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A Political Economy and Voicing Model of the Institutional Impact of Brain Drain, Human Capital, Inequality and Country Size

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ABSTRACT

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Brain drain BD, human capital h, and inequality's institutional impact is examined in a model where a rent-seeking elite taxes residents and voicing affects the likelihood of regime change. We find that BD and h's impact on institutional quality (Q) are as follows: *i*) Q is a *U*-shaped function of BD, with maximum (minimum) at $BD = 0$ ($0 < BD_1 < 1$); *ii*) Q is a *U*-shaped function of h, with minimum at $0 < h_1 < 1$; *iii*) the likelihood that Q improves with BD falls with international inequality; *iv*) the likelihood that Q improves with h falls with domestic inequality; *v*) the likelihood Q improves with h falls (rises) with BD for $BD <$ (>) BD_1, and is maximized at $BD = 0$; *vi*) Q increases in a high (low) BD country under a host country's immigration promotion (restriction); *vii*) a high BD country's institutions improve (worsen) under a large (small) reduction in BD; *viii*) the latter is particularly relevant for small and micro states where BD and Q are likely to be greater than in large but otherwise similar countries.

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I. Introduction [1]

People migrate for a variety of reasons, including that of escaping bad economic and political institutions. Individuals facing such institutions can remain in their home country and devote resources in order to change them, or they can change the ones they face through international migration. In terms of Hirschman's (1970) exit-and-voice framework, migration can be viewed as a decision to exit and non-migration as a decision to voice. On the other hand, migrants may decide to voice in order to improve institutions back home. They can do so, for instance, by providing information and organizational support to home country residents, raising awareness in the host country, and lobbying the host-country government for help. This holds especially for skilled migrants since they tend to have better access to information, the media and the authorities.[2]

On the other hand, educated home country residents typically play an important role in designing institutional reforms, framing the debate and organizing political support for them. Thus, a brain drain is likely to have both a positive and a negative impact on the quality of institutions, an issue examined in this paper. Human capital can also affect the quality of institutions and this issue is examined here as well.

Immigration policies have become increasingly biased in favor of skilled and against unskilled labor. In order to reflect the evolution of these policies, and following a large number of studies in this literature, we assume that host countries only allow entry of skilled migrants.

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[1] This paper is an expanded and improved version of Schiff and Docquier (2015).
[2] Migrants impact their home country in a number of other areas as well, including household members' health, education, poverty, investment and entrepreneurship (see, for instance, studies in Ozden and Schiff, 2006 and 2007), FDI from host to home country (Kugler and Rapoport, 2007; Javorcik et al., 2010), and fertility (Beine et al., 2013).

A number of studies (e.g., Mountford 1997; Beine et al. 2001, 2008) have assumed that the host country conducts an immigration policy that sets the rate rather than the level of skilled migration. The analysis provided in this paper is based on the same assumption.

The remainder of the paper is organized as follows. Section II presents the model, solves for institutional quality and derives the brain drain's impact on human capital, institutions and inequality. We first assume the brain drain is determined by the host country, is binding, and is taken as given by home country skilled residents. We then examine the case where the brain drain rate is determined endogenously and derive host country immigration policies that result in an improvement in the source country's institutional quality. This is followed by an analysis of the institutional impact of human capital. Section III examines the case of small and micro states, and Section IV concludes.

II. Model

Assume a home country population consisting of both skilled and unskilled individuals ruled by a political elite that exploits them by levying a tax on them. The tax represents the return to the elite on its corruption or rent-seeking activities. In other words, the tax represents a measure of institutional quality, with an increase (decline) in the tax representing a deterioration of (improvement in) the quality of institutions.

The size of the home country's native population is normalized to one. The share of skilled labor in the native population is denoted by $h \in [0,1]$ and that of unskilled labor by $(1 - h)$. Skilled (unskilled) individuals are assumed to possess one (no) unit of human capital, so that h also represents the average level of human capital. Brain drain or the share of skilled

migrants in the skilled native population is denoted by *m*, with that of skilled residents equal to (1 - *m*). The share of skilled migrants [residents] in the native population is *mh* [(1 - *m*)*h*], with the total resident population equal to (1 - *mh*).

The three groups of natives, i.e., the skilled migrants and the skilled and unskilled residents, can use part of their time to voice and thereby raise the probability of overthrowing the elite. Voicing has of course an opportunity cost, namely each group's wage rate. Home country residents' unskilled (skilled) wage rate is w_u (w_s) and the host country's skilled wage rate is w_m, with $w_u < w_s < w_m$. Individual income in the corresponding three groups is given by:

$$y_u = (1-v_u)w_u - \tau(1-p), \; y_s = (1-v_s)w_s - \tau(1-p), \; y_m = (1-v_m)w_m,^3 \qquad (1)$$

where v_i is the fraction of time spent voicing by individuals of group *i* ($i = u, s, m$), τ is the tax levied by the elite, and *p* is the overthrowing probability.

Migrants, who are assumed to feel altruistic towards the (poorer) home country residents, can help them through voicing. The extent to which they voice depends on the degree of altruism, $\gamma \in [0,1]$, that they feel towards the residents.

Utility of individuals in the three groups is given by:

$$U_u = y_u, U_s = y_s, U_m = y_m + \gamma\left[\frac{(1-m)h}{1-mh}y_s + \frac{1-h}{1-mh}y_u\right], \qquad (2)$$

where the term in square brackets is the home country's per-capita income.

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[3] For the sake of tractability, we assume a lump-sum tax that is identical for skilled and unskilled residents.

For the sake of simplicity and tractability, the utility function is assumed linear in income, implying a constant marginal utility of income. Note, however, that identical solutions are obtained under a log-linear specification (whose marginal utility is diminishing in income).

Assuming diminishing returns to voicing, the overthrowing technology p is

$$p = \pi\left[mhv_m^{.5} + (1-m)hv_s^{.5} + (1-h)\beta v_u^{.5}\right], \tag{3}$$

where $\beta \in (0,1)$ is the voicing effectiveness of unskilled relative to skilled natives and π reflects the overall effectiveness of voicing.

Section 1 of Part II examines the impact of the brain drain on institutional quality. Section 2 examines how North-South inequality affects this relationship. Section 3 looks at the impact of human capital and within-country inequality, and Section 4 briefly looks at the impact of technological progress in telecommunications. Part III examines the case of small and micro states, and Part IV concludes. Internal solutions are assumed throughout.

1. Institutional Impact of the Brain Drain

Skilled migrants and skilled and unskilled residents select the amount of time they devote to economic activities (work) and to political activities (voicing) in order to maximize utility. Optimal voicing is obtained by maximizing utility in (2), subject to (1) and (3). The solutions (which satisfy second-order conditions) are:

$$v_u^* = \left[\frac{\tau\pi(1-h)\beta}{2w_u}\right]^2, \ v_s^* = \left[\frac{\tau\pi(1-m)h}{2w_s}\right]^2, \ v_m^* = \left[\frac{\tau\pi mh}{2w_m}\right]^2. \tag{4}$$

Thus, voicing rises with the tax rate and with each group's share in the native population, and falls with each group's wage rate. Equations (3) and (4) imply:

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$$p = \frac{\tau\pi^2}{2w_m w_s w_u}\left[m^2 h^2 \gamma w_s w_u + (1-m)^2 h^2 w_m w_u + (1-h)^2 \beta^2 w_m w_s\right] \equiv \frac{\tau}{2}Q(m,h). \tag{5}$$

The elite maximizes its income:

$$y_e = (1-mh)\tau(1-p), \tag{6}$$

with respect to τ, subject to (5). The solution is:

$$\tau^*(m,h,W) = \frac{w_m w_s w_u}{\pi^2\left[m^2 h^2 \gamma w_s w_u + h^2(1-m)^2 w_m w_u + \beta^2(1-h)^2 w_m w_s\right]} = \frac{1}{Q(m,h)}. \tag{7}$$

From (7), $Q = 1/\tau$ is the inverse of the elite's optimal tax. Thus, it provides a measure of institutional quality, which is given by:

$$Q(m,h) = \frac{\pi^2\left[\gamma h^2 m^2 w_s w_u + h^2(1-m)^2 w_m w_u + \beta^2(1-h)^2 w_m w_s\right]}{w_m w_s w_u}. \tag{8}$$

Since $w_m > \gamma w_s$, it follows that $Q(0,h) > Q(1,h)$. In other words, institutional quality is higher in the absence of brain drain than under total brain drain. In fact, the value of m, denoted by m_E, where $Q(m_E,h) = Q(1,h)$ is given by $m_E = \dfrac{w_m - \gamma w_s}{w_m + \gamma w_s} < 1$. Thus,

$$Q(m,h) > Q(1,h) \Leftrightarrow m < m_E. \tag{9}$$

In other words, institutional quality is higher for any brain drain level $m < m_E$ than for a complete brain drain.

Define $A \equiv \dfrac{w_m w_s w_u}{\pi^2}$. The derivative of Q with respect to m is:

$$\frac{\partial Q}{\partial m} = \frac{2h^2 w_u [\gamma m w_s - (1-m)w_m]}{A} = \frac{2h^2 w_u [m(w_m + \gamma w_s) - w_m]}{A} = \frac{2h^2 w_u (w_m + \gamma w_s)(m - m_1)}{A}$$

$$> (<)0 \Leftrightarrow m > (<)m_1 \equiv \frac{w_m}{w_m + \gamma w_s} < 1. \tag{10}$$

Equation (10) implies that institutional quality is *U*-shaped with respect to brain drain *m*. It starts from a high level at $m = 0$, falls with *m* for $m < m_1$, reaches a minimum at $m = m_1$ and rises with *m* for $m > m_1$.[4] Hence, we have two local maxima, at $m = 0$ and at $m = 1$. Since $Q(0, h) > Q(1, h)$, it follows that *Q*'s global maximum is at $m = 0$. One can think of (8) as an institution-setting equation (*IS*), where optimal institutional quality $Q = Q(m, h)$ is a function of *m* (for a given level of *h*). The *IS* curve is illustrated in Figure 1.

Figure 1. Brain Drain and Institutional Quality

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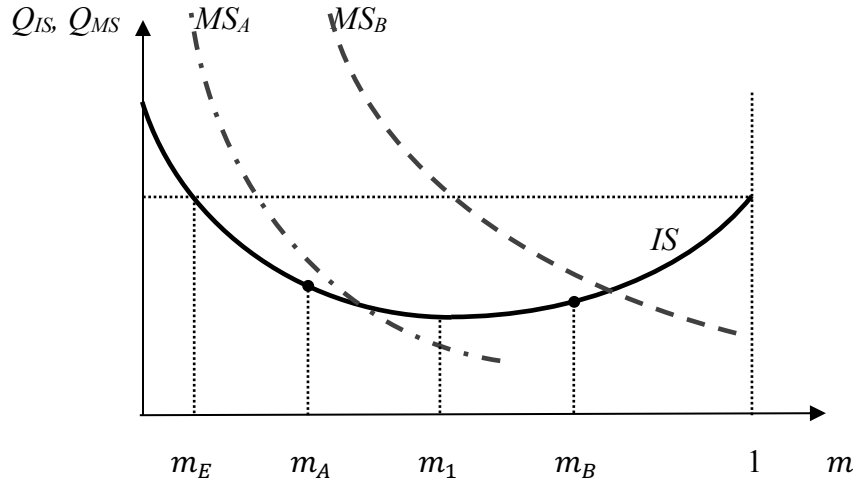
[4] The reason institutional quality is *U*-shaped with respect to *m* and $\partial Q / \partial m$ changes sign is as follows. As a change in *m* has no impact on unskilled voicing, the sign of $\partial Q / \partial m$ depends on how a change in *m* affects the sum of the impacts of skilled residents' and skilled migrants' voicing on the overthrowing probability. The impact of these two groups on the optimal tax depends on their individual voicing level, *v*, and on their share in the population, respectively $(1 - m)h$ and *mh*. However, *v* itself depends on its effectiveness, which increases with group size. Hence, the impact of these two groups is proportional to the *square* of their share in the population, $[h^2 m^2 \gamma w_s w_u + h^2 (1-m)^2 w_m w_u]$, which reaches a minimum at $m = m_1$.

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It follows from these results that a host country intent on helping a low-income, high-brain-drain country through a reduction in skilled immigration is likely to have a negative impact on the country's institutions if the reduction is not sufficiently large. On the other hand, equation (9) says that a policy that reduces skilled immigration to a level that is smaller than m_E unambiguously raises institutional quality.

In parallel with the institution-setting equation (*IS*), assume emigration decreases with migration cost, *C*, and with the home country's institutional quality, *Q*. This gives a migration-setting equation (*MS*) as a function of institutional quality and migration cost: $m = m(Q, C)$. Suppose for simplicity that $m = 1/CQ$, or $Q = 1/Cm$, giving the level of institutional quality compatible with any value of *C* and *m*. The equilibrium value for institutional quality and brain drain are obtained from $Q = 1/Cm$ and equation (8). This is shown in Figure 1 where country A (B) depicts the case of an economy with high (low) migration cost. The equilibrium can be located on the decreasing (e.g., m_A) or increasing (e.g., m_B) segment of the institution-setting curve.

Suppose the host country is concerned by the source country's quality of governance and has some influence on skilled migration levels and costs. Then:
1. If the equilibrium is on the decreasing segment of the institution-setting curve (high migration cost), the host country should limit the entry of skilled migrants.
2. If the equilibrium is on the increasing segment (low migration cost), the host country should facilitate the entry of skilled migrants.
3. The host country can maximize the source country's institutional quality by completely closing its borders to skilled migrants.

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Figure 1 clearly illustrates how a change in migration cost affects the *MS* curve and the equilibrium *m*-level. In Sections 2 to 4 below, we proceed with a comparative-statics analysis of the institution-setting curve (given by equation (8)).

2. North-South Inequality

The likelihood that $m > m_1$ falls as m_1 increases and, from equation (10), so does the likelihood that $\partial Q / \partial m > 0$. In other words, an increase in m_1 reduces the likelihood that institutional quality increases with the brain drain. It is clear from (10) that m_1 increases with w_m and decreases with w_s. Thus, m_1 increases with w_m / w_s, i.e., it increases with the skilled wage gap between North and South. Consequently, the likelihood that institutions improve with the brain drain falls with North-South inequality.

3. Human Capital and Within-Country Inequality

How does human capital affect the institution-setting curve? From equation (7), we have:

$$\frac{\partial Q}{\partial h} = \frac{h\left[\gamma m^2 w_s w_u + (1-m)^2 w_m w_u + \beta^2 w_m w_s\right] - \beta^2 w_m w_s}{A/2} > (<)0 \Leftrightarrow h > (<)h_1$$

$$\equiv \frac{\beta^2 w_m w_s}{\beta^2 w_m w_s + \gamma m^2 w_s w_u + (1-m)^2 w_m w_u} < 1. \qquad (11)$$

Thus, institutional quality is *U*-shaped with respect to human capital. It starts from a high level at $h = 0$, falls with h up to $h = h_1$ where it reaches a minimum, and increases with h for $h_1 < h < 1$.[5] Hence, an increase in human capital shifts the IS curve downwards (upwards) and reduces (raises) Q when $h < h_1$ ($h \geq h_1$).

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[5] The logic behind the change in the sign of $\partial \tau^* / \partial h$ is the same as the one provided for $\partial \tau^* / \partial m$ in footnote 4.

From (10) and (11), it follows that extreme values for the brain drain m and for native human capital h are preferable from the viewpoint of institutional quality than values equal to (or in the neighborhood of) h_1 and m_1 where institutional quality Q is lowest, with $m = 0$ preferable to $m = 1$. This is due to the fact that Q depends not on group size but on the square of group size, the reason for which is provided in footnote 5.

From (11), h_1 increases with w_s, decreases with w_u, and thus increases with w_s / w_u. In other words, the likelihood that institutions improve with human capital *falls* with the home country's level of income inequality.

Countries with the world's highest degree of inequality, as measured by Gini coefficients (UNDP and CIA Factbook, various years), are found in Sub-Saharan Africa (SSA) and Latin America and Caribbean (LAC). Of the 10 most unequal countries, 7 are in SSA and 3 are in LAC, while of the 20 worst, 10 are in LAC and 10 in SSA. Moreover, except for Uruguay, no LAC country belongs to the group of 33 developing countries whose Gini coefficient below 40. Similar results obtain when inequality is measured by the GDP share of the top quintile, relative to the bottom quintile. Thus, the likelihood that institutions will improve with human capital in a number of SSA and LAC countries is probably low, and most likely lower than in East Asia.

The likelihood that institutions improve with human capital depends on h_1, as shown in (11), and h_1 depends on the brain drain level, m. A decline in h_1 raises the likelihood that $\partial Q / \partial h > 0$. In fact, $\partial h_1 / \partial m < (>)0 \Leftrightarrow m > (<)m_1$. Thus, an increase in the brain drain raises (reduces) the likelihood that $\partial Q / \partial h > 0$ at high (low) brain drain levels, and the likelihood is greatest at $m = 0$.

4. Telecommunications Technology

The world has made dramatic technological advances in telecommunications in recent decades, particularly with respect to the Internet and cellular phones, thereby vastly improving access to information and allowing anyone anywhere to record and disseminate information almost instantaneously. These developments have raised the impact of voicing and thus the cost of government misbehavior. The increase in voicing's productivity is captured by an increase in parameter π, which represents voicing's overall effectiveness (as noted after equation 3).

As equations (4) and (5) show, an increase in π raises the level of voicing and raises its effectiveness, resulting in an increase in institutional quality, as shown in (8). Thus, technological developments in telecoms should help improve institutions. As has been abundantly reported, cellular phones and the Internet, including social media, have increased scrutiny of a number of non-democratic regimes and have contributed to political change in a number of them or helped constrain their propensity to abuse their citizens.

III. Small and Micro States

Small and micro states (SMS) differ from larger ones in various ways, and a large number of studies have examined issues specific to them. The most important distinction, according to the very definition of SMS, is population size. Small (micro) states are defined by the UN as states with a population smaller than or equal to 1.5 (0.2) million. Another important distinction is the significantly higher degree of openness to international trade, investment and labor mobility, including skilled labor or brain drain, found in SMS. These issues – and various other economic, social and environmental issues specific to SMS – are

examined in Briguglio's (2018) *Handbook of Small States*. The impact of altruism is examined in this section.

1. <u>Degree of altruism and the *IS* curve</u>

The degree of altruism, γ, emigrants experience with regard to their home country's residents (or non-migrants), is likely to be higher for emigrants from SMS than from larger states because people from SMS tend to be better acquainted with each other, have closer social and personal relationships, and their population is often more homogeneous culturally and ethnically. As Veenendaal (2020) states, natives of small island states experience "… greater social intimacy and interconnectedness."

This implies, ceteris paribus, that voicing by SMS migrants is higher (equation 4), which raises p (equation 5). Consequently, the elite's optimal tax is lower (equation 7) and institutional quality is higher (equation 8). In other words, the *IS* curve in Figure 1 is higher in the case of SMS, ceteris paribus. Thus, for any given level of m, institutional quality Q is greater.

Moreover, the value of m_1 – where the impact of the *BD* on institutional quality, Q, is nil – declines with the level of altruism, and thus the likelihood that $m > m_1$, and that institutions improve with the *BD*, is also higher for SMS.[6]

2. <u>Degree of altruism, migration cost, and the *MS* curve</u>

Migration cost C is an important determinant of the level and skill composition of migration. Moreover, as has been shown empirically by a number of studies, including

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[6] Similarly, a higher degree of altruism implies a lower value for h_1 and thus a greater likelihood that $h > h_1$, which implies that an increase in h is more likely to raise institutional quality.

notably by Carrington et al. (1996), *C* is endogenous and declines with the extent of prior migration or size of the migrant network. In other words, prior migration generates a positive externality for later migrants by reducing the latter's migration cost.

There is no a priori reason to assume that ties between migrants and their direct family members are stronger, or weaker, in SMS than in larger states. On the other hand: *A*) 'weak' ties – i.e., ties with individuals who are not direct family members – also play an important role in migration decisions, and *B*) they are likely to be stronger in SMS than in larger ones, as discussed below.

   A. The importance of weak ties for first-time migration decisions was examined in Liu (2013). She estimated a discrete-time hazard model using longitudinal data on migration from Senegal to France, Italy and Spain, and found that weak ties are an important determinant of first-time migration decisions, especially for male migration. (She also rejected the contention that strong ties are more important than weak ones).

   B. The greater strength of weak ties in SMS than in larger states is briefly described in the first paragraph of Section 1 above. As mentioned, Veenendaal (2020) states that SMS natives have "… greater social intimacy and interconnectedness." Prior support is therefore likely to be stronger for prospective migrants in the case of migration from SMS than from larger countries. Thus, prospective migrants from SMS are likely to benefit from a greater amount and quality of information about *i*) the most effective way of obtaining immigration approval and the risks involved in migrating to the host country, *ii*) job prospects, *iii*) the host country society's values and expectations regarding personal, social and professional

interactions and general behavior, and from a greater effort and support *iv)* in finding temporary housing, and *v)* in generating job offers.[7]

Thus, SMS migrants' networks are likely to raise prospective migrants' gains from migration not only by helping reduce their migration costs to a greater extent than those from large countries, but also by improving migrants' job opportunities to a greater extent.

The above implies that, in terms of Figure 1, MS_B corresponds to a (low-migration-cost) SMS curve, while MS_A corresponds to a larger country whose migration costs are high. Note that the difference between SMS and larger states is that institutional quality Q is higher in the SMS case because the greater degree of altruism, γ, reduces migration costs and raises its benefits (MS_B vs MS_A), and the greater voicing reduces the elite's tax and improves institutional quality (higher *IS*). These forces also result in a significantly higher *BD* level, *m*, as is confirmed by the data. For instance, Docquier and Marfouk (2006) show that among the 20 countries with the highest brain drain in 2000, eight of them were microstates, nine were small states, and only three were larger states.

Thus, equilibrium is more likely to be on the upward-sloping part of the (higher) IS curve in the case of SMS than in the case of larger states, with higher brain drain and institutional quality levels, principally because of the greater closeness between members of smaller groups, e.g., between the SMS prior migrants and prospective ones.

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[7] Given the difficulties and risks associated with first-time migration, early migrant cohorts tend to have a larger share of individuals who are more entrepreneurial and have a greater ability to deal with risk and a greater tolerance for it, who are more creativ and tend to have greater inter-personal skills (Schiff 2013). Early migrants also have a higher education level, with average education level declining as network size and support for prospective migrants increases (McKenzie and Rapoport 2007; Beine et al. 2011). For simplicity, the model developed in this paper assumes two levels of education: with and without tertiary education, and it abstracts from ability altogether.

Consequently, a host country intent on helping a small or micro state through a reduction in skilled immigration is likely to have a negative impact on the source country's institutions (and more likely than in the larger states), unless the reduction is sufficiently large so that the new skilled migration level $m < m_E$, which unambiguously raises institutional quality (see equation (9)).

IV. Conclusion

This paper used a simple voicing-and-exit political-economy model to examine the institutional impact of the brain drain, human capital and inequality.

The main findings are: i) institutional quality is a U-shaped function of the brain drain m, with a maximum at $m = 0$; ii) institutional quality is a U-shaped function of human capital h; iii) the likelihood institutions improve with m (h) is inversely related to international (domestic) inequality; iv) the likelihood institutions improve with h falls (rises) with m for $m < (>)m_1$, i.e., it falls (rises) with m at low (high) m values; v) a marginal change in skilled immigration raises institutional quality in a high (low) brain-drain country if the host country promotes (restricts) immigration; and vi) a high brain drain country's institutional quality improves under a sufficiently large reduction in skilled immigration – with a maximum attained when the host country closes its border to potential skilled immigrants – and worsens with a small reduction in skilled immigration; vii) the latter results are particularly relevant for small and micro states where the brain drain and institutional quality are likely to be higher than in large but otherwise similar countries; and vii) improvements in information and communication technologies result in an improvement in institutions.

Policy implications for a host country intent on helping a low-income, high-brain-drain source country improve the quality of its institutions through a reduction in *BD* or skilled migration, are as follows:

1. It will succeed if the reduction in the *BD* is sufficiently large.

2. Otherwise, it is likely to have a negative impact on that country's institutions.

3. It will maximize institutional quality in the source country by completely closing its borders to skilled immigrants.

4. These policy implications are particularly relevant for small and micro states.

5. The likelihood that institutions improve with human capital is likely to be small for the SSA and LAC regions where income inequality is very high, and substantially higher than in other regions, particularly East Asia.

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