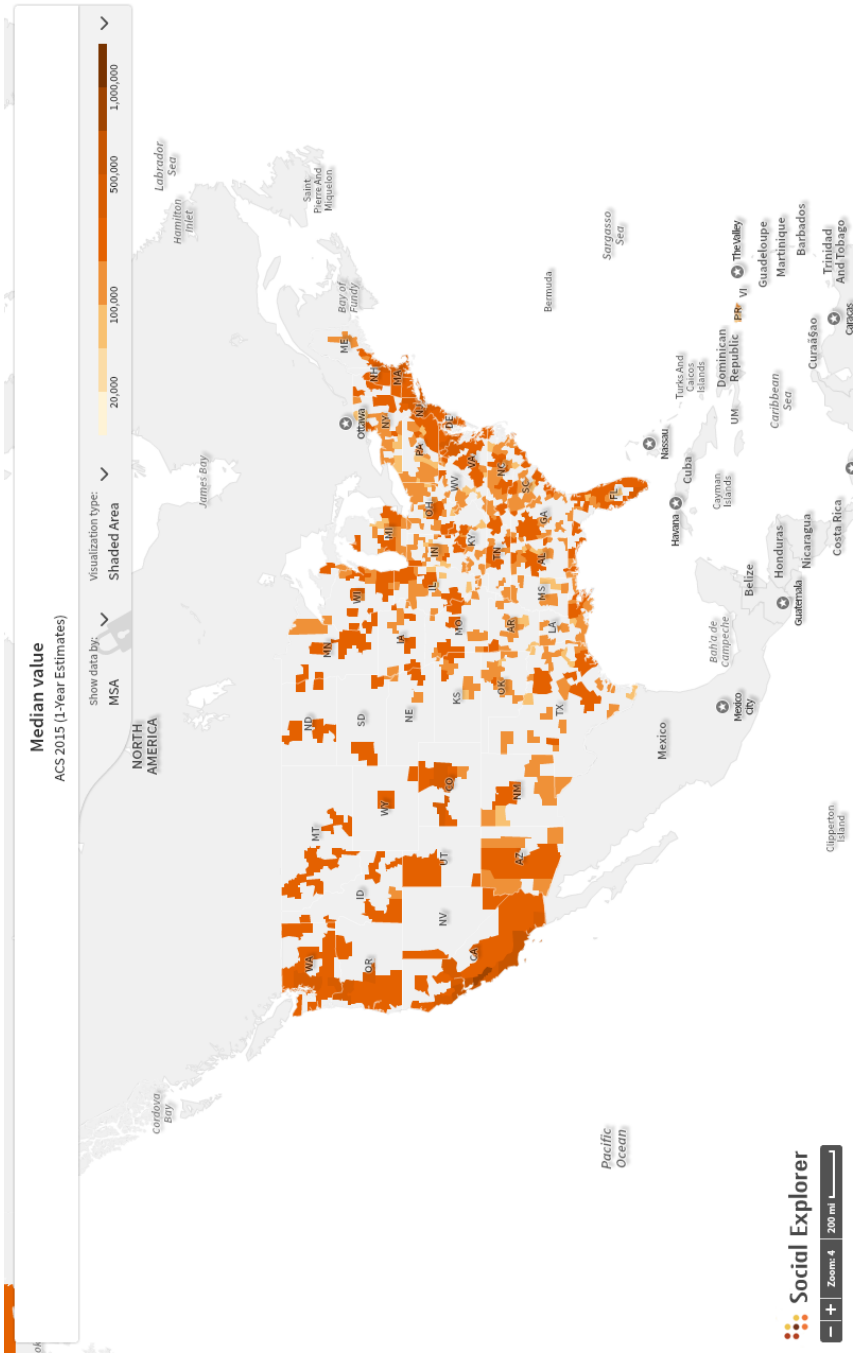

Figure 1: Median Housing Price by 2015 on MSA level in U.S.A.; SocialExplorer,2016.

Figure 2: Foreign-born Population Distribution by 2015 on MSA level in U.S.A

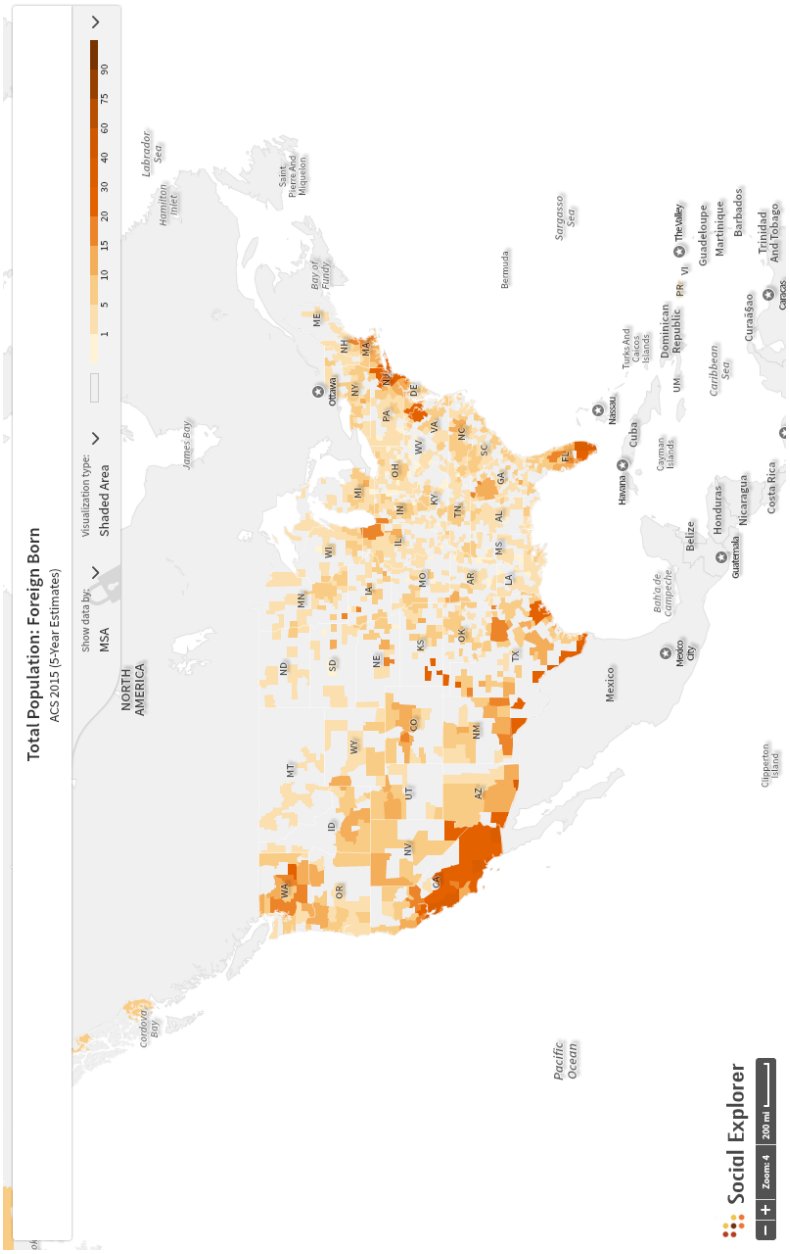

Figure 2: Foreign-born Population Distribution by 2015 on MSA level in U.S.A.; SocialExplorer,2016.

Figure 3: two way plot and linear prediction of log(house value) and log(foreign-born population)

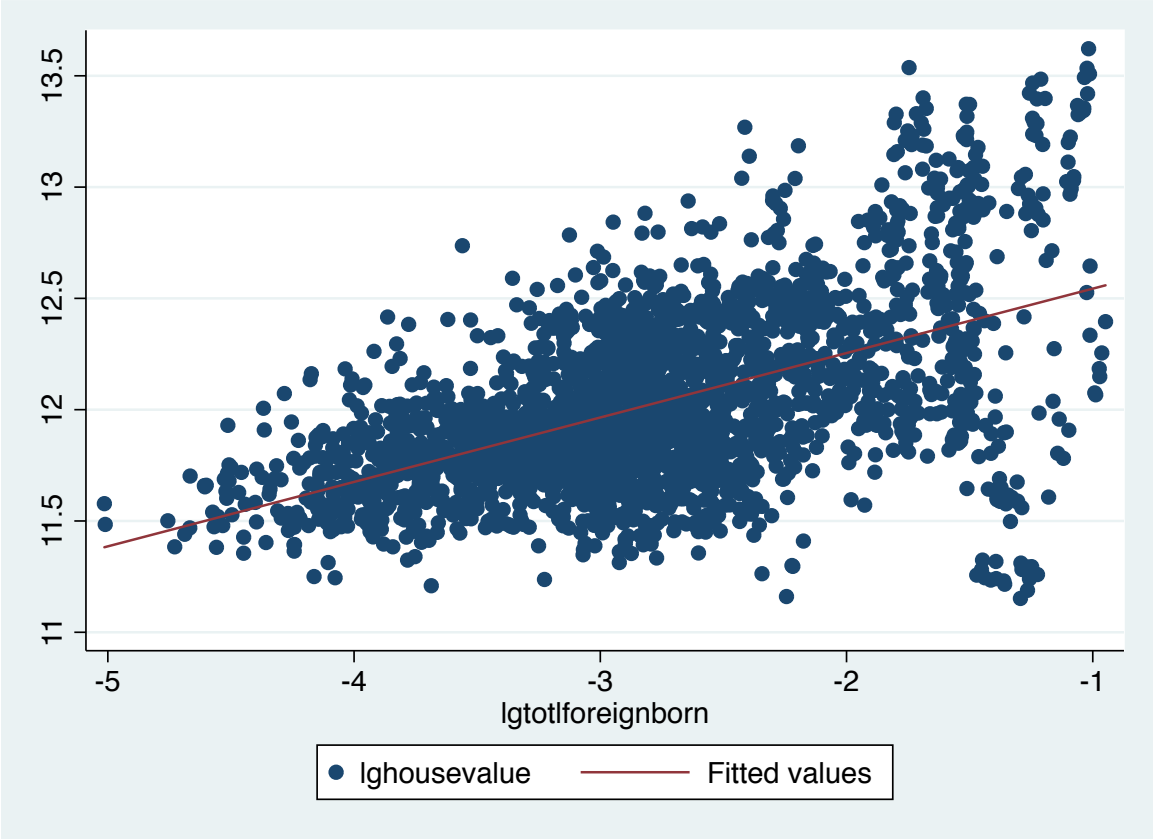

Figure 4: The Histogram of Median House Value of All Metropolitan Areas in the United States from 2007 to 2015

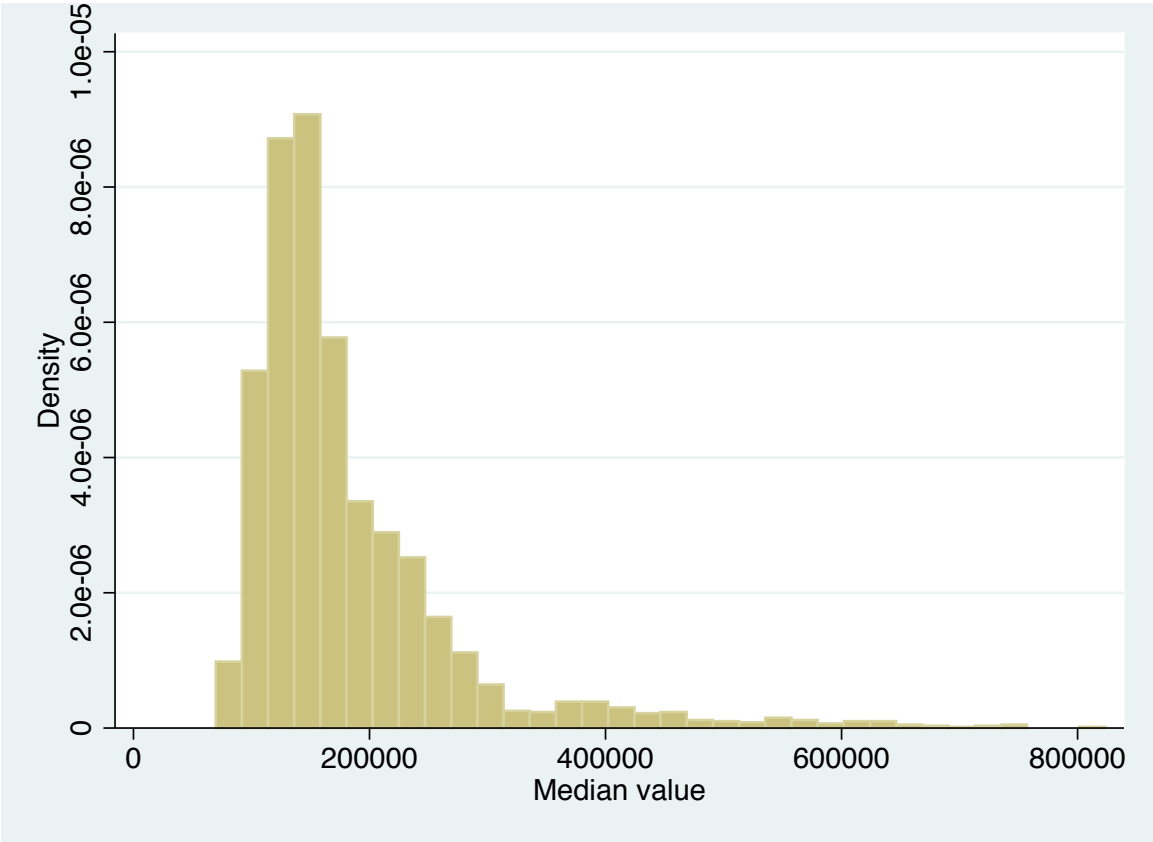

Figure 4: The Histogram of Log Value on Median House Value of All Metropolitan Areas in the United States from 2007 to 2015

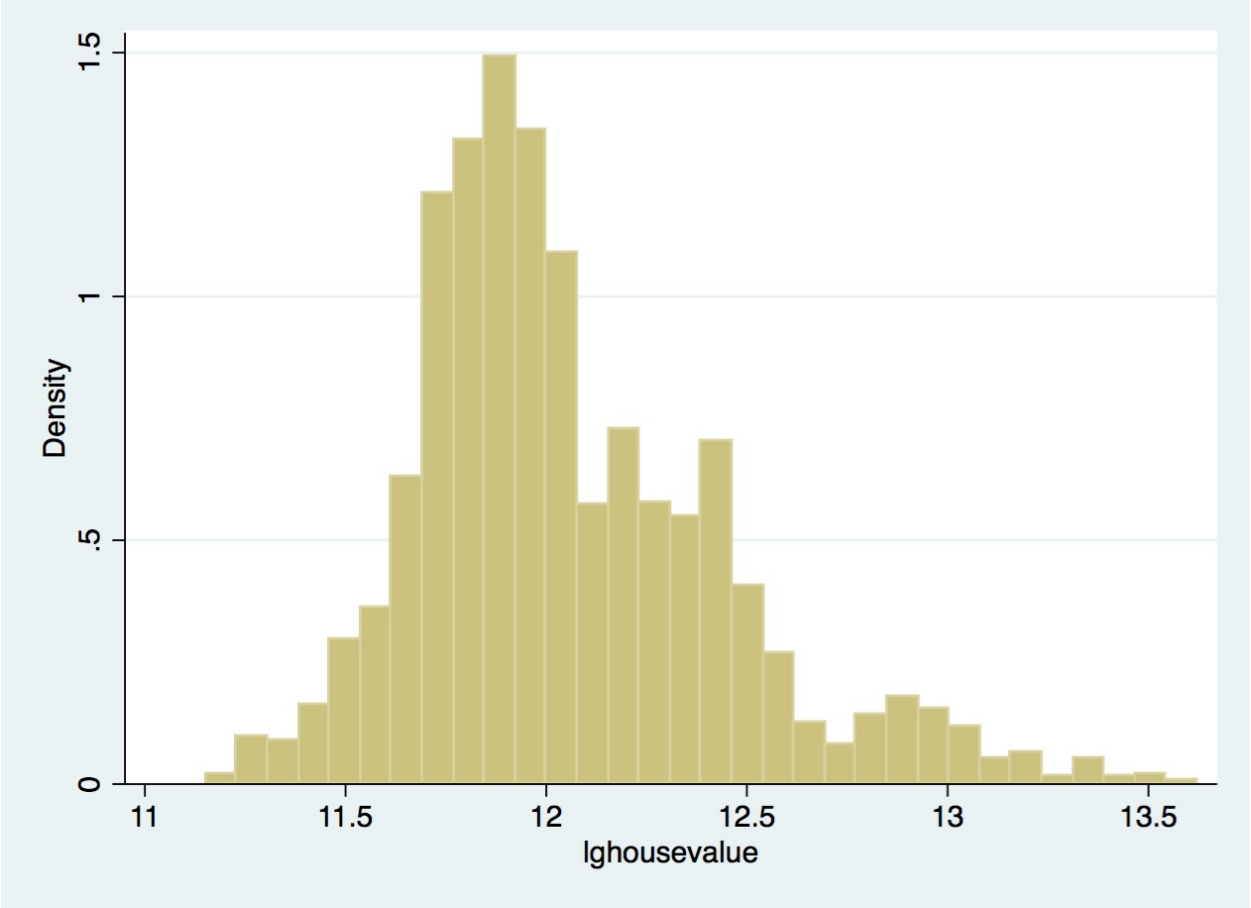

Figure 6: Map of Metropolitan Areas in the United States by 2015

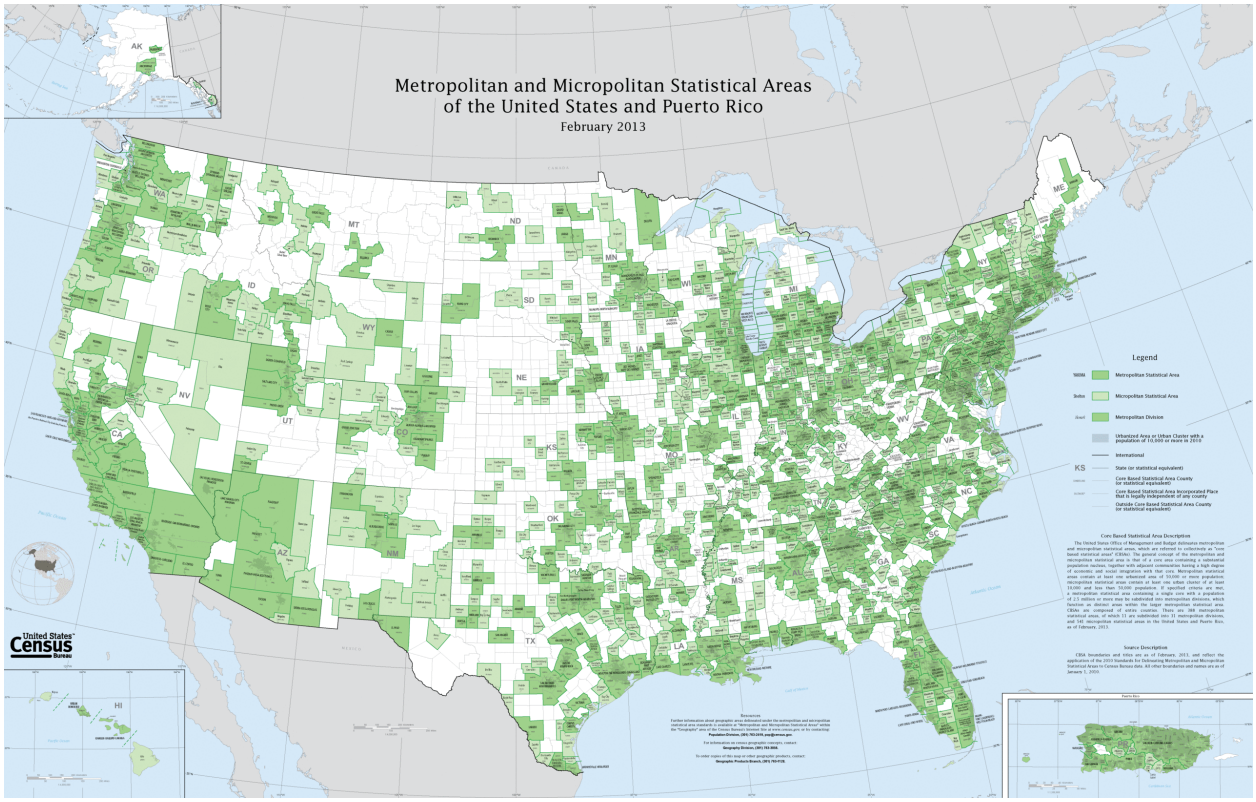

Figure 6: The Most Updated Figure of Metropolitan Statistical Area and Micropolitan Statistical Area by 2015 in U.S.A.; United States Census Bureau,2016.