

**ANYWHERE THEY GO, WE GO:
IMMIGRATION INFLOW'S IMPACT ON CO-ETHNIC NATIVES IN THE U.S.**

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Abstract

Using data from the 1970, 1980, 1990, and 2000 Censuses and the American Community Survey five-year sample for 2006–2010, we examine the impacts of immigration inflows on the migration patterns and wages of co-ethnic natives in the United States. We explore whether these patterns are driven by changes in labor market returns in the receiving cities or socio-cultural benefits of being surrounded by co-ethnics. We find that a higher ethnicity-specific immigrant population share within a city increases the population share of both pre-existing co-ethnic natives who remain in the receiving cities and out-of-town co-ethnic natives who migrate into these cities, relative to natives of other ancestries. All baseline results survive various robustness and falsification tests, as well as instrumental variable estimations. Importantly, we also find that the socio-cultural benefits, such as language and ethnic goods that immigrants bring to the receiving cities, are the potential channels that attract co-ethnic natives to migrate towards those enclaves.

JEL Codes: J15, J30, J61

Keywords: immigration, domestic migration, local labor market, ethnic enclave

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1. Introduction

The United States has experienced multiple waves of mass migrations. While the great majority of migrants were from southern and eastern Europe at the turn of the 20th century, a diverse group of ethnicities has continued to arrive in the United States since the Immigration and Nationality Act (INA) of 1965 (Xie and Gough, 2011). As the United States receives more and increasingly diverse immigrants,¹ understanding the attachment between immigrants and their co-ethnic natives is an important topic to both academia and the public. Besides immigration's potential impacts on natives' labor market outcomes due to their influences on labor supply and labor demand (Borjas and Doran, 2012; Wright et al., 1997), the increasingly diverse immigrants also create ethnic enclaves that may have specific impacts on the migratory decisions and labor market outcomes of natives who share the same ethnic backgrounds. Particularly, immigration inflows may not only provide positive or negative effects that might respectively benefit or harm the labor market outcomes of co-ethnic natives in the receiving areas (Portes and Bach, 1985; Damm, 2009; Aizer and Currie, 2002) but also provide unobservable socio-cultural benefits that influence the migratory decisions of co-ethnics.

This paper studies the impacts of immigration inflows on co-ethnic natives' migration patterns and labor market outcomes. Specifically, we first analyze whether immigration inflows of a particular ethnicity to a city would affect the propensity of co-ethnic natives to remain in that receiving city or migrate into that receiving city, compared to natives of other ethnicities. We then examine whether these patterns are linked to potential impacts of immigration on local labor market returns of co-ethnic natives. Furthermore, we explore whether other factors such as

¹ We present a figure on the changes in immigrant population shares of four race groups of whites, blacks, Asians, and Hispanics over time in Figure A1 in the Appendix. All races have experienced an increase in their population shares to various degrees.

unobserved socio-cultural benefits brought about by immigration inflows are the potential channels underlying the migratory patterns of co-ethnic natives.

Using data from the 1970, 1980, 1990, and 2000 Censuses and the American Community Survey (ACS) five-year sample for 2006–2010, we find that an increase in the co-ethnic immigrant population share in a metropolitan statistical area (MSA) leads to a higher percentage of co-ethnic natives to remain in the receiving city and pulls a higher percentage of co-ethnic natives living outside of the receiving city to migrate in, relative to natives of other ancestries. We also find that natives' wages are not, on average, associated with changes in immigrant population shares and, therefore, are unlikely to explain the motivation behind the migration choice of co-ethnics. In addition, heterogeneity analyses show that co-ethnic natives who are more culturally attached to their ethnic roots are more likely to migrate to receiving cities, and that immigration inflows from countries that potentially provide more socio-cultural benefits, such as linguistic convenience, are also more attractive to co-ethnic natives. We consider these results as evidence suggesting that the socio-cultural benefits brought about by immigration inflows, instead of labor market effects, play an important role in motivating the migratory decisions of co-ethnic natives.

The remainder of the paper is structured as follows. Section 2 introduces the background and the contribution of this paper. Section 3 discusses the datasets and sample. Section 4 provides the model, followed by a discussion of main results in section 5. In Sections 6 and 7, we present robustness and falsification tests, as well as explore the potential mechanisms behind the migration patterns of co-ethnic natives. Instrumental estimations are considered in Section 8. Section 9 concludes the study.

2. Background and Motivation

2.1 Impacts of Immigration on Natives' Labor Market Outcomes

The literature produced a wide range of empirical results on the wage and employment impacts of immigration.² The primary determinant of how arriving immigrants affect natives' outcomes in local labor markets depends on to what extent the immigrants substitute or complement the skills of natives. For example, an increase in competition of a certain skill group due to immigrant inflows could hurt the wages and employment opportunities of natives (Borjas and Doran, 2012). On the other hand, the decrease in equilibrium wages of labor input of a certain skill level due to immigration could either drive employers to hire more workers of that skill level or propel the local industries to restructure to take advantage of the lower labor costs and consequently mitigate any initially negative wage impact (Wright et al., 1997).

The strand of literature that is most relevant to our study investigates the migratory responses of natives due to immigration inflows. Borjas et al. (1996, 1997) and Borjas and Doran (2015) suggest that natives might leave the local labor markets where immigrants of similar skill levels arrive due to increased competition, thus dissipating the labor impact of immigration. These studies are, however, contradicted by other findings suggesting that immigration inflows either do not have a significant impact on out-migration decisions of natives (Wright et al., 1997; Kritiz and Gurak, 2001) or could even attract natives that share similarities with the immigrants (Card and DiNardo, 2000; Yang, 2017). Due to the nature of the research questions among these studies, there is, unfortunately, few explanations as to why the migration patterns of natives are as observed.

² Card (1990), Hunt (1992), Friedberg (2001), Angrist and Kugler (2003), Yasenov (2017) all find that the negative labor market impacts of immigration are small or non-existent and if any, only concentrated in the low skill sector (Lee, 2017). These results, however, are challenged in several fronts, such as questions about the causal identification of the studies (Angrist and Krueger, 1999) and concerns about miss identifying the subgroups that were most susceptible to the immigration's substitution effects (Borjas, 2017; Borjas and Monras, 2017).

Very few studies have attempted to analyze labor market outcomes for the native-born population from the perspective of co-ethnics. Prior studies have primarily focused on the general labor market effects of immigrants on similarly skilled natives, irrespective of which ethnic groups the natives belong to. Our study about understanding the attachment between immigrants and co-ethnic natives is important because it attempts to shed light on the dynamic shape of local labor markets due to the form of ethnic enclaves, which might not be apparent when studying the impacts of immigrants on natives beyond the same ethnic background.

To our knowledge, the only paper that studies the impact of co-ethnic immigration inflows on natives is Yang (2017), where the author uses a quasi-natural experiment in the formation of Chinese communities in California following the INA of 1965. The paper finds that compared to Japanese-Americans and Korean-Americans, Chinese-Americans are more likely to migrate to California since 1965 and enjoy positive economic returns. Yang (2017) therefore concludes that Chinese immigration inflows in California create conducive effects to the labor market success of Chinese-Americans and provide non-monetary benefits specific to the Chinese community. In our paper, we contribute to Yang (2017) by analyzing the migratory impacts of immigration inflows on co-ethnic natives of all identifiable ethnicities within all MSAs that are consistent between 1970 and 2010 to make inferences on the average labor market (and other) impacts of immigration on co-ethnics.

2.2 Immigration Inflows and Co-Ethnic Natives

Given the importance of analyzing the impact of immigration on co-ethnics, we detail the potential reasons regarding how and why immigration inflows, and by the extension of ethnic enclaves, could impact the migratory patterns of co-ethnics and related labor market outcomes.

Portes (1987) suggests that there are monetary returns in the labor market where there is a concentration of co-ethnic immigrants. First, there are higher returns to ethnic-specific human capital skills, such as ethnic language and ethnicity-specific cultural knowledge (Portes and Bach, 1985; Jensen and Portes, 1992). Second, ethnic peers might have better information about job vacancies, the establishment of ethnic businesses, sources of loans, or potential good matches between perspective workers and employers (Anderson et al., 2009; Damm, 2009). Accomplished co-ethnics can also help less skilled enclave members improve their marginal productivity through knowledge and experience sharing (Edin et al., 2003, Cutler et al., 2008) and can promote better work ethics (Zhou, 2004; Xie and Gough, 2011; Borjas, 1986). There are, however, many studies suggesting that living among co-ethnics could negatively impact labor market outcomes. Besides the potential wage decreases due to increases in the supply of similar workers, social networks could also provide information that is not conducive to labor market success. Examples include welfare opportunities and government assistance programs. These network effects could potentially cause a higher probability of idleness and lower productivity of those who live in areas with high concentrations of co-ethnics (Bertrand et al., 2000; Aizer and Currie, 2002). At the same time, some papers also suggest that people can be attracted to their co-ethnic immigration inflows due to benefits unrelated to the labor market. Examples of such benefits include linguistic convenience, residence near friends and relatives, ethnic foods, ethnic-specific religious institutions and ethnic schools (Chiswick and Miller, 2002; Yang, 2017).

While the abovementioned studies mainly focus on the impact of ethnic enclaves on immigrant outcomes, they suggest a mixed influence with many competing factors. Therefore, which factors play a more significant role is an empirical question. Built upon the previous literature, our study aims to examine the impacts of immigration inflow on the migration pattern

of co-ethnic natives in the United States and further investigate the potential channels. There are several advantages to focus on co-ethnic natives instead of native-born in general or pre-existing immigrants. First, compared to natives without co-ethnic background, co-ethnic natives may be more reactive to immigration inflows because they may have preferences for ethnicity-specific amenities and be able to provide ethnicity-specific services in immigrant-receiving local markets. Also, co-ethnic natives may have more freedom in migratory choices than immigrants, because they face lower migrating obstacles such as an unfamiliar host country language or a lack of social, cultural, or legal knowledge about the destination areas. Thus, focusing on co-ethnic natives' migrating behavior would better reflect the impacts brought about by immigration inflows. Second, changes in the co-ethnic immigrant share in the population is exogenous to natives, and since the migration patterns of natives and their human capital characteristics do not significantly affect the immigrant population share and their average human capital quality, we sidestep many endogeneity issues, such as the reflection problem.³ Lastly, this paper analyzes the impact of immigration inflows on all identifiable ethnic groups within all consistently identified MSAs in the United States for a long period of time. The results obtained in this paper can be considered as the average effect of immigration inflows, largely free from unobserved characteristics associated with a certain ethnic group, a certain area, or a certain time period. We hope the results presented in this paper would benefit the broad policy discussions related to immigration.

³ The reflection problem is evident if the focus is on immigrants' outcomes, because the treatment group of immigration inflows also makes up the treatment. In other words, immigrants and their human capital characteristics directly contribute to the population share and average human capital of immigration inflows. While there is a strand of literature that attempts to avoid this endogeneity issue by exploiting quasi-experiments of exogenous government refugee placement policies in various countries (Edin et al., 2003; Damm, 2009; Beaman, 2012) or through the adoption of instrumental variables (Cutler et al., 2008), the empirical results do not show consensus as to whether the immigration inflows have a positive or negative impact on the labor market outcomes of co-ethnics. This is possibly due to the fact that factors specific to the policy, the country, or the time period in question could cause unique impacts not applicable in other scenarios.

3. Data and Descriptive Statistics

We use the Integrated Public Use Micro Samples (IPUMS) data from 1970 to 2010, which includes two versions of the 1% state samples and two versions of the 1% metro samples of the 1970 Census; 5% Census samples of 1980, 1990, and 2000; and the ACS five-year sample for 2006–2010 (Ruggles et al., 2010). The sample is restricted to people who are between 18 and 64 years old and are not in school.⁴ In the discussions, we define an immigrant as a person born outside of the 50 U.S. states and a co-ethnic native as a person born within the 50 U.S. states and of foreign descent. The ethnicity of immigrants is differentiated by countries of origin, and there is a total of 113 ethnic groups in the analysis.⁵ The geographical units are divided by MSAs, and there are 101 identifiable MSAs consistent across samples.

We identify the ethnicities of natives using the following criteria. In the data from the 1980s and onward, we identify a native's ethnicity by their ancestry responses. Specifically, the person's ethnicity is identified according to their first ancestry response if the response is not the "United States". If the response of the first ancestry is empty or the "United States", the person's ethnicity is defined according to their second ancestry response. In the 1970 Census, where the ancestry responses are not available, we define a native's ethnicity according to their father's and mother's countries of birth. Specifically, the father's country of birth is used first to identify the native's ethnic group, and if the person's father is born in the United States, the mother's country of birth is then used as the identifier. We dropped observations of natives who identify their ethnicities only as the "United States".

⁴ This sample restriction also ensures that American-born children from the previous wave of immigration inflows are not included in the co-ethnic native-born sample.

⁵ A map of the 113 ethnicity groups (countries/regions) included in this analysis can be found in the Appendix Figure A2. We exclude Canada from the sample because it is theoretically difficult to differentiate Canadians from Americans as a separate "ethnicity." Note that including immigrants from Canada does not significantly change the results found in this paper. People born in Puerto Rico and the Virgin Islands are considered as immigrants.

Table 1 provides the basic demographic characteristics of the co-ethnic natives in our sample over the entire sample periods. It is worth noting that the proportion of people who are married and have children in the household both declined over the years, from 73 to 56 percent, and from 54 to 41 percent, respectively. There is also an increase in the proportion of female respondents in the sample, from 37 to 48 percent. Years of schooling rise from lower than 12 years in 1970 to nearly 14 years in 2010. A closer look at education attainments shows that the proportion of people with less than a high school degree drops from 38 to 5 percent; at the same time, the proportion of those with a college degree or higher grows from 15 to 40 percent. The racial composition of the population does not vary significantly over the sample period.⁶ The immigrant population share by MSA and ethnicity exhibits a decreasing trend over time, varying between 0.66 percent and 0.21 percent. This may be due to the increasing diversity of immigrants and the trend where immigrants were increasingly moving to places previously inhabited by very few immigrants (Alba and Nee, 2003).

[Insert Table 1 Here]

4. Model

To understand the impact of immigrant inflows on co-ethnic natives' migration decisions, we explore the internal migration patterns of co-ethnic natives from two channels. First, we examine whether immigrant inflows would induce more co-ethnic natives to remain as residents in the receiving cities, defined as *stayers*. Specifically, we estimate the following model:

$$stayer_share_{rct} = \alpha + \beta \cdot immi_share_{rct-1} + X_{rct}\Gamma + v_{rt} + \rho_{ct} + \theta_{rc} + u_{irct} \quad (1)$$

⁶ The population shares of racial groups add up to higher than 100 percent because many native-born people identify themselves with multiple racial groups.

where $stayer_share_{rct} = \frac{\sum_i stayer_{irct}}{\sum_{ir} stayer_{irct}}$ measures the share of co-ethnic stayers, namely, the population share of natives of ethnic group r among all natives who previously stayed in city c in period $t - 1$ and continue to stay in city c during period t .⁷ Our key regressor is $immi_share_{rct-1}$, the immigrant population share of ethnic group r in city c during sample period $t - 1$. The vector X accounts for a number of group-level characteristics likely affecting the migration choices, such as the ethnic group's average age; average age squared; average years of schooling; female percentage; percentage of those who are married; percentage of those with children in the household; and the percentages of natives that are black, Asian, or Hispanic within the ethnicity-MSA-year group. The analysis also includes ethnicity-year fixed effects u_{rt} , year-MSA fixed effects ρ_{ct} and ethnicity-MSA fixed effects θ_{rc} . The main coefficient of interest, β , gauges the extent to which an immigration inflow of a certain ethnic group in a city would induce a higher (or lower) share of co-ethnic natives among all stayers to remain as residents in that receiving city.

Second, we examine whether immigrant inflows would induce more co-ethnic natives to migrate into the receiving cities, defined as *arrivers*. Specifically, we estimate the following model:

$$arriver_share_{rct} = \alpha + \gamma \cdot immi_share_{rct-1} + X_{rct}\Gamma + v_{rt} + \rho_{ct} + \theta_{rc} + u_{irct} \quad (2)$$

⁷ Since the sample is decennial in case, we use the notation “ $t - 1$ ” to represent the census sample observed from the previous decade.

where $arriver_share_{rct} = \frac{\sum_i arriver_{irct}}{\sum_{ir} arriver_{irct}}$ measures the share of co-ethnic arrivers, namely, the population share of natives of ethnic group r among all natives who previously did not live in city c in period $t - 1$ and recently arrived in city c . All other controls remain the same as in Model (1). The key coefficient of interest in this model is γ , which gauges the extent to which an immigration inflow of a certain ethnic group in a city would induce a higher (or lower) share of co-ethnic arrivers among all arrivers in that receiving city.

The above two models help us gauge the impact of immigrant inflows on the migratory decisions of co-ethnics. Next, we want to further investigate the impact of immigrant inflows on co-ethnic natives' wages in local markets to understand whether any change in labor market returns due to immigration underlines the migration choices of co-ethnic natives. We implement this idea by estimating equation (3),

$$wage_{rct} = \alpha + \zeta \cdot immi_{share_{rct-1}} + X_{rct}\Gamma + v_{rt} + \rho_{ct} + \theta_{rc} + u_{irct} \quad (3)$$

where $wage_{rct}$ is the weighted average inflation-adjusted log hourly wage of ethnicity-MSA-year group rct .⁸ All other controls in equation (3) remain the same as in Models (1) and (2).

5. Baseline Empirical Results

5.1 The Impact of Immigration Inflows on Migration Decisions

Table 2 presents the results from estimating a number of model specifications of equation (1) that progressively include more control variables. In Column (1), one-way fixed effects are included

⁸ The hourly wage data are constructed by dividing annual inflation adjusted wages by total hours worked. Furthermore, the total working hours are calculated by multiplying the hours worked in a typical week with the number of weeks worked in a year.

to capture idiosyncratic characteristics by MSA and the natives' ethnicity. We also include fixed effects for the year in which individuals were surveyed to control for unobserved temporal factors potentially correlated to natives' migration choices. With these one-way fixed effects, we are able to account for differences in migration decisions by ethnicity, for area-specific conditions faced by natives potentially impacting their choices of residence, and for contemporaneous macroeconomic shocks possibly correlated to their migration choices in the past.⁹ The estimated coefficient of interest is positive and statistically different from zero. Immigrant inflows appear to be positively correlated to the likelihood that co-ethnics stay in the receiving city, compared to natives of other ethnicities. Specifically, a one-percentage-point increase in the immigrant inflow of a particular ethnic group is associated with 1.574 percentage points increase of the stayer share of corresponding co-ethnic natives.

There could be other year-MSA-specific, year-ethnicity-specific, or MSA-ethnicity-specific confounding factors potentially influencing the migration pattern revealed in Column (1). For example, a particular ethnic group might experience a greater mobility during a certain year than other years, or people from a certain ethnic group are more likely to be exposed to discrimination in one area as compared to other areas. To address these issues, we include year-MSA, year-ethnicity, and MSA-ethnicity fixed effects in Column (2). The estimated coefficient falls in magnitude but remains positive and statistically different from zero.

Individual characteristics could also affect people's migration patterns. The literature suggests that older people are generally less likely to move (Goss and Paul, 1986), married people are more likely to stay in their places of residence (Navratil and Doyle, 1977), and women and parents might be more likely to remain as well. Migration behaviors can also differ among different

⁹ For instance, Saks and Wozniak (2011) show that migration patterns are procyclical, and Molloy et al. (2017) show that there is a general reduction in migration in the last quarter of the 20th century.

racial groups. Blacks and Asians may have significantly different migration patterns relative to whites (Navratil and Doyle, 1977; Lei and South, 2016; Frey and Liaw, 2005), and there are conflicting findings regarding whether Hispanics are more or less likely to move than whites (Frey and Liaw, 2005; Schachter, 2003). In addition to the two-way fixed effects, we include these group average characteristics as control variables in Column (3). Our result is robust to including these further controls and the estimated coefficient remains positive and statistically significant. We consider this specification with the full set of controls and two-way fixed effects as the preferred model specification, and the estimated coefficient suggests that each one-percentage-point increase in the immigrant population share would lead to a 0.573 percentage point increase in the stayer share of corresponding co-ethnic natives in the receiving cities.

[Insert Table 2 Here]

Knowing that co-ethnic natives, compared to natives of other ethnicities, are more likely to remain in residence in a city when the share of the corresponding immigrant population increases, we next examine whether a higher immigrant share would also induce a higher share of co-ethnic natives to move into the receiving city as new arrivers, relative to natives of other ethnicities. Table 3 shows the results of estimating Model (2).

In Column (1), which includes only one-way fixed effects, the likelihood of co-ethnic natives arriving in the receiving city as new residents is positively correlated to the immigrant population share of the corresponding ethnicity in that city. In particular, a one-percentage-point increase in the immigrant inflow is associated with an increase the arriver share by 0.781 percentage point. Further inclusion of the two-way fixed effects reduces the magnitude of the estimates but does not alter this pattern, as shown in Column (2). In Column (3), where both group average characteristic controls and two-way fixed effects are included, the arriver share of a certain

co-ethnic group is raised by 0.247 percentage point for each one-percentage-point increase in its corresponding immigrant population share in that city.¹⁰

[Insert Table 3 Here]

To conclude, we explore two channels regarding how immigration inflows could impact the migration choices of co-ethnic natives. Substantial evidence suggests that an immigrant inflow induces both an increase in the share of co-ethnic natives who remain in the receiving city and the share of co-ethnic natives who newly arrive in the receiving city, relative to natives of other ethnicities.¹¹ We will further examine the mechanisms and heterogenous effects in Section 7.

5.2 The Impact of Immigration Inflows on Local Wages

To further explore the potential labor market impacts of immigration inflows on co-ethnic natives, we look at the relationship between immigration inflows and the inflation-adjusted hourly wages of co-ethnic natives. The scatter plot in Figure 1 depicts the correlation between the immigrant population share and the co-ethnic natives' log average wages. This figure suggests that natives who live in cities with higher co-ethnic immigrant shares earn lower wages. This finding is in line with the recent National Academies of Sciences, Engineering and Medicine's report on the economic impact of immigration (Lee, 2017).

[Insert Figure 1 Here]

While enlightening, Figure 1 fails to account for a wide range of factors potentially responsible for the negative relationship. Therefore, we examine the relationship more thoroughly by estimating the model indicated in equation (3). Table 4 shows the impact on the weighted group

¹⁰ The small change in sample size among various model specifications is due to the sample adjustments in calculating the asymptotic vce matrix according to the absorbed degrees of freedom of the model (Correia, 2015).

¹¹ Results are robust to restricting the sample to wage earners.

average hourly wage for natives of a specific ethnicity in the receiving city as its immigrant population share changes. The result yields a statistically significant negative estimated coefficient in specification (1), where only the ethnicity, MSA, and year one-way fixed effects are included. The key coefficient of interest is still negative but becomes statistically insignificant when the two-way fixed effects and demographic characteristics are included in Columns (2) and (3). Therefore, the results in Table 4 finds little impact of immigration inflows on local wage rates. This finding is largely consistent with the literature, albeit that the literature does not specifically study the impact of immigration on co-ethnic natives, per se (Card, 1990; Hunt, 1992; Friedberg, 2001; Angrist and Kugler, 2003; Yasenov, 2017). This finding may be suggestive that the potential wage change in the local market is not the reason behind the migration choices of co-ethnic natives during immigration inflows.

[Insert Table 4 Here]

6. Robustness and Falsification Tests

In the previous section, we primarily test the relationship between co-ethnic natives' outcomes and the lagged values of immigration inflows, with the assumption that natives need to observe the immigration inflows first, and then their migratory decisions and wages are reactionary in the next decade. However, since the data used in this paper are decennial in nature, the observed immigration inflow at period t , $immi_share_{rct}$, represents the inflow of immigrants of ethnic group r in city c within the past ten years. Similarly, the outcomes of co-ethnic natives at time t (such as res_share_{rct}) also indicate the respective outcomes within the past ten years. It is possible that the impact of immigration inflows on co-ethnic natives could take less than ten years to manifest. Therefore, we can relax the assumption adopted in the previous section, and next

examine whether the relationship between the contemporaneous co-ethnic immigrant share and outcomes of co-ethnic natives is also consistent with the relationship found in the baseline results. In Panel A of Table 5, we re-estimate all the baseline regressions in the previous section using $immi_share_{rct}$ instead of $immi_share_{rct-1}$ as the key independent variable to test the robustness of the models. This model would therefore estimate whether immigration inflows in the previous decade could also positively influence the migratory patterns of co-ethnic natives in the same time period. Panel A suggests that the positive effects of migration patterns and the insignificant effect on wage are consistent when using this contemporaneous measurement.

Next, we test the robustness of the models further by implementing two-period lag of immigration inflows. That is, we test the relationship between migratory patterns and wages of co-ethnic natives in period t with the immigration inflow 20 years prior, $immi_share_{rct-2}$, to account for any potential delayed reactions. Panel B shows that the results are robust both in magnitude and in statistical significance. Overall, Table 5 indicates that the results of the baseline regressions are robust to changes in time periods.¹²

Thus far, we have defined the ethnic groups according to the country of origin. Because of a lack of a significant number of immigrants from a certain country to arrive in a particular city during a specific decade, there are some ethnicity-city-year cells that have low or zero immigrant population shares. This could create less precise measurement in immigrant inflows. To alleviate this problem, we turn to the rationale that immigrants might not have to form ethnic enclaves only with those from the same countries. Instead, since there is a close relationship between language spoken and cultural identity (Kramsch ,1998), they could form enclaves with immigrants from

¹² We also test the robustness of the baseline results using PUMAs (Public Use Microdata Areas) instead of MSAs as the local labor market. Due to the existence of many singleton observations within ethnicity-PUMA-year cells, we use one-way fixed effect models instead of wo-way fixed effect models. Similar results are found.

multiple countries where the same language is spoken. We argue that this might be particularly true for immigrants from countries that do not have significant immigrant populations in the United States, since diminishing marginal returns suggest that members of smaller ethnic groups have a higher marginal benefit to form larger groups by joining others who speak similar languages. Following this reasoning, in Panel C of Table 5, we use this alternative definition of ethnic groups according to the language spoken in the home countries and show that the baseline results are robust to this new ethnic group definition.

[Insert Table 5 Here]

Given that the results are robust to changing time periods between t , $t - 1$, and $t - 2$, it is imperative to conduct falsification tests to ensure the validity of the baseline results. Specifically, any future changes of immigration inflows of the receiving cities should not have any impact on the migration decisions and labor market outcomes of co-ethnic natives. In practice, we test the relationship between co-ethnic natives' outcomes and the 10-year lead and 20-year lead values of immigration population share, $immi_share_{rct+1}$, and $immi_share_{rct+2}$. If the empirical models are properly specified, then there should not be significant relationship between the future immigration inflows and the past co-ethnic natives' outcomes.

Table 6 shows the results from such an exercise using the preferred model specification. The estimated coefficients are not statistically significant at the conventional level. Combining Tables 5 and 6, we conclude that immigration inflows in local markets have a consistent pulling effect on the co-ethnic natives' migratory decisions, regardless of whether the immigration inflows are contemporaneous or historical. Any future changes in immigration do not meaningfully impact co-ethnic natives.

[Insert Table 6 Here]

7. Mechanisms and Heterogeneous Effects

Given that the pulling effects of immigration inflows are robust, we would like to further investigate the potential motivations underlying such migration patterns. We turn to test whether there is any evidence that the pulling effect is caused by potential socio-cultural benefits of ethnic enclaves in local markets due to immigration inflows. Since it is difficult to measure the socio-cultural benefits of ethnic enclaves directly as they are largely unobservable, we resort to using heterogeneous effects to gain some insight. Specifically, we argue that co-ethnic natives more culturally attached to their ethnic roots should appreciate the potential socio-cultural benefits brought by immigration inflows more and, therefore, should be more attracted to cities that experience increases in their co-ethnic immigration inflows. Analogously, enclaves formed by immigration inflows of different ethnicities could provide different degrees of socio-cultural benefits and, therefore, should have differential impacts on the migration decisions of co-ethnic natives. In practice, we separate the co-ethnic natives into sub-samples that plausibly have different degrees of ethnic cultural attachments and separate immigration inflows into sub-groups that potentially provide different levels of socio-cultural benefits, and we test the heterogeneous effects of immigration inflows on the co-ethnic natives' migration decisions and wages accordingly.

In Columns (1) and (2) of Table 7, we separate the co-ethnic married natives into two sub-groups: those married to their co-ethnics and those not married to their co-ethnics. We argue that natives married to their co-ethnics are more attached to their ethnic cultural roots than those who are not, therefore, should be more attracted to the potential unobservable benefits of immigration inflows. The results suggest that natives who are married to their co-ethnics are significantly more likely to remain or move to co-ethnic immigration receiving cities than those not married to their

co-ethnics. This is consistent with our conjecture that more culturally attached natives respond more positively to immigration inflows. There is no discernable effect on wages for either subgroup.

Next, we argue that natives who speak their ethnic languages should be more culturally attached to their ethnic roots. For example, compared to Mexican-Americans who do not speak Spanish, those who speak Spanish are more likely to appreciate the Spanish-speaking environment and other socio-cultural benefits that Mexican immigrants might bring. Therefore, in Columns (3) and (4) of Table 7, we keep only those ethnic groups that do not speak English as their first language¹³ and separate the co-ethnic natives into those who speak their ethnic languages and those who do not. The results suggest that immigration inflows are significantly more attractive to co-ethnic natives who speak their ethnic languages than those who do not.

Lastly, since linguistic convenience is one of the largest socio-cultural benefits of ethnic enclaves, enclaves formed by immigrants from countries that do not speak English as their first language would be able to provide additional linguistic convenience to their co-ethnic natives than those formed by immigrants who speak English in their home countries. For example, holding every other potential socio-cultural benefit constant, compared to enclaves formed by South African immigrants, enclaves formed by Japanese immigrants would be able to provide more social benefits to Japanese-Americans in the United States simply because of the additional linguistic convenience. Therefore, Japanese immigration inflows should be more attractive to Japanese-Americans than South African immigration inflows are to South African-Americans.

¹³ The list of identified English speaking countries is retrieved from the CIA Factbook (2014). Central Intelligence Agency. (2014). Languages. In The world factbook. Retrieved from <https://www.cia.gov/library/publications/the-world-factbook/fields/2098.html>,

The comparison of results in Columns (5) and (6) of Table 7 confirm this inference – the magnitude of influence in non-English speaking ethnic groups are larger.

[Insert Table 7 Here]

To summarize, we use heterogeneous effects to explore the mechanism whether natives who are more culturally attached to their ethnic roots are more likely to gravitate towards their co-ethnic immigration inflows and whether immigration inflows that could potentially offer more socio-cultural benefits would attract more co-ethnic natives. The results consistently show that they do. Therefore, we consider all results in this section as empirical evidence suggesting that the immigration inflows’ pulling effect on co-ethnic natives is primarily due to unobserved socio-cultural benefits that they bring to the receiving cities.¹⁴

8. Instrumental Variable Estimations

In this section, we use the instrumental variable strategy to further parse out the causal relationship between immigrant shares and co-ethnic natives’ migration patterns. While the year-MSA, year-birthplace, and MSA-birthplace effects could control for all factors, observed and unobserved, that affect year-MSA, year-birthplace, and MSA-birthplace groups equally, there could still be unobserved factors specific to the year-MSA-ethnicity groups that are potentially correlated with immigrant shares and outcomes of co-ethnic natives. First, we rule out reverse causality issue because the co-ethnic natives’ migration patterns and wages at period t cannot retroactively affect

¹⁴ We carry out an additional exercise to examine whether immigration’s potential impact on the local real-estate market could be another reason behind the co-ethnic natives’ migration patterns. Under the argument of the “native flight” phenomenon, when immigrants of a particular ethnicity arrive in a neighborhood, natives of other ethnicities might leave the neighborhood and subsequently decrease the equilibrium housing prices of the neighborhood (Saiz and Wachter, 2011). Thus, the potentially lower housing prices within the ethnic neighborhoods could be another reason for co-ethnic natives to live in areas where immigrants cluster. Our results suggest that there does not seem to be a relationship between immigration inflows and co-ethnic natives’ rents while a negative correlation is found between immigration inflows and the local housing values which is consistent with the native flight phenomenon. Results are provided in the Appendix Table A1.

the immigrant population share in period $t - 1$. However, there could be confounding factors that simultaneously affect the immigrant population shares and co-ethnic natives' migration patterns. If we suppose that there is a random demand shock to a certain industry within a city where immigrants of a specific ethnicity are employed during period $t - 1$ and that the same industry extended their hiring effort to natives of the same ethnicity in the next 10 years as an expansion effort, then we could theoretically observe a positive relationship between the immigrant population share in period $t - 1$ and the migration patterns of natives in period t . Similarly, the simultaneous increase in demand and supply of immigrant and native workers of that ethnic group may result in unchanged equilibrium hourly wages. Therefore, to reassure our findings we address such endogeneity concerns by adopting the instrumental variable estimations in this section.

The first instrumental variable (IV) we use is an interaction term between the historical immigrant population share in the 1950s, $Share_{rc,1950}$, and the ethnic group's home country Gini coefficient during year $t - 1$, $Gini_{rt-1}$.¹⁵ The historical immigrant population share of a certain ethnicity in a city is correlated with future changes in that city-ethnicity groups' immigration shares because immigrants are known to concentrate in their previous ethnic peers' landing sites (Åslund et al., 2011). Thus, $Share_{rc,1950}$ would be an indicator of the direction of the corresponding future immigrant flows: it is a "pull factor." At the same time, since income inequality is found to be positively correlated with internal migrations within countries (Jestl et al., 2017), we can extend this theory by arguing that more people would tend to migrate out of the countries where income inequality is high. Therefore, the Gini coefficient of a country should be correlated with the size of corresponding ethnicities' migration flows, and we consider it a "push

¹⁵ The Gini coefficient dataset is retrieved from Table "SI.POV.GINI" of the World Bank Development Indicators (The World Bank, 2018a).

factor.” The interaction term of the push and pull factors, $Share_{rc,1950} \times Gini_{rt-1}$, would be an IV that predicts the direction and the size of immigrant flows, and it varies by year-MSA-ethnicity groups. The estimated coefficients in Panel A of Table 8 shows that the positive effect of immigrant shares on co-ethnic migration patterns are robust for both stayers and arrivers and that the wage effects are robustly statistically insignificant.¹⁶

In Panels B and C of Table 8, we re-estimate the IV regressions by implementing alternative measures of home country inequality. In Panel B, we use the income share of the highest 20 percent income earners of a country during year $t - 1$, $High_{rt-1}$, in place of $Gini_{rt-1}$.¹⁷ The results are similar to those found in Panel A. In Panel C, we use the 80:20 income ratio, $Twenty_{rt-1}$, which is the ratio of income shares between the top and bottom 20 percent income earners within a country during year $t - 1$, in place for $Gini_{rt-1}$.¹⁸ The results are largely unchanged. Empirical results from this section suggests that the baseline relationship between immigrant shares and co-ethnic natives’ outcomes are robust to various instrumental variable estimations.

[Insert Table 8 Here]

9. Conclusion

This paper defines 113 unique ethnicities according to the immigrants’ countries of origin and analyzes the relationship between local market’s ethnic-specific immigrant population shares and co-ethnic natives’ migratory patterns and wages between 1970 and 2010. We find that immigration

¹⁶ Due to a lack of the availability of Gini coefficients of many countries over the past four decades, there is a significant decrease in sample size. The first-stage F-statistics are all significantly greater than 20.

¹⁷ Data for the variable $High_{rt-1}$ are retrieved from Table “SI.DST.05TH.20” of the World Bank Development Indicators (The World Bank, 2018b).

¹⁸ The data are calculated from Tables “SI.DST.FRST.20” and “SI.DST.05TH.20” of the World Bank Development Indicators (The World Bank, 2018c).

inflows to a city in the proceeding decade attract both a higher share of co-ethnic natives to remain within the receiving city and a higher share of co-ethnic natives to migrate into the receiving city in the current decade, compared to natives of other ethnicities. We do not, however, find any evidence suggesting that immigration inflows significantly impacted the wages of co-ethnic natives in the local area. These findings survive several robustness checks, falsification tests, and instrumental variable estimations. Furthermore, the results from heterogeneous effects are consistent with the conjecture that socio-cultural benefits brought about by immigration inflows play an important role in driving the migratory patterns of co-ethnic natives. Marriage to co-ethnics and sharing a common language appear to be important channels that induce co-ethnic natives to the enclaves.

Given the increasing population of immigrants and the growing diverse culture in the past decades in the U.S., increased awareness of the interaction between immigrants and their co-ethnic natives in the country is crucial. Findings stemming from this paper are helpful in understanding the ethnic segmentation, the dynamic shape of local labor markets due to the form of ethnic enclaves, and may be beneficial to developing policies that promote social stability in general.

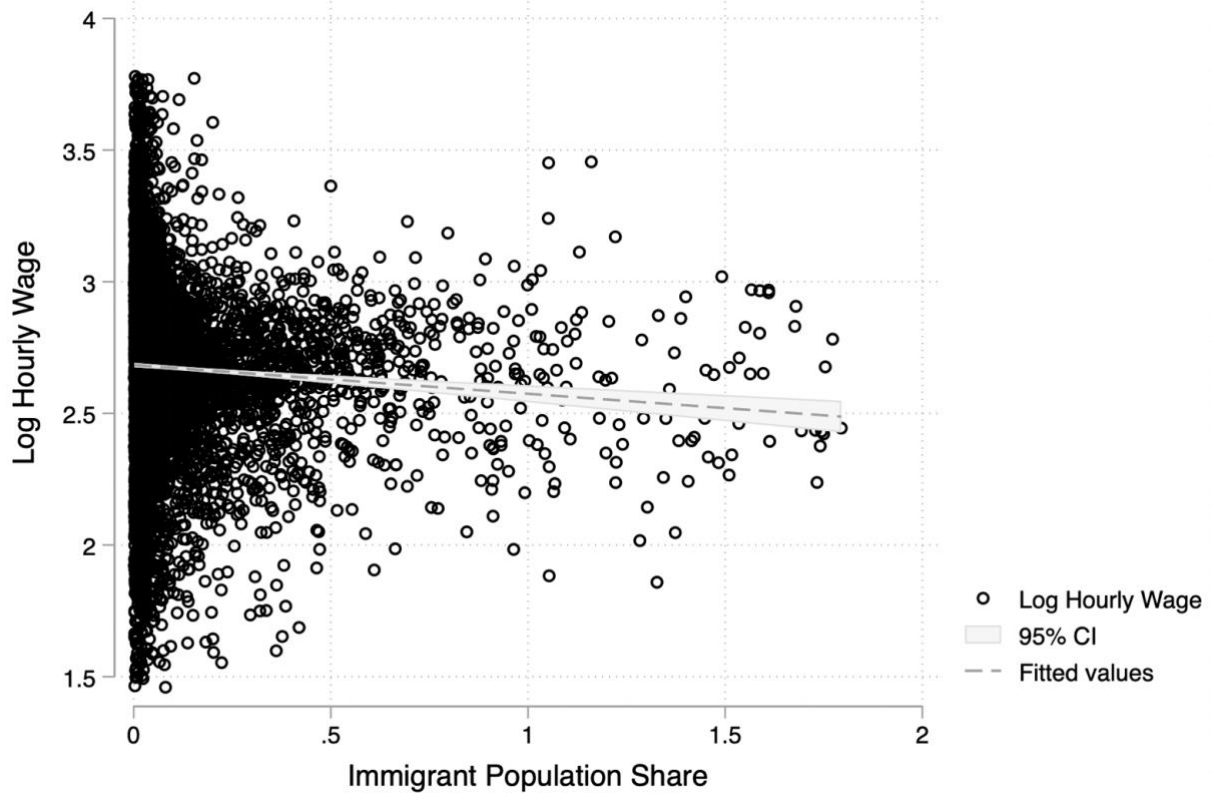
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Figure 1. Immigrant Population Share and Co-ethnic Natives' Log Hourly Wage



Notes: The wage sample consists of all natives who reside in identifiable metropolitan areas that are consistent across the samples of 1970, 1980, 1990, 2000 Censuses and the ACS sample of 2005 – 2010. The immigrant population share sample consists of calculated population share of immigrants by ethnicity-MSA-year cells.

Table 1. Descriptive Statistics of Co-ethnic Natives

	1970	1980	1990	2000	2010
Female	0.37	0.43	0.46	0.47	0.48
Age	46.27	37.01	38.19	40.10	42.33
Less than High School	0.38	0.18	0.09	0.07	0.05
High School	0.35	0.36	0.30	0.33	0.30
Some College	0.12	0.22	0.32	0.25	0.25
College Degree or Higher	0.15	0.24	0.29	0.35	0.40
Years of Schooling	11.68	12.87	13.52	13.70	13.97
Married	0.73	0.60	0.59	0.56	0.56
Having Children in Household	0.54	0.43	0.44	0.43	0.41
White	0.97	0.98	0.98	0.97	0.96
Black	0.004	0.006	0.004	0.008	0.011
Asian	0.03	0.01	0.01	0.02	0.02
Hispanic	0.08	0.06	0.06	0.08	0.09
Log Hourly Wage	2.83	2.64	2.66	2.73	2.72
MSA-Ethnicity Immigrant Population Share in Percentage	0.66	0.24	0.21	0.30	0.49

Notes: All native-born individuals of foreign descent ages from 18 to 64 who reside in identifiable metropolitan areas that are consistent across the samples of 1970, 1980, 1990, 2000 Censuses and the ACS sample of 2006 – 2010.

Table 2. The Impact of Immigrant Inflows on Co-Ethnic Stayer Share

Dependent Variable	Stayer Share		
	(1)	(2)	(3)
<i>immi_share_{rct-1}</i>	1.574*** (0.148)	0.564*** (0.075)	0.573*** (0.077)
Characteristics Controls	-	-	Yes
One Way Fixed Effects	Yes	-	-
Two Way Fixed Effects	-	Yes	Yes
Adjusted R ²	0.758	0.981	0.981
N	18,495	16,892	14,068

Notes: The sample consists of all native-born individuals of foreign descent between the ages of 18 and 64 and reside in identifiable metropolitan areas that are consistent across the samples of 1970, 1980, 1990, 2000 Censuses and the ACS sample of 2006 – 2010. One-way fixed effects include year, MSA, and ethnicity fixed effects. Two-way fixed effects include year-MSA, year-ethnicity, and MSA-ethnicity fixed effects. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.10

Table 3. The Impact of Immigrant Inflows on Co-Ethnic Arriver Share

Dependent Variable	Arriver Share		
	(1)	(2)	(3)
<i>immi_share_{rct-1}</i>	0.781*** (0.070)	0.248*** (0.078)	0.247*** (0.080)
Characteristics Controls	-	-	Yes
One Way Fixed Effects	Yes	-	-
Two Way Fixed Effects	-	Yes	Yes
Adjusted R ²	0.853	0.970	0.969
N	19,624	18,274	15,225

Notes: The sample consists of all native-born individuals of foreign descent between the ages of 18 and 64 and reside in identifiable metropolitan areas that are consistent across the samples of 1970, 1980, 1990, 2000 Censuses and the ACS sample of 2006 – 2010. One-way fixed effects include year, MSA, and ethnicity fixed effects. Two-way fixed effects include year-MSA, year-ethnicity, and MSA-ethnicity fixed effects. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.10

Table 4. The Impact of Immigrant Inflows on Group Average Wage

Dependent Variable	Wage		
	(1)	(2)	(3)
<i>immi_share</i> _{rct-1}	-0.639*** (0.158)	-0.059 (0.470)	-0.085 (0.440)
Characteristics Controls	-	-	Yes
One Way Fixed Effects	Yes	-	-
Two Way Fixed Effects	-	Yes	Yes
Adjusted R ²	0.200	0.284	0.465
N	16,394	18,274	14,982

Notes: The sample consists of all native-born individuals of foreign descent between the ages of 18 and 64 and reside in identifiable metropolitan areas that are consistent across the samples of 1970, 1980, 1990, 2000 Censuses and the ACS sample of 2006 – 2010. One-way fixed effects include year, MSA, and ethnicity fixed effects. Two-way fixed effects include year-MSA, year-ethnicity, and MSA-ethnicity fixed effects. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.10

Table 5. Robustness Checks

Dependent Variable	Stayer Share	Arriver Share	Wage
	(1)	(2)	(3)
<i>Panel A: Contemporaneous Effect</i>			
$immi_share_{rct}$	0.428*** (0.048)	0.203*** (0.054)	-0.596 (0.406)
Characteristics Controls	Yes	Yes	Yes
Two Way Fixed Effects	Yes	Yes	Yes
Adjusted R ²	0.964	0.963	0.617
N	20,107	21,269	20,892
<i>Panel B: Two-period Lagged Effect</i>			
$immi_share_{rct-2}$	0.472*** (0.125)	0.288*** (0.078)	0.716 (0.835)
Characteristics Controls	Yes	Yes	Yes
Two Way Fixed Effects	Yes	Yes	Yes
Adjusted R ²	0.982	0.965	0.422
N	7,792	8,438	8,308
<i>Panel C: Alternative Definition of Ethnic Groups: By Language</i>			
$immi_share_{lct-1}$	0.501*** (0.089)	0.268*** (0.102)	0.082 (0.284)
Characteristics Controls	Yes	Yes	Yes
Two Way Fixed Effects	Yes	Yes	Yes
Adjusted R ²	0.982	0.969	0.522
N	9,173	9,815	9,714

Notes: The sample consists of all native-born individuals of foreign descent between the ages of 18 and 64 and reside in identifiable metropolitan areas that are consistent across the samples of 1970, 1980, 1990, 2000 Censuses and the ACS sample of 2006 – 2010. $immi_share_{rct}$ is the contemporaneous immigrant population share by ethnicity-city-year groups. $immi_share_{rct-2}$ is the two-period lagged immigrant population share by ethnicity-city-year groups. $immi_share_{lct-1}$ is the one-period lagged immigrant population share by ethnicity-city-year groups, where the ethnicity is defined alternatively by language spoken in the home country, instead of country of origin. Two-way fixed effects include year-MSA, year-ethnicity, and MSA-ethnicity fixed effects. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.10

Table 6. Falsification Tests

Dependent Variable	Stayer Share	Arriver Share	Wage
	(1)	(2)	(3)
<i>Panel A: One-period Lead Effect</i>			
$immi_share_{rct+1}$	0.101* (0.053)	0.060 (0.052)	0.200 (0.597)
Characteristics Controls	Yes	Yes	Yes
Two Way Fixed Effects	Yes	Yes	Yes
Adjusted R ²	0.965	0.970	0.409
N	12,881	12,981	13,753
<i>Panel B: Two-period Lead Effect</i>			
$immi_share_{rct+2}$	0.020 (0.062)	0.000 (0.094)	-0.888 (1.525)
Characteristics Controls	Yes	Yes	Yes
Two Way Fixed Effects	Yes	Yes	Yes
Adjusted R ²	0.948	0.962	0.330
N	6,342	6,894	6,778

Notes: The sample consists of all native-born individuals of foreign descent between the ages of 18 and 64 and reside in identifiable metropolitan areas that are consistent across the samples of 1970, 1980, 1990, 2000 Censuses and the ACS sample of 2006 – 2010. Two-way fixed effects include year-MSA, year-ethnicity, and MSA-ethnicity fixed effects. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.10

Table 7. Heterogeneous Effects: Socio-cultural Benefits

Sample	Married to co-ethnics	Not married to co-ethnics	Speak ethnic language	Do not speak ethnic language	English speaking ethnic groups	Non-English speaking ethnic groups
	(1)	(2)	(3)	(4)	(5)	(6)
Stayer share	1.415*** (0.185)	0.207*** (0.052)	1.199*** (0.191)	0.396*** (0.087)	2.060*** (0.247)	3.322*** (0.362)
Arriver share	0.845*** (0.279)	0.037 (0.118)	0.631*** (0.162)	0.113*** (0.043)	0.980*** (0.365)	1.099** (0.499)
Wages	-0.221 (0.741)	-0.378 (0.532)	-0.104 (0.604)	-0.050 (0.515)	2.510 (5.196)	-0.112 (0.448)
Characteristics Controls	Yes	Yes	Yes	Yes	Yes	Yes
Two Way Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of all native-born individuals of foreign descent between the ages of 18 and 64 and reside in identifiable metropolitan areas that are consistent across the samples of 1970, 1980, 1990, 2000 Censuses and the ACS sample of 2006 – 2010. Two-way fixed effects include year-MSA, year-ethnicity, and MSA-ethnicity fixed effects. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.10

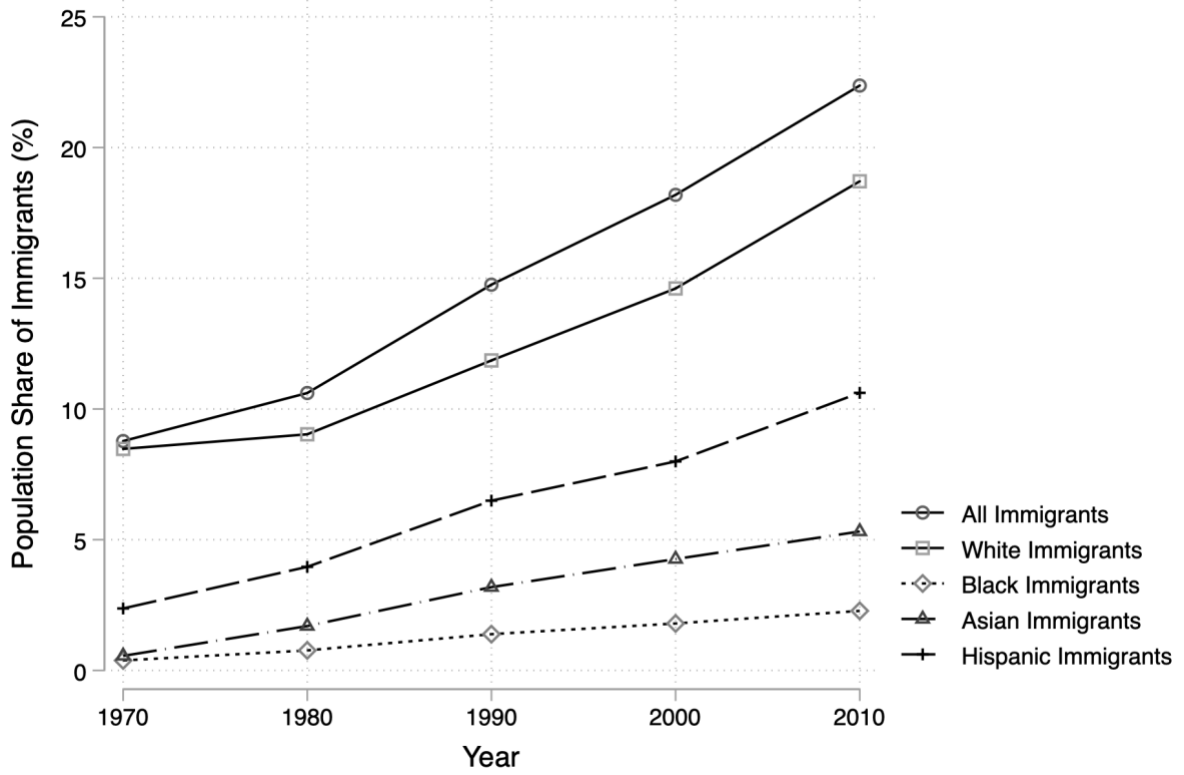
Table 8. Instrumental Variable Estimations

Dependent Variable	Stayer Share (1)	Arriver Share (2)	Wage (3)
<i>Panel A: Instrumental Variable: $Share_{rc,1950} \times Gini_{rt-1}$</i>			
$immi_share_{rct+1}$	0.629*** (0.129)	0.895*** (0.232)	5.627 (8.404)
Adjusted R ²	0.998	0.985	0.798
N	734	774	764
<i>Panel B: Instrumental Variable: $Share_{rc,1950} \times High_{rt-1}$</i>			
$immi_share_{rct+1}$	0.604*** (0.107)	0.835*** (0.153)	-0.432 (5.439)
Adjusted R ²	0.998	0.985	0.806
N	734	774	764
<i>Panel C: Instrumental Variable: $Share_{rc,1950} \times Twenty_{rt-1}$</i>			
$immi_share_{rct+1}$	0.591*** (0.102)	0.769*** (0.103)	-5.833 (3.158)
Adjusted R ²	0.998	0.986	0.810
N	734	774	764

Notes: The sample consists of all native-born individuals of foreign descent between the ages of 18 and 64 and reside in identifiable metropolitan areas that are consistent across the samples of 1970, 1980, 1990, 2000 Censuses and the ACS sample of 2006 – 2010. Two-way fixed effects include year-MSA, year-ethnicity, and MSA-ethnicity fixed effects. $Share_{rc,1950} \times Gini_{rt-1}$ is the interaction term between historical immigrant population share for ethnicity r in city c in 1950 and the Gini coefficient of country r during year $t - 1$. $High_{rt-1}$ is the share of income of the top 20% income earners of country r during year $t - 1$. $Twenty_{rt-1}$ is the ratio of income shares between the top and bottom 20% income earners of country r during year $t - 1$. Robust standard errors are shown in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Appendix

Figure A1. Immigrants by race as a percentage of U.S. population, 1970 – 2010



Notes: The sample consists of all immigrants who reside in identifiable metropolitan areas that are consistent across the samples of 1970, 1980, 1990, 2000 Censuses and the ACS sample of 2006 – 2010.

Figure A2. Identified Ethnic Groups' Countries of Origin



Note: Red-shaded countries/regions indicate the 113 defined ethnic groups included in this study.

Table A1. Housing Benefits

Dependent Variable	$\ln(\text{rent})_t$	$\ln(\text{house value})_t$
<i>immi_share</i> _{<i>rct</i>-1}	-0.287 (0.492)	-2.202** (0.951)
Socioeconomic Controls	Yes	Yes
Lagged Housing Values	Yes	Yes
Two Way Fixed Effects	Yes	Yes
Adjusted R ²	0.569	0.426
N	12,936	15,344

Notes: The sample consists of all native-born individuals of foreign descent between the ages of 18 and 64 and reside in identifiable metropolitan areas that are consistent across the samples of 1970, 1980, 1990, 2000 Censuses and the ACS sample of 2006 – 2010. Two-way fixed effects include year-MSA, year-ethnicity, and MSA-ethnicity fixed effects. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.10