Immigration and Provision of Public Goods: Evidence at the Local Level in the U.S.*

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Abstract

This paper studies the causal impact of immigration on provision of local public goods. We uncover substantial heterogeneity across immigrants with different skills, due to their asymmetric impact on the per capita tax base: Absent full insurance through intergovernmental transfers, there is a relative decline in per capita revenues and expenditures with the arrival of low-skilled immigrants, and an increase with high-skilled immigrants. While the two types of immigrants offset each other on average, spatial differences in the share of low- and high-skilled immigrants lead to unequal fiscal effects across counties; the impacts differ for second-generation immigrants and across public services, with no effect on education.

JEL classifications: F22, H41, H7, J61, J68, R5.
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1 Introduction

Despite the potential for aggregate economic gains, there has been growing public apprehension regarding immigration in many developed countries. Of particular concern is the impact of immigrants on wages and employment of native workers as well as on the welfare state, specifically the quantity and quality of public services. Attitudes surveys suggest that the fiscal channel is more important than labor-market effects in shaping public opinion towards immigration (Dustmann and Preston, 2005). Voters worry about increases in taxes as well as overcrowding of schools, hospitals and public transportation when immigrants arrive.[1] Despite this, the large and influential literature on the impact of immigrants on natives has mainly emphasized the labor market channel, with surprisingly much less evidence on fiscal effects.[2] This paper focuses on the latter by studying the impact of immigration on public finances and provision of local public goods in the United States.

There are various channels through which immigration could impact public goods' provision in a locality. If immigrants differ from natives in terms of skills, their arrival will result in changes in average per capita income due to a compositional change and (potentially) due to changes in factor prices. This will affect the local tax base of income, sales and property taxes. The direction and magnitude of the change in per capita revenues depend on the type of immigrants (low-skilled vs. high-skilled), as well as the response of the government. For example, the local government may respond by adjusting tax rates and/or per capita benefits. Federal and state governments may choose to fully or partially offset changes in locally-raised revenues via intergovernmental transfers. Since most local governments in the U.S. are constrained by a balanced budget requirement, the resulting change in *total* revenues (locally-raised revenues plus intergovernmental transfers) determines closely how public expenditures and provision of public goods are affected. The impact on expenditure will potentially vary across different spending items if the arrival of immigrants alters relative demand for or the cost of providing certain services in a locality.[3]

In this paper, we document a *causal* association between immigration and provision of local public goods at the U.S. county level.[4] We start by outlining a simple framework

[1] See Hanson et al. (2007), Facchini and Mayda (2009), Hainmueller and Hiscox (2010).

[2] The empirical literature on the labor-market impact of immigration is extensive. For recent reviews see, for example, Borjas (2014), Lewis and Peri (2015) and Peri (2016), among others.

[3] The change in demand could be due to differences across immigrants and natives in terms of the type of services they demand or due to political economy factors (e.g. changes in preferences for redistribution or for funding certain services). The arrival of immigrants could impact per capita costs due to economies of scale or a change in labor costs.

[4] We consider public goods provided by all local governments at the county level, namely counties, cities, townships, special districts, and independent school districts. These include services such as public education, infrastructure, law and order, sanitation, and public amenities, measured in (per capita) spending terms as well as using per pupil spending on education, teacher to student ratios and (property

depicting the fiscal impact of a change in the number of low- and high- skilled immigrants. We then empirically assess the importance of these shocks using detailed county-level data from the United States during 1990-2010. An important challenge in the analysis of the link between immigration and fiscal outcomes is endogeneity driven by sorting of immigrants into specific localities, potentially as a function of provision of local public goods. We address this issue by employing a shift-share instrument (Card, 2001), modified to be skill-specific. In particular, we leverage the different timing and size of the *national* inflow of low- and high-skilled immigrants by country of origin, which we apportion to the local level using the pre-sample shares of immigrants from each country of origin across U.S. counties (Mayda et al., 2022).[5]

We uncover substantial heterogeneity in terms of the fiscal effect of immigrants with different skills. There is a relative decrease in per capita public expenditures in a locality with the arrival of low-skilled immigrants (with less than college education), and a relative increase with high-skilled immigrants. Importantly, the impact of overall immigration (low-skilled plus high-skilled) on per capita public expenditures is small. In the *average* county, which experienced the same change in low- and high-skilled immigrant shares as the U.S. as a whole during 1990-2010, the adverse impact of low-skilled immigrants on public goods' provision was mostly offset by the positive impact of high-skilled immigrants: The net effect is a decline of 0.3 percent per year, relative to a county that did not receive any immigration during this period. However, most localities in the U.S. do not look like the average county, as they differ in the type of immigrants they attract. Hence the fiscal effect of immigration is heterogenous across space.[6]

We find that the opposite impact of low- vs. high-skilled immigrants on provision of public goods is in line with their asymmetric impact on the local per capita tax base: The arrival of high-skilled immigrants results in a relative increase in average local income and housing values, while the opposite is the case for low-skilled immigrants. The movement

and violent) crime rates.

[5] As we discuss in detail in Section 4.2, we confirm the validity of our instruments by conducting a fairly stringent set of tests. We first show that the instrument-predicted changes in immigrant shares over the period of analysis do not predict pre-sample changes in the main outcome variables (Autor et al., 2013). Next, we document that the pre-sample shares, especially those with the highest Rotemberg weights, are not correlated with pre-treatment trends (Goldsmith-Pinkham et al., 2020). We then confirm the robustness of our results using the aggregate shock representation (i.e. the national migration inflows by country of origin), as in Borusyak et al. (2022) and, by controlling for lagged changes in outcome variables. Finally, we show that our results are robust to using exogenous ancestry – as predicted by the interaction between time-series variation in (origin-specific) push factors and (destination-specific) pull factors – to construct the shares in the Card (2001) instrument (in place of the pre-sample shares), as in Burchardi et al. (2019) and Terry et al. (2023).

[6] Consider two counties at the extremes of the distribution of fiscal effects across counties: Between 1990 and 2010, in Presidio, TX the share of low- and high-skilled immigrants increased by 10 and 1 percentage points, respectively. On the contrary, in Monterey, CA, the share of low-skilled immigrants increased by 3 percentage points and the share of high-skilled immigrants increased by 7 percentage points. Based on our estimates, these inflows resulted in a 15 percent *reduction* in (per capita) spending on public services in Presidio and in a 14 percent *increase* in Monterey.

in locally-generated per capita revenues, and in particular per capita property, sales and income tax revenues, traces changes in the per capita tax base. These results are consistent with a framework in which tax rates do not *fully* adjust to immigration-induced variation in the tax base.[7] Transfers from the federal government partially smooth out the fiscal impact of immigration at the local level, but they do not fully offset it.[8] Instead, transfers from the state government exacerbate the impact of local immigration shocks because the latter are correlated within a state. Absent full insurance by federal and state governments and given only partial adjustment in tax rates, the balanced budget requirement implies that per capita changes in public expenditures trail those of per capita own revenues.

While total per capita expenditures increase (decrease) with the arrival of high- (low-) skilled immigrants, the impact is heterogeneous across spending on various public services, both in direction and in magnitude. For example, high-skilled immigration leads to a *reduction* in "law and order" spending. This finding might be in part driven by the decrease in (violent and property) crime rates which, we find, is associated with the arrival of high-skilled immigrants. The inflow of low-skilled migrants reduces expenditures on infrastructure and public amenities, while high-skilled immigrants have the opposite effect. For the largest expenditure item, education, we find no significant impact of either type of immigrants on per capita (or per pupil) spending, or on student to teacher ratios. Given the decline in per capita own revenues and in transfers dedicated to education, when low-skilled immigrants arrive, this finding points to a reallocation of resources across expenditure items towards education.

We also consider heterogeneity in the fiscal effects across generations of immigrants. The fiscal impact of second-generation immigrants could be different than that of first-generation ones, due for example, to differences in income levels and in utilization of locally provided public services. Another reason to consider the second generation is that, if the location decisions of the two generations of immigrants are correlated, as we find to be the case in the data, the estimated impact of first-generation immigrants could be biased. We show that the main results of this paper are robust to controlling for the share of second-generation immigrants: The impact of low-(high-)skilled first-generation immigrants on provision of local public goods is negative (positive). Consistent with NASEM (2016), second-generation immigrants have a positive and significant impact on per-capita (own) revenues, while their impact on per capita (general) expenditures is insignificant and small in magnitude.

Considering the emphasis on the fiscal effects of immigration in the public discourse,

[7] We provide some evidence of partial adjustment in the form of an increase in effective property tax rates with the arrival of low-skilled immigrants.

[8] Importantly, the federal government can, in fact, offset some of these effects, through either a redistribution of transfers across different localities which were differentially impacted or an adjustment of the overall level of federal transfers, given that the fiscal effects of immigration at the federal level are more positive than at the local level (NASEM, 2016).

the academic literature is not large.[9] Our paper complements earlier work which uses an accounting methodology to evaluate the fiscal impact by directly calculating benefit take-up and tax contributions of immigrants relative to natives.[10] Also related are the dynamic analyses of fiscal effects that consider both the current and future impact of immigration, by calculating the net present value of the stream of taxes and expenditures over the entire life-cycle of a given cohort or flow of immigrants. This is done either through calibration of general equilibrium overlapping generations models or by using generational accounting techniques.[11] These studies are insightful and have contributed a great deal to our understanding of fiscal effects of immigration. However, the approaches used require a multitude of assumptions (e.g. the extent to which immigrants increase the cost of public goods like roads, defense, etc.) and often do not incorporate some of the indirect fiscal effects of immigration through other channels, such as the labor, housing and capital markets, as well as any behavioural responses.[12]

Our paper is novel in its methodological approach, as we *estimate* the fiscal impact of immigration by using variation at the local level in the United States. Local governments in the United States are well-suited for this exercise as they have high levels of fiscal autonomy; they raise revenues from various taxes and fees to finance expenditures on locally provided public goods that are tailored towards local priorities.[13] This setting is different than that of many other countries that have a welfare state mostly operating at the national level, where population-based formulas often predictably determine spending at the local level. In addition, our reduced-form approach, applied to total revenues generated from both natives and immigrants at the local level, allows us to capture the indirect fiscal effects of immigration, for example those working through changes in natives' incomes in the labor market and in property values.

The findings of our paper are closely linked to the political economy literature that studies the impact of immigration on the size of the welfare state (Alesina and Stantcheva, 2020). Theoretically, in the presence of a fiscal leakage from the native to the foreign-born population, low-skilled immigration leads to a smaller welfare state through changes in preferences for redistribution, although migrants are likely to support greater benefits (Razin et al., 2002); this is especially the case in localities where natives are high-skilled (Facchini and Mayda, 2009). Some papers empirically investigate the impact of immigration

[9] See Preston (2014), Vargas-Silva (2015), Dustmann et al. (2017) and NASEM (2016) for comprehensive reviews of the literature on fiscal effects of immigration.

[10] See Bratsberg et al. (2010) for Norway; Ruist (2014) for Sweden; Borjas (1994) and NASEM (2016) for the U.S.; and Dustmann and Frattini (2014) for the UK.

[11] For the former, see for example, Storesletten (2000) for the U.S., Storesletten (2003) for Sweden and, Dustmann et al. (2023) for the U.K. For the latter, see Auerbach and Oreopoulos (1999) for the U.S., Chojnicki (2013) for France, Collado et al. (2004) for Spain, and Javdani and Pendakur (2014) for Canada.

[12] A few exceptions are Chassamboulli et al. (2020), Colas and Sachs (2020) and Clemens (2021).

[13] Local governments aggregated to the county level account for a quarter of overall revenues and expenditures of all levels of the U.S. government, including federal and state.

on preferences for redistribution, see for example, Jofre-Monseny et al. (2016), Alesina et al. (2018), Alesina et al. (2021) and Giuliano and Tabellini (2020).[14] While these papers focus on attitudes towards redistribution, our contribution to the literature is to show, in the context of the United States at the local level, that low-skilled (high-skilled) immigration reduces (increases) *actual* redistribution in the form of per capita public spending,[15] and that changes in the tax base and tax revenues are important drivers.[16] In that sense, our paper complements Tabellini (2019), which documents lower levels of redistribution in the early 20th century, triggered by the arrival of culturally more distant immigrants. We differ in our focus on the financial ability of local governments to provide public services when immigrants arrive; the time period of analysis and our emphasis on heterogeneity among immigrants in terms of their level of education.

The rest of the paper is organized as follows. In the next section, we introduce a simple framework to predict the fiscal impact of a change in the number of low- and high-skilled immigrants. Section 3 describes the data on immigration and local public finances. Section 4 introduces the identification strategy and presents our main results. We focus on the channels in Section 5 and document the impact of immigration on various revenue and expenditure items. Section 6 extends our analysis to second-generation immigrants, and Section 7 concludes.

2 Theoretical framework

To guide our empirical analysis, we consider a two-factors two-goods Heckscher-Ohlin model of a small open economy, augmented with a redistributive welfare system as in Dustmann and Preston (2005) and Facchini and Mayda (2009).[17] We use this framework to predict the fiscal impact of a change in the number of low- and high-skilled immigrants. The main insight of the model is that a change in the skill composition of the population will affect the per capita tax base and is enough to generate a fiscal response. We first develop the model absent labor-market effects and next, we extend it to incorporate changes in factor prices. In this section, we summarize the model detailed in Appendix A.

[14] Also related is the literature on the negative association between "preferences for redistribution" and the greater racial and ethnic heterogeneity of the population that immigration implies, see for example Luttmer (2001) and Dahlberg et al. (2012).

[15] Our work also relates to the literature on the *perceived* fiscal impact of immigration. What is key in these analyses is the type of adjustment that voters believe takes place as a consequence of immigration. Survey respondents perceive the fiscal impact of immigration as working through changes in tax rates (Dustmann and Preston, 2005; Hanson et al., 2007; Facchini and Mayda, 2009) and in per capita benefits (Hainmueller and Hiscox, 2010).

[16] Our work is also connected to the papers that analyze the local impact, on per capita public spending and provision of public goods, of respectively trade-induced income shocks (Feler and Senses, 2017), rising income inequality (Boustan et al., 2013) and the Black Migration within the United States after World War II (Boustan, 2007).

[17] Our model differs in that we derive the separate impact of low- and high-skilled immigrants, instead of assuming that the skill composition of immigrants and natives is constant.

The redistributive welfare system is so that the government levies a flat income tax rate, accompanied by a lump sum per capita benefit. The latter captures the provision of public services, which are assumed to be equally accessible to migrants and natives. Consistent with the balanced budget requirements commonly imposed on local governments in the U.S., the government budget constraint is assumed to be binding. The arrival of immigrants impacts the budget constraint by changing the tax base and the number of people eligible for benefits. This results in a change in the per capita tax base (in this case, average income) and a fiscal response that involves an adjustment of tax rates and/or per capita benefits, the magnitude and direction of which depend on the skill composition of immigrants.

We first assume that, faced with an inflow of immigrants, the government only adjusts the tax rate to balance the budget, keeping per capita benefits constant (the *tax adjustment scenario*). Given the budget constraint, low-skilled (high-skilled) immigration results in an increase (decrease) in the tax rate, to offset the resulting decrease (increase) in average income. Next, we consider the *benefit-adjustment scenario*, in which the welfare state adjusts only by changing per capita benefits, while keeping tax rates constant. The effects of low- and high-skilled immigration on the per capita benefit are of the same magnitude but in the opposite direction of those under the tax adjustment scenario. Specifically, low-skilled immigration implies a decrease in the per capita benefit, while high-skilled immigration results in an increase.[18]

The main insights of the model continue to hold with minor changes in the elasticity expressions when we consider several extensions of the benchmark case. In the benchmark model, the public benefits are defined in per capita terms and are the same for migrants and natives, and for low- and high-skilled workers. These assumptions best resemble a public service such as public education, for which expenditures may have to increase with utilization in order to keep quantity and quality constant; both native and immigrant kids have access to K-12 public education. The budget constraint can easily be modified to incorporate other types of services provided by local governments. Some of these services are more similar to (pure) public goods, such as infrastructure and parks, whose consumption is non-rival and non-excludable. For these, one can consider total expenditure, which implies that the fiscal effect of immigration depends on total income (which always increases with the size of the population) as opposed to average income (which may increase or decrease, depending on whether immigrants are high- or low-skilled). Public services also differ in terms of their target population. Utilization rates are very different for the rich and poor (high- and low-skilled, in the model) for services such as homeless shelters or public transportation, which suggests a modified budget constraint that allows for different

[18]While we model the two types of policy adjustment separately, in reality policy makers can adjust both tax rates and per capita benefits simultaneously. In this case, the percent change in each policy tool required to bring the budget back to balance is smaller in magnitude, but of the same sign as in the two extreme scenarios. Our empirical analysis allows for adjustments in both policy levers.

per capita benefits for high- and low-skilled workers. The same logic applies to benefits with different take up rates for natives and immigrants, due to informational asymmetries or eligibility requirements.[19]

Our model can easily be extended to incorporate taxes other than those applied to income (e.g. sales and property taxes), as well as progressive tax rates rather than a flat rate. We can also augment the model with intergovernmental transfers (from the state and federal governments), which affect the budget constraint and create a wedge between locally-raised revenues and expenditures. The transfers can (partially or fully) offset local shocks, in which case immigration would lead to changes in expenditures that are less pronounced than those in locally raised revenues. Our empirical analysis will shed light on this point. Finally, note that in the model we assume that the size of the welfare state is fixed, in order to focus on the fiscal effects operating through changes in the tax base and revenues. Our framework complements existing work that emphasizes the political-economy channel and, in particular, changes in preferences for the size of the welfare state when immigrants arrive. In this class of models, a smaller (larger) welfare state implies a simultaneous decline (increase) in per capita revenues and spending, as well as in tax rates, which we will explore empirically.

3 Immigration and Local Public Finances

Guided by the model, we use data on local government budgets and immigrant inflows to identify the impact of immigration on public finances and provision of public goods. Local governments in the United States are well-suited for this exercise as they have high levels of fiscal autonomy; they raise revenues from various taxes and fees to finance expenditures on locally provided public goods that are tailored towards local priorities. This section introduces the data sets we use to construct the immigration and public finance variables at the county level.

3.1 Immigration

Given our interest in the impact of immigrants with different skill levels, we focus on adult immigrants, who are more likely to have completed their formal schooling. Adult immigrants are also more likely to work and pay taxes, and therefore, impact the tax base, which is the main channel highlighted in the model.[20] The total number of adult immigrants

[19] Empirically, we separately examine per capita spending on different types of public services that likely differ along the dimensions highlighted here. However, since we do not observe take up rates by different segments of the population, our results on per capita expenditures for each type of spending reflect the experience of the average resident of a county.

[20] While children do not pay taxes, they do utilize public services. Hence, we consider spending in per capita (in case of education, per student) terms.

in county i at time t (M_{it}) is defined as foreign-born individuals who are at least 25 years old. Low-skilled immigrants are immigrants who do not have a college degree (M_{Lit}) and high-skilled immigrants are those with at least a college degree (M_{Hit}). We construct the shares of immigrants by skill group at the county level as: $M_{jit}/Pop_{it} = (M_{jzt}/M_{zt})(M_{it}/Pop_{it})$ where (M_{jzt}/M_{zt}) is the share of adult immigrants of skill level j ($j \in \{L, H\}$) in total number of immigrants in commuting zone z at time t, and (M_{it}/Pop_{it}) is the share of adult immigrants in total population of county i at time t. Pop_{it} includes all adults and kids of both natives and immigrants.[21]

Panel (a) of Table 1 shows the population weighted means and standard deviations of immigrant shares in 1990 and 2010. The share of immigrants increased from 5.7% to 10.6% of the total population between 1990 and 2010. The majority of immigrants in the U.S. are low-skilled. The shares of low-skilled and high-skilled immigrants in the total population were, respectively, 4.6% and 1.2% in 1990, and 7.6% and 3% in 2010, corresponding to a 3 percentage point increase for low-skilled and a 1.8 percentage point increase for high-skilled immigrants.

The average statistics reported in Table 1, although informative, hide important heterogeneity across U.S. counties in terms of the change in the number and type of immigrants during our sample period. Figures C1 and C2 depict the change in the shares of low- and high- skilled immigrants by U.S. county between 1990 and 2010. Few facts stand out: First, although on average the share of immigrants of each type has increased, several counties have experienced an increase in the share of low-skilled immigrants (e.g. Garza, TX by 22 percentage points), while others have faced a decline (e.g. Real, TX by 5 percentage points) during this period. A similar type of heterogeneity is evident for high-skilled immigration: For example, the share of high-skilled immigrants increased by 9 percentage points in Santa Clara, CA, while it decreased by 0.6 percentage points in Columbia, WA. Second, while there is some overlap, in general, counties and states that experienced a large increase in the share of low-skilled immigrants are not the same as those that received a greater number of high-skilled immigrants. The increase in the latter tends to be more concentrated in urban areas, particularly in the North East, Florida, Southern California and Arizona, while the share of low-skilled immigrants has increased throughout the country, except in the Northern states and in the Rust Belt.

3.2 Local Public Finances and Public Goods Provision

Detailed information on local government budgets for every five years (those ending with 2 and 7) during 1967-2012 are from the U.S. Census Bureau's State and Local Government

[21] The skill composition of immigrants is available only at the commuting zone level and is constructed using IPUMS in 1990, 2000 and 2010. The total number of immigrants at the county level is from tabulations by the U.S. Census Bureau for the years 1980, 1990 and 2000, and from the 5-year (2009-2013) sample of the American Community Survey for 2010.

Finances. The dataset includes detailed revenue and expenditure information on individual local governments, including counties, cities, townships, special districts, and independent school districts. We aggregate all these government records to the county level and match the two-year lead in the fiscal data (i.e. years 1982, 1992, 2002 and 2012) with the share of immigrants measured in 1980, 1990, 2000 and 2010 at the county level. Our final dataset includes 3,079 counties covering all U.S. states, except Alaska and Hawaii.

3.2.1 Revenues

Panel (b) of Table 1 reports population weighted means and standard deviations of per capita total revenues and its main sub-categories.[22] All values are in 1999 U.S. dollars. In 1990, total revenues in the average U.S. county were $2517 per person. About 58% ($1544) of these revenues were generated locally: mostly from property taxes, which on average account for about 43% of revenue from own sources, with the remainder sourced from sales and income taxes (about 8%), other taxes (e.g. license taxes, death and gift taxes, accounting for 2%), charges and administrative revenue (on education, hospitals, highways, etc., accounting for 33%) and revenues from liquor stores, the utility sector and insurance trust (about 14%). The remainder of revenues (on average $973 per person) was from intergovernmental transfers, a large portion of which was from state governments ($858); transfers from the federal and other local governments were small at around 6% each. While on average per capita revenues increased between 1990 and 2010 in every category in real terms, the relative contribution of each revenue item to total (and own) revenue remained relatively stable.[23]

3.2.2 Expenditures

Panel (c) of Table 1 reports population weighted means and standard deviations of per capita expenditures and its main sub-categories. About 90% of expenditures are general expenditures on public goods and service provision, and are the main focus of this paper; the remaining 10% of expenditures are devoted to liquor stores, utilities and the insurance trust sectors, and are mainly financed by dedicated revenue sources. On average, about half of general expenditures (52% or $1122 per capita in 1990) are allocated to public education. Spending on "law and order" (fire, police, protective inspection, corrections and judiciary) accounts for 8% of general expenditures ($178 per capita), while expenditures on "public amenities" such as libraries, parks and recreation, natural resources, health and hospitals, public welfare, housing and community development account for 15% at

[22] See Table B1 for the share of each budget item in total revenue and expenditure.

[23] Local governments in the U.S. differ significantly in terms of their reliance on different forms of revenue: while some counties do not collect sales and income taxes, for other counties these taxes account for over 40% of locally generated revenues. Similarly, reliance on property taxes varies from only 3% of own revenues to over 90%.

$380 per capita in 1990. The remaining categories are "sanitation" (sewerage and solid waste management), "transportation and building infrastructure" (air, water and highway transportation, transit subsidies, parking and public buildings), "administration" (financial administration, employment security administration, miscellaneous commercial activities, central staff services, interest on general debt) and "other general expenditure," with each item accounting for 4-8% of general expenditures (between about $85 and $205 per capita in 1990). Following the pattern of per capita revenues, per capita expenditures have increased in real terms for each category between 1990 and 2010 with, on average, little change in the relative importance of each expenditure item in the budget. Consistent with the balanced budget requirement, most counties broke even in 1990 and 2010.[24]

3.2.3 Public Goods Provision

It is difficult to measure quantity and quality of locally provided public services. Our main measure is *per capita* spending, which is consistently available and is comparable across different services. Despite its advantages and common use, this measure of provision is an imperfect proxy for the quantity and quality of locally provided public services. One problem is that a given service is not always utilized by everyone in the population; for example, only enrolled kids take advantage of public school services or only (a segment of) the poor use homeless shelters. We partially address this issue in the case of education spending, by analyzing more direct measures of quality of service provision (student to teacher ratios) and by measuring education spending in per pupil terms. Another problem is that while a decrease in per capita expenditures may reflect a deterioration of a particular public service provision, it may also indicate a decline in demand for that service. For example, a decrease in per capita spending on policing may be due to a decrease in crime rates, and hence a decline in demand for these services. A decline in both per capita spending together with a finding of a decline in crime rates would then be more consistent with this type of interpretation. Finally, *per capita* public expenditures would be an imperfect proxy for the quantity and quality of public services in situations where scale matters. For example, in education, higher enrollment might lead to worse quality and outcomes in public schools, even if per capita education spending remains constant, due to capacity constraints or difficulty of hiring good teachers. On the contrary, larger scale may be advantageous in the case of certain services that require a minimum scale of activity, such as a school library, sports field or specialized elective courses in local public schools;

[24]School districts (31.2 percent) and municipalities (30.8 percent) account for most local public expenditures, followed by county governments (22.9 percent), special districts (12 percent), and townships (3.1 percent). School and special districts focus on specific functions: Education spending is done almost entirely by school districts (about 80 percent). About 45 percent of all expenditures of special districts are on public amenities, with the remainder on utilities, insurance trust, liquor stores and sanitation. Cities, towns, and counties spend on law and order, education, infrastructure, government administration and public welfare. Some services are provided by more than one level of government (e.g. public safety could include both a municipal and a county police force).

or certain infrastructure with high fixed cost, such as investment in an airport or highway; or pure public goods whose consumption is non-excludable and non-rival, such as public parks. Given we do not fully address these issues, any extrapolation from per capita spending (on a particular service) to public good provision should be made with these caveats in mind.

4 Empirical Framework

4.1 OLS estimates

We model the effect of low- and high-skilled immigrants on log per capita revenues and expenditures ($\ln y_{it}$) in county i and year t as follows:

$$\ln y_{it} = \delta_i + \delta_t + \beta_L \frac{M_{Lit}}{Pop_{it}} + \beta_H \frac{M_{Hit}}{Pop_{it}} + \beta_x X_{z,1980} * t + \varepsilon_{it}, \quad (1)$$

where M_{Lit}/Pop_{it} and M_{Hit}/Pop_{it} are the population shares of low- and high-skilled immigrants in county i and year t. We capture slowly changing county-specific factors driving the fiscal variables with county fixed effects (δ_i), and account for any national trends with year fixed effects (δ_t). Instead of contemporaneous control variables which are likely to be endogenous, we include interactions of linear time trends with economic and demographic variables at the commuting zone level measured in 1980 ($X_{z,1980} * t$). The vector $X_{z,1980}$ includes the 1980 population shares of adult women (age 25 above), African-Americans, individuals who are younger than 25 (youth), married, unemployed, and located in urban areas, as well as the (real) average per-capita income (in logs) and the Bartik indicator. All commuting zone demograhic variables ($X_{z,1980}$) are from the 1980 U.S. Census and are summarized in Panel (d) of Table 1.

In a world in which both tax rates and benefits adjust in response to immigration, our theoretical model predicts that $\beta_L \leq 0$ and $\beta_H \geq 0$ for both per capita own revenues and expenditures. This suggests that the arrival of low-skilled immigrants will result in a decline in per capita own revenues and expenditures, unless an increase in tax rates fully compensates for the decrease in the per capita tax base, in which case $\beta_L = 0$; exactly the opposite is predicted for high-skilled immigrants. Note that the estimated elasticities, β_L and β_H, will likely differ in magnitude for per capita own revenues and expenditures, as the latter depends on *total* revenues, which are determined both by locally generated (own) revenues and intergovernmental transfers (from the federal and state governments).

In Table 2, we present estimates from variants of specification (1) with (log) per capita revenues from own sources and (log) per capita general expenditures as dependent variables in Panels (a) and (b), respectively. In the first two columns of each panel the main explanatory variable is the population share of immigrants (M_{it}/Pop_{it}), included in specifications with and without commuting zone controls. The last two columns allow the

impact of immigration to differ across immigrants of different skill levels as in equation (1). In all specifications, observations are weighted by population and standard errors are clustered at the county level to account for potential correlation of errors over time.

Few clear patterns emerge. There is a negative association between the share of immigrants and locally generated per capita revenues and general expenditures on public services. The estimated coefficients, while significant, are small, and hide important heterogeneity: There is a robust negative association between the share of low-skilled immigrants and both locally generated (per capita) revenues and general expenditures. This association is positive for the share of high-skilled immigrants. The estimates reported in Table 2 provide *prima facie* evidence for a strong association between the shares of immigrants and the local budget. We next turn to establishing whether the basic correlations reported in this section point to a causal relationship or are driven by factors that may simultaneously impact both the share of immigrants and public finances in a locality.

4.2 Identification

There are several threats to identifying a causal link between immigration and local revenues and expenditures based on the OLS estimates. One threat is that some counties have (persistent) economic, cultural and institutional features that attract immigrants and also affect their local budget. Inclusion of county fixed effects (δ_i) address these concerns for characteristics that do not change much over time. However, it is also possible that new immigrants sort themselves into specific localities as a function of *changes* in economic and demographic factors that also affect the local budget. This would be the case if, for example, immigrants select into growing counties which also have the potential for increased quality and quantity of locally provided public goods. Accounting for these changes with the interactions of linear time trends with 1980 economic and demographic variables ($X_{z,1980} * t$), as we do in equation (1), would reduce the bias but is unlikely to fully resolve it. Importantly, there is the possibility of reverse causality between fiscal variables and immigration, which would arise if, for example, an increase in the generosity or quality of per capita benefits or a decline in tax rates in a county attracts immigrants. Using lagged immigration rates would help address this issue if there were no persistence over time in local public finances, which again is not likely to be the case. Hence, estimation of a causal relationship between public finances and immigration requires an IV strategy with plausibly exogenous variation in immigration across localities.

Our instruments build on the widely used shift-share methodology (Card, 2001), which we modify to account for two distinct populations of immigrants by skill-level as in Mayda et al. (2022). We identify exogenous variation in low- and high-skilled migrant shares in a county by leveraging variation at the *national* level in the skill distribution of immigrants by country of origin, and variation in the pre-sample distribution of immigrants by country

of origin across counties.[25] Specifically, let us define the term $sh_{c,i,80}$ as the number of foreign-born from country c, age 25 or above, living in county i in 1980, as a share of their total population in the U.S. in 1980: $sh_{c,i,80} = M_{c,i,80}/(\sum_i M_{c,i,80})$.[26] The predicted number of high-skilled immigrants in county i and year t ($\widehat{M}_{Hit}$) is then the aggregate number of high-skilled immigrants from country c, age 25 or above, in year t (M_{Hct}) distributed across counties using their 1980 shares ($sh_{c,i,80}$). The predicted number of low-skilled immigrants is constructed in an analogous way: $\widehat{M}_{Hit} = \sum_c sh_{c,i,80} M_{Hct}$ and $\widehat{M}_{Lit} = \sum_c sh_{c,i,80} M_{Lct}$.

The instrument for the share of high-skilled immigrants in county i is the predicted number of high-skilled immigrants divided by the predicted total population ($\widehat{M}_{Hit}/\widehat{Pop}_{it}$). The predicted population of county i in year t is the sum of the number of natives in 1980 and the predicted number of immigrants of all ages in year t and in county i ($\widehat{Pop}_{it} = (N^{all}_{i,80} + \widehat{M}^{all}_{it})$. The predicted number of immigrants, $\widehat{M}^{all}_{it}$, is constructed by immigrants from country c at the national level distributed using their share in county i in 1980. The instrument for the share of low-skilled immigrants ($\widehat{M}_{Lit}/\widehat{Pop}_{it}$) is constructed analogously. The instrument for the overall immigrant share is then simply $(\widehat{M}_{Lit} + \widehat{M}_{Hit})/\widehat{Pop}_{it}$. As long as the educational composition of immigrants differs sufficiently by country of origin, counties with a similar total share of immigrants as of 1980, but attracting immigrants from different countries of origin, will experience differential variation in predicted high- and low-skilled immigrants.[27]

4.2.1 Validity of the Instruments

The shift-share instrument has been widely used in immigration economics. The instrument generally has reasonable power because networks of existing immigrants tend to attract new immigrants from the same country, and its exclusion restriction is plausible. The latter is based on the assumption that the distribution of immigrants across counties by country of origin 10 years prior to the beginning of the period of analysis (in 1980, in our case) is not correlated with local economic and demographic *changes*, during the period of analysis (after 1990, in our case), other than via their impact on current immigration. While we cannot investigate directly the exclusion restriction, we perform a series of tests that provide supporting evidence for it.

To address the concern that the instrument itself might be affected by reverse causality,

[25] We use data from the U.S. Census on national migration flows by country of origin and skill (1990, 2000 and 2010) and on county-level shares of immigrants by country of origin (1980).

[26] In order to ensure sufficient sample size, we consider 15 countries (or country-groups) of origin: Mexico, Canada, Rest of Americas, Western Europe, Eastern Europe, China, Japan, Korea, Philippines, India, Vietnam, Rest of Asia, Africa, Oceania, Others. See Figure C3 for the share of immigrants over 25, by county of origin as of 1980.

[27] Figure C4 shows the change in the share of immigrants by skill-level and county of origin between 1980 and 2010.

we regress the change in the instrument-predicted immigrant shares over the sample period (1990-2010) on pre-sample changes (1980-1990) in the fiscal variables. The estimates are reported in Table B2 separately for the change in predicted shares of total, low-skilled and high-skilled immigrants, as the dependent variable. All estimated coefficients for log change in per capita own revenues and general expenditures are small and insignificant, suggesting that reverse causality is not an issue once we instrument for the immigrant shares.[28] In Table 3 we report estimates from a slightly different exercise and show that the changes in our main outcome variables in the past (between 1980 and 1990) are not predicted by changes in immigrant shares in the future (in 1990-2010 and 1990-2000, respectively) after we instrument. These regressions can be thought of both as a falsification and a pre-treatment exercise, suggesting that changes in predicted immigrant shares in 1990-2010 (or 1990-2000) are orthogonal to changes in the fiscal variables in the pre-treatment period (1980-1990).[29]

An emerging literature has highlighted some of the weaknesses of the shift-share instrument approach and recommended a new set of stringent tests. One main concern is that the initial shares of the country-of-origin groups are endogenous. To mitigate this concern, we first measure how relevant each country-of-origin's shares are in generating the identifying variation in the two instruments by calculating the Rotemberg weights, as in Goldsmith-Pinkham et al. (2020). Figure C6 shows that Mexican immigrants have the largest weight for low-skilled immigrants, while immigrants from the Other Americas (countries other than the U.S., Mexico and Canada) have the highest weight for high-skilled immigrant flows. Then, we test for any correlation between the initial shares of each immigrant group and the pre-sample changes in the fiscal variables of interest. The estimates in Table B3 show no significant correlation between the initial shares and the changes over 1980-1990 in local per capita revenues from own sources and general expenditures for any country-of-origin group, including the groups with the highest importance (i.e. Rotemberg weights).[30] These results alleviate the concern that immigrants from any particular country of origin cause violation of the exclusion restriction.

Finally, Table B4 reports the coefficients from the first-stage regression for the share of total immigrants (columns (1) and (2)), the share of low-skilled immigrants (columns

[28] One exception is the estimated coefficient of (past) own revenues for (future) high-skilled immigrants in column (5), which we interpret as a well identified (significant at 10 percent) zero, given the estimated magnitude of the coefficient.

[29] Figures C5a-c provide visual evidence for the validity of the instruments. We plot pre-sample changes in log per capita own revenues and general expenditures (1980-1990) against the instrument-predicted changes over 1990-2010 in the overall (Figure C5a), the low-skilled (Figure C5b) and the high-skilled immigrant share (Figure C5c). The estimated lines are flat and the regression coefficients are close to zero and not statistically significant, which suggests no association between pre-sample trends in fiscal variables and predicted immigrant flows during the period of analysis.

[30] One exception is the estimated coefficient for own revenues for the Other Americas category, that is marginally significant (at 10 percent) but very small in magnitude (0.006), which we interpret as a well identified zero.

(3) and (4)) and the share of high-skilled immigrants (columns (5) and (6)), estimated with and without commuting-zone-level controls. The F-statistics of the first stage are large and the estimated coefficients are precisely estimated with the expected signs. The predicted shares of immigrants for both skill levels as well as for overall immigration are positively correlated with the corresponding immigrant shares. Taken together, we consider these results as supportive evidence that our instruments predict well the endogenous immigration shares and satisfy the exclusion restriction. We provide further robustness checks in Section 4.3.1.

4.3 2SLS estimates

This section presents our main findings on the causal association between the share of immigrants and local public finances. Table 4 reports estimates from the 2SLS specification based on exogenous variation in the share of immigrants, overall (in columns (1) and (2)) and by skill category (in columns (3) and (4)). In Panels (a) and (b) the dependent variables are the (log per capita) revenues from own sources and general expenditures, respectively. Specifications reported in columns (1) and (3) include county and year fixed effects; columns (2) and (4) also include exogenous controls at the commuting zone level, as in equation (1).

The estimated impact of overall immigration on own revenues and general expenditures is negative in column (1). Once we include the commuting zone level controls in column (2), the estimated coefficient becomes insignificant for both revenues and expenditures. However, the estimates for overall migration hide important heterogeneity across immigrants with different skill levels: While an increase in the share of high-skilled immigrants improves public finances in terms of both own revenues and spending, low-skilled immigrants have the opposite effect. Between 1990 and 2010, the share of low-skilled immigrants has increased on average by 3 percentage points, which results in a *reduction* in per capita own revenues by 8.4 percent (about \$129) and in per capita general expenditures by 5.6 percent (about \$125). During this period, the share of high skilled immigrants has increased by 1.8 percentage points, which results in an *increase* in per capita own revenues by 6 percent (about \$92) and in per capita general expenditures by 5.3 percent (about \$119).[31] Based on these estimates, the impact of the average increase in the share of overall immigrants between 1990 and 2010 is a decrease in per capita own revenues per year of about \$37 (2.4 percent) and a decrease in per capita general expenditures per year of only about \$6 (less than 0.5 percent).[32]

[31] Given the imprecisely estimated coefficients in column (2), in what follows, we focus our attention on the precisely estimated impact of low- and high-skilled immigrants and use these estimates to infer the impact of overall immigration ($\pi=\pi_L+\pi_H$) on per capita revenues and expenditures, as in $\hat{\beta}_{overall}=\hat{\beta}_L d\pi_L + \hat{\beta}_H d\pi_H$.

[32] The interpretation of our estimated fiscal effects differs from that of accounting exercises (NASEM,

Our results suggest that in the *average* county, which experienced the same change in immigrant shares as the U.S. as a whole during 1990-2010, the adverse impact of low-skilled immigrants on public goods' provision was mostly offset by the positive impact of high-skilled immigrants: The net effect is 0.3 percent per year, relative to a county that did not receive any immigration during this period. However, the average effect masks substantial geographical heterogeneity, as counties across the U.S. differ in terms of the composition of immigrants they received during this period, as depicted in Figures C1 and C2. Based on the observed changes in high and low-skilled immigrant shares at the *county level*, Figures C7 and C8 show variation in the predicted local impact of immigration on per capita revenues and expenditures across counties. For example, Monterey, CA experienced an increase in the share of low-skilled immigrants by 3.4 percentage points, and a larger increase in the share of high-skilled immigrants by 7.7 percentage points. Our estimates suggest that the fiscal impact of immigration in this county was positive and large, at about 14 percent for both revenues and expenditures. This is in contrast to a county like Presidio, TX which experienced a significant increase in the share of low skilled immigrants (by 9.7 percentage points) and a small increase in the share of high skilled immigrants (by 0.9 percentage points). As a consequence, revenues and expenditures *decreased* by, respectively, 24 and 15 percent. These two counties are at the extremes of the distribution of fiscal effects across counties. Figure C9 gives the kernel density of the county-level estimates, which shows large peaks around zero for both per-capita revenues from own sources and per-capita general expenditures.

The change in provision of public goods we observe in the data is an equilibrium outcome which reflects adjustments taking place, potentially, along multiple dimensions. Our finding that per capita revenues and expenditures decrease with the share of low-skilled immigrants and increase with the share of high-skilled immigrants is broadly consistent with the *benefit adjustment scenario*, under which local governments address the decline (increase) in the tax base by letting per capita revenues go down (up), with a resulting decline (increase) in per capita spending. These findings do not rule out the possibility that local governments simultaneously adjust tax rates in response to the arrival of immigrants. In fact, they are consistent with a situation in which, when low-skilled immigrants arrive, counties increase tax rates in order to *partially* alleviate the deterioration of the tax base (as in the *tax adjustment scenario*), as well as a situation in which, they *decrease* tax rates in response to a change in attitudes of natives towards a smaller welfare state. In the next section, we provide indicative evidence on these various channels by exploring changes in

2016). In our analysis, the beneficiaries of local public goods are both natives and immigrants while, in accounting exercises, public expenditures are restricted to those targeting immigrants directly. In terms of the estimated magnitudes, an interesting comparison is the impact of the China trade shock on the same set of fiscal variables. Feler and Senses (2017) document a decrease in per capita public spending of 2.9% associated with an average increase in imports per worker from China by $3,290 between 1990 and 2007. This is an impact a little more than half of what we find for an increase in the share of low-skilled migrants.

effective property tax rates and in the tax base, along with changes in preferences towards an increase in tax rates (vs. a spending cut).

4.3.1 Robustness

Before examining the underlying channels and mechanism, we provide additional support for the validity of the identification strategy and robustness of our estimates to alternative specifications. We first show that our results are robust to accounting for pre-existing trends in local public revenues and spending, that could be correlated with (future) migration flows. In Table B5a, we modify the benchmark specification by estimating it in long-differences (between 1990 and 2010) and by including, as controls, the changes in the dependent variables in the pre-sample period (between 1980 and 1990). Table B5b reports estimates from a stacked difference specification as in Card (2001). In line with the estimates in Table 4, overall immigration has a small and insignificant impact; the low-skilled immigrant share reduces per capita revenues and expenditures, and the high-skilled immigrant share increases them.

Identification of a causal effect can be achieved even if the initial shares are not exogenous, as long as the aggregate shocks are (Borusyak et al., 2022). In our case, the aggregate shocks are the migration inflows from the 15 different groups of countries of origin, over the three time periods. The estimates in Table B6 suggest that our results are robust to using a specification at the *country-of-origin* level (i.e. "shock-level") that includes country-of-origin and year fixed effects.[33]

In Table 5, we carry out a series of additional robustness checks, with own revenues (in panel (a)) and general expenditures (in panel (b)) as dependent variables. Our main results are replicated in column (1) with standard errors clustered at the state level. We check the sensitivity of our estimates to fixing the *total* population in the denominator of the instruments at its 1980 value, in column (2), and to constructing the instruments using the 1970 shares of immigrants from each country of origin, in column (3). To address the possibility that the national-level flows might not be exogenous to county-specific shocks (due for example to high concentration of immigrants from one country in a particular set of counties), we construct the "leave-out" version of the instrument where we subtract the immigrant inflows to the state (where the county is located) from the national flows, in column (4); in column (5) we omit immigrants from Mexico from our sample.[34] In columns (6), (7) and (8) we include, respectively, state-specific time trends, interactions of

[33] To convert the data from county-level to shock-level, we weight fiscal variables and commuting zone level controls by the 1980 county-specific immigration shares of a given country-of-origin and sum across all counties for every year. So, for example, "Mexican per-capita general expenditures" are the weighted average of county-level per capita general expenditures, with the share of Mexican immigrants by county in 1980, as weights.

[34] Our estimates are also robust to controlling for the share of (total, as well as, high- and low-skilled) Mexican immigrants in total population, with the caveat that this measure is endogenous.

year fixed effects with 1980 commuting zone controls and state-specific time fixed effects; in column (9) we weigh each observation using time-varying population weights. Our findings are robust, both in terms of signs and significance levels, as well as magnitudes of the estimated effects. We also confirm that our estimates are not driven by a specific state, by omitting one state at a time from the sample.[35] Finally, it is possible that the impact of natives and immigrants of the same skill level, on local public finances, is similar. If so, any correlation between the location decisions of immigrants and natives, due for example to local economic conditions, would potentially result in an overestimation of the impact of immigrants. Our instruments should address this concern since the immigrant shares are based on migrant networks of co-nationals which are likely to be independent of the location choice of natives. As an additional check, in column (10) we include the county-level share of low-skilled natives, albeit endogenous, in the specification and confirm the robustness of our main results.[36]

4.4 Leave-out Push-pull Ancestry Instrument

The shift-share instrument relies on the assumption that the variation in pre-existing communities of immigrants from the same country of origin is exogenous. We next account for the possibility that unobserved factors may simultaneously affect previous migration patterns and changes in local public finances, and construct a set of instruments for immigration as in Burchardi et al. (2019) and Terry et al. (2023).[37] This innovative instrument relies on the exogenous variation in the allocation of migrants across US counties driven by the interaction between time-series variation in (origin-specific) push factors and (destination-specific) pull factors. The pull factor from a given country of origin o to a given county d captures the destination choices of migrants arriving in the US that is common to all countries of origin and, is measured as the fraction of migrants to the US coming from anywhere in the world, except from country o, to county d at time t. The push factor is measured as the total number of migrants from country o at time t, except those who settled in the same region as county d. We use the series of interactions of these (residualized) push and pull factors, going back to 1880, to predict the present-day number of residents in county d with ancestry from country o.[38] The

[35] Figures C10a and C10b show the estimated coefficients for high- and low-skilled immigrant shares with own revenues and general expenditures as the dependent variables. The estimated coefficients are not significantly different from our benchmark which includes all states.

[36] The location decision of natives can be affected, among other factors, by the arrival of immigrants. We consider the *causal* effect of the arrival of immigrants on native flows, in or out of the locality, as part of the impact we intend to capture. While we find no evidence of a change in the native population of either skill level in response to the arrival of low-skilled immigrants, our estimates are suggestive of an outflow of low-skilled natives, when high-skilled immigrants move in. Results are available upon request.

[37] We use the replication package provided by the authors to reconstruct the instruments from Burchardi et al. (2019). A more detailed description of the methodology is included in Appendix B.

[38] An example from Terry et al. (2023) communicates well the intuition behind the plausible exogeneity of the instrument: The instrument would predict a relatively large inflow of Indian migrants (relative to

next step is analogous to constructing the shift-share instrument, where we use predicted ancestry as shares (in place of pre-sample shares) to predict migration to county d in year t between 1990 and 2010. As before, we instrument separately for skilled and unskilled migration inflows to a given county.

Our estimation results are reported in Table B7, with changes in per capita revenues and general expenditures as dependent variables in panels (a) and (b), respectively. The number of new low- and high- skilled migrants are instrumented with the modified push-pull shift-share instrument as in Burchardi et al. (2019), with time-fixed effects in column (1), state fixed effects (absorbing state-specific time trends) and commuting zone controls added, in columns (2) and (3). Estimates reported in columns (4)-(6) are analogous to that in (1)-(3) with instrumented new migrants as a share of population, akin to our baseline. Our estimates confirm a significant positive (negative) association between per capita spending and the arrival of high- (low-) skilled immigrants. Consistent with our benchmark, the predicted impact of the average increase in the number of immigrants between 1990 and 2010 on per capita spending is small, around 0.3 percent, depending on the specification.[39]

5 Unpacking the Channels

The arrival of immigrants will impact the local budget through their effect on the tax base and tax rates. Under the institutional requirement of a balanced budget for most localities in the U.S., any resulting change in local per capita revenues will be reflected in a change in per capita expenditures, unless the intergovernmental transfers fully insure against changes in own revenues. Changes in per capita expenditures will impact the quantity and quality of local public services supplied by the government. Immigration could also impact public good provision by changing demand for various services, as well as the cost of providing them. In this section, we focus on these mechanisms.

5.1 Revenue Items

We start with the revenue side of the fiscal equation and separately examine the association between immigration and various components of locally sourced revenues in Tables 6a and 6b, and extend our analysis to total revenue and intergovernmental transfers in Table 6c. Given the robust heterogeneous impact of low- and high-skilled immigrants in the previous

migrants from other Asian countries) to Fresno, CA (relative to other counties in the West Coast) in 1900, if at this time in history, many Indians happened to migrate to the U.S. (push factor) and, at the same time, Fresno happened to be attractive to migrants from any country-of-origin (pull factor).

[39] While the predicted impact based on estimates reported in column (6) are similar both in sign and magnitude to that of our benchmark, the instruments for the share of new migrants are significantly weaker, with F-stats below 2.

sections, we focus the rest of our analysis on specifications that include the immigrant shares by skill type.

Our benchmark results in Table 4 focus on per capita revenues *from own sources*. These revenues are derived from various types of taxes and charges, which we separately relate to immigration in the specifications reported in Table 6a. Locally generated revenues are made up of general revenues (column (2)) and revenues from utilities, insurance and liquor stores (column (8)). General revenues are our main focus as they are specifically used to fund locally provided public goods. More than half of general (own) revenues derive from locally levied taxes (column (3)), which are sourced from property taxes (column (4)), sales, income and license taxes (column (5)) and other taxes (column (6)). Charges and administrative revenue (column (7)) constitute the remainder of general revenues. The estimates reported in Table 6a broadly paint the same picture as before. The arrival of low-skilled immigrants results in a relative reduction of all sources of general (per capita) revenue, while the arrival of high-skilled immigrants results in an increase. For example, an increase in low-skilled immigrants by one percent of the local population reduces per capita tax revenues by 2.2 percent, while the same increase in high-skilled immigrants results in an increase by 2.5 percent. In terms of the magnitude and precision of the estimates, we find that the positive impact of high-skilled immigrants is more pronounced for per capita property taxes, other taxes, as well as for charges and administrative revenues; the negative effect of low-skilled immigrants mainly derive from their impact on per capita sales, income and license taxes, and on other taxes.

Tax revenues are jointly determined by tax rates and the tax base, both of which could change in response to immigration. The arrival of immigrants will impact the per capita tax base if they cause a change in average income in a county. This would mechanically be the case if the income of immigrants is different than that of the incumbents. In addition, immigration can impact average income through labor-market effects.[40] In column (1) of Table 6b, we use per capita personal income in a county as one proxy for the local tax base. We find that the arrival of high-skilled immigrants increases the average local income, while the opposite is true for low-skilled immigrants. These findings are in line with the result that income and sales taxes decrease (increase) when low-skilled (high-skilled) immigrants arrive, as documented in column (5) of Table 6a.

The arrival of immigrants could result in a change in housing values, through their effect on the local demand for housing both directly, and indirectly via the impact on

[40]The standard labor economics model predicts that immigrants should improve the wage and employment outcomes of complementary types of workers and worsen outcomes for workers with similar types of skills (Borjas (2014)). Other models point out that the economy may absorb the arrival of immigrants through alternative adjustment mechanisms, such as changes in the output mix in an open economy (Burstein et al., 2020) or through specialization in different tasks (Peri and Sparber, 2009), in which case wages and employment rates of similarly skilled workers do not necessarily decrease (and may even improve).

migration decisions of natives. Immigrants may also change the local supply of housing, through their effect on the level and type of new construction. Unless local governments adjust property tax rates to fully offset any resulting change in housing values, the revenue from local property taxes – which constitute, on average, 43 percent of local tax revenues – will be impacted.[41]

In columns (2)-(4) of Table 6b, we explore the effects of the two types of immigrants on the house price index, median house value and median rent.[42] We find that low-skilled immigrants are associated with a relative decline in house prices and rents, while high-skilled immigrants give rise to a relative increase. These findings are consistent with high-(low-) skilled immigrants increasing (decreasing) relative demand for houses with higher than average price in a given locality. This could be because high-skilled immigrants are more likely to demand single-family homes in high performing school districts or in low-crime areas, relative to high density apartment buildings or rental property. The decline in housing prices when low-skilled immigrants arrive could be a result of a change in preferences of natives away from counties that disproportionately attract low-skilled immigrants, due to discrimination and perceived (or actual) consequences of immigrants in a locality (Boustan et al., 2013). Also consistent is a supply side explanation, based on the increase in new construction in areas that receive low-skilled immigrants, perhaps due to a decrease in labor costs in construction. Independent of the particular channels through which immigrants impact house prices, our findings suggest that the property tax base was indeed affected by migration in a way that is consistent with our estimates of the impact on property tax revenues, as reported in column (4) of Table 6a.[43]

Tax revenues are also determined by tax rates, which may change in response to immigration. For example, local governments could react to the arrival of low-skilled immigrants by increasing tax rates in order to meet the balanced budget requirement. Alternatively, the arrival of low-skilled immigrants could alter preferences for redistribution and lead to a *reduction* in tax rates in order to shrink the size of the welfare state. In column (5) of Table 6b we provide some suggestive evidence on property tax rates. We construct a measure of median *effective* property tax rates by dividing median (self-reported) property taxes by median house values, at the commuting zone level.[44] Our results suggest that

[41] The empirical evidence on the effect of immigration on house prices in the U.S. is mixed (Saiz (2007), Saiz and Wachter (2011)). In general, the unit of analysis seems to be an important factor, with a positive (negative) estimated impact at more aggregate (local) levels (Sá (2015)). Importantly, the existing literature does not explore the possibility that any such impact might be heterogenous depending on the type of immigrants that the locality receives.

[42] The house price index is from the Federal Housing Finance Agency, and measures changes in single-family home values in 400 cities in 50 states, which we aggregate to the county level using transaction-sales-based weights. The median house value and the median rent are from the U.S. Census and reflect self-reported values by respondents in each county.

[43] Since housing is the most important component of household wealth, a relative decline in home values suppresses homeowners' perceived wealth and their consumption, which may further reduce local sales tax revenues (Chernick et al., 2011).

[44] Comprehensive data on local statutory property, income or sales tax rates are not available in the US.

an increase in the share of low-skilled immigrants has increased median property tax rates levied in a county; the arrival of high-skilled immigrants have resulted in a decrease, although the latter is not statistically significant.[45] We find that the observed changes in tax rates are broadly consistent with voters' demands: When low-skilled immigrants arrive in a locality, natives increasingly prefer to raise tax rates, as opposed to cut spending.[46] These estimates are reported in column (6) at the county level, and in Appendix C at the individual level.[47] The adjustment of tax rates does not fully offset the change in the tax base, however, given that we observe changes in per capita revenues and expenditures, as shown in Table 4. The findings on tax rates and attitudes, together with the results on the tax base, are consistent with the importance of financial constraints faced by local governments and suggest that *at the local level* a change in preferences towards a smaller welfare state is not the main explanation for our findings.

So far, our results suggest that the arrival of low-skilled immigrants decreases local average income and house prices, and results in a decline in per capita revenues from income, sales and property taxes, despite a slight increase in effective property tax rates. Given the binding budget constraint that most local governments face, the outcome should be a decline in (quality or quantity of) public goods provision, unless intergovernmental transfers increase to make up for the decrease in per capita revenues generated locally. Since the transfers from state and federal governments are, in general, a function of the locality's population and poverty rates measured during Census years, some degree of insurance against a decline in revenues due to immigration is to be expected. How much of the loss in per capita revenues these transfers insure against, in practice, is an empirical question. To explore this channel, we estimate the impact of immigrants on "total revenues", constructed as the sum of "revenues from own sources" and "total intergovernmental transfers" (in columns (1)-(3) of Table 6c). The coefficients in column (1) suggest that our results are somewhat less pronounced for total revenues: the coefficient on high-skilled immigrants is smaller in magnitude and not significant, while the coefficient on low-skilled immigrants remains unchanged. We document some degree of insurance by the federal government in column (4): Transfers from the federal government *increase* with the arrival of low-skilled

[45] These results are in line with Lutz (2008), where policymakers offset about 60% of house price changes by adjusting the effective tax rate, often by delaying downward adjustments in property assessments.

[46] One explanation is that the county becomes poorer relative to the rest of the state from a fiscal point of view, due to the deterioration of the local (per capita) tax base with the arrival of low-skilled immigrants, and hence voters perceive that the county would benefit from greater spending financed with tax increases.

[47] As we describe in detail in Appendix C, we use data on attitudes based on the responses to the following question in the Cooperative Election Study (CES), during 2006-19: "If your state were to have a budget deficit this year it would have to raise taxes on income or sales, or cut spending, such as on education, health care, welfare, and road construction. What would you prefer more: raising taxes or cutting spending?" Giuliano and Tabellini (2020) use the same question to analyze the long run effects of immigration on American political ideology. They find that historical European immigration, in particular migrants with a longer exposure to social welfare reforms prior to their arrival in the US, are associated with a preference towards higher tax rates away from spending cuts, today.

immigrants but decrease (although not significantly) when high-skilled immigrants arrive. This is not the case when we consider transfers from state and local governments, which decrease with both types of immigrants (column (5)). The latter effect dominates in the case of low-skilled immigrants, as reflected in a decline in overall transfers in column (3).

A potential explanation for lower state and local transfers, when low-skilled immigrants arrive, is that immigrant inflows are likely to be positively correlated within a state. If a county that receives low-skilled immigrants is located in a state which also experiences a decline in state revenues due to low-skilled immigration, this will restrict the ability of the state and other local governments to provide insurance. The decrease in transfers at a time when own revenues are also declining will then exacerbate the impact of the county level shock. We test for this hypothesis by controlling for low- and high-skilled immigrant shares in the rest of the state, in column (6). Our estimates suggest that a higher share of low-skilled immigrants in the rest of the state is associated with a decline in per capita transfers from the state and other local governments to the impacted county. Importantly, after we control for immigrant shares in the rest of the state, the impact of low-skilled immigrants on state and local transfers is no longer negative. Taken together, we find no evidence of substantial revenue smoothing by the state government in response to county level immigration shocks. If anything, the decline in transfers trails the decline in per capita own revenues in counties that receive low-skilled immigrants.[48] These findings suggest that the federal government may be better suited than state and local governments to smooth out fiscal shocks resulting from immigration. This could be achieved to some extent through a redistribution of federal transfers away from counties that do relatively better to those that do worse. Also possible is an adjustment of the overall level of federal transfers, given that the fiscal effects of immigration tend to be more positive at the federal level compared to the local level (NASEM, 2016).[49]

5.2 Expenditure Items

We next explore the expenditure side of the fiscal equation in order to identify how various spending items adjust with the arrival of low- and high-skilled immigrants. The effect of immigration on various expenditure categories reflects a combination of supply and demand channels. Given the balanced budget requirement, any change in per capita total revenues due to immigration will result in a corresponding change in per capita total expenditures. This will affect, on the supply side, the ability of local jurisdictions to fund different goods and services, with implications on their quantity and quality. Moreover,

[48] As a consistency check, we rule out an association between (residual) state-level immigration shares and respectively, *own* revenues and federal transfers. As expected, we find that per capita own revenues and federal transfers are not impacted by the (residual) state-level immigration shares; the sign and magnitude of the estimated coefficients on the county-level immigration variables remain unchanged.

[49] Edelberg and Watson (2022) explore mechanisms to transfer some of the potential federal gains from immigration towards adversely affected localities.

immigrants may directly impact the price of certain services, such as child and elderly care (Cortes, 2008), and alter the costs for public providers. If, for example, economies of scale are prevalent in service provision or if some of the immigrants work as teachers, nurses, bus drivers or custodians in public schools, the per capita cost of public education may decrease with an inflow of immigrants. Importantly, local services differ in their reliance on state and federal transfers that are based on formulas factoring in head counts (overall population, enrollments) and per capita income. As a result, in response to immigration, expenditure may vary more for services that are mostly locally funded, compared to items that rely more on intergovernmental transfers.

The arrival of low- and high-skilled immigrants might also change the demand for certain types of services. For example, to the extent immigration affects (or is *perceived* to affect) crime rates at the local level, the demand for public safety expenditures may be impacted. If low-skilled immigrants are on average poorer, the demand for public welfare expenditures may increase. An increase in low-skilled immigrants could increase demand for public education spending, if low-skilled immigrants have more school-age kids compared to natives, or for public transportation, to the extent car ownership rates are lower for low-skilled immigrants. It is also possible that preferences of natives for different types of spending change due to immigration. For example, natives may vote against funding public services that are disproportionately utilized by immigrants.

We provide indicative evidence for some of these mechanisms, by exploring the differential impact of immigration on different expenditure categories in Table 7a. About 90% of total expenditures (in column (1)) is general expenditures on locally provided public services (in column (2)), with the remainder 10% on liquor stores, utilities and the insurance trust sectors (column (10)). We find that per capita general expenditures decrease with the arrival of low-skilled immigrants and increase with high-skilled immigrants, with the magnitude of the estimates in column (2) providing a benchmark to assess any change in the composition of general expenditures as a consequence of immigration.

High-skilled immigration leads to increased spending on infrastructure (column (3)), which may be driven by greater demand for "transportation and building infrastructure" by high-skilled, high-income foreign-born residents, as well as by the greater per capita revenues they bring in. The expenditures on "public amenities" also trail changes in public revenues; they decrease with the arrival of low-skilled immigrants and increase with the arrival of high-skilled immigrants. The estimated impact is large with a decline of 4.8% and an increase of 3.9% in response to a one percentage point increase in the share of low- and high-skilled immigrants, respectively (column (4)).

Estimates reported in column (5) suggest that per capita spending on "law and order" does not increase with the arrival of neither low- nor high-skilled immigrants. This finding is noteworthy as public safety is the only spending item with a significant negative association with high-skilled immigration; the estimated impact on most other spending categories trails the positive impact on per capita revenues. Spending on public safety is shaped by

revenue streams as well as demand by the voting public, which is partially determined by the observed or perceived impact of immigration on crime rates. In the first two columns of Table 7b, we investigate the impact of low- and high-skilled immigration on county level violent and property crime rates. The results suggest that the fear that immigrants increase crime is unfounded: High-skilled immigration is associated with lower levels of both violent and property crime rates; the association between low-skilled immigrants and either type of crime is also negative, although imprecisely estimated.[50] These findings are in line with the changes we observe in public safety spending in Table 7a, with the decrease in crime rates reflected in lower demand for spending on law and order.

Education is the most important spending category, making up a little over half of general spending. While the impact of low- and high-skilled immigrants on per capita spending in education is negative and positive, respectively, the estimated coefficients are small in magnitude and are not statistically significant. These results are qualitatively unchanged, when we focus on *per pupil* expenditures on education, and are mirrored in a small and insignificant impact of either type of immigrants on student to teacher ratios, as in columns (3) and (4) of Table 7b. Taken together, we interpret these results as evidence against a significant impact of immigration on the quantity or quality of public education.[51] One possible explanation for this finding is the role of intergovernmental transfers. The share of such transfers in education spending is high, around 70% on average, with the magnitude based directly on formulas incorporating both the number of enrolled students and their household incomes. If the arrival of immigrants increases the number of kids enrolled in local public schools, the county will receive proportionally more money, therefore spending should not necessarily be affected on a per pupil basis, despite any decline in local revenues. We find no evidence of an increase in intergovernmental transfers dedicated to education in response to a decline in own revenues. Mirroring our findings for total transfers in Table 6c, while the federal transfers targeting education do in fact increase with low-skilled immigrants, this effect is outweighed by the decline in transfers from the state and local governments, mainly in counties located in states with high levels of low-skilled immigrants. Table B8 reports these estimates separately in per capita and per pupil terms.[52] Our finding of no impact of low-skilled immigration on per capita (or per pupil) spending on education or on student to teacher ratios, despite a decline in own revenues and in intergovernmental transfers dedicated to education, is

[50] The existing literature on immigration and crime focuses on the impact of overall immigration, abstracting away from heterogeneity across low- and high-skilled immigrants. The evidence in the U.S. points to no significant impact of overall immigration on crime rates, with a possible exception of property crimes (Reid et al., 2005; Spenkuch, 2014).

[51] This finding is in contrast to the prediction of a decline in per pupil education spending based on a calibrated quantitative political-economy model from California (Coen-Pirani, 2011).

[52] Feler and Senses (2017) estimate a relative decline in both per capita education spending and teacher to student ratios in localities more exposed to an increase in imports from China, with no evidence of adjustments in federal transfers. The difference in federal response to trade vs. migration shocks, is perhaps not surprising given that school enrollments enter the transfer formulas directly.

consistent with a reallocation of resources across expenditure items towards education.

6 Second-Generation Immigrants

Up to this point we have focused on the local fiscal effects of "first-generation" immigrants, i.e. foreign-born individuals. This section extends our analysis to incorporate "second-generation" immigrants, defined as native-born individuals with at least one foreign-born parent. The existence of a local immigrant community likely attracts both first- and second-generation immigrants to the same location. If this is the case, the omission of second-generation immigrants in specification (1) could result in biased estimates of the impact of foreign-born individuals.[53] The direction of the bias would depend on the fiscal impact of second-generation immigrants, which may be different than that of first-generation ones, due for example, to differences in income levels and utilization of local public services. Abramitzky and Boustan (2022) show significant intergenerational upward mobility of immigrants, with the second generation doing better than the first, both today and in the past. Consistent with this finding, NASEM (2016) documents that the direct tax payments of first-generation immigrants tend to be lower than those of natives, while second-generation immigrants contribute a significantly larger amount. Similarly, first-generation immigrants receive higher direct benefits than natives, while second-generation immigrants receive less than natives. These findings suggest that second-generation immigrants might have a more positive impact on revenues and a less positive impact on expenditures, than first-generation immigrants.

Due to lack of data on country of birth of a respondent's parents, we construct a *proxy* measure for the share of second-generation immigrants in a commuting zone as the share of individuals born in the U.S. who speak a language other than English at home.[54] Analogous to our analysis of first-generation immigrants, we instrument for the measure of second-generation immigrants using a shift-share variable. This is to address endogeneity, as well as measurement error in the language-based measure. In doing so, we take advantage of the fact that the Current Population Survey (CPS) reports the country of birth of the respondent's father and mother, which allows us to construct an estimate

[53] This point is related to the identification concerns in Jaeger et al. (2018), as the impact of second-generation immigrants can be viewed as part of the long-run effect of the first-generation, and is relevant not only for our analysis of the fiscal impact of immigration, but also for any estimated impact of immigration based on reduced-form analysis.

[54] Individuals who speak more than one non-English language at home are asked to report the language they speak most often, or the language they learned first. This proxy may be an underestimation of the actual number of second-generation immigrants, as it excludes those from English-speaking countries (e.g. Canada, the United Kingdom, South Africa), and those who do not speak the language of their parents at home. It is also possible that this measure overestimates the number of second-generation immigrants, due to individuals in multi-generational households who speak a language other than English at home with their immigrant grandparents (third-generation immigrants).

of the actual *national* number of second-generation immigrants by country of origin.[55] We then apportion the aggregate number of second-generation immigrants to counties using the (1970 and 1980) county-level shares of first-generation immigrants by country-of-origin, and sum across all countries of origin.[56] We report the first-stage regressions in Table B9. We use 1970 county-level shares in columns (1)-(3), based on the assumption that the adult second-generation immigrants observed in 1990-2010 are the children of (first-generation) immigrants who arrived at least a few decades earlier. Given the low F-values, we also report estimates based on the instrument using 1980 shares as weights, in columns (4)-(6), for robustness.

Table 8 reports estimates from specifications that include the share of second-generation immigrants in a locality. Specifically, we extend equation (1) first by directly including the language-based proxy in column (1), then by instrumenting it in columns (2) and (3), and by directly using each instrument as a proxy for second-generation immigrants in columns (4) and (5). The shares of low- and high-skilled first-generation immigrants are constructed and instrumented as before, in all specifications. Columns (6)-(10) report estimates from analogous specifications with per capita general expenditures as the dependent variable. The estimates in Table 8 suggest that the main results of this paper are robust to controlling for the share of second-generation immigrants: The impact of low-skilled immigrants on provision of local public goods is negative, while the impact of high-skilled immigrants is positive. There is a slight change in the magnitude of some of the effects, consistent with the possibility of omitted variable bias in previous estimates.[57] We also find that while second-generation immigrants have a positive and significant impact on per capita (own) revenues, their impact is insignificant and small in magnitude on per capita (general) expenditures. These findings are consistent with the results based on the accounting analysis in NASEM (2016). They also suggest that the increase in revenues brought about

[55] CPS is representative at the national but not at the local (state, commuting zone or county) level. 1994 is the first year the CPS provides information on the country of birth of the parents. We pool 1994 and 1995 and construct an average to proxy for the number of second-generation immigrants in 1990 from each country-of-origin group. For the remaining years, 2000 and 2010, we take the average of the pooled 2000 to 2002 and 2010 to 2012 samples, respectively. This is to avoid large year-to-year fluctuations, which are more pronounced for some country-of-origin groups, due to low sampling rates. If a person's parents were born in different countries, we attribute the person equally to the immigration stock of each.

[56] Both the language-based measure and the predicted measure of second-generation immigrants are positively correlated with our measure of first-generated immigrants, with correlation coefficients of 0.34 and 0.55, respectively.

[57] We compare the estimated impacts in columns (5) and (10) in Table 8 with our baseline estimates in Table 4, in response to the increase in the observed shares of immigrants in 1990-2010. The impact on per capita own-revenues is more negative for low-skilled (-12.3 versus -8.4 percent) and less positive for high-skilled immigrants (3.5 versus 6 percent). At the same time, the impact on per capita expenditures is similar: -6 (vs. -5.6) and 5 (vs. 5.3) percent for low- and high-skilled immigrants, respectively. The impact of the increase in the overall share of immigrants between 1990 and 2010 is a decrease in per capita general expenditures per year of 1 percent ($23), which is in the same ballpark as the estimates in Table 4. These estimates should be interpreted with the caveat that second-generation immigrants are measured with noise.

by second-generation immigrants partially offsets the decrease in revenues triggered by first-generation immigrants, with the consequence that per capita expenditures need not decrease much when the latter arrive.

7 Conclusion

Immigration continues to be a salient political issue. What is crucial in the debate is what role immigrants play in the destination countries. Immigrants affect the host economies through several different channels. They impact the labor market opportunities of natives; they affect the destination countries' welfare state; they change the prices of goods and services; they shape production patterns as well as trade and FDI flows to and from origin countries. In addition, immigrants have an impact from a non-economic point of view, for example on culture, potentially security and crime, and politics. While many papers have analyzed immigration along these various dimensions, the impact on local public finances has not received much attention, as of yet. This paper attempts to fill this gap.

The results of our paper shed light on the role that immigrants play from a public finance point of view at the *local* level. We document substantial heterogeneity in the effect of immigration, depending on the type of immigrants, location within the U.S. and across different generations. The skill level of immigrants is a key variable, as the effects on local public revenues and expenditures are opposite for low- and high-skilled immigrants. This is not surprising, given that immigrants' education level affects their income, which in turn impacts the local per capita tax base and corresponding public revenues (income, sales and property taxes). We document substantial variation in the shares of low-skilled and high-skilled immigrants across counties in the United States, which implies that the impact of immigration differs greatly over space, with some counties experiencing a negative fiscal impact, and others experiencing a positive one. We find that, while transfers from the federal government partially smooth out the impact on per capita revenues, transfers from the state government exacerbate it, since immigration shocks are correlated within a state. The second-generation immigrants have a positive and significant impact on per-capita (own) revenues; their impact is insignificant and small in magnitude on per-capita (general) expenditures. Our main findings on the fiscal effect of immigrants with different skill levels are robust to accounting for second-generation immigrants.

Our analysis has identified economic factors, namely changes in the per capita tax base and corresponding tax revenues, as a channel of impact of immigration on per capita spending. Political economy factors are important in shaping this association. For example, as we demonstrate, voters' sentiments change in response to immigration and this may affect policymakers' choice between the two types of adjustment (tax rates vs. per capita benefits) or the desired size of the welfare state. Public opinion may also affect the decision on how to allocate funds across various public goods: A local government may choose to allocate fewer resources to services that are intensively utilized by immigrants if the

anti-immigrant sentiment in that locality is high. Our preliminary results show interesting heterogeneity in fiscal response across counties with different political orientation. Future work will further investigate how changes in the per capita tax base and public expenditures interact with political economy considerations and county characteristics.

Our findings point to federal transfers as a potential policy tool to more evenly distribute the overall welfare gains from immigration and smooth out the distributional consequences of immigration across localities and over time. This is possible through either a redistribution of federal transfers across counties or an adjustment of the overall level of transfers. The design of such a policy requires a better understanding of the fiscal impact of immigration at the state and federal levels of the U.S. government, which we expect to differ from that at the local level. This is because the institutional constraints are different at the state and federal levels, compared to counties. For example, there are laws that require the same level of per capita spending across school districts in a given state; at the federal level, there is no balanced budget requirement. The approach implemented in this paper can be used to explore these important questions in order to provide a fuller picture of the overall fiscal impact of immigration and to inform evidence-based policy recommendations.

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9 Tables

Table 1: Summary Statistics

	1990		2010	
	mean	sd	mean	sd
(a) Immigrants				
Share of immigrants	0.057	0.065	0.106	0.092
Share of low-skilled immigrants	0.046	0.054	0.076	0.067
Share of high-skilled immigrants	0.012	0.012	0.030	0.028
(b) Per-capita revenues				
Total revenue	2516.7	1342.6	3685.6	2217.4
Total revenue from own sources	1543.7	1156.4	2283.1	1879.9
General revenue from own sources	1313.8	939.8	1962.8	1610.6
Total Tax revenue	776.9	570.7	1196.4	1214.0
Property tax	649.0	513.7	963.6	1136.4
Sales, income and license taxes	101.7	167.3	193.2	271.8
Other taxes	26.2	37.5	39.5	79.3
Charges and administrative revenue	536.9	594.6	766.4	785.0
Utilities, insurance trust and liquor stores	229.8	546.8	320.3	773.2
Inter-governmental transfers	973.1	444.3	1402.5	754.5
Federal	58.2	92.6	131.7	227.9
State	857.9	398.3	1179.5	602.4
Local	57.0	73.3	91.3	136.7
(c) Per-capita expenditures				
Total expenditure	2503.8	1298.7	3643.3	2212.9
General expenditure	2256.8	1067.1	3292.3	1842.1
Education	1122.3	392.8	1528.2	923.9
Law and Order	178.7	158.2	316.9	233.3
Sanitation	83.8	83.1	138.2	118.4
Infrastructure	204.9	176.6	285.5	343.3
Public amenities	379.6	406.3	630.2	827.0
Administrative	186.9	363.7	219.2	280.4
Other	100.5	121.0	174.1	234.4
Utilities, insurance trust and liquor stores	247.0	598.3	351.0	882.7
(d) Demographics				
			1980	
			mean	sd
Share of urban			0.686	0.350
Share of youth			0.416	0.031
Per-capita real income (in logs)			9.944	0.145
Share of African American			0.116	0.099
Share of adult women			0.310	0.019
Share of married			0.449	0.029
Share of unemployed			0.030	0.008
Bartik instrument			12.788	1.671

Notes: Population-weighted means and standard deviations are reported for 3,079 counties. Total revenues are revenues from own sources plus inter-governmental transfers. Revenue from own sources is the sum of general revenue from own sources and revenue from utilities, insurance trust and liquor stores. General revenue from own sources is total tax revenue (property, sales, income and license taxes and other taxes) and charges and administrative revenue. Inter-governmental transfers are from the federal, state and other local governments. Totals expenditures are equal to general expenditures on education, law and order, sanitation, infrastructure, public amenities, administrative and other spending, plus expenditures on utilities, insurance trust and liquor stores. Commuting zone demographic variables are from the 1980 US Census.

Table 2: The Effect of Immigration on Own Revenues and General Expenditures, OLS

(a) Per-capita revenues from own sources (in logs)

Dependent variable	Log of per-capita revenues from own sources			
	(1)	(2)	(3)	(4)
Share of immigrants	-0.369	-0.768**		
	[0.403]	[0.318]		
Share of low-skilled immigrants			0.320	-1.915***
			[0.919]	[0.466]
Share of high-skilled immigrants			-2.082*	1.894**
			[1.247]	[0.794]
Commuting zone controls	No	Yes	No	Yes
County fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Observations	12316	9237	12316	9237
R^2	0.74	0.54	0.74	0.54

(b) Per-capita general expenditures (in logs)

Dependent variable	Log of per-capita general expenditures			
	(1)	(2)	(3)	(4)
Share of immigrants	-0.160	-0.471**		
	[0.292]	[0.219]		
Share of low-skilled immigrants			0.520	-1.178***
			[0.720]	[0.280]
Share of high-skilled immigrants			-1.848*	1.166**
			[1.080]	[0.534]
Commuting zone controls	No	Yes	No	Yes
County fixed effects	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes
Observations	12316	9237	12316	9237
R^2	0.81	0.70	0.81	0.70

Notes: The dependent variables are the log of per-capita own revenues and log of per-capita general expenditures, in Panel (a) and (b), respectively. Commuting zone controls are interactions of linear time trends with 1980 values of shares of adult women, African-Americans, individuals who are younger than 25, married, unemployed, and located in urban areas, and the real (average) per-capita income (in logs) and the Bartik indicator. This indicator is defined as: $Bartik_{zt}^{EMPL} = \ln(empl_{z1980}) + \sum_j (share_{zj,1980}^{EMPL} \Delta \ln(empl)_{jt})$, where $\ln(empl_{z1980})$ is (log) total employment in commuting zone z in 1980. The second term is the weighted average of industry-specific changes in (log) employment in year t, with commuting zone employment shares of each industry in 1980 ($share_{zj,1980}^{EMPL}$) used as weights. Each specification includes county and panel fixed effects. Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table 3: Falsification Tests

Changes in Own Revenue and General Expenditure (1980-90) and Changes in Predicted Immigrant Shares (1990-2000 and -2010), 2SLS

Dependent variable	Log change in per-capita own revenue (1980-90)				Log change in per-capita general expenditure (1980-90)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Change in share of immigrants (1990-2010)	-0.173				0.397			
	[0.565]				[0.644]			
Change in share of immigrants (1990-2000)		-0.074				0.292		
		[0.429]				[0.485]		
Change in share of low-skilled immigrants (1990-2010)			-1.248				1.098	
			[0.817]				[0.752]	
Change in share of high-skilled immigrants (1990-2010)			1.501				-0.791	
			[1.068]				[0.946]	
Change in share of low-skilled immigrants (1990-2000)				-1.336				1.177
				[0.909]				[0.833]
Change in share of high-skilled immigrants (1990-2000)				3.064				-1.774
				[1.948]				[1.813]
Observations	3079	3079	3079	3079	3079	3079	3079	3079
IV F-stat	107.25	42.92	16.57	55.21	107.25	42.92	16.57	55.21

Notes: The dependent variable is the log change over 1980-1990 in total per-capita own revenues in columns (1)-(4) and in per-capita general expenditures in columns (5)-(8). Each 2SLS specification includes county and panel fixed effects, as well as commuting zone controls (see Note of Table 1 for details). Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table 4: The Effect of Immigration on Own Revenues and General Expenditures, 2SLS

(a) Per-capita own revenues (in logs)

	(1)	(2)	(3)	(4)
Share of immigrants	-0.515**	-0.324		
	[0.253]	[0.431]		
Share of low-skilled immigrants			-1.846**	-2.786***
			[0.837]	[0.823]
Share of high-skilled immigrants			1.124	3.316***
			[0.887]	[1.094]
Commuting zone controls	No	Yes	No	Yes
Observations	9237	9237	9237	9237
IV F-stat	67.02	47.24	17.97	26.27

(b) Per-capita general expenditures (in logs)

	(1)	(2)	(3)	(4)
Share of immigrants	-0.503**	0.076		
	[0.231]	[0.356]		
Share of low-skilled immigrants			-2.479***	-1.850***
			[0.667]	[0.636]
Share of high-skilled immigrants			1.933***	2.922***
			[0.749]	[0.956]
Commuting zone controls	No	Yes	No	Yes
Observations	9237	9237	9237	9237
IV F-stat	67.02	47.24	17.97	26.27

Notes: The dependent variables are the log of per-capita own revenues and general expenditures in Panel (a) and (b), respectively. Each specification includes county and panel fixed effects, and is estimated with and without commuting zone controls (see Note of Table 1 for details). Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table 5: Robustness

(a) Per capita revenues from own sources (logs)

Dependent variable	SE cluster state-level	Fixed population 1980	1970 imm. share	Leave-out IV	Remove Mexican imm.	State-time Trends	Controls x Year FE	State-Year FE	Current pop. weight	Include low-skilled natives
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Share of low-skilled imm.	-2.786***	-3.844***	-2.547***	-2.268**	-3.244*	-2.025***	-3.614***	-5.303***	-2.782***	-2.915***
	[0.874]	[0.882]	[0.946]	[0.881]	[1.845]	[0.757]	[0.858]	[1.858]	[0.820]	[0.931]
Share of high-skilled imm.	3.316**	3.669**	2.099*	3.377***	2.043**	3.381***	2.772**	2.792**	3.622***	3.277***
	[1.479]	[1.486]	[1.264]	[1.060]	[1.003]	[1.112]	[1.330]	[1.209]	[1.108]	[1.099]
Observations	9237	9237	9237	9237	9237	9237	9237	9237	9237	9237
IV F-stat	24.98	15.47	33.71	12.13	2.16	26.96	21.96	6.17	25.75	40.89

(b) Per capita general expenditures (logs)

Dependent variable	SE cluster state-level	Fixed population 1980	1970 imm. share	Leave-out IV	Remove Mexican imm.	State-time Trends	Controls x Year FE	State-Year FE	Current pop. weight	Include low-skilled natives
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Share of low-skilled imm.	-1.850**	-2.576***	-1.940***	-1.767**	-3.613**	-1.224*	-2.609***	-2.333*	-1.929***	-1.802**
	[0.719]	[0.692]	[0.687]	[0.703]	[1.729]	[0.717]	[0.625]	[1.192]	[0.643]	[0.728]
Share of high-skilled imm.	2.922**	2.991**	2.384**	2.979***	2.243**	2.341***	2.826**	3.644***	3.017***	2.936***
	[1.424]	[1.205]	[1.043]	[0.963]	[0.992]	[0.905]	[1.174]	[0.720]	[0.953]	[0.970]
Observations	9237	9237	9237	9237	9237	9237	9237	9237	9237	9237
IV F-stat	24.98	15.47	33.71	12.13	2.16	26.96	21.96	6.17	25.75	40.89

Notes: The dependent variable in Panel (a) is the log of total per capita own revenue, and in Panel (b) it is the log of per capita general expenditures in a county and year. For each panel, we report the following specifications in separate columns. In column (1) standard errors are clustered at the state level. Column (2) fixes the *total* population in the denominator of the instruments at its 1980 value. Column (3) reports estimates when using 1970 shares of immigrants as the initial share variable in the construction of the instrument. Column (4) reports estimates of the "leave-out" version of the instrument. Column (5) omits immigrants from Mexico from the sample. In columns (6), (7) and (8) we include, respectively, state-specific time trends, interactions of year fixed effects with 1980 commuting zone controls and state-specific time fixed effects. Column (9) weighs each observation using time-varying population weights and column (10) includes the county-level share of low-skilled natives. All specifications include the following commuting zone level controls: the 1980 values of the share of men, married, African Americans, and urban citizens, the log of the average income, the share of unemployed and people below age 25 and the Bartik employment shifter described in the text. If not indicated otherwise, each regression is weighted by the average population of the county over the sample period and standard errors in parentheses are clustered by the county level. ***, **, * indicate the statistically significant difference from zero at the 1, 5 and 10 percent levels, respectively.

Table 6a: The Effect of Immigration on Local Revenue, 2SLS

Dependent variable	Own revenues	General revenues	Tax revenues	Property tax revenues	Sales, income, license taxes	Other taxes	Total charges, admin. revenue	Utilities, insurance, liquor stores
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of low-skilled immigrants	-2.786***	-1.841*	-2.173***	-1.411	-17.435***	-6.908**	-0.946	-5.224
	[0.823]	[1.079]	[0.819]	[0.913]	[4.316]	[3.241]	[2.704]	[3.373]
Share of high-skilled immigrants	3.316***	4.204***	2.486**	2.577**	2.310	10.969***	8.082***	-3.996
	[1.094]	[1.219]	[0.992]	[1.264]	[8.976]	[2.956]	[2.291]	[3.690]
Observations	9237	9237	9237	9237	8525	9214	9237	9108
IV F-stat	26.27	26.27	26.27	26.27	26.32	26.27	26.27	26.20

Notes: General own revenues (column 2) are the sum of tax revenue (column 3) and total charges and administrative revenue (column 7). Total taxes are the sum of property taxes (column 4), sales, income, and license taxes (column 5) and other taxes (column 6). All dependent variables are in per-capita terms and in logs. Each specification includes county and panel fixed effects, as well as commuting zone controls (see Note of Table 1 for details). Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table 6b: The Effect of Immigration on the Tax Base and Tax Rates, 2SLS

Dependent variable	Per-capita personal income	House price index	Median house value	Median rent	Effective property tax rate	Finance deficit with tax increase
	(1)	(2)	(3)	(4)	(5)	(6)
Share of low-skilled imm.	-1.947***	-6.232***	-6.660***	-1.562**	0.095***	3.335**
	[0.518]	[1.358]	[1.819]	[0.765]	[0.027]	[1.594]
Share of high-skilled imm.	2.491***	9.224***	4.302*	4.644***	-0.097	0.624
	[0.778]	[2.140]	[2.672]	[1.402]	[0.064]	[3.312]
Observations	9231	6132	9239	9240	9241	23424
IV F-stat	25.68	19.53	26.20	26.20	26.41	8.41

Notes: The dependent variables are the (log of) per-capita personal income in column (1), the Freddie Mac house price index in column (2), the median house value column (3), and the median house rent in column (4). In column (5) the dependent variable is the median effective property tax rate, calculated as the median reported property tax paid divided by the median reported house value in a county and year. In column (6) the dependent variable is the share of respondents in a given county that prefers to raise taxes (instead of cut spending) in order to finance a budget deficit. The sample period for this regression is 2006 to 2019 as the CES is not available before these years. Each specification includes commuting zone controls (see Note of Table 1 for details) and regressions are weighted by the average population of the county over the sample period. Each specification includes county and panel fixed effects. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table 6c: The Effect of Immigration on Intergovernmental Transfers, 2SLS

Dependent variable	Total revenues	Revenue from own sources	Intergov. transfers	Transfer federal gov.	Transfer state and local gov.	Transfer state and local gov.
	(1)	(2)	(3)	(4)	(5)	(6)
Share of low-skilled imm.	-2.753***	-2.786***	-3.148**	6.971**	-3.387**	0.728
	[0.839]	[0.823]	[1.448]	[3.060]	[1.559]	[2.140]
Share of high-skilled imm.	1.526	3.316***	-1.004	-5.328	-2.549	-1.578
	[1.013]	[1.094]	[1.824]	[4.685]	[2.156]	[1.936]
Residual state-level share of low-skilled imm.						-5.598***
						[1.809]
Residual state-level share of high-skilled imm.						0.202
						[1.847]
Observations	9237	9237	9236	8951	9236	9236
IV F-stat	26.27	26.27	26.26	25.91	26.26	7.94

Notes: Total revenues (in column (1)) is the sum of own revenues (in column (2)) and intergovernmental transfers (in column (3)). Total intergovernmental transfers (3) are made up of transfers from the federal government (4) and from the state and other local governments (5). All dependent variables are in per-capita terms and in logs. Each specification includes county and panel fixed effects, as well as commuting zone controls (see Note of Table 1 for details). Column (6) also includes the share of immigrants in the rest-of-the-state (excluding the immigrants in the county) in the specification. Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table 7a: The Effect of Immigration on Local Expenditures

Dependent variable	Total	General	Infra-structure	Public Amenities	Law and order	Education	Sanitation	Admin.	Other	Utilities, ins. trust liquor st.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Share of low-skilled imm.	-1.800**	-1.850***	-1.640	-4.802**	-1.265	-0.460	-0.266	0.160	1.790	-1.432
	[0.745]	[0.636]	[1.780]	[2.209]	[0.893]	[1.218]	[2.091]	[2.801]	[2.149]	[3.788]
Share of high-skilled imm.	2.259**	2.922***	4.722*	3.863*	-4.383***	1.287	-1.747	-5.432	7.306**	13.437***
	[0.971]	[0.956]	[2.528]	[2.290]	[1.131]	[1.892]	[3.043]	[3.435]	[3.040]	[4.164]
Observations	9237	9237	9235	9231	9236	9226	9184	9131	9237	9205
IV F-stat	26.27	26.27	26.26	26.26	26.26	26.27	26.25	26.20	26.27	26.21

Notes: Total expenditures (in column (1)) are general expenditures (in column (2)) plus expenditures on liquor stores, utilities, and the insurance trust sector (in column (10)). General expenditure consists of expenditure on infrastructure, public amenities, law and order, education, sanitation, administration and other general expenditures, reported in columns (2)-(9). All dependent variables are in per-capita terms and in logs. Each specification includes county and panel fixed effects, as well as the commuting zone controls (see Note of Table 1 for details). Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table 7b: The Effect of Immigration on Crime Rates and Education Outcomes

Dependent variable	Violent crime	Property crime	Education expend. (per pupil)	Teacher to student ratio
	(1)	(2)	(3)	(4)
Share of low-skilled immigrants	-8.548	-2.101	-1.058	0.018
	[6.593]	[3.599]	[1.046]	[0.037]
Share of high-skilled immigrants	-20.385***	-19.534***	-0.272	-0.011
	[4.580]	[3.644]	[1.343]	[0.061]
Observations	8300	8593	9219	8848
IV F-stat	21.86	21.94	26.28	25.71

Notes: The dependent variables are (log) of violent and property crime rates, and per-pupil education spending in columns (1)-(3) and teacher to student ratio in column (4). Each specification includes county and panel fixed effects, as well as commuting zone controls. Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table 8: Effect of First and Second Generation Immigrants on Own Revenues and General Expenditures

	Per-capita own revenues (in logs)					Per-capita general expenditures (in logs)				
	Language-based proxy			Predicted share of second-generation imm.		Language-based proxy			Predicted share of second-generation imm.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Share of low-skilled imm.	-3.181***	-7.753***	-5.652***	-3.954***	-4.090***	-1.791***	-2.697**	-2.174***	-2.049***	-1.997***
	[0.947]	[2.339]	[1.271]	[0.831]	[0.936]	[0.676]	[1.236]	[0.686]	[0.660]	[0.602]
Share of high-skilled imm.	3.119***	0.825	1.879	2.761**	1.920	2.951***	2.497*	2.759**	2.827***	2.764**
	[1.101]	[2.671]	[1.754]	[1.139]	[1.292]	[0.952]	[1.301]	[1.144]	[0.990]	[1.100]
Share of second-generation imm.	1.002*	12.622**	7.283***	1.234***	1.505***	-0.150	2.152	0.823	0.210	0.170
	[0.568]	[6.017]	[2.039]	[0.425]	[0.501]	[0.352]	[2.843]	[1.252]	[0.425]	[0.501]
Second-generation immigrants										
Instrument	No	Yes	Yes	No	No	No	Yes	Yes	No	No
Predicted shares	-	1970	1980	1970	1980	-	1970	1980	1970	1980
Observations	9237	9237	9237	9237	9237	9237	9237	9237	9237	9237
IV F-stat	29.36	1.70	6.60	27.47	31.61	29.36	1.70	6.60	27.47	31.61

Notes: The dependent variables are the log of per-capita own revenues in columns (1)-(5) and general expenditures in columns (6) to (10). The OLS specifications in column (1) and (6) use a language based measure (speaking a language other than English at home) as a proxy for second generation immigrants. The 2SLS specifications reported in columns (2) (and (3)) and (7) (and (8)) instrument for this proxy using the predicted share of second generation immigrants, constructed using the national flow of second generation immigrants apportioned by the initial share of immigrants in the year 1970 (1980). Estimates reported in columns (4)-(5) and (9)-(10) are from OLS specifications that include the predicted share of second generation immigrants. Each specification includes county and panel fixed effects, as well as commuting zone controls (see Note of Table 1 for details). Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

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A Appendix: Theoretical framework

We consider a two-factors two-goods Heckscher-Ohlin model of a small open economy, augmented with a redistributive welfare system as in Dustmann and Preston (2005) and Facchini and Mayda (2009). Assume low-skilled (L_L) and high-skilled labor (L_H) are combined using a constant returns to scale technology $y_i = f_i(L_L, L_H)$ to produce output $i \in 1, 2$. Good 1 is the *numéraire* and p is the price of good 2. The economy is populated by N native workers and M immigrant workers. Each worker is endowed with one unit of either low-skilled or high-skilled labor. The total supply of each type of labor is:

$$L_j = N_j + M_j \quad j \in \{L, H\} \tag{2}$$

In the benchmark case, we assume a diversified production and abstract away from the impact of immigration on the labor market. With both goods produced in the economy, "factor price insensitivity" holds so that factor returns are not affected by immigration. w_j is the prevailing pre-tax wage rate, with $w_H > w_L$, and $c_i(w_L, w_H)$ is the unit cost function for good i. The factor-market equilibrium condition for each type of labor is:

$$L_j = y_1 \frac{\partial c_1(w_L, w_H)}{\partial w_j} + y_2 \frac{\partial c_2(w_L, w_H)}{\partial w_j} \quad j \in \{L, H\} \tag{3}$$

Perfect competition implies that firms earn zero profits in equilibrium:

$$1 = c_1(w_L, w_H) \tag{4}$$

$$p = c_2(w_L, w_H) \tag{5}$$

The welfare system is assumed to be redistributive: the government levies a flat income tax rate τ, which is accompanied by a lump sum per capita benefit b. The latter is intended to capture the provision of public services, which are assumed to be equally accessible to migrants and natives. Consistent with the balanced budget requirements commonly imposed on local governments in the U.S., the government budget constraint is assumed to be binding:

$$\tau(w_L L_L + w_H L_H) = b(N + M) \tag{6}$$

The arrival of immigrants impacts the budget constraint by changing the tax base ($w_L L_L + w_H L_H$) and the number of people eligible for benefits ($N + M$). This results in a change in the per capita tax base (in this case, average income) and a fiscal response that involves an adjustment of tax rates and/or per capita benefits, the magnitude and direction of which depend on the skill composition of immigrants. We model the two types of adjustment of the welfare state separately.

Specifically, we start from an initial equilibrium without immigrants and keep the number of natives constant. We first assume that, faced with an inflow of immigrants, the government only adjusts the tax rate to balance the budget, keeping per capita benefits constant (the *tax adjustment scenario*). Totally differentiating the budget constraint (6) at the initial equilibrium,

we obtain:

$$\hat{\tau} = d\pi_L(1 - \frac{n_L}{\phi_L}) + d\pi_H(1 - \frac{n_H}{\phi_H}) \tag{7}$$

where $\pi_L = \frac{M_L}{N+M}$ and $\pi_H = \frac{M_H}{N+M}$ are the shares of low-skilled and high-skilled immigrants relative to total population, respectively. The percentage change in the tax rate, $\hat{\tau}$, depends on the change in the share of low- and high-skilled immigrants ($d\pi_j$); the income share of low- and high-skilled labor ($n_j = \frac{w_j L_j}{\sum_i w_i L_i}$, with $\sum_j n_j = 1$); and the population share of workers of skill j in the initial equilibrium ($\phi_j = \frac{L_j}{\sum_i L_i}$, with $\sum_j \phi_j = 1$).

Low-skilled immigration results in an increase in the tax rate because the share of low-skilled workers in the initial population (ϕ_L) is larger than their initial income share (n_L). Conversely, the effect of high-skilled immigrants on the tax rate ($1 - \frac{n_H}{\phi_H}$) is negative, since the population share of high-skilled workers (ϕ_H) is smaller than their income share (n_H).[58] Note that this prediction derives entirely from compositional changes in the population that lead to movements in average income, even absent wage effects.

Next, we consider the *benefit-adjustment scenario*, in which the welfare state adjusts only by changing per capita benefits, while keeping tax rates constant. Totally differentiating the budget constraint (6) at the initial equilibrium, we obtain:

$$\hat{b} = d\pi_L(\frac{n_L}{\phi_L} - 1) + d\pi_H(\frac{n_H}{\phi_H} - 1) \tag{8}$$

The effects of low- and high-skilled immigration on the per capita benefit are of the same magnitude but in the opposite direction of the effects on the tax rate. Specifically, low-skilled immigration implies a decrease in the per capita benefit, while high-skilled immigration results in an increase.

While we model the two types of policy adjustment separately, in reality policy makers can adjust both tax rates and per capita benefits simultaneously. The tax rates will decrease and/or per capita benefits will increase, following the arrival of high-skilled immigrants who improve the local tax base; exactly the opposite will happen with the arrival of low-skilled immigrants who create a fiscal deficit. In this case, the percent change in each policy tool required to bring the budget back to balance is smaller in magnitude, but of the same sign as in equations (7) and (8). Our empirical analysis allows for adjustments in both policy levers in considering the fiscal response to immigration in equilibrium.[59]

Extensions

We consider several extensions of the benchmark case by allowing for labor market effects of immigration, for progressive tax rates, for taxes other than those applied to income (e.g. sales and property taxes), for different types of public services and for intergovernmental transfers. The main insights of the model continue to hold with minor changes in the elasticity expressions.

In the benchmark version of the model we abstracted away from the impact of immigration

[58] In a more general setting with immigrants present in the initial equilibrium, the qualitative implications are the same but the marginal effects of low- and high-skilled immigrants are also a function of the initial share of immigrants.

[59] As we detail in the next section, we mainly study changes in per capita revenues ($\frac{\tau(w_L L_L + w_H L_H)}{(N+M)}$) and expenditures ($b$). For both of these outcome variables, the predictions in terms of signs are the same as in equation 8. We also provide some evidence on changes in tax rates(τ) following immigration.

on wages and focused solely on changes in the per capita tax base driven by skill composition effects. The first extension we consider is to incorporate labor market impacts of immigration, by dropping the assumption of diversified production. We now start from an equilibrium in which the locality is specialized in the production of only one good. This means that only one of the two zero profit conditions (either (4) or (5)) holds, implying that factor returns are not pinned down by goods' prices alone, but they also depend on factor supplies. In this case, there will be a labor market effect of immigration, assuming that immigrants and natives are not identical in terms of skill composition. Keeping everything else constant, an inflow of low-skilled immigrants will lead to a reduction of low-skilled wages and an increase in high-skilled wages, while high-skilled immigrants will have the opposite effect (see Facchini and Mayda (2009)). If the inflow of immigrants is non–marginal (corresponding to $\Delta\pi_j$), the total remuneration of existing workers will rise. These labor-market gains from migration, or "surplus" as in Borjas (2014), will relax the government's budget constraint. In this case, when low-skilled (high-skilled) immigrants arrive, the increase (decrease) in the tax rate in the tax adjustment scenario and the decrease (increase) in benefits in the benefit adjustment scenario will be less (more) pronounced.[60]

The model can easily be extended to incorporate progressive income taxes, by modifying (6) as $\tau(\gamma w_L L_L + w_H L_H) = b(N + M)$ where $\gamma < 1$, in order to capture lower tax rates for low-income workers. In this case, (7) and (8) are the same as before, except for an adjustment to the denominator of n_j. In addition, the government can now change γ (keeping τ and b constant) as a way to bring the budget back to balance. Similarly, other taxes such as sales and property taxes, which are important sources of revenue for local governments, can be introduced in the model. Consider the case in which local governments finance themselves entirely via sales taxes. Assume that individuals spend a certain fraction of their income on consumption goods and that this fraction is higher for low-skilled workers. The budget constraint can be written as $sq(\delta w_L L_L + w_H L_H) = b(N + M)$, where s is the sales tax rate and the consumption shares of low-skilled and high-skilled workers are, respectively, δq and q, with $q < \delta q < 1$. Again, (7) and (8) are the same as before, except for the fact that the denominator of n_j is slightly modified and that the relevant tax rate is s. A similar intuition applies for property taxes.[61]

So far, we have assumed that public benefits (b) are defined in per capita terms and are the same for migrants and natives, and for low-skilled and high-skilled workers. These assumptions best resemble a public good such as public education, for which expenditures may have to increase with utilization in order to keep quantity and quality constant. Both native and immigrant kids (independent of legal status) have access to K-12 public education, consistent with the assumption that the per capita benefits are the same for the two groups. The budget constraint (6) can easily be modified to incorporate other types of services provided by local governments. Some of these services are more similar to (pure) public goods, such as infrastructure and parks, whose consumption is non-rival and non-excludable. For these, one can consider

[60] On the other hand, since workers are paid the value of their marginal product, a *marginal* inflow of immigrants ($d\pi_j$) will leave the total remuneration of the existing labor force unchanged and will have no effect on the redistribution carried out by the welfare state. This means that, although wages adjust, the change in the tax rate in the *tax adjustment scenario* and in benefits in the *benefit adjustment scenario* will be the same as they were in the absence of labor-market adjustments (Dustmann and Preston, 2005).

[61] The arrival of immigrants will impact the property tax base by changing property values. In a simplified framework, property values depend on: (i) the local average income and the share of income spent on housing; (ii) the level and composition of housing supply; (iii) the migration response by natives to the arrival of immigrants. While we do not separately model the housing market equilibrium, we explicitly test for this channel empirically.

total expenditure (B), as in $\tau(w_L L_L + w_H L_H) = B$, which implies that the fiscal effect of immigration depends on total income (which always increases with the size of the population) as opposed to average income (which may increase or decrease, depending on whether immigrants are high- or low-skilled). Since local governments provide both types of services, the budget constraint would then be $\tau(w_L L_L + w_H L_H) = b(N + M) + B$ and the main predictions would be qualitatively similar to the basic model. Public services also differ in terms of their target population. Utilization rates are very different for the rich and poor (high- and low-skilled, in the model), for services such as homeless shelters or public transportation, which suggests a modified budget constraint that allows for different per capita benefits for high- and low-skilled workers: $\tau(w_L L_L + w_H L_H) = b_L(N_L + M_L) + b_H(N_H + M_H)$, where a higher b_L would further enhance the redistributive character of the welfare state. The same logic applies to benefits for which the take up rate is likely different for natives and immigrants, due to informational asymmetries or eligibility requirements ($b_L(N_L + \delta_L M_L) + b_H(N_H + \delta_H M_H)$ with $\delta_j < 1$).[62]

Our basic model assumes that locally-raised taxes are the only revenues of local governments. In reality, state and federal governments make substantial transfers to local public entities. The model can be easily extended by introducing intergovernmental transfers, which affect the budget constraint and create a wedge between locally-raised revenues and expenditures. Transfers can be used to offset local shocks, in which case we would expect that immigration leads to changes in expenditures which are less pronounced than those in locally raised revenues. Our empirical analysis will shed light on this point.

Finally note that, in our model, we assume that the size of the welfare state ("preferences for redistribution") is fixed. This is to focus on fiscal effects that take place through changes in the tax base and revenues, which is what we observe in the data. Our framework complements existing work that emphasizes the political-economy channel and, in particular, changes in preferences for redistribution when immigrants arrive.

B Appendix: Leave-out Push-pull Ancestry Instrument

In this section, we describe in more detail the construction of the leave-out push-pull ancestry instrument, which is based on Burchardi et al. (2019) and Terry et al. (2023). The main idea of the instrument is to use the *predicted* ancestry distribution (instead of the past distribution of immigrants by country of origin) as shares in the shift-share Card instrument. Ancestry is predicted by linking it to a series of push and pull factors that brought immigrants to different localities of the United States over more than a century. In particular, using self-reported ancestry measures from IPUMS samples going back to 1880, and the replication package provided by the authors, we construct the instruments in two steps:

First, we predict the number of residents with ancestry from country o in county d at year t ($A_{o,d,t}$) during our sample period 1990-2010, using the (residualized) interactions of historical push and pull factors, for each period starting in 1880. Specifically, we estimate equation (2)

[62] Empirically, we separately examine per capita spending on different types of public services (such as, infrastructure, education, law and order) that likely differ along the dimensions highlighted here. However, since we do not observe take up rates by different segments of the population, our results on per capita expenditures for each type of spending reflect the experience of the average resident of a county.

from Burchardi et al. (2019):

$$A_{o,d,t} = \delta_{o,r(d)} + \delta_{c(o),d} + X'_{o,d}\zeta + \sum_{\tau=1880}^{t} a_{r(d),\tau} I_{o,-r(d),\tau} \frac{I_{Europe,d,\tau}}{I_{Europe,\tau}} + \nu_{o,d,t} \tag{9}$$

where $I_{o,-r(d),\tau}$ is the aggregate number of immigrants arriving from (non-European) country of origin o at year τ, who settle in counties outside of the region $r(d)$ where county d is located (the leave-out push factor). This term is interacted with $\frac{I_{Europe,d,\tau}}{I_{Europe,\tau}}$, the share of European migrants in county d at year τ (the pull factor). As in Terry et al. (2023), the predicted ancestry, $\hat{A}_{o,d,t}$, is residualized with respect to a series of origin country-destination region and continent of origin-destination county fixed effects ($\delta_{o,r(d)}$ and $\delta_{c(o),d}$), as well as a set of time-invariant controls ($X'_{o,d}$). The variations in *relative* predicted ancestry based on these interactions capture the fact that, for example, Indian immigrants first came to the U.S. in large numbers at a time (1900) when Fresno, CA was attractive to (all) immigrants, leading to many Indian immigrants settling in Fresno during this period, as well as to a large community of residents of Indian ancestry in this county, today.

The second step is to construct the shift-share instrument for the total number of immigrants settling in county d in period t by using the *predicted* ancestry in a given county to distribute the contemporaneous aggregate immigrant inflows from country of origin o. We construct modified versions of this instrument for low- and high- skilled immigrants, analogous to our benchmark specification.

C Appendix: Attitudes on Tax Increases vs. Spending Cuts

This section provides a more detailed description of our analysis of the change in attitudes on tax increases vs. spending cuts with the arrival of immigrants, as depicted in column (6) of Table 6b). We use data from the Cooperative Election Study (CES), which is a nationally representative survey of American residents on ideology and preferences for redistribution, conducted online in November of every year since 2005. We focus on the 2006-19 period and use detailed information on demographic and socioeconomic characteristics of more than 260,000 respondents, specifically their age, gender, marital status, nativity, income, educational status and county of residence.

We base our analysis on the responses of natives (i.e., people born in the United States) to the following question: 'If your state were to have a budget deficit this year, it would have to raise taxes on income or sales, or cut spending, such as on education, health care, welfare, and road construction. What would you prefer more: raising taxes or cutting spending?". The respondents are asked to choose a number along the scale from 0 to 100, which we normalize to a range between 0 and 1, where 1 suggests a preference towards financing the deficit entirely with tax increases, and 0 suggests a preference towards not raising taxes at all, and instead financing all the deficit with spending cuts. Giuliano and Tabellini (2020) use the same question from the CES and interpret responses more favorable to an increase in tax rates (as opposed to spending cuts) as indicative of higher preferences for redistribution.

In estimating the impact of the arrival of immigrants on these preferences, we consider three different specifications, reported in Table B10. First, in column(1), we regress responses to this question, at the individual level, on county shares of low-skilled and high-skilled immigrants, along with county and year fixed effects. We control for individual-level characteristics, including age, gender, race (African American, white), marital status (single, married, divorced, widowed),

education (no high school, high school degree, more than high school), employment status, labor market participation and dummies for income brackets (less than 10K, between 10K and 20K, ..., above 150K).[63] Next, we calculate for each sample year a sample-weighted average of the individuals' responses at the county level to obtain a representative respondent's attitude on whether she prefers to raise taxes (instead of cut spending), in order to finance a budget deficit. We use this average response at the county-level as the dependent variable in column (2) (as well as in column (6) of Table 6b). We include county and year fixed effects as well as time-varying commuting zone controls, as described in Table 1.

Lastly, we run an auxiliary regression, where we regress the individual responses on individual-level control variables. The residual from this specification captures predicted individual responses net of individual characteristics. We then aggregate the residualized individual responses to the county level using the sample weight of each respondent and use them as dependent variable in a specification including county- and skill-specific immigration shares, and the same set of controls as those in column (2). Estimates from all three specifications suggest that the share of low-skilled immigrants increases the likelihood of a respondent preferring to increase tax rates rather than cut spending in order to finance a fiscal deficit. We do not find a significant impact of the share of high-skilled immigrants on attitudes towards redistribution. Overall, these results are suggestive evidence that, at the local level, a change in preferences towards a smaller welfare state is not the main explanation for our findings.

[63] These are the same individual-level control variables used in Giuliano and Tabellini (2020).

D Appendix Tables

Table B1: Summary Statistics, in Shares

(a) Revenue shares

	1990		2010	
	mean	sd	mean	sd
Rev. from own sources in total rev.	58.4	13.8	59.0	13.8
General rev. in rev. from own sources	86.5	13.0	86.9	12.4
Taxes in general rev. from own sources	61.1	16.2	63.2	16.3
Property taxes in tax rev.	80.3	16.5	77.7	16.3
Sales, income and license taxes in tax rev.	15.7	14.9	18.8	15.6
Other taxes in tax rev.	4.0	4.8	3.5	4.1
Charges and administrative rev. in general rev. from own sources	38.9	16.2	36.8	16.3
Utilities, insurance trust and liquor stores in total rev. from own so	13.5	13.0	13.1	12.4
Inter-governmental transfers in total rev.	41.6	13.8	41.0	13.8
Federal in intergov. transfers	5.6	6.8	8.6	8.3
State in intergov transfers	88.5	9.5	85.2	9.9
Local in intergov transfers	6.0	6.7	6.2	6.1

(b) Expenditure shares

	1990		2010	
	mean	sd	mean	sd
General exp. in total exp.	91.3	9.4	91.6	8.9
Education in general ex	52.6	12.7	49.0	12.9
Law and order in general exp.	7.8	3.7	10.1	4.6
Sanitation in general exp.	3.7	2.9	4.4	3.0
Infrastructure in general exp.	8.9	5.1	8.3	5.5
Public amenities in general exp.	15.1	11.1	16.3	13.1
Administration in general exp.	7.6	5.8	6.7	3.7
Other spending in general exp.	4.2	3.2	5.1	4.0
Utilities, insurance trust, and liquor stores in total exp	8.7	9.4	8.4	8.9

Notes: Population-weighted means and standard deviations are reported for 3,079 counties. Total revenues are revenues from own sources plus inter-governmental transfers. Revenue from own sources is the sum of general revenue from own sources and revenue from utilities, insurance trust and liquor stores. General revenue from own sources is total tax revenue (property, sales, income and license taxes and other taxes) and charges and administrative revenue. Inter-governmental transfers are from the federal, state and other local governments. Totals expenditures are equal to general expenditures on education, law and order, sanitation, infrastructure, public amenities, administrative and other spending, plus expenditures on utilities, insurance trust and liquor stores.

Table B2: Reverse Causality Analysis
Changes in Predicted Immigrant Shares (1990-2010) and Changes in Own Revenue and General Expenditure (1980-90), OLS

Dependent variable	Change predicted share of immigrants (1990-2010)					
	Total		Low-skilled		High-skilled	
	(1)	(2)	(3)	(4)	(5)	(6)
Log change in per capita own revenues (1980-90)	-0.001		-0.006		0.002*	
	[0.006]		[0.004]		[0.001]	
Log change in per capita general expenditure (1980-90)		0.007		0.010		-0.002
		[0.012]		[0.007]		[0.002]
Observations	3079	3079	3079	3079	3079	3079
R^2	0.46	0.46	0.64	0.64	0.76	0.76

Notes: The dependent variable in each specification is the change in the predicted share of total, low-skilled and high-skilled immigrants, calculated over 1990-2010, in columns (1)-(2), (3)-(4) and (5)-(6), respectively. Each OLS specification includes county and panel fixed effects, as well as commuting zone controls constructed as interactions of linear time trends with 1980 values of shares of adult women, African-Americans, individuals who are younger than 25, married, unemployed, and located in urban areas, and the real (average) per-capita income (in logs) and the Bartik indicator. Specifications (3) and (4) ((5) and (6)) also include the change in the predicted share of high- (low-) skilled immigrants, as a control. Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table B3: Exogeneity of the Initial (1980) Shares of Country-of-Origin Groups, OLS (Goldsmith-Pinkham et al., 2020)

(a) Change in (log) per-capita own revenues, 1980-1990

	Canada	Other Americas	Mexico	Western Europe	Eastern Europe	China	Japan	Korea	Philippines	Vietnam	India	Other Asia	Africa	Oceania	Rest of world
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Change in (log) own rev. (1980-90)	-0.002 [0.003]	0.006* [0.004]	0.001 [0.006]	0.001 [0.003]	0.005 [0.005]	0.000 [0.003]	0.000 [0.003]	0.001 [0.005]	0.002 [0.004]	-0.000 [0.003]	0.005 [0.006]	-0.000 [0.004]	0.001 [0.003]	0.000 [0.002]	0.003 [0.003]
Observations	3044	3044	3044	3044	3044	3044	3044	3044	3044	3044	3044	3044	3044	3044	3044
R^2	0.19	0.24	0.23	0.19	0.13	0.23	0.23	0.22	0.22	0.23	0.13	0.21	0.22	0.24	0.22

(b) Per-capita general expenditures, 1980-1990

	Canada	Other Americas	Mexico	Western Europe	Eastern Europe	China	Japan	Korea	Philippines	Vietnam	India	Other Asia	Africa	Oceania	Rest of world
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Change in (log) gen. exp. (1980-90)	-0.001 [0.003]	0.004 [0.003]	0.010 [0.009]	-0.001 [0.002]	-0.001 [0.003]	0.001 [0.004]	0.004 [0.005]	0.004 [0.006]	0.003 [0.004]	0.003 [0.005]	-0.003 [0.003]	0.002 [0.005]	0.000 [0.003]	0.003 [0.004]	0.001 [0.003]
Observations	3044	3044	3044	3044	3044	3044	3044	3044	3044	3044	3044	3044	3044	3044	3044
R^2	0.19	0.24	0.23	0.19	0.13	0.23	0.23	0.22	0.22	0.23	0.13	0.21	0.22	0.24	0.22

Notes: The dependent variables are the initial (1980) shares of immigrants by each country-of-origin group, regressed on the log change over 1980-90 in per-capita own revenues in panel (a) and on the log change in per-capita general expenditures in panel (b). Each specification includes commuting zone controls constructed as change over 1980-90 in the shares of adult women, African-Americans, individuals who are younger than 25, married, unemployed, and located in urban areas, and the real (average) per-capita income (in logs) and the Bartik indicator. Observations are weighted by the beginning of period population of the county. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table B4: First-Stage Specifications

Dependent variable	Share of immigrants		Share of low-skilled imm.		Share of high-skilled imm.	
	(1)	(2)	(3)	(4)	(5)	(6)
Predicted share of immigrants	0.435***	0.311***				
	[0.053]	[0.045]				
Predicted share of low-skilled imm.			0.261***	0.295***	-0.002	0.009
			[0.051]	[0.042]	[0.021]	[0.025]
Predicted share of high-skilled imm.			0.169	-0.320**	0.869***	0.660***
			[0.138]	[0.152]	[0.078]	[0.098]
Commuting zone controls	No	Yes	No	Yes	No	Yes
Observations	9237	9237	9237	9237	9237	9237
R^2	0.76	0.83	0.68	0.76	0.84	0.87

Notes: The dependent variables are the population shares of total, low-skilled and high-skilled immigrants in columns (1) to (2), (3) to (4) and (5) to (6), respectively. is the share of high-skilled immigrants in the total population. Each specification includes county and panel fixed effects, and is estimated with and without commuting zone controls. Commuting zone controls are constructed as interactions of linear time trends with 1980 values of shares of adult women, African-Americans, individuals who are younger than 25, married, unemployed, and located in urban areas, and the real (average) per-capita income (in logs) and the Bartik indicator. Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table B5a: Changes in Immigrant Share and in Own Revenues and General Expenditures, over 1990-2010, 2SLS

Dependent variable	Change in own revenue (1990-2010)				Change in general expenditure (1990-2010)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Change in share of immigrants (2010-1990)	0.123	0.105			0.338	0.441		
	[0.516]	[0.502]			[0.410]	[0.421]		
Change in share of low-skilled immigrants (2010-1990)			-1.857*	-2.163**			-1.671**	-1.296
			[1.023]	[1.008]			[0.763]	[0.802]
Change in share of high-skilled immigrants (2010-1990)			2.780***	3.149***			3.035***	2.766**
			[1.043]	[1.117]			[1.041]	[1.131]
Lagged change own revenue (1980-1990)		-0.244***		-0.245***				
		[0.045]		[0.044]				
Lagged change in general expenditure (1980-1990)						-0.354***		-0.341***
						[0.036]		[0.038]
Observations	3079	3079	3079	3079	3079	3079	3079	3079
IV F-stat	42.92	44.49	16.57	17.23	42.92	43.31	16.57	16.29

Notes: The dependent variables are (log) changes in per-capita own revenues and general expenditures between 2010 and 1990, in columns (1)-(4) and (5)-(8), respectively. Each specification includes county and panel fixed effects, as well as commuting zone controls. Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table B5b: Changes in Immigrant Share and in Own Revenues and General Expenditures, Stacked Differences, 2SLS

Dependent variable	Change in own revenue				Change in general expenditure			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Change in share of immigrants	-0.620*	-0.770			-0.266*	0.104		
	[0.357]	[0.709]			[0.149]	[0.215]		
Change in share of low-skilled immigrants			-1.243**	-2.052***			-1.068***	-1.078***
			[0.573]	[0.554]			[0.280]	[0.294]
Change in share of high-skilled immigrants			1.458**	4.628***			1.386***	3.440***
			[0.728]	[1.091]			[0.482]	[0.925]
Observations	6158	6158	6158	6158	6158	6158	6158	6158
IV F-stat	33.19	27.77	17.89	11.36	33.19	27.77	17.89	11.36

Notes: The dependent variables are (log) changes in per-capita own revenues and general expenditures between 2010 and 1990, in columns (1)-(4) and (5)-(8), respectively. Each specification includes county and panel fixed effects, as well as commuting zone controls. Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table B6: The Effect of Immigration on Own Revenues and General Expenditures, Shock-level representation, 2SLS, (Borusyak et al., 2022)

Dependent variable	Own revenue	Total revenue	General expenditure	Total expenditure
	(1)	(2)	(3)	(4)
Share of low-skilled immigrants	-0.710**	-2.829***	-1.638***	-1.775***
	[0.359]	[0.589]	[0.342]	[0.451]
Share of high-skilled immigrants	2.307**	0.941	1.863*	1.960*
	[0.941]	[1.712]	[1.018]	[1.186]
Observations	45	45	45	45
IV F-stat	12.44	12.44	12.44	12.44

Notes: The dependent variable in each 2SLS specification is the shock-level transformations of the log of the per-capita values given by the specific columns. Each observation is weighted by the average exposure weight of the country of origin. Robust standard errors, clustered by country-of-origin groups, are reported in parentheses. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table B7: The Effect of Immigration on Own Revenues and General Expenditures, Leave-out Push-Pull Ancestry Instrument, 2SLS (Burchardi et al. (2019) and Terry et al. (2023))

(a) Change in per capita revenues from own sources (logs)

	(1)	(2)	(3)	(4)	(5)	(6)
New low-skilled imm. (in mil.)	-1.816***	-1.830***	-2.002***			
	[0.501]	[0.557]	[0.587]			
New high-skilled imm. (in mil.)	5.648***	5.721**	6.634***			
	[2.114]	[2.236]	[2.301]			
Share of new low-skilled imm.				-5.150***	-7.019***	-7.397***
				[1.446]	[2.177]	[2.694]
Share of new high-skilled imm.				9.011**	11.602***	17.259***
				[3.803]	[3.767]	[6.040]
Commuting zone controls	No	No	Yes	No	No	Yes
State fixed effects	No	Yes	Yes	No	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6156	6156	6156	6156	6156	6156
IV F-stat	1465.83	843.18	908.07	2.09	1.36	1.39

(b) Change in per capita general expenditures (logs)

	(1)	(2)	(3)	(4)	(5)	(6)
New low-skilled imm. (in mil.)	-0.572***	-0.445***	-0.490***			
	[0.166]	[0.157]	[0.147]			
New high-skilled imm. (in mil.)	1.811***	1.615***	1.988***			
	[0.572]	[0.562]	[0.539]			
Share of new low-skilled imm.				-3.061***	-3.457**	-3.080*
				[1.071]	[1.528]	[1.666]
Share of new high-skilled imm.				7.605***	7.816**	9.783**
				[2.755]	[3.257]	[4.079]
Commuting zone controls	No	No	Yes	No	No	Yes
State fixed effects	No	Yes	Yes	No	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6156	6156	6156	6156	6156	6156
IV F-stat	1465.83	843.18	908.07	2.09	1.36	1.39

Notes: The explanatory variables are the number of new immigrants (in millions) by skill-level in columns (1)-(3) and the share of new immigrants by skill-level relative to the beginning of period population in the county in columns (4)-(6). Columns (1) and (4) include only time-fixed effects, columns (2) and (5) add state fixed effects and columns (3) and (6) add commuting zone controls. The controls at the commuting zone level are the share of men, married, African Americans, and urban citizens, the log of the average income, the share of unemployed and people below age 25 and the Bartik employment shifter described in the text. Each regression is weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote signifi cance at the 1, 5 and 10 percent levels, respectively.

Table B8: The Effect of Immigration on Intergovernmental Transfers Dedicated to Education, 2SLS

Dependent variable	Intergovernmental Transfers for Education					
	Federal per pupil	State & Local per pupil	State & Local per pupil	Federal per capita	State & Local per capita	State & Local per capita
	(1)	(2)	(3)	(4)	(5)	(6)
Share of low-skilled immigrants	22.191**	-6.374***	-3.124	22.830**	-5.771***	-3.151
	[9.288]	[1.651]	[1.959]	[9.385]	[1.737]	[2.305]
Share of high-skilled immigrants	-17.124	-3.017	-3.039	-16.123	-1.470	-1.465
	[14.052]	[3.176]	[2.738]	[13.379]	[3.915]	[3.707]
Residual state-level share of low-skilled immigrants			-5.685***			-4.547**
			[1.836]			[2.050]
Residual state-level share of high-skilled immigrants			4.052*			3.154
			[2.116]			[2.712]
Observations	6437	9219	9219	6442	9224	9224
IV F-stat	22.27	26.28	7.95	22.25	26.27	7.94

Notes: The dependent variables are the log of the values given by the specific columns. Educational transfers from the federal government and from the state and other local governments are in columns (1) and (2)-(3) in per-capita terms and in columns (4) and (5)-(6) in per pupil terms. to the county on a per pupil basis in column (1) and on a per capita basis in column (4). Each specification includes county and panel fixed effects, as well as commuting zone controls constructed as interactions of linear time trends with 1980 values of shares of adult women, African-Americans, individuals who are younger than 25, married, unemployed, and located in urban areas, and the real (average) per-capita income (in logs) and the Bartik indicator. Columns (3) and (6) also include the share of immigrants in the rest-of-the-state (excluding the immigrants in the county). Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

Table B9: First-Stage Specifications: First- and Second-Generation Immigrants, 2SLS

IV specification	Initial share of immigrants in 1970			Initial share of immigrants in 1980		
Dependent variable	Second gen. imm.	Low-skilled imm.	High-skilled imm.	Second gen. imm.	Low-skilled imm.	High-skilled imm.
	(1)	(2)	(3)	(4)	(5)	(6)
Predicted share of second-gen. imm.	0.087**	-0.113***	0.027*	0.181***	-0.232***	0.007
	[0.039]	[0.040]	[0.015]	[0.033]	[0.042]	[0.014]
Predicted share of low-skilled imm.	0.105***	0.308***	0.002	0.081***	0.339***	0.008
	[0.022]	[0.047]	[0.024]	[0.024]	[0.048]	[0.023]
Predicted share of high-skilled imm.	-0.099	-0.161	0.653***	-0.145**	-0.102	0.649***
	[0.068]	[0.155]	[0.078]	[0.073]	[0.159]	[0.078]
Observations	9249	9249	9249	9249	9249	9249
IV F-stat	1.7	1.7	1.7	6.6	6.6	6.6

Notes: The dependent variable is the share of second-generation immigrants based on speaking a language other than English at home in columns (1) and (4), the share of low-skilled (first-generation) immigrants in columns (2) and (5) and, the share of high-skilled (first-generation) immigrants in columns (3) and (6). In columns (1)-(3) and (4)-(6) the instruments for the second-generation immigrants are based on the initial share of immigrants by country of origin in the year 1970 and 1980, respectively. Each specification includes county and panel fixed effects, as well as commuting zone controls constructed as interactions of linear time trends with 1980 values of shares of adult women, African-Americans, individuals who are younger than 25, married, unemployed, and located in urban areas, and the real (average) per-capita income (in logs) and the Bartik indicator. Observations are weighted by the average population of the county over the sample period. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively..

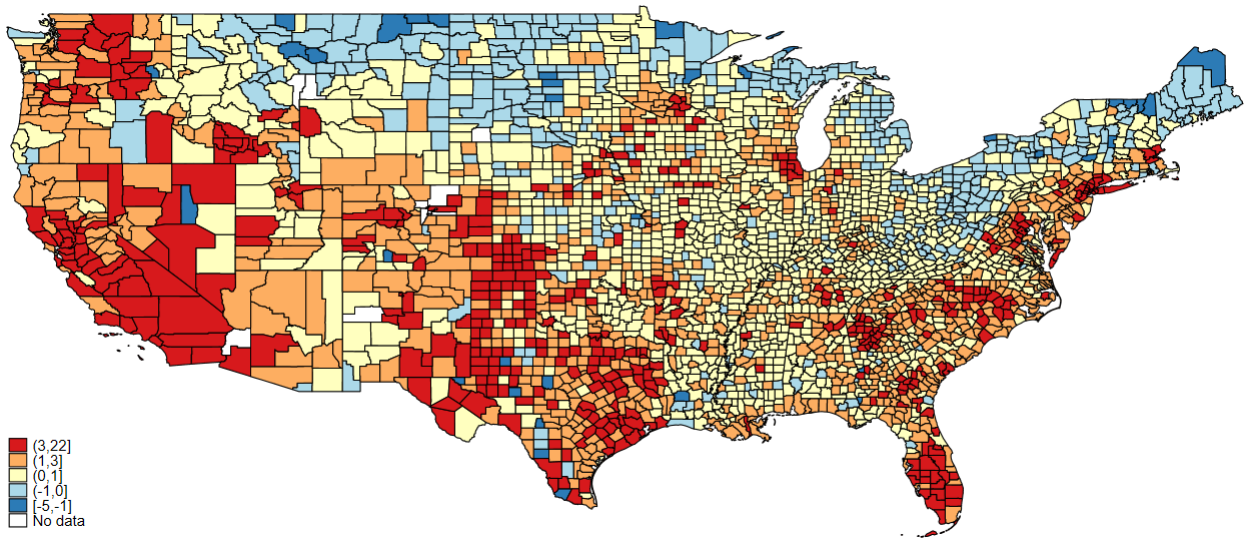
Table B10: The Effect of Immigration on Attitudes toward Redistribution, 2SLS

Dependent variable:	Prefer to raise taxes in order to finance a budget deficit		
Level of aggregation:	Individual	County	County
	(1)	(2)	(3)
Share of low-skilled immigration	2.289**	3.335**	3.721**
	[1.138]	[1.594]	[1.650]
Share of high-skilled immigration	-0.102	0.624	2.142
	[1.007]	[3.312]	[3.512]
Control variables	Individual	Czone	Czone
County fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
Observations	264577	23424	23424
IV F-stat	10.82	8.41	8.41

Notes: In column (1) the dependent variable equals 1 if the respondent in the Cooperative Election Study (CES) prefers to raise taxes in order to finance a budget deficit and 0 if the respondent prefers to cut spending in order to finance a budget deficit. In column (2) the dependent variable is the share of respondents in a given county that prefers to raise taxes (instead of cut spending) in order to finance a budget deficit. In column (3) the dependent variable is the residualized share of respondents in a given county that prefers to raise taxes (instead of cut spending) in order to finance a budget deficit. In column (1) the individual controls are: age, gender, African American, marital status (single, married, divorced, widowed), education (no high school, high school, more than high school), employment status, labor market participation and dummies for ranges of 10K income brackets. The regression is weighted by the sample case weight of each respondent. Columns (2) and (3) include commuting zone controls (see Note of Table 1 for details) and regressions are weighted by the average population of the county over the sample period. Each specification includes county and panel fixed effects. Robust standard errors, clustered at the county level, are reported in parenthesis. ***, **, * denote significance at the 1, 5 and 10 percent levels, respectively.

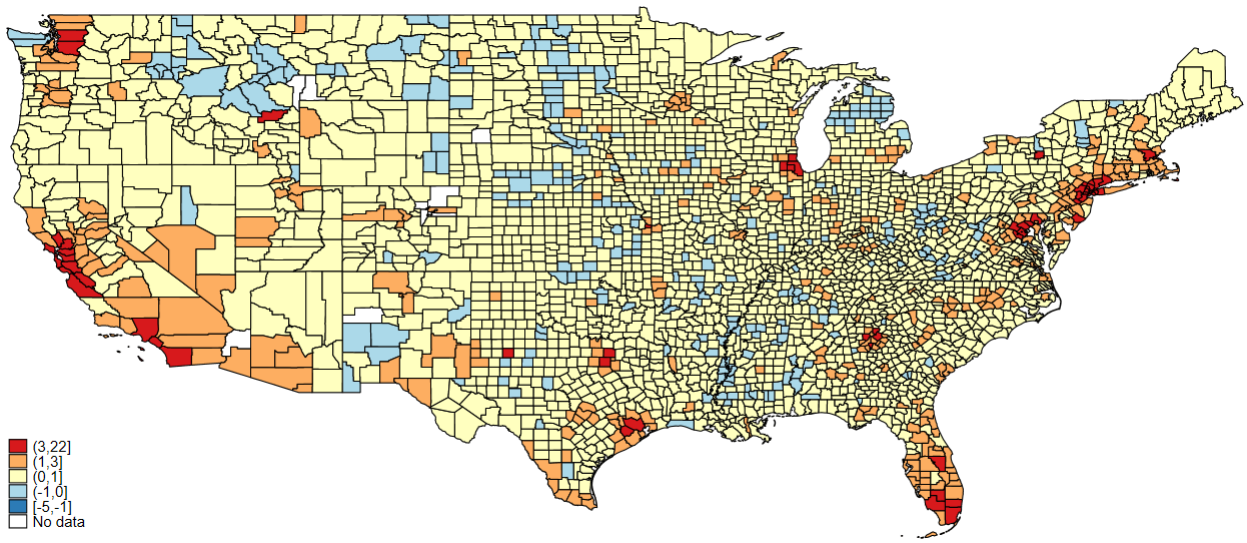
E Appendix Figures

Figure C1: Change in the Share of Low-Skilled Immigrants, by County (1990-2010)



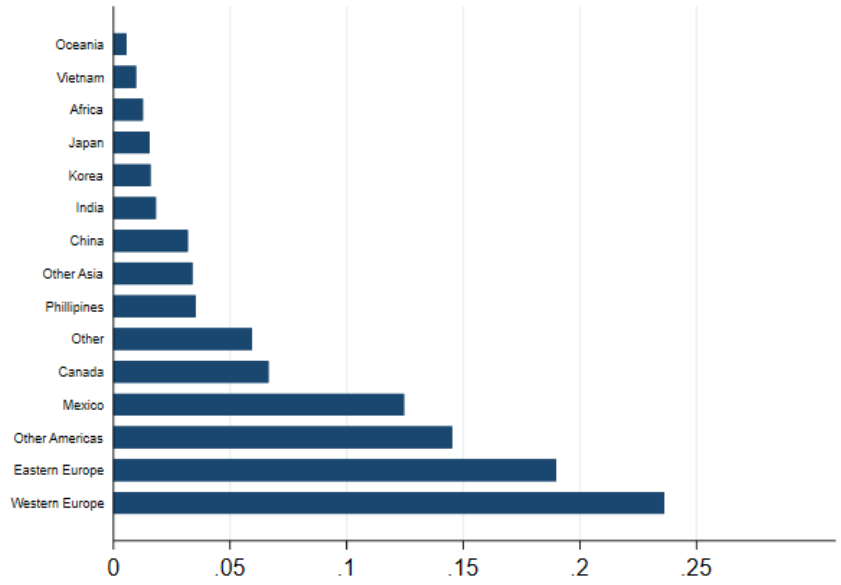
Notes: The changes in the shares of low-skilled immigrants are calculated for each county, over 1990-2010 period. The shape file for the map is from the U.S. Census Bureau (2016).

Figure C2: Change in the Share of High-Skilled Immigrants, by County (1990-2010)



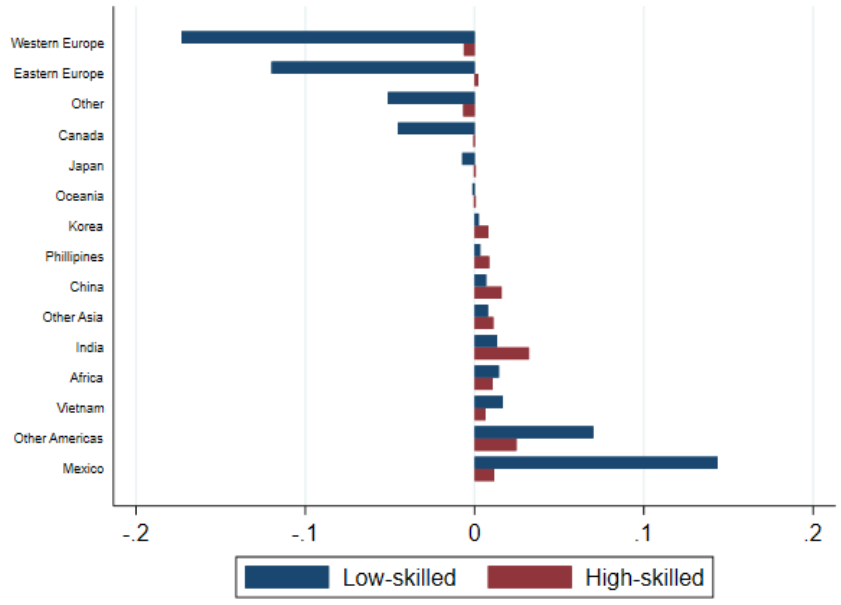
Notes: The changes in the shares of high-skilled immigrants are calculated for each county, over 1990-2010 period. The shape file for the map is from the U.S. Census Bureau (2016).

Figure C3: The Share of Adult Immigrants by Country of Origin, in 1980



Notes: Each bar represents the share of adult immigrants from each country-of-origin group, in the total number of adult immigrants (age 25 and above) as of 1980.

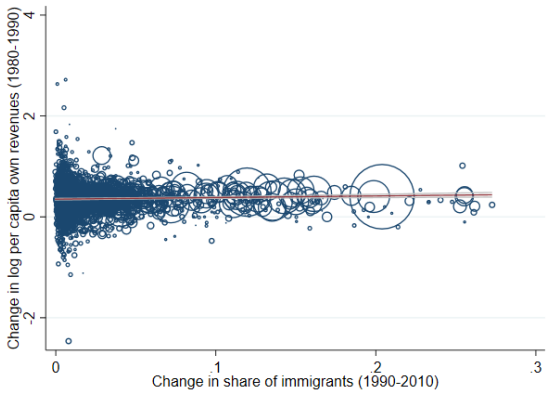
Figure C4: The Change in the Share of Immigrants by Country of Origin (1990-2010)



Notes: Blue (red) bars represent the change in the share of low- (high-) skilled immigrants by country-of-origin group, in the overall population, over the 1990-2010 period.

Figure C5a: Changes in Predicted Immigrant Shares (1990-2010) and Changes in Own Revenue and General Expenditure (1980-90)

(i) Per-capita own revenues



(ii) Per-capita general expenditures

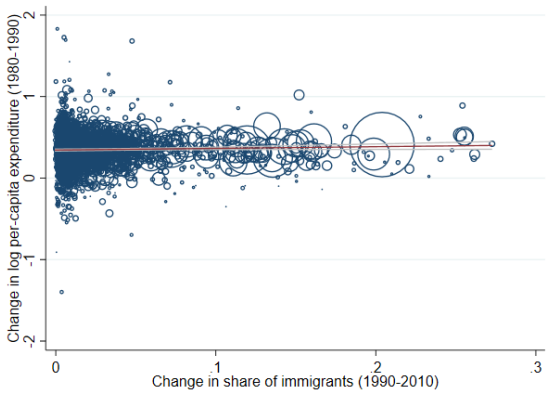
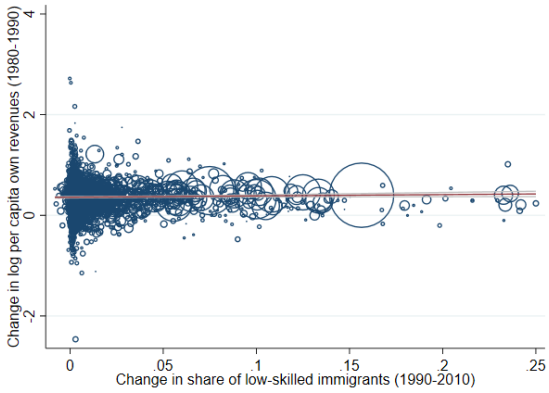


Figure C5b: Changes in Predicted Low-Skilled Immigrant Shares (1990-2010) and Changes in Own Revenue and General Expenditure (1980-90)

(i) Per-capita own revenues



(ii) Per-capita general expenditures

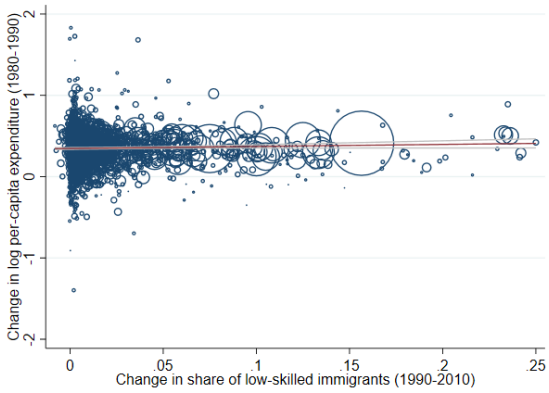
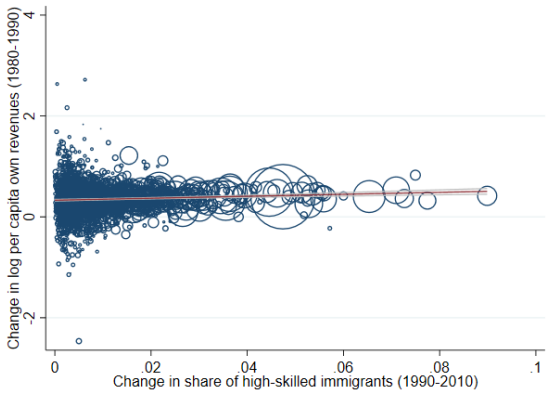
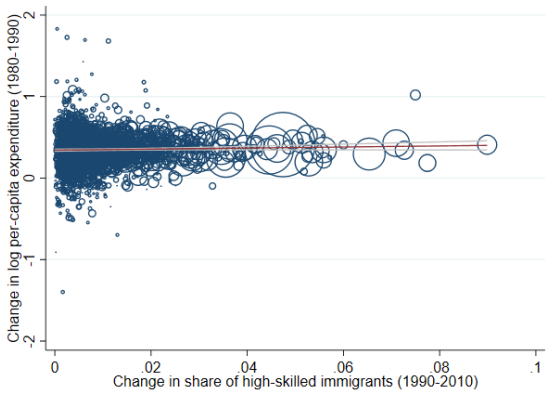


Figure C5c: Changes in Predicted High-Skilled Immigrant Shares (1990-2010) and Changes in Own Revenue and General Expenditure (1980-90)

(i) Per-capita own revenues

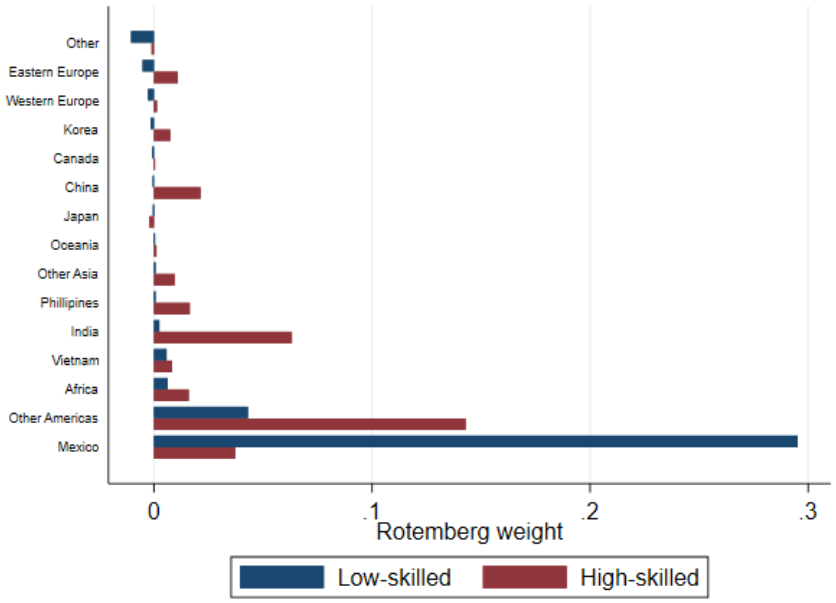


(ii) Per-capita general expenditures



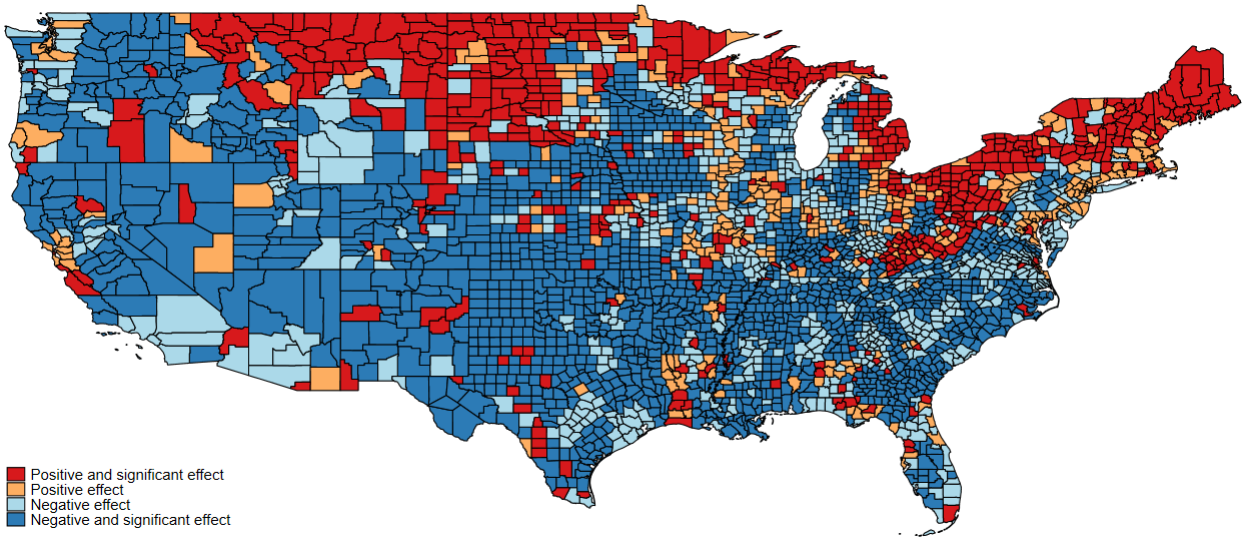
Notes: Figures (i) and (ii) plot log changes in (per capita) own revenues and in (per capita) general expenditures over 1980-90 period, respectively, against the change over 1990-2010 period in the share of total immigrants in Figure 3a, in the share of low-skilled immigrants in Figure 3b and in the share of high-skilled immigrants in Figure 3c. Each point represents a county, weighted by its overall population, with the red line depicting the fitted values.

Figure C6: Rotemberg Weights by Country-of-Origin



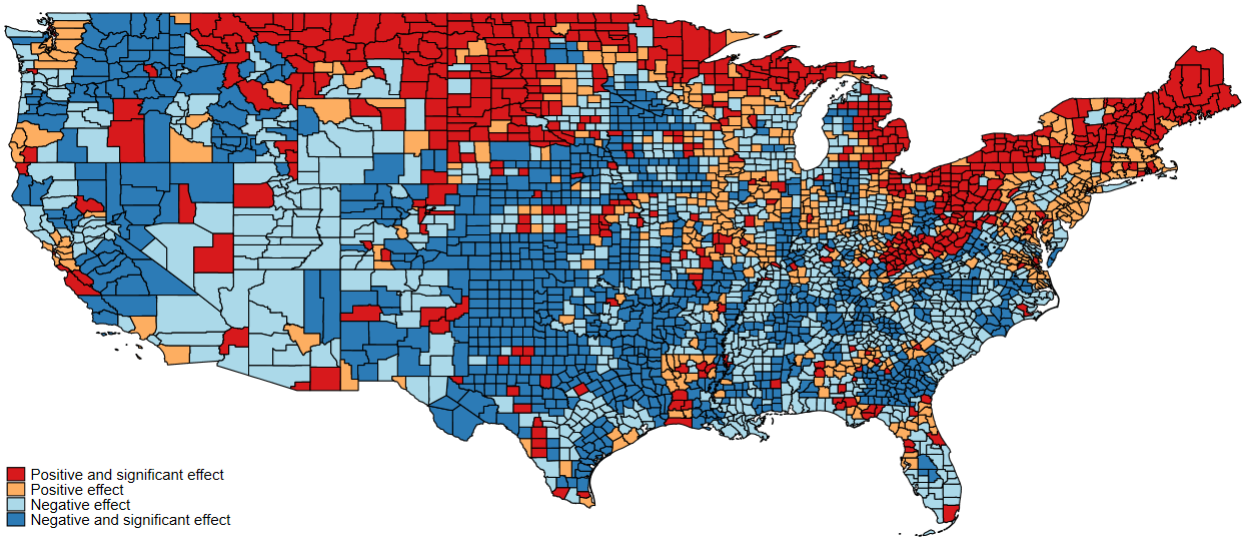
Notes: Each bar represents the Rotemberg weight for low- and high-skilled immigrants by country of origin as in Goldsmith-Pinkham et al. (2020).

Figure C7: The Effect of Immigration on Own Revenues, 1990-2010



Notes: The county-level impact is calculated using the estimated coefficients in column(4) of Panel (a) of Table 6 and the observed changes in the shares of low- and high-skilled immigrants over 1990-2010 period in that county. The shape file for the map is from the U.S. Census Bureau (2016).

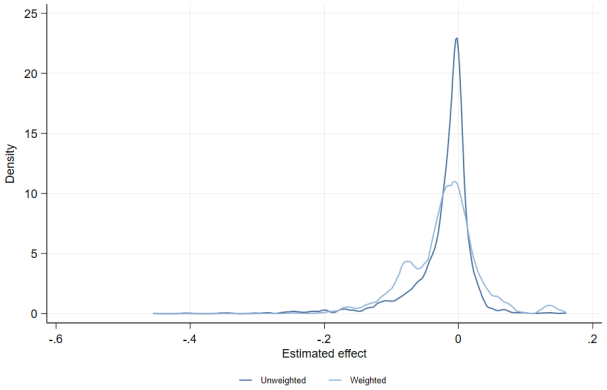
Figure C8: The Effect of Immigration on General Expenditures, 1990-2010



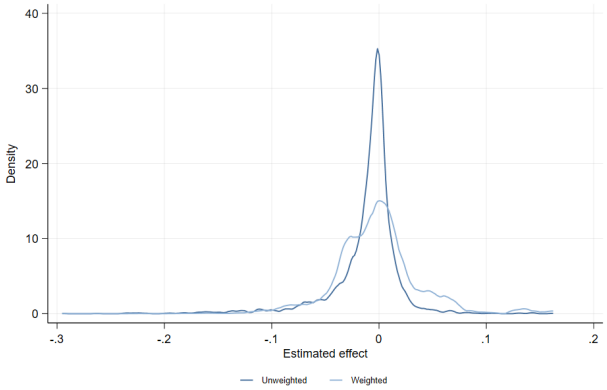
Notes: The county-level impact is calculated using the estimated coefficients in column(4) of Panel (b) of Table 6 and the observed changes in the shares of low- and high-skilled immigrants over 1990-2010 period in that county. The shape file for the map is from the U.S. Census Bureau (2016).

Figure C9: Estimated Fiscal Effects across U.S. Counties

(i) Own revenues



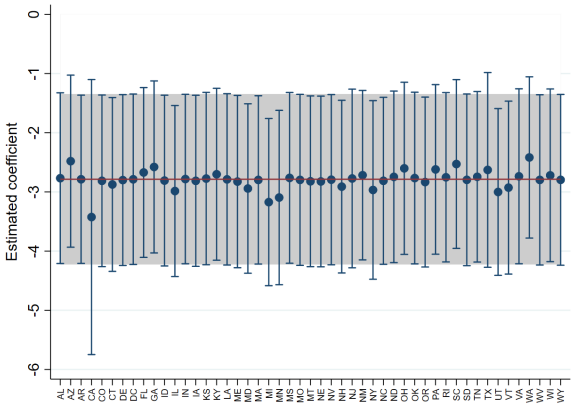
(ii) General expenditures



Notes: The histograms represent the estimated impact of the change in low- and high-skilled immigration over 1990-2010, on own revenues and general expenditure across counties, with and without population weights. All calculations are based on estimated coefficients from column (4) in Panels (a) and (b) of Table 6, for own revenues and general expenditures, respectively.

Figure C10a: Omit one State at a Time: IV estimates of Per-capita Own Revenues

(i) Low-skilled immigration share



(ii) High-skilled immigration share

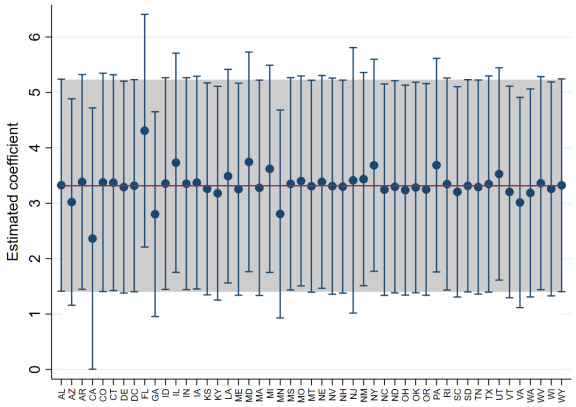
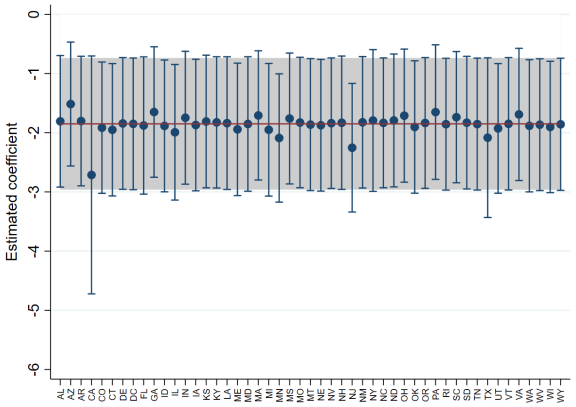
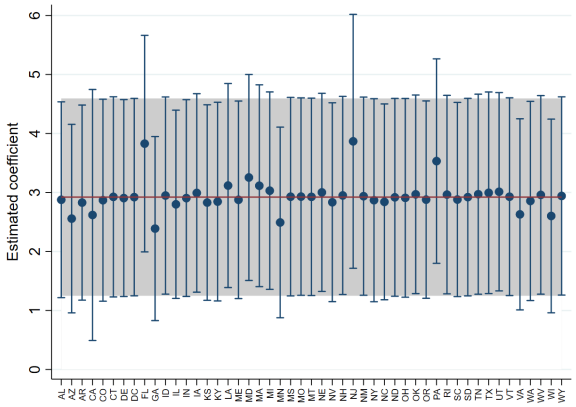


Figure C10b: Omit one State at a Time: IV estimates of Per-capita General Expenditures

(i) Low-skilled immigration share



(ii) High-skilled immigration share



Notes: Figures C10a and C10b plot the estimated coefficients when omitting one US state at a time from our baseline regressions in Table 4. Panel (i) shows the point estimates with 95 percent confidence intervals in bars of the share of low-skilled immigrants on the log changes in per capita own revenues (Figure C10a) and in per capita general expenditures (Figure C10b). Panels (ii) shows the estimated coefficients and the 95 percent confidence intervals in bars for the share of high-skilled immigrants on the log changes in per capita own revenues (Figure C10a) and in per capita general expenditures (Figure C10b). For comparisons, the figures include grey-shaded areas that show the 95 percent confidence interval with the baseline estimates of Table 4.