Immigrant Misallocation*

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Abstract

We quantify the barriers that impede the integration of immigrants into foreign labor markets and investigate their aggregate implications. We develop a model of occupational choice with natives and immigrants of multiple types whose decisions are subject to wedges which distort their allocation across occupations. We estimate the model to match salient features of U.S. and cross-country individual-level data. We find that there are sizable GDP gains from removing the wedges faced by immigrants in U.S. labor markets, accounting for approximately one-fifth of the overall economic contribution of immigrants to the U.S. economy. These effects arise from both increased flows from non-participation to predominantly manual jobs as well as from reallocation within the market sector that raises productivity in non-routine cognitive jobs. We contrast our findings for the U.S. with estimates for 11 high-income countries and document substantial differences in the magnitude of immigrant wedges across countries. Importantly, we find differences in the distribution of immigrant wedges across occupations lead to substantial variation in the gains from removing immigrant misallocation, even among countries with similar average degrees of distortions.

Keywords: Immigration, Occupational Barriers, Mobility, Misallocation

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1 Introduction

Immigrants can hold the promise of boosting a country's labor supply and stock of human capital, with potentially significant implications for innovation and growth. Yet, immigrants often face severe barriers to integrate into foreign labor markets, preventing them from working in the occupations that they are most productive at and restricting their productive potential. For instance, immigrants' potential is often limited by occupational regulations and licensing (Peterson, Pandya, and Leblang 2014), lack of destination-specific skills (Moreno-Galbis and Tritah 2016), or discrimination (Oreopoulos 2011). While micro-level evidence on various types of barriers faced by immigrants has been extensively documented in the literature, understanding their relative importance and aggregate effects to aid in the design of immigration and labor market policies has remained elusive.

The goal of this paper is to quantify the aggregate and distributional implications of barriers that prevent immigrants from integrating into foreign labor markets. To do so, we set up a model of occupational choice á la Roy (1951) featuring natives and immigrants of multiple types, where the decisions of immigrants are distorted relative to their native counterparts by wedges. We interpret these wedges as capturing distortions that might impact the occupational choice of immigrants. We find that immigrant wedges in the U.S. are quantitatively large, with significant heterogeneity across worker types and occupations, and with sizable effects on real GDP from removing them. To understand the extent to which the underlying distribution of wedges affects the aggregate implications of immigrant misallocation, we exploit harmonized microdata across multiple countries. We find that cross-country differences in the distribution of wedges across occupations with varying productivities lead to substantial differences in the real GDP gains from removing them, even among countries with similar average degrees of distortions.

These findings raise questions about the economic opportunities offered to immigrants and their degree of economic mobility. For instance, in the U.S. economy, we find that while the estimated wedges are higher among recent immigrants, they remain quantitatively significant even across immigrants who have lived in the U.S. for at least 10 years. Overall, immigrant wedges not only have severe implications for the well-being of immigrants themselves, but also curb their economic potential in the aggregate.

This paper contributes to the literature along three important dimensions. First, we show that the extensive barriers faced by immigrants previously documented in the literature lead to significant misallocation in the aggregate, with high potential real GDP gains from removing them. Second, we identify the key margins across occupations and worker types along which immigrant distortions are quantitatively the largest or are most distortive in the aggregate. Finally, we identify key cross-country differences accounting for heterogeneity in the aggregate implications of immigrant barriers.

We begin the paper by setting up a quantitative general equilibrium model of a closed economy. The economy is populated by natives and immigrants of multiple types who decide whether to work in various types of labor market occupations or stay non-employed. If they participate in the labor market, they choose the market occupation to work in. Each worker type has heterogeneous preferences and productivity across occupations. In addition, each individual worker has an idiosyncratic level of productivity at working in each occupation. The returns obtained by immigrants from working in each occupation are distorted by wedges, which we model as proportional taxes that are reimbursed across all individuals. We interpret these wedges as capturing the wide range of barriers faced by immigrants in foreign labor markets that have been previously documented in the literature. In this model, the wedges distort the occupational choice decisions of immigrants relative to their native-counterparts along two key margins. First, they lead to the exclusion of immigrants from market occupations, generating elevated non-participation rates. Second, they prevent the allocation of immigrants in the market sector to their most productive occupations, leading to misallocation and reduced aggregate output and productivity.

Our first goal is to characterize the magnitude and distribution of the wedges faced by immigrants in U.S. labor markets, and to quantify their aggregate implications. To do so, we estimate the parameters of the model and the wedges to match salient features of individual-level data from the Current Population Survey (CPS) across natives and immigrants of multiple types. Specifically, we estimate the model to match the joint distribution of employment across worker types and occupations as well as their joint distribution of income and wages. In our estimation, we consider three main groups of workers: recent immigrants, those with less than or equal to 10 years since immigration, established immigrants, those with more than 10 years since immigration, and natives. For both types of immigrants and natives, we also consider worker subtypes based on education level, age, and gender. We classify occupations into six groups based on their skill and task-intensity, following Acemoglu and Autor (2011). These disaggregate worker groups allow us to account for demographic differences across occupations with differential skill requirements, when estimating immigrant wedges.

We find that the estimated wedges are quantitatively large and vary systematically across worker types and occupations. In particular, recent immigrants are estimated to face higher wedges than established immigrants, highlighting the importance of accounting for differences even within immigrant subgroups. We also find that wedges are estimated to be larger and more persistent for occupations that are more intensive in person-to-person interactions.

To evaluate the aggregate implications of the barriers faced by immigrants in U.S. labor markets we conduct the following experiment. We contrast our estimated model of the U.S. economy with a counterfactual economy were immigrant wedges are reduced to the level of their native counterparts. We find that removing immigrant wedges leads real GDP to increase by around 4.4 percent. This increase of output results from reallocation along two margins: an increase of labor force participation among immigrants and a reallocation of employed immigrants into more productive jobs. The extensive margin adjustments result in a large increase of immigrant labor supply, especially into manual jobs. This suggests that frictions that discourage immigrant participation in the labor force have a disproportionate impact on occupations that are relatively intensive in manual skills. Along the intensive margin, the reallocation of immigrants across occupations leads to larger gains in productivity but to more modest gains in employment across non-routine and cognitive occupations.

We evaluate the quantitative importance of our findings by contrasting the real GDP gains from removing immigrant wedges relative to the overall real GDP gains provided by immigrants. In particular, we compute the overall real GDP gains provided by immigrants by contrasting our estimated model of the U.S. economy with a counterfactual economy that is identical but without immigrants. We find that the real GDP gains from removing immigrant wedges are substantial: they are approximately one-fifth of the overall real GDP gains provided by immigrants in the U.S. That is, we find that the barriers faced by immigrants in U.S. labor markets severely hinder their productive potential, with significant consequences not only to immigrants themselves but more broadly to the overall U.S. economy.

We show that the magnitude and aggregate implications of immigrant barriers differ substantially across worker types and occupations. To do so, we consider a series of experiments in which we contrast our estimated model of the U.S. economy relative to counterfactual economies in which wedges are removed one-at-a-time for specific worker types or occupations. These exercises reveal that larger real GDP gains accrue from removing the wedges faced by recent immigrants and those without a college degree. We also find larger real GDP gains from removing distortions into non-routine cognitive occupations. These findings show that the magnitude and implications of immigrant distortions are heterogeneous across worker types and occupations, and that these differences are quantitatively significant.

Our second goal is to contrast our findings for the U.S. relative to other high-income economies. To do so, we use the Luxembourg Income Study (LIS) to combine and harmonize individual-level data from labor force surveys for 11 economies. We use the cross-country microdata to estimate the model following the same approach as for the U.S., and use the series of estimated models to contrast immigrant wedges across countries as well as their aggregate implications. We find that there is substantial heterogeneity in the magnitude of the barriers faced by immigrants across different countries. For instance, countries such as Germany or Switzerland are estimated to feature low immigrant wedges on average, while other countries like Spain or Netherlands are estimated to feature much higher average immigrant wedges. In particular, we find that the U.S. features immigrant wedges that are close to the average across the countries in our sample.

Importantly, we show that there is a low correlation between the magnitude of immigrant wedges and the aggregate effects associated with their removal across the countries in our sample.

For instance, the real GDP gains per immigrant from removing immigrant wedges in Canada and Germany are more than twice as large as those of the U.S., despite them having lower immigrant wedges than the U.S. We show that this disconnect between the immigrant wedges and their aggregate implications is a result of cross-country differences in the distribution of immigrant wedges across occupations that are heterogeneous in productivity. Countries with immigrant distortions that are most severe in high-productivity occupations stand to gain the most from removing the labor market barriers faced by immigrants.

This paper contributes to an extensive literature that studies differences in the labor market experience of natives and immigrants. Immigrants have been documented to be at a disadvantage in foreign labor markets due to occupational regulations and licensing (Peterson, Pandya, and Leblang 2014), having lower bargaining power against employers (Moreno-Galbis and Tritah 2016), being subject to discriminatory practices among recruiters (Oreopoulos 2011), facing initial gaps in complementary skills and skills mismatch that results in downgrading (Eckstein and Weiss 2004; Dustmann, Frattini, and Preston 2013), the slowing pace of labor market assimilation (Albert, Glitz, and Llull 2020), and cultural factors (Antecol 2000), among many other factors. These barriers lead to immigrants' poorer performance and outcomes in host countries' labor markets (Abramitzky and Boustan 2017; Arellano-Bover and San 2020; Dostie, Li, Card, and Parent 2020; Albert and Monras 2018). Our paper complements these studies by quantifying the macroeconomic effects of immigrant misallocation that result from these barriers. Our approach relies on using microdata to identify key dimensions of heterogeneity in the size of immigrant wedges across demographics and occupations, and importantly, demonstrates how the distribution of immigrant wedges affects key aggregates such as output, employment, productivity, wages, and labor market allocations.

Our paper also contributes to a broader literature on the macroeconomic effects of the misallocation of factor inputs across production units, sectors, and occupations (Restuccia and Rogerson 2008; Hsieh and Klenow 2009; Buera, Kaboski, and Shin 2011; Bartelsman, Haltiwanger, and Scarpetta 2013; Hopenhayn 2014; Bento and Restuccia 2017; Gopinath, Kalemli-Özcan, Karabarbounis, and Villegas-Sanchez 2017; Hsieh, Hurst, Jones, and Klenow 2019). Relative to this body of work, we focus on the misallocation of immigrants, which represent an increasing share of employment in host countries. We show that immigrant face substantial wedges that distort their occupation decisions, with significant implications for aggregate outcomes.

This paper is organized as follows. Section 2 presents our model. Section 3 provides details on the data and estimation approach, and presents the estimation results. Section 4 shows and discusses our findings. Section 5 concludes.

2 Model

We consider an economy populated by a continuum of individuals and a discrete number of occupations $j = 1, ..., J$. Individuals choose the occupations in which to work, and production in each occupation is carried out by a representative firm that hires their labor. A representative final good producer aggregates the production from each occupation into a final good consumed by individuals. Below, we describe the economic environment in which these agents operate and then define a competitive equilibrium of this economy.

2.1 Individuals

Demographics Individuals live for one period. They are partitioned into types $i = 1, ..., I$ based on their immigration status (e.g., natives, recent immigrants, or established immigrants). Individuals of a given type i are further partitioned into subtypes $g = 1, ..., G$ based on observables such as age, gender, and education. We denote the mass of individuals of type i and subtype g by N_{ig}; the total mass of individuals in the economy is denoted by $N = \sum_{i=1}^{I} \sum_{g=1}^{G} N_{ig}$.

Preferences Individuals of type i and subtype g who choose to work in occupation j have preferences over consumption of the final good that are represented by the following utility function:

$$u_{ig}^{j}(c) = \nu_{ig}^{j} c$$

where ν_{ig}^{j} is a preference shifter that is common across all individuals of type i and subtype g who choose to work in occupation j.

Labor productivity across occupations Individuals are endowed with one unit of labor that they supply to an occupation $j = 1, ..., J$. But individuals are not equally productive in all occupations. Individuals of a given type i and subtype g who choose to work in occupation j share a common productivity component z_{ig}^{j}.

Moreover, each individual of type i and subtype g is characterized by a vector of idiosyncratic productivities $(\varepsilon_1, ..., \varepsilon_j)$ for each of the occupations in the economy. These idiosyncratic productivities are distributed Frechet with scale parameter η and are *i.i.d.* within individuals as well as across individuals of all types and subtypes. The joint cumulative distribution function (CDF) is thus given by $F(\varepsilon_1, ..., \varepsilon_j) = \exp\left(\sum_{j=1}^{J} \varepsilon_j^{-\eta}\right)$.

Then, the effective units of labor supplied by an individual of type i and subtype g who chooses to work in occupation j are given by $z_{ig}^{j}\varepsilon_j$.

Labor income and wedges Individuals of type i and subtype g who work in occupation j are paid a wage rate w_{ig}^{j} per effective unit of labor. Yet, their compensation is subject to wedges $\tau_{i,g}^{j}$ that are specific to each type i, subtype g, and occupation j. We model these wedges as proportional taxes (or subsidies) on the labor income of individuals. We assume that the aggregate revenue collected through these wedges is reimbursed as a proportional subsidy s across all individuals.[1]

Problem of individuals The problem of an individual of type i and subtype g consists of maximizing utility by choosing the occupation j in which to work subject to the budget constraint. In particular, a worker of type i, subtype g, and vector of idiosyncratic productivities $(\varepsilon_1, ..., \varepsilon_j)$ chooses the occupation j^* that solves the following problem:

$$\max_{j=1,...,J} \nu_{ig}^{j} c$$
$$\text{subject to}$$
$$pc = (1 - \tau_{ig}^{j}) w_{ig}^{j} z_{ig}^{j} \varepsilon_j \times (1 + s)$$

where p denotes the price of final goods. The right-hand-side of the budget constraint denotes the labor income of individuals net of wedges $\tau_{i,g}^{j}$ and the reimbursement s; the left-hand-side shows individuals issue all their income to purchase final goods.

2.2 Occupations

Production in each occupation $j = 1, ..., J$ is carried out by an occupation-specific representative firm. We partition the set of occupations into two groups. We refer to occupations $j = 1, ..., J_m$ as market occupations to capture employed workers in the labor market, and to occupations $j = J_m + 1, ..., J_m + J_h$ as non-market occupations to capture non-employed workers, where $J_m + J_h = J$.

We model the difference between market and non-market occupations by assuming that they differ in their production technologies. Production in market occupations is carried out through a constant elasticity of substitution production technology that aggregates the different types of labor in the economy. In contrast, production in non-market occupations is carried out through a linear (constant returns to scale) technology to capture the idea that non-market occupations may encompass home production activities that could be carried out independently by each individual.[2]

[1] Allocations remain unchanged if we instead consider the remibursement of wedges via lump-sum transfers.

[2] Specifically, while we consider an aggregate linear technology in non-market occupations, the equilibrium allocations are identical to those from an economy in which such technology is operated independently by each individual who chooses such occupations.

2.2.1 Market occupations

Production in market occupation $j = 1, ..., J_m$ is carried out by a representative firm using labor supplied by individuals of each type i and subtype g. The production technology features a constant elasticity of substitution σ_j across all worker types and subtypes and is given by:

$$y_j = A_j \left[\sum_{i=1}^{I} \sum_{g=1}^{G} n_{ig}^{j\,\frac{\sigma_j - 1}{\sigma_j}} \right]^{\frac{\sigma_j}{\sigma_j - 1}}$$

where y_j denotes the total output produced by occupation j, and A_j denotes occupation-specific productivity.

The problem of the representative producer in market occupation $j = 1, ..., J_m$ consists of maximizing profits by choosing the amount of labor to hire of each type and subtype taking as given the price of the good sold as well as the wages per effective units of labor of each labor type. The problem is then given by:

$$\max_{y_j, \{n_{ig}^j\}_{i,g}} \; p_j y_j - \sum_{i=1}^{I} \sum_{g=1}^{G} w_{ig}^j n_{ig}^j$$

$$\text{subject to}$$

$$y_j = A_j \left[\sum_{i=1}^{I} \sum_{g=1}^{G} n_{ig}^{j\,\frac{\sigma_j - 1}{\sigma_j}} \right]^{\frac{\sigma_j}{\sigma_j - 1}}$$

where p_j denotes the price of the goods produced by occupation j, and n_{ig}^j denotes the effective units of labor hired from individuals of type i and subtype g.

2.2.2 Non-market occupations

Production in non-market occupation $j = J_m + 1, ..., J_m + J_h$ is carried out by a representative firm using labor of any type and subtype. The production technology is linear in the total effective units of labor hired, with occupation-specific productivity A_j.

The problem of the representative producer in non-market occupation $j = J_m + 1, ..., J_m + J_h$ consists of maximizing profits by choosing the total effective units of labor hired given the price of the good sold as well as the occupations-specific wage rate. The problem is then given by:

$$\max_{y^j, n^j} p_j y_j - w^j n^j$$

$$\text{subject to}$$

$$y_j = A_j n^j$$

2.3 Final good producer

Final goods are produced by a representative firm that aggregates the goods produced across all occupations by operating a constant elasticity of substitution technology with elasticity σ.

The problem of the representative producer of final goods consists of maximizing profits by choosing the amount of goods to purchase from each of the occupations, taking as given the price of final goods as well as the price of the goods produced across all occupations. The problem is then given by:

$$\max_{y,\{y_j\}_{j=1}^{J}} py - \sum_{j=1}^{J} p_j y_j$$

subject to

$$y = \left[\sum_{j=1}^{J} y_j^{\frac{\sigma-1}{\sigma}}\right]^{\frac{\sigma}{\sigma-1}}$$

2.4 Equilibrium

Let each individual's idiosyncratic productivity vector be denoted by ω, and let $\phi(\omega)$ denote the probability density function of individuals with vector ω. Let the occupation choice of an individual of type i, subtype g, and idiosyncratic productivity vector ω, be denoted by $\mathcal{O}_{ig}(\omega) \in \{1, ..., J\}$.

A *competitive equilibrium* of this economy consists of prices $\left(p, \{p_j\}_{j=1}^{J}, \{w_{ig}^{j}\}_{i,g,j}\right)$ and allocations $\left(y, \{y_j\}_{j=1}^{J}, \{n_{ig}^{j}\}_{i,g,j\leq J_m}, \{n^j\}_{j>J_m}, \{\mathcal{O}_{ig}\}_{i,g,j}\right)$ such that:

1. Given price p and wages $\{w_{ig}^{j}\}_{j=1}^{J}$, $\mathcal{O}_{ig}(\omega)$ solves the problem of each individual of type i, subtype g, and productivity vector ω

2. Given price p_j and wages $\{w_{ig}^{j}\}_{i,g}$, y_j and $\{n_{ig}^{j}\}_{i,g}$ solve the problem of the representative firm in each market occupation $j = 1, ..., J_m$

3. Given price p_j and wage w^j, y_j and n^j solve the problem of the representative firm in each non-market occupation $j = J_m, ..., J_m + J_h$

4. Given prices p and $\{p_j\}_{j=1}^{J}$, $\{y_j\}_{j=1}^{J}$ solve the problem of final good producers

5. Government's budget constraint holds:

$$\sum_{j=1}^{J}\sum_{i=1}^{I}\sum_{g=1}^{G} N_{ig} \int_{\omega} \left[\tau_{ig}^{j} w_{ig}^{j} z_{ig}^{j} \varepsilon_j(\omega) \mathbf{I}_{\{j=\mathcal{O}_{ig}(\omega)\}} - s(1-\tau_{ig}^{j}) w_{ig}^{j} z_{ig}^{j} \varepsilon_j(\omega) \mathbf{I}_{\{j=\mathcal{O}_{ig}(\omega)\}}\right] \varphi(\omega) d\omega = 0$$

6. Labor market clearing for individuals (i, g) in market occupation $j = 1, ..., J_m$:

$$n_{ig}^j = N_{ig} \times \int z_{ig}\varepsilon_j(\omega)\mathbf{I}_{\{j=\mathcal{O}_{ig}(\omega)\}}\varphi(\omega)d\omega$$

7. Labor market clearing in non-market occupation $j = J_m + 1, ..., J$:

$$n^j = \sum_{i=1}^{I}\sum_{g=1}^{G}\left(N_{ig} \times \int z_{ig}\varepsilon_j(\omega)\mathbf{I}_{\{j=\mathcal{O}_{ig}(\omega)\}}\varphi(\omega)d\omega\right)$$

8. Market clearing of final goods: $\sum_{i=1}^{I}\sum_{g=1}^{G}\int_\omega c_{ig}(\omega)\varphi(\omega)d\omega = y$

Note that, for expositional simplicity, we do not use different notation to denote the demand and supply of occupation-specific goods. Thus, we abstract from the market clearing conditions for such goods; implicitly assuming the same values that solve the problem of occupational good producers also solve the problem of final good producers.

3 Estimation

In this section, we present our approach to estimating the model to capture salient features of U.S. data. We first describe our data and estimation strategy, and then discuss our estimation results. In Section 4.2 we describe our approach to estimating the model across multiple countries.

3.1 Data

We use U.S. data from the Current Population (CPS) between 2015 and 2019. We restrict our sample to non-business owner individuals between the ages of 25 and 54. This sample restriction allows us to focus on working age individuals, after they finish schooling and prior to retirement. We also drop individuals who are not on active military duty.

We begin by partitioning individuals into three worker types ($I = 3$): natives, recent immigrants, and established immigrants. We define an immigrant to be a foreign-born individual who is either a naturalized citizen or not a citizen. This implies that natives' foreign-born children are classified as natives. Immigrants whose years of immigration to date is less than or equal to 10 years are classified as "recent immigrants" and immigrants whose years of immigration to date is more than 10 years are classified as "established immigrants". Each worker type $i = 1, .., 3$ is then further partitioned into subtypes g based on their level of education, age, and gender. We classify individuals by education into two groups: those with less than a college degree and those with at least a college degree. For age, we consider three groups: young (25-34), middle-aged (35-44), and old (45-54). As a result, these yield a total of 36 worker (type,subtype) pairs.

Our disaggregation of workers into disaggregated subtype categories is key in allowing us to estimate differential labor market outcomes and wedges across individuals. First, these characteristics of individuals are important determinants of labor market outcomes such as earnings and occupation, as previously documented in the literature. Second, workers of different types may have differential wedges in the labor market.

Next, we partition each individual's reported occupation into six categories based on the skills and types of tasks involved. To do so, we classify occupations following Acemoglu and Autor (2011) into: routine manual, routine cognitive, non-routine manual interpersonal, non-routine manual physical, non-routine cognitive interpersonal, and non-routine cognitive analytical. They calculate a category-specific task measure for each occupation in the Standard Occupational Classification (SOC) 2000 list. We merge these with the CPS by mapping the SOC 2000 occupations to the SOC 2010 used by the CPS using crosswalks from the Bureau of Labor Statistics (BLS). Each occupation is then assigned into one category based on the task-measure it scores the highest in.

Finally, we closely follow Hsieh, Hurst, Jones, and Klenow (2019) in allocating individuals between the home non-market and market occupations based on hours worked. We classify an individual as being in the non-market occupation if she is not currently employed or employed and usually working less than 10 hours per week. A currently-employed individual who usually works more than 30 hours per week is assigned to one of the six market occupations defined above. Finally, a currently-employed individual who usually works between 10 and 30 hours per week is classified as a part-time worker. For any part-time worker, we divide her sample weight equally between the non-market the market occupations.

We define annual earnings as total labor income in the previous year. Similar to Hsieh, Hurst, Jones, and Klenow (2019), we calculate earnings only from a restricted sample of full-time workers: individuals who are currently employed, who worked at least 48 weeks in the previous year, and who earned at least $1000 in labor income.[3] Finally, we define hourly earnings as the ratio of annual earnings to total hours worked in the previous year. For each worker-occupation group, we compute the group's average annual and hourly earnings as a geometric average.

The first panel of Table 1 presents the distribution of individuals across market occupations for each worker type (native, recent immigrant, established immigrant). Recent immigrants are well-represented in a wide-range of occupations such as non-routine jobs that are cognitive-analytical and routine-manual jobs. Established immigrants, on the other hand, are more likely to be working in non-routine and routine manual jobs than recent immigrants. When compared to natives, both types of immigrants are more likely to be working in routine manual or non-routine physical jobs.

Our empirical findings also reveal a large degree of heterogeneity in annual (middle panel)

[3]For all earnings data, we use CPI values to adjust for inflation. We report earnings in 2010 dollars.

Table 1: Empirical moments

Occupation Type		Distribution			Annual income			Hourly income		
		N	I_{0-10}	I_{10+}	N	I_{0-10}	I_{10+}	N	I_{0-10}	I_{10+}
Non-routine	Manual, Physical	0.14	0.17	0.19	1.03	0.75	0.84	1.03	0.78	0.86
	Manual, Personal	0.17	0.13	0.14	1.09	0.83	1.07	1.15	0.88	1.13
	Cognitive, Analytical	0.18	0.25	0.16	1.64	1.73	1.90	1.64	1.79	1.92
	Cognitive, Personal	0.25	0.13	0.16	1.45	1.57	1.53	1.41	1.57	1.53
Routine	Manual	0.12	0.23	0.24	0.86	0.62	0.65	0.89	0.66	0.70
	Cognitive	0.15	0.09	0.10	0.90	0.87	0.92	0.97	0.94	1.00

Note: This table presents the employment distribution, annual income, and hourly income across different worker and occupations types. Values are based on a sample of non business owner individuals age 25–54 from the 2015-2019 CPS and averaged over educational attainment. The employment distribution across occupations is conditional on each worker type i. Hourly income and annual income are all expressed as a multiple of values for non-college native workers. N denotes natives, I_{0-10} denotes recent immigrants (≤ 10 years) and I_{10+} denotes established immigrants (> 10 years).

and hourly income (last panel) across worker types and occupations. For example, immigrants have lower annual and hourly income than natives in manual jobs but are typically paid more in cognitive jobs. Importantly, distinguishing immigrants based on the years since arrival leads to an important empirical conclusion: immigrants' negative income gap relative to natives becomes markedly smaller, especially in manual occupations, as the years since immigration increase.

3.2 Estimation Approach

We now present our approach to estimating the model. To do so, we partition the parameter space into two groups. On the one hand, we have a set of parameters that are predetermined and set to standard values from the literature. On the other hand, we have a set of parameters that we estimate to match salient features of the data. Table 2 summarizes our estimation approach, listing the predetermined and estimated parameters, and the moments used to pin down the latter.

The set of predetermined parameters consists of η, σ, and $\{\sigma_j\}_{j=1}^{J}$. We set the shape parameter of the Frechet distribution η to 4, a common value in the literature. We also set the elasticity of substitution across sectoral goods σ to 2, and the elasticity of substitution across all worker types and subtypes σ_j to 4 for all market occupations $j = 1, ..., J$.

Our first step to pinning down our estimated parameters is to make a set of normalizations and identifying assumptions. First, we normalize the worker productivity of natives without a college degree in manual physical non-routine occupations to be given by $z_{1,1}^{1} = 1$. This implies that the productivity of all other worker and occupation types is relative to the productivity of natives without a college degree in manual physical non-routine occupations. Second, we assume that workers of all types and subtypes face no wedges to choose non-market occupations $\tau_{ig}^{j} = 0$.

Table 2: Estimation approach: Parameters and targets

Predetermined Parameters

Parameter	Value	Description
η	4	Frechet shape
σ	2	Elasticity across sectoral goods
$\{\sigma_j\}$	4	Elasticity across worker types

Estimated Parameters

Parameter	# of Parameters	Description	Normalization
$\left\{z_{ig}^j\right\}$	41	Worker productivity	$z_{1,1}^1 = 1$
$\left\{\tau_{ig}^j\right\}$	30	Wedges	$\tau_{1,1}^j = 0 \ \forall j, \ \tau_{ig}^j = 0 \ \forall, i, g, j > J_m$
$\left\{\nu_{ig}^j\right\}$	36	Preferences	$\nu_{ig}^j = 1 \ \forall, i, g, j > J_m$
$\{N_{ig}\}$	6	Mass of workers	$\sum_{i,g} N_{ig} = 1$
$\{A_j\}$	6	Occupation productivity	$A_1 = 1$
Total	119		

Target Moments

Moment	# of Moments
Share of agents (i, g) that work in occupation $j \ \ \forall i, g, j$	42
Avg. annual income of (i, g) in j relative to $(1, 1)$ in 1 $\forall i, g, j$	41
Avg. hourly income of (i, g) in j relative to $(1, 1)$ in 1 $\forall i, g, j$	36
Total	119

Note: This table presents a list of predetermined parameters, estimated parameters, and target moments used in model estimation.

We also assume that natives with a college degree face no wedges to work in any of the market occupations. Thus, we assume that choosing to stay non-employed is not subject to frictions, and that natives with a college degree are not subject to frictions when choosing their market occupations. Third, we normalize the preference for non-market occupations such that $\nu_{ig} = 1$ for all worker types. Finally, we normalize the total mass of all worker types to be 1 and the productivity of the non-routine manual physical occupation A_1 to be 1.

We use the remaining parameters to target the share of workers (i, g) that work in occupation $j \ \forall i, g, j$, average annual income of (i, g) in j relative to the average annual income of natives without a college degree in manual physical non-routine occupations $\forall i, g, j$, and the average hourly income of (i, g) in j relative to the average hourly income of natives without a college degree in manual physical non-routine occupations $\forall i, g, j$.

What determines differences in the distribution of natives and immigrants across employment vs. non-employment as well as across market occupations? What determines income differences across workers and occupations? We answer these questions for a special case of our model to illustrate our approach: We assume that worker productivities z_{ig}^j are common across all occupations j. We then focus on a specific worker type (i, g) and examine differences in allocation and income across occupations j and k.

After some derivations from the agents' problems, the probability that a worker type (i, g) chooses occupation j is given by:

$$\mu_{ig}^j = \frac{\left[w_{ig}^j z_{ig}^j (1 - \tau_{ig}^j) \nu_{ig}^j\right]^\eta}{\sum_{k=1}^J \left[w_{ig}^k z_{ig}^k (1 - \tau_{ig}^k) \nu_{ig}^k\right]^\eta}.$$

Then, we can show that the ratio of wedges across occupations j and k is given by:

$$\frac{1 - \tau_{ig}^j}{1 - \tau_{ig}^k} = \left(\frac{w_{ig}^k}{w_{ig}^j}\right) \times \left(\frac{\text{Avg. Income}_{ig}^j}{\text{Avg. Income}_{ig}^k}\right) \times \left(\frac{\mu_{ig}^j}{\mu_{ig}^k}\right).$$

Given that the ratio of average annual incomes in occupations j and k and the ratio of average hourly incomes in occupations j and k are close to each other in the data, we can write

$$\frac{1 - \tau_{ig}^k}{1 - \tau_{ig}^j} \approx \frac{\mu_{ig}^j}{\mu_{ig}^k}.$$

Thus, our model accounts for empirical differences in the allocation of workers across occupations as primarily arising from differences in wedges across occupations.

Next, we show that differences in income across occupations are inversely related to the ratio of preferences between them:

$$\frac{\nu_{ig}^k}{\nu_{ig}^j} = \frac{\text{Avg. Income}_{ig}^j}{\text{Avg. Income}_{ig}^k}.$$

As a result, income differences within worker types across occupations in the data are primarily interpreted by our model as arising from differences in preferences across occupations.

3.3 Estimation Results

We estimate a version of the model where workers differ in terms of their immigration status type $i \in \{$Native, Recent immigrants, Established immigrants$\}$ and educational attainment subtype $g \in \{$Non-college, College$\}$. Table 3 shows our estimated wedges τ, worker-occupation productivities z, preferences ν, and occupation productivities A for each worker type i; we report weighted averages across worker subtypes.

We highlight the following results. First, while wedges tend to be larger among recent

Table 3: Estimation results

Occupation Type		Wedges τ			Productivity z			Preferences v			Productivity A
		N	I_{0-10}	I_{10+}	N	I_{0-10}	I_{10+}	N	I_{0-10}	I_{10+}	All
Non-routine	Manual, Physical	-0.21	0.52	0.29	0.96	0.94	0.99	0.50	0.50	0.50	1.00
	Manual, Personal	-0.21	0.69	0.52	0.91	0.82	0.86	0.56	0.51	0.47	2.60
	Cognitive, Analytical	0.14	0.46	0.35	1.02	1.06	1.06	0.38	0.27	0.26	5.48
	Cognitive, Personal	0.16	0.56	0.48	1.11	0.92	0.97	0.41	0.29	0.32	5.63
Routine	Manual	-0.03	0.53	0.35	0.86	0.97	1.01	0.62	0.60	0.64	1.09
	Cognitive	0.05	0.53	0.41	0.86	0.77	0.78	0.60	0.47	0.48	1.12

Occupation Type		Distribution			Annual income			Hourly income		
		N	I_{0-10}	I_{10+}	N	I_{0-10}	I_{10+}	N	I_{0-10}	I_{10+}
Non-routine	Manual, Physical	0.15	0.17	0.20	1.04	0.77	0.84	1.04	0.80	0.87
	Manual, Personal	0.17	0.13	0.14	1.09	0.88	1.09	1.15	0.93	1.14
	Cognitive, Analytical	0.17	0.24	0.16	1.63	1.67	1.89	1.64	1.73	1.92
	Cognitive, Personal	0.25	0.14	0.16	1.45	1.57	1.54	1.41	1.56	1.54
Routine	Manual	0.12	0.21	0.24	0.86	0.64	0.66	0.89	0.68	0.71
	Cognitive	0.14	0.11	0.11	0.90	0.91	0.94	0.97	0.99	1.02

Note: This table presents estimated wedges τ, productivity z, and preferences ν for each occupation and worker type, as well as estimated occupation-specific productivity A. It also presents model-implid targeted moments for worker allocation, annual income, and hourly incomes for each occupation type. All moments are aggregated from education-specific values. Wedges of college natives are assumed to be 0 for all occupations. Worker-occupation productivity z, hourly income, and annual income are all expressed as a multiple of values for non-college native workers. Preferences are assumed to be unity for the Home sector, where the annual income is assumed to be half that of non-routine manual physical occupations. N denotes natives, I_{0-10} denotes recent immigrants ($\leq$ 10 years) and I_{10+} denotes established immigrants (> 10 years).

immigrants, they are much smaller among established immigrants, implying that immigrant misallocation across market occupations is partially mitigated as years since arrival becomes longer. Second, worker types have varying occupation-specific productivity strengths. For example, the productivity of natives in non-routine cognitive personal occupations is larger than that of immigrants, while the opposite is true for non-routine cognitive analytical jobs. Furthermore, worker-occupation-specific productivity z is higher among established immigrants relative to recent immigrants. Third, the lower income in manual jobs is reflected in higher preferences ν for manual jobs across all worker types. Finally, occupation-specific productivity A_j is estimated to be much higher for non-routine and cognitive jobs.

4 Results

In this section, we conduct a series of experiments to understand the aggregate and heterogeneous effects of labor market misallocation among immigrants. We begin by analyzing the effect of eliminating the wedges faced by immigrants relative to their native counterparts. This is followed by analyzing the worker- and occupation-specific effects of eliminating wedges. We end

Table 4: Aggregate and sectoral effects of removing wedges

Occupation Type		Percent change Real GDP	Percent change TFP	Percent change Labor	Change in immigrant share (pp)
Aggregate		4.36	0.18	4.23	6.56
Non-routine	Manual, Physical	6.41	-1.26	7.77	10.11
	Manual, Personal	5.54	0.06	5.48	8.42
	Cognitive, Analytical	2.68	1.91	0.75	2.11
	Cognitive, Personal	4.26	1.26	2.97	5.71
Routine	Manual	4.93	-0.62	5.58	6.72
	Cognitive	4.44	0.89	3.52	6.50

Note: This table presents the percent change in aggregate and occupation-specific real GDP, TFP, and labor when immigrant wedges are set equal to their counterpart natives of the same type. A reference worker type (natives with college degree) have wedges set to zero. Aggregate real GDP is output produced in the market sector; total factor productivity (TFP) is real GDP per worker, and labor is the mass of workers in the market sector (or each occupation). The change in immigrant share denotes percentage point change in the fraction of immigrants employed in the market sector or each occupation.

the section with a cross-country examination of the differing extents of misallocation faced by immigrants, the relative gains of addressing misallocation, and the potential reasons behind the differential wedges and gains observed.

4.1 Experiments

Removing immigrant wedges Our main exercise investigates the aggregate and heterogeneous effects of eliminating the distortions faced by immigrants relative to their native counterparts. Formally, this involves setting the wedges τ_{ig}^{j} faced by immigrant type i and subtype g in occupation j equal to the wedge $\tau_{i=N,g}^{j}$ faced by its native counterpart of the same subtype g in occupation j.

Table 4 presents the effects of removing the immigrant-native wedge gap on output, productivity, and employment, both in the aggregate and across occupations. The aggregate output gains associated with improving labor market allocations among immigrants are sizable: real GDP increases by 4.36 percent when immigrant wedges are removed. This increase of output is driven by inflows of immigrants from the non-market sector into market occupations, as well as by a reallocation of workers within market occupations. While the contribution of improvements in total factor productivity (TFP) is limited relative to the expansion of employment in market occupations, this masks two opposing channels. The inflow of less-productive workers who switch from non-market to market occupations leads to lower average labor productivity, especially in occupations that absorb a large mass of such switchers. In contrast, improvements in the allocation of workers across market occupations leads to an increase in average productivity.

The sources of real GDP gains vary significantly across occupations. Manual occupations

Table 5: Quantitative importance of wedges relative to immigrant labor supply

	Real GDP	TFP	Labor
No immigrants	0.77	0.91	0.84
Baseline	1.00	1.00	1.00
No immigrant wedges	1.04	1.00	1.04
$\frac{\text{Gains from no immigrant wedges}}{\text{Gains from immigrants with wedges}}$	18.6%	2.1%	26.1%

Note: This table presents a comparison of real GDP, total factor productivity (TFP), and labor under three scenarios: (1) when all immigrants are removed from the economy, (2) the baseline economy, and (3) when wedges faced by immigrants in excess of those that natives face are removed.

feature the largest employment gains due to a large number of non-market-to-market switchers opting for employment within these occupations. However, this results in a concomitant decrease of TFP in these occupations. In contrast, cognitive occupations observe smaller increases in employment and larger gains in TFP, suggesting a larger role of improvements in the composition of workers arising from within-market reallocation toward these occupations.

Next, in Table 5, we quantify the relative importance of the real GDP, employment, and TFP gains from removing immigrant wedges. To put our findings in perspective, we contrast them relative to the overall contribution of immigrants to the U.S. economy. To do so, we compute the implications of a counter-factual economy identical to our baseline but setting the mass of immigrants to zero. Thus, we compare three economies: (*i*) baseline economy with no immigrants, (*ii*) baseline economy, and (*iii*) baseline economy with no immigrant wedges. In particular, we compare the output, employment, and TFP effects of removing immigrant wedges in the baseline economy (levels under the third economy minus those under the second economy) to the overall effects of immigration (levels under the second economy minus levels under the first economy).[4] We find that the real GDP gains from removing immigrant wedges is approximately 20 percent of the overall real GDP gains provided by immigration. An important implication of this result is that labor market wedges significantly impact immigrants from reaching their productive potential, which in turn greatly affects their contribution to the U.S. economy.

Heterogeneous gains across workers We now turn to analyzing the differential effects of removing wedges by worker type. This allows us to understand which types of immigrants face larger labor market distortions and the heterogeneous payoffs associated with a targeted removal of wedges for each worker type. To do so, we consider counterfactuals where we only remove wedges for immigrant workers of type i and subtype g while holding all other wedges fixed to their baseline values. The first column of panel A in Table 6 shows the real GDP gains from removing wedges faced by each immigrant-education type, while the final column divides this gain by the labor force share of the respective type in order to adjust for differences in the share

[4] We normalize the level of real GDP, TFP, and labor in our baseline economy to unity.

Table 6: Gains from removing wedges by worker and occupation types

		Real GDP (% Δ)	Share of labor force (baseline level, %)	Real GDP growth per 1% of imm. (%)
		A. Removing wedges by worker type		
Immigrants	Non college	1.11	2.95	0.38
(0-10 years)	College	0.82	3.19	0.26
Immigrants	Non college	1.64	9.02	0.18
(>10 years)	College	0.48	5.04	0.10
		B. Removing wedges by occupation type		
Non-	Manual, Physical	-1.00	15.56	-0.06
routine	Manual, Personal	0.76	15.92	0.05
	Cognitive, Analytical	2.10	17.58	0.12
	Cognitive, Personal	2.55	23.28	0.11
Routine	Manual	-1.21	14.00	-0.09
	Cognitive	-0.19	13.65	-0.01

Note: This table presents the effect of removing wedges faced by immigrants (relative to natives) on real GDP. In the last column of panel A, we adjust for the size of each immigrant type by presenting the ratio of real GDP growth to the share of each immigrant type in the labor force. Similarly, in the last column of panel B, we adjust for the relative size of immigrants in each occupation by presenting the ratio of real GDP growth to the share of each immigrant type in the occupation.

of workers of each type.

We note two important observations. First, there are larger gains associated with removing wedges for recent immigrants. While this suggests that newcomers face significant frictions in the labor market, it also shows that these frictions are not persistent and decay over time. Second, larger distortions are also observed among immigrants with no college education, affirming our earlier finding that the removal of wedges leads to a relatively larger reallocation from non-employment (non-market occupations) toward lower-paying market occupations that rely less on college degrees.

Heterogeneous gains across occupations Finally, we consider the heterogeneous effects of removing immigrant wedges by occupation type. This exercise is similar to the previous one except we set the wedges faced by immigrants of all types and subtypes equal to their native counterparts separately for each occupation j one at a time, while holding all other wedges fixed. The last column of panel B in Table 6 presents the resulting change of aggregate real GDP for each counterfactual, adjusted for the baseline share of immigrants working in each occupation.

When the wedges of a given occupation are lowered, workers from other occupations (or the non-market occupation) are diverted towards this occupation. This implies that removing wedges from low-productivity occupations results in lower aggregate output while the opposite is true for high-productivity occupations. This finding reveals that while simultaneously removing all wedges is output-enhancing in the aggregate, removing wedges for a subset of occupations is not always desirable as far as output is concerned.

4.2 Cross-country analysis

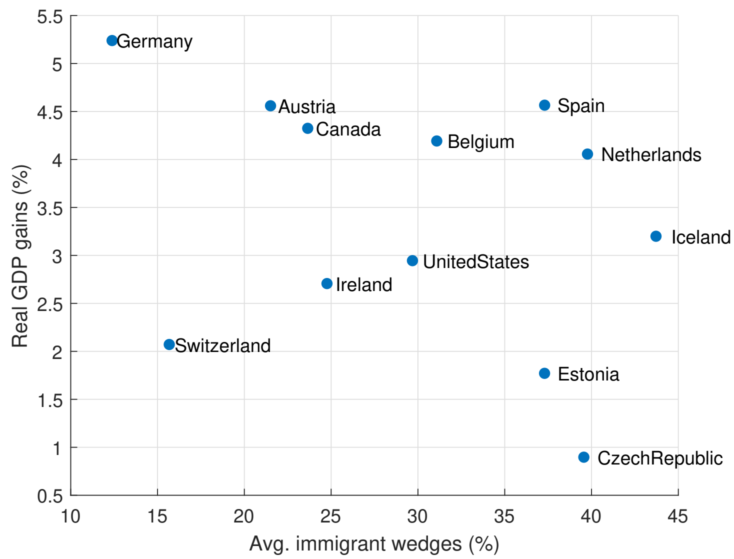
Thus far, we have analyzed the macroeconomic implications of removing the wedges faced by immigrants in U.S. labor markets. We now investigate the degree to which immigrant wedges and their aggregate implications differ across across countries. To do so, we recompute the analysis conducted for the U.S. using cross-country data.

Data We use labor force surveys collected by the Luxembourg Income Study (LIS) database. LIS contains person-level data on labor income, labor market outcomes (including employment, occupation, usual weekly hours worked, and number of weeks worked per year), demographics (including education, age, gender), as well as immigration status. We abstract from differences by years since immigration since this variable is only available for a limited number of countries. Furthermore, we maximize comparability across countries by grouping occupations into quintiles based on average employment-weighted annual earnings. Finally, LIS publishes data in waves which are typically three to five years apart. The latest wave is Wave 11, which collects data for 2018 and 2019. When Wave 11 data is not available for a country, we use the latest wave for which the country has the information necessary to conduct our analysis. This is usually Wave 10 which covers the period from 2015 to 2017.[5] This allows us to compute homogenized target moments on worker distributions, annual income, and hourly income for 12 countries, including the U.S., Canada, and 10 European countries.

Findings Using the harmonized cross-country microdata, we re-estimate the model to match the same target distributional and income moments outlined in Section 3.2 for each country in our sample. Figure 1 presents the cross-country differences in the estimated wedges — presented as the average across worker types and occupations — against the percent gains in real GDP that are realized when wedges are removed. We highlight the following key observations. First, we find a large degree of dispersion not only in the average size of immigrant wedges (10–45 percent) but also in the output gains from removing these wedges (0.5–5.5 percent) across countries. Second, the correlation between the average size of wedges and output gains from removing wedges is low. Take for example the case of the U.S., Canada, and Germany whose average wedges are decreasing in the order listed. However, the output gains from removing wedges turn out to be the highest for Germany and the lowest for the U.S.

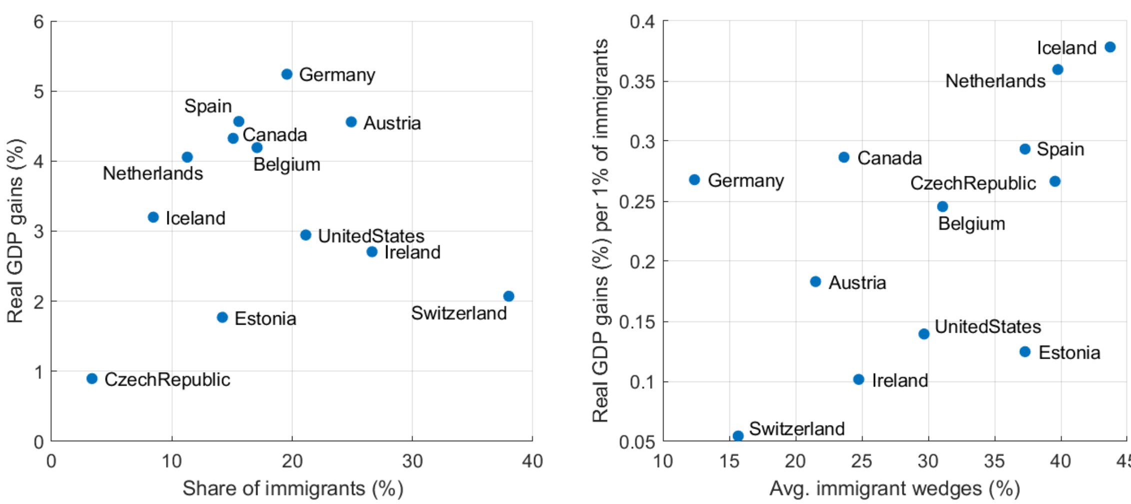
[5] Some countries have data for multiple years between 2015 and 2017. In this case, we use data from the last year available.

Figure 1: Immigrant misallocation across countries



Note: This figure presents a cross-country comparison of the size of average immigrant wedges and the percent increases in real GDP associated with eliminating the wedge-gap between immigrants and natives. Harmonized data on immigration status, employment, income, and demographics are obtained from the Luxembourg Income Study Database (LIS).

Figure 2: Immigrant misallocation across countries: controlling for immigrant share



Note: This left panel plots cross-country real GDP gains associated with eliminating the wedge-gap between immigrants and natives against the share of immigrants in each country's working-age population. The right panel plots real GDP gains adjusted for immigrant share in the population against the average wedges faced by immigrants. Harmonized data on immigration status, employment, income, and demographics are obtained from the Luxembourg Income Study Database (LIS).

One candidate explanation would be differences in the share of immigrants in a country's labor force. Even if estimated wedges are large, a small immigrant population may imply smaller output gains associated with reducing misallocation. The left panel of Figure 2 plots real GDP gains associated with removing wedges against the share of immigrants in the working-age population of each country in our sample. Countries in our sample have large but varying immigrant presence, most within the range of 10 to 30 percent. Indeed, countries with a larger share of

Table 7: Cross-country differences in sector-specific wedges

Country	Parameter	Q1	Q2	Q3	Q4	Q5
U.S.	A_j	1.00	2.47	5.12	8.61	17.30
	Avg. τ_{ig}^{j}	0.01	0.30	0.45	0.41	0.25
Canada	A_j	1.00	1.28	1.28	5.23	3.61
	Avg. τ_{ig}^{j}	0.03	0.39	0.19	0.39	0.38
Germany	A_j	1.00	2.61	6.22	14.78	32.57
	Avg. τ_{ig}^{j}	-0.52	-0.11	0.13	0.38	0.42

Note: This table compares the relationship between occupation-specific wedges and productivity for the U.S., Canada, and Germany. Occupations are divided into quintiles based on average annual income.

immigrants in their population tend to have larger gains from reducing immigrant misallocation. However, sizeable deviations remain: there are countries that have relatively low immigrant distortions but stand to gain larger output increases when wedges are removed than countries with higher average wedges.

Finally, in the right panel of Figure 2, we plot the average size of immigrant wedges against the real GDP gains from removing wedges adjusted by the share of immigrants within the labor force. While this adjustment results in a positive correlation between the average size of wedges and gains from removing wedges, there exists a notable subset of countries for whom the two measures are negatively correlated. For example, Canada and Germany would see output gains from removing immigrant wedges that are close to 2.5 times that of the U.S.'s despite the former countries having smaller immigrant wedges.

What might be driving such non-monotonicities in the relationship between the size of immigrant distortions and the gains from removing them? Table 7 shows the average size of occupation-specific immigrant wedges and compares them with the estimated productivity A_j of each occupation.[6] Clear differences are observed across the three aforementioned countries. In the U.S., immigrant wedges are largest in the third-quintile occupation group. In contrast, Canada and Germany have the largest immigrant wedges in the most productive occupation groups. This suggests that it is not only the size of distortions that matter but also *which* occupations are subject to large distortions. Indeed, Table 8 shows that the larger output gains per immigrant are observed for countries like Canada and Germany for whom there is a stronger (positive) correlation between wedges and occupation-specific productivity. In this sense, the aggregate economic losses incurred from the labor market barriers faced by immigrants cannot be quantified by the average size of distortions alone. An equally important indicator is the *distribution* of wedges across occupations and worker types with varying productivities.

[6] Recall that we group occupations into quintiles based on the average annual earnings of individuals in each occupation.

Table 8: Effects of wedge-productivity relationship on ouptut gains from reducing misallocaiton

Country	corr $\left(A_j, \text{ave.}\, \tau_{ig}^j\right)$	Real gain per 1% immigrants (%)
U.S.	0.24	0.14
Canada	0.63	0.29
Germany	0.79	0.27

Note: This table compare shows the correlation between occupation-specific immigrant wedge size and productivity as well as the output gains adjusted for immigrant population for the U.S., Canada, and Germany. Occupations are divided into quintiles based on average annual income.

5 Conclusion

In this paper, we quantify the labor market barriers faced by immigrants in the U.S. and across countries. We emphasize the importance of both the magnitude of these wedges and how they are distributed across immigrants with different demographics and occupations that vary in skill-intensity and productivity.

Our findings show that the gains from removing labor market misallocation among immigrants in the U.S. are on the order of above 4 percent of real GDP. These gains arise from both increased market participation among immigrants as well as an improved immigrant-job matches. The gains are also distributed unevenly, with recent immigrants without a college-degree poised to benefit the most. A cross-country comparison shows large variations in immigrant distortions and associated GDP gains from reducing misallocation. These findings are especially relevant for countries that rely on the inflow of immigrants who contribute to growth and innovation.

References

(Luxembourg Income Study (LIS) Database): http://www.lisdatacenter.org, (multiple countries; 2020-2021). Luxembourg: LIS.

Abramitzky, R. and L. Boustan (2017): "Immigration in American economic history," *Journal of Economic Literature*, 55, 1311–45.

Acemoglu, D. and D. Autor (2011): "Skills, tasks and technologies: Implications for employment and earnings," *Handbook of Labor Economics*, 4, 1043–1171.

Albert, C., A. Glitz, and J. Llull (2020): "Labor Market Competition and the Assimilation of Immigrants," Tech. rep., mimeo, Universitat Autonoma de Barcelona.

Albert, C. and J. Monras (2018): "Immigration and spatial equilibrium: the role of expenditures in the country of origin," .

Antecol, H. (2000): "An examination of cross-country differences in the gender gap in labor force participation rates," *Labour Economics*, 7, 409–426.

Arellano-Bover, J. and S. San (2020): "The Role of Firms in the Assimilation of Immigrants," *Available at SSRN 3594778.*

Bartelsman, E., J. Haltiwanger, and S. Scarpetta (2013): "Cross-country differences in productivity: The role of allocation and selection," *American Economic Review*, 103, 305–34.

Bento, P. and D. Restuccia (2017): "Misallocation, establishment size, and productivity," *American Economic Journal: Macroeconomics*, 9, 267–303.

Buera, F. J., J. P. Kaboski, and Y. Shin (2011): "Finance and development: A tale of two sectors," *American Economic Review*, 101, 1964–2002.

Dostie, B., J. Li, D. Card, and D. Parent (2020): "Employer policies and the immigrant-native earnings gap," Tech. rep., National Bureau of Economic Research.

Dustmann, C., T. Frattini, and I. P. Preston (2013): "The effect of immigration along the distribution of wages," *Review of Economic Studies*, 80, 145–173.

Eckstein, Z. and Y. Weiss (2004): "On the wage growth of immigrants: Israel, 1990–2000," *Journal of the European Economic Association*, 2, 665–695.

Gopinath, G., Ş. Kalemli-Özcan, L. Karabarbounis, and C. Villegas-Sanchez (2017): "Capital allocation and productivity in South Europe," *The Quarterly Journal of Economics*, 132, 1915–1967.

Hopenhayn, H. A. (2014): "Firms, misallocation, and aggregate productivity: A review," *Annual Review of Econonomics*, 6, 735–770.

Hsieh, C.-T., E. Hurst, C. I. Jones, and P. J. Klenow (2019): "The allocation of talent and us economic growth," *Econometrica*, 87, 1439–1474.

Hsieh, C.-T. and P. J. Klenow (2009): "Misallocation and manufacturing TFP in China and India," *The Quarterly Journal of Economics*, 124, 1403–1448.

Moreno-Galbis, E. and A. Tritah (2016): "The effects of immigration in frictional labor markets: Theory and empirical evidence from EU countries," *European Economic Review*, 84, 76–98.

Oreopoulos, P. (2011): "Why do skilled immigrants struggle in the labor market? A field experiment with thirteen thousand resumes," *American Economic Journal: Economic Policy*, 3, 148–71.

Peterson, B. D., S. S. Pandya, and D. Leblang (2014): "Doctors with borders: occupational licensing as an implicit barrier to high skill migration," *Public Choice*, 160, 45–63.

Restuccia, D. and R. Rogerson (2008): "Policy distortions and aggregate productivity with heterogeneous establishments," *Review of Economic Dynamics*, 11, 707–720.

Roy, A. D. (1951): "Some thoughts on the distribution of earnings," *Oxford economic papers*, 3, 135–146.