Closing the Border: The Impact of U.S. Migration and Trade Policy*

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Abstract

This paper quantifies the impact of recent U.S. migration policy on the aggregate economy and state-level outcomes using a general equilibrium trade model with heterogeneous firms and imperfect substitution between natives and immigrants. The analysis incorporates data on migration by legal status, skill composition, trade flows, and firm heterogeneity. Repatriating undocumented immigrants reduces U.S. GDP by 5.46% and natives' welfare by 2.46%, while repatriating temporary visa holders results in declines of 1.50% and 0.66%, respectively. Regional effects vary, reflecting differences in states' immigrant-to-population shares. Model-implied welfare losses from repatriating undocumented immigrants are almost twice that of recent tariff increases.

JEL Classifications: F12, F15, F22, F24

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1 Introduction

The last decade has brought renewed challenges to globalization, with migration emerging as a central point of contention. Large inflows of immigrants have generated economic, political, and social pressures. This phenomenon has been particularly acute in the United States, as it hosts more immigrants than any other country in the world, and this pattern has intensified over time: the U.S. immigrant-to-population share increased by four percentage points (pp) between 2000 and 2023.

The current administration has adopted more restrictive migration policies, taking a particularly firm stance on undocumented immigration and visa holders.[1] This paper quantifies the potential impacts of these restrictions on the U.S. and foreign economies, as well as explore the distributional consequences across U.S. states and workers with different skill levels. To do this, we build a general equilibrium trade model of the world economy that incorporates cross-country productivity differences, native and immigrant labor forces, remittances, multiple levels of skill, inter and intranational trade, tariffs, and heterogeneity in the size distribution of the firm, extending the work of di Giovanni, Levchenko and Ortega (2015). Importantly, our new framework also allows us to perform a quantitative analysis of changes in recent migration and trade policies jointly, as well as explore heterogeneous effects across U.S. regions.

We implement migration policy as the repatriation of immigrant workers back to their home countries. A change in a country's labor force affects the economy through standard neoclassical channels when natives and immigrants are imperfect substitutes, but also influences the number of firms and thus the variety of products available for consumption and intermediate usage. This extensive margin adjustment is quantitatively important in the model's "long-run" where the number of *potential* entrepreneurs adjusts, and in the model's "short-run" where only the *actual* number of existing firms adjusts. The reduction in the number of consumers and thus the market size will only affect the least productive ("marginal") firms in the short run, which will exit the export market and potentially also domestic production. However, the loss of these small firms has limited impacts on macroeconomic outcomes. In the long run, since the mass of potential entrepreneurs now changes, the fewer opportunities to discover the most productive entrepreneurs leads to a smaller number of high-performing firms in the economy.

We calibrate the model's baseline economy using newly assembled data on migration by legal status, skill composition, productivity, trade flows, and firm size for 2020. Given this baseline economy, we first calculate the benefits of immigration for the U.S. economy by repatriating all

[1] Executive Order 14159 ("Protecting the American People Against Invasion") signed immediately after inauguration targets undocumented immigrants for deportation through several mechanisms: expanded use of expedited removal (which allows for deportation without a court hearing), cut of federal funding to sanctuary jurisdictions, significant hiring increases of Immigration and Custom Enforcement and Custom and Border Protection, among others (Trump, 2025).

immigrants residing in the U.S. to their birth countries. This policy reduces the number of workers in the U.S. economy by 17.54% and leads to a fall in U.S. GDP and welfare for natives of 28.80% (16.86%) and 14.03% (1.38%) in the long (short) run, respectively. These results show that immigration gains are large for the U.S. economy and provide a baseline for comparing the potential losses resulting from different migration policies. We next examine the cross-sectional welfare implications across U.S. states (and Washington, D.C.). The states that lose the most in the long run are California, New York, Florida, and New Jersey; whereas Montana, West Virginia, South Dakota, and Mississippi lose the least. We further show that a state's initial immigrant-to-population share largely drives the relative welfare losses of the policy. Finally, we quantify the relative impact on high- and low-skilled natives and find that the relative wage of high-skilled natives falls by 1.80% relative to their low-skilled counterparts.

We then evaluate the welfare consequences of repatriating immigrants according to their legal status, particularly for undocumented immigrants and temporary residents (i.e., visa holders). They represent a quarter and a twentieth of the total immigrants in the U.S., respectively, and the aggregate declines in welfare and GDP are commensurate. However, the analysis of the cross-section shows clear differences in terms of the most affected U.S. states. When repatriating undocumented immigrants, Texas, Nevada, Hawaii, and California face welfare losses fifty percent higher than the national average. When repatriating temporary residents, Massachusetts and Washington, D.C. experience welfare losses twice as large as the national average.

Finally, we examine the impacts of repatriation when U.S. tariffs increase from 2020 to 2025 levels, equivalent to an aggregate rise of more than 18 pp. The resulting increase in marginal costs discourages firm entry, reducing the available varieties and amplifying the tariff-induced increase in domestic prices. Although U.S. GDP increases by 5.20%, as domestic firms' production replaces imports, average native welfare declines by 1.41% in the long run. The short-run impacts are similar due to the limited impact of tariffs on the extensive margin of firms. Compared to repatriation scenarios, the average welfare loss under the tariff increase is half (twice) the size as the repatriation of undocumented immigrants (temporary residents). However, U.S. states are differentially affected by migration and commercial restrictions, with Michigan, South Carolina, and Texas being the most affected by higher tariffs. When both policies are jointly implemented, we observe higher costs of repatriation than in our baseline estimates because the role of international trade as an adaptation mechanism is muted: the substitution from relatively expensive domestic goods to cheap foreign goods is eroded with higher tariffs.

Our work contributes to the literature that evaluates the economic and welfare consequences of migration restrictions using quantitative trade models. Caliendo, Opromolla, Parro and Sforza (2021) develops a multi-country dynamic general equilibrium model, with costly trade and forward-looking migration, to study the economic effects of the 2004 enlargement of the European Union.

Iranzo and Peri (2009) is the first paper to study migration with endogenous product variety in a neo-classical framework such as the one used in this paper. Aubry, Burzyński and Docquier (2016) calculates the effect of global migration on the welfare of non-migrant OECD citizens accounting for the interactions between the labor market, fiscal, and market size effects of migration. Cravino, Levchenko, Ortega and Pandalai-Nayar (2025) quantifies the regional impact of deporting undocumented migrants. Their analysis is more granular than our work in terms of occupation- and sector-level analysis, but omits the impact of trade on equilibrium outcomes. By extending the framework of di Giovanni et al. (2015), we are able to study the impact of migration restrictions both at a global and subnational level for the United States along with the impact of recent changes in trade policy. Additionally, our paper connects to the current analysis of higher U.S. tariffs from *Liberation Day* (Caliendo, Kortum and Parro, 2025; Ignatenko, Lashkaripour, Macedoni and Simonovska, 2025; Rodríguez-Clare, Teti, Ulate, Vásquez and Zárate, 2025).

The remainder of the paper is organized as follows. Section 2 presents the multi-region heterogeneous firm model of production and trade. Section 3 describes its parameterization and the data sources. Section 4 discusses the impact of immigration restrictions on the U.S. economy and their distributional impacts across states and skill levels. Section 5 concludes and a Supplemental Appendix delves into the derivation of the theoretical framework, the numerical algorithm to solve it, the quantification of the model, and additional results.

2 Theoretical Framework

Our framework is based on di Giovanni et al. (2015): a multi-country heterogeneous firm model of production and trade, encompassing labor productivity differences between locations and skill levels, as well as remittances. We extend this model to incorporate subnational heterogeneity within the United States and the impact of tariffs. The derivation of the model is presented in Supplemental Appendix A.

2.1 Preferences

The world economy is partitioned into $\mathcal{I}$ locations, indexed by i, j. Locations can represent U.S. states or Rest of the World (RoW) regions. In each location i, households use their nominal income y_i to maximize the consumption of tradable T and non-tradable N goods. Their indirect utility function can be written as:

$$u_i = \frac{y_i}{\left(P_i^N\right)^{\alpha}\left(P_i^T\right)^{1-\alpha}}, \tag{1}$$

where α is the relative consumption weight for non-tradable goods, and P_i^s is the ideal price index of sector s. Sectoral consumption is a CES aggregate across varieties, which are produced by domestic and foreign (in the case of tradable) firms. Thus, the ideal price index of sector s is given by:

$$P_i^s = \left(\sum_{j=1}^{\mathcal{I}} \int_{J_{ij}^s} p_{ij}^s(k)^{1-\varepsilon^s} \, \mathrm{d}k \right)^{\frac{1}{1-\varepsilon^s}}, \tag{2}$$

where ε^s denotes the elasticity of substitution across varieties in sector s, J_{ij}^s is the mass of varieties available in sector s and location i coming from j, and $p_{ij}^s(k)$ is the price of variety k.

2.2 Technology

In each location j and sector s, there is a mass of entrepreneurs I_j^s. Each entrepreneur k has the ability to produce a differentiated variety, which confers them market power. They thus operate in a monopolistic competitive environment, where the demand for variety k in location i from location j is given by:

$$x_{ij}^s(k) = X_i^s \left(\frac{p_{ij}^s(k)}{P_i^s} \right)^{1-\varepsilon^s}, \tag{3}$$

where X_i^s represents the aggregate expenditure of location i for goods of sector s.

Production uses equipped labor and intermediate non-tradable and tradable inputs, which are aggregated according to a Cobb-Douglas structure. The marginal cost of production is given by:

$$c_j^s = w_j^{\beta^s} \left[\left(P_j^N\right)^{\eta^s} \left(P_j^T\right)^{1-\eta^s} \right]^{1-\beta^s}, \tag{4}$$

where β^s and η^s represent the contribution of labor to production and the contribution of non-tradabable goods to total intermediate inputs, respectively. The variable w_j is the wage per unit of equipped labor, and P_j^s is the sectoral ideal price index from equation (2).

Entrepreneurs' ability is heterogeneous and drawn from a Pareto distribution, $G^s(a) = (b^s a)^{\theta^s}$, with scale b^s and shape θ^s. More precisely, a represents the input bundle required to produce one unit of input; thus, more productive entrepreneurs display lower a. Each entrepreneur must incur a fixed cost to start production, f_{jj}^s. The combination of heterogeneous ability and fixed production costs imply that only the most productive entrepreneurs operate. Moreover, in the tradable sector T, entrepreneurs must incur a fixed cost to export, f_{ij}^T. Fixed export costs are strictly greater than fixed production costs for locations in different countries and are equal for locations in the same country. In addition, there are iceberg bilateral trade costs when selling to other locations, so that $\tau_{ij}^s \geq 1$ represents the quantity of goods that need to be sent from j so that i receives one unit. The variable trade costs are equal to one when origin and destination are the same; and are strictly greater than one, otherwise.[2] Goods imported by i from j have to pay an ad-valorem tariff rate t_{ij}^s over unit prices.

[2]Fixed trade costs are associated with country-level customs regulations and inspections, and variable trade costs with the physical cost of shipping goods over space (even within the same country).

Each entrepreneur k in location j maximizes profits of serving market i with marginal cost $(1+t^s_{ij})\tau^s_{ij}c^s_j a(k)$.[3] From the optimality conditions, prices and variable profits of serving market i from location j are:

$$p^s_{ij}(k) = \left(\frac{\varepsilon^s}{\varepsilon^s - 1}(1+t^s_{ij})\tau^s_{ij}c^s_j a(k)\right), \tag{5}$$

$$\pi^s_{ij}(k) = \left(\frac{X^s_i}{\varepsilon^s(1+t^s_{ij})}\right)\left(\frac{\varepsilon^s}{\varepsilon^s - 1}\frac{(1+t^s_{ij})\tau^s_{ij}c^s_j a(k)}{P^s_i}\right)^{1-\varepsilon^s}. \tag{6}$$

With the presence of fixed trade costs and heterogeneous ability, only a subset of entrepreneurs in j serves market i. More precisely, only those entrepreneurs for which $\pi^s_{ij}(k) \geq c^s_j f^s_{ij}$ holds. Consequently, the ability threshold a^s_{ij} below which entrepreneurs in j serve market i is characterized by:

$$a^s_{ij} = \left(\frac{\varepsilon^s - 1}{\varepsilon^s}\frac{P^s_i}{(1+t^s_{ij})\tau^s_{ij}c^s_j}\right)\left(\frac{X^s_i}{\varepsilon^s(1+t^s_{ij})c^s_j f^s_{ij}}\right)^{\frac{1}{\varepsilon^s - 1}}. \tag{7}$$

2.3 Equipped labor and workers composition

We allow for several layers of heterogeneity in worker type. Workers in each location are differentiated by their birthplace and skill level. We denote N^e_{ji} as the mass of workers residing in j who were born in i and have skill level e. Skill is classified into two categories: low ℓ and high h.

Equipped labor, L_j, is a CES composite of low- and high-skilled workers:

$$L_j = A_j\left[\left(L^\ell_j\right)^{\frac{\sigma-1}{\sigma}} + \left(\mu_j L^h_j\right)^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}}, \tag{8}$$

with elasticity of substitution σ. The parameters A_j and μ_j represent the aggregate productivity and the skill productivity gap, respectively. Within each skill category, natives and immigrants are, in turn, aggregated by a CES structure:

$$L^e_j = \left[\left(\sum_{i\in\mathcal{C}(j)} N^e_{ji}\right)^{\frac{\lambda^e-1}{\lambda^e}} + \left(\varphi^e_j \sum_{i\notin\mathcal{C}(j)} N^e_{ji}\right)^{\frac{\lambda^e-1}{\lambda^e}}\right]^{\frac{\lambda^e}{\lambda^e-1}}, \tag{9}$$

with elasticity of substitution λ^e. The function $\mathcal{C}(j)$ denotes the country to which location j belongs, and the parameter φ^e_j represents the immigrant productivity gap.[4]

[3] Note that for non-tradable goods, $t^N_{ij} = 0$ for all i, j, and $\tau^N_{ij} \to \infty$ if $i \neq j$, and $\tau^N_{ij} = 1$ otherwise.

[4] This notation implicitly assumes that natives across different U.S. states are perfect substitutes, and that immigrants across different RoW regions are also perfect substitutes. Additionally, we assume that $j = \mathcal{C}(j)$ if j is a RoW region and $j \subset \mathcal{C}(j) =$ U.S. if j is a U.S. state.

2.4 Equilibrium

Location j's income is the sum of labor income $w_j L_j$, profits in both sectors $\Pi_j^N + \Pi_j^T$, tariff revenue Υ_j and net remittances R_j, where aggregate profits in sector s are:

$$\Pi_j^s = \sum_{i=1}^{\mathcal{I}} \int_{J_{ij}^s} \left(\pi_{ij}^s(k) - c_j f_{ij}^s\right) \mathrm{d}k, \tag{10}$$

tariff revenue is:

$$\Upsilon_j = \sum_{i=1}^{\mathcal{I}} \int_{J_{ji}^s} t_{ji}^T \left(\frac{x_{ji}^T(k)}{1 + t_{ji}^T}\right) \mathrm{d}k, \tag{11}$$

and net remittances is the difference of remittances received minus those sent to other countries. Because of remittances, trade is not balanced.

Income for individuals residing in j who were born in i and have skill level e is composed by: labor income (which varies across i and e given the imperfect substitutability across birthplaces and skill levels), profits of the firms in the two sectors and tariff revenue (which are rebated homogeneously across residents in j), and remittances (for natives, remittances are positive as they receive them; but for immigrants, they are negative as they send them to their places of birth).[5]

To close the model, we consider two definitions of an equilibrium, which differ in their assumptions on the mass of entrepreneurs I_j. In the short-run equilibrium, the mass of entrepreneurs is fixed; whereas in the long-run, it is determined endogenously. Specifically, before learning their ability, agents must pay an exploration cost F_j^s to become an entrepreneur. Agents will enter the market until the expected profit per entrepreneur equals the exploration cost:

$$\frac{\Pi_j^s}{I_j^s} = c_j^s F_j^s. \tag{12}$$

This difference in the short- and long-run equilibria has important implications in terms of how firms adjust to repatriation shocks, and the overall impact on natives' welfare. The algorithm to solve the model is shown in Supplemental Appendix B.

3 Data and model quantification

We quantify our model for the year 2020. We consider a geographical resolution of 50 U.S. states and Washington, D.C., and 8 RoW regions: Canada (CAN), Mexico (MEX), Latin America (LAT), Europe (EUR), Africa (AFR), South and Central Asia (IND+), East Asia (CHN+), and Oceania

[5] We make two assumptions about the distribution of remittances. First, remittances from abroad (i.e., incoming remittances) are distributed among native residents and not among immigrants. Second, remittances sent abroad (i.e., outgoing remittances) are transferred by immigrants and not by natives.

and South East Asia (OCE). We divide skill levels into low and high, where the latter refers to adults whose highest educational attainment is at least one year of college. We define the tradable sector as agriculture, mining, and manufacturing; and non-tradable as all of the other sectors. A detailed discussion of data sources and model quantification is presented in Supplemental Appendix C.

3.1 Migration and remittances

We define immigrants as adults (i.e., individuals aged 15 years or older) whose country of birth is different from their country of residence, irrespective of their legal status. We take the number of adults, N_{ji}^{e}, by country of residence j, country of birth i, and level of skill e from Artuc et al. (2023). To disaggregate the United States at the subnational level, we use the 5-year sample of the 2020 American Community Survey (ACS) to construct the number of adults residing in each U.S. state by birthplace (i.e., U.S. state or RoW region) and skill level (Ruggles et al., 2025).[6]

At the national level, 17.54% of adults are immigrants. However, there is a large degree of heterogeneity at the subnational level: in California, Florida, New Jersey, and New York this share is higher than 27%, but in Mississippi, Montana, and West Virginia it is lower than 4%. Heterogeneity is also present by skill level, because immigrants are, on average, less skilled than natives: 51% of immigrants are high-skilled, while this percentage is 60% for natives.

We further classify immigrants into four mutually exclusive legal-status categories: (i) undocumented immigrants, (ii) temporary residents (i.e., visa holders), (iii) permanent residents (i.e., green card holders), and (iv) naturalized citizens. We first distinguish documented (i.e., temporary residents, permanent residents, or naturalized citizens) from undocumented immigrants by implementing the residual method of Borjas and Cassidy (2019), where an immigrant is classified as documented if any of the following holds: arrival before 1980, naturalized citizenship, receipt of public benefits (e.g., SSI), veteran status, employment in the armed forces or government, Cuban origin, employment in licensed or credentialed occupations, being the spouse, child, or grandchild of a native-born or already-legal household member, or meeting the H1-B criteria.[7] We then classify documented immigrants into temporary residents, permanent residents, or naturalized citizens, as in FWD.us (2024). Temporary residents are F-1, H-1B, H-2A, or H-2B visa holders, who are characterized by their country of birth, occupation, years since migration, schooling, and age. Naturalized citizens are those reporting American citizenship. Permanent residents are the remaining documented noncitizens. Our estimates, displayed in Table 1, indicate that at the national level, 21% of immigrants are undocumented, 4% are temporary residents, 24% are permanent residents,

[6] We assume that for each RoW region, the share of adults born in each U.S. state relative to the national level is equal to the share of adults residing in that U.S. state relative to the national level.

[7] An immigrant meets the H1-B criteria if all of the following hold: migration within the last six years, employment in specialty occupations, and at least a bachelor's degree.

and 51% are naturalized citizens.[8]

Table 1. U.S. immigrant-to-population by legal status

Legal status	Immigrant share (in %)
Undocumented immigrants	3.68
	[1.88, 4.42]
Temporary residents (visa holders)	0.74
	[0.54, 0.99]
Permanent residents (green card holders)	4.23
	[2.05, 6.39]
Naturalized citizens	8.89
	[4.19, 16.27]
All immigrants	17.54
	[8.62, 27.93]

Notes: This table reports the U.S. immigrant-to-population ratio for each legal status. The first row of each legal status lists the aggregate share for the U.S. economy, while the second row presents the 25th and 75th percentiles of the share across U.S. states (italicized and in brackets). The shares are calculated using data covering the period 2016-2020. Source: Authors' calculations using data from the ACS (Ruggles et al., 2025) and legal status classification from Borjas and Cassidy (2019) and FWD.us (2024).

While it broadly mirrors the geography of total immigrants, the distribution of immigrants by legal status exhibits a couple of interesting features. First, Nevada and Texas show a particularly large number of undocumented immigrants (more than 6.50% of their population and 25% of all their immigrants), due to their prominent construction and hospitality sectors and their proximity to Mexico. Second, Massachusetts and Washington, D.C. display a relatively high number of temporary residents (more than 1.50% of their population and 8% of all their immigrants), due to the high number of universities, federal government agencies and international organizations.

Finally, we take cross-country bilateral remittances R_{ji} from the World Bank (2022). To disaggregate the data for the United States at the subnational level, we use the Migration Supplement of the 2008 Current Population Survey to construct the state-level total value of remittances received or sent abroad (Flood et al., 2024). Since the questionnaire does not specify the country of origin or destination of remittances, we construct bilateral remittances between the U.S. states and RoW regions as the U.S. remittances with each RoW times the state's share of total U.S. remittances.[9]

3.2 Productivity

We set the immigrant productivity gap φ_j^e to replicate the relative wages of immigrants to natives, conditional on skill level. The ACS indicates that low-skilled native workers earn, on average,

[8]Similarly, Passel and Krogstad (2024) estimates that for the year 2022, on average, 23% of immigrants are undocumented, 4% are temporary residents, 24% are permanent residents, and 49% are naturalized citizens.

[9]In the bilateral remittance matrix, we assume no remittances if both origin and destination belong to the same country (i.e., $R_{ji} = 0$ if $\mathcal{C}(i) = \mathcal{C}(j)$).

16% more than their immigrant counterparts;[10] however, this pattern is reversed for high-skilled workers, as average natives earn 10% less than their immigrant counterparts. We choose the skill productivity gap μ_j to replicate that high-skilled workers earn, on average, 80% more than low-skilled workers. Finally, we calibrate the aggregate productivity A_j to match GDP in each location.

3.3 Trade

Tariffs and variable trade costs We take effective bilateral tariffs from Rodríguez-Clare et al. (2025), which provide estimates of U.S import tariffs and tariffs faced by U.S. exporters at the product-level. We then aggregate across products and from country to RoW region level using the trade flows for the year 2017 as weights.[11]

We use bilateral trade flows between countries from CEPII Trade and Production Data (Mayer, Santoni and Vicard, 2023). To account for subnational heterogeneity within the United States, we employ information from the Bureau of Transport Statistics (2025), which provides data on trade flows between U.S. states, from U.S. states to RoW regions, and from RoW regions to U.S. states. We construct symmetric variable trade costs, $\tau_{ij} = \tau_{ji}$, which replicate the observed relative trade patterns following the approach of Head and Ries (2001).

Fixed trade costs and exploration costs To construct bilateral fixed production and trade costs, f_{ij}^s, we utilize the Cost of Doing Business (World Bank, 2020), which provides country-level information on the administrative cost to set up a firm, export, and import. To obtain variation at the subnational level in the United States, we scale these costs based on firm density (i.e., number of firms per population).[12] Finally, we normalize the sector-level fixed costs to match the number of U.S. firms in the tradable (1.1 millions) and non-tradable (5.3 millions) sectors (U.S. Census Bureau, 2023) and pick the sector-specific exploration cost so that all potential entrepreneurs become active firms. Although our quantification only matches the total number of firms, the model is successful in replicating the untargeted distribution of firms across U.S. states.[13]

4 Scenario Analysis

We compare our benchmark economy in the long-run equilibrium with a battery of counterfactuals that repatriate all or a fraction of immigrants, depending on their legal status, back to their places of birth. We also evaluate these impacts under higher tariffs. When households are repatriated,

[10] Ortega and Hsin (2022) argue that wage gaps between documented and undocumented workers reflect employer exploitation, endogenous occupational sorting, and productivity losses associated with lack of legal status.

[11] Since the main country of interest is the United States, we assume no bilateral tariffs across RoW regions.

[12] Specifically, we construct the bilateral fixed trade costs as the geometric mean of the cost to export and import, relative to the production cost; for the non-tradable sector, the fixed cost is simply the production cost.

[13] The correlation between observed and predicted number of firms for across U.S. states is higher than 99% for both the non-tradable and tradable sector.

the domestic economy experiences two changes. First, a reduction in the number of immigrants in the United States contracts the supply of equipped labor in the domestic economy and increases it in the Rest of the World.[14] Second, outgoing remittances from the U.S. to other countries decline proportionally to the change in immigrant population.

Our main outcomes of interest are the change in GDP, consumer price index, and welfare in the long-run equilibrium. We interpret welfare at the U.S. state level as the utility of natives (regardless of their U.S. state of birth). Supplemental Appendix D delves into our definition of welfare and presents additional results, including the short-run equilibrium.

4.1 Repatriation of all immigrants

We first present the most extreme scenario of repatriation of all immigrants to lay out the mechanisms at play. This scenario also underscores the gains from international migration, that is, the benefits that the U.S. economy experiences when immigrants interact with natives relative to an economy with closed borders.[15]

U.S. and RoW aggregate impact The repatriation of all immigrants in the United States back to their birthplace leads to a national average welfare loss for U.S. natives in the long-run equilibrium of 14.03%. To explain the mechanisms driving down welfare, recall that native's utility is defined as real income, where income is the sum of labor income plus tariff revenue plus incoming remittances. Fewer people working in the United States naturally contracts the labor supply, increasing wages. The rise in the marginal cost of production from higher wages results in higher prices and larger productivity thresholds above which firms can produce and export, which causes the least productive firms to exit. The decline in the number of firms leads to a reduction in the available product varieties for consumption and intermediate materials. Losing these marginal varieties adds an upward (but limited) pressure to prices. Holding the mass of entrepreneurs as fixed (i.e., short-run equilibrium), the welfare losses of repatriation would be more muted (1.38%) as the increase in prices would be counteracted with a larger wage.

The key addition to our analysis relative to the neoclassical migration literature is the endogenous product variety channel. When we allow the mass of entrepreneurs to respond to the repatriation (i.e., long-run equilibrium), the lower demand for tradable and non-tradable goods pushes profits per entrepreneur downward, discouraging entry. Unlike the short-run equilibrium, now the exit of firms occurs along the entire productivity distribution rather than only among the least productive ones. The smaller mass of entrepreneurs shrinks the number of available varieties,

[14]We assume that the immigrants repatriated to their birthplace operate with the labor productivity of natives in the corresponding countries.

[15]We can interpret the gains from international migration in a similar way the trade literature compares the benchmark economy with one in autarky.

reinforcing the increase in prices. Overall, the price index for consumption increases by 0.41% compared to the economy without repatriation. The lower demand for goods reduces the demand for labor, diminishing wages. Hence, our model features both a contraction of labor supply and labor demand. In our quantitative model, the latter effect dominates and average nominal income for natives decrease by 13.68%. In summary, the decline in wages and the strengthened increase in prices, originated by the endogenous decline in the number of varieties, explain the substantial fall in long-run welfare.

Foreign economies experience the opposite effects as in the U.S. economy, as shown in panel (b) of Figure 1: the increase in the labor supply and the increase in the demand for goods lead to higher GDP and lower prices. These positive effects on welfare are attenuated by the drop in incoming remittances in the RoW regions. Mexico stands out as an economy largely impacted by the readmission of nationals: the number of workers increases by almost 12%, leading to a 16% rise in GDP and 2% welfare improvement. At the opposite end, the effects on Africa are negligible because the number of workers in these locations increases by less than 0.30%.

Heterogeneous impacts within the U.S. Our quantification allows us to explore the heterogeneous long-run welfare losses at the U.S. subnational level. As illustrated in panel (a) of Figure 1, all U.S. states are worse off with repatriation, but there is a substantial degree of heterogeneity: California, New York, Florida, and New Jersey undergo losses greater than 19%. At the opposite extreme, Montana, West Virginia, South Dakota, and Mississippi experience losses of no more than 6%. In other words, the most affected U.S. states in the long run are those with the largest immigrant-to-population shares. When migrants are repatriated, those regions experience the starkest decline in the mass of entrepreneurs and consequently in the labor demand which pushes down natives' income and depresses welfare. In contrast, in the short run, the U.S. states that are hit hardest differ markedly from those in the long run, as the rankings of welfare losses are in fact negatively correlated. In the short-run equilibrium, the U.S. states with larger immigrant-to-population ratios experience a relatively smaller drop in labor demand because only marginal firms exit, whereas in the long run the exit occurs along the whole firm distribution.

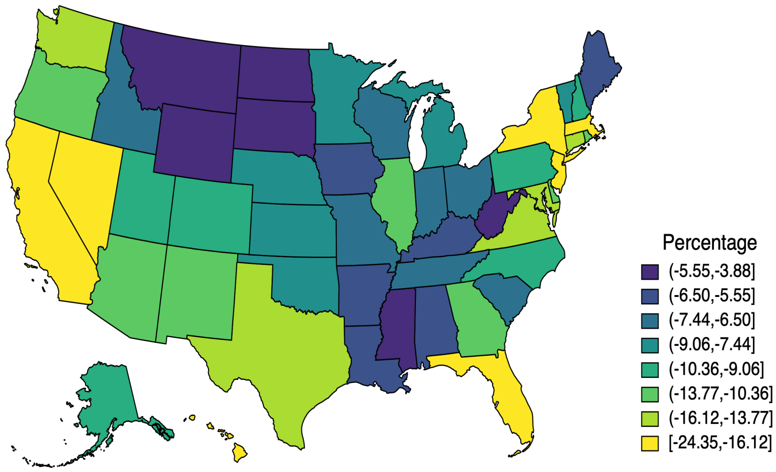
Although welfare losses are highly correlated across skill levels, high-skilled natives experience larger welfare losses than their low-skilled counterparts.[16] Since native workers are, on average, more skilled than their immigrant counterparts, when the latter are repatriated, the ratio of high-to-low-skilled workers increases and thus we observe a decline in the wage skill premia of 1.80%.[17]

[16] As a consequence of the strong correlation (95%) between low- and high-skill immigrant-to-population shares across U.S. states, the welfare losses between skill types also display a high correlation (99%).

[17] Caiumi and Peri (2024) find that immigration, thanks to native-immigrant imperfect substitutability and college skill content of immigrants, had a positive and significant effect between +1.70% to +2.60% on wages of less skilled native workers, over the period 2000-2019 and no significant wage effect on college skilled natives. Our estimate of the skill premia lies within their range.

Figure 1. Welfare change under repatriation of all immigrants in the long-run equilibrium

(a) By U.S. state



(b) By RoW region

RoW region	Δ% Welfare
AFR	−0.02
CAN	0.15
CHN+	1.49
EUR	1.00
IND+	0.14
LAT	2.21
MEX	2.13
OCE	0.39
USA	−14.03

Notes: This figure reports the percentage change in welfare in the long-run counterfactual in which all immigrants are repatriated to their birthplace relative to the baseline equilibrium by U.S. state in panel (a) and by RoW region in panel (b). The RoW regions are: Africa (AFR), Canada (CAN), East Asia (CHN+), Europe (EUR), South and Central Asia (IND+), Latin America (LAT), Mexico (MEX), and Oceania and South East Asia (OCE). The measure of welfare is average income (labor income plus tariff revenue plus incoming remittances) of natives across skill levels relative to the consumer price index. Source: Model output.

4.2 Repatriation by legal status

Previously, we explored the results of repatriating all immigrants. We now perform a series of more nuanced exercises in which we repatriate a fraction of the immigrants according to their legal status and evaluate their long-run welfare consequences.[18] We follow the classification of immigrants of Table 1 and show the impacts of repatriation by legal status in panel A of Table 2. The first and second rows indicate the effects of exclusively repatriating the undocumented immigrants and temporary residents, which represent roughly a quarter and a twentieth of the total immigrants in the U.S., respectively. Naturally, the declines in average native's welfare (2.46% and 0.66%) and GDP (5.46% and 1.50%) are commensurate to the size of immigrants repatriated, as the same mechanisms are at work, they simply have a different magnitude. As we gradually extend the coverage of repatriation, welfare and GDP losses and price increases monotonically deteriorate relative to the scenario of repatriating only undocumented immigrants. When both undocumented workers and temporary residents are repatriated, U.S.-born worker welfare falls an additional 0.67 pp. Adding permanent residents causes welfare to drop another 3.09 pp. Finally, repatriating naturalized citizens reduces welfare by an additional 7.81 pp.

The analysis of the cross-section, displayed in Figure 2, shows clear differences in terms of

[18] When we repatriate a fraction of immigrants, we assume that remittances decrease proportionally with the share of immigrants repatriated, irrespective of their legal status or skill level.

the most affected U.S. states. When repatriating undocumented immigrants only, Texas, Nevada, Hawaii, and California suffer welfare losses of roughly 4% (which are 50% larger than the national average). When repatriating temporary residents only, Massachusetts and Washington, D.C. face welfare losses larger than 1.20% (which are twice as large as the national average). As expected, the size of the U.S. state-level welfare losses reflects the relative size of immigrants in population.

Table 2. Impact of repatriation in the U.S. in the long-run equilibrium

Panel A. By legal status

Repatriation/Trade Scenario	Δ% Population	Δ% Welfare	Δ% GDP	Δ% Price Index
Undocumented	−3.68	−2.46	−5.46	0.08
Temporary	−0.74	−0.66	−1.50	0.00
Undocumented+Temporary	−4.42	−3.13	−6.93	0.08
Undocumented+Temporary+Permanent	−8.65	−6.22	−13.48	0.20
All immigrants	−17.54	−14.03	−28.80	0.41

Panel B. By legal status and higher tariffs

Repatriation/Trade Scenario	Δ% Population	Δ% Welfare	Δ% GDP	Δ% Price Index
Tariffs	0.00	−1.41	5.20	6.71
Tariffs+Undocumented	−3.68	−3.89	−0.60	6.79
Tariffs+Temporary	−0.74	−2.08	3.61	6.71
Tariffs+Undocumented+Temporary	−4.42	−4.56	−2.16	6.79

Notes: This table reports the percentage change of number of population, welfare, GDP, and the price index in the long-run counterfactual relative to the baseline equilibrium by legal status in panel (a) and by legal status with higher tariffs in panel (b). Tariffs increased, on average, 18.31 pp from 2020 to 2025. The measure of welfare is the average income (labor income plus tariff revenue plus incoming remittances) of natives across skill levels relative to the consumer price index. The price index is a Cobb-Douglas aggregate of the prices of non-tradable and tradable goods. Source: Model output.

4.3 Repatriation under higher tariffs

We now examine the impacts of repatriation in an environment with higher tariffs. Specifically, we increase U.S. tariffs from 2020 to 2025 levels with no retaliation from the RoW regions. On average, U.S. import tariffs escalated by 18.31 pp, but with large heterogeneity across countries: U.S. imports from South East Asia and Canada experienced tariff increases of 29.05 pp and 19.98 pp, respectively.[19]

Panel B of Table 2 shows the joint impact of migration and commercial restrictions. The first row displays the effect of higher tariffs only, which translates into higher prices in the tradable sector, as well as in the non-tradable sector due to the input-output structure. The consequent increase in marginal costs discourages entry, reducing the set of domestic varieties and thereby amplifying the

[19] We assume no retaliation as tariffs on U.S. exports rose, on average, 1.07 pp during this period.

resulting increase in prices. Although tariffs successfully reallocate production toward the United States, raising U.S. GDP by 5.20%, average native long-run welfare declines by 1.41%, as higher prices outweigh the increase in nominal income (including the tariff rebate). The short-run effects are of similar magnitude: GDP increases by 6.20% and average native welfare declines by 0.93%. The differences between short- and long-run outcomes under commercial restrictions are modest because tariffs shift demand from foreign to domestic goods, which attenuate the decline in average profits and, consequently, in the mass of local entrepreneurs.

Compared to the repatriation scenarios, the long-run average welfare loss under the tariff increase is half (twice) the size as the repatriation of undocumented immigrants (temporary residents).[20] However, U.S. states are differently affected by migration and commercial restrictions, with Michigan, South Carolina, and Texas standing out as the most affected U.S. states, facing welfare losses higher than 2%. Figure 2 compares the welfare losses of higher tariffs with undocumented immigrants in panel (a) and temporary residents in panel (b). The green (purple) region illustrates the U.S. states that undergo larger (smaller) losses with migration than with commercial restrictions. To exemplify the heterogeneous effects of these policies, consider Texas and Hawaii, U.S. states with a similar and vast mass of undocumented immigrants, which experience large welfare losses from repatriation. To the extent that the former is specialized in the production of tradable goods and thus relatively open to trade with foreign economies, the welfare losses from higher tariffs in Texas are four times larger than those in Hawaii, a U.S. state specialized in non-tradable services and consequently relatively closed.

Finally, the last three rows in panel B of Table 2 evaluate the joint implementation of migration and commercial restrictions. The decline in welfare is larger than the sum of the two separate policies, reflecting that repatriation and tariffs reinforce each other. When immigrants are repatriated, the decrease in the number of firms increases domestic prices but lower foreign prices. As tariffs rise, foreign goods become more expensive, limiting the ability of U.S. households and firms to substitute away from costly domestic goods. Consequently, with higher tariffs, the role of trade as an adaptation mechanism erodes and welfare losses deepen.

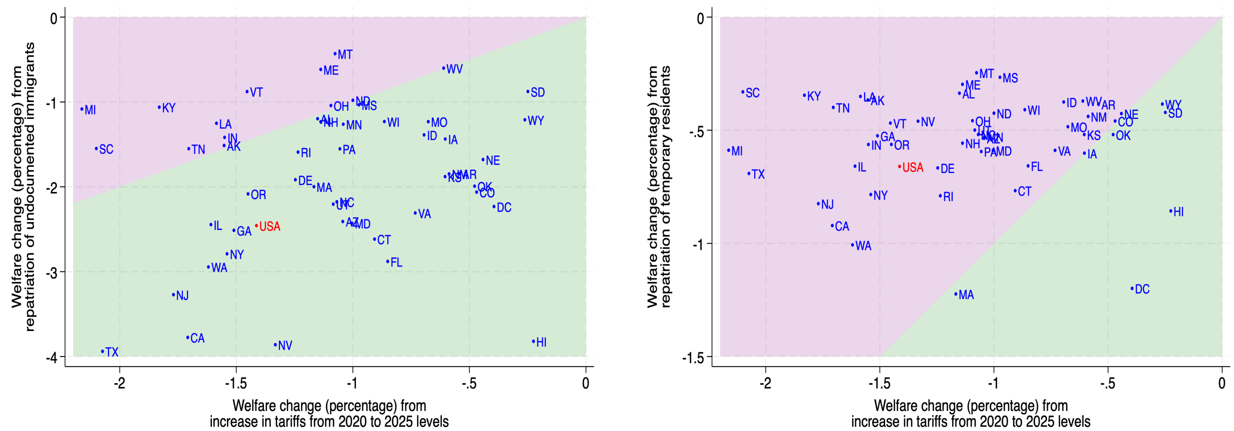
5 Conclusion

We conclude by highlighting some lines of future research. First, we assume no household mobility across U.S. states. To the extent that repatriation yields heterogeneous effects at the subnational level, real income differentials create incentives for households to reallocate over space. Consequently, within-U.S. dispersion and average welfare losses would be smaller when allowing costly

[20]In the short run, tariff increases generate welfare losses an order of magnitude larger than those from repatriating undocumented immigrants or temporary residents. The short-run welfare losses under repatriation by legal status are more muted because the contraction of labor supply (from fewer workers) and that of labor demand (from fewer customers which induce fewer firms) are roughly of a similar magnitude.

Figure 2. Welfare change under migration and commercial restrictions in the U.S. in the long-run equilibrium

(b) Undocumented immigrants and higher tariffs *(b) Temporary residents and higher tariffs*



Notes: This figure reports the percentage change in welfare by U.S. state in the long-run counterfactual in which undocumented immigrants are repatriated (vertical axis) and tariffs increase from 2020 to 2025 levels (horizontal axis). The green (purple) area shows the region in which welfare losses from migration restrictions are larger (smaller) than those from commercial restrictions. The measure of welfare is the average income (labor income plus tariff revenue plus incoming remittances) of natives across skill levels relative to the consumer price index. Source: Model output.

mobility decisions.[21] Second, immigration shifts the spatial distribution of population and economic activity by affecting the benefits and costs of density. These agglomeration and congestion externalities can take many forms, like improvements in productivity from highly skilled migrants or higher competition for public amenities. The direction of welfare due to immigration restrictions will depend on the relative strength of these two forces. Third, we assume that natives and immigrants draw their entrepreneurial ability from the same distribution and thus contribute proportionally to the total number of firms. Chodavadia et al. (2024) and Azoulay et al. (2022) argue that immigrants play a more prominent role in the creation of new business relative to natives. Emphasizing the role of immigrants as job creators is expected to deepen the welfare losses of repatriation.

[21] Jones et al. (2025) find that the share of adults in the U.S. that move across states is less than 1.50%. Incorporating mobility decisions is expected to have a limited role in our quantitative results, as argued by Cravino et al. (2025).

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Supplemental Appendix

Closing the Border: The Impact of U.S. Migration and Trade Policy

José-Luis Cruz and Julian di Giovanni

Appendix A Derivations of the theoretical framework

Prices Recall the expression for the ideal price index, equation (2), and insert the variety-level price, equation (5):

$$
\begin{aligned}
P_i^s &= \left(\sum_{j=1}^{\mathcal{I}} \int_{J_{ij}^s} p_{ij}^s(k)^{1-\varepsilon^s} \, \mathrm{d}k \right)^{\frac{1}{1-\varepsilon^s}} \\
&= \left(\sum_{j=1}^{\mathcal{I}} \int_{J_{ij}^s} \left(\frac{\varepsilon^s}{\varepsilon^s - 1} (1+t_{ij}^s) \tau_{ij}^s c_j^s a(k) \right)^{1-\varepsilon^s} \mathrm{d}k \right)^{\frac{1}{1-\varepsilon^s}} \\
&= \left(\sum_{j=1}^{\mathcal{I}} I_j^s \int_0^{a_{ij}^s} \left(\frac{\varepsilon^s}{\varepsilon^s - 1} (1+t_{ij}^s) \tau_{ij}^s c_j^s a \right)^{1-\varepsilon^s} \mathrm{d}G^s(a) \right)^{\frac{1}{1-\varepsilon^s}} \\
&= \left(\sum_{j=1}^{\mathcal{I}} I_j^s \left(\frac{\varepsilon^s}{\varepsilon^s - 1} (1+t_{ij}^s) \tau_{ij}^s c_j^s \right)^{1-\varepsilon^s} (b^s)^{\theta^s} \frac{\theta^s}{\theta^s - (\varepsilon^s - 1)} (a_{ij}^s)^{\theta^s - (\varepsilon^s - 1)} \right)^{\frac{1}{1-\varepsilon^s}} \\
&= \frac{1}{b^s} \left(\frac{\theta^s}{\theta^s - (\varepsilon^s - 1)} \right)^{-\frac{1}{\theta^s}} \left(\frac{\varepsilon^s}{\varepsilon^s - 1} \right) \left(\frac{X_i^s}{\varepsilon^s} \right)^{-\frac{\theta^s - (\varepsilon^s - 1)}{\theta^s(\varepsilon^s - 1)}} \\
&\quad \times \left(\sum_{j=1}^{\mathcal{I}} I_j^s \left((1+t_{ij}^s) \tau_{ij}^s c_j^s \right)^{-\theta^s} \left((1+t_{ij}^s) c_j^s f_{ij} \right)^{-\frac{\theta^s - (\varepsilon^s - 1)}{\varepsilon^s - 1}} \right)^{-\frac{1}{\theta^s}},
\end{aligned}
\tag{A.1}
$$

where the last equality follows from the solution of the productivity threshold a_{ij}^s, given by equation (7).

Trade The total sales from j to i are given by:

$$
\begin{aligned}
X_{ij}^T &= \int_{J_{ij}^T} \left(\frac{X_i^T}{(P_i^T)^{1-\varepsilon^T}} \right) p_{ij}^T(k)^{1-\varepsilon^T} \, \mathrm{d}k \\
&= I_j^T \int_0^{a_{ij}^T} \left(\frac{X_i^T}{(P_i^T)^{1-\varepsilon^T}} \right) \left(\frac{\varepsilon^T}{\varepsilon^T - 1} (1+t_{ij}^T) \tau_{ij}^T c_j^T a \right)^{1-\varepsilon^T} \mathrm{d}G^T(a) \\
&= I_j^T \left(\frac{X_i^T}{(P_i^T)^{1-\varepsilon^T}} \right) \left(\frac{\varepsilon^T}{\varepsilon^T - 1} (1+t_{ij}^T) \tau_{ij}^T c_j^T \right)^{1-\varepsilon^T} \left(\frac{(b^T)^{\theta^T} \theta^T}{\theta^T - (\varepsilon^T - 1)} \right) (a_{ij}^T)^{\theta^T - (\varepsilon^T - 1)},
\end{aligned}
$$

where I_j^T denotes the mass of entrepreneurs in location j and sector T. Insert the expressions for the threshold and prices, equations (7) and (A.1), to write:

$$X_{ij}^T = \lambda_{ij}^T X_i^T,$$
$$\lambda_{ij}^T := \frac{I_j^T \left((1+t_{ij}^T)\tau_{ij}^T c_j^T\right)^{-\theta^T} \left((1+t_{ij}^T)c_j^T f_{ij}^T\right)^{-\frac{\theta^T-(\varepsilon^T-1)}{\varepsilon^T-1}}}{\sum_{l=1}^{\mathcal{I}} I_l^T \left((1+t_{il}^T)\tau_{il}^T c_l^T\right)^{-\theta^T} \left((1+t_{il}^T)c_l^T f_{il}^T\right)^{-\frac{\theta^T-(\varepsilon^T-1)}{\varepsilon^T-1}}}, \tag{A.2}$$

where λ_{ij}^T denotes the share of goods in sector s that i purchases from j.

Profits Total profits, after paying the fixed trade costs, in location j are given by:

$$\begin{aligned}
\Pi_j^s &= \sum_{i=1}^{\mathcal{I}} \int_{J_{ij}^s} \left(\pi_{ij}^s(k) - c_j f_{ij}^s\right) \mathrm{d}k \\
&= \sum_{i=1}^{\mathcal{I}} I_j^s \int_0^{a_{ij}^s} \left[\left(\frac{X_i^s}{\varepsilon^s(1+t_{ij}^s)}\right)\left(\frac{\varepsilon^s}{\varepsilon^s-1}\frac{(1+t_{ij}^s)\tau_{ij}^s c_j^s a}{P_i^s}\right)^{1-\varepsilon^s} - c_j f_{ij}^s\right] \mathrm{d}G^s(a) \\
&= \sum_{i=1}^{\mathcal{I}} \left(b^s a_{ij}^s\right)^{\theta^s} I_j^s \left[\left(\frac{X_i^s}{\varepsilon^s(1+t_{ij}^s)}\right)\left(\frac{\varepsilon^s}{\varepsilon^s-1}\frac{a_{ij}^s(1+t_{ij}^s)\tau_{ij}^s c_j^s}{P_i^s}\right)^{1-\varepsilon^s}\left(\frac{\theta^s}{\theta^s-(\varepsilon^s-1)}\right) - c_j f_{ij}^s\right] \\
&= \left(\frac{\varepsilon^s-1}{\theta^s-(\varepsilon^s-1)}\right)\sum_{i=1}^{\mathcal{I}} \left(b^s a_{ij}^s\right)^{\theta^s} I_j^s \left(c_j^s f_{ij}^s\right),
\end{aligned}$$

where the last equation follows by manipulating the solution for the ability thresholds. Now, combine equations (7) and (A.1):

$$\begin{aligned}
\left(b^s a_{ij}^s\right)^{\theta^s} I_j^s \left(c_j^s f_{ij}^s\right) &= \left(\frac{\varepsilon^s-1}{\varepsilon^s}\right)^{\theta^s} \left(b^s P_i^s\right)^{\theta^s} \left(\frac{X_i^s}{\varepsilon^s}\right)^{\frac{\theta^s}{\varepsilon^s-1}} \\
&\quad \times I_j^s \left((1+t_{ij}^s)\tau_{ij}^s c_j^s\right)^{-\theta^s} \left((1+t_{ij}^s)c_j^s f_{ij}^s\right)^{-\frac{\theta^s-(\varepsilon^s-1)}{\varepsilon^s-1}} (1+t_{ij}^s)^{-1} \\
&= \left(\frac{\theta^s-(\varepsilon^s-1)}{\theta^s}\right)\left(\frac{X_i^s}{\varepsilon^s(1+t_{ij}^s)}\right) \\
&\quad \times \left(\frac{I_j^s \left((1+t_{ij}^s)\tau_{ij}^s c_j^s\right)^{-\theta^s} \left((1+t_{ij}^s)c_j^s f_{ij}^s\right)^{-\frac{\theta^s-(\varepsilon^s-1)}{\varepsilon^s-1}}}{\sum_l I_l^s((1+t_{il}^s)\tau_{il}^s c_l^s)^{-\theta^s}((1+t_{il}^s)c_l^s f_{il})^{-\frac{\theta^s-(\varepsilon^s-1)}{\varepsilon^s-1}}}\right) \\
&= \left(\frac{\theta^s-(\varepsilon^s-1)}{\theta^s\varepsilon^s}\right)\left(\frac{\lambda_{ij}^s X_i^s}{1+t_{ij}^s}\right),
\end{aligned} \tag{A.3, A.4}$$

where λ_{ij}^s denotes the share of goods in sector s that i purchases from j. Finally, insert equation (A.4) into the expression for aggregate profits:

$$\Pi_j^s = \xi^s \left(\sum_{i=1}^{\mathcal{I}} \frac{\lambda_{ij}^s X_i^s}{1+t_{ij}^s}\right), \tag{A.5}$$

where $\xi^s := (\varepsilon^s-1)/(\theta^s\varepsilon^s)$.

Tariff revenue Denote Υ_j as the tariff revenue collected by location j:

$$\begin{aligned}\Upsilon_j &= \sum_{i=1}^{\mathcal{I}} \int_{J_{ji}^T} t_{ji}^T \left(\frac{x_{ji}^T(k)}{1+t_{ji}^T} \right) \mathrm{d}k \\ &= \sum_{i=1}^{\mathcal{I}} t_{ji}^T \left(\frac{\lambda_{ji}^T X_j^T}{1+t_{ji}^T} \right). \end{aligned} \tag{A.6}$$

Market clearing Denote Y_i^s as the output value by sector s firms located in i and X_i^s the expenditure on sector s by consumers and firms located in i. The market clearing conditions for non-tradable and tradable goods are:

$$Y_i^N = X_i^N, \quad Y_i^T = \sum_{j=1}^{\mathcal{I}} \frac{\lambda_{ji}^T X_j^T}{1+t_{ji}^T}, \tag{A.7}$$

Output and expenditure of the tradable sector are not equal because of remittances R_i, which are the difference of remittances received minus those sent to other countries:

$$R_i = \sum_{j=1}^{\mathcal{I}} R_{ij} - \sum_{j=1}^{\mathcal{I}} R_{ji},$$

with R_{ij} being the remittances sent from j to i.

Trade deficits can thus be written as the difference of imports minus exports:

$$R_i = \sum_{j=1}^{\mathcal{I}} \frac{\lambda_{ij}^T X_i^T}{1+t_{ij}^T} - \sum_{j=1}^{\mathcal{I}} \frac{\lambda_{ji}^T X_j^T}{1+t_{ji}^T}.$$

Short-run equilibrium In the short-run equilibrium, with an exogenous mass of entrepreneurs, total profits are strictly positive and are given by equation (A.5). Total income is the sum of labor income, profits in both sectors, and net remittances:

$$Y_i = w_i L_i + \Pi_i^N + \Pi_i^T + R_i + \Upsilon_i. \tag{A.8}$$

In each sector s, total expenditure equals final consumption by households plus intermediate usage by firms:

$$\begin{aligned} X_i^N &= \alpha Y_i + \left(1-\beta^N\right) \eta^N \left(1-\xi^N\right) Y_i^N + \left(1-\beta^T\right) \eta^T \left(1-\xi^T\right) Y_i^T, \\ X_i^T &= \left(1-\alpha\right) Y_i + \left(1-\beta^N\right) \left(1-\eta^N\right) \left(1-\xi^N\right) Y_i^N + (1-\beta^T)(1-\eta^T) \left(1-\xi^T\right) Y_i^T. \end{aligned} \tag{A.9}$$

Finally, the short-run equilibrium is a set of wages, prices and expenditure (w_i, P_i^s, X_i^s) for $s = N, T$ and $i = 1, \cdots, \mathcal{I}$ that solves equations (4), (A.1), (A.6), (A.7), (A.8) and (A.9); given endowments for equipped labor L_i and mass of entrepreneurs I_i^s.

Long-run equilibrium In the long-run equilibrium, the mass of entrepreneurs is endogenously determined by the free-entry condition, which equalizes expected profits per firm (before learning their ability) to the exploration cost:

$$\frac{\Pi_i^s}{I_i^s} = c_i^s F_i^s. \tag{A.10}$$

Total income is the sum of labor income and net remittances:

$$Y_i = w_i L_i + R_i + \Upsilon_i. \tag{A.11}$$

In each sector s, total expenditure equals final consumption by households plus intermediate usage by firms:

$$\begin{aligned} X_i^N &= \alpha Y_i + \left(1-\beta^N\right)\eta^N Y_i^N + \left(1-\beta^T\right)\eta^T Y_i^T, \\ X_i^T &= (1-\alpha)\, Y_i + \left(1-\beta^N\right)\left(1-\eta^N\right) Y_i^N + (1-\beta^T)(1-\eta^T) Y_i^T. \end{aligned} \tag{A.12}$$

Finally, the long-run equilibrium is a set of wages, prices, expenditure, and mass of entrepreneurs $(w_i, P_i^s, X_i^s, I_i^s)$ for $s = N, T$ and $i = 1, \cdots, \mathcal{I}$ that solve equations (4), (A.1), (A.6), (A.7), (A.10), (A.11), and (A.12); given endowments for equipped labor L_i.

Appendix B Algorithm to solve the model

B.1 Short-run equilibrium

The algorithm to solve the short-run equilibrium is shown below:

1. Guess w_i for $i = 1, \cdots, \mathcal{I}$.

2. Guess X_i^s for $s = N, T$ and $i = 1, \cdots, \mathcal{I}$.

3. Guess P_i^s for $s = N, T$ and $i = 1, \cdots, \mathcal{I}$.

4. Update prices using equations (4) and (A.1):

$$c_j^s = w_j^{\beta^s}\left[\left(P_j^N\right)^{\eta^s}\left(P_j^T\right)^{1-\eta^s}\right]^{1-\beta^s},$$

$$P_i^s = \frac{1}{b^s}\left(\frac{\theta^s}{\theta^s-(\varepsilon^s-1)}\right)^{-\frac{1}{\theta^s}}\left(\frac{\varepsilon^s}{\varepsilon^s-1}\right)\left(\frac{X_i^s}{\varepsilon^s}\right)^{-\frac{\theta^s-(\varepsilon^s-1)}{\theta^s(\varepsilon^s-1)}}$$
$$\times\left(\sum_{j=1}^{\mathcal{I}} I_j^s\left((1+t_{ji}^s)\tau_{ij}^s c_j^s\right)^{-\theta^s}\left((1+t_{ji}^s)c_j^s f_{ij}\right)^{-\frac{\theta^s-(\varepsilon^s-1)}{\varepsilon^s-1}}\right)^{-\frac{1}{\theta^s}}.$$

If the difference between the guess and the update of P_i^s is small enough, go to the next step. Otherwise, return to step 3 and use the update as the new guess.

5. Construct trade shares as in equation (A.2), tariff revenue as in equation (A.6), production as in equation (A.7), and income as in equation (A.8):

$$
\begin{aligned}
\lambda_{ij}^T &= \frac{I_j^T \left((1+t_{ij}^T)\tau_{ij}^T c_j^T\right)^{-\theta^T} \left((1+t_{ij}^T)c_j^T f_{ij}^T\right)^{-\frac{\theta^T-(\varepsilon^T-1)}{\varepsilon^T-1}}}{\sum_{l=1}^{\mathcal{I}} I_l^T \left((1+t_{il}^T)\tau_{il}^T c_l^T\right)^{-\theta^T} \left((1+t_{il}^T)c_l^T f_{il}^T\right)^{-\frac{\theta^T-(\varepsilon^T-1)}{\varepsilon^T-1}}}, \\
\Upsilon_i &= \sum_{j=1}^{\mathcal{I}} t_{ij}^T \left(\frac{\lambda_{ij}^T X_i^T}{1+t_{ij}^T}\right), \\
Y_i^N &= X_i^N, \quad Y_i^T = \sum_{j=1}^{\mathcal{I}} \frac{\lambda_{ji}^T X_j^T}{1+t_{ji}^T}, \\
Y_i &= w_i L_i + \xi^N Y_i^N + \xi_i^T Y_i^T + R_i + \Upsilon_i.
\end{aligned}
$$

6. Update expenditure using equation (A.9):

$$
\begin{aligned}
X_i^N &= \alpha Y_i + \left(1-\beta^N\right)\eta^N\left(1-\xi^N\right)Y_i^N + \left(1-\beta^T\right)\eta^T\left(1-\xi^T\right)Y_i^T, \\
X_i^T &= (1-\alpha)\,Y_i + \left(1-\beta^N\right)\left(1-\eta^N\right)\left(1-\xi^N\right)Y_i^N + (1-\beta^T)(1-\eta^T)\left(1-\xi^T\right)Y_i^T.
\end{aligned}
$$

   If the difference between the guess and the update of X_i^s is small enough, go to the next step. Otherwise, return to step 2 and use the update as the new guess.

7. Update wages:

$$
w_i = \left(\beta^N Y_i^N + \beta^T Y_i^T\right)/L_i.
$$

   If the difference between the guess and the update of w_i is small enough, the algorithm concludes. Otherwise, return to step 1 and use the update as the new guess.

B.2 Long-run equilibrium

The algorithm to solve the short-run equilibrium is shown below:

1. Guess I_i^s for $s = N, T$ and $i = 1, \cdots, \mathcal{I}$.

2. Guess w_i for $i = 1, \cdots, \mathcal{I}$.

3. Guess X_i^s for $s = N, T$ and $i = 1, \cdots, \mathcal{I}$.

4. Guess P_i^s for $s = N, T$ and $i = 1, \cdots, \mathcal{I}$.

5. Update prices using equations (4) and (A.1):

$$c_j^s = w_j^{\beta^s} \left[\left(P_j^N\right)^{\eta^s} \left(P_j^T\right)^{1-\eta^s} \right]^{1-\beta^s},$$

$$P_i^s = \frac{1}{b^s} \left(\frac{\theta^s}{\theta^s - (\varepsilon^s - 1)} \right)^{-\frac{1}{\theta^s}} \left(\frac{\varepsilon^s}{\varepsilon^s - 1} \right) \left(\frac{X_i^s}{\varepsilon^s} \right)^{-\frac{\theta^s - (\varepsilon^s - 1)}{\theta^s(\varepsilon^s - 1)}}$$

$$\times \left(\sum_{j=1}^{\mathcal{I}} I_j^s \left((1+t_{ji}^s)\tau_{ij}^s c_j^s\right)^{-\theta^s} \left((1+t_{ji}^s) c_j^s f_{ij}\right)^{-\frac{\theta^s - (\varepsilon^s - 1)}{\varepsilon^s - 1}} \right)^{-\frac{1}{\theta^s}}.$$

If the difference between the guess and the update of P_i^s is small enough, go to the next step. Otherwise, return to step 4 and use the update as the new guess.

6. Construct trade shares as in equation (A.2), tariff revenue as in equation (A.6), production as in equation (A.7), and income as in equation (A.11):

$$\lambda_{ij}^T = \frac{I_j^T \left((1+t_{ij}^T)\tau_{ij}^T c_j^T\right)^{-\theta^T} \left((1+t_{ij}^T) c_j^T f_{ij}^T\right)^{-\frac{\theta^T - (\varepsilon^T - 1)}{\varepsilon^T - 1}}}{\sum_{l=1}^{\mathcal{I}} I_l^T \left((1+t_{il}^T)\tau_{il}^T c_l^T\right)^{-\theta^T} \left((1+t_{il}^T) c_l^T f_{il}^T\right)^{-\frac{\theta^T - (\varepsilon^T - 1)}{\varepsilon^T - 1}}},$$

$$\Upsilon_i = \sum_{j=1}^{\mathcal{I}} t_{ij}^T \left(\frac{\lambda_{ij}^T X_i^T}{1 + t_{ij}^T} \right),$$

$$Y_i^N = X_i^N, \quad Y_i^T = \sum_{j=1}^{\mathcal{I}} \frac{\lambda_{ji}^T X_j^T}{1 + t_{ji}^T},$$

$$Y_i = w_i L_i + R_i + \Upsilon_i.$$

7. Update expenditure using equation (A.12):

$$X_i^N = \alpha Y_i + \left(1 - \beta^N\right) \eta^N Y_i^N + \left(1 - \beta^T\right) \eta^T Y_i^T,$$

$$X_i^T = (1 - \alpha) Y_i + \left(1 - \beta^N\right) \left(1 - \eta^N\right) Y_i^N + (1 - \beta^T)(1 - \eta^T) Y_i^T.$$

If the difference between the guess and the update of X_i^s is small enough, go to the next step. Otherwise, return to step 3 and use the update as the new guess.

8. Update wages:

$$w_i = \left(\beta^N Y_i^N + \beta^T Y_i^T\right) / L_i.$$

If the difference between the guess and the update of w_i is small enough, go to the next step. Otherwise, return to step 2 and use the update as the new guess.

9. Update the mass of entrepreneurs using equation (A.5):

$$I_i^N = \frac{\xi_i^N Y_i^N}{c_i^N F_i^N}, \quad I_i^T = \frac{\xi_i^T Y_i^T}{c_i^T F_i^T}.$$

If the difference between the guess and the update of I_i^s is small enough, the algorithm concludes. Otherwise, return to step 1 and use the update as the new guess.

Appendix C Data and model quantification

Table C.1 summarizes the parametrization of the model and this Supplemental Appendix provides a further discussion.

Table C.1. Summary of parametrization

Parameter	Value	Source or target
N_{ij}^e		Artuc et al. (2023) and American Community Survey (Ruggles et al., 2025)
σ	3	Caiumi and Peri (2024)
λ^e	20	Caiumi and Peri (2024)
μ_j		Target relative wages between high and low skilled workers
φ_j^e		Target relative wages between immigrants and natives
A_j		Target GDP
f_{jj}^N, f_{ji}^T		Target total number of firms in the U.S. using data from Cost of Doing Business (World Bank, 2020)
τ_{ji}		Target relative trade flows from Mayer et al. (2023) and Bureau of Transport Statistics (2025)
t_{ji}		Rodríguez-Clare et al. (2025)
F^N, F^T	46, 99	Target 1.1 and 5.3 million entrants in the non-tradable and tradable sectors
ε^s	6	Anderson and van Wincoop (2003)
θ^s	5.30	Axtell (2001)
α	0.67	U.S. Bureau of Labor Statistics (2020)
β^N, β^T	0.47, 0.25	U.S. Bureau of Economic Analysis (2023)
η^N, η^T	0.79, 0.40	U.S. Bureau of Economic Analysis (2023)

Geographical resolution Table C.2 provides the crosswalk between countries and the Rest of the World (RoW) regions.

Migration We follow FWD.us (2024) and identify temporary residents (i.e., documented visa holders) as those who meet the following criteria:

- F-1: Currently enrolled in college or graduate school and arrived in the United States within the past ten years.
- H-1B: Within six years of migration, employed in specialty occupations, and holding at least a bachelor's degree.
- H-2A: Ages 18-64, born in a country on the 2018 H-2A eligibility list, working in agricultural occupations, and within five years of migration.
- H-2B: Ages 18-64, born in a country on the H-2B eligibility list, working in top-selected H-2B occupations (U.S. Department of Labor and Administration, 2025), and within five years of migration.

Table C.2. Crosswalk between countries and Rest of the World regions.

Region	Countries (ISO 3 codes)
AFR	AGO, ATF, BDI, BEN, BFA, BWA, CAF, CIV, CMR, COD, COG, COM, CPV, DJI, DZA, EGY, ERI, ESH, ETH, GAB, GHA, GIN, GMB, GNB, GNQ, IOT, KEN, LBR, LBY, LSO, MAR, MDG, MLI, MOZ, MRT, MWI, MYT, NAM, NER, NGA, REU, RWA, SDN, SEN, SHN, SLE, SOM, SSD, STP, SWZ, SYC, TCD, TGO, TUN, TZA, UGA, ZAF, ZMB, ZWE
CAN	CAN
CHN+	CHN, HKG, JPN, KOR, MAC, MNG, PRK, TWN
EUR	ALA, ALB, AND, AUT, BEL, BGR, BIH, BLR, CHE, CZE, DEU, DNK, ESP, EST, FIN, FRA, FRO, GBR, GGY, GIB, GRC, GRL, HRV, HUN, IMN, IRL, ISL, ITA, JEY, LIE, LTU, LUX, LVA, MCO, MDA, MKD, MLT, MNE, NLD, NOR, POL, PRT, ROU, RUS, SJM, SMR, SRB, SVK, SVN, SWE, UKR, VAT
IND+	AFG, ARE, ARM, AZE, BGD, BHR, BTN, CYP, GEO, IND, IRN, IRQ, ISR, JOR, KAZ, KGZ, KWT, LBN, LKA, MDV, NPL, OMN, PAK, PSE, QAT, SAU, SYR, TJK, TKM, TUR, UZB, YEM
LAT	ABW, AIA, ARG, ATG, BES, BHS, BLM, BLZ, BMU, BOL, BRA, BRB, BVT, CHL, COL, CRI, CUB, CUW, CYM, DMA, DOM, ECU, FLK, GLP, GRD, GTM, GUF, GUY, HND, HTI, JAM, KNA, LCA, MAF, MSR, MTQ, NIC, PAN, PER, PRI, PRY, SGS, SLV, SPM, SUR, SXM, TCA, TTO, URY, VCT, VEN, VGB, VIR
MEX	MEX
OCE	ASM, AUS, BRN, CCK, COK, CXR, FJI, FSM, GUM, HMD, IDN, KHM, KIR, LAO, MHL, MMR, MNP, MUS, MYS, NCL, NFK, NIU, NRU, NZL, PCN, PHL, PLW, PNG, PYF, SGP, SLB, THA, TKL, TLS, TON, TUV, UMI, VNM, VUT, WLF, WSM

Notes: This table defines the RoW regions as Africa (AFR), Canada (CAN), East Asia (CHN+), Europe (EUR), South and Central Asia (IND+), Latin America (LAT), Mexico (MEX), and Oceania and South East Asia (OCE). The right column shows the three-character ISO country codes for the region. Source: Bureau of Transport Statistics (2025).

Table C.3. Immigrant-to-population share by legal status

	Share in population (%)				
U.S. state	Undocumented	Temporary	Permanent	Naturalized	All immigrants
AK	1.98	0.40	2.17	7.46	12.00
AL	1.41	0.29	1.20	2.01	4.91
AR	2.54	0.36	1.45	2.18	6.53
AZ	3.75	0.61	4.85	7.96	17.17
CA	6.06	1.09	8.91	17.34	33.40
CO	3.26	0.54	3.05	5.81	12.66
CT	4.21	0.86	4.43	11.11	20.62
DC	3.06	1.50	4.74	7.97	17.26
DE	2.65	0.67	2.74	6.65	12.72
FL	4.42	0.85	6.39	16.27	27.93
GA	4.02	0.57	2.65	6.24	13.48
HI	5.48	1.09	8.25	9.37	24.20
IA	1.89	0.68	1.62	2.57	6.76
ID	1.95	0.41	2.00	3.55	7.90
IL	4.05	0.77	3.94	8.84	17.61
IN	1.86	0.59	1.65	2.80	6.90
KS	2.84	0.58	2.17	3.81	9.41

Table C.3 - Continued

U.S. state	Undocumented	Temporary	Permanent	Naturalized	All immigrants
KY	1.21	0.31	1.41	2.14	5.07
LA	1.37	0.35	1.30	2.34	5.37
MA	2.72	1.71	5.76	11.69	21.88
MD	3.97	0.73	3.99	10.31	19.00
ME	0.39	0.19	1.56	2.74	4.88
MI	1.29	0.60	2.05	4.67	8.62
MN	1.88	0.63	2.36	5.49	10.35
MO	1.22	0.44	1.18	2.74	5.58
MS	0.88	0.16	0.81	1.55	3.40
MT	0.22	0.24	1.05	1.95	3.46
NC	3.42	0.54	2.13	4.33	10.41
ND	1.06	0.51	1.43	2.60	5.61
NE	2.53	0.49	2.24	4.19	9.45
NH	1.18	0.44	1.87	4.63	8.12
NJ	5.78	1.09	5.42	16.87	29.16
NM	2.41	0.48	4.01	5.33	12.23
NV	6.50	0.52	6.31	11.91	25.24
NY	4.30	0.99	6.82	16.59	28.71
OH	1.06	0.43	1.29	3.35	6.12
OK	2.76	0.56	1.99	2.86	8.17
OR	2.89	0.55	3.34	5.86	12.65
PA	1.81	0.65	2.08	5.36	9.89
RI	2.19	0.96	3.95	10.47	17.57
SC	2.12	0.31	1.60	3.07	7.11
SD	1.05	0.46	1.59	1.92	5.02
TN	2.14	0.39	1.49	2.69	6.72
TX	6.96	0.87	5.59	8.70	22.13
UT	3.54	0.64	2.35	4.91	11.45
VA	3.46	0.67	3.36	8.97	16.47
VT	0.45	0.41	1.48	3.51	5.86
WA	4.28	1.12	4.56	8.85	18.81
WI	1.46	0.42	1.86	2.88	6.62
WV	0.29	0.31	0.71	1.16	2.48
WY	1.25	0.38	1.25	1.89	4.77
USA	3.68	0.74	4.23	8.89	17.54

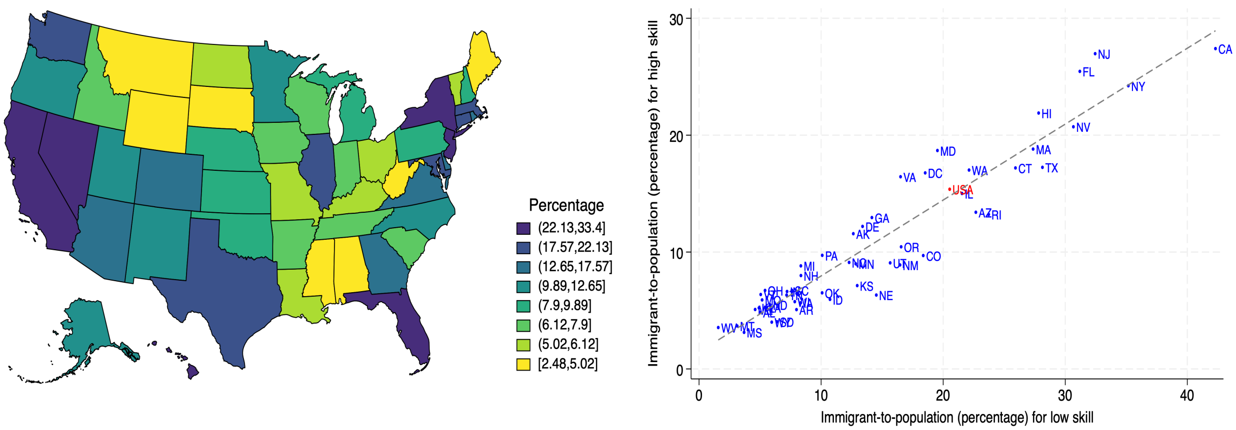
Notes: This table reports the percentage of undocumented, temporary, permanent, naturalized, and all immigrants relative to each U.S. state's population. Each category is calculated following Borjas and Cassidy (2019) and FWD.us (2024). Source: Author's calculations using data from the ACS (Ruggles et al., 2025).

Productivity In this subsection, we discuss the quantification of aggregate productivity A_j, skill productivity gap μ_j, and immigrant productivity gap φ_j^e. First, we choose N_{ji}^e to maximize

Figure C.1. Immigrant-to-population by U.S. state

(a) Average across skills
U.S. aggregate: 17.54%

(b) By skill
U.S. aggregate: 15.37% *(high skill)*
20.53% *(low skill)*



Notes: Panel (a) shows the share of immigrants, defined as adults (i.e., individuals aged 15 years or older) whose country of birth is different from their country of residence, irrespective of legal status, relative to the U.S. adult population in each U.S. state. Panel (b) compares two ratios: the number of high-skilled immigrants as a percentage of the high-skilled population (vertical axis) versus the number of low-skilled immigrants as a percentage of the low-skilled population (horizontal axis). The data covers the period 2016-2020. Source: Authors' calculations using data from the ACS (Ruggles et al., 2025).

equipped labor subject to the budget constraint.

$$\max \quad L_j = A_j \left[\left(L_j^\ell\right)^{\frac{\sigma-1}{\sigma}} + \left(\mu_j L_j^h\right)^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}}$$

$$\text{st} \quad L_j^e = \left[\left(\sum_{i \in \mathcal{C}(j)} N_{ji}^e \right)^{\frac{\lambda^e-1}{\lambda^e}} + \left(\varphi_j^e \sum_{i \notin \mathcal{C}(j)} N_{ji}^e \right)^{\frac{\lambda^e-1}{\lambda^e}} \right]^{\frac{\lambda^e}{\lambda^e-1}}$$

$$\mathcal{W}_j = \sum_{i=1}^{\mathcal{I}} \sum_{e \in \{\ell, h\}} w_{ji}^e N_{ji}^e,$$

where w_{ji}^e is the wage per unit of time for workers residing in j born in i with skill level e. Alternatively, the budget constraint can be rewritten as $\mathcal{W}_j = w_j L_j$, where w_j is the wage per unit of equipped labor.

The firm's optimality conditions pin down the immigrant productivity gap:

$$\varphi_j^e = \left(\frac{\sum_{i \notin \mathcal{C}(j)} w_{ji}^e N_{ji}^e / \sum_{i \notin \mathcal{C}(j)} N_{ji}^e}{\sum_{i \in \mathcal{C}(j)} w_{ji}^e N_{ji}^e / \sum_{i \in \mathcal{C}(j)} N_{ji}^e} \right)^{\frac{\lambda^e}{\lambda^e-1}} \left(\frac{\sum_{i \notin \mathcal{C}(j)} N_{ji}^e}{\sum_{i \in \mathcal{C}(j)} N_{ji}^e} \right)^{\frac{1}{\lambda^e-1}},$$

where the first term is the average wage of immigrants relative to that of natives, and the second term is the number of immigrants relative to that of natives, conditional on skill level. The firm's optimality conditions also pin down the skill productivity gap:

$$\mu_j = \left(\frac{\sum_{i=1}^{\mathcal{I}} w_{ji}^h N_{ji}^h / \sum_{i=1}^{\mathcal{I}} N_{ji}^h}{\sum_{i=1}^{\mathcal{I}} w_{ji}^\ell N_{ji}^\ell / \sum_{i=1}^{\mathcal{I}} N_{ji}^\ell} \right)^{\frac{\sigma}{\sigma-1}} \left(\frac{\sum_{i=1}^{\mathcal{I}} N_{ji}^h}{\sum_{i=1}^{\mathcal{I}} N_{ji}^\ell} \right)^{\frac{\sigma}{\sigma-1}} \left(\frac{L_j^h}{L_j^\ell} \right)^{-1},$$

where the first term in parentheses is the high-to-low skill wage ratio, the second is the high-to-low skill number of workers ratio, and the third is the high-to-low skill labor equipped ratio.

For each U.S. state, we construct average wages by skill and birthplace categories from the American Community Survey (ACS). We restrict the sample to employed individuals working more than 35 hours per week.[22] For RoW regions, we apply the U.S. immigrant-to-native wage ratio and adjust the high-to-low skill wage ratio using the return to a year of skill (Patrinos, 2024) and the skill gap between high and low skill workers (Barro and Lee, 2013) relative to those in the U.S.[23]

We calibrate aggregate productivity A_j so that the model-derived value added $w_i L_i$ in the long-run equilibrium matches exactly GDP in each location. For country-level data, we use World Bank GDP at market exchange rates, aggregated to the RoW region level. For U.S. states, we use Bureau of Labor Statistics data, normalized so the national total matches World Bank figures while preserving state-level shares.

We take the elasticities of substitution from Caiumi and Peri (2024), who estimates the substitution across different groups of workers for the U.S. economy. In their preferred specification, they report an elasticity of substitution between skill levels of $\sigma = 3$ and an elasticity of substitution between natives and immigrants of similar skill and experience levels of $\lambda^e = 20$.[24]

[22]The results are similar if we include the earnings of self-employed, as we observe a correlation of 0.83 for low-skilled and 0.99 for high-skilled.

[23]Barro and Lee (2013) classifies individual's educational attainment into 7 possible categories: no schooling (ns), incomplete primary (ip), complete primary (cp), incomplete secondary (is), complete secondary (cs), incomplete tertiary (it), and complete tertiary (ct). We define high skill as the last two categories and construct the average years of schooling for low and high skill workers as shown below:

$$\text{years educ}_j^\ell = \frac{0 \cdot N_j^{\text{ns}} + 3 \cdot N_j^{\text{ic}} + 6 \cdot N_j^{\text{cp}} + 9 \cdot N_j^{\text{is}} + 12 \cdot N_j^{\text{cs}}}{N_j^{\text{ns}} + N_j^{\text{ic}} + N_j^{\text{cp}} + N_j^{\text{is}} + N_j^{\text{cs}}},$$

$$\text{years educ}_j^h = \frac{14 \cdot N_j^{\text{it}} + 16 \cdot N_j^{\text{ct}}}{N_j^{\text{it}} + N_j^{\text{ct}}},$$

where N_j^{ns} represents the number of individuals in country j with no schooling.

From Patrinos (2024), we take the returns for a year of skill, β_j^{educ}. Since the years of skill and the returns to skill are expressed at the country level, we aggregate them at the RoW region level using population weights. Finally, we adjust the high-to-low skill wage ratio in the RoW regions as follows:

$$\left(\frac{w_j^h}{w_j^\ell} \right) = \left(\frac{w_{\text{USA}}^h}{w_{\text{USA}}^\ell} \right) \left(\frac{\exp(\beta_j^{\text{educ}}(\text{years educ}_j^h - \text{years educ}_j^l))}{\exp(\beta_{\text{USA}}^{\text{educ}}(\text{years educ}_{\text{USA}}^h - \text{years educ}_{\text{USA}}^l))} \right).$$

[24]Caiumi and Peri (2024) estimates this elasticity for workers with no high school diploma, high school diploma, some college, and no college. They find values as low as 10 for the two groups at the extremes of the skill range, while values as high as 50 for the intermediate ones. This is explained by the fact that in very low-skilled jobs, immigrants tend to specialize in manual intensive tasks, and in very high-skilled jobs, immigrants tend to specialize in Science, Technology and Engineering (rather than law, communication or human resources).

Fixed trade costs To construct the bilateral fixed trade costs, we employ the Cost of Doing Business from World Bank (2020), which provides country-level information on the cost to produce, export, and import.[25] We then aggregate from countries to RoW regions using as weights the value of production, exports, and imports of each country relative to the regional total. To obtain variation at the subnational level in the United States, we define:

$$\text{cost produce}_i = \left(\frac{\text{number firms}_i/\text{population}_i}{\text{number firms}_{\text{USA}}/\text{population}_{\text{USA}}}\right)^{-\frac{2(\varepsilon^T-1)}{\theta^T}} \text{cost produce}_{\text{USA}},$$

$$\text{cost export}_i = \left(\frac{\text{number firms exporting}_i/\text{total number firms}_i}{\text{number firms exporting}_{\text{USA}}/\text{total number firms}_{\text{USA}}}\right)^{-\frac{2(\varepsilon^T-1)}{\theta^T}} \text{cost export}_{\text{USA}},$$

$$\text{cost import}_i = \left(\frac{\text{number firms importing}_i/\text{total number firms}_i}{\text{number firms importing}_{\text{USA}}/\text{total number firms}_{\text{USA}}}\right)^{-\frac{2(\varepsilon^T-1)}{\theta^T}} \text{cost import}_{\text{USA}},$$

where the number of firms by U.S. state comes from U.S. Census Bureau (2023) and the number of firms internationally trading proceeds from International Trade Administration (2022).

With the cost to produce, export, and import at the appropriate level of geographical resolution, we construct the bilateral fixed trade costs as the geometric mean of the relative cost to export and import:

$$f_{ji}^T = \begin{cases} f^T f_i^D \sqrt{f_i^X f_j^M}, & \mathcal{C}(i) \neq \mathcal{C}(j) \\ f^T f_i^D, & \mathcal{C}(i) = \mathcal{C}(j) \end{cases}$$

$$f_i^D = \text{cost produce}_i,$$

$$f_i^X = 1 + \text{cost export}_i/\text{cost produce}_i,$$

$$f_j^M = 1 + \text{cost import}_j/\text{cost produce}_j,$$

where f_i^D represents the cost to start a business, and f_i^X, f_j^M the percentage increase in cost when exporting or importing relative to selling domestically, respectively.[26] When the transaction occurs across subnational units within a country, the fixed costs only comprise the cost to start a business. In a similar fashion, the fixed costs of production for the non-tradable sector are given by:[27]

$$f_{ii}^N = f^N f_i^D,$$

where f_i^D represents the cost to start a business, as in the case for tradable goods. The scalars f^T and f^N target the total number of firms in the United States in the tradable (1.1 millions) and non-tradable (5.3 millions) sector (U.S. Census Bureau, 2023).

[25] Specifically, we use the variables whose cost is defined in terms of the amount of time, the cost to export and import are constructed as the sum of time for border compliance plus that for documentary compliance.

[26] Note that by construction $f_i^X > 1$ and $f_j^M > 1$ imply $f_{ji}^T > f_{ii}^T$ and consequently that the mass of firms exporting is strictly lower than the mass of firms selling domestically.

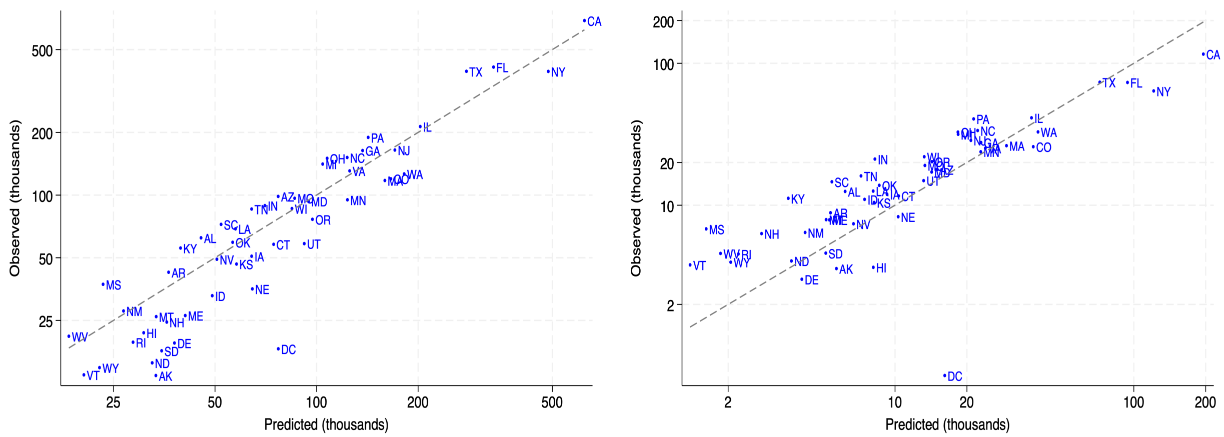
[27] Since the Cost of Doing Business (World Bank, 2020) does not disaggregate across sectors, we assume f_j^D to be the same for the non-tradable and tradable sector.

Although the quantification only targets the total number of firms at the national level, the model is successful in replicating the untargeted distribution of firms across U.S. states. Figure C.2 shows the correlation between the predicted and observed number of firms for each sector.

Figure C.2. Number of firms in the U.S. in the long-run equilibrium

(a) Non-tradable sector
U.S. aggregate: 5.3 *millions*

(b) Tradable sector
U.S. aggregate: 1.1 *millions*



Notes: This figure shows the number of observed firms (from U.S. Census Bureau, 2023) in the vertical axis versus the number of predicted firms in the long-run equilibrium (from the model) in the horizontal axis, for the non-tradable sector in panel (a) and the tradable sector in panel (b). Each dot represents a U.S. state, and the dashes are the best fit line. Source: Authors' calculations using data from U.S. Census Bureau (2023) and model output.

Tariffs Table C.4 shows the U.S. import tariffs and tariffs on U.S. exports in 2020 and 2025 by RoW region.

Table C.4. U.S. import tariffs and tariffs on U.S. exports in 2020 and 2025 (in %)

Region	U.S. import tariffs		Tariffs on U.S. exports	
	2020	2025	2020	2025
AFR	0.68	5.99	6.12	6.12
CAN	0.11	20.09	1.15	3.73
CHN+	9.44	38.50	10.09	16.08
EUR	2.08	15.33	1.82	1.01
IND+	2.75	13.25	5.19	4.88
LAT	1.23	10.85	4.78	4.78
MEX	0.05	15.62	0.10	0.00
OCE	2.47	16.50	2.88	1.49
Average	3.40	21.71	4.10	5.17

Notes: This table reports the U.S. import tariffs and tariffs on U.S. exports by the RoW regions in September 1, 2020 and September 1, 2025. We aggregate across products and from countries to RoW regions using the trade flows for 2017 as weights. Source: Authors' calculations using data from Rodríguez-Clare et al. (2025).

Variable trade costs We construct the variable trade costs following Head and Ries (2001), which assume symmetry $\tau_{ji}^T = \tau_{ij}^T$, normalize the trade costs with itself to one $\tau_{jj} = 1$, and define:

$$\tau_{ji}^T = \left(\frac{X_{ji}^T X_{ij}^T}{X_{ii}^T X_{jj}^T} \right)^{-\frac{1}{2\theta^T}} \left(1 + t_{ji}^T\right)^{-\frac{1}{2}} \left(1 + t_{ij}^T\right)^{-\frac{1}{2}}, \tag{C.1}$$

where X_{ji}^T denotes the trade flows from i to j and t_{ji}^T the tariffs imposed by j on products coming from i. Note that the bilateral fixed trade costs do not appear in equation (C.1), because they are multiplicative separable.

Exploration cost We follow di Giovanni et al. (2015) and pick the sector-specific exploration cost $F_j^s = F^s$ that targets 1.1 millions in the tradable sector and 5.3 millions in the non-tradable sector, so that virtually all potential entrepreneurs become active. Since we do not have information on the potential number of entrants in each country, we use the same parameter across locations.[28] As a comparison, F^N is 46 times higher than $f_{\text{USA,USA}}^N$ and F^N is 99 higher than $f_{\text{USA,USA}}^T$. The finding that exploration costs are considerably higher than production costs is commonplace (Ghironi and Melitz, 2005).

Substitution across varieties We set the elasticity of substitution between varieties to $\varepsilon^s = 6$. Anderson and van Wincoop (2003) report available estimates of this elasticity in the range of 3 to 10, and we pick a value close to the midpoint.

Pareto distribution In this model, firm sales follow a power law with an exponent equal to $\theta^s/(\varepsilon^s - 1)$.[29] In the data, firm sales follow a power law with an exponent close to one. Axtell (2001) reports a value of 1.06, which we use to find the shape of the Pareto distribution: $\theta^s = 1.06 \times (\varepsilon^s - 1) = 5.30$. di Giovanni et al. (2011) shows that the reduced form exponent in the empirical distribution of firm size, which corresponds to $\theta^s/(\varepsilon^s - 1)$, is similar between the tradable and non-tradable sectors.[30]

Consumption and production shares We use data from the Consumer Expenditure Survey (U.S. Bureau of Labor Statistics, 2020) to construct the national share of consumer expenditure on non-tradable goods relative to total consumer expenditure and obtain a value of $\alpha = 0.67$.[31]

[28] Since F^s represents the cost of finding one's ability, we do not expect it to be affected by policies and therefore differ between countries.

[29] For further references, see di Giovanni and Levchenko (2012).

[30] We normalize the scale of the Pareto distribution to $b^s = 0.1$. This parameter simply scales all productivities by a constant, and thus does not alter production or export productivity thresholds.

[31] We define tradable categories as: food at home, alcoholic beverages, housekeeping supplies, households furnishing and equipment, apparel, transportation (excluding public transportation), personal care products, tobacco products and smoking supplies, and other miscellaneous.

We use the Domestic Requirements data (U.S. Bureau of Economic Analysis, 2023), aggregate them from 15 sectors to our two-sector classification,[32] construct the share of value added in total production, and obtain sector-specific values of $\beta^N = 0.47$ and $\beta^T = 0.25$. Thus, the tradable sector is considerably more input-intensive than the non-tradable sector. Additionally, we compute the share of non-tradable intermediate inputs relative to the total intermediate inputs and obtain sector-specific values of $\eta^N = 0.79$ and $\eta^T = 0.40$. In other words, 79% (60%) of the inputs used in the non-tradable (tradable) come from the non-tradable (tradable) sector itself.

Appendix D Additional results

Prices and wages We aggregate prices at the national level in a gravity-consistent fashion:

$$P^s_{\mathcal{C}(j)} = \left(\sum_{k \in \mathcal{C}(j)} \left(\frac{X^s_k}{\sum_{l \in \mathcal{C}(j)} X^s_l} \right) (P^s_k)^{1-\varepsilon^s} \right)^{\frac{1}{1-\varepsilon^s}}, \tag{D.1}$$

where X^s_k is the expenditure of location k on goods from sector s, and we aggregate wages at the national level as:

$$w_{\mathcal{C}(j)} = \sum_{k \in \mathcal{C}(j)} \left(\frac{L_k}{\sum_{l \in \mathcal{C}(j)} L_l} \right) w_k.$$

Welfare Our main measure of welfare is the utility of natives by skill level e:

$$u^e_{j\mathcal{C}(j)} = \frac{w^e_{j\mathcal{C}(j)} + \pi_j + r^{\text{in}}_j + \upsilon_j}{\left(P^N_j\right)^{\alpha} \left(P^T_j\right)^{1-\alpha}},$$

where $w^e_{j\mathcal{C}(j)}$ represents the wage earned by workers of skill level e residing in location j who were born in $\mathcal{C}(j)$, which can be calculated as:

$$w^e_{j\mathcal{C}(j)} = \chi^e_{j\mathcal{C}(j)} \left(\frac{w_j L_j}{\sum_{l \in \mathcal{C}(j)} N^e_{jl}} \right) = \left(\frac{\chi^e_{j\mathcal{C}(j)}}{\sum_{l \in \mathcal{C}(j)} N^e_{jl}} \right) GDP_j,$$

$$\chi^e_{j\mathcal{C}(j)} := \left(\frac{\left(\mu^e_j L^e_j\right)^{\frac{\sigma-1}{\sigma}}}{\left(L^\ell_j\right)^{\frac{\sigma-1}{\sigma}} + \left(\mu_j L^h_j\right)^{\frac{\sigma-1}{\sigma}}} \right) \left(\frac{\left(\sum_{k \in \mathcal{C}(j)} N^e_{jk}\right)^{\frac{\lambda^e-1}{\lambda^e}}}{\left(\sum_{k \in \mathcal{C}(j)} N^e_{jk}\right)^{\frac{\lambda^e-1}{\lambda^e}} + \left(\varphi^e_j \sum_{k \notin \mathcal{C}(j)} N^e_{jk}\right)^{\frac{\lambda^e-1}{\lambda^e}}} \right),$$

$$\mu^e_j := \begin{cases} \mu_j, & e = h \\ 1, & e = \ell \end{cases};$$

[32] We define tradable sectors are agriculture, forestry, fishing, and hunting; mining; and manufacturing; and wholesale trade.

π_j represents the profits rebated from the firm to all residents in j:[33]

$$\pi_j = \left(\frac{\Pi_j^N + \Pi_j^T}{\sum_{e\in\{\ell,h\}} \sum_{i=1}^{\mathcal{I}} N_{ji}^e}\right);$$

r_j^{in} is the incoming remittances distributed to all native residents in j:[34]

$$r_j^{\text{in}} = \left(\frac{R_j^{\text{in}}}{\sum_{e\in\{\ell,h\}} \sum_{i\in\mathcal{C}(j)} N_{ji}^e}\right);$$

and υ_j is the tariff revenue rebated to all residents in j:

$$\upsilon_j = \left(\frac{\Upsilon_j}{\sum_{e\in\{\ell,h\}} \sum_{i=1}^{\mathcal{I}} N_{ji}^e}\right).$$

We now construct the average utility of natives across subnational units within a country as:[35]

$$u_{\mathcal{C}(j)\mathcal{C}(j)}^e = \frac{w_{\mathcal{C}(j)\mathcal{C}(j)}^e + \pi_{\mathcal{C}(j)} + r_{\mathcal{C}(j)}^{\text{in}} + \upsilon_{\mathcal{C}(j)}}{\left(P_{\mathcal{C}(j)}^N\right)^\alpha \left(P_{\mathcal{C}(j)}^T\right)^{1-\alpha}}, \tag{D.2}$$

where the sectoral prices $P_{\mathcal{C}(j)}^s$ are defined as in equation (D.1). $w_{\mathcal{C}(j)\mathcal{C}(j)}^e$ represents the wage earned by workers of skill level e born and residing in $\mathcal{C}(j)$, which can be calculated as:

$$w_{\mathcal{C}(j)\mathcal{C}(j)}^e = \left(\frac{\sum_{k\in\mathcal{C}(j)} \chi_{k\mathcal{C}(j)}^e w_k L_k}{\sum_{k\in\mathcal{C}(j)} \sum_{l\in\mathcal{C}(j)} N_{kl}^e}\right) = \left(\frac{\sum_{k\in\mathcal{C}(j)} \chi_{k\mathcal{C}(j)}^e \left(GDP_k/GDP_{\mathcal{C}(j)}\right)}{\sum_{k\in\mathcal{C}(j)} \sum_{l\in\mathcal{C}(j)} N_{kl}^e}\right) GDP_{\mathcal{C}(j)},$$

where $GDP_{\mathcal{C}(j)} = \sum_{k\in\mathcal{C}(j)} GDP_k$; $\pi_{\mathcal{C}(j)}$ is the profits rebated from all the firms in $\mathcal{C}(j)$ to all residents in $\mathcal{C}(j)$:

$$\pi_{\mathcal{C}(j)} = \left(\frac{\sum_{k\in\mathcal{C}(j)} \left(\Pi_k^N + \Pi_k^T\right)}{\sum_{k\in\mathcal{C}(j)} \sum_{e\in\{\ell,h\}} \sum_{i=1}^{\mathcal{I}} N_{ki}^e}\right);$$

$r_{\mathcal{C}(j)}^{\text{in}}$ represents the incoming remittances to all subnational units in $\mathcal{C}(j)$ distributed to all native residents in $\mathcal{C}(j)$:

$$r_{\mathcal{C}(j)}^{\text{in}} = \left(\frac{\sum_{k\in\mathcal{C}(j)} R_k^{\text{in}}}{\sum_{k\in\mathcal{C}(j)} \sum_{e\in\{\ell,h\}} \sum_{i\in\mathcal{C}(j)} N_{ji}^e}\right);$$

[33] The assumption on the distribution of profits only plays a role in the short-run equilibrium; as in the long-run equilibrium, the exploration costs exhausts profits and thus households receive zero profits.

[34] We make two assumptions about the distribution of remittances. First, remittances from abroad coming into location j (i.e., incoming remittances are defined as $R_j^{\text{in}} := \sum_{i\notin\mathcal{C}(i)} R_{ji}$) are distributed among natives residing in location j and not among immigrants living in location j. Second, remittances sent abroad from location j (i.e., outgoing remittances are defined as $R_j^{\text{out}} := \sum_{i\notin\mathcal{C}(i)} R_{ij}$) are transferred by immigrants living in location j and not by natives living in location j.

[35] We construct average utility as in equation (D.2), rather than as the linear average of location-specific utilities weighted by population shares, to remain internally consistent with the gravity structure of the model and to ease the interpretation of changes in prices and GDP with respect to changes in welfare.

and $\upsilon_{\mathcal{C}(j)}$ is the tariff revenue collected by all subnational units in $\mathcal{C}(j)$ distributed to all native residents in $\mathcal{C}(j)$:

$$\upsilon_{\mathcal{C}(j)} = \left(\frac{\sum_{k \in \mathcal{C}(j)} \Upsilon_k}{\sum_{k \in \mathcal{C}(j)} \sum_{e \in \{\ell, h\}} \sum_{i=1}^{\mathcal{I}} N_{ki}^e} \right).$$

Finally, we construct average utility of natives across skill levels as:

$$u_{j\mathcal{C}(j)}^a = \sum_{e \in \{\ell, h\}} \left(\frac{\sum_{k \in \mathcal{C}(j)} N_{jk}^e}{\sum_{k \in \mathcal{C}(j)} \left(N_{jk}^{\ell} + N_{jk}^h \right)} \right) u_{j\mathcal{C}(j)}^e.$$

D.1 Repatriation of all immigrants

Table D.1. Impact of repatriation of all immigrants in each Rest of the World region or U.S. state in the long-run equilibrium

RoW region or U.S. state	Δ% Population	Δ% Welfare	Δ% GDP	Δ% Price Index
AFR	0.26	−0.02	0.46	−0.27
CAN	2.25	0.15	1.57	−0.86
CHN+	0.31	1.49	0.51	−0.23
EUR	0.80	1.00	1.14	−0.26
IND+	0.29	0.14	0.29	−0.27
LAT	3.16	2.21	6.01	−0.38
MEX	11.64	2.13	15.69	−1.61
OCE	0.83	0.39	1.18	−0.34
AK	−12.00	−9.63	−19.54	−0.53
AL	−4.91	−5.81	−11.47	−0.79
AR	−6.53	−6.30	−12.81	−0.59
AZ	−17.17	−13.34	−26.93	−0.26
CA	−33.40	−24.35	−47.08	1.12
CO	−12.66	−9.78	−20.06	−0.36
CT	−20.62	−16.01	−31.99	−0.10
DC	−17.26	−14.43	−29.05	−0.19
DE	−12.72	−11.46	−23.45	−0.26
FL	−27.93	−20.42	−40.26	0.51
GA	−13.48	−11.21	−23.37	0.00
HI	−24.20	−18.45	−36.04	−0.28
IA	−6.76	−6.46	−13.10	−0.60
ID	−7.90	−6.97	−13.89	−0.75
IL	−17.61	−12.76	−26.84	0.43
IN	−6.90	−6.86	−14.03	−0.53
KS	−9.41	−7.92	−16.22	−0.48
KY	−5.07	−5.55	−11.18	−0.64
LA	−5.37	−5.66	−11.40	−0.67
MA	−21.88	−16.12	−32.68	0.30
MD	−19.00	−14.58	−29.76	0.13
ME	−4.88	−6.04	−11.77	−0.88
MI	−8.62	−7.86	−16.87	0.01

Table D.1 – Continued

RoW region or U.S. state	Δ% Population	Δ% Welfare	Δ% GDP	Δ% Price Index
MN	−10.35	−8.21	−17.11	−0.29
MO	−5.58	−6.50	−12.97	−0.73
MS	−3.40	−5.15	−9.63	−1.07
MT	−3.46	−3.88	−7.74	−0.62
NC	−10.41	−9.22	−19.01	−0.35
ND	−5.61	−5.34	−10.75	−0.64
NE	−9.45	−7.44	−15.40	−0.39
NH	−8.12	−9.13	−17.80	−1.02
NJ	−29.16	−19.99	−40.57	1.35
NM	−12.23	−10.36	−21.06	−0.42
NV	−25.24	−18.07	−35.81	0.10
NY	−28.71	−20.67	−40.99	0.83
OH	−6.12	−6.70	−13.59	−0.60
OK	−8.17	−7.60	−15.09	−0.80
OR	−12.65	−11.42	−22.86	−0.62
PA	−9.89	−9.73	−19.34	−0.78
RI	−17.57	−13.10	−26.37	−0.33
SC	−7.11	−6.98	−14.31	−0.51
SD	−5.02	−4.89	−9.94	−0.56
TN	−6.72	−6.68	−13.61	−0.58
TX	−22.13	−15.27	−31.72	0.75
UT	−11.45	−9.06	−18.21	−0.66
VA	−16.47	−13.77	−28.14	0.02
VT	−5.86	−7.77	−14.57	−1.32
WA	−18.81	−15.86	−32.25	0.29
WI	−6.62	−6.64	−13.33	−0.69
WV	−2.48	−4.27	−8.02	−0.93
WY	−4.77	−5.42	−10.65	−0.79
USA	−17.54	−14.03	−28.80	0.41

Notes: This table reports the percentage change of number of population, welfare, GDP, and the price index for each U.S. state (represented by a 2-digit code) and RoW region (represented by a 3-digit code) in the long-run counterfactual in which all immigrants are repatriated to their birthplace relative to the baseline equilibrium. The RoW regions are: Africa (AFR), Canada (CAN), East Asia (CHN+), Europe (EUR), South and Central Asia (IND+), Latin America (LAT), Mexico (MEX), and Oceania and South East Asia (OCE). The measure of welfare is the average income (labor income plus tariff revenue plus incoming remittances) of natives across skill levels relative to the consumer price index. The price index is a Cobb-Douglas aggregate of the prices of non-tradable and tradable goods. Source: Model output.

Table D.2. Impact of repatriation of all immigrants in each Rest of the World regions or U.S. state in the short-run equilibrium

RoW region or U.S state	Δ% Population	Δ% Welfare	Δ% GDP	Δ% Price Index
AFR	0.26	−0.15	0.46	0.02
CAN	2.25	−0.52	1.34	−0.40
CHN+	0.31	0.56	0.49	0.03
EUR	0.80	0.20	0.85	−0.01
IND+	0.29	−0.06	0.38	0.02

Table D.2 – Continued

RoW region or U.S state	Δ% Population	Δ% Welfare	Δ% GDP	Δ% Price Index
LAT	3.16	−0.05	3.42	−0.34
MEX	11.64	−2.90	8.97	−1.55
OCE	0.83	−0.12	0.89	−0.06
AK	−12.00	−0.67	−10.63	1.07
AL	−4.91	−1.12	−5.84	0.39
AR	−6.53	−0.85	−6.68	0.60
AZ	−17.17	−0.81	−15.23	1.75
CA	−33.40	−0.69	−29.16	4.37
CO	−12.66	−0.54	−11.00	1.20
CT	−20.62	−0.97	−18.48	2.24
DC	−17.26	−1.36	−16.55	1.96
DE	−12.72	−1.45	−13.10	1.50
FL	−27.93	−0.60	−24.17	3.32
GA	−13.48	−1.09	−13.16	1.65
HI	−24.20	−0.84	−20.99	2.48
IA	−6.76	−0.85	−6.84	0.61
ID	−7.90	−0.69	−7.23	0.57
IL	−17.61	−0.46	−15.45	2.17
IN	−6.90	−1.03	−7.42	0.70
KS	−9.41	−0.71	−8.69	0.88
KY	−5.07	−0.97	−5.74	0.46
LA	−5.37	−0.93	−5.87	0.46
MA	−21.88	−0.61	−19.07	2.54
MD	−19.00	−0.85	−17.15	2.21
ME	−4.88	−1.22	−5.96	0.35
MI	−8.62	−1.07	−9.29	1.21
MN	−10.35	−0.56	−9.29	1.05
MO	−5.58	−1.25	−6.72	0.52
MS	−3.40	−1.24	−4.69	0.10
MT	−3.46	−0.66	−3.80	0.27
NC	−10.41	−1.06	−10.39	1.14
ND	−5.61	−0.67	−5.49	0.44
NE	−9.45	−0.46	−8.25	0.88
NH	−8.12	−1.69	−9.42	0.64
NJ	−29.16	−0.02	−24.68	3.87
NM	−12.23	−0.99	−11.58	1.23
NV	−25.24	−0.33	−21.05	2.68
NY	−28.71	−0.50	−24.79	3.59
OH	−6.12	−1.20	−7.13	0.63
OK	−8.17	−0.91	−7.91	0.61
OR	−12.65	−1.38	−12.60	1.24
PA	−9.89	−1.44	−10.43	0.89
RI	−17.57	−0.51	−14.86	1.67
SC	−7.11	−1.03	−7.59	0.73
SD	−5.02	−0.65	−5.06	0.44
TN	−6.72	−1.00	−7.16	0.65
TX	−22.13	−0.15	−18.66	2.73
UT	−11.45	−0.56	−9.80	0.90
VA	−16.47	−1.36	−16.08	2.02
VT	−5.86	−1.70	−7.42	0.25

Table D.2 – Continued

RoW region or U.S state	Δ% Population	Δ% Welfare	Δ% GDP	Δ% Price Index
WA	−18.81	−1.69	−18.80	2.50
WI	−6.62	−0.98	−6.94	0.57
WV	−2.48	−1.11	−3.81	0.10
WY	−4.77	−0.94	−5.35	0.35
USA	−17.54	−1.38	−16.86	2.22

Notes: This table reports the percentage change of number of population, welfare, GDP, and the price index for each U.S. state (represented by a 2-digit code) and RoW region (represented by a 3-digit code) in the short-run counterfactual in which all immigrants are repatriated to their birthplace relative to the baseline equilibrium. The RoW regions are: Africa (AFR), Canada (CAN), East Asia (CHN+), Europe (EUR), South and Central Asia (IND+), Latin America (LAT), Mexico (MEX), and Oceania and South East Asia (OCE). The measure of welfare is the average income (labor income plus per capita profits plus tariff revenue plus incoming remittances) of natives across skill levels relative to the consumer price index. The price index is a Cobb-Douglas aggregate of the prices of non-tradable and tradable goods. Source: Model output.

D.2 Repatriation by legal status and under higher tariffs

Table D.3. Impact of repatriation in the U.S. in the short-run equilibrium

Panel A. By legal status

Repatriation/Trade Scenario	Δ% Population	Δ% Welfare	Δ% GDP	Δ% Price Index
Undocumented	−3.68	−0.04	−2.96	0.37
Temporary	−0.74	−0.09	−0.79	0.10
Undocumented+Temporary	−4.42	−0.13	−3.76	0.47
Undocumented+Temporary+Permanent	−8.65	−0.32	−7.46	0.96
All immigrants	−17.54	−1.38	−16.86	2.22

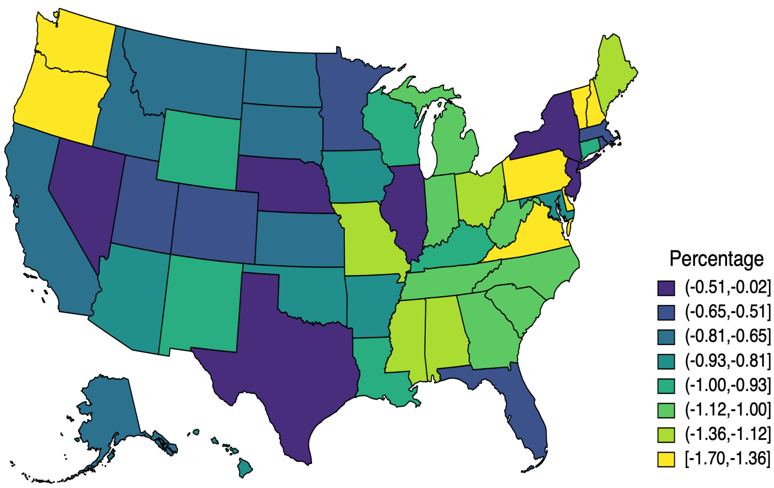
Panel A. By legal status and trade scenario

Repatriation/Trade Scenario	Δ% Population	Δ% Welfare	Δ% GDP	Δ% Price Index
Tariffs	0.00	−0.93	6.20	7.12
Tariffs+Undocumented	−3.68	−0.99	3.05	7.52
Tariffs+Temporary	−0.74	−1.03	5.36	7.23
Tariffs+Undocumented+Temporary	−4.42	−1.09	2.20	7.63

Notes: This table reports the percentage change of number of population, welfare, GDP, and the price index in the short-run counterfactual relative to the baseline equilibrium by legal status in panel (a) and by legal status and trade scenario in panel (b). Tariffs increased, on average, 18.31 pp from 2020 to 2025. The measure of welfare is the average income (labor income plus per capita profits plus tariff revenue plus incoming remittances) of natives across skill levels relative to the consumer price index. The price index is a Cobb-Douglas aggregate of the prices of non-tradable and tradable goods. Source: Model output.

Figure D.1. Welfare change under repatriation of all immigrants in the short-run equilibrium

(a) By U.S. state



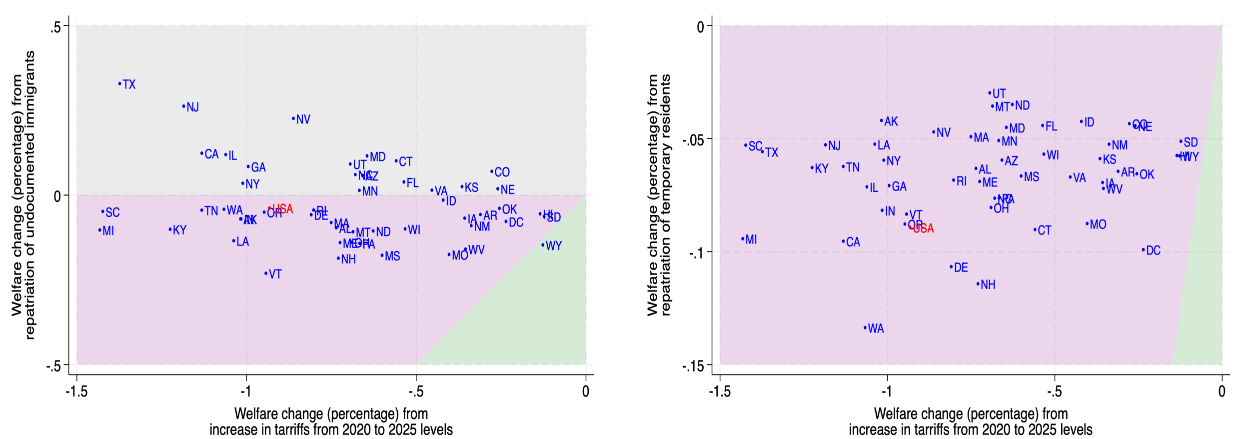
(b) By RoW region

RoW region	Δ% Welfare
AFR	−0.15
CAN	−0.52
CHN+	0.56
EUR	0.20
IND+	−0.06
LAT	−0.05
MEX	−2.90
OCE	−0.12
USA	−1.38

Notes: This figure reports the percentage change in welfare in the short-run counterfactual in which all immigrants are repatriated to their birthplace relative to the baseline equilibrium by U.S. state in panel (a) and by RoW region in panel (b). The RoW regions are: Africa (AFR), Canada (CAN), East Asia (CHN+), Europe (EUR), South and Central Asia (IND+), Latin America (LAT), Mexico (MEX), and Oceania and South East Asia (OCE). The measure of welfare is the average income (labor income plus per capita profits plus tariff revenue plus incoming remittances) of natives across skill levels relative to the consumer price index. Source: Model output.

Figure D.2. Welfare change under migration and commercial restrictions in the U.S. in the short-run equilibrium

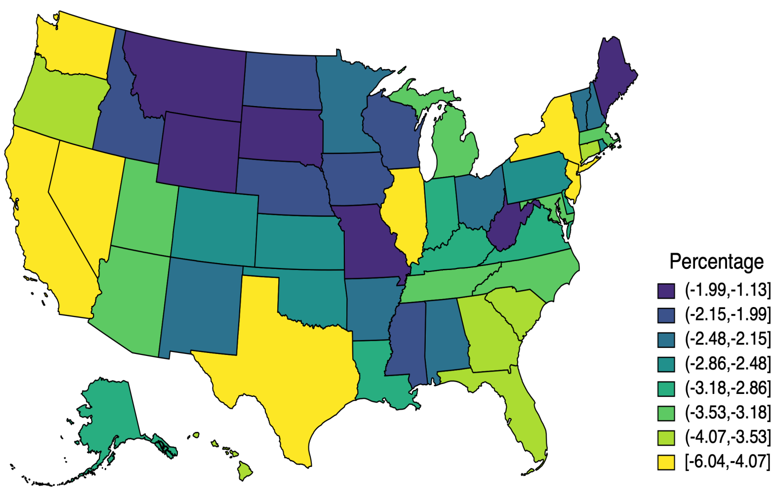
(b) Undocumented immigrants and higher tariffs *(b) Temporary residents and higher tariffs*



Notes: This figure reports the percentage change in welfare by U.S. state in the short-run counterfactual in which undocumented immigrants are repatriated (vertical axis) and tariffs increase from 2020 to 2025 levels (horizontal axis). The green (purple) area shows the region in which welfare losses from migration restrictions are larger (smaller) than those from commercial restrictions. The gray area shows the region with welfare gains from migration restrictions. The measure of welfare is the average income (labor income plus per capita profits plus tariff revenue plus incoming remittances) of natives across skill levels relative to the consumer price index. Source: Model output.

Figure D.3. Welfare change under repatriation of undocumented immigrants and higher tariffs in the long-run equilibrium

(a) By U.S. state



(b) By RoW region

RoW region	Δ% Welfare
AFR	0.50
CAN	10.25
CHN+	3.60
EUR	13.55
IND+	2.58
LAT	2.33
MEX	3.24
OCE	4.21
USA	−3.89

Notes: This figure reports the percentage change in welfare in the long-run counterfactual in which undocumented immigrants are repatriated to their birthplace and tariffs increase from 2020 to 2025 levels relative to the baseline equilibrium by U.S. state in panel (a) and by RoW region in panel (b). The RoW regions are: Africa (AFR), Canada (CAN), East Asia (CHN+), Europe (EUR), South and Central Asia (IND+), Latin America (LAT), Mexico (MEX), and Oceania and South East Asia (OCE). The measure of welfare is the average income (labor income plus tariff revenue plus incoming remittances) of natives across skill levels relative to the consumer price index. Source: Model output.

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