This paper uses an “exit and voice” political economy model to examine the institutional impact of brain drain, human capital, and inequality. Some of the main findings are: 1) the impact of brain drain $m$ on institutional quality is $U$-shaped, with a maximum at $m = 0$; 2) the institutional impact of human capital $h$ is $U$-shaped; 3) the likelihood that institutions will improve with $m$ ($h$) is inversely related to international (domestic) inequality. Thus, the prospect that institutions will improve with human capital is likely to be small in SSA and LAC, where income inequality is substantially higher than in East Asia.

**JEL classifications:** F22, D33, I24, I25

**Keywords:** Human capital, brain drain, inequality, institutional impact, political economy

### 1. Introduction

People migrate for a variety of reasons, including to escape 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 which institutions 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.

On the other hand, educated home-country residents typically play an important role in designing institutional reforms, framing the debate...
and organizing political support. Thus, a brain drain is likely to have both a positive and negative impact on the quality of institutions, an issue examined in this paper. This analysis includes deriving the net impact of the brain drain on institutional quality as a function of the brain-drain level. 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.

A number of studies (e.g., Mountford, 1997; Beine et al., 2001, 2008) assume the host country maintains 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.

A vast literature exists on the economic analysis of institutions, with noteworthy early studies including North (1961), Fogel (1964), and Davis and North (1971), and later work including efforts from Engermann and Sokoloff (1997), Acemoglu et al. (2002), and Rodrik et al. (2004), to name a few. The international migration literature is similarly vast, especially analyses of the impact on developed host countries, though studies on developing source countries have expanded rapidly in recent decades, with early contributions to analysis and policy including Bhagwati (1976, 1983).

On the other hand, the intersection between these two literatures is very small, especially work focused on international migration’s impact on formal economic and political institutions. For instance, an interesting study is Spilimbergo (2009), which examined the impact of foreign students from developing countries when they return to their home country—i.e., the opposite of a brain drain—and found that they have a positive impact on democratic institutions back home, but only if they studied in a democracy. Docquier and Rapoport (1993) modeled an ethnically divided developing country, where a majority group exploits an ethnic minority by extracting rents from it, and found that

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1. The success of Cliometrics (or New Economic History), which applies economic theory, econometric techniques, and other formal methods to the study of (social and economic) history, owes much to Fogel and North.

2. Studies on migration’s impact in developing source countries have looked at various issues, including the impact on household members’ health, education, poverty, investment, and entrepreneurship (e.g., see studies in Oxen and Schiff, 2006 and 2007), and on source countries’ trade, inward FDI (e.g., Javorcik et al., 2011, and Kugler and Rapoport, 2007, on the latter), fertility (Beine et al., 2013), and more.
the free migration option reduces the extent of discrimination and that any attempt by the majority to prevent emigration by the minority in order to further exploit it leads to the seemingly paradoxical outcome of increased emigration.

This paper examines the case of a powerful elite that exploits the entire population, whether skilled or not. It obtains a different and new result, namely that the degree to which the population is exploited is minimized when skilled migration is nil. Further contributions include analyses of the institutional impact of domestic and international (North–South) economic inequality.

The remainder of the paper is organized as follows. Section 2 presents the model, solves for institutional quality and derives the institutional impact of the brain drain, human capital, and inequality. The first part of the analysis is based on the assumption that 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 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 3 offers a conclusion.

2. 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. The brain drain or 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 an opportunity cost, of course, 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:

\[
\begin{align*}
y_u &= (1 - v_u)w_u - \tau(1 - p), \\
y_s &= (1 - v_s)w_s - \tau(1 - p), \\
y_m &= (1 - v_m)w_m,
\end{align*}
\]

where \( v_i \) is the fraction of time spent voicing by individuals of group \( i (i = u, s, m) \), \( \tau \) is the tax levied by the elite, and \( p \) is the overthrowing probability.\(^3\)

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:

\[
U_u = y_u, \quad U_s = y_s, \quad U_m = y_m + \frac{(1 - m)h}{1 - mh} y_s + \frac{1 - h}{1 - mh} y_u,
\]

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

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).

---

\(^3\) For the sake of tractability, we assume a lump-sum tax that is identical for skilled and unskilled residents.
Assuming diminishing returns to voicing, the overthrowing technology \( p \) is

\[
p = \pi \left[ m h v_m^5 + (1 - m) h v_s^5 + (1 - h) \beta v_u^5 \right],
\]

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

Section 2.1 examines the impact of the brain drain on institutional quality. Section 2.2 examines how North–South inequality affects this relationship. Section 2.3 looks at the impact of human capital and within-country inequality. Section 2.4 briefly examines the impact of technological development in telecommunications. Internal solutions are assumed throughout.

### 2.1 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:

\[
\begin{align*}
    v_u^* &= \frac{\tau \pi (1 - h) \beta^2}{2 w_u}, \\
    v_s^* &= \frac{\tau \pi (1 - m) h^2}{2 w_s}, \\
    v_m^* &= \frac{\tau \pi \beta m h^2}{2 w_m},
\end{align*}
\]

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:

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

The elite maximizes its income:

\[ y_e = (1 - mh)\tau(1 - p) \]  

(6)

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

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

(7)

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

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

(8)

Since \( w_m > \gamma w_s \), it follows that \( Q(0, h) > Q(1, h) \), i.e., institutional quality is higher in the absence of brain drain than under total brain drain. This is shown in Figure 1. In fact, the value of \( m \), denoted by \( m_E \), where \( Q(m_E, h) = Q(1, h) \) is given by \( m_E = (w_m - \gamma w_s) / (w_m + \gamma w_s) \). Thus,

\[
Q(m, h) > Q(1, h) \iff m < m_E.
\]

(9)

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

Define \( A \equiv (w_m w_s w_u) / \pi^2 \). The derivative of \( Q \) with respect to \( m \) is given by:
\[
\frac{\partial Q}{\partial m} = \frac{2h^2 w_u (w_m + \gamma w_s)(m - m_1)}{A} > (\leq 0) \Leftrightarrow m > (\leq m_1
\]
\[
\equiv \frac{w_m}{w_m + \gamma w_s} < 1.
\]

Equation (10) implies that institutional quality, depicted by the IS curve in Figure 1, is U-shaped with respect to the brain drain. It starts from a high level at \(m = 0\), falls with the brain drain for \(m < m_1\), reaches a minimum at \(m = m_1\), and rises with the brain drain for \(m > m_1\). Hence, we have two local maxima, at \(m = 0\) and at \(m = 1\). Since, as noted above, \(Q(0,h,W) > Q(1,h,W)\), it follows that institutional quality’s global maximum is at \(m = 0\). One can think of equation (8) as an institution-setting equation (IS), where optimal institutional quality \(Q = Q(m,h)\) is a function of the brain drain \(m\) (for a given level of human capital).

It follows from these results that a host country intent on helping a low-income, high brain-drain country (where \(m > m_1\)) through a reduction in skilled immigration is likely to have a negative impact on the low-income country’s institutions, if the reduction is insufficiently 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 \(Q\).

Before turning to the issue of host-country policy, we examine the intuition behind the fact that the impact of migration on institutional quality, \(\partial Q/\partial m\), changes sign when migration reaches a certain level \(0 < m_1 < 1\). First, a tradeoff clearly exists between residents’ and migrants’ impact on source-country institutions. Migrants can use resources, including their time, to raise awareness of the host-country population and obtain the support of the host-country government in terms of applying direct pressure on the source-country government and in providing resources to the migrants and the source country’s opposition in order to help the latter improve its organizational, communication, and dissemination capabilities and more. The success of the migrants’ efforts requires a skilled home-country population to implement them. Thus, a migration increase helps the migrants’ efforts in the host country but reduces the skilled population’s implementation capacity.
The model developed in this paper reflects this tradeoff as the shares of migrants and residents play a crucial role in the impact of voicing. Note that since $m$ has no impact on unskilled voicing, the sign of $\partial Q/\partial m$ depends exclusively on how $m$ affects the sum of the impacts of skilled residents’ and skilled migrants’ voicing on the overthrowing probability. Second, the impact of voicing of either of these two groups depends both on the level of voicing of the individual members in each group and on the number of individuals in each group, i.e., on each group’s weight or share in the skilled population, $mh$ for migrants and $(1 - m)h$ for residents. Given that the weight of each group raises the impact of voicing of the individuals belonging to it, it follows that the optimal level of voicing itself increases with that weight. Thus, the impact of each group depends on—and is proportional to—the square of their weight, i.e., to the square of their share in the skilled population, $[h^2m^2 \gamma w_s w_u + h^2(1 - m)^2 w_m w_u]$. The latter reaches a minimum at $m = m_1$.

We have assumed here that the host country uses the level of immigration as an instrument to help a high brain-drain country maximize the quality of its institutions. A question arises as to why it does not use the immigration level to maximize the welfare of the source country’s population? Under conditions found in high brain-drain developing countries, namely a low average level of human capital, it be can shown that the immigration level that maximizes the source country’s institutional quality also maximizes its welfare, irrespective of whether welfare is defined as that of the home-country native or resident population. These results are shown in the Appendix.

We now turn to the host country’s immigration policy. In parallel with the institution-setting equation ($IS$), assume emigration decreases with institutional quality and with migration cost, $C$. 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 with the quality of governance and has some influence on migration costs. Then:

- 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.
- If the equilibrium is on the increasing segment (low migration cost), the host country should facilitate the entry of skilled migrants. The host country can maximize institutional quality by completely closing its borders to skilled migrants.

Figure 1 clearly illustrates how a change in migration cost affects the MS curve and the equilibrium migration level. In the next sections, we proceed with an analysis of international and domestic inequality and improvements in telecommunications on the institution-setting curve (given by equation (8)) and the quality of institutions.

2.2 North–South inequality

The likelihood that \( m > m_1 \) falls as \( m_1 \) increases and, from (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.

2.3 Human capital and domestic inequality

How do changes in human capital affect the institution setting (IS) curve? From equation (7), we have:

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

\[
> (\leq 0 \Leftrightarrow h > (\leq) h_1) \quad \text{ (11)}
\]

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

Thus, institutional quality is U-shaped with respect to human capital. It starts from a high level at \( h = 0 \), falls with \( h \) to \( h = h_1 \) where it reaches a minimum, and increases with \( h \) for \( h_1 < h < 1 \). Hence, when \( h < h_1 (h \geq h_1) \), an increase in human capital shifts the IS curve downwards (upwards). From (10) and (11), it follows that extreme values for the brain drain \( m \) and for native human capital \( h \) are more preferable from the viewpoint of institutional quality than values equal (or close) to \( h_1 \) and \( m_1 \), where institutional quality is lowest, with \( m_1 = 0 \) preferable to \( m_1 = 1 \) (equation 8).

From (11), \( h_1 \) increases with \( w_s/w_u \), decreases with \( w_s/w_u \), 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 worst countries, seven are in LAC and three in SSA; of the 20 worst, 13 are in LAC and seven in SSA. Moreover, no LAC

4. The logic behind the change in the sign of \( \frac{\partial Q}{\partial h} \) is the same as the one provided for \( \frac{\partial Q}{\partial m} \) in Section 1.
country belongs to the group of 33 developing countries whose Gini coefficient is below .40. Similar results are obtained when inequality is measured by the GDP share of the top, relative to the bottom, quintile. Thus, the likelihood that institutions improve with human capital in a number of SSA and LAC countries is probably low.

2.4 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 $\pi$, which represents voicing’s overall effectiveness (as noted after equation 3). As equations (4) and (5) show, an increase in $\pi$ raises the level of voicing and raises its effectiveness, thereby resulting in an increase in institutional quality, as shown in (8). In other words, technological developments in telecoms result in an improvement in 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.

3. Conclusion

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

The main findings are: 1) the impact of the brain drain $m$ on institutional quality is $U$-shaped, with a maximum at $m = 0$; 2) the institutional impact of human capital $h$ is $U$-shaped; 3) the likelihood that institutions will improve with $m$ ($h$) is inversely related to international (domestic) inequality; 4) the likelihood that institutions will improve with $h$ falls (rises) with $m$ for $m < (>) m_1$; 5) a marginal change in skilled immigration

5. This includes the revolutions in recent years in various North African countries (though the final outcome is far from clear).
raises institutional quality in a high (low) brain-drain country if the host country promotes (restricts) immigration; and 6) a high brain-drain country’s institutional quality improves under a non-marginal reduction in skilled immigration, if the reduction is sufficiently large—with a maximum attained when the host country closes its border to potential immigrants—and worsens otherwise; and 7) improvements in information and communication technologies result in an improvement in institutional quality.

One policy implication is that a host country will succeed in its intent to help a low-income, high brain-drain country improve its institutional quality through a reduction in skilled immigration if the reduction is sufficiently large; otherwise, it is likely have a negative impact on that country’s institutions. In addition, the host country will maximize institutional quality by completely closing its borders to skilled migrants. Another implication is that the prospect that institutions will improve with human capital is likely to be small in SSA and LAC, where income inequality is substantially higher than in East Asia.
REFERENCES


APPENDIX

Assume first that welfare is defined as that of the source country’s native population, i.e.:

\[
W = (1 - m)hU_S + (1 - h)U_U + mhU_m
\]

\[
= (1 - m)hy_S + (1 - h)y_U + mh\left\{ y_m + \gamma \left[ \frac{(1 - m)h}{1 - mh} y_S + \frac{1 - h}{1 - mh} y_U \right] \right\}
\]

\[
= \left[ 1 + \left( \frac{mh}{1 - mh} \right) \gamma \right] \left\{ (1 - m)h \left[ w_S - \frac{\pi^2(1 - m)^2h^2}{4w_S Q^2} - \frac{1}{2Q} \right] \right\} + (1 - h)w_U - \frac{\pi^2(1 - h)^2\beta^2}{4w_U Q^2} - \frac{1}{2Q}
\]

\[
+ mh \left[ w_m - \frac{\pi^2\gamma^2m^2h^2}{4w_m Q^2} \right]
\]

where \( Q \) is given in equation (8) and income for the three groups is obtained from the solutions for voicing, institutional quality, and apprehension probability.

It can be shown that \( \frac{\partial W}{\partial m} < (>) 0, \forall m \in [0,1] \), when \( h \) is small (large). Since educational attainment in high brain-drain developing countries is typically low, it follows that \( W \) is maximized at \( m = 0 \). As we saw in Section 2.1, institutional quality \( Q \) is also maximized at \( m = 0 \). In other words, the host country’s immigration policy is the same whether the objective is to maximize the host country’s welfare or the quality of its institutions.\(^6\)

The same result obtains as well when welfare is that of the source country’s resident population, i.e., for

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6. Moreover, when \( h = 0 \), \( W(0,0) > W(1,0) \) as \( W = w_U - \frac{\pi^2(1 - h)^2\beta^2}{4w_U Q^2} - \frac{1}{2Q} \) in both cases, but \( Q(0,h) > Q(1,h) \).
\[ W = (1 - m)h U_S + (1 - h)U_U = (1 - m)h y_S + (1 - h)y_U \]
\[
= (1 - m)h \left[ w_s - \frac{\pi^2 (1 - m)^2 h^2}{4w_s Q^2} - \frac{1}{2Q} \right] \\
+ (1 - h) \left[ w_u - \frac{\pi^2 (1 - h)^2 \beta^2}{4w_u Q^2} - \frac{1}{2Q} \right].
\]

Moreover,
\[
W(0, h) = h \left[ w_s - \frac{\pi^2 h^2}{4w_s Q^2(0, h)} - \frac{1}{2Q(0, h)} \right] \\
+ (1 - h) \left[ w_u - \frac{\pi^2 (1 - h)^2 \beta^2}{4w_u Q^2(0, h)} - \frac{1}{2Q(0, h)} \right].
\]

at \( m = 0 \) and
\[
W(1, h) = (1 - h) \left[ w_u - \frac{\pi^2 (1 - h)^2 \beta^2}{4w_u Q^2(1, h)} - \frac{1}{2Q(1, h)} \right]
\]

at \( m = 1 \), and since \( Q(0, h) > Q(1, h) \), it follows that \( W(0, h) > W(1, h) \).