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Abstract

We study immigration policy in a model with multiple receiving countries and self-selection of migrants. We show that, while a change in the skill composition of the migrant population affects immigration policy, the converse is also true. From this interaction multiple equilibria may arise in a small open economy, which are driven by the policy maker's expectation on the migrants' skill composition (and, hence, on the welfare effects of immigration). In particular, pessimistic (optimistic) beliefs induce a country to impose higher (lower) barriers to immigration, which crowd out (crowd in) skilled migrants and thus confirm initial beliefs. This self-fulfilling mechanism sustains the endogenous formation of an anti or pro-immigration "prejudice". These insights may help rationalize the cross-country variation in attitudes towards immigration and choices of immigration policy.

***Keywords**: Immigration policy, social policy, skilled/unskilled workers, multiple-countries.*
***JEL** Classification: F22, J24, J61.*

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1 Introduction

Immigration policy varies across receiving countries, sometimes to a large extent. While virtually all countries in the world impose restrictions on the mobility of people, different countries impose different levels of restrictions to immigration. These differences reflect the perception of the relative costs and benefits of immigration for the recipient countries in terms of economic performance, redistributive consequences, effects on public finances and the labor market, crime, capacity to integrate, etc.[1] In particular, these costs and benefits are affected, among others, by the *skill composition* of the migrant population. It is widely believed that skilled migrants are more beneficial to the receiving country than unskilled migrants. Several arguments have been advanced to maintain this claim, such as: positive spillovers of skilled migrants for the receiving economy, higher production complementarities between skilled labor and capital, greater flexibility of the skilled labor market (see for instance Borjas, 1995). Another popular argument is the fiscal cost that low-skill migrants potentially impose on natives when the receiving country implements redistributive policies or other welfare programs favoring low-skill workers (and thus low-skill migrants). Finally, several observers have emphasized the non-economic costs of immigration (and, particularly, low skilled immigration), such as the costs of integrating immigrants into native societies or the risks associated to a surge in criminality. Mostly based on these arguments, in the last decade a lively debate has involved researchers as well as policy makers about the opportunity of introducing skill-selective policies (see Belot and Hatton, 2008).

As theory suggests that unskilled migrants are more costly (or less beneficial) than skilled migrants, it would be reasonable to expect that, over time as well as across countries, an "adverse" skill composition be associated with more restrictive immigration policies. Empirical evidence seems

[1] See Facchini and Mayda (2008).

to confirm this claim. In a two-century historical overview of migration inflows in the traditional receiving countries (such as US, Canada, Australia, etc.), Hatton and Williamson (2004) show that a deterioration of the quality of immigrants has been concomitant with a tightening of immigration policy.

In addition, a growing recent empirical literature studies the determinants of attitudes towards immigration.[2] In particular, recent work by Hanson, Scheve and Slaughter (2007) emphasizes the role of the skill composition of the immigrant population in determining individuals' views on immigration. They find that individuals in the US are more opposed to immigration in states with relatively less skilled immigrant populations. Figure 1 suggests that this holds true for Europe as well. We plot the data on views on immigration policy for several European countries against the skill composition of the immigrant population for each country. The figure shows that lower levels of skills are associated with tougher anti-immigration attitudes. It is suggestive to notice from Figure 2 that the correlation between views on immigration and the total size of the immigrant population relative to the native population is less clear cut. To the extent that the restrictions imposed on immigration reflect the citizens' views on its benefits, this preliminary evidence seems to confirm the existence of a negative relationship between the skill composition of the immigrant labor force and the strength of migratory restrictions in receiving countries.

INSERT FIGURES 1 AND 2 HERE

We build a model of immigration which allows us to discuss the relationship between the beliefs on the benefits of immigration (or *prejudice*), skill composition and immigration policy in

[2] This literature suggests that individual attitudes about immigration depend on an individual's skill level, the exposure of an individual to the fiscal consequences of immigration and the size of the immigrant population in an individual's state. See for instance Scheve and Slaughter (2001), and Mayda (2006).

the destination countries. Different beliefs about the skill composition of the incoming migrant labor force (and, hence, on the welfare effects of immigration) influence the choice of migratory restrictions in a society. But the migrants' skill composition depends on immigration policy. We show how this interaction between beliefs and policies may lead to multiple equilibria. In particular, if a society believes that immigration will be costly (i.e. has an *anti-immigration prejudice*), it will choose high restrictions to the entry of foreign workers. In equilibrium, strict immigration policies that are not skill selective worsen the migrants' skill composition, in which case immigration will be relatively more costly and social beliefs will be self-fulfilled. If instead a society believes that immigration will be beneficial (i.e. has a *pro-immigration prejudice*), it will set low restrictions, thus improving the skill composition of migrants and making these beliefs self-confirmed as well.

Our analysis begins with a *two-country model* as a useful benchmark. In this model there are two regions: a sending and a receiving region. The latter is populated by - skilled and unskilled - workers and capitalists. The pool of immigrants populating the sending region is composed of high and low-skill workers. A first key feature of the model is that migration choices are endogenous and depend on the economic incentives that foreign workers face and on the policy to regulate migratory flows enacted in the receiving region.[3] Immigration policy in our set-up is not skill selective (which may reflect the inability of the government to observe the skills of applicants) and is parametrized by a cost borne by (high and low skill) immigrants once in the destination region. The higher this cost, the tougher the policy. A second important feature of the model is that low-skill migrants are more costly than high-skill migrants. This is rationalized with the existence in the receiving region

[3] While most theoretical contributions on immigrants' self-selection are based on a partial equilibrium analysis, we consider the effects of immigration policy on the equilibrium wage and how, in turn, this affects economic incentives to migration for skilled and unskilled foreign workers (and, hence, the skill composition of migrants in the receiving region). On this, see also the recent work of Bellettini and Berti Ceroni (2007) and Bianchi (2007), who however limit their analysis to a two-country model.

of *social policies*, redistributing income in favor of low-skill (native and foreign) workers. After defining the objective function of the government of the destination region as a weighted average of the utility of workers and capitalists, we characterize the immigration policy which optimally trades off the costs and the benefits from immigration.

We then extend this model to a *multiple-country set-up*, in which the receiving region is made up of a large number of small countries, each one of which can decide independently its own immigration policy.[4] In this new framework we add a crucial hypothesis: high-skill migrants are assumed to be more internationally mobile than low-skill migrants, in the sense that they can choose to emigrate to a larger set of destination countries. Several reasons can be identified to justify this assumption. The choice of low-skill migrants is more constrained by such factors as geographical distance (because of more stringent poverty constraints), cultural distance such as language, or colonial origin, or network effects (because of lower adaptation capacity to diversity), and skill-selective migration policies which, by construction, render high-skill migrants more free to choose where to migrate relative to unskilled workers. If, for instance, geographical distance matters relatively more for unskilled than for skilled migrants, we would expect that, other things equal, in any destination country immigrants coming from distant countries are relatively more skilled than immigrants coming from near countries. Belot and Hatton (2008) confirm empirically this claim by showing that immigrants are more positively selected by education, the greater the distance between the source and the destination country. They also show that past colonial links are associated with negative selection.

As a result of this assumption, a restrictive immigration policy in one of the receiving countries

[4] We are not aware of other works adopting a similar approach to study immigration policy. An exception is Casella (2005) who builds a multi-country model which allows for international migrations of workers and uses it to study efficient immigration and redistributive policy.

has two effects: it will reduce the total inflow of migrants in the country and it will negatively affect the skill composition of the incoming foreign labor force, as high-skill immigrants choose to migrate where restrictions are lower (*crowding out* effect). In contrast, a softer immigration policy will increase the total inflow of foreign workers and positively affect its skill composition, by attracting skilled migrants from the rest of the region (*crowding in* effect). This mechanism is at the root of the results we obtain.

We prove that, when a small economy in the receiving world decides immigration policy independently and taking as given the policy of the rest of the region, multiple equilibria arise which depend on the country's expectations of the migrants' skill composition (and, hence, on the costs and benefits of immigration). In the first equilibrium, the economy benefits of a *high-skill immigration boom* which is driven by optimistic expectations on the skill composition of migrant flows. If the policy maker (or the citizens that appoint him) anticipates that a relatively large number of highly skilled foreign workers will be entering the country (and, hence, that the effects of immigration on the destination country will be largely positive), it will rationally set low restrictions to immigration. The effect of low barriers to immigration will be to attract (highly mobile) skilled migrants and, hence, to improve the skill composition of the migrant labor force in the destination country. This validates the initial beliefs.

In the second (and opposite) equilibrium, the small economy can be stuck in an *unskilled immigration trap*, driven by pessimistic expectations. In particular, suppose that the elected government in a certain country has pessimistic beliefs about the skill composition of migrants. The rational response to this belief would be to impose higher barriers to immigration than the rest of the region (as the presence of the welfare state costs may render immigration costly to the destination country in expected terms). Given the skilled migrants' freedom of choice, this policy will have the effect of crowding them out. The composition of immigration in this country will be then biased towards low-skill immigrants, thus validating the initial pessimistic belief. This self-fulfilling mechanism may sustain the endogenous formation of a prejudice against immigration.

Finally, a third equilibrium exists, where the country expects (low and high-skill) immigrants to distribute uniformly over the receiving region. Under these expectations, the elected policy maker optimally sets immigration restrictions as in the rest of the region. In equilibrium, beliefs are once again validated. Importantly, while the "high-skill immigration boom" and the "unskilled immigration trap" are stable equilibria, this third equilibrium is not. Moreover, the three equilibria can be ranked: welfare is lowest for the receiving country in the "unskilled immigration trap" and highest in the "high-skill immigration boom".

The rest of the paper is organized as follows. In the next section we introduce the two-country model, analyze the migration choice of skilled and unskilled foreign workers, characterize the labor market equilibrium, and find the migration policy which maximizes aggregate welfare for the entire receiving region. In Section 3 we extend the model to a multi-country setting. We analyze the new migration choice, and derive and discuss the equilibria for a small economy. Finally, in Section 4 we comment on possible extensions of the model. Concluding remarks are in Section 5, while all proofs are in the technical appendix.

2 A Two-Country Model of Immigration

Let us assume that the world is made up of a receiving region, or 'home', (H) and a sending region, 'foreign', (F). The focus of our analysis is on the effects of migratory flows and immigration policy on the receiving region.

There are three key sets of actors in the economy: agents in the receiving region, that will be referred to as 'natives', who express their preferences over immigration policy; foreign workers, who choose whether to migrate or not; and the home government, which decides immigration policy to maximize natives' welfare. In H there are N_H workers, a fraction of whom is skilled. We denote by S_H the number of skilled and by $U_H = N_H - S_H$ that of unskilled native workers. Each native worker is endowed with one unit of labor, which is inelastically supplied on the (competitive) labor market. Individual labor supply is higher in efficiency units for skilled agents than for unskilled. H is also populated by a number K of native capitalists, each of whom is endowed with one unit of capital. Population in F is made up of workers, denoted by $N_F = S_F + U_F$ with the same notation for skilled/unskilled. Agents' utility in H is linear in their (disposable) income, which is entirely spent to consume the unique final good produced in the economy.

2.1 Home Technology and Social Policy

The final good is produced competitively via a Cobb-Douglas technology in *effective* labor (L) and a fixed factor (capital, denoted by K):[5]

$$Y = K^{\alpha} L^{1-\alpha}. \tag{1}$$

From first order conditions, we obtain equilibrium factor prices, the capital rent (r_H) and the wages for unskilled and skilled workers respectively

$$r_H = \alpha \left(\frac{K}{L} \right)^{\alpha - 1}, \tag{2}$$

[5] This type of technology is also used in Bellettini-Berti Ceroni (2007) and Brauninger-Vidal (2000).

$$w_H \varepsilon_u = (1-\alpha)\left(\frac{K}{L}\right)^{\alpha} \varepsilon_u, \tag{3}$$

$$w_H \varepsilon_s = (1-\alpha)\left(\frac{K}{L}\right)^{\alpha} \varepsilon_s, \tag{4}$$

where $w_H = (1-\alpha)(K/L)^{\alpha}$ is the level of wage per efficiency unit of labor, and ε_s and ε_u denote the productivity of skilled and unskilled workers respectively with $\varepsilon_s > \varepsilon_u$. Effective labor supply of natives is then

$$L_H = \varepsilon_s S_H + \varepsilon_u U_H. \tag{5}$$

Total effective labor supply (L) includes foreign labor supply in addition to natives', where foreign labor supply is endogenously determined.

Last, we assume region H has a social policy that redistributes labor income from high-skill to low-skill workers. In particular, we suppose that this policy consists of an exogenous and fixed lump-sum transfer γ_u to (native and foreign) unskilled workers which is financed through a proportional tax $\tau \in [0,1]$ on the labor income of native high-skill workers.[6] In the absence of immigration, the (balanced) budget of this policy is given by

$$\tau \varepsilon_s w_H S_H = \gamma_u U_H,$$

that is, the tax inflow is equal to the lump-sum transfer times the number of native unskilled. As

[6] Naturally, one can model the social policy in the receiving region in a number of different ways (for instance, by introducing a proportional income tax, or taxing capital rather than skilled labor, or imposing redistributive taxation to high-skill migrants in addition to skilled natives, etc.). These alternative formalizations would generally not alter the logic of our results as long as the social policy implies a net transfer of resources from natives to unskilled foreign workers.

we will see later, in presence of immigration, the tax outflow depends on the (exogenous) size of the transfer (γ_u) as well as on the (endogenous) number of unskilled migrants entering region H. To introduce the balanced budget constraint in presence of immigration, therefore, we first need to deal with the migration choice.

2.2 The Migration Choice

We now introduce the possibility of international labor movements and study the determinants of migratory decisions. Migration is assumed to be a one-time and non reversible decision. The general idea is that immigrants who have high levels of productivity not only benefit from emigrating, but they can also make a significant contribution to the economy of the receiving region. Conversely, if immigrants lack the skills that employers in the host country demand, they can still choose to migrate to receive social assistance programs. In this case, natives may be concerned that immigration will increase the costs associated with income maintenance policy in the receiving country.

In F the wage rate is assumed exogenous and denoted by w^*. We call the productivities for foreign skilled and unskilled workers respectively $\varepsilon_s^*, \varepsilon_u^*$. For simplicity we assume that the former have positive productivity, while foreign unskilled are unproductive (i.e. $\varepsilon_s^* > \varepsilon_u^* = 0$). We will discuss the case in which $\varepsilon_u^* > 0$ in Section 4.[7] If foreign workers choose to remain in the sending region, their wages are respectively given by $w^*\varepsilon_s^*$ and $w^*\varepsilon_u^* = 0$. In this setting, it is immediate to verify that the wage incentive to migrate would be higher for skilled rather than for unskilled workers. In fact,

[7] In particular, we will argue that introducing $\varepsilon_u^* > 0$, a part from rendering the model analytically less manageable, does not alter our results.

$$(w_H - w^*)\varepsilon_s^* > (w_H - w^*)\varepsilon_u^* = 0, \tag{6}$$

that is, the increase in wage would be higher for skilled than for unskilled.

We assume that each immigrant i - whether skilled or unskilled - faces a psychological cost to leave her own country, θ_i, which is uniformly distributed in $[0, \bar{\theta}]$. In addition, the government in H can set up an immigration policy which is parametrized by a cost borne by immigrants once in the new country, $\mu_H \in \mathbb{R}_+$. One can interpret μ_H in several ways, from the number of bureaucratic procedures (i.e. the time a worker needs to spend applying for a work permit in the receiving region, which implies an opportunity cost for the applicant), to laws that affect the life of immigrants in the host country such as the number of years to obtain voting rights or citizenship.

We start by considering the policy variable μ_H as exogenous and look at migratory decisions. In a later section we endogenize the policy choice. A skilled foreign worker i will migrate if and only if

$$w_H\varepsilon_s^* - \mu_H - \theta_i \geq w^*\varepsilon_s^*, \tag{7}$$

while an unskilled foreign worker i will migrate if and only if

$$\gamma_u - \mu_H - \theta_i \geq 0. \tag{8}$$

Quite naturally, foreign workers will migrate into the home region if and only if the utility they can reach there -the (endogenous) home wage rate times their own productivity or the lump-sum transfer in the case of unskilled migrants, minus the costs of migration- is higher than the utility they can achieve in the sending region -the (exogenous) foreign wage rate times their productivity.

We can then find the two threshold values of θ, call them $\hat{\theta}_s$ and $\hat{\theta}_u$ respectively for skilled and unskilled, such that all those below that value are willing to migrate. We have

$$\hat{\theta}_s = (w_H - w^*)\,\varepsilon_s^* - \mu_H \tag{9}$$

and

$$\hat{\theta}_u = \gamma_u - \mu_H. \tag{10}$$

All skilled workers whose θ is lower than $\hat{\theta}_s$, and all unskilled workers whose θ is lower than $\hat{\theta}_u$ are willing to migrate. If both skilled and unskilled foreign workers are distributed uniformly in $[0, \bar{\theta}]$, the number of skilled and unskilled migrants will be respectively $(\hat{\theta}_s/\bar{\theta})S_F$ and $(\hat{\theta}_u/\bar{\theta})U_F$.[8]

If there were no transfer, that is, if $\gamma_u = 0$, the proportion (for each group) would be higher for skilled rather than for unskilled migrants ($\hat{\theta}_s > \hat{\theta}_u = 0$). This result of 'positive' self-selection comes directly from (6), stating that the wage differential for skilled is higher than the one for unskilled. In this model, however, whether there is 'positive', 'negative' or 'neutral' self-selection depends on the generosity of the transfer program (γ_u). In particular,

$$\hat{\theta}_u \gtreqless \hat{\theta}_s \Leftrightarrow \gamma_u \gtreqless \widehat{\gamma}_u = (w_H - w^*)\,\varepsilon_s^*.$$

With a low transfer ($\gamma_u < \widehat{\gamma}_u$), there will be positive self-selection ($\hat{\theta}_u < \hat{\theta}_s$), with a high transfer ($\gamma_u > \widehat{\gamma}_u$), there will be negative self-selection ($\hat{\theta}_u > \hat{\theta}_s$). In only one case ($\gamma_u = \widehat{\gamma}_u$), the proportions will be identical ($\hat{\theta}_u = \hat{\theta}_s$).[9]

[8] Before proceeding let us just notice that condition (9) holds true to the extent that it is positive and lower than $\bar{\theta}$. Whenever $(w_H - w^*)\,\varepsilon_s^* - \mu_H < 0$, then $\hat{\theta}_s = 0$, while if $(w_H - w^*)\,\varepsilon_s^* - \mu_H > \bar{\theta}$, then $\hat{\theta}_s = \bar{\theta}$. The same is true, *mutatis mutandis*, for $\hat{\theta}_u$.

[9] Several studies (Chiquiar and Hanson (2005), Hatton and Williamson (2004) and Brucker and Defoort (2006)

The amount of effective foreign labor supply in H will then be

$$L_F = \varepsilon_s^* \frac{\hat{\theta}_s}{\bar{\theta}} S_F. \tag{11}$$

where $\hat{\theta}_s$ is given by (9). As low skill foreign workers are unproductive, they do not affect the effective foreign labor supply in the domestic economy. Aggregate labor supply includes the migrant labor force and the (exogenous) natives' labor supply, both in efficiency units, that is, $L = L_H + L_F$. As the fraction of high skill foreigners that choose to migrate $(\hat{\theta}_s/\bar{\theta})$ depends on the home wage rate w_H, the aggregate labor supply in efficiency units L will depend on it as well. In particular, it can be immediately verified that the aggregate labor supply in efficiency units L is increasing in the wage rate w_H.[10] Labor supply in efficiency units at home (L_H) is fully inelastic. However, a higher wage rate in the receiving region increases the benefits of emigration from the sending region for the skilled workers and positively affects the fraction of high skilled migrants. This raises the foreign component of the aggregate labor supply (L_F).

Last, we can find the tax rate that balances the budget of the income support program in presence of immigration. Social spending will be equal to the transfer per worker (γ_u) times the number of workers who benefit from the transfer $\left(U_H + \hat{\theta}_u/\bar{\theta}U_F\right)$, where the expression in brackets denotes the total number of unskilled workers in region H (i.e. domestic and foreign). A balanced budget implies

among others) document that migrants are not a random sample of the population of the sending region. It is by now standard to define positive or negative self-selection when those who migrate are on average more or less skilled than the average worker in the sending region. On welfare state and immigration, see Razin and Sadka (2004).

[10] Total effective labor supply with immigration is given by $L = L_H + L_F = \varepsilon_s S_H + \varepsilon_u U_F + \varepsilon_s^* \left(\hat{\theta}_s/\bar{\theta}\right) S_F$, where $\hat{\theta}_s$ is given by (9) and is a linear functions of w_H. Substituting for this condition into the aggregate labor supply in efficiency units and taking derivatives with respect to w_H, we get $dL/dw_H = (\varepsilon_S^*)^2 S_F/\bar{\theta} > 0$.

$$\tau \varepsilon_s w_H S_H = \gamma_u \left(U_H + \frac{\hat{\theta}_u}{\bar{\theta}} U_F \right),$$

and, hence, the tax rate on skilled labor income is

$$\tau = \frac{\gamma_u \left(U_H + \frac{\hat{\theta}_u}{\bar{\theta}} U_F \right)}{\varepsilon_s w_H S_H}, \tag{12}$$

where $\hat{\theta}_u$ is itself a function of γ_u.

Our next step is to find the equilibrium in the Home labor market and to investigate the effects of immigration policy (μ_H).

2.3 Immigration Policy and the Home Labor Market

The equilibrium in the domestic labor market with immigration is determined by the intersection of the (traditional) labor demand curve and the total (i.e. augmented for immigration) effective labor supply:

$$\begin{cases} w_H = (1-\alpha) \left(\frac{K}{L} \right)^{\alpha} \\ L = \varepsilon_s S_H + \varepsilon_u U_H + \varepsilon_s^* \frac{(w_H - w^*)\varepsilon_s^* - \mu_H}{\bar{\theta}} S_F, \end{cases} \tag{13}$$

where we used the threshold value $\hat{\theta}_s$ given by condition (9) into the aggregate labor supply in efficiency units.

The traditional labor demand is decreasing in the wage rate, while effective labor supply is linearly increasing in w_H. Hence, the system above determines the equilibrium wage rate (w_H), the amount of effective labor (L), and hence the number of skilled migrants for a given immigration policy. Figure 3 provides a graphical intuition of the equilibrium in the domestic labor market.

INSERT FIGURE 3 HERE

An increase in migratory costs (μ_H) in the receiving region alters the equilibrium in the domestic labor market and the two key prices in the model economy: the wage rate and the rate of return on the fixed factor. The policy variable μ_H affects directly the number of immigrants (and, hence, the effective labor supply) by changing the incentives to migrate. The higher μ_H, the lower the labor supply (via skilled immigration) and the higher the wage rate. On the other hand, as the amount of capital is fixed in the receiving region, the lower labor supply depresses rents. The effect on the home labor market of the introduction of a more restrictive policy, say from μ_H to $\mu'_H > \mu_H$, can be appreciated in figure 4. Labor supply shifts upward (because the 'applications' of skilled immigrants decrease), and in equilibrium the amount of effective labor decreases while the wage rate increases.

Notice however that, while a more restrictive migration policy has a negative effect on the total number of migrants, it has a positive effect on the skill composition of the migrant labor force. In fact, the number of unskilled migrants decreases proportionally with the increase of migratory restrictions ($d\hat{\theta}_u/d\mu_H = -1$), while the number of skilled migrants decreases less than the number of the unskilled because of the increase in the equilibrium wage rate ($d\left(\varepsilon_s^* w_H\right)/d\mu_H > 0$). As a consequence, $\hat{\theta}_u$ goes down by more than $\hat{\theta}_s$ (that is, $-1 = d\hat{\theta}_u/d\mu_H < d\hat{\theta}_s/d\mu_H < 0$).[11]

INSERT FIGURE 4 HERE

Previous statements are true to the extent that immigration policy is not already at one of its

[11] For a similar result see Bianchi (2007). We will see in the next section that this effect on the skill composition of migrants will be reversed in the multi-country analysis. In a way, we have placed ourselves in a two-country scenario in which an increase in migratory restrictions improves the skill composition to show the relevance of the extension to a multi-country set up in reversing the prediction about this relationship.

two boundary values. In fact, in our formulation there exist an upper and a lower bound beyond which a change in μ_H has no effect on the number of migrants. For instance, if μ_H is such that all foreign workers are already willing to enter, a further decrease has no effect on immigration. Symmetrically, if μ_H is such that no foreign worker is willing to enter, a further increase has no effect on immigration either. Before turning to the study of the optimal immigration policy, let us define these lower and upper bounds. We define "open door" policy ($\underline{\mu_H}$) and "closed door" policy ($\overline{\mu_H}$) as the policies which induce, respectively, *all* foreign workers and *no* foreign worker to emigrate to H (a formal definition of these policies is given in Appendix).[12] To the extent that $\mu_H \in \left(\underline{\mu_H}, \overline{\mu_H}\right)$, comparative statics analysis of immigration policy can be summarized in the following

Proposition 1. *A restriction of immigration policy in the home economy (i.e. increasing μ_H) 1. decreases equilibrium effective labor by reducing total immigration ($dL/d\mu_H < 0$); 2. increases the domestic equilibrium wage rate ($dw_H/d\mu_H > 0$); 3. reduces the rent on the fixed factor ($dr_H/d\mu_H < 0$); 4. reduces unskilled migration ($d\hat{\theta}_u/d\mu_H < 0$) and skilled migration ($d\hat{\theta}_s/d\mu_H < 0$); 5. improves the skill composition of the migrant labor force ($d\hat{\theta}_u/d\mu_H < d\hat{\theta}_s/d\mu_H < 0$).*

The last proposition describes the effects of a restriction in immigration policy on equilibrium employment, the wage rate, the returns from capital, and the skill composition of foreign labor. We now turn our attention to the welfare effects of immigration policy and its politically optimal choice from the point of view of the receiving region.

[12] Notice also that, since the policy maker faces no cost in lowering μ_H below $\underline{\mu_H}$ or raising μ_H above $\overline{\mu_H}$, and that migration flows are unaffected by that decrease/increase, in principle any $\mu_H < \underline{\mu_H}$ and any $\mu_H > \overline{\mu_H}$ represent respectively an "open door" and a "closed door" policy. For simplicity we however restrict μ_H to belong to $\left[\underline{\mu_H}, \overline{\mu_H}\right]$.

2.4 The Politically Optimal Immigration Policy at Home

The utility of skilled workers in the domestic economy is given by their after-tax labor income

$$u_s = (1 - \tau) w_H \varepsilon_s.$$

By substituting for τ given in condition (12) into the expression above, we obtain

$$u_s = w_H \varepsilon_s - \frac{\gamma_u}{S_H} \left(U_H + \frac{\hat{\theta}_u}{\bar{\theta}} U_F \right), \tag{14}$$

stating that, *coeteris paribus*, the native skilled workers' income is negatively affected by the generosity of the transfer program as well as by the amount of (both native and foreign) unskilled workers.

Unskilled native workers instead benefit from the transfer program γ_u. Their utility is

$$u_u = w_H \varepsilon_u + \gamma_u.$$

Finally the utility of each capitalist is simply given by r_H.

We assume that the objective function of the government of the receiving region is a weighted sum of the utilities of native capitalists and native workers. Summing over the utilities of all natives (recalling that $L_H = \varepsilon_s S_H + \varepsilon_u U_H$), and weighing capitalists' utility and workers' utility respectively by a, $1 - a$ (with $a \in [0, 1]$), this objective function can be expressed as

$$W_H = a \cdot r_H K + (1 - a) \cdot \left(w_H L_H - \gamma_u \frac{\hat{\theta}_u}{\bar{\theta}} U_F \right).$$

As is well know from the immigration literature (see for instance Borjas, 1995), immigration has powerful redistributive effects on the native population. In particular, the entry of foreign workers hurts native workers (by lowering their wage and, at least for the skilled native workers, by increasing their tax rate τ), and benefits capitalists (by rasing their rent). The policy maker might not be neutral with respect to the distributional consequences of immigration. The weight a captures this concern of the policy maker over the two groups of natives: the higher a, the greater the importance of the capitalists' utility in the definition of welfare and hence, *coeteris paribus*, the higher the evaluation of the benefits from immigration.[13]

The (politically) optimal immigration policy ($\hat{\mu}_H$) for the receiving region is the one which maximizes

$$\begin{aligned} W_H(\mu_H) &= a \cdot r_H(\mu_H) K + (1-a) \cdot \left(w_H(\mu_H) L_H - \gamma_u \frac{\hat{\theta}_u(\mu_H)}{\bar{\theta}} U_F \right) \\ s.t.\ \mu_H &\in \left[\underline{\mu_H}, \overline{\mu_H} \right]. \end{aligned}$$

Immigration policy (μ_H) affects the utility of native workers through two channels. First, directly, by influencing the number of immigrants and, therefore, the fiscal cost of immigration ($\gamma_u \hat{\theta}_u / \bar{\theta} U_F$) through its effect on the threshold $\hat{\theta}_u$ (see condition (10)). Second, immigration policy affects the effective labor supply and the wage rate w_H. The effect of immigration policy on the utility of native capitalists works through the rent on the fixed factor r_H.

Whether the optimal immigration policy is an "open door" ($\underline{\mu_H}$), "closed door" ($\overline{\mu_H}$) or an

[13] If the "political" weight were equal to 1/2, the objective function of the government would correspond to social welfare for the entire region. As it is well understood from the theory of collective action (Olson, 1965), however, governments tend to favor (i.e. give a higher weight in their objective function) better organized special interests. This may explain deviations from pure welfare maximization. Facchini, Mayda and Mishra (2007) employ a lobbying model and provide a micro-analytic foundation to the political economy representation that we use in our model. Interestingly, they also find empirical evidence of the over-representation of capitalists' interests in immigration policy.

"intermediate" policy - $\hat{\mu}_H \in \left(\underline{\mu_H}, \overline{\mu_H}\right)$, in which the number of immigrants is a positive and proper fraction of the sending region's population - depends on both a and γ_u. For instance, if $a = 1$ ($a = 0$) the government perceives immigration to be only beneficial (costly), and the politically optimal policy will be an "open door" ("closed door") policy. More generally, lower values of a and/or higher values of γ_u are associated with stricter immigration policies. This is hardly surprising when one thinks that both a decrease in a and an increase in γ_u represent an increase in the costs associated to immigration. The politically optimal immigration policy is characterized in the following

Proposition 2. *The politically optimal degree of restrictiveness of the immigration policy ($\hat{\mu}_H$) depends on both the distributional concerns of the policy maker (a) and the generosity of the social policy (γ_u). There always exist combinations of parameters a and γ_u for which the policy maker partially limits migratory inflows by optimally trading off the costs and the benefits from immigration, - that is, for which $\hat{\mu}_H \in \left(\underline{\mu_H}, \overline{\mu_H}\right)$. Moreover, the higher $1 - a$ and/or γ_u, the more restrictive the politically optimal policy.*

In the real world immigration policies are always "partially" restrictive, in that they limit incoming migratory inflows up to a certain extent. When extending the model to a multi-country setting, we will focus on this case.

3 A Multi-Country Model of Immigration Policy

Most models of immigration policy have the basic two-country structure discussed in the previous section. However, the receiving region is in fact composed of several countries, each with its own immigration policy. Moreover, foreign workers (or, at least, some of them) do not only decide whether to migrate or not, but also choose their destination country in the receiving region.

Assume now that the receiving region H is composed of a continuum of countries indexed by ω in the interval $[0, Z]$. Each country ω is *small* with respect to the whole region H, which implies that changes in ω do not affect H. Countries are identical along the interval $[0, Z]$ except (possibly) for immigration policy, which can be country-specific. Factor endowments will then be $1/Z$ of the region's endowments (that is, $K_\omega = K/Z$, $L_\omega^H = L_H/Z \ \ \forall\omega$). We denote μ_ω as the immigration policy in country ω.

As discussed in the introduction, low-skill migrants are generally more constrained in their choice as to where to migrate compared to high-skill migrants. Define $U_F(\omega)$ as the population of potential unskilled foreign workers targeting country ω. We assume that this number is fixed, in the sense that these workers cannot migrate anywhere else in the region. To keep the structure symmetric and without loss of generality, suppose $U_F(\omega) \equiv U_F/Z \ \forall\omega$. The number of unskilled migrants in country ω will then be $\left(\tilde{\theta}_u/\bar{\theta}\right)(U_F/Z)$ where $\tilde{\theta}_u$ is the threshold value of the psychological cost (to be determined in the next subsection).

Skilled foreign workers, instead, have more freedom in choosing their destination country. Realistically, there may exist a pool of skilled foreign workers who can target country ω as well as other countries in the region. These workers will then be free to choose, not only whether to migrate or not, but also which country to move to. To capture the higher degree of mobility of skilled foreign workers, we assume that the pool of potential skilled entrants in country ω be $(S_F/Z)\,\overline{\Psi}$ where $1 < \overline{\Psi} < Z$. This pool is made up of two groups, one which is constrained to migrating to country ω, $(S_F/Z)\,\underline{\Psi}$ where $0 \leq \underline{\Psi} < 1$, the other, $(S_F/Z)\left(\overline{\Psi} - \underline{\Psi}\right)$, which is free to target country ω as well as other countries in the region. Both groups compare the pay-off they would obtain from country ω to the one from their country of origin. The "free" group, however, also compares the pay-off from migrating to ω to the one from migrating to the rest of the receiving region. The number of skilled migrants will then be $\left(\tilde{\theta}_s/\bar{\theta}\right) S_F(\omega)$ where $\tilde{\theta}_s$ is the threshold value of the psychological cost (see next subsection), and $S_F(\omega) \equiv (S_F/Z)\,\Psi_\omega$ with Ψ_ω varying between $\underline{\Psi}$ and $\overline{\Psi}$. In what follows we focus on the equilibrium of country ω and suppose that the rest of the region has been implementing the global politically optimal immigration policy $\hat{\mu}_H \in \left(\underline{\mu_H}, \overline{\mu_H}\right)$.

3.1 The New Migration Choice

The migration choice of low-skill foreign workers in country ω parallels the one we have seen for the entire region. These workers migrate to ω if and only if

$$\gamma_u - \mu_\omega - \theta_i \geq 0,$$

from which we determine the threshold $\tilde{\theta}_u$ (below which unskilled foreign workers find it profitable to migrate) as

$$\tilde{\theta}_u = \gamma_u - \mu_\omega. \tag{15}$$

The number of unskilled migrants will then be $\left(\tilde{\theta}_u/\bar{\theta}\right)(U_F/Z)$. It is immediate to verify that the number of low-skill migrants in country ω is higher (lower) than the average number in the other countries of the receiving region if and only if its migration policy is looser (stricter) than in the rest of the region:

$$\frac{\tilde{\theta}_u}{\bar{\theta}}\frac{U_F}{Z} \gtrless \frac{\hat{\theta}_u}{\bar{\theta}}\frac{U_F}{Z} \Leftrightarrow \mu_\omega \lesseqgtr \hat{\mu}_H.$$

Even skilled foreign workers targeting country ω compare their pay-off as immigrants in country

ω to the one from their country of origin:

$$w_\omega \varepsilon_s^* - \mu_\omega - \theta_i > w^* \varepsilon_s^*. \tag{16}$$

The threshold $\tilde{\theta}_s$ is then

$$\tilde{\theta}_s = (w_\omega - w^*)\, \varepsilon_s^* - \mu_\omega.$$

The pool of constrained skilled migrants will then simply be $\left(\tilde{\theta}_s/\bar{\theta}\right)(S_F/Z)\,\underline{\Psi}$. The subset of free skilled workers, however - $(S_F/Z)\left(\overline{\Psi} - \underline{\Psi}\right)$ - also compare their pay-off in ω with the one they would obtain in the rest of the region H, and choose country ω if the former is higher than the latter:

$$w_\omega \varepsilon_s^* - \mu_\omega - \theta_i > w_H \varepsilon_s^* - \hat{\mu}_H - \theta_i. \tag{17}$$

As a result, all free skilled workers whose psychological cost is lower than $\tilde{\theta}_s$ will enter country ω if and only if $\mu_\omega < \hat{\mu}_H$ (*crowding in*), and enter the rest of the region if and only if $\mu_\omega > \hat{\mu}_H$ (*crowding out*).[14] When $\mu_\omega = \hat{\mu}_H$, these workers will be indifferent between country ω and the rest of the region. For symmetry we assume that they will distribute uniformly across the whole region. The number of skilled migrants, as a function of immigration restrictions in ω, will then be $\left(\tilde{\theta}_s/\bar{\theta}\right)(S_F/Z)\,\Psi_\omega$ where

$$\Psi_\omega = \begin{cases} \overline{\Psi} \text{ if } \mu_\omega < \hat{\mu}_H \\ 1 \text{ if } \mu_\omega = \hat{\mu}_H \\ \underline{\Psi} \text{ if } \mu_\omega > \hat{\mu}_H. \end{cases}$$

[14] Refer to condition (17). Indeed, crowding in and crowding out take place because, as can be easily verified, $d\left(\varepsilon_s^* w_\omega\right)/d\mu_\omega < 1$.

INSERT FIGURE 5 ABOUT HERE

The sum of skilled and unskilled immigrants, $\left(\tilde{\theta}_s/\bar{\theta}\right)(S_F/Z)\,\Psi_\omega + \left(\tilde{\theta}_u/\bar{\theta}\right)(U_F/Z)$, is a piece-wise continuous function of μ_ω whose only discontinuity point is $\mu_\omega = \hat{\mu}_H$. It can be interpreted as the immigrants' best-response function, as it captures the optimal reaction of immigrants to any level of immigration restrictions chosen by the policy maker. What makes this behavior interesting, and different from the one we have illustrated in the two-country model, is the function $\Psi_\omega(\mu_\omega)$ (depicted in Figure 5) which represents the behavior of free skilled migrants. This function is responsible for the discontinuity of the immigrants' best-response to immigration restrictions at point $\mu_\omega = \hat{\mu}_H$.

Importantly, notice that in the multi-country model a restrictive immigration policy works as an adverse skill selection filter for the host economy by discouraging mostly the free skilled workers. Raising barriers to immigration leads to a negative skill composition effect (the opposite of the positive effect that we found in the two-country model).

3.2 Immigration Policy in a Small Open Economy

We have seen above that the migration choice of foreign workers, and hence the skill composition of the migrant population in ω, depend on the immigration policy enacted in this country. In particular, internationally mobile skilled workers might decide not to target country ω when observing a comparatively stricter policy than in the rest of the region and viceversa. However, the immigration policy set up by the government in country ω depends, in turn, on the expected skill composition of the migrant population. Intuitively, the better the skill composition expected by the policy maker in country ω - that is, the higher the ratio between skilled and unskilled migrants -, the softer its immigration policy. This subsection is devoted to prove formally this statement.

In the two-country model developed above we have characterized the politically optimal immigration policy $\hat{\mu}_H$ for the entire region H. We now proceed analogously to determine the immigration policy decision in country ω. The policy maker chooses restrictions $\hat{\mu}_\omega$ to maximize

$$\begin{aligned} W_\omega(\mu_\omega) &= a \cdot r_H(\mu_\omega) K_\omega + (1-a) \cdot \left(w_\omega(\mu_\omega) L_\omega^H - \gamma_u \frac{\tilde{\theta}_u(\mu_\omega)}{\bar{\theta}} \frac{U_F}{Z} \right), \\ s.t.\ \mu_\omega &\in \left[\underline{\mu_\omega}, \overline{\mu_\omega} \right] \end{aligned}$$

where $r_H = \alpha \left[K_\omega / \left(L_\omega^H + L_F(\omega) \right) \right]^{\alpha-1}$, $w_\omega = (1-\alpha) \left[K_\omega / \left(L_\omega^H + L_F(\omega) \right) \right]^{\alpha}$, and where $L_F(\omega) = \varepsilon_s^* \left(\tilde{\theta}_s / \bar{\theta} \right) (S_F/Z) \Psi_\omega$ is the expected foreign labor supply. The two boundary values, $\underline{\mu_\omega}$ and $\overline{\mu_\omega}$, are defined, analogously to the two-country model, as respectively the "open door" and the "closed door" policy for country ω.[15] The crucial difference with respect to the two-country model is that here the immigration policy chosen by country ω, $\hat{\mu}_\omega(\cdot)$, is a function of Ψ_ω, which captures the expected behavior of free skilled migrants. Clearly, when $\Psi_\omega = 1$, this maximum problem coincides with the maximum problem in the two-country model multiplied by a constant $(1/Z)$. As a result, the two problems have the same solution, $\hat{\mu}_\omega(\Psi_\omega = 1) = \hat{\mu}_H$. In studying the relationship between $\hat{\mu}_\omega$ and Ψ_ω we assume that $\hat{\mu}_H \in \left(\underline{\mu_H}, \overline{\mu_H} \right)$[16], and prove the following

Lemma 3. *The politically optimal immigration policy in country ω, $\hat{\mu}_\omega$, is a decreasing function of $\Psi_\omega \in \left[\underline{\Psi}, \overline{\Psi} \right]$.*

INSERT FIGURE 6 ABOUT HERE

The curve drawn in Figure 6 describes the locus of points in which immigration policy in

[15] Incidentally notice that, while $\overline{\mu_\omega} = \overline{\mu_H}$, $\underline{\mu_\omega} \neq \underline{\mu_H}$ since it depends on $\overline{\Psi}$.

[16] We have determined sufficient conditions for the existence of a unique global interior maximum in the proof of proposition 2 in appendix. Indeed, all our results hold even when the globally optimal policy is a corner solution (under proper conditions on $\underline{\Psi}$ and $\overline{\Psi}$). We however focus on this more realistic case.

country ω is politically optimal for any value of Ψ_ω between $\underline{\Psi}$ and $\overline{\Psi}$. A decrease in the pool of expected skilled foreign workers ($\Psi_\omega \downarrow$), by worsening the skill composition of the migrant population, is associated to a tightening of the immigration policy ($\hat{\mu}_\omega \uparrow$), and viceversa. Hence, Lemma 3 implies that $\hat{\mu}_\omega\left(\underline{\Psi}\right) > \hat{\mu}_\omega\left(1\right) > \hat{\mu}_\omega\left(\overline{\Psi}\right)$, as $\underline{\Psi} < 1 < \overline{\Psi}$.[17]

3.3 The High-Skill Boom Equilibrium and the Unskilled Migration Trap

We are now ready to characterize the policy equilibria in country ω. The mutual interaction between the policy maker and the foreign workers can be described as a sequential game in which *(i)* the former chooses immigration policy as a function of the expected skill composition of the migrant population, *(ii)* the latter make their migration choice depending on this immigration policy. This structure gives rise to a multiplicity of equilibria which we are now going to discuss.

For a country ω an *equilibrium* is defined as a configuration in which *(i)* the policy maker chooses the immigration policy which maximizes her objective function given her (correct) beliefs on the foreign workers' behavior, *(ii)* foreign workers make their migration choice to maximize their utility for given immigration policy. Our results are summarized in the following

Proposition 4. *Three policy equilibria exist in country ω:*

1. The "high-skill boom" equilibrium, where the policy in ω is soft, $\hat{\mu}_\omega\left(\overline{\Psi}\right) = \mu_\omega^{soft} < \hat{\mu}_H$, and the skill composition - $\left(\tilde{\theta}'_s/\bar{\theta}\right)(S_F/Z)\,\overline{\Psi}/\left(\tilde{\theta}'_u/\bar{\theta}\right)(U_F/Z)$ - and the welfare are higher in ω compared to H (crowding in).

2. The second corresponds to the "globally optimal policy" equilibrium, in which $\hat{\mu}_\omega\left(1\right) = \hat{\mu}_H$, and the skill composition -$\left(\hat{\theta}_s/\bar{\theta}\right)(S_F/Z)\,/\left(\hat{\theta}_u/\bar{\theta}\right)(U_F/Z)$ - as well as the welfare are equal to those

[17] The curve $\hat{\mu}_\omega\left(\Psi_\omega\right)$ has been drawn under the assumption that $\hat{\mu}_\omega\left(\overline{\Psi}\right) < \underline{\mu_\omega}$ and $\hat{\mu}_\omega\left(\underline{\Psi}\right) > \overline{\mu_\omega}$, that is, when skilled migrants crowd in or crowd out, the optimal policy is still an "intermediate" policy (and not, respectively, an "open door" or a "closed door" policy). The proof of lemma 3 takes however this case into account.

in H.

3. Finally, the "unskilled migration trap" equilibrium, in which the policy in ω is tight, $\hat{\mu}_{\omega}(\underline{\Psi}) = \mu_{\omega}^{tight} > \hat{\mu}_H$, and the skill composition - $\left(\tilde{\theta}_s^{''}/\bar{\theta}\right)(S_F/Z)\underline{\Psi}/\left(\tilde{\theta}_u^{''}/\bar{\theta}\right)(U_F/Z)$ - and the welfare are lower in country ω than in the rest of the receiving region (crowding out).

A graphical intuition of this result is provided in Figure 7, where the two schedules, capturing the free high-skill migrants' behavior and the politically optimal immigration policy, intersect in three points, which constitute the policy equilibria of country ω.

INSERT FIGURE 7 ABOUT HERE

In this model, expectations are self-fulfilling. In a country where the dominant belief is that immigration will be mostly unskilled (and, therefore, costly for the redistributive system), the government sets a restrictive policy. In turn, a restrictive immigration policy scares - at least some - skilled foreign workers who prefer to migrate to other countries in the region. This creates a trap with low skilled immigration in ω and lower welfare compared to the rest of the receiving region. The opposite -i.e. good- equilibrium with high skilled immigration and higher welfare would be triggered by a positive belief on the skill composition (and the welfare effects) of immigration. Finally, the third possibility is that a country expects that skilled and unskilled immigrants will distribute uniformly across the receiving region. In this case, the equilibrium implies that the policy and the welfare in country ω are exactly as in region H, and skilled and unskilled foreign workers are symmetrically distributed in H. A corollary of Proposition 4 is that, if *all* skilled foreign workers are internationally mobile ($\underline{\Psi} = 0$), an equilibrium arises in country ω where the migration policy is so restrictive that not a single foreign worker - whether skilled or unskilled - will enter this country. This equilibrium would configure as a "no migration trap".

While the "high-skill boom" and the "unskilled trap" are stable equilibria, the "globally optimal policy" equilibrium is unstable. The very existence of the latter indeed, crucially hinges on the assumption of symmetric behavior of the free skilled migrants when the policy maker sets up the globally optimal policy (that is, $\Psi_\omega = 1$ and hence $S_F(\omega) = S_F/Z$ when $\mu_\omega = \hat{\mu}_H$). A small perturbation of this behavior makes, however, the economy diverge towards either of the two equilibria (depending on whether that perturbation is positive or negative). Consider a π-perturbation of $\Psi_\omega = 1$, for a however small real number π. If $\pi > 0$, for lemma 3 the government reacts by slightly softening its immigration policy, that is, $\hat{\mu}_\omega (1 + \pi) < \hat{\mu}_H$. Skilled migrants respond to this policy by crowding in country ω, which in turn leads the policy maker to set up $\hat{\mu}_\omega = \mu_\omega^{soft}$. The economy then converges to the high-skill boom equilibrium. Conversely, if $\pi < 0$ the government sets up a slightly tighter immigration policy. As a consequence, skilled migrants crowd out of country ω, the policy maker sets $\hat{\mu}_\omega = \mu_\omega^{tight}$, and the economy converges to the unskilled migration trap. This reasoning is captured graphically in Figure 8.

INSERT FIGURE 8 ABOUT HERE

3.4 Self-Confirming Immigration Policy

An interesting interpretation of our equilibria is as *self-confirming equilibria* in the sense of Fudenberg and Levine (1993a). In a self-confirming equilibrium each player plays her best response to her beliefs on the opponent's behavior, and beliefs must be correct along the equilibrium path. The peculiarity of this equilibrium is that it is in fact compatible with incorrect beliefs *off* the equilibrium path. The self-confirming equilibrium is a generalization of the Nash equilibrium, in that a Nash equilibrium is always a self-confirming equilibria but not viceversa. The rationale for this generalization can be explained as follows. If it is true that "non-cooperative equilibria should be interpreted as the outcome of a learning process, in which players revise their beliefs using their observations of previous play" (Fudenberg-Levine, 1993a, p. 523), the concept of self-confirming equilibrium captures the idea that players tend to learn - and hence to have correct beliefs on - their opponents' behavior along the path followed by the equilibrium but not (necessarily) in contingencies that are in fact never played.

If we follow this logic, the "anti-immigration prejudice" may be interpreted as the policy maker's belief that, whatever she does, skilled migrants will crowd out. Even though this belief is partially incorrect - with a soft policy a skilled migrants' crowding out would not take place, quite the opposite indeed! -, no evidence emerges which contradicts the policy maker' wrong belief, as she will implement a tight policy which will in fact crowd out skilled migrants. Following the terminology of Fudenberg and Levine (2006), the incorrect belief off the equilibrium path is indeed a "*superstition*", which can in principle be sustained forever to the extent that play follows the equilibrium path, and players will never learn about their mistaken belief. Of course, the same interpretation can be given to the "pro-immigration prejudice": driven by the optimistic "superstition" that most skilled immigrants will choose country ω independently of the implemented immigration policy, the policy maker will set up a soft policy which will in fact attract most skilled immigrants. Here again, the policy maker will never realize her mistake, which can in principle survive forever.

One might argue that a policy maker who is stuck into the unskilled trap might experiment alternative paths and eventually learn her mistake. As argued by Fudenberg and Levine (1993b), superstitions may vanish if players are patient enough to carry out a sufficient amount of experimentation off the equilibrium. In our theoretical framework, even deviating just once from the restrictive policy is enough to eradicate the superstition forever. Observation of the real world seems, however, to suggest that (1) the skill composition does not respond instantaneously to changes in immigration policy, which may render the real learning process far more complex and slow than suggested in our simple stylized world, (2) patience may not be a major virtue of policy makers who must quickly respond to the voters' attitude towards immigration (Facchini-Mayda, 2008).

Although we find the reference to the self-confirming equilibrium appealing[18], that is not the only possible interpretation of our policy equilibria. We could in fact interpret them as Nash equilibria of a simultaneous coordination game between the policy maker and the foreign workers, in which both players are uncertain, and hence form expectations, about the other's behavior. The reason why foreign workers should be uncertain about immigration policy is that they are mainly interested in the *future* immigration policy, that is, in the immigration policy which will be set up from the moment of their entry onwards.

4 Discussion

In this section we briefly discuss some extensions to our framework. First, we consider the case where low-skill immigrants have both a negative effect (due to rising welfare costs) and a positive effect (through the production process) on receiving countries. Second, we discuss how our results extend to a different model where foreign workers may complement domestic workers. Finally, we

[18] The self-confirming equilibrium has recently found several applications in the macroeconomic literature. For instance, Sargent et al. (2006) develop a theory of inflation based on this concept. In Alesina and Angeletos (2005), the two policy equilibria - the European high-redistribution equilibrium and the US low-redistribution equilibrium - may also be interpreted as self-confirming equilibria.

analyze the case of discriminatory immigration restrictions.

Even though less productive than high-skill migrants, low-skill migrants may still have a positive effect on receiving countries. If $\varepsilon_u^* > 0$, low-skill migrants increase the effective foreign labor supply (for the entire region), which now equals

$$L_F = \varepsilon_s^* \frac{\hat{\theta}_s}{\overline{\theta}} S_F + \varepsilon_u^* \frac{\hat{\theta}_u}{\overline{\theta}} U_F,$$

where the threshold is $\hat{\theta}_u = (w_H - w^*)\, \varepsilon_u^* - \mu_H + \gamma_u$. In this case, a surge in low-skill immigration in the host country implies increasing welfare costs, but also an increase in the effective labor supply, and hence in the benefits arising through this channel. Although analytically more cumbersome, this extension would bring the same qualitative results to the extent that the equilibrium immigration policy in the multiple country model still implies a positive but not complete restriction to the migrants' incoming flows. In other words and quite naturally, our results still hold true whenever the new benefits associated with low-skill migrants are not so high to always more than offset the welfare costs, and hence to induce the policy maker to set up an "open door" policy.[19]

The technology that we employ does not allow for complementarities between domestic skilled (unskilled) workers and foreign unskilled (skilled) migrants. With production function (1) (and under $\varepsilon_u^* > 0$), any increase in immigration (skilled or unskilled) reduces domestic wages by augmenting the foreign component of the labor supply. The negative effect on labor income of high and low skill domestic workers is more than compensated by the positive effect on the rental rate of capital that natives own. As standard in these models, the immigration surplus -as this net

[19] We have only briefly discussed the intuition of this case. A complete analytical treatment is however available from the authors upon request.

effect is often referred to- arises because of the complementarities that exist between migrants and native-owned capital.

Consider now the alternative linear homogeneous technology which is also often used to study immigration:

$$Y = f(K, S, U),$$

where S and U are respectively the total (i.e. native plus foreign) number of skilled and unskilled workers.[20] This technology satisfies the following standard assumptions: $f_i > 0$, $f_{ii} < 0$ and $f_{ij} > 0$ (where $i, j = S, U$), that is both types of labor are complementary in production. Is the immigration surplus increasing in the migrants' skill composition in this case? As discussed by Borjas (1995), the answer to this question depends on the complementarity between the fixed factor (here, capital) and skilled and unskilled labor. If the complementarities in production between skilled workers and the fixed factor are sufficiently strong, natives gain from an improvement in the skill composition of migrants, even if the domestic labor force is predominantly skilled.[21] If this is the case, the logic of our results is unaltered within this framework. High-skill foreign immigrants have an unambiguous positive effect on the receiving country, as they imply a positive immigration surplus (independently of the skill composition of the domestic economy). On the other hand, unskilled foreign workers may have on net a negative effect on the receiving economy, due to the increase in the cost of welfare programs. As in Section 3, beliefs on the skill composition of migrants determine immigration restrictions, which in turn influence migratory decisions of skilled workers and the welfare effects of immigration.

[20]For simplicity assume that skilled and unskilled are identical, no matter if they are foreign or native.

[21]This conclusion is reinforced in a more general model where human capital of immigrants has external effects in production.

Finally, consider the case where the government of country ω is able to discriminate between skilled and unskilled immigrants (i.e. filter the more productive workers). The optimal (discriminatory) policy for the entire region is such that all high-skill immigrants enter (i.e. no restriction on high-skill foreign workers) and no low-skill foreign worker will be willing to migrate (i.e. restrictions on unskilled migrants which fully offset the social policy). Independently of a country's beliefs on the skill composition of the migrant labor force, the optimal policy for country ω consists of setting high barriers to low-skill immigration and no restrictions to the mobility of highly skilled immigrants. This will imply that the only equilibrium will be such that no foreign worker with low skills migrates, while the high-skill migrants distribute uniformly in the receiving region. In other words, the presence of discriminatory immigration policies eliminates both the skilled immigration boom and the unskilled immigration trap. For instance, if country ω expects that only unskilled immigrants will enter, the government can set up a high restriction on this group of foreign workers only (and leave unaltered the policy on high-skill immigrants). In this case, country ω would receive the same number of skilled immigrants as any other country in the destination region and no unskilled. Beliefs would not be vindicated. A similar argument can be made for optimistic expectations on the migrants' skill composition.

5 Conclusion

In most countries there is a heated debate on immigration. The mobility of people across borders has important effects on both source and destination economies. Within the receiving part of the world, for instance, several issues are at the forefront of public discussion and of academic research, including the performance of immigrants and their ability to integrate in the destination country, the impact of migrants on natives' employment opportunities, the proper design of social and labor market policy in presence of immigration. We focus on the host economy (that is, do not address the effects of a diaspora on the source countries) and abstract from several of these important issues.

This paper provides a model to investigate how attitudes towards immigration interact with immigration policy and the welfare effects of immigration. We show that in a setting where high skilled foreign workers are more mobile than unskilled migrants, a pro or an anti-immigration prejudice can have radically different effects on restrictions to immigration and on its effects on welfare. Optimistic beliefs on immigration induce a government to set low restrictions which attract high-skill foreign workers, while pessimistic beliefs bring high restrictions which scare skilled immigrants. This self-fulfilling mechanism will sustain the endogenous formation of a prejudice (pro or anti) immigration. While clearly not the only explanation, our work thus sheds some light on why differences in attitudes towards immigration may be so rooted in different countries.

This analysis contributes to the discussion on the proper design of immigration policy in host countries. The model implies that the choice of the right policy may have a significant impact in the short run, as well as in the long run through the formation of attitudes towards immigration that will change only slowly. First, the multi-country setting helps us clarifying that a country must be careful in implementing restrictive immigration policies to control the migration flow. The reason is that migration policies affect not only the number of immigrants but also their quality, and a restrictive policy could indirectly act as an instrument of selection of the lowest quality immigrants. Secondly, a generous social policy is likely to induce governments to implement a more restrictive migration policy and, hence, more likely to fall into an unskilled immigration trap. Third, while skills of foreign workers may be difficult to infer correctly, several arguments have been proposed in favor of policies that filter applicants in terms of observable skills (e.g. skilled migrants are more productive, less likely to participate in income support programs, etc.). This paper adds to these arguments that selective policies may influence natives' attitude towards immigration and, hence, increase support for further reductions of barriers. In principle an anti-immigration prejudice could "vanish" via a combination of rules that favor more productive migrants with a more open migration policy.

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Appendix

Proof of proposition 1.

1. First we show that L_F is decreasing in μ_H. Notice that from condition (11) and the labor market equilibrium condition (13), we obtain the implicit function for L_F as

$$F(L_F, \mu_H) \equiv L_F - \varepsilon_s^* \frac{\left[(1-\alpha)\left(\frac{K}{L_H+L_F}\right)^{\alpha} - w^*\right]\varepsilon_s^* - \mu_H}{\bar{\theta}} S_F = 0.$$

We then use the implicit function theorem and obtain

$$\frac{dL_F}{d\mu_H} = -\frac{\frac{\varepsilon_s^*}{\bar{\theta}} S_F}{1 - +(1-\alpha)\alpha\left(\frac{K}{L}\right)^{\alpha}\frac{1}{L}\frac{(\varepsilon_s^*)^2}{\bar{\theta}} S_F} < 0.$$

Given that $L = L_H + L_F$ and that L_H is exogenous, it follows $dL/d\mu_H < 0$.

2. In order to find $dw_H/d\mu_H$ we first need to characterize the implicit function for w_H which is the following:

$$F(w_H, \mu_H) \equiv (1-\alpha)\left[\frac{K}{L_H + \varepsilon_s^* \frac{(w_H - w^*)\varepsilon_s^* - \mu_H}{\bar{\theta}} S_F}\right]^{\alpha} - w_H = 0.$$

Differentiating w_H with respect to μ_H we obtain

$$\frac{dw_H}{d\mu_H} = \frac{(1-\alpha)\,\alpha\left(\frac{K}{L}\right)^{\alpha}\frac{1}{L}\varepsilon_s^*\frac{S_F}{\bar{\theta}}}{(1-\alpha)\,\alpha\left(\frac{K}{L}\right)^{\alpha}\frac{1}{L}\left(\varepsilon_s^*\right)^2\frac{S_F}{\bar{\theta}} + 1},$$

which is always strictly higher than zero, confirming that an increase in μ_H leads to a higher wage rate.

3. In point 1 we have proven that $dL/d\mu_H < 0$. Given that $r_H = \alpha\,(K/L)^{\alpha-1}$, and that $\partial r_H/\partial L > 0$, it follows $dr_H/d\mu_H < 0$.

4. The effect on the number of unskilled foreign migrants of an increase in μ_H can be immediately calculated:

$$\frac{d\hat{\theta}_u}{d\mu_H} = -1 < 0. \tag{18}$$

The first derivative of $\hat{\theta}_s$ with respect to μ_H can be computed as follows:

$$\frac{d\hat{\theta}_s}{d\mu_H} = \frac{\partial\hat{\theta}_s}{\partial\mu_H} + \frac{\partial\hat{\theta}_s}{\partial w_H}\frac{dw_H}{d\mu_H},$$

where $dw_H/d\mu_H$ is given in point 2, $\partial\hat{\theta}_s/\partial\mu_H = -1$ and $\partial\hat{\theta}_s/\partial w_H = \varepsilon_s^*$. It is now easy to show that

$$\frac{d\hat{\theta}_s}{d\mu_H} = -\frac{1}{(1-\alpha)\,\alpha\left(\frac{K}{L}\right)^{\alpha}\frac{1}{L}\left(\varepsilon_s^*\right)^2\frac{S_F}{\theta}+1} < 0. \tag{19}$$

5. Simple comparison shows the composition effect:

$$-1 = \frac{d\hat{\theta}_u}{d\mu_H} < \frac{d\hat{\theta}_s}{d\mu_H} = -\frac{1}{(1-\alpha)\,\alpha\left(\frac{K}{L}\right)^{\alpha}\frac{1}{L}\left(\varepsilon_s^*\right)^2\frac{S_F}{\theta}+1} < 0.$$

"Open door" and "closed door" policies.

The "closed door" policy is implicitly defined by

$$\overline{\mu_H} = \max\left\{\gamma_u, \left(w_H\left(\overline{\mu_H}\right) - w^*\right)\varepsilon_s^*\right\},$$

where $\mu_H = \gamma_u$ and $\mu_H = \left(w_H\left(\mu_H\right) - w^*\right)\varepsilon_s^*$ are, by construction, the immigration policies respectively dissuading all unskilled and all skilled foreign workers from emigrating to country H. When $\mu_H = \overline{\mu_H}$, population in H is only made up of natives ($L = L_H$ and $\hat{\theta}_u = 0$), and it is easy to calculate the numerical value for welfare as

$$\overline{W}_H = K^{\alpha} L_H^{1-\alpha} \left[a\alpha + (1-a)(1-\alpha) \right]. \tag{20}$$

The "open door" policy is the one associated with the maximum number of skilled migrants, which is S_F. In order for this to be the case, μ_H must be set so that $\hat{\theta}_s = \bar{\theta}$, that is, so that all skilled foreign workers find it profitable to migrate. The following equation implicitly defines the "open door" policy for the receiving region H:

$$\underline{\mu_H} = \left(w_H(\underline{\mu_H}) - w^* \right) \varepsilon_s^* - \bar{\theta}.$$

In this case population in H is made up of both natives and (all) foreigners ($L \equiv \underline{L} = L_H + \varepsilon_s^* S_F$ and $\hat{\theta}_u = \bar{\theta}$).[22] The numerical value for welfare is given by

$$\underline{W}_H = K^{\alpha} \underline{L}^{1-\alpha} \left[a\alpha + (1-a)(1-\alpha) \frac{L_H}{\underline{L}} - (1-a)\gamma_u U_F \right]. \tag{21}$$

Whether $\underline{W}_H \lesseqgtr \overline{W}_H$, and hence whether the "open door" policy is better than the "closed door" policy depends on the parameters of the economy.

Proof of proposition 2.

The policy problem consists of maximizing the following condition

$$\begin{aligned} W_H &= a \cdot r_H K + (1-a) \cdot \left(w_H L_H - \gamma_u \frac{\hat{\theta}_u}{\bar{\theta}} U_F \right) \\ s.t.\ \mu_H &\in \left[\underline{\mu_H}, \overline{\mu_H} \right], \end{aligned}$$

[22] Only for simplicity, and to compute welfare as function of parameters only, we are implicitely assuming that the policy which attracts all skilled foreign workers is also able to attract all unskilled foreign workers. This is the case whenever $\gamma_u - \underline{\mu_H} \geq \bar{\theta}$.

where $w_H = (1-\alpha)(K/L)^{\alpha}$, $r_H = \alpha(K/L)^{\alpha-1}$ and $\hat{\theta}_u = \gamma_u - \mu_H$. The candidate solutions to this problem are an interior maximum, $\hat{\mu}_H \in \left(\underline{\mu_H}, \overline{\mu_H}\right)$, and the two corner solutions, that is, the "open door" ($\underline{\mu_H}$) and the "closed door" policy ($\overline{\mu_H}$).

To characterize an interior solution to the maximum problem we need to compute the first and the second order conditions. The total derivative of W_H with respect to μ_H can be expressed as

$$\frac{dW_H}{d\mu_H} = \frac{dW_H}{dL} \cdot \frac{dL}{d\mu_H} + \frac{\partial W_H}{\partial \mu_H}$$

where

$$\frac{\partial W_H}{\partial \mu_H} = (1-a)\gamma_u \frac{U_F}{\bar{\theta}} > 0$$

$$\frac{dL}{d\mu_H} = -\frac{\frac{\varepsilon_s^*}{\bar{\theta}} S_F}{1 + (1-\alpha)\alpha\left(\frac{K}{L}\right)^{\alpha} \frac{1}{L} \frac{(\varepsilon_s^*)^2}{\bar{\theta}} S_F} < 0,$$

and

$$\frac{dW_H}{dL} = \alpha(1-\alpha)\left(\frac{K}{L}\right)^{\alpha}\left[a - (1-a)\frac{L_H}{L}\right] \lesseqgtr 0.$$

The FOC can then be expressed as

$$\frac{dW_H}{d\mu_H} = (1-a)\gamma_u \frac{U_F}{\bar{\theta}} - \frac{\alpha(1-\alpha)\left(\frac{K}{L}\right)^{\alpha}\left[a - (1-a)\frac{L_H}{L}\right] \frac{\varepsilon_s^*}{\bar{\theta}} S_F}{1 + (1-\alpha)\alpha\left(\frac{K}{L}\right)^{\alpha} \frac{1}{L} \frac{(\varepsilon_s^*)^2}{\bar{\theta}} S_F} = 0 \tag{22}$$

where the first and the second term respectively represent the marginal costs (of a reduction in μ_H) in terms of social policy, and the marginal benefits (if positive) in terms of production. From (22) notice that marginal benefits are positive only when $a > \frac{L_H}{L} / \left(\frac{L_H}{L} + 1\right)$. A sufficient condition for this to happen for any $L > L_H$ would be to assume $a \geq 1/2$.

To check the second order condition, let us now calculate the second derivative of the government's objective function with respect to μ_H:

$$\frac{d^2W_H}{d\mu_H^2} = \frac{d^2W_H}{dL^2}\frac{dL}{d\mu_H}.$$

After some algebra we obtain

$$\frac{d^2W_H}{d\mu_H^2} = -\frac{\frac{d\chi}{d\mu_H}\left[a - (1-a)\frac{L_H}{L}\right] + \chi\frac{1}{L^2}\frac{dL}{d\mu_H}\left[(1-a)L_H + a\chi\varepsilon_s^*\right]}{\left[\frac{1}{L}\chi\varepsilon_s^* + 1\right]^2},$$

where

$$\chi(\mu_H) \equiv (1-\alpha)\,\alpha\left(\frac{K}{L}\right)^{\alpha}\varepsilon_s^*\frac{S_F}{\bar{\theta}} > 0,$$

$$\frac{d\chi}{d\mu_H} = -(1-\alpha)\,\alpha^2\left(\frac{K}{L}\right)^{\alpha}\varepsilon_s^*\frac{S_F}{\bar{\theta}}\frac{1}{L}\frac{dL}{d\mu_H} > 0,$$

and where the expression for $dL/d\mu_H < 0$ is already given above.

In order for $\hat{\mu}_H$ to be a global interior maximum, it must be

$$\frac{dW_H}{d\mu_H}(\hat{\mu}_H) = 0,\ \frac{d^2W_H}{d\mu_H^2}(\hat{\mu}_H) < 0 \text{ and } W_H(\hat{\mu}_H) > \overline{W}_H, \underline{W}_H.$$

where $\overline{W}_H, \underline{W}_H$ represent the values of government welfare under, respectively, the "closed door" and the "open door" policies as defined in (20) and (21). Unfortunately neither the FOC nor the SOC can be solved explicitly for μ_H, and hence a complete characterization of the solution cannot be carried out. To prove the existence of economies characterized by a global interior maximum, we then look for a sufficient condition. To give an intuition, we will now prove that there exist values of $a \in (0,1)$ and $\gamma_u > 0$ such that the FOC is satisfied at an interior $\hat{\mu}_H$ and the welfare function is *everywhere* strictly concave.

By plugging the expressions for $d\chi/d\mu_H$, $dL/d\mu_H$ and $\chi(\mu_H)$ into $d^2W_H/d\mu_H^2$ we obtain that

$$\frac{d^2W_H}{d\mu_H^2} < 0 \Longleftrightarrow a > \frac{\alpha\left(\frac{L_H}{L}+1\right)}{\alpha\left(\frac{L_H}{L}+1\right)+\frac{L_H}{L}-\frac{1}{L}\chi\varepsilon_s^*} \equiv \bar{a}(\mu_H). \tag{23}$$

A sufficient condition to have $\bar{a}(\mu_H) < 1\ \forall\mu_H$ is that $L_H > \left[(1-\alpha)\,\alpha\,(K)^\alpha\,(\varepsilon_s^*)^2\,\frac{S_F}{\bar{\theta}}\right]^{\frac{1}{\alpha+1}}$, which in fact ensures $L_H/L-(1/L)\,\chi\varepsilon_s^* > 0$. Hence, for any $a \in (\bar{a}(\mu_H), 1)$, $d^2W_H/d\mu_H^2 < 0$ everywhere, and the welfare function is strictly concave. Let us now consider the first order condition. Indeed there always exists a $\gamma_u > 0$ such that $dW_H/d\mu_H = 0$ whenever the second term in (22) is positive. As we have seen above, a sufficient condition for this to happen is that $a \geq 1/2$. Since $\bar{a}(\mu_H) \gtreqless 1/2$, then for any $a \in \min\{(\bar{a}(\mu_H),1),(1/2,1)\}$, there always exists a positive γ_u such that $dW_H/d\mu_H = 0$. For all these economies the welfare function admits a global interior maximum, $\hat{\mu}_H \in \left(\underline{\mu_H}, \overline{\mu_H}\right)$.

We now prove that $\hat{\mu}_H$ is increasing in γ_u and decreasing in a, that is:

$$\frac{d\hat{\mu}_H}{d\gamma_u} = -\frac{\frac{dG}{d\hat{\mu}_H}}{\frac{dG}{d\gamma_u}} > 0 \text{ and } \frac{d\hat{\mu}_H}{da} = -\frac{\frac{dG}{d\hat{\mu}_H}}{\frac{dG}{da}} < 0$$

where $G \equiv dW_H/d\hat{\mu}_H$. We already know that $dG/d\hat{\mu}_H = d^2W_H/d\hat{\mu}_H^2 < 0$. Since $dG/d\gamma_u = (1-a)\,U_F/\bar{\theta} > 0$, then it will be $d\hat{\mu}_H/d\gamma_u > 0$. Moreover

$$\frac{dG}{da} = -\frac{\alpha(1-\alpha)\left(\frac{K}{L}\right)^\alpha\left[1+\frac{L_H}{L}\right]\frac{\varepsilon_s^*}{\bar{\theta}}S_F}{1+(1-\alpha)\alpha\left(\frac{K}{L}\right)^\alpha\frac{1}{L}\frac{(\varepsilon_s^*)^2}{\bar{\theta}}S_F} < 0$$

implies $d\hat{\mu}_H/da < 0$.

Proof of lemma 3.

The policy maker in ω has the following maximization problem:

$$\max_{\mu_\omega} W_\omega = \max_{\mu_\omega} \left[a \cdot r_H K_\omega + (1-a) \cdot \left(w_\omega L_\omega^H - \gamma_u \frac{\tilde{\theta}_u}{\bar{\theta}} \frac{U_F}{Z} \right) \right],$$

where W_ω is the objective function of the government (i.e. the politically weighted aggregate welfare) of country ω and $K_\omega \equiv K/Z$ and $L_\omega^H \equiv L_H/Z = \varepsilon_s S_H/Z + \varepsilon_u U_H/Z$. The expression above can be rewritten as

$$\max_{\mu_\omega} \left[a \cdot \alpha \left(\frac{K_\omega}{L_\omega^H + L_F(\omega)} \right)^{\alpha-1} K_\omega + (1-a) \cdot \left((1-\alpha) \left(\frac{K_\omega}{L_\omega^H + L_F(\omega)} \right)^{\alpha} L_\omega^H - \gamma_u \frac{\tilde{\theta}_u}{\bar{\theta}} \frac{U_F}{Z} \right) 2 \right],$$

where we used the conditions for factor prices from the main text. Finally, recall that expected foreign labor supply is such that

$$L_F(\omega) = \varepsilon_s^* \frac{\tilde{\theta}_s}{\bar{\theta}} \frac{S_F}{Z} \Psi_\omega.$$

We now proceed as in the two-country model to obtain the following first-order condition:

$$\frac{dW_\omega}{d\mu_\omega} = (1-a)\gamma_u \frac{U_F}{\bar{\theta} Z} - \frac{\chi_\omega(\Psi_\omega, \mu)\left[a - (1-a)\frac{L_\omega^H}{L_\omega}\right]}{1 + \chi_\omega(\Psi_\omega, \mu_\omega)\frac{\varepsilon_s^*}{L_\omega}} = 0, \tag{24}$$

where

$$\chi_\omega(\Psi_\omega, \mu_\omega) \equiv (1-\alpha)\alpha \left(\frac{K_\omega}{L_\omega} \right)^{\alpha} \varepsilon_s^* \frac{S_F \Psi_\omega}{\bar{\theta} Z} > 0,$$

and $L_\omega \equiv L_\omega^H + L_F(\omega)$. The second derivative of welfare with respect to μ_ω is

$$\frac{d^2 W_\omega}{d\mu_\omega^2} = -\frac{\frac{d\chi_\omega}{d\mu_\omega}\left[a - (1-a)\frac{L_\omega^H}{L_\omega}\right] + \chi_\omega \frac{1}{L_\omega^2}\frac{dL_\omega}{d\mu_\omega}\left[(1-a)L_\omega^H + a\chi_\omega \varepsilon_s^*\right]}{\left[\frac{1}{L_\omega}\chi_\omega \varepsilon_s^* + 1\right]^2},$$

where

$$\frac{d\chi_\omega}{d\mu_\omega} = -\left(1-\alpha\right)\alpha^2 \left(\frac{K_\omega}{L_\omega}\right)^\alpha \varepsilon_s^* \frac{S_F \Psi_\omega}{\bar{\theta} Z} \frac{1}{L_\omega} \frac{dL_F\left(\omega\right)}{d\mu_\omega} > 0$$

and

$$\frac{dL_\omega}{d\mu_\omega} = -\frac{\varepsilon_s^* \frac{S_F \Psi_\omega}{\bar{\theta} Z}}{(1-\alpha)\alpha \left(\frac{K_\omega}{L_\omega}\right)^\alpha \frac{1}{L_\omega} \left(\varepsilon_s^*\right)^2 \frac{S_F \Psi_\omega}{\bar{\theta} Z} + 1} < 0.$$

For simplicity, first consider the case in which the global maximum is an interior point for any Ψ_ω in $\left[\underline{\Psi}, \overline{\Psi}\right]$. Then the locus of points of interior maxima $\hat{\mu}_\omega\left(\Psi_\omega\right)$ is given by (24). For ease of exposition, denote the FOC as $G\left(\hat{\mu}_\omega, \Psi_\omega\right)$. In order to prove our statement we simply need to show that

$$\frac{d\hat{\mu}_\omega}{d\Psi_\omega} = -\frac{\frac{dG}{d\Psi_\omega}}{\frac{dG}{d\hat{\mu}_\omega}} < 0.$$

First notice that $dG/d\hat{\mu}_\omega = d^2 W_\omega / d\hat{\mu}_\omega^2 < 0$ as $\hat{\mu}_\omega$ is an interior maximum for any Ψ_ω. Let us now analyze $dG/d\Psi_\omega$. After some algebra we obtain

$$\frac{dG}{d\Psi_\omega} = -\frac{\frac{d\chi_\omega}{d\Psi_\omega}\left[a - \left(1-a\right)\frac{L_\omega^H}{L_\omega}\right] + \chi_\omega \frac{1}{L_\omega^2}\frac{dL_\omega}{d\Psi_\omega}\left[\left(1-a\right)L_\omega^H + a\chi_\omega \varepsilon_s^*\right]}{\left[\frac{1}{L_\omega}\chi_\omega \varepsilon_s^* + 1\right]^2} < 0,$$

since

$$\frac{dL_\omega}{d\Psi_\omega} = \frac{\varepsilon_s^* \frac{\widetilde{\theta}_s}{\bar{\theta}} \frac{S_F}{Z}}{\chi_\omega \frac{1}{L_\omega}\varepsilon_s^* + 1} > 0$$

and

$$\frac{d\chi_\omega}{d\Psi_\omega} = \left(1-\alpha\right)\alpha \left(\frac{K_\omega}{L_\omega}\right)^\alpha \varepsilon_s^* \frac{S_F}{\bar{\theta} Z}\left[1 - \alpha \frac{1}{L_\omega}\Psi_\omega \frac{dL_\omega}{d\Psi_\omega}\right] > 0.$$

Since both $dG/d\hat{\mu}_\omega < 0$ and $dG/d\Psi_\omega < 0$, then it will be $d\hat{\mu}_\omega/d\Psi_\omega < 0$, and hence $\hat{\mu}_\omega(\Psi_\omega)$ is a strictly decreasing function of Ψ_ω for any Ψ_ω in $\left[\underline{\Psi}, \overline{\Psi}\right]$.

Under the weaker assumption that only $\hat{\mu}_\omega(\Psi_\omega = 1) = \hat{\mu}_H$ be an interior maximum (see proof of proposition 2 for a sufficient condition), the reasoning above can be repeated identically in a neighborhood of $\Psi_\omega = 1$. In that neighborhood $\hat{\mu}_\omega(\Psi_\omega)$ is a decreasing function of Ψ_ω. The only difference is that now we are not guaranteed that the optimal policy be an interior maximum for any Ψ_ω in $\left[\underline{\Psi}, \overline{\Psi}\right]$. It may happen that there exist (1) a threshold value $\Psi^o \in (1, \overline{\Psi}]$ above which it is optimal to set an "open door" policy, (2) a threshold value $\Psi^c \in [\underline{\Psi}, 1)$ below which it is optimal to set a "closed door" policy. The function $\hat{\mu}_\omega(\Psi_\omega)$ will then be weakly decreasing, in the sense of being strictly decreasing in $\Psi_\omega \in [\Psi^c, \Psi^o]$, and constant in both $[\underline{\Psi}, \Psi^c)$ and $(\Psi^o, \overline{\Psi}]$.

Proof of Proposition 4.

We start by finding the three equilibria, then we show that they can be Pareto ranked.

1a. The globally optimal policy equilibrium. Under our symmetry assumption, when the policy maker sets up the globally optimal policy, $\hat{\mu}_\omega = \hat{\mu}_H$, skilled migrants distribute uniformly along the receiving region H, that is, in country ω it is $\Psi_\omega = 1$ and hence $S_F(\omega) = S_F/Z$. On the other hand, when the government expects $S_F(\omega) = S_F/Z$, the best policy coincides with the globally optimal policy, $\hat{\mu}_\omega = \hat{\mu}_H$. In fact, in this case (expected) foreign labor supply is given by

$$L_F(\omega) = \varepsilon_s^* \frac{\tilde{\theta}_s(\mu_\omega)}{\bar{\theta}} \frac{S_F}{Z} = \frac{L_F}{Z},$$

and the maximization problem of government ω then corresponds to the problem for the entire region multiplied by a constant $1/Z$, which implies $\hat{\mu}_\omega = \hat{\mu}_H$. The point $(\hat{\mu}_\omega = \hat{\mu}_H, \Psi_\omega = 1)$ then satisfies our definition of equilibrium, and the skill composition is given by $\left(\hat{\theta}_s/\bar{\theta}\right)(S_F/Z) \,/\, \left(\hat{\theta}_u/\bar{\theta}\right)(U_F/Z)$

where $\hat{\theta}_s$ and $\hat{\theta}_u$ are given by (9) and (10).

1b,c. High-skill boom and unskilled migration trap. The optimal behavior of free skilled migrants is such that, when $\hat{\mu}_\omega < \hat{\mu}_H$ then $\Psi_\omega = \overline{\Psi} > 1$, and when $\hat{\mu}_\omega > \hat{\mu}_H$ then $\Psi_\omega = \underline{\Psi} < 1$. On the other hand, the policy maker's best response function $\hat{\mu}_\omega(\cdot)$ is a continuous, strictly decreasing function in $\Psi_\omega \in \left[\underline{\Psi}, \overline{\Psi}\right]$ (as proven in lemma 3), which takes value $\hat{\mu}_\omega(\cdot) = \hat{\mu}_H$ when $\Psi_\omega = 1$ (as proven above). These elements ensure that, when $\Psi_\omega = \overline{\Psi} > 1$, then $\exists\ \hat{\mu}_\omega\left(\overline{\Psi}\right) \equiv \mu_\omega^{soft} > \hat{\mu}_H$, and when $\Psi_\omega = \underline{\Psi} < 1$, then $\exists\ \hat{\mu}_\omega(\underline{\Psi}) \equiv \mu_\omega^{tight} > \hat{\mu}_H$. The two points $(\mu_\omega^{tight}, \underline{\Psi})$, $(\mu_\omega^{soft}, \overline{\Psi})$ satisfy our definition of equilibrium. Under the first equilibrium the skill composition is high:

$$\frac{\frac{\tilde{\theta}_s'}{\tilde{\theta}}\frac{S_F}{Z}\overline{\Psi}}{\frac{\tilde{\theta}_u'}{\tilde{\theta}}\frac{U_F}{Z}} \text{ where } \tilde{\theta}_s' = \left[w_\omega\left(\mu_\omega^{soft}\right) - w^*\right]\varepsilon_s^* - \mu_\omega^{soft}. \text{ and } \tilde{\theta}_u' = \gamma_u - \mu_\omega^{soft}.$$

Under the second equilibrium the skill composition is low:

$$\frac{\frac{\tilde{\theta}_s''}{\tilde{\theta}}\frac{S_F}{Z}\underline{\Psi}}{\frac{\tilde{\theta}_u''}{\tilde{\theta}}\frac{U_F}{Z}} \text{ where } \tilde{\theta}_s'' = \left[w_\omega\left(\mu_\omega^{tight}\right) - w^*\right]\varepsilon_s^* - \mu_\omega^{tight}. \text{ and } \tilde{\theta}_u'' = \gamma_u - \mu_\omega^{tight}.$$

2. We now prove that the three equilibria can be ranked in terms of welfare from the lowest - unskilled migration trap - to the highest - the high-skill boom equilibrium. First notice that, under the usual condition that skilled migrants are beneficial for the receiving economy ($a > \frac{L_\omega^H}{L_\omega} / \left(\frac{L_\omega^H}{L_\omega} + 1\right)$, see proof of proposition 2), aggregate welfare is an increasing function of Ψ_ω:

$$\frac{dW_\omega}{d\Psi_\omega} = \alpha(1-\alpha)\left(\frac{K_\omega}{L_\omega}\right)^\alpha \frac{\partial L_\omega}{\partial \Psi_\omega}\left[a - (1-a)\frac{L_\omega^H}{L_\omega}\right] > 0, \tag{25}$$

as $\partial L_\omega / \partial \Psi_\omega > 0$. It is then immediate to prove that welfare under the high-skill boom equilibrium ($W_\omega\left(\mu_\omega^{soft}, \overline{\Psi}\right)$) is unambiguously higher than welfare under global optimal policy equilibrium ($W_\omega(\hat{\mu}_H, 1)$). In fact, (1) since $\overline{\Psi} > 1$, (25) implies that welfare is higher under high-skill boom and the same immigration policy ($W_\omega\left(\hat{\mu}_H, \overline{\Psi}\right) > W_\omega\left(\hat{\mu}_H, 1\right)$); (2) $\hat{\mu}_H$ is a sub-optimal policy when $\Psi_\omega = \overline{\Psi}$ since, as we have seen above, welfare is maximized when $\hat{\mu}_\omega\left(\overline{\Psi}\right) \equiv \mu_\omega^{soft} > \hat{\mu}_H$ (that is, $W_\omega\left(\mu_\omega^{soft}, \overline{\Psi}\right) > W_\omega\left(\hat{\mu}_H, \overline{\Psi}\right)$). Hence it will be $W_\omega\left(\mu_\omega^{soft}, \overline{\Psi}\right) > W_\omega\left(\hat{\mu}_H, 1\right)$.

Analogously, it is possible to prove that welfare under unskilled migration trap ($W_\omega\left(\mu_\omega^{tight}, \underline{\Psi}\right)$) is unambiguously lower than welfare under global optimal policy equilibrium ($W_\omega\left(\hat{\mu}_H, 1\right)$). In fact, (1) under the same immigration policy μ_ω^{tight}, it is $W_\omega\left(\mu_\omega^{tight}, \underline{\Psi}\right) < W_\omega\left(\mu_\omega^{tight}, 1\right)$ as $\underline{\Psi} < 1$; (2) μ_ω^{tight} is a sub-optimal policy when $\Psi_\omega = \underline{\Psi}$, and hence $W_\omega\left(\mu_\omega^{tight}, 1\right) < W_\omega\left(\hat{\mu}_H, 1\right)$. We then conclude that $W_\omega\left(\mu_\omega^{tight}, \underline{\Psi}\right) < W_\omega\left(\hat{\mu}_H, 1\right)$. Finally, notice that condition (25) holds for $a \geq 1/2$ (that is, also when $a = 1/2$ -i.e. when political weights on capitalists and workers in the objective function of the government are identical). This implies that the above proof is valid for both government welfare and social welfare in ω.

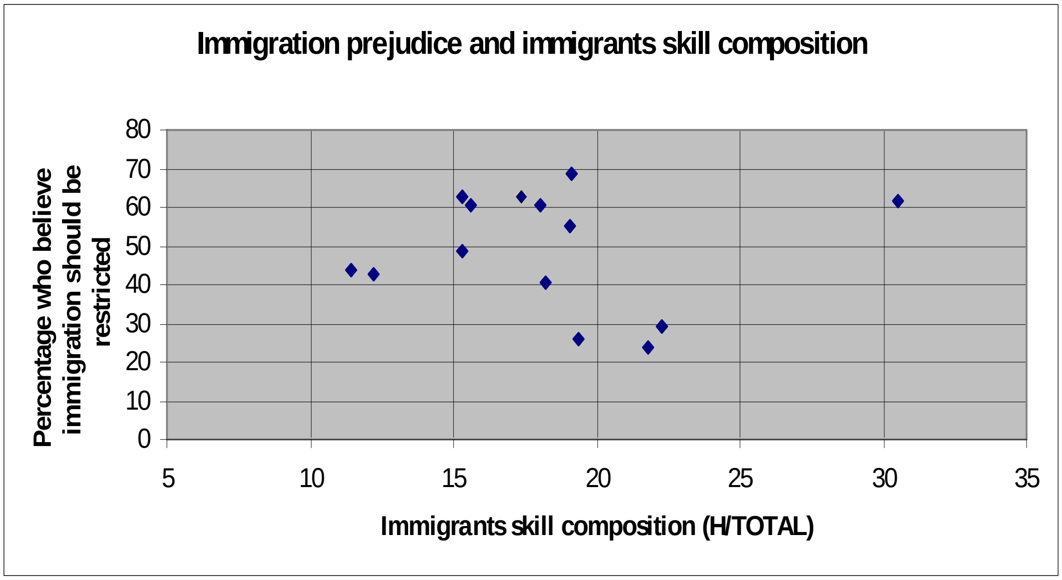

Figure 1: Attitude towards immigration Versus immigrants' skill composition across European countries

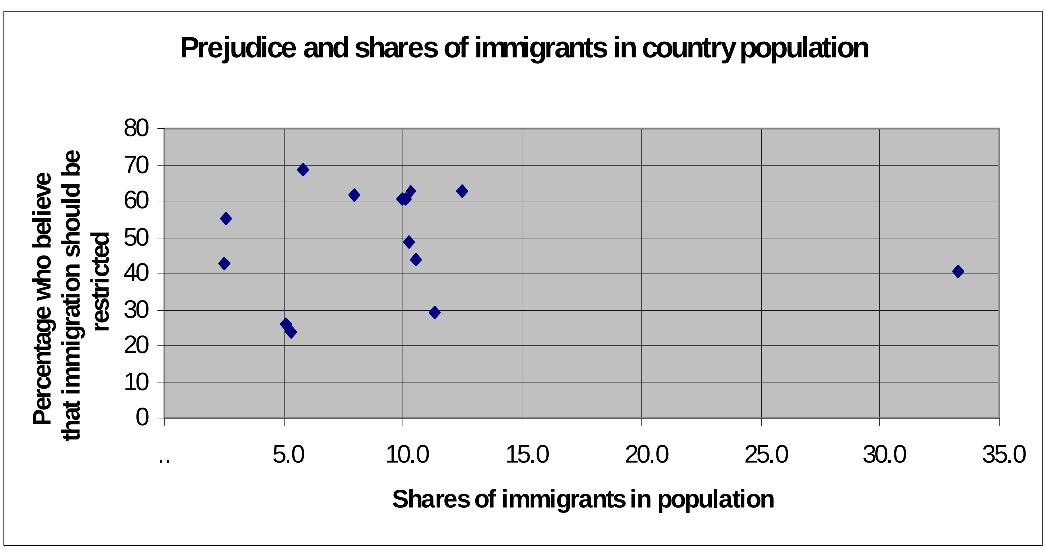

Figure 2: Attitude towards immigration Versus share of immigrants in population across European countries.

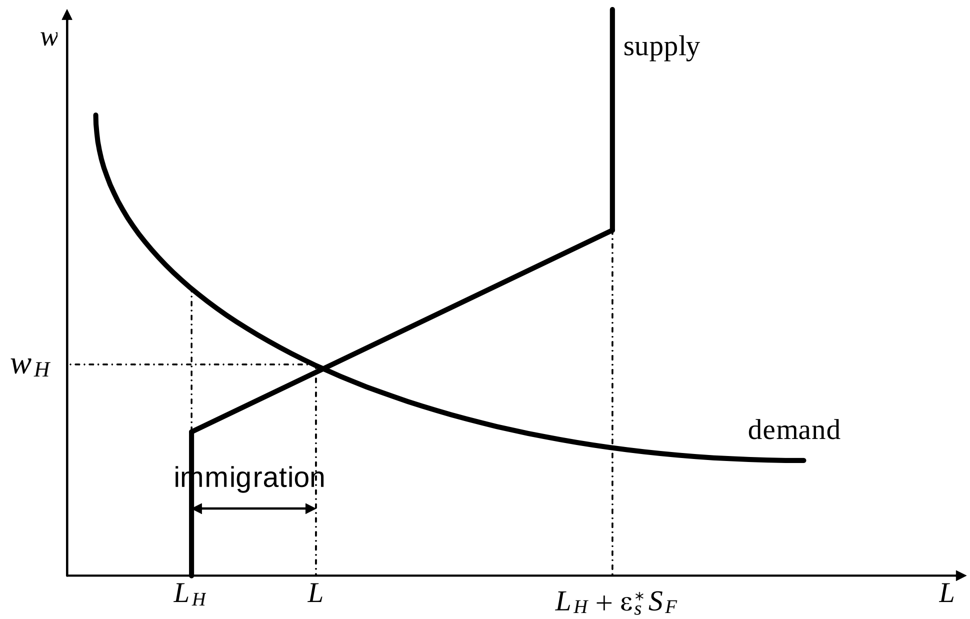

Figure 3: The equilibrium in the labor market.

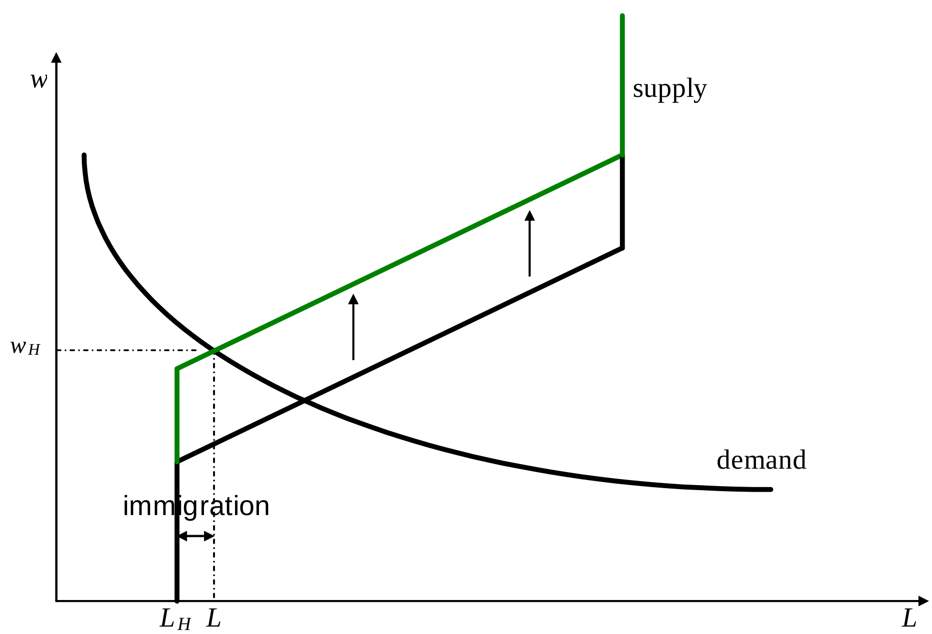

Figure 4: A tightening of immigration policy in the receiving region.

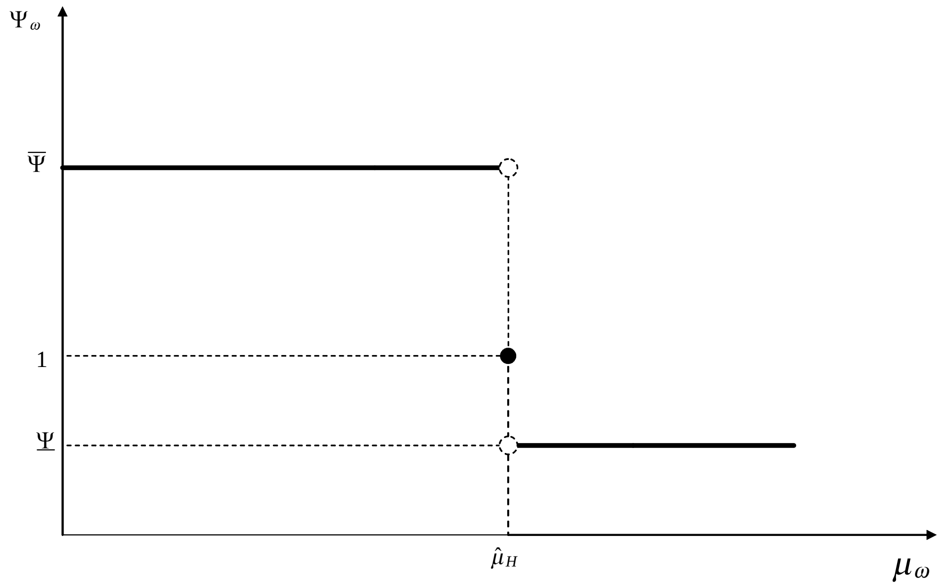

Figure 5: Crowding in and crowding out of skilled immigrants as a function of immigration policy.

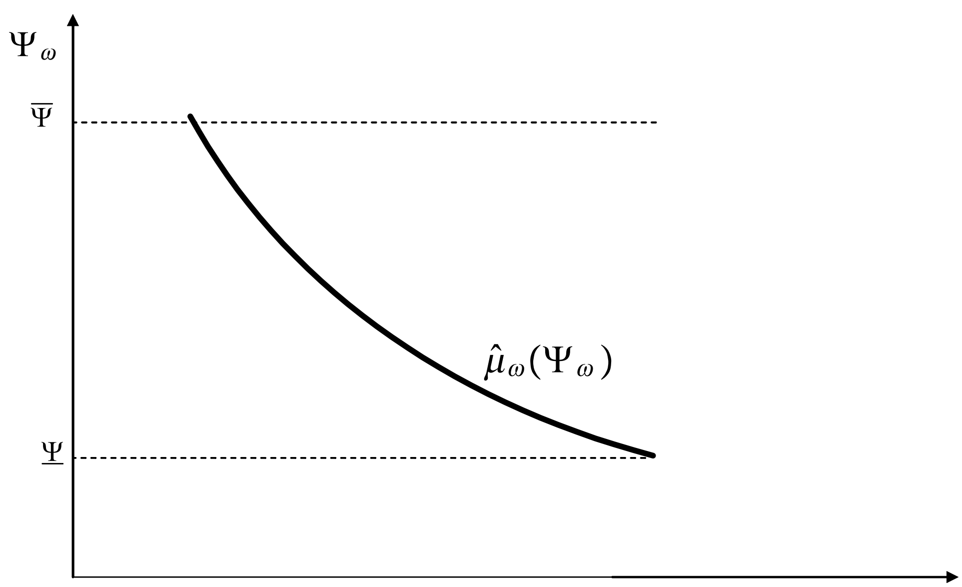

Figure 6: The policy maker's best response to the skilled immigrants' behavior.

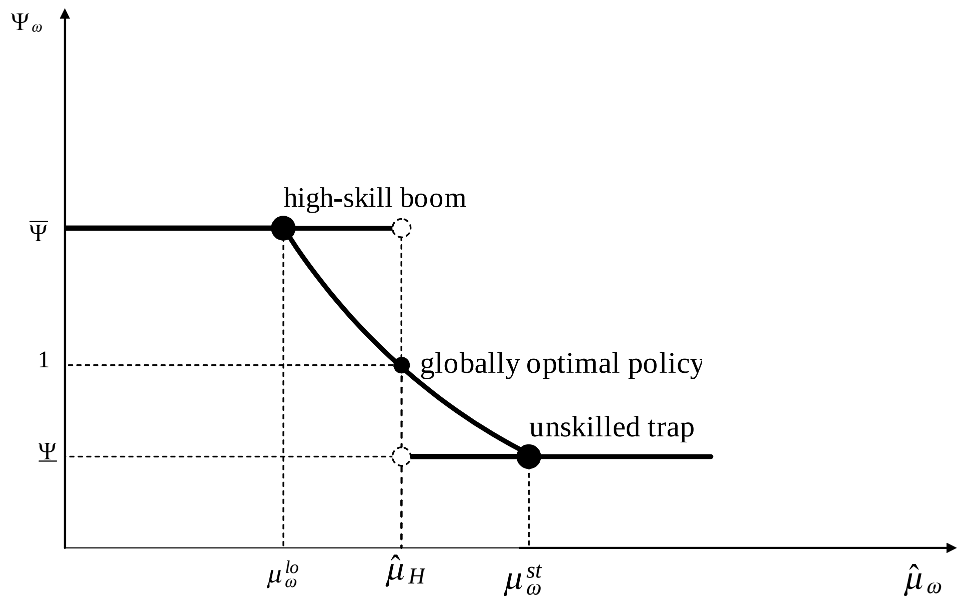

Figure 7: The three policy equilibria.

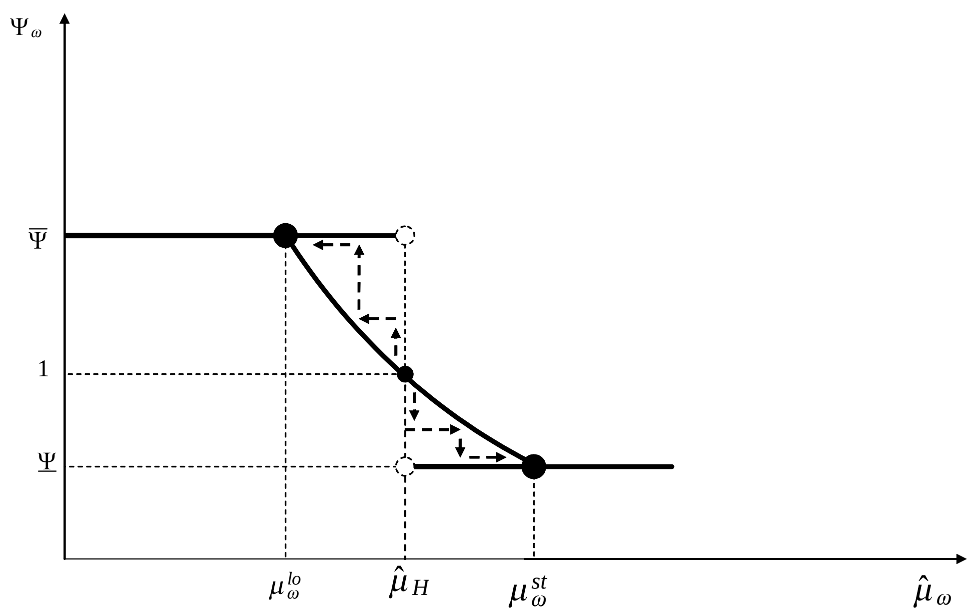

Figure 8: Stability and instability of the three policy equilibria.