JOURNAL OF ECONOMIC DEVELOPMENT 35
Volume 39, Number 3, September 2014

THE INCONSISTENCY OF "BRAIN GAIN": THE SCHOOLING-MIGRATION NEXUS REVISITED

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This paper analyzes the impact of emigration of high-skilled workers on the skill formation in a small sending country within an Overlapping Generations framework. In contrast to the preceding literature, emigration is explicitly modelled as the outcome of a deterministic decision-process and domestic wages respond endogenously to the outflow. It is shown that lowering emigration barriers in this general equilibrium framework never results into a positive long-run effect on human capital despite positive repercussions on schooling, which challenges the propositions of the more stylized class of 'brain gain' models. Implications for policy designs in developing countries as well as for empirical research are discussed.

Keywords: Skilled Emigration, Human Capital, Overlapping Generations
JEL classification: F22, I25, J24

1. INTRODUCTION

In a globalizing world, competition for the most qualified professionals seems to have steadily grown in intensity over the last decades. In a comparison on the international level, harmonized data collected by Docquier and Marfouk (2006) shows that countries in the regions of Sub-Saharan Africa, Central America and surrounding the Caribbean Sea have exhibited the highest share of emigrants among workers with tertiary education in 2000. At a global level, this assigns developing countries the role of net exporters of skilled labor. Within these countries, this has triggered public fears that an ongoing loss of intellectual resources might seriously hamper growth, thus inhibiting the process of catching-up.

Against this background, economic research has come up with some ideas why skilled worker emigration might at least provide some long-term benefits to people in sending countries. These include channels such as technology transfers (Kapur, 2001),

* The author would like to thank an anonymous referee for very useful comments and suggestions.

promotion of foreign investments through business networks (Kugler and Rapoport, 2005) and the possibility of return migration (Dustmann, 2003). In addition, an increasingly popular strand of literature has emerged that analyzes the impact of migration flows on school participation.

In referring to endogenous growth theory (Lucas, 1988), this literature regards human capital formation as a crucial driving force of economic growth in developing economies. Facilitating outmigration for skilled workers is predicted to boost knowledge creation in the sending country, as the prospect of higher foreign payment raises the expected returns to education. Under the condition that some selection mechanism limits actual emigration, proponents of this theory argue that this effect could even trigger a long-run increase of the domestic stock of human capital. As opposed to a 'brain drain' resulting from emigration, this has been popularized as the 'brain gain' theory.

However, existing evidence in this direction (Beine *et al*., 2001; Beine *et al*., 2008) relies purely on cross-sectional regressions. Besides, human capital in these regressions is simply measured in numbers of educated workers, irrespective of differences in the skill composition among graduates. In this respect, these approaches do not account for the phenomenon of self-selection of migrants documented by empirical results of Liebig and Sousa-Poza (2004) and Chiquiar and Hanson (2005): emigrants exhibit a longer average school participation than the total population in the sending region. Taking this argument a little further, there is no reason to believe that a positive migrant selection merely occurs with respect to formal education. Heterogeneity with regard to personal characteristics could represent an additional selection criterion among workers with equivalent level of schooling. Workers endowed with a superior bundle of talents are more likely to cope with the costs of migrating abroad, as they can achieve a higher remuneration on the foreign labor market. In this paper, we will demonstrate the dynamic effects of introducing such a mechanism of self-selection into a standard Overlapping Generations (OLG) framework. In doing so, it will become clear how strongly the central results of the 'brain gain' theory hinge upon on the set of rigid assumptions made by these frameworks.

The further outline of the paper is the following: the next section provides an overview on the evolution of the 'brain gain' literature. Afterwards, we present our own setup in Section 3. Section 4 derives long-run results from this setup, while Section 5 illustrates the underlying dynamics. Section 6 discusses several policy implications of our results and Section 7 concludes with a summary and prospects for future research.

2. LITERATURE REVIEW

In the economic literature, the first authors that discussed the impact of human capital outflows on the sending country were Grubel and Scott (1966). In a framework of competitive markets, they argue that the welfare of domestic workers should be unaffected by such an outflow, as the marginal productivity of emigrants exactly equals

the emigrants' share in national income. However, Bhagwati and Hamada (1974) as well as Rodriguez (1975) showed that this result is not robust to the introduction of labor market imperfections. Moreover, it takes no account of the dynamic implications for skill formation.

Stark *et al*. (1998) made a seminal contribution in this regard. They incorporate emigration motives into a basic lifecycle framework of human capital investment. In the first period of their lives, agents allocate time between learning activities and work. In the second period, they experience an upgrade of their productivity whose extent depends on the time spent learning. With a fixed probability, workers gain the opportunity to supply their enhanced skill on foreign labor markets and receive a higher remuneration than at home. By examining the effects of an increase in this probability, Stark *et al*. (1998) show that migration opportunities can stimulate educational investment by raising the returns to education. For some range of migration probabilities, they further demonstrate that this can even lead to a long-run increase of the domestic stock of human capital despite intensified outmigration.

This paper was accompanied by a series of contributions that investigated the presence of this effect within richer frameworks. Vidal (1998) adds a threshold effect concerning human capital accumulation, Beine *et al*. (2001) as well as Stark and Wang (2002) discuss the interplay with long-term growth by introducing learning externalities. They demonstrate that the creation of emigration opportunities can guide the economy on more efficient growth paths as it reduces the externality-based inefficiency in skill accumulation. More recent contributions have added network effects among migrants (Kanbur and Rapoport, 2005), incentives for tax avoidance (Haupt and Janeba, 2009) and labor market frictions (Fan and Stark, 2007).

The key assumption of emigration as representing the outcome of some kind of lottery was however left untouched. Commonly, this is justified by referring to immigration restrictions on the part of destination countries. However, immigration policies of developed countries nowadays rarely imply a random selection, but are instead increasingly designed to cherry-pick the most qualified applicants. Besides, an internal inconsistency of this modelling framework can be seen in the fact that emigration incentives are (in contrast to schooling) assumed to be equal among all skilled workers, even though its returns are increasing with personal talent.

In this paper, we will show that lifting the assumption of probabilistic migration leads to a collapse of the 'brain gain' hypothesis. As a consequence, this hypothesis can be considered a special case for a rather exotic scenario which is inadequate to derive general propositions on the subject.

3. MODEL SETUP

To focus on the implications of our central argument, our setup is in other respects closely related to the strand of 'brain gain' literature originating from Stark *et al*. (1998).

Precisely, we consider a small open economy populated by an infinite amount of agents with lifespans of two periods. Each period *t*, a new generation of these agents of standardized mass $m = 1$ is born. Since we neglect any form of bequests, the initial endowment of a young agent merely consists of one marginal unit of unskilled labor *L* and an individual-specific level of talent *a*. At this point, the only assumption on the distribution of *a* is that it is defined over some range $[0, \chi]$.

In the first period of their lives, agents can decide on participating in a schooling program. Participation does not involve any direct costs, but requires students to devote a share of $\in$ of their time to studying. In the subsequent period, old agents who participated in the schooling program become skilled workers and are able to supply $(1 + a\varphi)$ marginal units of skilled labor (*H*) on the labor market, where φ is a parameter symbolizing the efficiency level of the schooling program. Non-participants remain unskilled workers. In addition, skilled workers have the opportunity to emigrate. Emigration is associated with a cost c_{mig}, a cost composite reflecting all the monetary and psychological costs of going abroad. Since we focus on issues of skilled emigration, unskilled workers are assumed to be excluded from this opportunity.

A main deviation from the literature is introduced by our treatment of emigration. In contrast to models designed to support the 'brain gain' theory, we assume emigration not to be probabilistic, but to represent the outcome of a deterministic decision weighing the costs and benefits of going abroad. In this way, linkages between schooling and migration in our model are established through a two-stage decision process of rational individuals, not through an exogenous migration lottery.

To solve the model, a few restrictions on the production technology are needed. In line with standard 'brain drain' models, capital *K* used in domestic production is assumed to be borrowed on the world capital market at a fixed rental rate *r*. However, in contrast to standard models, we treat skilled and unskilled labor as different factors of production. The three factors jointly determine aggregate output *Y* based on the following constant returns to scale technology:

$$Y_t = F(H_t, L_t, K_t), \tag{1}$$

$$\frac{\partial F}{\partial H_t} > 0, \quad \frac{\partial F}{\partial L_t} > 0, \quad \frac{\partial F}{\partial K_t} > 0, \tag{2}$$

$$\frac{\partial^2 F}{\partial H_t^2} < 0, \quad \frac{\partial^2 F}{\partial L_t^2} < 0, \quad \frac{\partial^2 F}{\partial K_t^2} < 0, \quad \frac{\partial^2 F}{\partial H_t \partial L_t} > 0, \tag{3}$$

$$\lim_{H_t \to 0} \frac{\partial F}{\partial H_t} = \infty, \quad \lim_{L_t \to 0} \frac{\partial F}{\partial L_t} = \infty. \tag{4}$$

This formulation reflects the basic complementarity between the two types of labor. As a side effect, it allows domestic wages to remain flexible.[1] In addition, the presence of the Inada conditions (4) will prove to be convenient for the model solution.

Markets are assumed to be perfectly competitive, implying profit maximizing firms to employ workers and capital such that marginal productivities equal factor prices, where $w_t^h (w_t^l)$ denotes the wage rate paid per unit of skilled (unskilled) labor in *t*:

$$r = \frac{\partial F}{\partial K_t}, \quad w_t^h = \frac{\partial F}{\partial H_t}, \quad w_t^l = \frac{\partial F}{\partial L_t}. \tag{5}$$

Having specified labor demand, aggregate labor supply can be determined by dividing the population into students and non-students as well as emigrants and domestic workers based on their draws from the talent distribution. Individuals are presumed to be rational utility maximizers. Since they have unlimited capacities to borrow on the world capital market, they make decisions on schooling and emigration by comparing levels of discounted lifetime income irrespective of time preferences in consumption. With regards to migration, this simply involves a comparison of second-period incomes, where w^{h^f} denotes the (exogenous) wage rate paid abroad:

$$(1 + a\varphi)w^{h^f} - (1 + a\varphi)w_t^h \geq c_{mig}. \tag{6}$$

In situations where a pull effect is present ($w^{h^f} > w_t^h$), more talented graduates from the schooling program are more inclined to leave, because their higher wage gains allow them to better compensate the associated costs.[2] Hence, we can determine a cut-off level for talent a_t^m above which a domestic graduate will go abroad by finding the level of *a* where expression (6) holds with equality:

$$a_t^m = z\left(\frac{c_{mig}}{\varphi(w^{h^f} - w_t^h)} - \frac{1}{\varphi}\right), \tag{7}$$

[1] In the standard 2-factor models, the assumption of a fixed rental rate for capital simultaneously fixes the domestic wage rate, thereby neglecting any repercussions of school participation and migration on the domestic returns to education.

[2] This mechanism persists as long as migration costs can be assumed not to be positively correlated with talent. If there is some correlation in reality, it should rather be negative: the capabilities of high-talented individuals could allow them to adapt faster to the environment in the destination region, implying lower psychological costs.

$$with\ z(x) = \max\{0, \min\{x, \chi\}\}, \tag{8}$$

where $z(x)$ defines boundaries for the cut-off level given the range of the talent distribution.

With regards to school participation, a similar cut-off level a_t^e can be determined. More talented workers can expect larger income flows from supplying skilled labor and thus higher returns to education. In this regard, we make use of the fact that Inada conditions (4) imply $a_t^m > a_t^e$ for any period *t*. In words, a complete exodus of all domestic skilled workers can be ruled out, as this would imply domestic wages for skilled workers to go to infinity, thereby eliminating any emigration incentive. Consequently, it is guaranteed that the least talented agent among all domestic students will stay, which enables us to restrict our discussion to a comparison of domestic lifetime incomes. A worker has an incentive to participate in the schooling program under the following condition:

$$w_t^l + \frac{E_t w_{t+1}^l}{1+r} \leq (1-\varepsilon) w_t^l + \frac{(1+a\varphi) E_t w_{t+1}^h}{1+r}. \tag{9}$$

The cut-off level is then again determined by calculating the talent level at which (9) holds with equality:

$$a_t^e = z\left(\frac{E_t w_{t+1}^l + (1+r)\varepsilon w_t^l}{\varphi E_t w_{t+1}^h} - \frac{1}{\varphi} \right). \tag{10}$$

Notice the implication of this formulation for the type of linkage between schooling and emigration: as opposed to probabilistic models, higher emigration rates as such do not directly affect the returns to schooling for low-talented workers. However, an indirect effect can arise through the channel of domestic wage adjustments.

Finally, to close the model, we assume that both labor markets instantly clear and derive the following expressions for domestic labor supply as functions of the two cut-off levels:

$$H_t = \int_{a_{t-1}^e}^{a_t^m} (1 + a\varphi) da, \tag{11}$$

$$L_t = a_t^e + (1-\varepsilon)(\chi - a_t^e) + a_{t-1}^e. \tag{12}$$

4. LONG-RUN ANALYSIS

In line with previous approaches, our first interest is to investigate the effects of changes to migration restrictions on steady-state outcomes. The relevant model parameter for this task is c_{mig}. In practice, a decline in the costs of emigrating abroad could for instance result from international agreements on labor mobility, implying emigrants to face lower transaction costs during the move and the period of job search in the destination country. By analyzing the total differential of model variables with respect to c_{mig}, we can assess how domestic labor supply responds to such a permanent decline of migration barriers in the long-run.

Since there is no mechanism to generate persistent output growth included in the model, any long-run equilibrium has to be a stationary one. Time subscripts will hence be dropped for the following analysis. To simplify the system, one can start with eliminating physical capital by solving the production technology (1) for *K* and plugging the result into (5). Then, as a consequence of the constant returns to scale property, wage rates can be expressed as functions of the ratio between skilled and unskilled labor only:

$$w^h = f_1\underset{-}{\left(\frac{H}{L}\right)}, \quad w^l = f_2\underset{+}{\left(\frac{H}{L}\right)}. \tag{13}$$

In turn, this employment ratio is positively related to the cut-off level concerning emigration and negatively related to the cut-off level concerning schooling.

$$\frac{H}{L} = f_3\left(\underset{-}{a^e}, \underset{+}{a^m}\right). \tag{14}$$

Totally differentiating the reduced system with respect to the migration cost level yields the following set of equations:

$$dw^h = w^{h'}\left(\frac{H}{L}\right)\cdot d\left(\frac{H}{L}\right), \tag{15}$$

$$dw^l = w^{l'}\left(\frac{H}{L}\right)\cdot d\left(\frac{H}{L}\right), \tag{16}$$

$$d\left(\frac{H}{L}\right) = \frac{H'}{L}(a^e)\cdot da^e + \frac{H'}{L}(a^m)\cdot da^m, \tag{17}$$

$$da^e = a^{e'}(w^h) \cdot dw^h + a^{e'}(w^l) \cdot dw^l , \tag{18}$$

$$da^m = a^{m'}(w^h) \cdot dw^h + a^{m'}(c_{mig}) \cdot dc_{mig} . \tag{19}$$

Solving for the ratio in labor supply enables us to establish an unambiguous result for its long-term change.

$$\frac{d\left(\frac{H}{L}\right)}{dc_{mig}} = \frac{\frac{H'}{L}(a^m)a^{m'}(c_{mig})}{1-\left(\frac{H'}{L}(a^e)\left(a^{e'}(w^h)w^{h'}\left(\frac{H}{L}\right)+a^{e'}(w^l)w^{l'}\left(\frac{H}{L}\right)\right)+\frac{H'}{L}(a^m)a^{m'}(w^h)w^{h'}\left(\frac{H}{L}\right)\right)}. \tag{20}$$

Provided that migration costs are low enough to observe any outmigration at all, reducing migration barriers thus leads to a decline in the skill intensity of domestic production. In principle, this could be due to an excessive outflow of professionals or to a decline in school participation. This can be ascertained by determining the signs of changes in the domestic wage rates:

$$\frac{dw^h}{dc_{mig}} \leq 0 , \quad \frac{dw^l}{dc_{mig}} \geq 0 . \tag{21}$$

Hence, a decrease of migration costs yields an increase in the domestic skill premium as long as $a^m < 1$ holds (i.e., migration takes place). As an immediate consequence, the cut-off level concerning school participation shrinks:

$$\frac{da^e}{dc_{mig}} \geq 0 . \tag{22}$$

Hence, our setup shares with previous models the basic result that better emigration opportunities raise the domestic returns to education in the long-run. The mechanism which generates this outcome is however a completely different one. While in a context of stochastic emigrant selection an increase in the emigration probability serves to attract additional students, this is not the case in our model. Here, the cut-off workers are perfectly aware that the given technology is unable to yield a set of wage rates that would render them better-off in case of emigrating. Instead, it is the anticipated increase

in the mobility of more productive graduates which causes cut-off workers to expect a higher personal remuneration, plainly as a result of reduced domestic competition.

From this, we can easily derive the implications for absolute supply levels of the two skill types. From the change in the schooling cut-off, it follows that in presence of outmigration lower migration costs will always result into a decrease of the domestic supply of unskilled labor.

$$\frac{dL}{dc_{mig}} \geq 0 . \tag{23}$$

To derive the implications for the supply of skilled labor, the effect on emigration rates needs to be taken into account as well. In this respect, our result of a decline in the ratio between skilled and unskilled labor supply implicates that the long-run effect of lifting migration barriers will be detrimental. Given the decrease of the supply of unskilled labor, the supply of skilled labor has to decrease as well to obtain a decline in skill intensity. Hence, we can conclude:

$$\frac{dH}{dc_{mig}} \geq 0 . \tag{24}$$

This result marks a significant departure from the literature. Better opportunities for skilled workers to emigrate result into an unambiguous deterioration of the economy's stock of human capital. In explaining this outcome, one needs to refer to the two-stage process of self-selection ignored by previous work. It implies that an increase in the number of students is unable to compensate the loss stemming from the increased outflow, given that the group of additional graduates represents an inferior selection compared to the ones pulled abroad. Quite the opposite, as the additional graduates are themselves disinclined to move, the underlying reason for increased school participation is merely an increased domestic scarcity of skilled labor. Hence, following a shock to migration barriers, a long-run increase in school participation is inevitably associated with a downfall of human capital.

5. TRANSITIONAL DYNAMICS

Following an unanticipated decline of migration costs, different generations might be affected differently on the path towards a new steady-state. The reason why such a switch to a new equilibrium state does not occur instantly lies in the intertemporal repercussions of migration and schooling decisions. In our framework, these repercussions are driven by the basic complementarity of skill types. For instance, a sudden increase of the cut-off level for migration can induce an increase of the domestic

supply of unskilled labor in the subsequent period by raising the opportunity costs of schooling:

$$\frac{\partial L_{t+1}}{\partial a_t^m} = \frac{\partial L_{t+1}}{\partial a_t^e} \cdot \frac{\partial a_t^e}{\partial w_t^l} \cdot \frac{\partial w_t^l}{\partial a_t^m} > 0 . \tag{25}$$

The presence of these intrinsic dynamics marks another departure from existing frameworks with probabilistic migration, where dynamics are only generated by the introduction of non-market human capital externalities.

To illustrate its implications, we analyze the dynamics resulting from a decrease of migration costs by 10 percent. Precisely, the economy is assumed to have reached a long-term equilibrium in $t = 0$. At the beginning of $t = 1$, agents face an unanticipated drop of c_{mig} by 10 percent, e.g., due to some international agreement on facilitating cross-border migration for skilled workers. The goal is to derive the time paths for all variables starting from $t = 1$. To this end, the dynamic system defined by (5), (7)-(8) and (10)-(12) can be reduced to two (nonlinear) difference equations linking the two cut-off levels:

$$a_t^m = g_1(a_t^m, a_t^e, a_{t-1}^e), \tag{26}$$

$$a_t^e = g_2(E_t a_{t+1}^e, a_t^e, a_{t-1}^e, E_t a_{t+1}^m, a_t^m) . \tag{27}$$

Regarding their dynamic properties, both cut-off variables hence possess both a forward- and a backward-looking component.

The non-integer powers present in the production technology prevent an analytical solution of (26) and (27). As an alternative, we present a numerical solution for specific parameter values. Precisely, parameters are calibrated such that cut-off levels in the initial steady-state resemble a real-world scenario. Given the existence of our scaling parameter φ, we are allowed to assign a standardized uniform distribution $U(0,1)$ to domestic talent for this task.

The cut-off level for schooling is fit to completion rates of upper secondary education. Within the group of emerging market economies, OECD estimates of this rate for 2009 differ significantly. They lie within a range from close to 20 percent for India to slightly more than 60 percent for Brazil (OECD, 2012). As a compromise, we choose a benchmark value of 40 percent, implying a baseline cut-off $a^e = 0.6$. The cut-off level for migration is identified based on data from Docquier and Marfouk (2007), who estimate an average emigration rate among professionals of 7.3 percent. Adjusted for the cut-off level for schooling, this implies a baseline cut-off $a^m = 0.971$. Further conditions imposed on the initial steady-state are an equal distribution of aggregate labor income between skilled and unskilled workers as well as a certain level of income

variation among skilled workers, represented by a standard deviation of log income equal to 0.361 (taken from Freeman and Schettkat, 2001).

With the help of these conditions, the following values for ε, φ, γ and c_{mig} are determined: $\varepsilon = 0.76$, $\varphi = 2.82$, $\gamma = 0.943$, $c_{mig} = 1.82$. In addition, given that one model period comprises approximately 20 real-life years, the assumption of an annual interest rate of 4 percent leads to a value of $r = 1.04^{20} - 1 = 1.1912$ for the discount rate. Finally, labor-to-labor substitutability is specified as $\sigma = 1.4$ and w^{h^f} is standardized to unity.

Before numerically determining the transition path, the stability as well as the uniqueness of this path has to be confirmed. This is done by performing a linear taylor approximation around the initial steady-state and determining the eigenvalues of the resulting system. For the given structure, the dimension of this matrix is 3×3, 3 eigenvalues are hence to be computed. With 2 forward-looking variables, the Blanchard-Kahn conditions (Blanchard and Kahn, 1980) require exactly two of them to lie outside the unit circle, which is numerically confirmed to be the case. In addition, the rank condition holds as well.

Then, the pattern of transition as displayed in Figure 1 documents over- as well as undershooting behavior of the relevant variables. The reason is the delay in the response of skill formation combined with the complementarity of skill types. In $t = 1$, the number of domestic graduates is still predetermined by the pre-shock scenario. However, there is an immediate response in the number of emigrants, as the decline in migration costs raises the returns to emigration. The result is a sudden decline of domestic human capital coupled with an increase of the domestic skill premium reflecting the grown scarcity.

Dynamic repercussions arise through the effect on the returns to education for the young generation. The decrease in wages paid to unskilled workers following the exodus of complementary skilled labor lowers their opportunity costs of schooling. As a consequence, there is a strong increase in school participation (i.e. a decrease in the schooling cut-off a^e to be observed in $t = 1$. This increase, however, is unable to reverse the loss of human capital in $t = 2$, since increased domestic competition among graduates initiates a rebound effect of the domestic skill premium, which further raises incentives to emigrate. In the following periods, this process comes to a halt due to the effect of increased scarcity on domestic wages. The economy converges to a new long-run equilibrium featuring higher emigration rates, higher school participation and a lower aggregate supply of skilled labor.

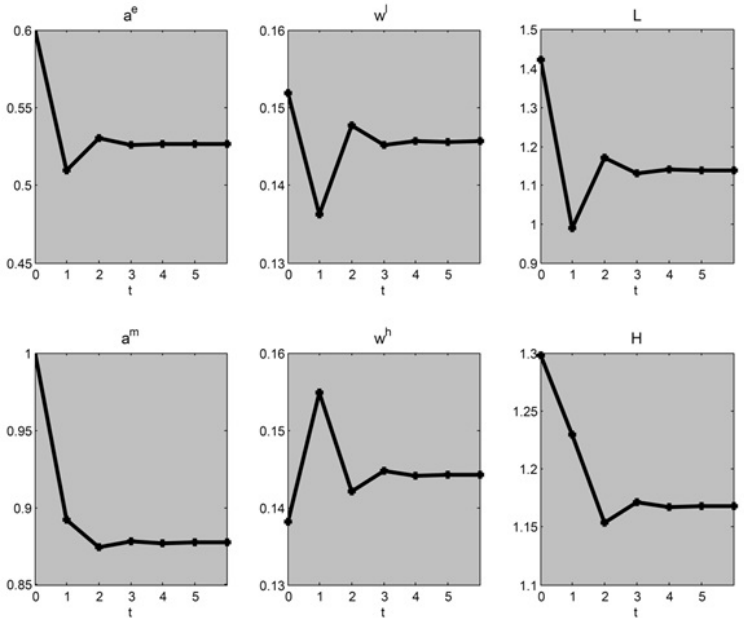

Figure 1. Transition Dynamics after an Unexpected Decline of Migration Costs

6. POLICY IMPLICATIONS

Accounting for both migrant selection and skill complementarity allows us to derive more detailed policy conclusions than preceding frameworks. First of all, our results so far indicate that facilitating emigration for skilled workers does not only reduce economy-wide growth opportunities through a loss of human capital. It is also predicted to raise economy-wide inequality. While high-talent workers can benefit from the improved conditions for emigration, workers with talent levels too low to invest into education are all made worse-off due to a decline in the remuneration of unskilled labor. In this regard, accounting for the existence of technological externalities related to human capital would make matters even worse. Apart from a short-term loss of the complementary factor, unskilled workers would be additionally harmed by reduced technological progress in the long-run.

In addition, our framework allows assessing the impact of a host country's immigration policies on the skill composition in the sending country. For instance, consider the introduction of a screening system where only migrants with talent exceeding a certain level a^* are allowed to enter foreign labor markets. In other words, a host country decides to cherry-pick only the best professionals from the rest of the world. If migration barriers are anyway high and/or international wage differentials low

such that $a^* < a^m$, this policy would be ineffective. If, however, the relationship $a^* > a^m$ holds, a policy of cherry-picking immigrants is predicted to promote skill formation in sending countries. It prevents at least some range of medium-talented graduates from going abroad. This has a positive impact on human capital even though returns to education and thus school participation are predicted to shrink, because a lower domestic skill premium represents a side effect of intensified domestic competition.

Additional insights concern the effect of subsidies on higher education. In frameworks with probabilistic migration like Stark *et al*. (1998), subsidizing schooling does not affect the share of emigrating professionals since domestic wages remain unaltered. In our framework, the introduction of a subsidy boosts outmigration: an increase in the number of graduates depresses domestic wages for skilled workers, inducing a decline of the talent threshold for emigration. Moreover, the distributional effects of such an educational subsidy are also different. While in previous approaches all school participants achieve the same expected lifetime benefit, our approach predicts that the most talented professionals profit the most from this type of educational policy. The reason is that their opportunity to emigrate allows them to escape the tougher domestic competition. At the same time, increased outmigration harms workers at the bottom end of the talent distribution due to a loss of the complementary factor. Hence, the increase in intragenerational inequality following the introduction of such a subsidy is the larger the lower the emigration barriers.

7. CONCLUSION

In this paper, we developed and solved an OLG model that introduces deterministic emigration decisions into a standard lifecycle framework with human capital accumulation. It provides a simple yet consistent analysis of the interplay between schooling and migration for a small economy populated by individuals who differ with respect to talent and age. Contrary to the propositions of a popular strand of 'brain drain' literature, we demonstrated that in this framework an improvement of emigration opportunities for skilled workers never results into a long-run increase of domestic human capital. This is the case even though there are positive repercussions of emigration on school participation present. The reason is the two-fold selection mechanism at work. Differences in talent induce individuals not only to self-select into low- and high-skilled workers, but also into emigrants and non-emigrants. Emigrants thus represent a superior selection compared to domestic skilled workers. Under the rather artificial assumption of purely probabilistic emigration, this channel is not accounted for, thereby producing the counterintuitive result of intensified human capital accumulation despite increased outmigration.

Regarding empirical research, this questions the eligibility of human capital measures that are based on numbers of educated workers or average years of schooling.

Instead, our approach stresses the necessity of more elaborate measures which account for individual characteristics linked to the selection process.

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Received January 6, 2014, Revised May 26, 2014, Accepted August 18, 2014.