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Entrepreneurship and the Efficiency Effects of Migration*

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Abstract

This paper constructs and calibrates a parsimonious two-country dynamic general equilibrium model of entrepreneurship and migration. Countries differ in their TFP and degree of financial frictions. The model is calibrated to replicate the economic and migratory situation of the United States and the rest of the world. I evaluate the impact of changing migration barriers on GDP per capita, average firms productivity, business ownership rates, and consumption on both regions. I find that migration barriers have a non-monotone impact on the average productivity of the host country, depending this on the entrepreneurial skill and mass of people that move in and are displaced by entrants. A migration policy that favors the entry of foreign people with a higher entrepreneurial drive would reduce profits of native entrepreneurs, but would make the economy more efficient and would lift the welfare of workers of the host economy.

Resumen

En este artículo construyo y calibro un modelo de equilibrio general dinámico de dos países que incluye decisiones de emprendimiento y migración. Los países difieren en su productividad total de factores (PTF) y en su grado de fricciones financieras. Calibro el modelo para replicar la situación económica y migratoria de los Estados Unidos y el resto del mundo. Evalúo el impacto de cambiar las barreras a la migración sobre el PIB per cápita, la productividad promedio de las firmas, las tasas de propiedad de negocios, y el consumo en ambas regiones. Encuentro que las barreras a la migración tienen un impacto no monotónico sobre la productividad promedio del país receptor de migrantes, el cual depende de la habilidad y la masa de personas que migran en relación a las personas que son desplazadas por los migrantes. Una política migratoria que favorezca la entrada de extranjeros con una inclinación al emprendimiento mayor reduciría las ganancias de los empresarios locales, pero volvería la economía más eficiente y elevaría el bienestar de los trabajadores de la economía receptora de inmigración

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1 Introduction

One of the most controversial topics in the public agenda during the last years has been immigration. The world has seen important surges in migration flows, motivated either by geopolitical conflicts or the better opportunities that richer countries offer to those who decide to pack things up and move. This has brought reasonable concerns among the population of host countries about the effects that these movements may have on their economies.

The academic literature has typically addressed these questions by considering migration inflows as exogenous increases of labor supply, finding that skilled immigrants may have a positive impact on the economy by augmenting the stock of human capital and improving innovation rates in the areas where they concentrate. Nonetheless, it has had a hard time trying to explain empirically small wage and displacement effects on natives on the aggregate, even when large migration inflows are considered. Famous has been the debate between Card (2005), Card (2009) and Borjas (2006) on the topic.

This paper will follow a different approach. Instead of treating migration flows strictly as changes in labor supply, it will consider migrants as just people that happen to be in a country that is not theirs, in which they are able not only to work as employees, but also to occupy themselves as generators of employment by creating firms. This way of understanding immigrants' activities breaks the tight link between migration and labor supply created by the literature, allowing labor demand to be directly affected by changes in these flows. Moreover, the migration decision will induce selection effects along the entrepreneurial capabilities dimension in the pool of actual migrants. In this way, migration flows will affect average productivity of firms in the host and sending countries by directly modifying the set of potential entrepreneurs and indirectly the conditions in which businesses are created.

The specific theoretical framework used is a parsimonious two-country dynamic general equilibrium model of entrepreneurship and immigration, inspired by Lucas (1978) and Roy (1951) and extended to include capital accumulation, incomplete markets, and financial frictions, following closely Buera and Shin (2017). There will be a host and a sending country of migrants, which will represent the U.S. and the rest of the world, respectively. They will differ in two respects: the host country will have a higher countrywide common TFP component and will feature no financial frictions. Agents will be heterogeneous in how talented they are to manage firms. Those with relatively more talent to run a company than to work in any given country will choose as occupation to be

employers rather than employees and vice-versa. People from both countries will face shocks to their entrepreneurial ability, which they will only be able to insure against by the accumulation of a unique internationally-traded risk-free asset.

People of the sending country will also decide whether it is convenient for them to move abroad. Those that migrate will have to pay a fixed monetary cost out of their pockets and will suffer a preference shock that captures the subjective taste or distaste of just being in the receiving country. Immigrants that are more gifted for entrepreneurship than marginal domestic businessmen, will displace the less efficient ones. The degree in which this displacement effect raises the host country's average productivity will depend crucially on the extent of positive selection in the immigration process. There will be perfect mobility of capital across countries.

The model is calibrated for the U.S. economy and the population weighted average of countries of the rest of the world. The databases used are the American Community Survey, the Current Population Survey, the Survey of Business Owners, and the OECD databases, trying to use the most recent data.

Four policy experiments are considered, three based on comprehensive migration policy changes, and one on a selective one that tries to pick only the most entrepreneurial agents of the rest of the world. The first one is a policy of total restriction on immigration. In this case overall efficiency in the United States decreases. By removing the competition of better foreign entrepreneurs, the people that win from this policy are local entrepreneurs, which in equilibrium are less and enjoy higher profits, while the ones that lose are U.S. workers, who in spite of not having the competitive pressure of foreigners, face a lower demand for their services. Local entrepreneurs are on average worse than the set of immigrants that are absent from the country.

The second one is a free migration policy, which also turns out to have negative effects on efficiency, by inducing more entry of less able people to the entrepreneurial sector. This lower efficiency and the higher competition from foreign workers damages U.S. workers' welfare. Nonetheless, American entrepreneurs would benefit from lower wages.

In third place, I analyze what would happen if we make the immigrant stock as a share of total population to be 10%, as has been tentatively proposed in the media by President Trump. In this case, output per capita, capital per worker, and the wage rate fall. The reason is once again the worsening in the average skill of entrepreneurs due to the exit of immigrant ones, that on average are better endowed than locals. This policy leaves native entrepreneurs better off and domestic workers worse off, which goes against the

set of people that allegedly the policy was intended to help.

Finally, a policy in which the U.S. favors migration of people that held a business in their country of origin is considered, in order to assess the extent in which immigrant entrepreneurs are relevant for the host economy. And I find they indeed are important. Average firms' productivity, capital-labor ratio, and the wage rate all improve substantially, even though output per capita goes down. This is due to the fact that most of the gains accrue to workers, while domestic entrepreneurs lose to the higher competition from foreigners.

It is worth to mention that I observe that policies that improve the efficiency of the host economy by unintentionally or purposefully taking advantage of immigrant entrepreneurs, tend to be of a "beggar-thy-neighbor" type, creating brain drain problems in the rest of the world and reducing their efficiency levels.

The remainder of the article proceeds as follows. Section 2 covers the related literature. Section 3 describes a static model to show in a clear way the main mechanisms this paper considers that are different from the previous literature. Section 4 presents the dynamic model used for the quantitative analysis. Section 5 explains the calibration strategy. Section 6 explains the experiments considered and discusses the main findings. Section 7 finally concludes.

2 Related Literature

There is very little literature dealing with the relation between immigration and entrepreneurship, and even less about the effect of immigrant entrepreneurs on host and sending countries. Most of the research to date has been descriptive, with the focus put on depicting how different are businesses run by immigrants with respect to those of natives, and on how varied are the trajectories that immigrants follow before starting up a firm. In that line, Kerr and Kerr (2016), Kerr and Kerr (2018) and Brown et al. (2015), using restricted-access U.S. Census Bureau data and the Survey of Business Owners (SBO), find that firms founded by immigrants are similar if slightly better than those founded by natives in terms of job creation, have better survival rates, grow at a faster pace, and are more prone to engage in R&D and innovation. Fairlie (2012) and Fairlie and Lofstrom (2014) find that rates of business ownership are generally higher among foreign-born than natives in many developed countries, and that also trends in self-employment rates and new business formation are increasing among immigrants but decreasing among natives

in the United States.

Hunt (2011) and Hunt (2015) focus her attention on the characteristics of immigrant entrepreneurs, finding that skilled immigrants are more likely than comparable natives to start firms with more than 10 employees, and that the entry visa status is an important predictor of the likelihood of entrepreneurship, being higher for those entering with study or work visa than family reunification.

With respect to trajectory patterns, Kerr et al. (2015a) and Kerr et al. (2015b) point that many skilled immigrants enter the U.S. for study or paid work and start their companies after several years in the country, while a smaller number enter for the specific purpose of opening a business. Akee et al. (2007) find that immigrants that performed entrepreneurial activities in their home countries before migrating were more likely to be self-employed in the United States. On the other hand, Lofstrom (2002) finds that the likelihood for becoming an entrepreneur are bigger for immigrants that have spent more time in the U.S.

In terms of how immigrants may affect the entrepreneurial activities of locals, Fairlie and Meyer (2003) find some negative evidence using 1980 and 1990 Census records. However, Kerr and Lincoln (2010), Hunt and Gauthier-Loiselle (2010), and Peri et al. (2015) get positive spillover effects associated to skilled immigrants workers in local areas. This paper will also contribute to answering this question, but by making use of a structural model that includes immigrant workers and immigrant entrepreneurs, allowing to control for the incidence of foreign businessmen on local start-up activity.

Another strand of literature that this paper touches is the one about the choice of migration. The seminal paper is Borjas (1987), which describes how immigrants are not a random selection of people from the sending country, but a biased one in terms of skills, the bias being determined by the relative skill premium in both countries. My model will not have skill premium but will induce a biased selection of immigrants via entrepreneurial abilities. The mean and dispersion of business profits in each country will determine what part of the distribution moves in.

Regarding the studies about the effects of migration on the host country's economic outcomes, the structural model described in Borjas (2003) has come to become a benchmark in the literature (e.g., Ottaviano and Peri (2012); Burstein et al. (2020); Waugh (2017)). This paper, however, will not display heterogeneity of agents with respect to skill, having a very simplified labor market. Instead, my model features heterogeneity in terms of the ability to manage firms. The action will not be on the relative wage movements but on

the entry-exit decision of entrepreneurs, which will in turn affect the composition of the entrepreneurial sector and its productivity.

Finally, this paper is necessarily related to the literature about entrepreneurship and capital accumulation. In this sense, it extends the basic models described in Cagetti and de Nardi (2006), Buera (2009), and Buera and Shin (2017), among others, to an environment that allows for immigrant entrepreneurs and migration choices depending on the returns to entrepreneurial abilities in each country.

3 Static Model

To illustrate the main mechanisms that this article seeks to highlight, I will start with a simple static model. There is a host country and a mass of potential migrants from abroad. Let us denote the host country with the letter H and the rest of the world with an F. The only interaction between these two countries is migration flows (no trade in final goods allowed). The mass of people in the host country is 1, while the mass of potential migrants is ω. Each agent, migrant or native, is endowed with an individual-specific entrepreneurial ability z, drawn in an i.i.d. fashion from the distribution $G(z)$ with support $[\underline{z}, \bar{z}]$. Every agent is also endowed with one unit of time, which they supply inelastically in any of the two mutually exclusive occupations, worker (W) or entrepreneur (E).

In order to migrate, potential migrants have to pay a fixed cost of migration f in units of the final good in country H. After having done that, they are free to perform any activity they desire in H. When assessing whether to migrate or not, migrants also consider the forgone earnings in F, determined by the corresponding local optimal occupational choice. For simplicity, migrants will be considered atomistic with respect to the size of F, so no general equilibrium effects from migration in F are considered. Natives only decide their occupation, hence it is assumed that they do not wish to migrate.

People that decide to be entrepreneurs in country $j \in \{H, F\}$ operate a production function $F(z, A_j l)$, where l are units of labor input and A_j is a labor-augmenting productivity parameter, specific to country j. The production function satisfies:

$$F_z > 0,\ F_{zz} = 0,\ F_l > 0,\ F_{ll} < 0, F_{A_j} > 0, F_{z,A_j} > 0, F_{z,l} > 0$$

and the following Inada conditions:

$$F(0, A_j l) = 0,\ F(z, 0) = 0,\ \lim_{l \to 0} F_l = \infty,\ \lim_{l \to \infty} F_l = 0$$

They will thus receive as income profits $\pi(z, A_j, w_j)$ given by:

$$\pi(z, A_j, w_j) = \max_l \left\{ F(z, A_j l) - w_j l \right\}$$

The first order condition of the profit maximization problem of the entrepreneur is:

$$w_j = A_j F_l(z, A_j l)$$

Labor demand by an entrepreneur with entrepreneurial ability z will then be given by $l^d = l^d(z, A_j, w_j)$, such that $\partial l^d / \partial z > 0$, $\partial l^d / \partial A_j > 0$, and $\partial l^d \partial w_j < 0$. This means that better entrepreneurs command larger companies, that countries with more productive workers feature bigger firms, and that countries with higher labor costs have smaller firms.

On the other hand, people that decide to be workers in country j simply receive a wage w_j for their endowment of time. Let us index occupations by $o \in \{W, E\}$. The optimal occupational choice in country j, $o^*(z, A_j, w_j)$, will then be given by:

$$o^*(z, A_j, w_j) = \arg \max_{o \in \{W,E\}} y_j^o(z, w_j)$$

where $y_j^W(z, A_j, w_j) = w_j$ and $y_j^E(z, A_j, w_j) = \pi(z, A_j, w_j)$. However, it is possible to characterize this occupational choice by a cutoff rule on entrepreneurial ability:

$$o^*(z, A_j, w_j) = \begin{cases} E & \text{if } z \geq z_j^*(A_j, w_j) \\ W & \text{otherwise} \end{cases}$$

where $z_j^*(A_j, w_j)$ is the cutoff, which solves $\pi(z^*, A_j, w_j) = w_j$. The cutoff satisfies $\partial z_j^* / \partial A_j < 0$ and $\partial z_j^* / \partial w_j > 0$. In this way, entrepreneurs will be those with an ability high enough to make the business at least as profitable as the outside option of being a worker. On top of this choice, which they do in every country, migrants that decided to be entrepreneurs at home also have to decide where to occupy themselves. Migrants that opted for being workers at home will not have that option and will be locked in their home country. The

optimal location choice, $j^*(z, \mathbf{A}, \mathbf{w})$, where $\mathbf{A} = [A_H, A_F]$ and $\mathbf{w} = [w_H, w_F]$, will solve:

$$\max\{y_F^E(z, A_F, w_F), y_H^{o^*(z, A_H, w_H)} - f\}$$

There is the possibility of two types of migration flows depending on the optimal occupations in each country:

1. Entrepreneur-worker (EW): It is characterized by those with:

   $$z_F^*(A_F, w_F) \leq z < \min\{\hat{z}^{EW}(A_F, \mathbf{w}, f), z_H^*(A_H, w_H)\}$$

   where $\hat{z}^{EW}(A_F, \mathbf{w}, f)$ is a cutoff entrepreneurial ability that solves:

   $$w_F - f = \pi(\hat{z}^{EW}(A_F, \mathbf{w}, f), A_F, w_F)$$

   such that $\partial \hat{z}^{EW}/\partial A_F < 0$, $\partial \hat{z}^{EW}/\partial w_H > 0$, $\partial \hat{z}^{EW}/\partial w_F > 0$, $\partial \hat{z}^{EW}/\partial f < 0$. Here entrepreneurs with $z \geq \hat{z}^{EW}(A_F, \mathbf{w}, f)$ will stay put, while those with $z < \hat{z}^{EW}(A_F, \mathbf{w}, f)$ will migrate. The observation of this type of flow implies that $z_H^*(A_H, w_H) > z_F^*(A_F, w_F)$, or equivalently that $w_H/A_H > w_F/A_F$.

2. Entrepreneur-Entrepreneur (EE): It is given by those potential migrants with:

   $$z \geq \max\{z_F^*(A_F, w_F), z_H^*(A_H, w_H)\}$$

   It will only be possible if $\pi(z, A_H, w_H) \geq \pi(z, A_F, w_F)$, which is equivalent to require that $w_F/A_F \geq w_H/A_H$, i.e. the wage per efficiency unit has to be higher in F than in H. Let us define the cutoff $\hat{z}^{EE}(z, \mathbf{w}, \mathbf{A}, f)$ such that all entrepreneurs with $z \geq \hat{z}^{EE}(z, \mathbf{w}, \mathbf{A}, f)$ migrate, while those with $z < \hat{z}^{EE}(z, \mathbf{w}, \mathbf{A}, f)$ stay in F

We can immediately appreciate that in this simple model it is not possible to see EW and EE flows simultaneously. When EW flows are observed, wages per efficiency unit in H have to be so high compared to those in F, that profits from running a business in H will be lower than doing it in F, making EE migration not convenient. Conversely, when EE migration happens, wages per efficiency unit in H will be so low that it will always be a worse option to migrate to be a worker in H than being an entrepreneur in H or F.

Let the set of people coming from country j that are working in occupation o in country

l be given by $\mathcal{Z}_{jl}^{o}$. Then equilibrium in country H is determined by:

$$\int_{z\in\mathcal{Z}_{HH}^{W}} dG(z) = \sum_{j=H,F} \int_{z\in\mathcal{Z}_{jH}^{E}} l^{d}(z, A_j, w_j) dG(z) \tag{1}$$

where wages in country H adjust to clear the market by changing the labor demand of each entrepreneur and the supplies of entrepreneurs and workers (native and foreign).

Let us consider an equilibrium in which only EE flows are observed. In particular, assume a situation in which:

$$z_H^*(A_H, w_H) < z_F^*(A_F, w_F) = \hat{z}^{EE}(z, \mathbf{w}, \mathbf{A}, f) \tag{2}$$

Then the equilibrium in H's labor market will look like:

$$\int_{\underline{z}}^{z_H^*} dG(z) = \int_{z_H^*}^{\bar{z}} l^{d} dG(z) + \int_{\hat{z}^{EE}}^{\bar{z}} l^{d} dG(z) \tag{3}$$

where the arguments of the cutoff functions have been dropped for the sake of space and will continue in that way unless otherwise needed. The average productivity level for country H, denoted by $\tilde{z}$, can be consequently defined as:

$$\tilde{z} \equiv \frac{\int_{z_H^*}^{\bar{z}} z dG(z) + \int_{\hat{z}^{EE}}^{\bar{z}} z dG(z)}{2 - G(z_H^*) - G(\hat{z}^{EE})} \tag{4}$$

Similarly, output per capita, denoted by $\tilde{q}$, will be given by:

$$\tilde{q} \equiv \frac{\int_{z_H^*}^{\bar{z}} q(z, w_H) dG(z) + \int_{\hat{z}^{EE}}^{\bar{z}} q(z, w_H) dG(z)}{2 - G(\hat{z}^{EE})} \tag{5}$$

where $q(z, w_H)$ is the final output produced by an entrepreneur of ability z that faces a wage w_H.

Totally differentiating the labor market equilibrium condition we can obtain the following expression relating the equilibrium wage rate in country H to movements in the cutoff for the migration of immigrant entrepreneurs (derivation in Appendix):

$$\frac{dw_H}{d\hat{z}^{EE}} = -\frac{l^{d} g(\hat{z}^{EE})}{g(z_H^*)\frac{\partial z_H^*}{\partial w_H}\left(l^{d}+1\right) - \left(\int_{z_H^*}^{\bar{z}} \frac{\partial l^{d}}{\partial w_H} dG(z) + \int_{\hat{z}^{EE}}^{\bar{z}} \frac{\partial l^{d}}{\partial w_H} dG(z)\right)} < 0 \tag{6}$$

Wages will move in the opposite direction of $\hat{z}^{EE}$. The intuition is very simple, a bigger influx of entrepreneurs is equivalent to a higher demand for labor. Thus the equilibrium can only be restored if wages go up as this induces a lower labor demand per entrepreneur and makes more entrepreneurs switch of occupation to become workers. The converse applies for smaller flows of migrant entrepreneurs.

Using the result just derived, we can apply the same procedure to average productivity and evaluate the incidence of a higher $\hat{z}^{EE}$ on this variable (derivation in Appendix):

$$\frac{d\tilde{z}}{d\hat{z}^{EE}} = \frac{g(\hat{z}^{EE})}{2 - G(z_H^*) - G(\hat{z}^{EE})}\left[\tilde{z} - \hat{z}^{EE}\right] + \frac{g(z_H^*)\frac{\partial z_H^*}{\partial w_H}\frac{dw_H}{d\hat{z}^{EE}}}{2 - G(z_H^*) - G(\hat{z}^{EE})}\left[\tilde{z} - z_H^*\right] \tag{7}$$

We can observe that there are two effects of a higher cutoff. First of all, if we look at the first term, we can realize that as long as the cutoff is below the current average level of productivity, a marginal increase in it should improve average productivity, as the pool of immigrant entrepreneurs are better skilled than before. This is the reinforcement of the positive selection effect induced by migration choices. If the opposite happens, the effect is negative as we will be putting relatively more mass on less efficient native entrepreneurs. On the other hand, the second term is unambiguously negative. This comes from a general equilibrium effect operating through wages. If the cutoff increases, wages go down, inducing more people with lower entrepreneurial skills to become an entrepreneur, deteriorating average productivity. All these effects are modulated by the share of people on the cutoffs (migration and occupational)

With output per capita things operate in a similar fashion. We can show that (derivation also in Appendix):

$$\begin{aligned}\frac{d\tilde{q}}{d\hat{z}^{EE}} =& \frac{\frac{dw_H}{d\hat{z}^{EE}}}{2 - G(\hat{z}^{EE})}\left[\int_{z_H^*}^{\bar{z}} \frac{\partial q}{\partial w_H} dG(z) + \int_{\hat{z}^{EE}}^{\bar{z}} \frac{\partial q}{\partial w_H} dG(z) - q(z_H^*, w_H) g(z_H^*)\right] \\ &+ \frac{g(\hat{z}^{EE})}{2 - G(\hat{z}^{EE})}\left[\tilde{q} - q(\hat{z}^{EE}, w_H)\right]\end{aligned} \tag{8}$$

The first term comprises all the displacement effects on native and immigrant entrepreneurs that stay by the marginal immigrant entrepreneur. Inside the squared brackets, the two terms with integrals consist of the reduction in production by natives and by immigrant stayers when wages go up induced by movements in the cutoff to migrate. The last term inside the brackets is the loss in production by the marginal native entrepreneur that switches occupation in response to changes in wages. As wages go down when the cut-

off is increased, this first term is positive. The second term corresponds to the change in the direct contribution of immigrant entrepreneurs to output per capita when the cutoff changes. If current output per capita is over the output that the marginal immigrant entrepreneur produces, raising the cutoff will improve output per capita as the pool of immigrant entrepreneurs will have a better skill on average and will earn on average more than before the change. If the opposite is true, increasing the cutoff would reduce output per capita as, just like with average productivity, less mass is put on relatively better producers.

What are the main takeaways of this section? First, we see that wages necessarily go up when there is a larger abundance of immigrant entrepreneurs. This certainly goes against the conventional wisdom that higher immigrant inflows would tend to depreciate the value of labor. We need to take into account what they are actually doing. Second, the effect of immigrant entrepreneurs on average productivity, firm size, and output per capita is far from being unambiguous. In particular, it is necessary to consider the relative position of the marginal immigrant entrepreneur with respect to the mean in any of the dimensions considered, and the displacement effects of these entrepreneurs on natives. In general, one could say that higher inflows of immigrant entrepreneurs will be more beneficial or less harmful for the host country when the economic conditions make that the positive selection effect is so strong that all of them are no worse than the average incumbent.

Of course, this simple model abstracts from many considerations that may be relevant in a qualitative and quantitative sense when evaluating immigration impacts is about. First, there are no dynamics, which prevents us from analyzing the effect of immigrant entrepreneurs on capital accumulation and interest rates. Second, not all immigrants stay abroad, some return to their home country. Migration in this sense is a risky venture. Third, conditional on having the same entrepreneurial abilities, some people might be more willing to migrate than others. The dynamic model in the following section will be a first step in dealing with all these issues.

4 Dynamic Model

I now consider a full dynamic model, which will comprise the mechanisms highlighted in the previous section, but will also incorporate savings, capital accumulation, imperfect capital rental markets, stochastic entrepreneurial ability endowments, and return migra-

tion. Imperfection in the capital rental market is modeled with a collateral constraint that is proportional to an individual's financial wealth. Individuals will only be able to use an internationally traded risk-free asset to smooth consumption across time and states as in a standard Bewley model.

Just like in the static model, there will be two countries, home H and rest of the world F, indexed by $j \in \{H, F\}$. The mass of people in H is 1, while the mass of people in F is ω. People living in F, will have the option to migrate to H after paying the upfront monetary cost in final good units f. Once having migrated, immigrants will stochastically return to their home countries with exogenous probability η. There is no upfront cost of returning home. Natives of country H will never migrate. Capital is perfectly mobile across countries. There will be no further interaction between H and F besides migration and capital flows. The model will be set in discrete time.

4.1 Heterogeneity and Demographics

Individuals are assumed to be infinitely-lived and heterogeneous with respect to their wealth a, their entrepreneurial productivity z, and their country of birth $k \in \{H, F\}$. Wealth is chosen endogenously by forward-looking savings decisions. The individual's entrepreneurial productivity follows an exogenous Markovian stochastic process with transition matrix $P(z, z')$, where $p_{i,j} = \Pr(z' = z_i | z = z_j)$.

4.2 Preferences

Individuals discount future utility using the discount factor β, which is common for all people of both countries. Preferences are described by the following expected utility function over sequences of consumption, $\{c_t\}_{t=0}^{\infty}$:

$$U(c) = \mathbb{E}\left[\sum_{t=0}^{\infty} \beta^t u(c_t)\right], \quad u(c_t) = \frac{c_t^{1-\sigma}}{1-\sigma} \tag{1}$$

where σ is the coefficient of relative risk aversion. Leisure does not enter the utility function, which rationalizes the assumption that individuals supply inelastically their unit endowment of time in any of the two occupations available, worker or entrepreneur.

4.3 Production Technology

At the beginning of each period, in any country, individuals choose whether to work for the market wage or to operate their own business. An entrepreneur with productivity z in country j produces using capital k and labor l according to:

$$A_j z f(k,l) = A_j z k^{\alpha} l^{\theta} \tag{2}$$

where α and θ are the elasticities of output with respect to capital and labor such that $\alpha + \theta < 1$, implying diminishing returns to scale in variable factors at the establishment level, mimicking the span-of-control feature of Lucas (1978). A_j is a country-specific common TFP parameter that boosts productivity of factors and entrepreneurial abilities in the same proportion. It will be endogenous and its determination will be based on the following functional form:

$$A_j = \bar{A}_j M_j^{\phi}, \;\; \phi < 0$$

where M_j is total population (natives and immigrants) living in country j. The idea of this functional form is to capture any kind of variable that determines productivity outside of the elements considered in this model (institutions, quality of infrastructure, labor force average human capital, etc.) and the existence of a fixed factor, which can be thought of as land, that creates congestion effects when more people move in.

4.4 Financial markets

A risk-free one-period bond and physical capital are the only financial and real assets in both economies. In every country j there is a perfectly-competitive financial intermediary that sells bonds backed by the physical capital stock to households, and rents out capital to entrepreneurs of any country j at rate R. Individuals may also issue bonds (private IOUs) to other individuals subject to a borrowing constraint. All bonds are repaid with probability one. The risk-free return is denoted by r (common for both countries). The zero profit condition for the intermediary implies that the rental cost of capital is $R = r + \delta$ in every country, with δ being the depreciation rate, common for both countries.

Entrepreneurs' capital rental k in country j will be limited by imperfect enforceability of contracts. In particular, once production has occurred, entrepreneurs may renege on their contracts. When this happens, entrepreneurs keep a fraction $1/\lambda_j$ of the rented capital,

i.e.:

$$\frac{1}{\lambda_j}k, \;\; \lambda_j \geq 1$$

The punishment will be the loss of their financial assets a, held by the intermediary. Entrepreneurs who default are not excluded from any economic activity in the future. Actually, they might even deposit the stolen capital k/λ_j and continue on as a worker or an entrepreneur. This assumption is made to get a simple static collateral constraint.

I will focus on equilibria in which rental capital contracts are incentive-compatible. Hence, entrepreneurs' capital rental k in country j will be limited by the collateral constraint $k \leq \lambda_j a$. Thus, $\lambda_j = \infty$ would correspond to perfect capital rental markets, and $\lambda_j = 1$ to financial autarky, where all capital needs to be self-financed by entrepreneurs. The same λ_j applies to everyone in a given economy. This specification follows the standard practice in the literature on financial frictions and entrepreneurship.

I will restrict the analysis to the case where credit transactions are within a period. That is, borrowing for inter-temporal consumption smoothing is not allowed in this model ($a \geq 0$). This constraint will bind only for individuals who choose to be workers, and has no direct incidence on the behavior of entrepreneurs, who have to hold financial assets to rent capital.

4.5 Agents' Problems

4.5.1 Country H's natives

The recursive representation of the problem of an individual born in country H is given by the following Bellman equation:

$$v^H(a,z) = \max_{c,a' \geq 0} \left\{ u(c) + \beta \mathbb{E}\left[v(a',z') | z \right] \right\}$$

subject to:

$$c + a' \leq \max\left\{ w_H, \pi_H(a,z;w_H,r) \right\} + (1+r)a$$

where w_H is the wage rate in country H, and $\pi_H(a,z;w_H,r)$ is the profit from operating the individual technology. This profit function is defined as:

$$\pi_H(a,z;w_H,r) = \max_{l,k \leq \lambda_H a} \left\{ A_H z k^\alpha l^\theta - w_H l - (\delta + r)k \right\}$$

The input demand functions are denoted by $l(a, e; w_H, r)$ and $k(a, e; w_H, r)$, and the collateral constraint $k \leq \lambda_H a$ is taken into account

4.5.2 Country F's natives

Potential migrants: Besides their consumption, savings, occupational, and entrepreneurial choices, they have to decide whether to migrate or not to country H. This decision is evaluated at the end of the corresponding period. Hence, the recursive representation of their problem is as follows:

$$v^F(a, z) = \{v_s(a, z), v_m(a, z) - \epsilon\}$$

where s is for staying, m for migrating, and $\epsilon \sim N(0, \sigma_\epsilon^2)$ is an i.i.d. preference shock for living abroad. The purpose of this shock is to avoid sharp movements in migration flows when environment conditions change, which is at odds with the data. Thus $v_s(a, z)$ is the indirect discounted utility from staying in country F and $v_m(a, z)$ is the gross indirect discounted utility from migrating to country H. The value function of staying is given by:

$$v_s(a, z) = \max_{c, a' \geq 0} \left\{ u(c) + \beta \mathbb{E} \left[v^F(a', z') | z \right] \right\}$$

subject to:

$$c + a' \leq \max \{w_F, \pi_F(a, z; w_F, r)\} + (1 + r)a$$

where w_F and r are the wage rate and the rental rate of capital prevalent in country F. $\pi_F(a, z; w_F, r)$, $l(a, e; w_F, r)$, and $k(a, e; w_F, r)$ are defined in an analogous way to the country H's natives case.

On the other hand, the value function of migrating will be:

$$v_m(a, z) = \max_{c, a' \geq 0} \left\{ u(c) + \beta \mathbb{E} \left[v_e(a', z') | z \right] \right\}$$

subject to:

$$c + a' \leq \max\{w_H, \pi_H(a, z; w_H, r)\} + (1 + r)a - f$$

where $v_e(a, z)$ is the indirect discounted utility from being an emigrant in country H.

Emigrants living in H: Individuals already living in H will not have a migration choice, but they will face uncertainty about whether they will have to return forcefully to their home country or not. In this sense, the recursive representation of their problem will be

given by:

$$v_e(a,z) = \max_{c,a' \geq 0} \left\{ u(c) + \beta \mathbb{E}\left[\eta v_s(a',z') + (1-\eta) v_e(a',z') | z \right] \right\}$$

subject to:

$$c + a' \leq \max\left\{ w_H, \pi_H(a,z;w_H,r) \right\} + (1+r)a$$

It is important to note that once having been selected to return, immigrants have to spend at least one period in their home country, which is reflected in that the continuation value in that case is $v_s(a,z)$ and not $v^F(a,z)$. Similarly, new immigrants in country H will spend at least two periods, one as a new immigrant, other as an emigrant, before facing the uncertainty of having to return to their home country.

4.5.3 Occupational Choice

The max operator in each one of the budget constraints represents the occupational choice. An individual with current wealth a and entrepreneurial productivity z will choose to be an entrepreneur only if profits as an entrepreneur $\pi_j(a,e;w_j,r)$, exceed labor income as a wage earner, w_j. We can characterize this as a simple policy function. Define z^* to be the ability at which individuals are just indifferent between being wage earners and being entrepreneurs conditional on being able to borrow freely at the interest rate r, i.e. z^* solves:

$$\pi_j(\underline{a}^j(z), z; w_j, r) = w_j$$

Individuals with ability higher than z^* decide to be entrepreneurs if their current wealth is higher than the cutoff wealth $a^*(z)$, $a \geq a^*(z)$, where $a^*(e)$ solves:

$$A_j z (\lambda_j a^*(e))^\alpha (\tilde{l}(\lambda_j a^*(e), z, w_j))^\theta - w_j \tilde{l}(\lambda_j a^*(e), z, w_j) - (\delta + r)\lambda_j a^*(e) = w_j$$

where $\tilde{l}(k,z,w_j)$ is the demand for labor conditional on a certain level of rental capital. This means that with imperfect capital rental markets, individuals with a certain ability will choose to be entrepreneurs only if they are wealthy enough to overcome the collateral constraint and run their businesses at a profitable scale. Alternatively, agents of a given wealth a choose to become entrepreneurs if their ability is high enough. Both ability and resources determine the occupational decision.

Therefore, given the optimal static decision, the dynamic program is as stated in the two previous subsections for natives of both countries, but subject to an occupation-related

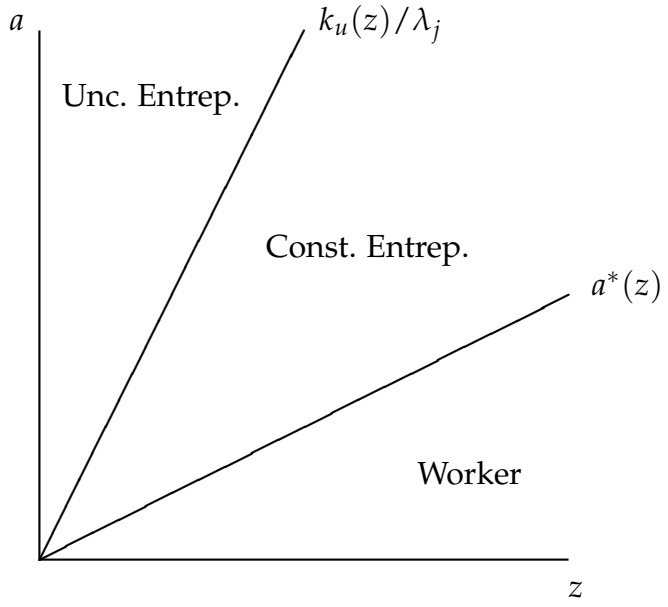
income function of the form:

$$y_j(z,a) = \begin{cases} w_j & \text{if } a \in [0, a^*(z)) \\ \bar{\pi}_j(a,z;w_j,r) & \text{if } a \in [a^*(z), k_u(z)/\lambda_j) \\ \pi_j(a,z;w_j,r) & \text{if } a \in [k_u(z)/\lambda_j, \infty) \end{cases}$$

where $\bar{\pi}_j^c$ refers to the amount of profits an entrepreneur with ability z and wealth $a \geq a^*(z)$ would obtain if constrained to have $k = \lambda_j a$, $k_u(z)$ is the level of capital hired when the entrepreneur is unconstrained, and π_j is the associated unconstrained level of profits.

In Figure 1 we can graphically appreciate how the amount of wealth will indirectly determine the occupational choice in an environment with financial frictions. At any given level of entrepreneurial ability, the wealth cutoff to become an entrepreneur will be given by $a^*(z)$, however had the individual become an entrepreneur, it would be a constrained one. To operate at the efficient scale, the agent needs to possess a higher amount of wealth, in fact at least $k_u(z)/\lambda_j$. Just there he will be unconstrained. Note that if $\lambda_j \to \infty$, the cutoff to be unconstrained will fall below the cutoff to become an entrepreneur, effectively making any individual that decides to be an entrepreneur to be an unconstrained one and decoupling the occupational choice from asset holdings.

Figure 1: Optimal Occupation



4.6 Stationary Competitive Equilibrium

Let $\mu(a,z)$ be the cumulative density function for the joint distribution of wealth and entrepreneurial productivity z in the world. Let $\nu(a,z,\chi)$ be the world cumulative density function for the joint distribution of wealth, z, and the individual-specific migration status χ in the world. Migration statuses can be any of the following

$$\chi \in \{\text{native, emigrant, new immigrant, foreigner}\}$$

where *native* means born in H residing in H, *emigrant* born in F residing in H, *new immigrant* born in F just arrived to H, and *foreigner* born in F residing in F. Let $b(a,z,\chi)$ be the migration policy function for an individual with wealth a, entrepreneurial ability z, and migration status z. This policy function will only be defined for agents with *foreigner* migration status. Finally, let $\nu(a|z,\chi)$ be the associated c.d.f. of wealth conditional on a given (z,χ) pair.

A stationary competitive equilibrium thus consists of joint distributions $\nu(a,z,\chi)$, allocations $c(a,z,\chi), a'(a,z,\chi), l(a,z,\chi), k(a,z,\chi), b(a,z)$, and prices w_H, w_F, r such that:

- Given w_H, w_F, r, $\{c(a,z,\chi), a'(a,z,\chi), l(a,z,\chi), k(a,z,\chi), b(a,z,\chi)$ solve the problem of agents in both countries
- Labor, capital, and goods markets clear
  - Labor market:

$$\int_{\{\chi\neq\text{for.}\}} \left(\int_{a^*(z)}^{\infty} l(a,z,\chi) d\nu(a|z,\chi) \right) d\mu(z,\chi) = \int_{\{\chi\neq\text{for.}\}} \nu(a^*(z)|z,\chi) d\mu(z,\chi)$$

$$\int_{\{\chi=\text{for.}\}} \left(\int_{a^*(z)}^{\infty} l(a,z,\chi) d\nu(a|z,\chi) \right) d\mu(z,\chi) = \int_{\{\chi=\text{for.}\}} \nu(a^*(z)|z,\chi) d\mu(z,\chi)$$

    where for. stands for foreigner.
  - Capital market:

$$\int \left(\int_{a^*(z)}^{\infty} k(a,z,\chi) d\nu(a|z,\chi) \right) d\mu(z,\chi) = \int \int_0^{\infty} a d\nu(a|z,\chi) d\mu(z,\chi)$$

- The joint distribution of wealth, productivity, and migration statuses $\nu(a,z,\chi)$ evolves

according to:

$$\nu'(a', z', \text{native}) = \int_{\{a'(a,z,\text{emig.}) \leq a', z \leq z'\}} d\nu(a, z, \text{native})$$

$$\begin{aligned}\nu'(a', z', \text{emig.}) =& (1-\eta) \int_{\{a'(a,z,\text{emig}) \leq a', z \leq z'\}} d\nu(a, z, \text{emig.}) \\ &+ \int_{\{a'(a,z,\text{new im.}) \leq a', z \leq z'\}} d\nu(a, z, \text{new im.})\end{aligned}$$

$$\nu'(a', z', \text{new im.}) = \int_{\{a'(a,z,\text{for.}) \leq a', z \leq z', b(a,z,\chi) = m\}} d\nu(a, z, \text{for.})$$

$$\nu'(a', z', \text{for.}) = \eta \int_{\{a'(a,z,\text{emig.}) \leq a', z \leq z'\}} d\nu(a, z, \text{emig.})$$

where new im. stands for new immigrant. and emig. for emigrant.

We can appreciate that labor market is cleared in each country separately, but the capital market is at the world level. This comes from the assumption of perfect capital but imperfect labor mobility.

In the quantitative analysis the model will be calibrated to the U.S. and a population weighted average of the countries of the rest of the world. The U.S. will be the understood as the analog of country H, while the rest of the world will be of F. It will be assumed that the world has converged to a stationary equilibrium, where distributions of entrepreneurial productivity, wealth, and migration statuses are invariant.

5 Calibration

Calibration will be performed assuming that the U.S. economy has perfect capital markets ($\lambda_H = \infty$), while the rest of the world does not ($1 \leq \lambda_F < \infty$). Additionally, the U.S. economy will be the frontier in terms of overall efficiency. This will mean that A_H will be set to 1. The entrepreneurial technology will be interpreted as an establishment in the data. The entrepreneurial productivity z will be assumed to follow a discretized version of an autoregressive process with normal innovations, $\log z' = \rho \log z + \varepsilon$, with $\varepsilon \sim N(0, \tau^2)$. I will approximate this autoregressive process with a 5-state Markov chain following Tauchen (1986) procedure.

There are fifteen parameter values to be determined: the coefficient of relative risk aversion, σ; the depreciation rate δ; two entrepreneurial technology parameters, α and θ; the

probability of return migration, η; the population mass of the rest of the world population, ω; two parameters describing the entrepreneurial productivity process, ρ and τ; the TFP intercept of both countries, A_H and A_F; the financial frictions parameter in the rest of the world, λ_F; the subjective discount factor, β; the fixed cost of migration, f; the variance of the preference shock, σ_ϵ^2; and the elasticity of TFP to total population, ϕ.

The calibration strategy will consist in reducing the number of parameters that are used to match the data as much as possible. Therefore, I will divide the parameters in two sets. The first set either can be easily estimated from the data without using the model or has been estimated by many previous studies. The second set of parameters will be used to match some relevant empirical moments.

5.1 Externally Calibrated Parameters

I will set $\sigma = 1.5$, a value close to those estimated by, among others, Attanasio et al. (1999). The annual depreciation rate will be $\delta = 0.06$, as is standard in the business cycle literature. To match the aggregate income share of capital in the U.S., I will impose $\alpha/(\alpha + \theta)$ to be equal to 0.33. The return migration probability, η, will be taken directly from the American Community Survey database for the years 2010-2014, where it is defined as the number of immigrant returnees and deads over the total immigrant population. Its value is $\eta = 0.015$. The mass of country F, ω, will be set to the ratio of the sum of the population of all the countries of the world but the U.S. to the population of the U.S. Its value will be 22. The variance of the preference shock cannot be identified from a steady state analysis. In the migration literature it is typically considered a determinant of the elasticity of migration flows to changes in migration costs. Therefore, we would need to find a broad and hopefully exogenous change in migration costs in the U.S. data in order to assess the response of flows to it. This has not been done in this version of the paper, but the plan is to incorporate it in the future. In the meantime, I will just set the parameter to be 8.7025, which is the variance of the mean zero i.i.d. Type-I extreme value preference shocks estimated in Caliendo et al. (2021), using EU data. The elasticity of TFP with respect to total population, ϕ, will be set to -0.03, which is a value taken from Docquier et al. (2010). The justification for the use of this number is that according to the literature (Ciccone and Hall (1996)) the share of land in production is approximately 0.03. Given this number, I will set the TFP intercept of the United States to be such that total TFP amounts to 1, i.e. $\bar{A}_H = 1.7961$. A summary of the parameters and their values can be observed in Table 1.

5.2 Estimated Parameters

We have seven parameters still to be determined, $\alpha + \theta$, ρ, τ, $\bar{A}_F$, β, f, and λ_F. For all the parameters besides those strictly pertaining to the rest of the world economy, the United States will be considered the economy of reference. The seven moments that will be targeted are: the share of earnings generated by the top five percentiles of the population; the exit rate of establishments; the employment share of the top decile of establishments by size; the ratio of GDPs per capita in the U.S. and in the whole world; the real interest rate; the fraction of immigrants in the population; and the the degree of external finance over GDP in the rest of the world.

In Table 1 we can appreciate all the calibrated parameters with their values and the associated targeted moments, if any. The top 5 percentiles of the population by earnings represent 30% of the total earnings generated in 1998. The top decile of establishments by size has an employment share of 69% in 2000. The annual establishment exit rate is 0.1. These three statistics are obtained from the US Census Business Dynamics Statistics. The real interest rate is set to 0.04, which is a typical empirical value obtained in previous studies. The fraction of immigrants in the population is 0.135, which is the number obtained in the 2017 Current Population Survey (CPS). The fraction of U.S. GDP in the U.S. to that of the whole world is 0.15 at purchasing power parity US dollars, according to the IMF databases for the year 2017. Finally, the ratio of external finance by firms to GDP is 0.7, a value in the ballpark of those estimated for developing countries according to Beck et al. (2000). The list of targeted parameters and their values in the data and the model can be found in Table 2.

The identification of the parameters will be performed by making use of a simulated method of moments (SMM) approach. All moments will be equally weighted, which could impact the efficiency of the estimation but should not render biased estimates if we believe in the model at hand. In particular, let M^E denote the vector of empirical moments and $M(\Omega)$ denote the vector of simulated moments for a given Ω. I will then choose Ω to minimize the sum of squared deviations between the model and the data, i.e.:

$$\min_{\Omega} \sum_{i=1}^{8} \left(M_i^E - M_i(\Omega) \right)^2$$

where i indexes the moment in question.

Even though the parameters are calibrated jointly, and most of the target moments cannot be expressed analytically, I would like to be as transparent as possible about the

parameter identification. For that purpose, I will provide below a heuristic description about the relationship between the parameters and the specific moments chosen.

Table 1: Calibration

Parameter	Value	Source/Target
A. Externally calibrated		
σ	1.5	Attanasio et al. (1999)
δ	0.06	Stokey and Rebelo (1995)
$\alpha/(\alpha+\theta)$	0.33	NIPA
η	0.015	ACS 2010-2014
ω	22	U.S. Census Bureau
σ_ϵ^2	8.7025	Caliendo et al. (2021)
ϕ	-0.03	Docquier et al. (2010)
$\bar{A}_H$	1.7961	Normalization
B. Internally calibrated		
β	0.9298	Real interest rate
f	7.50	Fraction of immigrants
$\alpha+\theta$	0.7918	Top 5% earnings share
τ	0.0704	Top 10 % employment
ρ	0.9793	Establishment exit rate
$\bar{A}_F$	1.3288	U.S. GDP/World GDP
λ_F	1.5055	External finance/GDP

Table 2: Moments

Moment	Data	Model
Real interest rate	0.04	0.04
Fraction of immigrants	0.14	0.15
Top 5% earnings share	0.30	0.31
Top 10% employment	0.69	1.00
Establishment exit rate	0.10	0.01
U.S. GDP/World GDP	0.15	0.07
External finance/GDP	0.70	0.83

5.3 Identification Discussion

The parameter β, which determines how important are future periods relative to the current period for agents, will be identified from the real interest rate. A higher β means that individuals will save more in order to insure themselves against idiosyncratic shocks to their entrepreneurial abilities in the future, therefore augmenting the supply of assets and lowering its return. The identification of the fixed migration cost f is obtained by

targeting the share of immigrants on the total population. The higher the f, the less profitable it is for potential migrants to make it to the U.S., so a smaller amount of people will decide to do so. The degree of decreasing returns to scale, $\alpha + \theta$, should be captured by the variation in the top 5% earnings share. The lower the degree of decreasing returns to scale, the closer the model gets to a standard constant returns to scale setup where there are no economic rents left for the owners of firms. Therefore, the more concentrated earnings are, the more likely is that are important decreasing returns to scale present. The variance of the shocks to the idiosyncratic entrepreneurial ability will be mostly identified by the top decile of establishments by size. The higher τ, the bigger the concentration of employment at the top of the tail of the distribution of employment per firm. To identify the persistence of a certain entrepreneurial ability level ρ, I focus on the establishment exit rate. The higher the persistence of shocks to entrepreneurial ability, the lower the exit rate, as entrepreneurs would be more and more concentrated in very high types that would hardly drop out of their occupation. To identify the TFP parameter of the rest of the world, $\bar{A}_F$, the ratio of U.S. GDP to that of the world is used. The logic is pretty simple and is that the less productive the rest of the world is, the lower its GDP would be and in turn that of the world as a whole, which would raise the ratio in consideration. The financial frictions parameter λ_F will be identified by targeting the share of external finance to GDP. A lower λ_F implies more stringent credit conditions in the rest of the world, hence a higher share of projects will be funded mostly with internal funds.

We can appreciate in Table 2 that the fit is reasonable, and that besides the share of total employment of the top 10% by size, the establishment exit rate, and the U.S. GDP/ World GDP ratio, all moments are in the neighborhood of what would be considerable acceptable from the point of view of approximating reality.

6 Results

In this section I will analyze the response of the economies of the U.S. and the rest of the world to changes in the U.S. migration policy, which will be expressed in movements in the fixed migration cost, f. Four policy experiments will be considered. The first three will be about changing the migration cost for every agent in the same proportion, while the fourth will be about modifying it just for a subset of potential migrants. In particular, those that show some kind of entrepreneurial pulse.

6.1 Comprehensive Migration Policies

The three comprehensive migration policies considered will be as follows. The first one will be one that will prevent any immigration to occur at all. This will be equivalent to set f to infinity. The second one will be one of open doors, so that no barriers to immigration are imposed, i.e. $f = 0$. Lastly, I will look to set migration costs at a level such that the share of immigrants on total population is equal to 10%, which is the figure given in the media for the average share of immigrants on total population in the U.S. since 1850. This last policy is inspired by President Trump's announcement of his intention to curb immigration levels to keep them within "historical norms" measured by population share. [1].

All results are expressed as percentage deviations from the benchmark, which is the current state of the world, i.e. let us consider variable X, then the result in the counterfactual scenario will be:

$$\Delta X\%_{counterfactual} = \left(\frac{X_{counterfactual} - X_{benchmark}}{X_{counterfactual}} \right) \times 100$$

6.1.1 No Immigrants Allowed

In Table 3 we can observe that when no immigration occurs output per capita in the U.S. goes down, just like the average productivity of firms, the capital-labor ratio and the wage rate. This can be explained mostly by the fact that a total restriction of migration flows will prevent foreign people with very high entrepreneurial ability to come to the U.S. and create firms there. This effect dominates the potential positive one of not allowing the entry of people that would occupy themselves mostly as workers, thereby increasing wages, raising the cutoff to become an entrepreneur, and in that way boosting aggregate productivity and the output per capita. In addition to this, immigrant entrepreneurs, by being financially constrained in their home countries, probably possess a distribution of assets for any given level of entrepreneurial ability that is skewed to the right, thus disproportionately contributing to capital deepening relative to domestic entrepreneurs.

In the rest of the world, on the other hand, we see in Table 4 that output per capita, average firms' productivity, and the wage rate go up, which is explained by the same reasoning highlighted in the previous paragraph but operating in the reverse direction.

[1] https://www.theatlantic.com/politics/archive/2016/09/trumps-proposal-for-legal-immigration/499061/

The only variable that does not see an increase in its value is the capital-labor ratio. This is explained by the fact that as very skilled entrepreneurs return to the rest of the world, they displace less efficient ones that would have accumulated important quantities of assets to overcome the financial constraint. These less efficient ones become workers, taking advantage of the higher wages, and do not accumulate assets at the same rate that would otherwise do. Then, on net, capital per worker goes down.

Regarding distributional effects, we can appreciate in Table 5 that U.S. natives win with the abolition of immigration, just like as people that stay in the rest of the world. This is for two reasons. First, U.S. entrepreneurs are disproportionately better off than what workers are worse off, as they do not face the competition of foreign entrepreneurs anymore. Therefore, their profits increase at the same time that workers' wages fall. Second, when migration is allowed, the rest of the world suffers a phenomenon similar to what has been labeled "brain drain" in the migration literature. This is to say, people that migrate are better off by migrating, but that leaves all the people that stays worse off. When migration is not permitted then naturally stayers in the rest of the world win. Nonetheless, we do observe that both entrepreneurs and workers in the rest of the world benefit from migration restrictions. This can be explained partly because workers enjoy higher wages, but those wages are lower than those that entrepreneurs had to face in the U.S., leaving both types of agents in a better position than when migration is allowed.

Finally, when migration is totally restricted, we can see in Table 5 that average business ownership goes down in the U.S. and the rest of the world, but for different reasons. In the rest of the world it falls because production is concentrated in less hands, while in the United States goes down because of the absence of immigrant entrepreneurs.

6.1.2 All Immigrants are Welcome

When there are no explicit costs of migrating output per capita, average firms productivity, the capital labor ratio, and the wage rate go down in a big proportion in the United States, as can be seen in Table 3. This is basically due to migration flows mostly composed of workers, which exert downward pressure on wages, making easier for less efficient entrepreneurs to create businesses, reducing productivity and output per capita. As workers do not save as much as entrepreneurs, capital per workers is reduced as well. On the other hand, in Table 4 we can observe that the rest of the world faces increases in all these variables, which is the other side of the coin of this big outflow of mostly workers.

In this case certainly U.S. natives lose, as workers' wages go down in a big proportion

which does not get to be compensated by the gains enjoyed by entrepreneurs. Not surprisingly, as we can appreciate in Table 5, people from the rest of the world are better off no matter which subset of people we consider, being stayers in the rest of the world the ones that enjoy the biggest gains in welfare in the steady state.

As there is less supply of workers, wages go up in the rest of the world, which makes harder to do business there. Therefore, average business ownership falls relative to the benchmark. This is also the situation in the United States, but for a different reason. Here the enormous supply of people with low ability to manage firms makes the average rate to go down.

6.1.3 Reduce Immigration to 10% of Total Population

In Table 3 we can observe that even when immigration is reduced to 10%, historical levels, effects are not trivial on the U.S. economy. Particularly, output per capita would fall in roughly 3.6%, driven mostly by the reduction in capital deepening of the economy. This is explained by the loss of immigrant entrepreneurs that contributed with important quantities of assets to the host economy, which , as was stated before, were accumulated to overcome the financial constraint that they were facing in their home countries. Given that the capital-labor ratio falls, wage rates do so as well.

In the rest of the world (Table 4), on the contrary, output per capita, productivity, and wages go up, being the mechanism also the one of entrepreneurs staying at home, displacing less efficient entrepreneurs, who stop saving in the same proportion of before, therefore decreasing the capital-labor ratio of the economy, but increasing wages as overall productivity improves.

Regarding consumption (Table 5), both natives and immigrants are on average better off. This is because there is less competition both in the entrepreneurial sector and the labor market of immigrant entrepreneurs. At the same time stayers in the rest of the world win from this situation by receiving better entrepreneurs. Nonetheless, when we look closer at subsets by occupation, we realize that both workers and entrepreneurs on average lose in the U.S. These two apparently contradictory results can be reconciled if one thinks in the dispersion of earnings existent in the domestic entrepreneurial sector. This means that most of the gains in consumption seen for U.S. natives as a whole is being driven by some super productive entrepreneurs, while the rest of the people is not seeing improvements in their welfare.

Lastly, business ownership decreases in the United States and in the rest of the world as

well. In the U.S. motivated by the outflow of immigrant entrepreneurs, while in the rest of the world by the concentration of production in less more productive entrepreneurs.

If we believe that reality is well represented by this model, we can say that, from the policy point of view, a measure like the one proposed by President Trump, would hardly benefit the wide mass of native working class people, which allegedly is the target group that this policy seeks to lift their welfare to. Quite the contrary, it is the small mass of very high productive entrepreneurs the ones who would gain the most if something like this happened.

6.2 Pro-Entrepreneurship Migration Policy

This paper has tried to highlight the relevance of immigrant entrepreneurs on the degree of production efficiency of the host economy. Nonetheless, entrepreneurial ability is not something that migration officials can observe as easily as, for example, the human capital that an individual has accumulated, which could be inferred from his/her educational attainment and country of origin.

So what if authorities could design some migration policy to indirectly attract people with a higher ability to run successful businesses? From the perspective of the model considered in this article, people that did decide to be entrepreneurs have to be relatively more endowed with entrepreneurial ability than the rest of the population, a natural sorting process coming from the independent occupational choices of individuals. Business ownership is then a variable that should be correlated with a higher entrepreneurial skill. Moreover, it is something observable. It naturally follows then that a migration policy that favors people that ran businesses in their home countries would be able to partially select those people that contribute the most to improve the efficiency of the receiving country [2].

In the last column of Table 3 we can appreciate that a policy like this one would not lift output per capita, but would actually reduce it. However, if we analyze in more detail, we can see that average productivity and capital deepening both increase, just like the wage rate. How can this be understood? In Table 5, we can observe that from the pro entrepreneurship policy the subset of the population that is most affected are precisely entrepreneurs in the U.S., due to the competitive pressure that more and better

[2]Of course, this is conditional on being able to design a mechanism in which there is no chance for people with poor managerial skills to pretend being highly entrepreneurial by just creating a small business. In the simple analysis of this section I do not study whether this is being achieved or not.

entrepreneurs bring about. Therefore, even though there is a loss in output per capita, workers in the U.S. earn around a 25% in consumption levels with respect to the benchmark, effect that dominates the loss that entrepreneurs might suffer in terms of profits.

For the same reason, in Table 4 it is clear that this policy creates a "brain drain" problem in the rest of the world, decreasing output per capita, average firms productivity, capital deepening, and the wage rate.

Given the targeted nature of the policy in question, in Table 6 we appreciate that business ownership rises in a 56% respect to the benchmark in the United States, while it decreases in around 20% in the rest of the world.

In this way, even with a simple policy that imperfectly favors the people with a higher entrepreneurial pulse from the rest of the world, we can obtain important effects in terms of productivity and wage gains, which highlights the importance of taking into account the fact that immigrants do not migrate to other countries to just work as employees in some domestic company, but also are potential generators of employment and could make things better than domestic businessmen.

Table 3: United States (% deviations from benchmark)

Variable	$f = \infty$	$f = 0$	10% share	Pro Entrep.
Output p.c.	-8.09	-21.28	-3.59	-3.86
Avg. Firms Prod.	-9.97	-10.59	0.60	8.14
K/L	-6.97	-17.80	-0.28	11.07
Wage rate	-8.84	-17.38	-1.48	14.14

Table 4: Rest of the World (% deviations from benchmark)

Variable	$f = \infty$	$f = 0$	10% share	Pro Entrep.
Output p.c.	7.67	4.33	2.34	-5.39
Avg. Firms Prod.	1.68	3.72	1.72	-1.36
K/L	-2.23	0.03	-2.76	-3.90
Wage rate	0.68	3.46	0.62	-2.92

7 Conclusion

Immigration has been a very contingent topic in the last years in the world. The stagnation in the growth of incomes and the economic crises in the developed economies have caused that migrants are typically used as scapegoats of the suffering of nationals

Table 5: Consumption (% deviations from benchmark)

Group	$f = \infty$	$f = 0$	10% share	Pro Entrep.
U.S. natives	0.19	-9.47	0.39	0.06
Immigrants in the U.S.	n.a.	0.05	4.95	-16.63
Stayers in the R.o.W.	6.97	15.68	5.75	0.79
Entrepreneurs in the U.S.	19.95	8.98	-1.30	-36.40
Workers in the U.S.	-8.91	-7.74	-1.20	24.89
Entrepreneurs in the R.o.W.	21.95	36.39	21.98	16.66
Workers in the R.o.W.	3.65	19.72	4.13	1.30

Table 6: Business Ownership

Group	$f = \infty$	$f = 0$	10% share	Pro Entrep.
U.S.	-25.44	-26.64	-3.59	56.74
R.o.W.	-10.32	-28.16	-15.06	-19.86

by politicians and the common people. One of the most repeated arguments against immigration has been that migrants tend to reduce wages and displace native workers from their jobs, effects that have been weakly supported by the empirical evidence. On the other hand, pro-immigrant advocacy groups have usually argued that immigrants boost host economies by being more entrepreneurial than native people, becoming themselves in a source of creation of jobs, and exerting competitive pressure on local firms, thus forcing them to be more efficient. Motivated by this discussion, this paper has tried to quantitatively estimate the efficiency gains from immigration when entrepreneurship is considered as an alternative occupation for both natives and immigrants.

To that effect, I have built a two-country dynamic general equilibrium model, which has been calibrated to the U.S. economy and the rest of the world. The model allows for general technology and financial frictions differences between the two countries and features heterogeneity of agents in wealth and asset holdings. Four policy experiments are considered, three based on comprehensive migration policy changes, and one on a selective one that tries to pick only the most entrepreneurial agents of the rest of the world.

In the case of the comprehensive policies I find that, first of all, a policy of total restriction on immigration would decrease overall efficiency in the United States. By removing the competition of better foreign entrepreneurs, the people that earn the most from this policy are local entrepreneurs, which in equilibrium are less and enjoy higher profits, while the ones that lose the most are workers, who in spite of not having the competitive pressure

of foreign workers, face a lower demand for their services. Secondly, a totally free migration policy would also have negative effects on efficiency, by inducing more entry of less able people to the entrepreneurial sector. The lower efficiency and the higher competition from foreign workers make once again workers in the U.S. worse off. Finally, if the United States restricted migration in order to take the immigrant stock as a share of total population to 10%, output per capita would fall just like capital deepening and the wage rate. Effect that is driven mostly by the decrease in the average skill of entrepreneurs.

On the other hand, when the U.S. favors migration of people that held a business in their country of origin it is found that output per capita also is lower relative to the benchmark, but this time average efficiency, the capital-labor ratio, and the wage rate all substantially improve. This leads to gains to workers in the United States, and losses to entrepreneurs, which are derived from the much better pool of entrepreneurs that has been selected, highlighting the importance of immigrant people with higher propensity to choose this occupation in their contribution to the host economy.

Even though the results are supportive of the main hypothesis that has guided this paper, i.e. that entrepreneurship matters if we want to properly assess the contribution of immigrants to the host economy, the framework used could be extended to analyze other side effects of entrepreneurship decisions that could quantitatively contain the magnitude of the outcomes. In particular, two aspects stand out. First, it would be desirable to include some kind of heterogeneity of human capital across people, so that the paper can speak about how immigration might attract to create firms or displace more native skilled people to the labor market. Depending on the relative endowments of entrepreneurial and human capital skill levels of this subset of the population, the efficiency gains from immigration could be very different. Moreover, it is evident that in practice migration costs are very different for people with different amounts of human capital. Secondly, not all firms in a country are of the start up type, where the owner bears all the risk of the project. In fact, the risk-diversified corporate sector typically gets the lion's share of total profits in developed countries, so its inclusion is necessary if we do not want to overestimate the competitive effects of having better entrepreneurs. Future versions of the paper will certainly display these features.

References

Akee, Randall Q., David A. Jaeger, and Konstantinos Tatsiramos, "The Persistence of Self-Employment across Borders: New Evidence on Legal Immigrants to the United States," IZA Discussion Papers 3250, IZA Institute for the Study of Labor 2007.

Attanasio, Orazio P., James Banks, Costas Meghir, and Guglielmo Weber, "Humps and Bumps in Lifetime Consumption," *Journal of Business and Economic Statistics*, 1999, *17* (1), 22–35.

Borjas, George, "Self-Selection and the Earnings of Immigrants," *American Economic Review*, 1987, pp. 531–553.

_ , "The Labor Demand Curve *Downward* Sloping: Reexamining the Impact of Immigration on the Labor Market," *Quarterly Journal of Economics*, 2003, *118* (4), 1335–1374.

_ , "Native Internal Migration and the Labor Impact of Immigration," *Journal of Human Resources*, 2006, *41* (2), 221–258.

Brown, J. David, John S. Earle, Mee Jung Kim, and Kyung Min Lee, "Firms and the Economics of Skilled Immigration," in "Innovation Policy and the Economy Vol. 15," University of Chicago Press, 2015.

Buera, Francisco J., "A Dynamic Model of Entrepreneurship with Borrowing Constraints: Theory and Evidence," *Annals of Finance*, 2009, *5*, 443–464.

_ **and Yongseok Shin**, "Productivity Growth and Capital Flows: The Dynamics of Reforms," *American Economic Journal: Macroeconomics*, 2017, *9* (3), 147–185.

Burstein, Ariel, Gordon H. Hanson, Lin Tian, and Jonathan Vogel, "Tradability and the Labor Market Impact of Immigration: Theory and Evidence from the United States," *Econometrica*, 2020, *88* (3), 1071–1112.

Cagetti, Marco and Mariacristina de Nardi, "Entrepreneurship, Frictions, and Wealth," *Journal of Political Economy*, 2006, *115* (5).

Caliendo, Lorenzo, Luca D. Opromolla, Fernando Parro, and Alessandro Sforza, "Goods and Factor Market Integration: A Quantitative Assessment of the EU Enlargement," *Journal of Political Economy*, 2021, *129* (12).

Card, David, "Is the New Immigration Really so Bad?," *The Economic Journal*, 2005, *115* (507), 300–323.

_ , "Immigration and Inequality," *American Economic Review: Papers and Proceedings*, 2009, *99* (2), 1–21.

Ciccone, Antonio and Robert E. Hall, "Productivity and the Density of Economic Activity," *American Economic Review*, 1996, *86* (1), 54–70.

Docquier, Frederic, Caglar Ozden, and Giovanni Peri, "The Wage Effects of Immigration and Emigration," NBER Working Paper 16646, National Bureau of Economic Research 2010.

Fairlie, Robert W., "Immigrant Entrepreneurs and Small Business Owners, and their Access to Financial Capital," U.S. Small Business Administration Report, U.S. Small Business Administration 2012.

_ **and Bruce D. Meyer**, "The Effects of Immigration on Native Self-Employment," *Journal of Labor Economics*, 2003, *21* (3), 619–650.

_ **and Magnus Lofstrom**, "Immigration and Entrepreneurship," in "Handbook on the Economics of International Migration," Elsevier, 2014.

Hunt, Jennifer, "Which Immigrants are Most Innovative and Entrepreneurial? Distinctions by Entry Visa," *Journal of Labor Economics*, 2011, *29* (3), 417–457.

_ , "Are Immigrants the Most Skilled U.S. Computer and Engineering Workers?," *Journal of Labor Economics*, 2015, *33* (S1), S39–S77.

_ **and Marjolaine Gauthier-Loiselle**, "How Much Does Immigration Boost Innovation?," *American Economic Journal: Macroeconomics*, 2010, *2* (2), 31–56.

Kerr, S., W. Kerr, and W. Lincoln, "Firms and the Economics of Skilled Immigration," in "Innovation Policy and the Economy Vol. 15," University of Chicago Press, 2015.

Kerr, Sari P. and William R. Kerr, "Immigrant Entrepreneurship," NBER Working Paper 22385, National Bureau of Economic Research 2016.

_ **and** _ , "Immigrant Entrepreneurship in America: Evidence from the Survey of Business Owners 2007 & 2012," NBER Working Paper 24494, National Bureau of Economic Research 2018.

_ , _ , **and William F. Lincoln**, "Skilled Immigration and the Employment Structures of U.S. Firms," *Journal of Labor Economics*, 2015, *33* (S1), S109–S145.

Kerr, William R. and William F. Lincoln, "The Supply Side of Innovation: H-1B Visa Reforms and U.S. Ethnic Invention," *Journal of Labor Economics*, 2010, *28* (3), 473–508.

Lofstrom, Magnus, "Labor Market Assimilation and the Self-Employment Decision of Immigrant Entrepreneurs," *Journal of Population Economics*, 2002, *15* (1), 83–114.

Lucas, Robert E., "On the Size Distribution of Business Firms," *The Bell Journal of Economics*, 1978, *9* (2), 508–523.

Ottaviano, Gianmarco I. and Giovanni Peri, "Rethinking the Effect of Immigration on Wages," *Journal of the European Economic Association*, 2012, *10* (1), 152–197.

Peri, Giovanni, Kevin Shih, and Chad Sparber, "STEM Workers, H-1B Visas, and Productivity in U.S. Cities," *Journal of Labor Economics*, 2015, *33* (S1), S225–S255.

Roy, A., "Some Thoughts on the Distribution of Earnings," *Oxford Economic Papers*, 1951, *3* (2), 135–146.

Stokey, Nancy L. and Sergio Rebelo, "Growth Effects of Flat-Rate Taxes," *Journal of Political Economy*, 1995, *103* (3).

Tauchen, George, "Finite State Markov-Chain Approximations to Univariate and Vector Autoregressions," *Economics Letters*, 1986, *20* (2), 177–181.

Waugh, Michael E., "Firm Dynamics and Immigration: The Case of High-Skilled Immigration," NBER Working Paper 23387, National Bureau of Economic Research 2017.

Appendix: Derivations Static Model

Effect on wages of higher $\hat{z}^{WE}$

Totally differentiating labor market clearing condition (3):

$$\begin{aligned} g(z_H^*)\frac{\partial z_H^*}{\partial w_H}dw_H = &- l^d(z_H^*, w_H)g(z_H^*)\frac{\partial z_H^*}{\partial w_H}dw_H + \int_{z_H^*}^{\bar{z}} \frac{\partial l^d}{\partial w_H}dG(z)dw_H \\ &- l^d(\hat{z}^{WE}, w_H)g(\hat{z}^{WE})d\hat{z}^{WE} + \int_{\hat{z}^{WE}}^{\bar{z}} \frac{\partial l^d}{\partial w_H}dG(z)dw_H \end{aligned}$$

Dividing by $d\hat{z}^{WE}$:

$$\begin{aligned} g(z_H^*)\frac{\partial z_H^*}{\partial w_H}\frac{dw_H}{d\hat{z}^{WE}} = &- l^d(z_H^*, w_H)g(z_H^*)\frac{\partial z_H^*}{\partial w_H}\frac{dw_H}{d\hat{z}^{WE}} + \int_{z_H^*}^{\bar{z}} \frac{\partial l^d}{\partial w_H}dG(z)\frac{dw_H}{d\hat{z}^{WE}} \\ &- l^d(\hat{z}^{WE}, w_H)g(\hat{z}^{WE}) + \int_{\hat{z}^{WE}}^{\bar{z}} \frac{\partial l^d}{\partial w_H}dG(z)\frac{dw_H}{d\hat{z}^{WE}} \end{aligned}$$

Grouping terms and solving for $\frac{dw_H}{d\hat{z}^{WE}}$:

$$\frac{dw_H}{d\hat{z}^{WE}} = \frac{-l^d(\hat{z}^{WE}, w_H)g(\hat{z}^{WE})}{g(z_H^*)\frac{\partial z_H^*}{\partial w_H} + l^d(z_H^*, w_H)g(z_H^*)\frac{\partial z_H^*}{\partial w_H} - \int_{z_H^*}^{\bar{z}} \frac{\partial l^d}{\partial w_H}dG(z) - \int_{\hat{z}^{WE}}^{\bar{z}} \frac{\partial l^d}{\partial w_H}dG(z)}$$

Effect on average productivity of higher $\hat{z}^{WE}$

If we totally differentiate $\tilde{z}$:

$$\begin{aligned} d\tilde{z} = &- \frac{1}{2 - G(z_H^*) - G(\hat{z}^{WE})}\left(z_H^* g(z_H^*)\frac{\partial z_H^*}{\partial w_H}dw_H + \hat{z}^{WE}g(\hat{z}^{WE})d\hat{z}^{WE}\right) \\ &+ \frac{\tilde{z}}{2 - G(z_H^*) - G(\hat{z}^{WE})}\left(g(z_H^*)\frac{\partial z_H^*}{\partial w_H}dw_H + g(\hat{z}^{WE})d\hat{z}^{WE}\right) \end{aligned}$$

Dividing by $d\hat{z}^{WE}$ and grouping terms:

$$\frac{d\tilde{z}}{d\hat{z}^{WE}} = \frac{g(\hat{z}^{WE})}{2 - G(z_H^*) - G(\hat{z}^{WE})}\left[\tilde{z} - \hat{z}^{WE}\right] + \frac{g(z_H^*)\frac{\partial z_H^*}{\partial w_H}\frac{dw_H}{d\hat{z}^{WE}}}{2 - G(z_H^*) - G(\hat{z}^{WE})}\left[\tilde{z} - z_H^*\right]$$

Effect on output per capita of higher $\hat{z}^{WE}$

If we totally differentiate $\tilde{q}$:

$$\begin{aligned} d\tilde{q} =& \frac{1}{2 - G(\hat{z}^{WE})} \left(-q(z_H^*, w_H) g(z_H^*) \frac{\partial z_H^*}{\partial w_H} dw_H + \int_{z_H^*}^{\bar{z}} \frac{\partial q}{\partial w_H} dG(z) dw_H \right) \\ &+ \frac{1}{2 - G(\hat{z}^{WE})} \left(-q(\hat{z}^{WE}, w_H) g(\hat{z}^{WE}) d\hat{z}^{WE} + \int_{\hat{z}^{WE}}^{\bar{z}} \frac{\partial q}{\partial w_H} dG(z) dw_H \right) \\ &+ \frac{\tilde{q} g(\hat{z}^{WE})}{2 - G(\hat{z}^{WE})} d\hat{z}^{WE} \end{aligned}$$

Dividing by $d\hat{z}^{WE}$ and grouping terms:

$$\begin{aligned} \frac{d\tilde{q}}{d\hat{z}^{WE}} =& \frac{\frac{dw_H}{d\hat{z}^{WE}}}{2 - G(\hat{z}^{WE})} \left[\int_{z_H^*}^{\bar{z}} \frac{\partial q}{\partial w_H} dG(z) + \int_{\hat{z}^{WE}}^{\bar{z}} \frac{\partial q}{\partial w_H} dG(z) - q(z_H^*, w_H) g(z_H^*) \right] \\ &+ \frac{g(\hat{z}^{WE})}{2 - G(\hat{z}^{WE})} \left[\tilde{q} - q(\hat{z}^{WE}, w_H) \right] \end{aligned}$$

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