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Working Paper 30464
<http://www.nber.org/papers/w30464>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
September 2022

We acknowledge helpful feedback from seminar participants at Yonsei University. We have not received any financial support for this project. All errors are our own. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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Do Low-skilled Immigrants Improve Native Productivity but Worsen Local Amenities? Learning from the South Korean Experience

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NBER Working Paper No. 30464

September 2022

JEL No. J21,J61,R12,R31

ABSTRACT

In this study, we first evaluate the effect of a significant increase in low-skilled immigration in Korean municipalities from 2010-2015 on the internal migration of natives. Using Korean survey data we are able to distinguish between natives moving for work-related and non-work-related reasons. Using a change in immigration policy and the pre-existing networks of immigrants to construct an instrument for immigration across Korean municipalities, we find that locations experiencing significant low-skilled immigration attracted natives who moved for working purposes. However, these locations saw outflows of natives that moved for non-work-related reasons, such as due to housing and local amenities. We then estimate that immigration had positive effects on local firm creation and on native wages but reduced the quality of local amenities. It had small to no impact on local housing prices. These facts together suggest that immigration attracted natives who value labor income over local amenities but pushed out those who place a higher value on local amenities. Thus, immigration, while generating little net native migration, changed the composition of natives in Korean municipalities.

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1 Introduction

In several advanced economies, the increase in average education and income and the aging of the native population have generated a decline in the supply of workers performing low-skilled, manual jobs in agriculture, personal services, food services, construction, and related sectors. At the same time, these services, which are difficult to offshore or automate, have been in high and growing demand in, rich aging societies (Autor, 2019). These issues have been exacerbated in all developed countries by the Covid-19 epidemic, which induced resignation and retirement and has led to widespread and persistent shortages of manual, low-skilled labor (Lowrey, 2021). Low- and medium-skilled immigrants typically fill those bottlenecks, given that they have often specialized in manual, physically-intensive jobs in many countries (Peri and Sparber, 2009). Indeed, in recent years, countries where immigration was strongly limited or where it has slowed significantly have experienced larger shortages in these types of jobs (Peri and Zaiour, 2022).

South Korea is an extreme example of a highly educated and aging society. However, until the early 2000s, this country was drastically limiting the inflow of all types of immigrants (Kim, 2021; Han, Hur, Lee, and Yang, 2022). South Korea introduced reforms in the early 2000s in response to the economic need to fill low-skilled jobs in manufacturing and services. These reforms generated a significant increase in the share of foreign-born individuals from less than 1% of the population in 2002 to more than 4.5% by 2019. Many of those immigrants were ethnically Korean, and thus culturally similar to native Koreans. Still, they were usually less educated and generally took low-skilled jobs with low wages.

As immigrants were mainly low-skilled, relatively to a highly educated Korean population, and as they were filling jobs characterized by shortages and bottlenecks, this should be a case in which the economic effect of immigration on native wages and productivity is unambiguously positive. According to existing frameworks such as Borjas (2003) or Ottaviano and Peri (2012), the difference in education levels, age, and type of jobs between natives and immigrants should produce the strongest complementarity between them. Furthermore, the fact that these immigrants fill labor shortages should allow for increases in capital productivity and firm expansion as well.

Nevertheless, the economic impact of less-educated immigrants on natives is not limited to wages and productivity. Immigrant inflows may also affect the quality of local services, local public goods, and local amenities. This can occur through over-crowding, such as with public schools, parks, roads (Casco and Lewis, 2012), or, by potentially reducing the human capital intensity of a location and thereby worsening the amenities that depend on human capital such as cultural facilities, pollution, or care centers (Diamond, 2016). These effects could imply the reduction of local property values (Saiz and Wachter, 2011) and/or the out-migration of natives if the negative impacts on local amenities offset the positive economic impact on real wages and employment opportunities.

In this paper, we analyze the impact of the wave of low-skilled immigration in Korea from 2010 to 2015 across 229 local municipalities (*Si-Gun-Gus*) on the internal mobility of natives. Importantly and new in this literature, our data allow us to separate natives' mobility responses by "reason for the move". The mobility response of natives to immigrants is very important. To a first approximation, if there is roughly free internal mobility, the mobility response of natives tells us whether the local conditions for the marginal native improved or deteriorated in their location. While the impact of immigration on wages, prices, and local amenities can be separately estimated, the net effect of immigration on natives' welfare depends on the relative importance of these factors in the natives' utility function. Ultimately, whether the marginal person is better off or worse off by immigration is revealed by their mobility choice. In a model of optimal location choice as Diamond (2016) and, more in general, in any model of location choice based on the Multinomial Logit framework of Mcfadden (1973), the utility level in a location is proportional to the number of people who move there. If different groups of people place different values on real local income and local amenities, then these groups may have different migration responses to a shock that affects both of these variables.

Several studies in the literature have found small net effects of immigrants on native mobility, as summarized in Peri (2016). In this study, however, we can differentiate between moves for "work-related reasons", and those for "not-for-work reasons", which we consider to be mainly affected by local amenities, broadly interpreted. One can think of the first type of move as driven by improvement in overall utility because of higher wage income, and of the second type as driven by improvements in overall utility because of better local amenities.

We use the sudden increase in the inflow of ethnic Koreans after 2004, and the pre-2004 distribution of immigrants (with China as the main origin of the new immigrants) as in Han et al. (2022), and we test that post-reform changes in immigration are uncorrelated with pre-reform economic variables. We find that areas with large inflows of immigrants experienced large inflows of native Koreans who moved for work-related reasons, as well as similarly large and opposite outflows of native Koreans who moved for non-work-related reasons. Additionally, using the same identification strategy, we find that immigration had a small positive effect on the average wage of native Koreans and a positive effect on the number of local firms. Labor markets for Korean nationals seem to have improved with more immigrants, thanks to the above-mentioned complementarities between natives and immigrants and possibly to a push for more investment and firm entry. At the same time, we find that immigration had little to no impact on housing costs and had a negative effect on a set of local amenities. These effects ranged from a decreased density of daycare, senior centers, and cultural centers, and increases in pollution, road accidents, and transportation delays.

We think that the results are consistent, overall, with the existence of two distinct groups of native individuals responding to immigration. One group is more sensitive to job opportunities and real wages, which were improved by immigration. This group was attracted into locations where immigration was growing and

stimulating labor demand for complementary natives. A second group, however, places a higher value on local amenities than local real wages and moved out of municipalities that received more immigration.

Our paper extends the literature on the local impact of immigrants on natives in three ways. First, by studying the effect of an inflow of low-skilled immigrants on the local economy, wages, firm creation, and housing prices, we add a new case study to the abundant literature that has looked at the labor market effect of low-skilled (mainly Mexican) migration in the US (Peri, 2011; Monras, 2020; Lee, Peri, and Yasenov, 2022). Those papers have mainly shown the expansionary effects of low-skilled immigrants on firms and the mild positive effects on high-skilled wages, together with possibly mildly negative effects on low-skilled wages. Second, it expands the literature on the impact of immigrants on native mobility (Card, 2001; Peri and Sparber, 2011; Mocetti and Porello, 2010) by adding, thanks to original data, information about the reason for moving and therefore separating flows by type of mobility. Third, our paper is one of the first, to our knowledge, to identify directly the impact of immigration on a range of local amenities and dis-amenities, such as daycare facilities, cultural facilities, transportation, pollution, and waste sites. This direct analysis of the impact of immigration on local amenities is key to understanding the welfare effects of immigration on natives and understanding their mobility responses, but it has thus far rarely been addressed.

Overall our results suggest that low-skilled immigration seems to have two sets of effects that imply different responses from two types of natives. On one hand, it stimulates local firms' growth, local high-skilled wages, and local employment opportunities. This increases the welfare of all natives. The group of natives who value work income the most takes advantage of this and moves to the areas where immigration increases.

On the other hand, while housing prices remain stable, local amenities worsen, with fewer daycare, senior centers, and cultural facilities per native and more waste, accidents, and pollution. These factors affect a group of natives, who likely value amenities more than labor income and are therefore more likely to move out of the areas that receive more immigrants.

The size of the work-driven native inflows and amenity-driven native outflows are similar, so the net population does not change significantly. However, the composition of natives changes, and municipalities with different levels of immigration change in terms of the types of natives they attract. This can generate divergences in preferences, attitudes, and productivity, and social and political implications. One possibility generated by these results is that large, highly productive, and dense municipalities attract immigrants, and their arrival further increases those features by attracting work-motivated natives. However, those municipalities may also select natives less concerned with the quality of local amenities and public goods, which may subsequently lead to a decline in the quality of these amenities.

The rest of the paper proceeds as follows: Section 2 presents a simple framework to interpret the impact of immigrants on the internal mobility of natives. Section 3 presents the data and main variables of the analysis.

Section 4 describes the identification strategy and empirical approach. Section 5 presents the main results. Section 6 concludes the paper.

2 Theoretical framework

One can understand the mobility decision of native individuals by describing their indirect utility of living in a location as a function of their local real income, their expenditures on local goods (housing), and on the utility derived by the quality of local amenities, plus an idiosyncratic term representing individual preferences for location and moving.

The presence of this idiosyncratic term implies heterogeneous preferences for a specific location among individuals. Any change in the level of utility linked to local income, local prices and local amenities will generate a mobility response of a certain number of people for whom the utility of that location has dropped below or increased above that of the best alternative. Using a formulation similar to the one in Diamond (2016), we can write the indirect utility V of individual i in location j as a log-linear approximation of real income, real local expenditure and individual-specific evaluation of local amenities as follows¹:

$$V_{ij} = \ln\left(\frac{W_j}{P}\right) - \chi \ln\left(\frac{R_j}{P}\right) + s_i(A_j) + \epsilon_{ij} \quad (1)$$

The term (W_j/P) captures the real wage in location j , evaluated at the national price level of tradeable goods, P . A higher real wage clearly increases the desirability of a location. The term (R_j/P) captures the local expenditure on housing in real terms, and the coefficient χ depends on the share of income spent on local housing. Higher local housing costs decrease the desirability of a location. Finally (A_j) is the aggregate indicator of the quality of local amenities and the coefficient s_i is the individual weight given to local amenities, relative to the utility given to real income (standardized to 1). A higher value of local amenities increases the desirability of a location, more so for individuals with a larger value of s_i .

This setup is basically identical to the conditional logit model, formulated in the utility maximization context by Mcfadden (1973). The population differences of individuals of a given type across municipalities represent differences in these people's mean utility values for these municipalities. The (log) total expected population of municipality j is proportional to the probability that each worker lives in the municipality, summed over all individuals. Now, consider the case where there are two types of individuals with different values of the parameter s_i , equal to H for high or L for low. The first group puts a higher weight on amenities relative to the second. If the idiosyncratic term ϵ_{ij} is distributed as an extreme value function, then the population N_{Tj}

¹The indirect utility below is obtained from the maximization of a Cobb-Douglas utility function as follows: $[\ln(M^\chi) + \ln(T^{1-\chi}) + s_i A]$ where M is a local housing good, T is tradable consumption good and A are local amenities, under the budget constraint: $PT + RM \leq W$

of people of type $T = H, L$ in location j is proportional to the exponential of their average utility:

$$N_{Tj} = \exp \left(\ln \left(\frac{W_j}{P} \right) - \chi \ln \left(\frac{R_j}{P} \right) + s_T(A_j) \right) \quad (2)$$

The population of each type choosing to live in a location will be proportional to the term in the utility function for each type. Therefore municipalities with higher quality amenities will count for a larger share of the population valuing local amenities more, and municipalities with higher labor productivity will count for a larger share of the population valuing wages more.

Then take the logs on both sides and consider a change of an exogenous variable, such as an inflow of immigrants, that changes each component of the utility. In this case, the change in the population of each type T in municipality j , achieved via internal net migration, will be proportional to the combination of log changes of each component of utility driven by the exogenous change and weighted by the coefficients:

$$\Delta \ln(N_{Tj}) = \left(\Delta \ln \left(\frac{W_j}{P} \right) - \chi \Delta \ln \left(\frac{R_j}{P} \right) + s_T \Delta(A_j) \right) \quad (3)$$

This simple framework implies that if there is one group of natives, whose internal migration response to an immigration shock is significantly positive ($\Delta \ln(N_{Tj}) > 0$), then for such a group the right-hand side of the equation in response to migration shock must be positive too. As we show, additionally, that the impact of immigration on the first term $\Delta \ln \left(\frac{W_j}{P} \right)$ (real wage) is mildly positive, and on the second term $\Delta \ln \left(\frac{R_j}{P} \right)$ (real rents) is close to 0, while on the third term (amenities) it is negative, the migration result implies that the weight placed by this group on the term $\Delta(A_j)$ is small. Hence they would be the group valuing local amenities the least, with $s_T = s_L$.

On the other hand, if another group has a significant negative net internal migration response from location j , receiving the same immigrant shock, then for that group, the coefficient s_T must be large enough so that the left-hand side of the equation (3) is negative. For that group, the negative effect of immigration on amenities has to be weighted more than for the previous group. Thus, this group values amenities the most.

Guided by this simple utility-based structure of the mobility behavior of individuals, we now analyze empirically the impact of immigration on different types of mobility responses of natives and on each component of the natives' utility, namely, real labor income $\Delta \ln \left(\frac{W_j}{P} \right)$, real local price of housing $\Delta \ln \left(\frac{R_j}{P} \right)$ and local amenities $\Delta(A_j)$.

3 Background and Data

3.1 Background: Immigration in South Korea

Until the early 2000s South Korea was one of the most ethnically homogeneous countries in the world (Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg, 2003), with a very small percentage of people born in other countries. However, in the last decades, South Korea has increasingly opened up to immigration, driven by economic and demographic needs due to its rapidly aging population. While this is still a very small percentage relative to other advanced economies, the change has been significant. Figure 1 shows this increase in immigrants during the period of the fastest growth of this group. In 2009, there were about 1.1 million (2.2% of the total population) immigrants in Korea, but by 2015, this number reached 1.7 million (3.4% of the total population)²

This significant increase in immigrants in Korea was driven in a significant part by the rapid inflow of overseas individuals who are ethnically Koreans but had left Korea in the early 20th century. These “overseas Koreans” include second and third-generation descendants as well as some of the original emigrants. While the share of these ethnic Koreans out of all immigrants was only 4 percent in 2009, it grew to more than 16 percent by 2015 (Figure 1) and ethnic Koreans contributed about 40% of the net growth of foreign-born between 2009 and 2015. The majority of these ethnic Korean immigrants are from China: 70 percent of the immigrants with the overseas Korean visa (the F-4 visa) originated from that country. This increase in immigration from China was primarily driven by a Korean immigration policy change. In 2008, the F-4 visa was expanded to include overseas Koreans in China and the CIS area, who were excluded before 2008 by the Korean government because of concerns about the negative effects of these immigrants on the domestic labor market.³ Previous studies (Han et al., 2022; Kim and Lee, 2022a) use this expansion as an exogenous shock, and we also exploit this policy change that created a discontinuity in the size of the inflow of immigrants and their country of origin.

Most of the immigrants to Korea were less educated than native Koreans. Moreover, since their education was mainly received abroad, it is also likely that there was some downgrading of their skills upon migration, so that they were employed in occupations hiring typically low educated Koreans. Table 1 shows the educational attainment (Panel A) and the occupation distribution (Panel B) of natives and immigrants in Korea in 2015. Panel A shows that while about 50 percent of native Koreans have at least some college education, less than 30 percent of immigrants received any college education, and fully 30 percent of them had no high school degree either. Panel B shows that, because of differences in education, as well as due to the downgrading of skills of immigrants, the occupational distributions between natives and immigrants are very different. While about 43% of natives are managers, professionals, or clerks, which are the most high-skilled jobs, only 12% of immigrants

²The most recent data before the Covid-19 show that, as of 2019, there were more than 2.2 million immigrants (4% of the population).

³The F-4 visa provides immigrants with virtually a semi-permanent legal status. For instance, The F-4 visa could be renewed repeatedly with some restrictions.

are, while 60% of immigrants are assembly or elementary workers. Overall, this table suggests very dramatic differences in the labor markets of natives and immigrants in Korea. The increase in immigration can be viewed as a significant increase in the unskilled labor force, which could complement the tasks of highly educated native workers. At the same time, the table also shows that immigrants took jobs that are likely to pay significantly less than the jobs held by natives, and hence, by including them, the average human capital and the average income in the local economies where they moved would decline.

3.2 Data and Summary Statistics

The administrative districts of South Korea consist of 8 metropolitan areas (of which Seoul is the largest) and 9 provinces. These metropolitan areas and large cities in the provinces have multiple boroughs so in total we use 229 municipalities in our analysis. Throughout the paper, we simply call them “municipalities”. Using these fine geographic units is particularly relevant as they cover the whole country, Additionally as we can capture geographic mobility of natives between them, this allows us to observe potential mobility spillovers.

Our primary data source to measure the geographic mobility of natives is The Statistics on Internal Migration (SIM) data. This is an administrative data set based on the mandatory move-in registration that Koreans must complete when they move. It provides not only the origin and destination of internal migrants but also the main reason for moving among seven possible categories (job, education, family, residential environment, housing, natural environment, and other reasons). Previous studies (Han et al., 2022; Kim and Lee, 2022b) have used this data relative to specific neighborhoods, to examine the responses of Korean natives in response to several types of local shocks. We use this data and aggregate them into only two different reasons for moving: work and non-work-related moves. From this dataset, our sample includes individuals between 25 and 64 years old who are in working age and whose move is less likely related to study and retirement reasons.

To measure the municipality-level inflow of foreign immigrants, we use the Statistics on Foreign Residents from the Ministry of the Interior and Safety. From this dataset, we count the number of immigrants in each municipality in 2010 and 2015 by visa type and nationality. This detailed information allows us to construct the explanatory variable and our instrument. The definition of immigrants (foreign residents) in this dataset includes only those who reside in Korea for longer than 90 days. That is, we exclude short-term visitors who are in Korea for business or tourism purposes.

Our measure of the immigration inflow is the municipality-level change in the number of immigrants between 2010 and 2015 relative to the total working-age population of the municipality in 2010. We focus on the period between 2010 and 2015 for three main reasons. First, as shown in Figure 1, this period saw a significant increase in the immigration of overseas Koreans, which we will leverage to estimate the effects of immigration on native mobility. Second, several of the local amenity measures are only available since 2010. Third, the census in Korea

is available only every 5 years. We do not extend our analysis through 2020, however, because the Covid-19 pandemic significantly slowed immigration and disrupted local labor markets.

Figure 2 presents a municipality-level map of the immigration inflow from 2010 to 2015 standardized by the 2010 total municipality working-age population. Darker shades correspond to larger inflows as a percentage of the working-age population. There is significant variation in immigration inflows across municipalities in Korea. While the average inflow was about 1.7 percent of the 2010 working-age population, there are municipalities that received an inflow of above 8 percent during the period, while other municipalities received almost no immigrants. The high-immigration municipalities not only include large urban areas such as Seoul, but also small rural areas such as Eumseong (48,415 working-age population in 2010). Only six municipalities experienced a decrease in the number of immigrants during this period. We leverage this significant variation across municipalities to estimate the impact of immigration on municipality-level outcomes.

To measure labor market outcomes, we merge various sources of administrative data at the municipality level. We first rely on the population Census of Korea to examine the effects of immigration on employment. As Census in Korea does not provide wage information, we also use the Regional Employment Survey (RES). In this data, the number of area observations is reduced to 162, because the RES does not provide information on municipalities (boroughs) within large metropolitan areas such as Seoul, and we, therefore, need to aggregate them. Lastly, to measure the effects of immigration on firms and local capital, we use the Census of Establishments to measure the change in the number of establishments by industry in a municipality.

One innovative aspect of this paper is that we analyze the impact of immigrants on local amenities variables. The impact of immigration on local amenities can be a very important part of its total economic impact on natives. Local amenities, more than local productivity, have been identified as the primary reason why college-educated Americans moved to highly dense and costly cities in the 1980-2000 period (Diamond, 2016). Local amenities have also been found to be an increasingly relevant reason that people move as they age (see Chen and Rosenthal (2008)). Therefore the existing literature suggests that native Koreans, who are increasingly old and highly educated, may respond very strongly to changing amenities. If local amenities deteriorate in response to immigration, a significant share of the native population may leave even if local economic conditions improve.

To measure the variable component of the local amenities (i.e. not weather- or geography-related and therefore fixed in each location), we use data from Statistics Korea, where we collect several variables that capture municipality-level amenities. These variables include the number of daycare facilities, the number of private tutoring facilities and after-school tutoring programs, the number of cultural facilities (such as libraries, museums, art galleries, and theaters), the number of senior centers (such as schools for the elderly), a measure of waste emissions, car crashes, a “transport culture” index capturing the habits and behaviors of drivers and pedestrians from 18 evaluation indicators, and the class size in local schools. Several of these amenities, such as

private tutoring programs and class sizes, affect the quality of children rearing and education and are therefore particularly valuable to families with children.⁴ We are interested in whether immigration affected any of the above-described local amenities.

Lastly, we use data on housing prices from the Korea Real Estate Board, which provides the index of housing prices according to the type of house (apartment and house) and the type of contract (sale and rent) in each municipality. This index should only capture the price of average housing, once we keep constant the quality/type of housing in a municipality.

Table 2 presents summary statistics of the variables from the various sources that we described above. Panel A shows summary statistics for municipality-level outcome variables including migration of natives by reason for the move, labor market outcomes, the change in amenities, and the change in housing price. Most of the statistics show that Korean municipalities have grown in terms of population and employment from 2010 to 2015. Low-skilled employment of native Koreans, however, has declined during the period. Variables that capture local amenities tend to show very large variation across municipalities. For instance, the log change in waste emission ranges between -1.361 to 1.099, while its mean is 0.026. Panel B shows our explanatory variable of interest, the change in immigration during 2010-2015 which we showed in Figure 2. Lastly, in Panel C, we summarize the municipality-level control variables for all 229 municipalities. The average share of the elderly (aged 55-65) across those municipalities was 21% of the 2010 working-age population. The mean rural population share was 47%, and the share of college graduates was 18.7%. The mean population in a municipality in 2010 was about 140,000 individuals. Lastly, the average size of the Bartik index, which captures local labor demand, is about 0.007. We will explain this measure in Section 4.

3.3 Native mobility: job-related and non-job related

The first key outcome variable we analyze is the migration of natives, by reason of the move, from the SIM data. We collapse the seven different reasons for moving (job, education, family, residential environment, housing, natural environment, and other reasons) into two categories and call them “job migration” (the first) and “non-job migration” (all the others). It is straightforward to think that “job” represents migration for job opportunities. All the other reasons can include moves related to amenities/welfare of the family which in our framework we associate with non-labor income reasons.⁵ In short, the “non-job” reasons capture all factors other than the labor market that affect migration, which we argue are strongly affected by local amenities. In order to strengthen our confidence in this classification, we show the correlations between net migration (by type) and various measures of local amenities.

⁴Due to very high focus of parents on the educational achievements of their children, many parents send their children in these private tutoring facilities in Korea. They represent a very important indicator of educational quality of municipalities.

⁵We exclude “other” reason as it is not obvious to classify that into “job” or “non-job,” but the results including “other reasons” as “non-job” migration are robust. The results using all seven cases are available in Appendix Table A6.

Figure 3 shows four different scatter plots using our definition of “job” and “non-job” migration. Here, migration refers to net migration (in-migration minus out-migration) from 2010 to 2015, standardized by the working-age population in 2010. Panel A shows the relationship between these two types of migration. They are only weakly correlated, implying that they are different types of moves and likely respond to different local factors. In particular, there are many municipalities that receive strong inflows for job reasons, but see outflows for non-job reasons (and vice-versa). In Panels B through D, we relate these two types of migration with wage growth and two of the local amenities we will consider (amount of waste per person and number of car crashes, capturing local pollution and traffic congestion). Each circle (triangle) represents job migration (non-job migration), and the straight (dashed) line indicates the linear fit. First, in Panel B, job migration is positively correlated with wage growth, but the correlation between non-job migration and wage growth is not significant. This is consistent with job migration capturing the response to the local labor market strength. Panels C and D show that non-job migration is negatively correlated with the amount of waste per person and the number of car crashes. That is, natives tend to leave places with these dis-amenities. On the other hand, job migration is not correlated with these amenity variables.

Overall, the correlations in Figure 3 establish two significant findings. First, the two types of migration show quite different variations, and exhibit low correlation. Second, job-migration is positively correlated with wage growth, while non-job migration is positively associated with the quality of local amenities.

4 Empirical Framework

4.1 Framework

Our empirical analysis exploits variation in the inflow of new immigrants across Korean municipalities during 2010-2015 to estimate their impact on native migration and other local outcomes. The main equation we estimate is as follows:

$$y_c = \alpha + \beta \frac{\Delta F_c^{2010-15}}{L_{c,2010}} + \gamma \text{Bartik}_c^{2010-15} + \Phi X_c^{2010} + \lambda_z + \varepsilon_c. \quad (4)$$

The variable, y_c , represents the outcome in municipality c during the period 2010-2015. Initially, this will be the total number of migrants by reason for migration (either job-migration or non-job migration), standardized by the initial year (2010) working-age population. We then will use the same equation to analyze the effect of immigration on native wages, the local number of firms, local housing prices and local amenities.

The explanatory variable, $\Delta F_c^{2010-15}/L_{c,2010}$, is the change in immigrants in the municipality c , standardized by the initial year working-age population ($L_{c,2010}$). To control for local labor demand shifts driven by industry-

specific demand changes, we include $Bartik_c^{2010-15}$ variable.⁶ The specification includes additional municipality-level controls measured at the beginning of the period, X_c^{2010} . These variables include (log) population, the population share of the elderly (aged 55-65), the share of rural residents, and the share of college-educated residents, all measured in 2010. The term λ_z represents 46 Living Zone fixed effects, where Living Zones are Korean regions containing multiple municipalities. They capture regional economic trends during the 2010-2015 period. Lastly, ε_c^j is the error term.

The coefficients of interest is β . Because both the dependent and the independent variables are standardized in the same way and capture the net flow of international migrants and the net flow of natives, we can interpret the coefficient as the number of natives that are moving (in or out) in response to one more immigrant arriving in the municipality. One interesting question is whether the coefficients β , estimated using the job-related and using the non-job related mobility as dependent variable, have different magnitudes or signs. The large inflow of unskilled immigrants affected local productivity, housing prices and amenities in different ways. As a consequence different groups of natives who value income, local prices, and local amenities differently may have heterogeneous mobility responses. The idea is that by classifying moves as motivated by job or non-job reasons, we can separate different types of natives' responses to immigration.

To obtain an estimate capturing the causal effect of immigrants on native mobility, however, one would need to observe changes in immigration that are not correlated with unobservable municipality-level shocks that also affect native migration choices. We do this by constructing a version of the shift-share instrument, popular in this literature, and subjecting it to the validity checks discussed in Goldsmith-Pinkham, Sorkin, and Swift (2020) and Borusyak, Hull, and Jaravel (2022) that will test whether the main identifying variation is uncorrelated with pre-existing trends and to other municipality characteristics.

4.2 Instrument: Construction and Strength

As discussed in Subsection 3.1, a very significant portion of the increase in immigration from 2010 to 2015 was due to overseas Koreans migrating to Korea. This increase was driven by the expansion of the special visa (F-4) program, which was approved and implemented in 2008. This new policy generates a discontinuous change in immigration, as countries, where ethnic Koreans lived like China, quickly became the primary immigrant origin countries. This type of “sudden” change in the country of origin of immigrants is the type of shock that allows researchers to identify the short-term effects of immigration rather than long-term, lingering effects (as shown in (Jaeger, Ruist, and Stuhler, 2018)). Relying on this fact, we construct our instrument for the overseas Korean-driven increase in immigration into each municipality between 2010 and 2015 as follows:

⁶This variable is constructed as $Bartik_c^{2010-15} = \sum_s \eta_c^s \Delta \ln(E^s)$ where η_c^s denotes the share of total employment in industry s in municipality c in 2010; $\Delta \ln(E^s)$ is the national change in the log of employment in the same industry between 2010 and 2015.

$$\frac{\Delta \widehat{F}_c^{Overseas}}{L_{c,2010}} = \frac{\sum_{n=1}^{10} S_{nc}^{2003} \cdot \Delta Overseas_n^{2010-15}}{L_{c,2010}} \quad (5)$$

The term S_{nc}^{2003} measures the share of immigrants from origin country n that are in municipality c , measured in the year 2003.⁷ This distribution captures the potential network of co-ethnic immigrants before the expansion of the special visa (F-4) program. We interact this term with the national increase in overseas Koreans, $\Delta Overseas_n^{2010-15}$, by the nation of origin (n). Therefore, the term $\Delta \widehat{F}_c^{Overseas}$ is the predicted increase in immigrants driven by the increase in ethnic Koreans, distributed across municipalities proportionally to the pre-2003 network by country of origin. We standardize this imputed inflow relative to the initial year working-age population in municipality c ($L_{c,2010}$). We will refer to this instrumental variable as the ‘‘Overseas IV.’’ This imputed variable can be viewed as a modified version of the standard shift-share variable introduced in Card (2001) and broadly used in this literature. For the growth factor of immigrants, we use the national increase in overseas Korean immigrants rather than all immigrants. In this regard, our methodology is very similar to Han et al. (2022) except for the fact that we use different geographic units.⁸

Alternatively, to examine the robustness of our results, we also adopt a standard shift-share IV, using the national increase in *all* immigrants as the growth factor. Specifically, it is constructed as follows:

$$\frac{\Delta \widehat{F}_c^{All}}{L_{c,2010}} = \frac{\sum_{n=1}^{10} S_{nc}^{2003} \cdot \Delta All_n^{2010-15}}{L_{c,2010}} \quad (6)$$

This is essentially the same form as equation 5, but uses $\Delta All_n^{2010-15}$, the national increase in immigration, instead of $\Delta Overseas_n^{2010-15}$. Because the composition of immigrants by nationality between ethnic Koreans and all immigrants is quite different, this alternative instrument identifies a very different source of variation, and it serves as a useful robustness check. We refer to this instrumental variable as the ‘‘Shift-share IV.’’ The results using this IV are available in Appendix Tables A1 to A6.

Figure 4 shows the correlation between our explanatory variable (the actual immigrant inflows between 2010 and 2015) reported on the vertical axis and the Overseas IV, i.e. the imputed overseas Korean inflows, both standardized by initial population. Each circle represents a municipality, and the shading of an individual observation indicates the weight based on the working-age population in 2010. The scatter-plot shows significant variation in the instrument across municipalities, and a strong correlation with the explanatory variable. We do not see particular outliers. We leverage this variation to estimate the impact of immigration on the internal migration of natives.

Table 3 shows the estimated coefficients for the first stage. The dependent variable is the change in immi-

⁷Countries of origin are collapsed into 10 groups based on regional proximity. These groups are China, Taiwan, Japan, Mongolia, Southeast Asia, Southern Asia, Central Asia, United States, Russia, and others.

⁸We cover entire municipalities across South Korea, while Han et al. (2022) examines the mobility response of natives across neighborhoods within Seoul.

grants, as described in Subsection 4.1. Panel A (Panel B) presents the results using Overseas IV (Shift-share IV) as an explanatory variable. From columns 1 through 4, we progressively add municipality-specific control variables. All columns include 46 Living Zone fixed effects, and standard errors are clustered by Living Zone, in order to account for potential correlations across municipalities within Living Zones. The coefficients across columns in Panel A indicate that, after controlling for local characteristics, a one percentage point predicted increase in immigrants (driven by ethnic Korean immigration) is associated with 1.5 percentage points more actual immigrants. These correlations are highly statistically significant and the first stage F-statistic is equal to 31 with our full set of controls, reducing the fear of a weak IV. The coefficient is greater than 1 as the increase in this type of immigrant may attract other types of immigrants as well. In Panel B, we also find that our standard shift-share IV is sufficiently strong (the first stage F-statistic is at least greater than 17 with the full set of controls), with a coefficient of about 0.7. The lower strength of the shift-share IV indicates that the net inflow of overseas Korean is a better predictor of total immigration in the 2010 to 2015 period, relative to other immigrants groups that may have had a larger network in the past but did not immigrate to Korea in large numbers during this period.

4.3 Instrument: Validity

The instruments introduced in the previous subsection are variations of the shift-share approach pioneered in Card (2001) which has been widely used in the previous studies of the effects of immigration. Several recent studies have raised concerns about this type of instrument (Jaeger et al., 2018; Goldsmith-Pinkham et al., 2020; Borusyak et al., 2022), particularly regarding the potential correlation of initial immigrant shares with previous and subsequent economic changes. We argue that the construction of our IV helps alleviate these concerns, and we show that our instrument passes the validity tests recommended by Goldsmith-Pinkham et al. (2020).

The first advantage of our approach is to use the overseas Korean immigrants, rather than all immigrants, to impute the number of immigrants across municipalities. As the increase in overseas Korean immigration was mainly driven by a significant and not anticipated policy change in 2008, this can be considered an exogenous shock akin to a natural experiment (Borusyak et al., 2022). Our use of the initial shares in 2003, well before the expansion of the F-4 visa program in 2008, makes this part of the IV pre-determined relative to any economic and social changes taking place in the 2010-2015 period. Moreover, as documented in past studies of Korean immigration (Han et al., 2022), the expansion of the F-4 program substantially changed the composition of immigrants in Korea. While in 2000, the share of Chinese among Korean immigrants was about 28 percent, this share had risen to almost 50 percent by 2019. Due to this change in the national origin of immigrants, our Overseas IV instrument is not highly correlated with earlier immigration, which allows us to isolate the short-run effect of the recent immigrants from the long-run effects of earlier immigration, as shown in Jaeger

et al. (2018).

Second, as suggested in Goldsmith-Pinkham et al. (2020), we test for the partial correlation of the IV with the municipality-level economic trends in the pre-expansion period (either 1995-2000 or 1998-2003) of the F-4 visa. Panel A of Table 4 presents the coefficients from the regression of the changes in native population and employment over the period 1995-2000 (columns 1 and 2) as well as net migration during 1998-2003 (column 3) on our Overseas IV. All regressions include the full set of control variables and Living Zone fixed effects. Standard errors are clustered by Living Zones. None of the correlations in Panel A is statistically significant. This means that municipalities that had large inflows of overseas Korean immigrants in 2010-2015 due to the legal change did not perform differently in terms of employment, wages, or net migration in the pre-period compared to those that received few overseas Koreans. Therefore, if we find significant effects on the mobility of natives during 2010-2015, this should not be due to persistent spurious trends correlated with the IV.

Finally, in Panel B, we also examine the validity of the shift-share by regressing the pre-period changes in several economic variables on the initial origin-specific immigration share that has the highest Rotemberg weights. Goldsmith-Pinkham et al. (2020) argue that an important assumption for the validity of the shift-share instrument is the exogeneity of the initial origin-specific migration shares, especially those with high weight. It turns out that the Rotemberg weight for Chinese is greater than 0.84. As most of the ethnic immigrants in Korea during 2010-2015 are from China, the variation in this share across municipalities in 2003 is what drives identification. It is therefore very reassuring that when using the share of Chinese in the municipality as the explanatory variable, the estimated coefficients on employment, population, and net migration in Panel C are not statistically significant. In other words, the variation we rely on is not correlated with the pre-trends of the key economic and demographic variables across municipalities. Overall, these results support the exogeneity of the initial share of immigrants and the overall validity of our 2SLS estimations.

5 Main Results

In this section, we present our estimates of the impact of immigration on various outcomes, including native internal mobility by reason, the labor market outcomes of natives, local amenities, and housing prices.

5.1 Internal Mobility of Natives

We begin by presenting our estimates of the effect of immigration on the internal migration of natives. Table 5 shows the estimates of equation 4. Panel A shows the Least Square estimates, where we weight by the total working age population in each municipality in 2010. Panels B through D use 2SLS estimation with Overseas IV. All regressions include the full set of control variables and Living Zone fixed effects are weighted by the

working-age population in each municipality in 2010. Standard errors are clustered by Living Zones. Column 1 shows the effect of immigration on internal migration for any reason, while columns 2 and 3 consider the effect on job-related migration and non-job-related migration, respectively. In the WLS estimates, the coefficient on job-related migration is positive, while the coefficients on non-job-related migration and all migration are not statistically significant. Because these results could be driven by omitted variables bias, we should focus on the findings in Panels B through D, which show the 2SLS results for net-migration, in-migration, and out-migration, respectively.

Panel B of Table 5 shows the first important finding of this paper. Our estimates show that immigration has large, significant effects on the job- and non-job-related migration, but that these effects have opposing signs: Municipalities with more immigration see net inflows of natives for job-related reasons, and net outflows of natives for non-job-related reasons. Column 2 shows that the net-migration of natives for job-related reason increased significantly in response to the inflow of immigrants. The effect is substantial: one more immigrant in a municipality leads to a 1.3 net inflow of natives for job-related reasons. On the other hand, column 3 shows that non-job related inflows of natives decreased significantly in response to immigration. The magnitude of the effect is similar in size compared to the coefficient shown in column 2 but with the opposite sign. As a consequence of these competing effects, the estimated overall effect of immigration on internal migration is small (-0.17) and not statistically significant (column 1). These results indicate that while the net migration response of natives in response to immigration was small, this does not tell the whole story: Municipalities with more immigration saw an increase in net migration of natives for job-related and a decrease in net migration for non-job-related reasons. This suggests that the composition of natives could be changing significantly in municipalities that receive large numbers of immigrants even if the net amount of native migration is not very large.

Panels C and D of Table 5 decompose the effects shown in Panel B into the effects of immigration on natives' internal in-migration to (Panel C) and out-migration from (Panel D) municipalities. We find that one more immigrant increases very significantly in- and much less out-migration for job-related reasons. Immigrants generate more job-related migration from natives mainly by stimulating the inflow of natives from outside the municipality (rather than reducing their work-related out-migration from the municipality). In other words, immigrants increase how attractive the municipality is to natives moving from other municipalities for a job related reason. For non-job related migration, instead, most of the negative effect of immigration is driven by the outflow of natives, rather than their reduced inflow. That is immigration results in the "flight" of natives, with 2 natives leaving for non-job related reasons for each immigrant arriving.

While there can be many explanations for these heterogeneous findings, we will try to find a simple explanation by combining them with the effects of immigrants on labor markets, local prices and local amenities

simultaneously. The large difference in the response of work-related and non-work-related moves already suggests that a potential explanation is a heterogeneous effect of immigrants on labor markets and local amenities with different types of natives having a heterogeneous mobility responses to those changes.

In Appendix Table A1, we present the 2SLS results shown in Table 5 using the standard shift-share IV as a robustness check. We find qualitatively similar results across Panels A through C. Specifically, net job-related native migration increased in response to immigration, while native Koreans leave municipalities with a large increase in immigration for non-job reasons. Although the sizes of the coefficients are slightly different from those in Table 5, we can draw similar conclusions from the results on in-migration (Panel B) and out-migration (Panel C): immigration increases mainly in-migration for job reasons, whereas it only affects out-migration for non-job reasons.

It is interesting to compare the inter-municipal native mobility responses found in this section with the ones found in Han et al. (2022), who investigate the neighborhood choices of natives within Seoul. Both papers find a strong net inflow of natives for job reasons and outflows for non-job reasons in response to immigration. Hence, the patterns of native migration across neighborhoods in Seoul in response to immigration seem to mirror the broader native migration responses across municipalities. However, *across municipalities*, the net outflow of natives for non-job reasons is mainly driven by native flight, while *across neighborhoods* in Seoul, Han et al. (2022) shows that the decline in natives is due to reduced inflows. It could be that outside of Seoul, the motivation to flee areas that are becoming denser with immigrants is stronger for cultural reasons. A systematic comparison of native migration between municipalities and between neighborhoods in large municipalities could be interesting and provide insight into spatial sorting and segregation between and within municipalities.

5.2 Labor Market Outcomes of Natives

The results in the previous subsection establish that immigration caused the significant inflow of natives for job-related reasons. This could be explained if immigration increases the productivity and working opportunities of native workers, as previous studies have found in other contexts. We might expect this to be the case, particularly for highly-educated workers due to their complementarity with less-skilled immigrants (Borjas (2003); Ottaviano and Peri (2012)). In addition, due to agglomeration economies, immigrants may induce positive local demand effects (Hong and McLaren, 2015) and, by reducing bottlenecks in the labor market, they can induce more capital investment and firm creation as well. We examine whether these effects of immigration are found in the context of Korean immigration.

Panel A of Table 6 shows the Overseas IV estimates of the effect of immigration on native labor market outcomes (employment and wages), broken down by the skill level of natives.⁹ We classify natives into three

⁹The WLS results are in Appendix Table A2.

skill groups. The native workers with a 4-year college degree or more are classified as highly skilled. Those with a high school degree or higher (including some college education) are denoted as medium-skilled. Finally, natives who do not have a high school degree are classified as low-skilled. None of our estimates of the effect of immigration on the employment of natives is significant. However, the coefficients for medium- and high-skilled employment are positive, while the estimate for low-skilled employment is near zero. In terms of the effect of immigration on wages, we find effects with similar signs as the employment effects. However, we find statistically significant, positive, and economically large effects on the wages of medium-skilled natives. In other words, we find evidence that medium-skilled native workers benefit from immigration and that highly-skilled native workers may also benefit, while low-skilled native workers are not helped by immigration. We speculate that the middle and high educated could be the group of workers more likely to move into a municipality in response to immigration. The data on internal mobility does not include information on education, so we cannot formally test this hypothesis.

The positive wage and employment effects may stem from agglomeration economies, labor complementary with natives and physical capital investments. We explore this in Panel B of Table 6 which shows the effect of immigration on the growth in the number of local establishments by type of industry during 2010-2015. We separately estimate the effect on firm growth in manufacturing and service sectors and further classify them by the skill level of industries of the firm.¹⁰ In general, the effects of immigration on local establishment growth are highly significant, especially for service industries (columns 4 through 6), where a one percentage point increase in the number of immigrants led to an increase in the number of local firms by 1.1 to 3.8 percent. This is consistent with immigration increasing local investment (previously shown in Olney (2013)) as firm entry responds to local opportunities, as well as immigrants stimulating demand for local services created by immigrants (Hong and McLaren (2015)). Immigration also increases the number of establishments in low-skilled manufacturing (column 3), although there is no significant effect on high or medium-skilled manufacturing (columns 1 and 2). Overall, our results show that immigration led to the creation of new establishments, which could contribute to the inflow of natives for job reasons.

In summary, we find mildly positive economic effects of low-skilled immigrants on wages, employment, and firm growth. This is consistent with the findings of several papers focused on the US economy both in recent decades (Peri, 2012) and historically (Tabellini, 2020).

5.3 Local Amenities and Housing price

To shed light on the non-job related out-migration of some natives in response to immigration, we examine how immigration affected local amenities. If immigration caused local amenities to deteriorate, this could explain

¹⁰We divide them according to the share of college graduates in 2015 for each sector using the two-digit industry codes.

the outflow of some natives, especially those who value these amenities the most. Table 7 presents the impact of immigration on the log changes of several different measures of local amenities. Panel A shows the results using weighted least square estimation, while Panel B shows the 2SLS estimates using our Overseas IV. Overall, immigration tends to worsen local amenities and increase local dis-amenities. For instance, in Panel B, an 1 percent increase in immigration, relative to the working-age population, led to a 0.5 percent decrease in daycare facilities per person (column 1) and a 2 percent decrease in private tutoring facilities per person (column 2). This same increase in immigration also decreased cultural facilities per person by 1.7 percent (column 4) and lowered the index of “positive transport culture” (capturing the ordered flow of traffic) (column 6) by 1.1 percent. Furthermore, immigration also increases dis-amenities such as waste emission (column 3) and car crashes (column 7). The only measure of local amenities that are not affected by immigration is the density of senior centers. The negative effects of immigration on local amenities are consistent with the findings of Diamond (2016) and could be driven by either an over-crowding effect of immigration or because immigrants have lower levels of education and hence do not value or contribute to these local amenities as much.

While the outflow of natives due to non-job reasons can be explained by many factors, the results in Table 7 are consistent with the idea that some residents are more sensitive to the negative changes in local amenities than the positive change in labor opportunities, and thus are more likely to leave for non-job reasons in response to immigration.

Some of the local amenities negatively affected by immigration (daycare and private tutoring) affect the care and education of children. Families with children would be the group most affected by those changes, and we, therefore, might expect that they should be a relevant component of the movers for non-job reasons.

In order to find out whether the natives that are likely to be more sensitive to local amenities are also more likely to leave for non-job reasons, we investigated the heterogeneity of the native migration responses by age, gender, and the presence of a child.¹¹ The results are shown in Table 8. Panels A and B examine young (aged 25-44) singles and Panels C and D show the results for families with and without children, respectively.

Panels A and B of Table 8 show that for young males, the coefficients on the job and non-job migration are similar in magnitude, while the relative size of the coefficient on non-job migration is slightly greater for young females. Looking at families in Panels C and D, we clearly see that families with children are the group that is more concerned with local amenities. The size of the coefficient for non-job migration (-0.733) is 2.5 times greater than that for job-migration (0.256) and is highly significant. This relatively large non-job related outflow of families with children is even greater than that of families without children (Panel D). It is plausible to think that families with children care the most about the educational and safety amenities and in fact, those seem to be leaving the municipality in a larger share.

¹¹Another natural classification would be to look for heterogeneity by natives’ skills. However, as mentioned previously, the SIM data does not provide the educational attainment of natives.

Lastly, we investigate how local housing prices respond to immigration. The increased productivity effect and worsened amenities effect from immigration should be reflected in local housing prices, likely in opposite ways. Additionally, since the net overall mobility of natives is negligible, there should not be an increase in the demand for housing by natives. Thus, we would expect to see negligible effects on housing prices. Table 9 presents both WLS and 2SLS results on the effect of immigration on housing prices. The 2SLS results in Panel B show that in most cases immigration has a small, insignificant negative effect on housing prices. Only the effect on the rental price of the apartment is positive, though still small. Overall the positive productivity and negative amenity effects of immigration seem to result in negligible effects on housing values on the net.

6 Conclusion

This paper investigates the relationship between immigration and native internal mobility in South Korea. We use a policy-induced increase in immigrants to Korea, between 2010 and 2015, that also changed the country of origin of the majority of immigrants. The mobility response of natives is interesting because, in the medium to long run, it should reveal whether, aggregating their economic effects, natives perceive immigration as beneficial or harmful to their overall welfare.

Our analysis shows that natives who move for work-related reasons are attracted to municipalities with large increases in immigration. On the contrary, natives who move across municipalities for non-job related reasons seem to leave locations that receive large inflows of immigrants. In order to understand these heterogeneous responses, guided by a simple model of natives who choose a location to maximize their utility, we examine the effects of immigration on two local dimensions: labor market outcomes and local amenities.

We find that medium- and highly-educated natives, representing the majority of the labor force in South Korea, experience positive wage and employment effects from immigrants who are mainly low-skilled. This is driven by likely complementarities between immigrants and natives plus local business vitality driven by immigrants. These positive effects explain the inflow of natives for work-related reasons in response to immigration. On the other hand, we also find that immigration has significant negative effects on local amenities such as private tutoring facilities, daycare facilities, and cultural facilities while increasing dis-amenities such as pollution and traffic. This deterioration could explain the outflow of natives for non-work-related reasons, especially among those who value these amenities the most.

Overall, these two opposing migration responses leave the price of local housing unaffected and the total net migration of natives close to 0. They also embody the tension in the overall impact of immigration, which on one hand helps natives by boosting productivity and the dynamism of labor markets, but on the other may crowd/reduce some local amenities that they value. The differing mobility responses of people who place different values on the labor market and local amenities imply that immigration can change the composition of

natives in municipalities even if the net-migration response of natives in response to immigration is small.

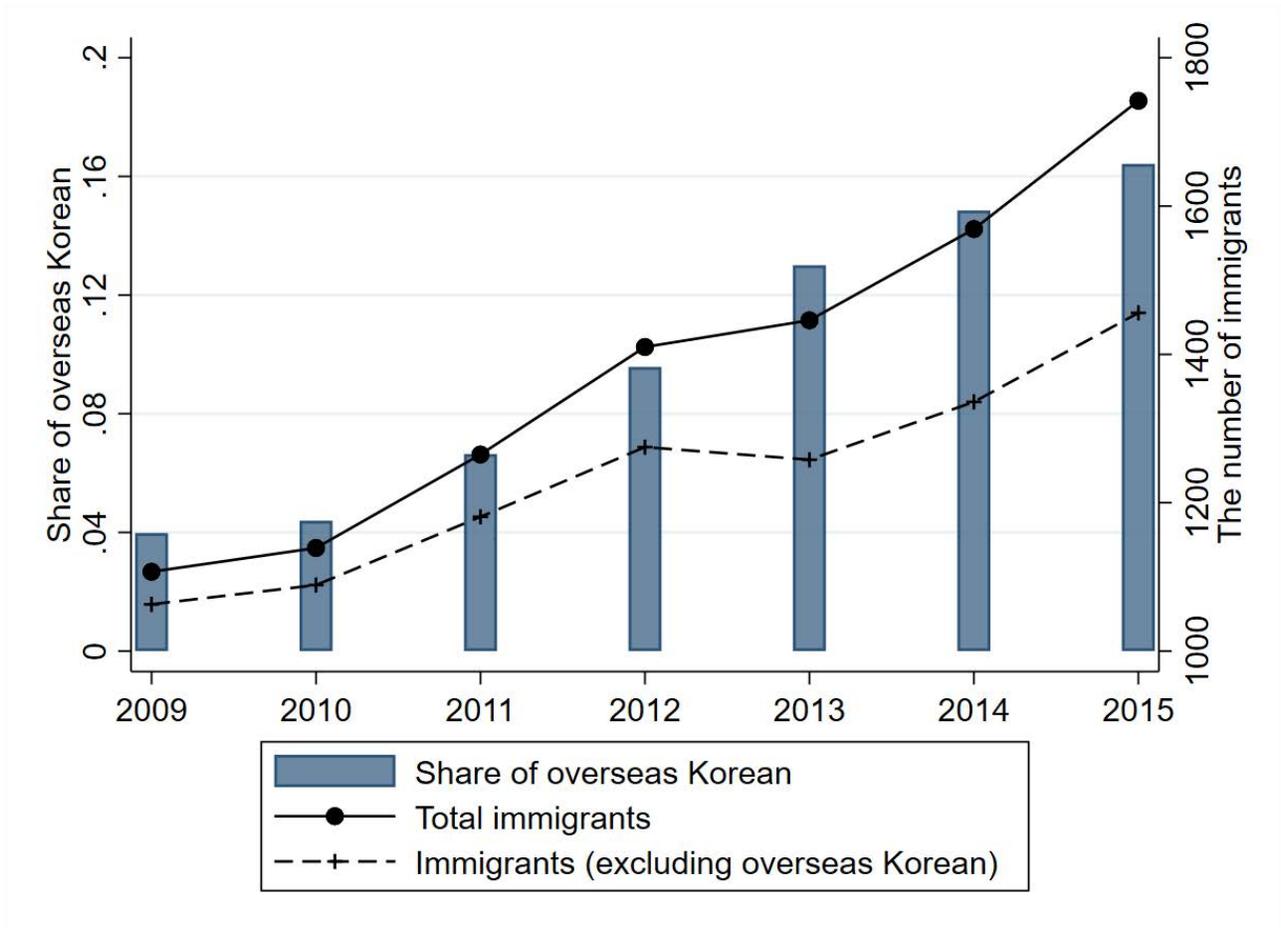
Bibliography

- Alesina, A., A. Devleeschauwer, W. Easterly, S. Kurlat, and R. Wacziarg (2003). Fractionalization. *Journal of Economic Growth* 8(2), 155–194.
- Autor, D. H. (2019). Work of the past, work of the future. In *AEA Papers and Proceedings*, Volume 109, pp. 1–32. JSTOR.
- Borjas, G. J. (2003). The labor demand curve is downward sloping: Reexamining the impact of immigration on the labor market. *The quarterly journal of economics* 118(4), 1335–1374.
- Borusyak, K., P. Hull, and X. Jaravel (2022). Quasi-experimental shift-share research designs. *The Review of Economic Studies* 89(1), 181–213.
- Card, D. (2001). Immigrant inflows, native outflows, and the local labor market impacts of higher immigration. *Journal of Labor Economics* 19(1), 22–64.
- Cascio, E. U. and E. G. Lewis (2012). Cracks in the melting pot: immigration, school choice, and segregation. *American Economic Journal: Economic Policy* 4(3), 91–117.
- Chen, Y. and S. S. Rosenthal (2008). Local amenities and life-cycle migration: Do people move for jobs or fun? *Journal of Urban Economics* 64(3), 519–537.
- Diamond, R. (2016). The determinants and welfare implications of us workers’ diverging location choices by skill: 1980-2000. *American Economic Review* 106(3), 479–524.
- Goldsmith-Pinkham, P., I. Sorkin, and H. Swift (2020). Bartik instruments: What, when, why, and how. *American Economic Review* 110(8), 2586–2624.
- Han, J., J. Hur, J. Lee, and H. Yang (2022). To move or not to move? immigration and natives’ neighborhood choices in seoul, korea. *Journal of Economic Geography* 22(4), 779–799.
- Hong, G. and J. McLaren (2015). Are immigrants a shot in the arm for the local economy? Technical report, National Bureau of Economic Research.
- Jaeger, D. A., J. Ruist, and J. Stuhler (2018). Shift-share instruments and the impact of immigration. Technical report, National Bureau of Economic Research.
- Kim, H. (2021). Wage and employment effects of immigration: Evidence from south korea. *Journal of Demographic Economics*, 1–21.
- Kim, H. and J. Lee (2022a). Immigration and task specialization across industries: Evidence from korea. *mimeo*.

- Kim, H. and J. Lee (2022b). Risk of natural disasters and migration: Evidence from the 2017 pohang earthquake in korea. *mimeo*.
- Lee, J., G. Peri, and V. Yasenov (2022). The labor market effects of mexican repatriations: Longitudinal evidence from the 1930s. *Journal of Public Economics* 205, 104558.
- Lowrey, A. (2021). Low-skill workers aren't a problem to be fixed. *The Atlantic*.
- Mcfadden, D. (1973). Conditional logit analysis of qualitative choice behavior. *Frontiers in Econometrics*, 105–142.
- Mocetti, S. and C. Porello (2010). How does immigration affect native internal mobility? new evidence from italy. *Regional Science and Urban Economics* 40(6), 427–439.
- Monras, J. (2020). Immigration and wage dynamics: Evidence from the mexican peso crisis. *Journal of Political Economy* 128(8), 3017–3089.
- Olney, W. W. (2013). Immigration and firm expansion. *Journal of regional science* 53(1), 142–157.
- Ottaviano, G. I. and G. Peri (2012). Rethinking the effect of immigration on wages. *Journal of the European Economic Association* 10(1), 152–197.
- Peri, G. (2011). Rethinking the area approach: Immigrants and the labor market in california. *Journal of International Economics* 84(1), 1–14.
- Peri, G. (2012). The effect of immigration on productivity: Evidence from us states. *Review of Economics and Statistics* 94(1), 348–358.
- Peri, G. (2016). Immigrants, productivity, and labor markets. *Journal of Economic Perspectives* 30(4), 3–30.
- Peri, G. and C. Sparber (2009). Task specialization, immigration, and wages. *American Economic Journal: Applied Economics* 1(3), 135–69.
- Peri, G. and C. Sparber (2011). Assessing inherent model bias: An application to native displacement in response to immigration. *Journal of Urban Economics* 69(1), 82–91.
- Peri, G. and R. Zaiour (2022). Labor shortages and the immigration shortfall. *Econofact*.
- Saiz, A. and S. Wachter (2011). Immigration and the neighborhood. *American Economic Journal: Economic Policy* 3(2), 169–88.
- Tabellini, M. (2020). Gifts of the immigrants, woes of the natives: Lessons from the age of mass migration. *The Review of Economic Studies* 87(1), 454–486.

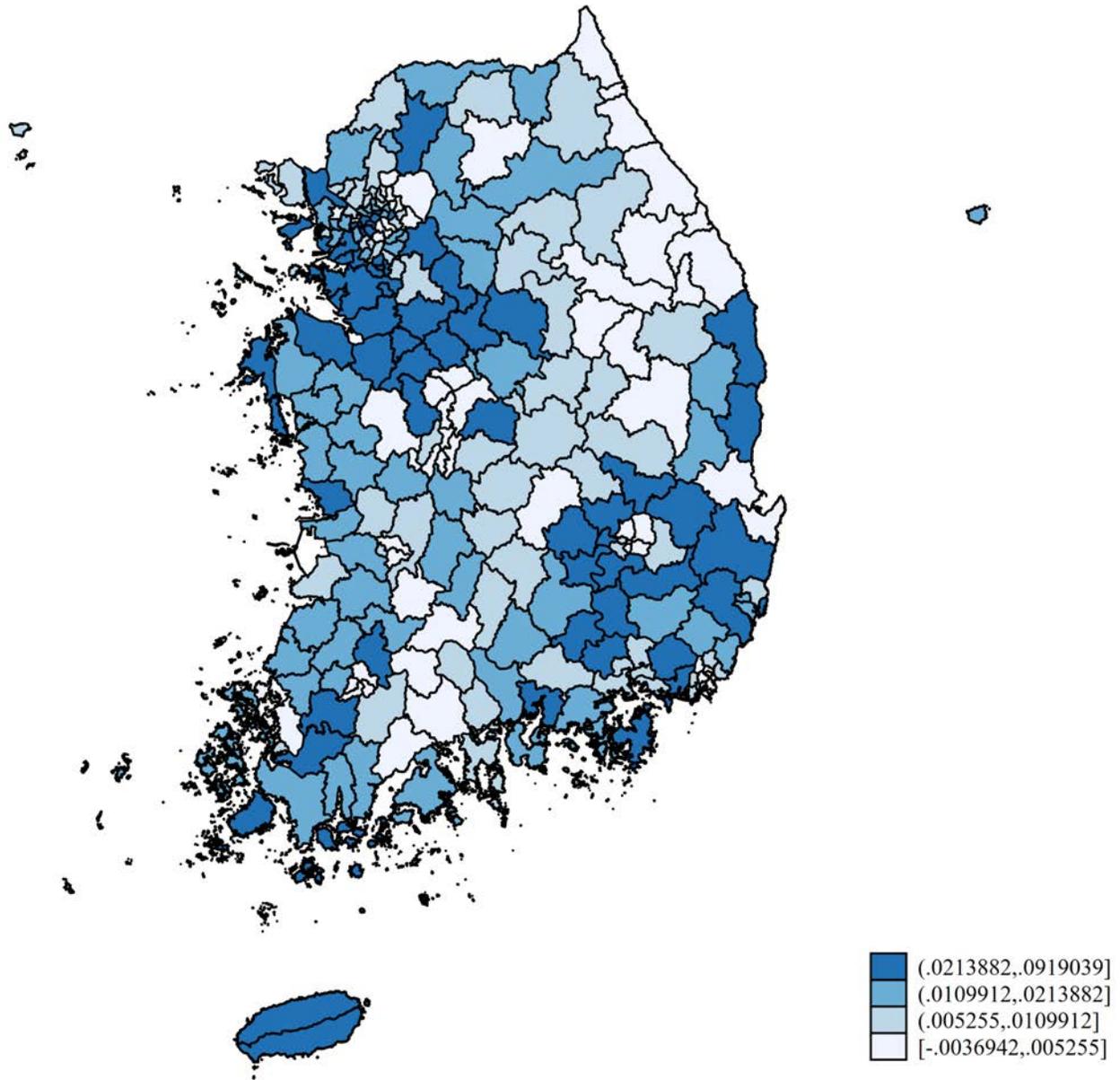
Figures

Figure 1: Immigration Trends in South Korea, 2009-2015



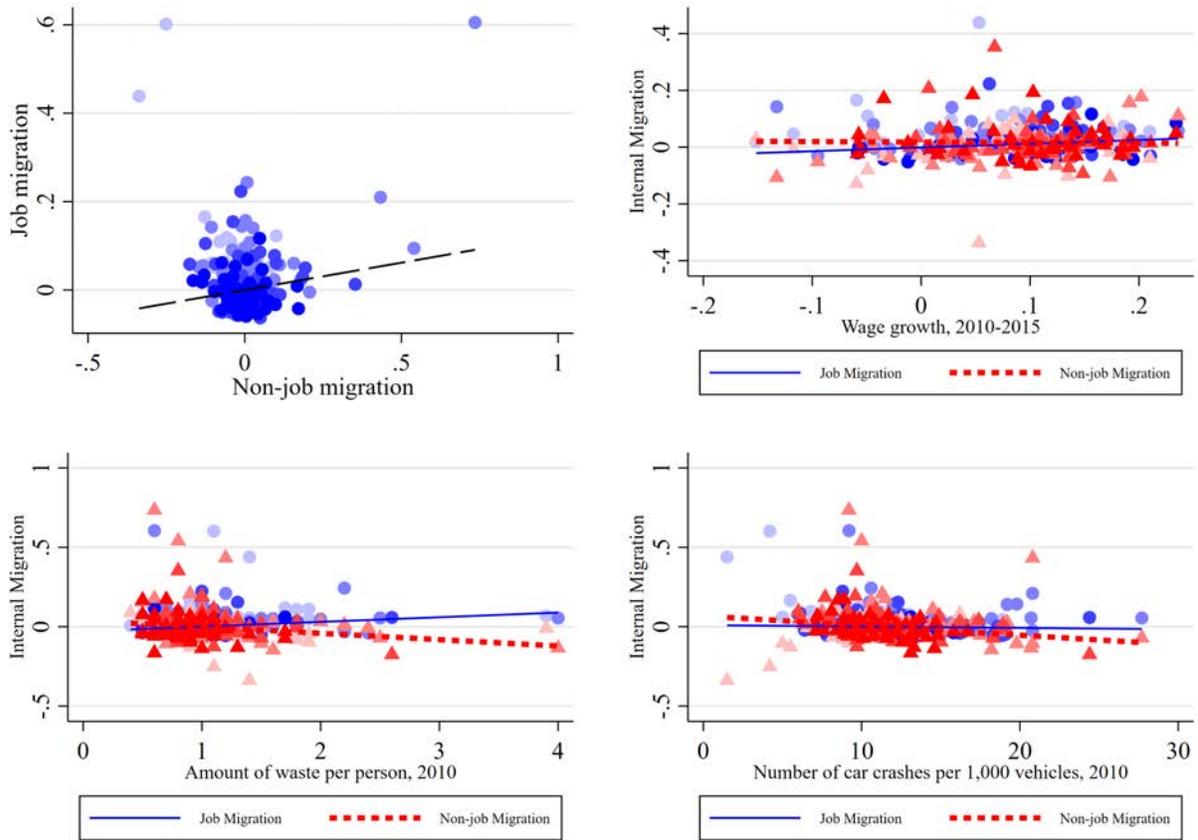
Note: Foreigners with visas shorter than 90 days are excluded. Source: The Ministry of the Interior and Safety (2009–2015)

Figure 2: Geographic Distribution of the Change in Immigrants



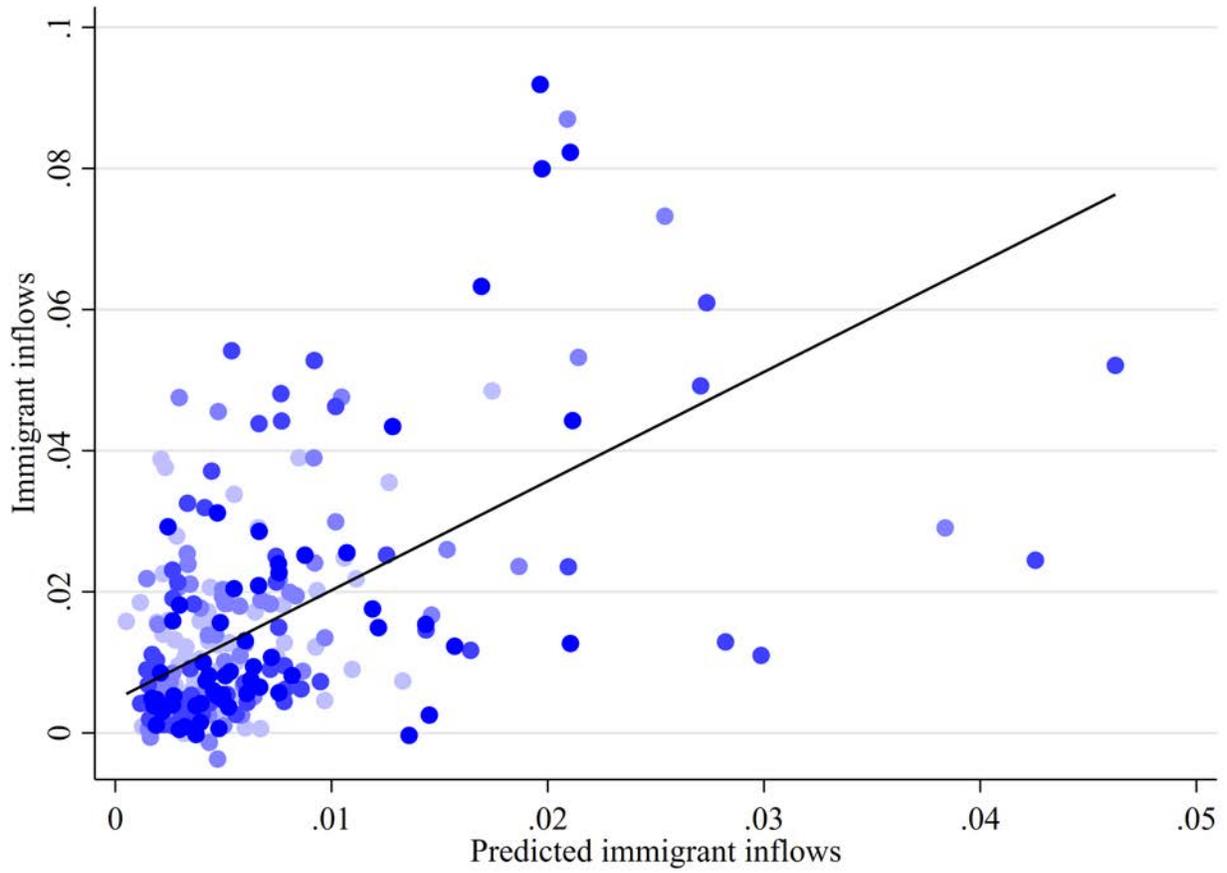
Note: The values shown in the map are change in immigrants during 2010-2015, standardized by the size of working-age population in 2010. The geographical unit of the map is municipalities.

Figure 3: Migration by Type, Wage Growth, and Amenities



Note: The shading of an individual observation indicates the weight of each municipality defined as working-age population in 2010, with dark shading of an individual point implying greater weight.

Figure 4: First-stage Scatter Plot



Notes: This figure shows the scatter plot of actual immigrant inflows between 2010 and 2015 (Y-axis) versus imputed inflows in overseas Koreans (X-axis). The shading of an individual observation indicates the weight of each municipality defined as working-age population in 2010, with dark shading of an individual point implying greater weight.

Tables

Table 1: Characteristics of Natives and Immigrants

	Natives	Immigrants
Panel A: Education level (%)		
No high school degree	6.39	29.74
High school degree	45.41	41.86
Some college Education	12.90	9.35
College Degree	35.31	19.04
Panel B: Occupation (%)		
Managers	1.65	0.92
Professionals	22.15	8.55
Clerks	18.41	2.84
Service workers	10.44	8.72
Sales workers	12.09	2.44
Skilled agricultural workers	3.18	2.38
Craft workers	9.87	14.58
Assembling workers	12.66	27.68
Elementary workers	9.56	31.91

Notes: Aged 25-64, Sources of the data are from Population Census (2015) and Foreign Labor Force Survey (2015).

Table 2: Summary Statistics

	Mean	SD	min	max
Panel A: Outcome Variables				
Net-migration, Overall, 2010-2015	0.030	0.133	-0.143	1.340
Net-migration, Job, 2010-2015	0.025	0.081	-0.063	0.605
Net-migration, Non-job, 2010-2015	0.005	0.097	-0.337	0.735
Δ Employment, High, 2010-2015	0.064	0.059	0.001	0.792
Δ Employment, Med, 2010-2015	0.043	0.060	-0.072	0.360
Δ Employment, Low, 2010-2015	-0.055	0.043	-0.191	0.020
Δ Wage, High, 2010-2015	-0.058	0.107	-0.428	0.226
Δ Wage, Med, 2010-2015	-0.012	0.083	-0.337	0.213
Δ Wage, Low, 2010-2015	0.036	0.100	-0.472	0.362
Δ Firms, High Manu, 2010-2015	0.359	0.255	-0.431	1.435
Δ Firms, Med Manu, 2010-2015	0.287	0.240	-0.636	1.521
Δ Firms, Low Manu, 2010-2015	0.136	0.144	-0.266	0.738
Δ Firms, High Service, 2010-2015	0.116	0.118	-0.050	0.829
Δ Firms, Med Service, 2010-2015	0.264	0.135	0.007	1.098
Δ Firms, Low Service, 2010-2015	0.092	0.095	-0.091	0.638
Δ ln daycare facilities, 2010-2015	0.130	0.138	-0.488	0.597
Δ ln private tutoring facilities, 2010-2015	-0.039	0.233	-0.693	1.596
Δ ln waste, 2010-2015	0.026	0.304	-1.361	1.099
Δ ln cultural facilities, 2010-2015	0.252	0.221	-0.811	0.875
Δ ln senior centers, 2010-2015	-0.126	0.115	-1.139	0.116
Δ ln transport culture index, 2010-2015	0.033	0.088	-0.265	0.415
Δ ln car crashes, 2010-2015	-0.192	0.214	-0.993	0.550
Δ ln class size, 2010-2015	-0.112	0.057	-0.743	0.081
Δ Apartment sale price, 2010-2015	0.025	0.032	-0.028	0.100
Δ Apartment rent price, 2010-2015	0.062	0.023	0.004	0.121
Δ House sale price, 2010-2015	0.017	0.024	-0.029	0.084
Δ House rent price, 2010-2015	0.045	0.021	0.001	0.105
Panel B: Variable of Interest				
Δ Immigrants, 2010-2015	0.017	0.017	-0.004	0.092
Panel C: Control Variables				
Share Elder, 2010	0.214	0.073	0.093	0.389
Share Rural, 2010	0.470	0.447	0.000	1.000
Share College educated, 2010	0.187	0.091	0.065	0.590
Bartik index, 2010-2015	0.007	0.010	-0.004	0.046
Working-age Population, 2010	139,488	143,395	4,995	727,293

Table 3: First Stage Regressions

Panel A: Overseas IV				
	(1)	(2)	(3)	(4)
Overseas IV	1.576*** (0.121)	1.587*** (0.179)	1.498*** (0.252)	1.562*** (0.279)
Log of Population		0.000 (0.003)	0.001 (0.003)	-0.005** (0.002)
Share Old			-0.116** (0.046)	-0.134** (0.051)
Share Rural			0.007* (0.004)	0.005 (0.004)
Share College			-0.065*** (0.012)	-0.073*** (0.014)
Bartik				0.400** (0.166)
First Stage F-stat	169.779	78.480	35.282	31.357
Observations	229	229	229	229
R-squared	0.436	0.436	0.549	0.558
Panel B: Shift share IV				
	(1)	(2)	(3)	(4)
Shift share IV	0.825*** (0.139)	0.827*** (0.164)	0.727*** (0.169)	0.741*** (0.177)
Log of Population		0.000 (0.003)	-0.000 (0.003)	-0.004* (0.002)
Share Old			-0.079*** (0.029)	-0.091*** (0.031)
Share Rural			0.002 (0.006)	0.000 (0.006)
Share College			-0.049*** (0.009)	-0.053*** (0.010)
Bartik				0.265* (0.133)
First stage F-stat	35.069	25.295	18.410	17.534
Observations	229	229	229	229
R-squared	0.495	0.495	0.546	0.550

Notes: Each entry shows the estimated coefficient from a regression of the immigrant inflows between 2010 and 2015 relative to total working age population in 2010 on Overseas IV (Panel A) or Shift share IV (Panel B) and a set of controls. The unit of observation is a municipality. All regressions are weighted by total working age population in 2010. Standard errors are clustered by Living Zone.

p<0.01, *p<0.001, *p<0.1

Table 4: Falsification Tests

Panel A: Overseas IV			
	(1)	(2)	(3)
	Δ Population, 1995-2000	Δ Employment, 1995-2000	Net-migration, 1998-2003
Overseas IV	3.371	1.935	6.168
	(4.644)	(2.523)	(4.015)
Controls	YES	YES	YES
Observations	215	215	215
R-squared	0.441	0.465	0.250
Panel B: Share of Chinese			
	(1)	(2)	(3)
	Δ Population, 1995-2000	Δ Employment, 1995-2000	Net-migration, 1998-2003
Share Chinese	3.748	2.157	6.442
	(5.024)	(2.741)	(4.120)
Controls	YES	YES	YES
Observations	215	215	215
R-squared	0.442	0.466	0.250

Notes: Each entry shows the estimated coefficient from a regression of the pre-period outcome denoted in each panel header on Overseas IV (Panel A) and share of Chinese (Panel B), and a set of controls. Controls include log of population, share of the elderly, share of rural population, share of the college-educated, and Bartik index. The unit of observation is a municipality. All regressions are weighted by total working age population in 2010. Standard errors are clustered by Living Zone.

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

Table 5: Immigration and Internal Mobility of Natives

Panel A: Net-migration, 2010-2015 (WLS)			
	(1)	(2)	(3)
WLS	Overall	Job	Non-job
Δ Immigrant	0.895 (0.756)	1.154** (0.471)	-0.259 (0.313)
Controls	YES	YES	YES
Observations	229	229	229
R-squared	0.027	0.175	0.004
Panel B: Net-migration, 2010-2015 (2SLS)			
	(1)	(2)	(3)
Overseas IV	Overall	Job	Non-job
Δ Immigrant	-0.170 (0.404)	1.293*** (0.096)	-1.463*** (0.342)
Controls	YES	YES	YES
Observations	229	229	229
R-squared	0.384	0.543	0.286
Panel C: In-migration, 2010-2015 (2SLS)			
	(1)	(2)	(3)
Overseas IV	Overall	Job	Non-job
Δ Immigrant	2.357*** (0.518)	1.841*** (0.119)	0.516 (0.505)
Controls	YES	YES	YES
Observations	229	229	229
R-squared	0.592	0.641	0.608
Panel D: Out-migration, 2010-2015 (2SLS)			
	(1)	(2)	(3)
Overseas IV	Overall	Job	Non-job
Δ Immigrant	2.527*** (0.404)	0.548*** (0.127)	1.979*** (0.492)
Controls	YES	YES	YES
Observations	229	229	229
R-squared	0.735	0.689	0.758

Notes: Each entry shows the estimated coefficient from a regression of the migration outcome denoted in each panel header on immigrant inflows between 2010 and 2015 relative to total working age population in 2010 and a set of controls. Controls include log of population, share of the elderly, share of rural population, share of the college-educated, and the Bartik index. The unit of observation is a municipality. All regressions are weighted by total working age population in 2010. Standard errors are clustered by Living Zone.

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

Table 6: Immigration, Labor Market Outcomes and Local Establishments

Panel A: Labor Market Outcomes, 2010-2015 (2SLS)						
	(1)	(2)	(3)	(4)	(5)	(6)
Overseas IV	Δ Employment, High, 2010-2015	Δ Employment, Med 2010-2015	Δ Employment, Low, 2010-2015	Δ Wage, High, 2010-2015	Δ Wage, Med, 2010-2015	Δ Wage, Low, 2010-2015
Δ Immigrant	0.154 (0.167)	0.172 (0.190)	-0.019 (0.151)	0.094 (0.430)	1.431*** (0.329)	-0.246 (0.734)
Controls	YES	YES	YES	YES	YES	YES
Observations	229	229	229	162	162	162
R-squared	0.230	0.627	0.825	0.397	0.484	0.377
Panel B: Local Establishments, 2010-2015 (2SLS)						
	(1)	(2)	(3)	(4)	(5)	(6)
Overseas IV	Δ Firms, High Manu, 2010-2015	Δ Firms, Med Manu, 2010-2015	Δ Firms, Low Manu, 2010-2015	Δ Firms, High Service, 2010-2015	Δ Firms, Med Service, 2010-2015	Δ Firms, Low Service, 2010-2015
Δ Immigrant	-0.510 (0.436)	-0.197 (1.144)	2.147* (1.240)	3.877*** (0.430)	1.534** (0.686)	1.164*** (0.268)
Controls	YES	YES	YES	YES	YES	YES
Observations	229	229	229	229	229	229
R-squared	0.283	0.416	0.411	0.405	0.452	0.583

Notes: Each entry shows the estimated coefficient from a regression of the labor market outcome or local establishments denoted in each panel header on immigrant inflows between 2010 and 2015 relative to total working age population in 2010 and a set of controls. Controls include log of population, share of the elderly, share of rural population, share of the college-educated, and the Bartik index. The unit of observation is a municipality. All regressions are weighted by total working age population in 2010. Standard errors are clustered by Living Zone.

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

Table 7: Immigration and Local Amenities

Panel A: WLS								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
WLS	$\Delta \ln$ daycare facilities	$\Delta \ln$ private tutoring facilities	$\Delta \ln$ waste	$\Delta \ln$ cultural facilities	$\Delta \ln$ senior centers	$\Delta \ln$ transport culture index	$\Delta \ln$ car crashes	$\Delta \ln$ class size
Δ Immigrant	0.345 (0.299)	-1.125** (0.472)	1.761*** (0.514)	-2.104*** (0.302)	0.475** (0.225)	-0.638*** (0.214)	3.586*** (0.545)	0.061 (0.105)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	226	228	228	228	228	222	228	229
R-squared	0.633	0.318	0.343	0.430	0.816	0.319	0.424	0.912
Panel B: 2SLS (Overseas IV)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Overseas IV	$\Delta \ln$ daycare facilities	$\Delta \ln$ private tutoring facilities	$\Delta \ln$ waste	$\Delta \ln$ cultural facilities	$\Delta \ln$ senior centers	$\Delta \ln$ transport culture index	$\Delta \ln$ car crashes	$\Delta \ln$ class size
Δ Immigrant	-0.544** (0.241)	-2.057** (0.921)	6.593*** (2.175)	-1.744 (1.085)	0.368 (0.776)	-1.119*** (0.213)	3.582*** (0.463)	0.087 (0.122)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	226	228	228	228	228	222	228	229
R-squared	0.624	0.314	0.274	0.430	0.816	0.306	0.424	0.912

Notes: Each entry shows the estimated coefficient from a regression of the amenity outcome denoted in each panel header on immigrant inflows between 2010 and 2015 relative to total working age population in 2010 and a set of controls. Controls include log of population, share of the elderly, share of rural population, share of the college-educated, and the Bartik index. The unit of observation is a municipality. All regressions are weighted by total working age population in 2010. Standard errors are clustered by Living Zone.

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

Table 8: Immigration and Internal Mobility of Natives, by Household Types

Panel A: Net-migration, Aged 25-44, Single, Male			
	(1)	(2)	(3)
Overseas IV	Overall	Job	Non-job
Immigrant	-0.013 (0.136)	0.610*** (0.043)	-0.623*** (0.104)
Controls	YES	YES	YES
Mean of outcome	0.000	0.004	-0.004
Observations	229	229	229
R-squared	0.364	0.592	0.253
Panel B: Net-migration, Aged 25-44, Single, Female			
	(1)	(2)	(3)
Overseas IV	Overall	Job	Non-job
Immigrant	-0.105 (0.136)	0.331*** (0.024)	-0.436*** (0.118)
Controls	YES	YES	YES
Mean of outcome	0.001	0.002	-0.001
Observations	229	229	229
R-squared	0.316	0.384	0.295
Panel C: Net-migration, Aged 25-64, Families with children			
	(1)	(2)	(3)
Overseas IV	Overall	Job	Non-job
Immigrant	-0.444 (0.274)	0.288*** (0.065)	-0.733*** (0.217)
Controls	YES	YES	YES
Mean of outcome	0.009	0.009	0.000
Observations	229	229	229
R-squared	0.223	0.328	0.205
Panel D: Net-migration, Aged 25-64, Families without children			
	(1)	(2)	(3)
Overseas IV	Overall	Job	Non-job
Immigrant	-0.080 (0.254)	0.256*** (0.058)	-0.335* (0.202)
Controls	YES	YES	YES
Mean of outcome	0.018	0.010	0.008
Observations	228	229	228
R-squared	0.317	0.430	0.282

Notes: Each entry shows the estimated coefficient from a regression of the migration outcome denoted in each panel header on immigrant inflows between 2010 and 2015 relative to total working age population in 2010 and a set of controls. Controls include log of population, share of the elderly, share of rural population, share of the college-educated, and the Bartik index. The unit of observation is a municipality. All regressions are weighted by total working age population in 2010. Standard errors are clustered by Living Zone.

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

Table 9: Immigration and Housing Prices

	(1)	(2)	(3)	(4)
WLS	Δ Apartment sale, 2010-2015	Δ Apartment rent, 2010-2015	Δ House sale, 2010-2015	Δ House rent, 2010-2015
Δ Immigrant	-0.174 (0.203)	0.235*** (0.066)	-0.123 (0.161)	0.158*** (0.057)
Controls	YES	YES	YES	YES
Observations	155	155	155	155
R-squared	0.009	0.051	0.007	0.026
	(1)	(2)	(3)	(4)
Overseas IV	Δ Apartment sale, 2010-2015	Δ Apartment rent, 2010-2015	Δ House sale, 2010-2015	Δ House rent, 2010-2015
Δ Immigrant	-0.094	0.086**	-0.045	-0.046
Controls	YES	YES	YES	YES
Observations	155	155	155	155
R-squared	0.893	0.705	0.884	0.704

Notes: Each entry shows the estimated coefficient from a regression of the housing price denoted in each panel header on immigrant inflows between 2010 and 2015 relative to total working age population in 2010 and a set of controls. Controls include log of population, share of the elderly, share of rural population, share of the college-educated, and Bartik index. The unit of observation is a municipality. 74 municipality-level observations are missing. All regressions are weighted by working age population in 2010. Standard errors are clustered by Living Zone.

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

Appendix

Table A1: Immigration and Internal Mobility of Natives, Shift share IV

Panel A: Net-migration, 2010-2015 (2SLS)			
	(1)	(2)	(3)
Shift share IV	Overall	Job	Non-job
Δ Immigrant	0.500	1.358***	-0.858**
	(0.465)	(0.104)	(0.398)
Controls	YES	YES	YES
Observations	229	229	229
R-squared	0.373	0.537	0.292
Panel B: In-migration, 2010-2015 (2SLS)			
	(1)	(2)	(3)
Shift share IV	Overall	Job	Non-job
Δ Immigrant	2.641***	1.946***	0.695
	(0.562)	(0.150)	(0.514)
Controls	YES	YES	YES
Observations	229	229	229
R-squared	0.583	0.635	0.600
Panel C: Out-migration, 2010-2015 (2SLS)			
	(1)	(2)	(3)
Shift share IV	Overall	Job	Non-job
Δ Immigrant	2.141***	0.589***	1.553***
	(0.418)	(0.126)	(0.490)
Controls	YES	YES	YES
Observations	229	229	229
R-squared	0.753	0.687	0.782

Notes: Each entry shows the estimated coefficient from a regression of the migration outcome denoted in each panel header on immigrant inflows between 2010 and 2015 relative to total working age population in 2010 and a set of controls. Controls include log of population, share of the elderly, share of rural population, share of the college-educated, and the Bartik index. The unit of observation is a municipality. All regressions are weighted by total working age population in 2010. Standard errors are clustered by Living Zone.

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

Table A2: Immigration, Labor Market Outcomes and Local Establishments, WLS

Panel A: Labor Market Outcomes, 2010-2015 (WLS)						
	(1)	(2)	(3)	(4)	(5)	(6)
WLS	Δ Employment, High, 2010-2015	Δ Employment, Med 2010-2015	Δ Employment, Low, 2010-2015	Δ Wage, High, 2010-2015	Δ Wage, Med, 2010-2015	Δ Wage, Low, 2010-2015
Δ Immigrant	0.035 (0.185)	-0.044 (0.219)	-0.088* (0.045)	0.540 (0.323)	0.808* (0.461)	1.133*** (0.334)
Controls	YES	YES	YES	YES	YES	YES
Observations	229	229	229	162	162	162
R-squared	0.232	0.632	0.827	0.400	0.497	0.409
Panel B: Local Establishments, 2010-2015 (WLS)						
	(1)	(2)	(3)	(4)	(5)	(6)
WLS	Δ Firms, High Manu, 2010-2015	Δ Firms, Med Manu, 2010-2015	Δ Firms, Low Manu, 2010-2015	Δ Firms, High Service, 2010-2015	Δ Firms, Med Service, 2010-2015	Δ Firms, Low Service, 2010-2015
Δ Immigrant	0.120 (0.395)	0.565 (0.965)	-0.213 (0.533)	1.374*** (0.241)	0.658 (0.558)	0.113 (0.412)
Controls	YES	YES	YES	YES	YES	YES
Observations	229	229	229	229	229	229
R-squared	0.286	0.419	0.482	0.519	0.465	0.613

Notes: Each entry shows the estimated coefficient from a regression of the labor market outcome denoted in each panel header on immigrant inflows between 2010 and 2015 relative to total working age population in 2010 and a set of controls. Controls include log of population, share of the elderly, share of rural population, share of the college-educated, and the Bartik index. The unit of observation is a municipality. All regressions are weighted by total working age population in 2010. Standard errors are clustered by Living Zone.

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

Table A3: Immigration, Labor Market Outcomes and Local Establishments, Shift share IV

Panel A: Labor Market Outcomes, 2010-2015 (2SLS)						
	(1)	(2)	(3)	(4)	(5)	(6)
Shift share IV	Δ Employment, High, 2010-2015	Δ Employment, Med 2010-2015	Δ Employment, Low, 2010-2015	Δ Wage, High, 2010-2015	Δ Wage, Med, 2010-2015	Δ Wage, Low, 2010-2015
Δ Immigrant	0.304 (0.202)	0.477** (0.208)	0.002 (0.174)	0.026 (0.449)	1.457*** (0.353)	-0.330 (0.774)
Controls	YES	YES	YES	YES	YES	YES
Observations	229	229	229	162	162	162
R-squared	0.222	0.603	0.824	0.395	0.483	0.373
Panel B: Local Establishments, 2010-2015 (2SLS)						
	(1)	(2)	(3)	(4)	(5)	(6)
Shift share IV	Δ Firms, High Manu, 2010-2015	Δ Firms, Med Manu, 2010-2015	Δ Firms, Low Manu, 2010-2015	Δ Firms, High Service, 2010-2015	Δ Firms, Med Service, 2010-2015	Δ Firms, Low Service, 2010-2015
Δ Immigrant	-0.254 (0.410)	0.568 (1.276)	2.421** (1.115)	3.543*** (0.451)	2.156*** (0.797)	1.496*** (0.302)
Controls	YES	YES	YES	YES	YES	YES
Observations	229	229	229	229	229	229
R-squared	0.285	0.419	0.393	0.433	0.426	0.560

Notes: Each entry shows the estimated coefficient from a regression of the labor market outcome denoted in each panel header on immigrant inflows between 2010 and 2015 relative to total working age population in 2010 and a set of controls. Controls include log of population, share of the elderly, share of rural population, share of the college-educated, and the Bartik index. The unit of observation is a municipality. All regressions are weighted by total working age population in 2010. Standard errors are clustered by Living Zone.

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

Table A4: Immigration and Local Amenities, Shift share IV

Panel A: 2SLS(Shift share IV)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Shift share IV	$\Delta \ln$ daycare facilities	$\Delta \ln$ private tutoring facilities	$\Delta \ln$ waste	$\Delta \ln$ cultural facilities	$\Delta \ln$ senior centers	$\Delta \ln$ transport culture index	$\Delta \ln$ car crashes	$\Delta \ln$ class size
Δ Immigrant	-0.747** (0.300)	-1.511 (0.921)	6.927*** (2.397)	-1.839 (1.323)	-0.119 (0.831)	-1.179*** (0.239)	4.087*** (0.480)	0.043 (0.137)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	226	228	228	228	228	222	228	229
R-squared	0.619	0.317	0.264	0.430	0.812	0.303	0.423	0.912

Notes: Each entry shows the estimated coefficient from a regression of the amenity outcome denoted in each panel header on immigrant inflows between 2010 and 2015 relative to total working age population in 2010 and a set of controls. Controls include log of population, share of the elderly, share of rural population, share of the college-educated, and the Bartik index. The unit of observation is a municipality. All regressions are weighted by total working age population in 2010. Standard errors are clustered by Living Zone.

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

Table A5: Immigration and Housing Prices, Shift share IV

	(1)	(2)	(3)	(4)
Shift share IV	Δ Apartment sale price, 2010-2015	Δ Apartment rent price, 2010-2015	Δ House sale price, 2010-2015	Δ House rent price, 2010-2015
Δ Immigrant	-0.115 (0.116)	0.086* (0.049)	-0.104 (0.093)	-0.038 (0.081)
Controls	YES	YES	YES	YES
Observations	155	155	155	155
R-squared	0.892	0.705	0.878	0.706

Notes: Each entry shows the estimated coefficient from a regression of the housing price denoted in each panel header on immigrant inflows between 2010 and 2015 relative to total working age population in 2010 and a set of controls. Controls include log of population, share of the elderly, share of rural population, share of the college-educated, and Bartik index. The unit of observation is a municipality. 74 municipality-level observations are missing. All regressions are weighted by working age population in 2010. Standard errors are clustered by Living Zone.

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

Table A6: Immigration and Internal Mobility of Natives by Seven Reasons, 2SLS

Panel A: Overseas IV (Net-migration, 2010-2015)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Job	Family	Housing	Education	Residential environment	Natural environment	Others
Δ Immigrant	1.293*** (0.096)	-0.711*** (0.082)	-0.675** (0.266)	-0.035** (0.016)	-0.002 (0.009)	-0.039** (0.017)	0.259* (0.135)
Controls	YES	YES	YES	YES	YES	YES	YES
Observations	229	229	229	229	229	229	229
R-squared	0.543	0.297	0.270	0.358	0.246	0.799	0.246
Panel B: Shift share IV (Net-migration, 2010-2015)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Job	Family	Housing	Education	Residential environment	Natural environment	Others
Δ Immigrant	1.358*** (0.104)	-0.545*** (0.098)	-0.236 (0.308)	-0.045** (0.018)	-0.009 (0.009)	-0.022 (0.021)	0.395** (0.166)
Controls	YES	YES	YES	YES	YES	YES	YES
Observations	229	229	229	229	229	229	229
R-squared	0.537	0.339	0.255	0.355	0.239	0.802	0.226

Notes: Each entry shows the estimated coefficient from a regression of the migration outcome denoted in each panel header on immigrant inflows between 2010 and 2015 relative to total working age population in 2010 and a set of controls. Controls include log of population, share of the elderly, share of rural population, share of the college-educated, and the Bartik index. The unit of observation is a municipality. All regressions are weighted by working age population in 2010. Standard errors are clustered by Living Zone.

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