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### **Analysis of International Migration and its Impacts on Developing Countries**

by:

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November 2007

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# **Analysis of International Migration and its Impacts on Developing Countries**

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## **Abstract:**

This paper provides a review of the literature on the reasons and consequences of international migration. The principal determinants of migration are analyzed and it is seen that educated people from developing countries are more likely to migrate for several reasons (i.e. network determinants, costs of moving, pull factors and push factors). Looking into the empirical data, the global trend is that emigration of educated people (usually called “brain drain”) has increased a lot. This trend implies that industrialized countries are importing highly skilled people from developing countries and this will certainly have important consequences for developing countries in the long run. Some researchers argue that developing countries will loose, since the most qualified people leave and stop contributing to their country. Others say that the global trend can be beneficial because positive spillovers will be created; in the sense that developing countries will experience higher investments in human capital (“brain gain”). Empirical findings show that these spillovers depend on the probability to migrate and the stock of human capital that a country has. Finally another group of researchers argues that this process is inevitable, and barriers to migration should be abolished in order to reap the benefits for both sending and receiving countries as well as the migrants themselves.

**Keywords:** Migration, Brain Drain, Brain Gain

**JEL Classification:** F22, O15.

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## Introduction

As a result of globalization and industrialization, the world has experienced a growing flow of capital and labor between countries. Regarding labor, the flow of people has gone in general from developing to developed countries. The reasons are mainly grouped in two. First, due to the great economic differences between countries, people from the developing countries are willing to move from their home country<sup>1</sup> to search for better opportunities in a developed country (Chand and Paldam, 2005 (henceforth CP)). Additionally, the rapid decline of transportation and telecommunication costs has made it easier for people to move from one country to another. Second, developed countries have attracted people from developing countries according to their needs. For instance in Australia, New Zealand, Canada and United States immigration policies have been based in attracting high skilled workers.

There is no doubt that there is a positive result from migration, at least when people from less developed countries reach their objectives and when the receiving countries can take advantage of new workers according to their needs. Nevertheless, there are indirect consequences of migration that can make results ambiguous in the long run.

Some literature recognizes possible positive effects for developing countries when skilled migration occurs. It is argued that this type of migration can generate positive spillovers in human capital formation. Accordingly due to higher levels of human capital, higher growth and welfare can be achieved in developing countries (Doqcuier and Marfouk, 2005, henceforth (DM)).

Other literature notifies that if education is financed by the public sector, the outflow of skilled people from developing countries will imply a loss in their investment. Moreover, the home country will remain with less of its most productive people, damaging the process of development (Commander, Kangasniemi, Winters, 2003 (henceforth CKW)).

Thus some inquiries arise. First of all, are there other determinants of migration besides the economic ones? Which ones? What is the global trend of migration? Who is

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<sup>1</sup> Home country or origin country is the country from where people emigrate and destination country is the country to where they go.

migrating more? And finally, is migration positive or detrimental for developing countries in the long run? Why?

This paper will try to answer these questions through a revision of the most important literature in this field. The objective is to explain clearly the main points and basic insights of what it has been written so far.

The paper is organized as follows. The first section is based on the study done by Pedersen, Pytlikova and Smith (2006) (henceforth PPS) about determinants of international migration. The second section accounts for empirical facts of migration, its composition of type of migrant and the global trend (based on DM). The third explains different theories about the consequences of skilled migration. The existent theories fall into three types: the first are those that argue that emigration is detrimental, because the origin country remains with low average ability and lose its investment in education (CKW). The second type of theories argue that skilled migration can be good due to a raise in human capital (Breine, Doquier and Rapoport, 2003 (henceforth BDR)). The third group states that migration is a natural process of industrial concentration (CKW). Finally the conclusions are presented.

# 1 Determinants of International Migration

Although the economic reasons to migrate are the most expected, i.e. higher relative wages and opportunities of employment abroad, there are other determinants of migration, as the immigrant, the home-country and destination-country specific characteristics.

PPS analyzed the principal determinants of immigration to the OECD countries for the period 1990-2000. The authors classified the explanatory variables in 4 groups: network effects, costs of moving to a foreign country, push factors and pull factors.

## *Network effects*

Network effects refer to the link between persons that migrate for the first time to a particular country (new immigrants) and those that have already migrated and are living in that country (old immigrants). The relation is that in those countries where exist more networks of immigrants, an increase in immigration to that country will be observed. The explanation is that it is easier to arrive to a place where social networks are already established, since they ease the process of learning and adaptation for the new immigrants.

## *Costs of moving*

Regarding costs of moving to a foreign country, it was found that the origin countries where the same language is spoken, is closer in distance to, are former colonies of, and trade a lot with the destination country are more likely to migrate to the destination country, since the cultural barriers are less making the costs of adaptation lower than immigrating to other destiny countries.

## *Pull factors*

Pull factors include variables about the “attractiveness” of the destination country that make people to move. For instance, low rates of unemployment and high GDP levels in the host country will increase migration to that country.

In general it is expected that those countries with a foundation of generous benefit systems will attract more immigrants<sup>2</sup>. Contrary to that, PPS found that the welfare systems may not be important when determining migration and may even diminish the migration

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<sup>2</sup> The welfare state attractor was measured by the tax pressure.

intensity. The argument is that the existence of important welfare systems in the destination country is equivalent to high public costs per capita. Therefore destiny countries will tend to impose high cost restrictions to the entrance of new people, which imply lower migration.

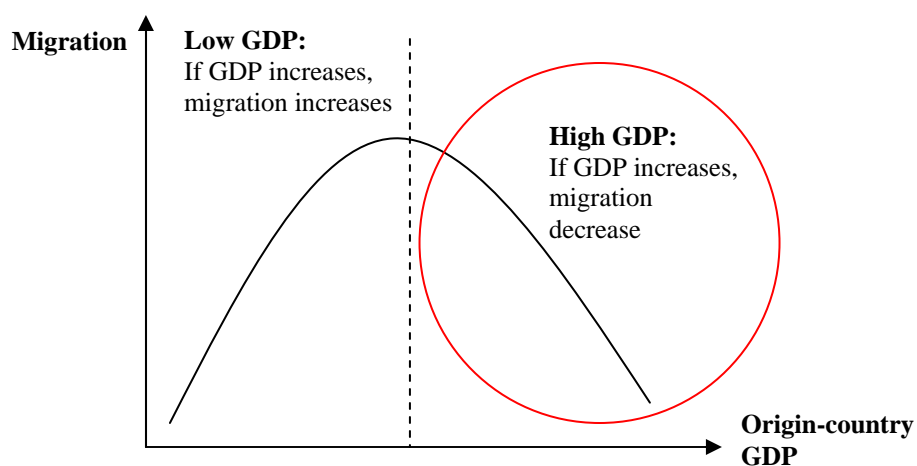
### *Push factors*

Push factors are the origin-country characteristics that push people to migrate. If the origin country has a low degree of freedom, low GDP, and high population pressure<sup>3</sup>, most likely its citizens will migrate.

### *GDP*

Regarding GDP, earlier studies have argued that the relation between GDP and migration should look like that of Figure 1, where countries with low GDP, the poor countries, will experience an increase in migration flows (emigration) whenever their GDP increases. In other words, in countries where the situation is really bad, migration is low since they are too poor to afford moving their living place, but if things get better, they will migrate. Whereas rich countries experience the contrary fact: when their situation improves they don't have an incentive to leave their country.

**Figure 1: Relation between migration and GDP**



<sup>3</sup> Population pressure was measured as the origin-country population relative to the destiny-country population.

PPS estimated a linear relation between GDP and migration (after controlling for other variables). The result was a negative coefficient: if the origin-country GDP increases, migration will decrease. This outcome is similar to the right part of the former figure, where the richest countries are situated (in fact the richest countries were included in the origin-country group).

#### *Unemployment*

The authors have found, after controlling for other variables, a negative relation between rates of unemployment in the origin country and emigration: if unemployment increases, emigration rates will decrease. The author's argument is that unemployed people find migration to another country too costly, so the more unemployed people there are, the lower the levels of migration.

#### *Education*

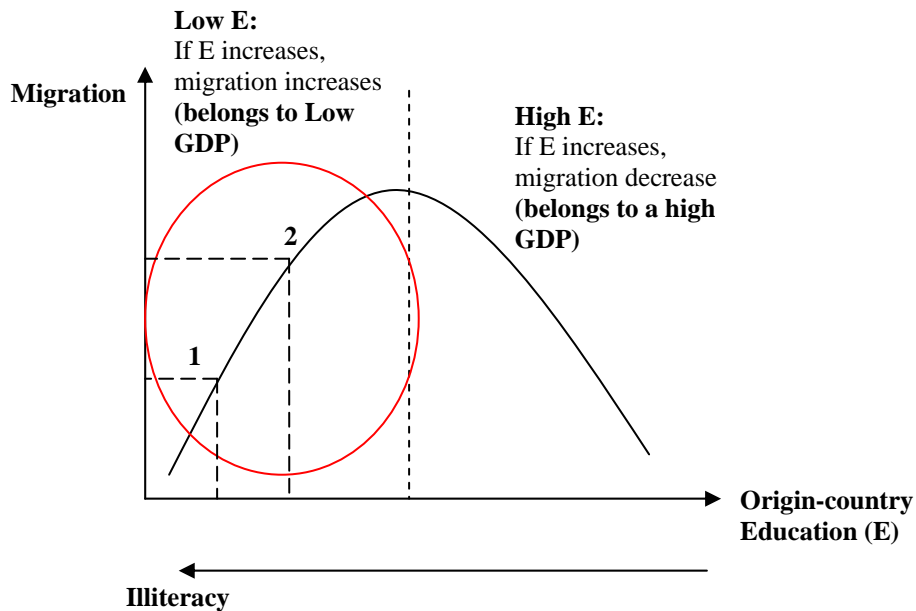
The authors have analyzed the level of education (E) in the origin country and its relation to migration. It is expected that the relation between education and migration looks like the relation of GDP and migration: in countries where education is on average low, an increase in education will make people more prepared to move away from their country; and for people that live in countries with high levels of education, an increase in their education will make it less attractive to move to a new place. Thus the relation between education and migration will look like that of Figure 2.

The variable used to estimate education in PPS is the illiteracy rate which is the percentage of people above 15 years who cannot read or write a short statement. This variable is zero or almost zero for the richest countries, so the estimations basically eliminate the rich countries. Then results are based on the left hand side of the figure (for poor countries) and they, in fact, find a positive relation between education and migration: higher education will increase migration (from points 1 to 2 in Figure 2).

Normally, in poor countries, people with low education move to a better place inside the same country (national migration) while people with more education move to another country (international migration). After all educated people (from poor countries)

will be able to find better opportunities abroad than at home, since their work requirements increase with the level of education.<sup>4</sup>

**Figure 2: Relation between migration and education**



The relation between educated people and migration is quite relevant for the least developed countries. If many educated people migrate (brain drain), on one hand, poor countries could be getting even poorer because they are losing their most qualified people. On the other hand, maybe the existence of brain drain is a way to reduce inequalities, since those who migrate send money back, push their families to get higher education, invest in their country and so on and so forth.

Anyway, before getting to any conclusion it is important to determine if brain drain is a real problem. The next section analyzes the data and trend in the world about this matter.

<sup>4</sup> See Figure 3. In 2006 63.6% of migration was high educated people and 10 years earlier this share was only around 50%. Also low skilled people do actually migrate but they account for a lesser share of total migration.

## 2 Facts about international migration

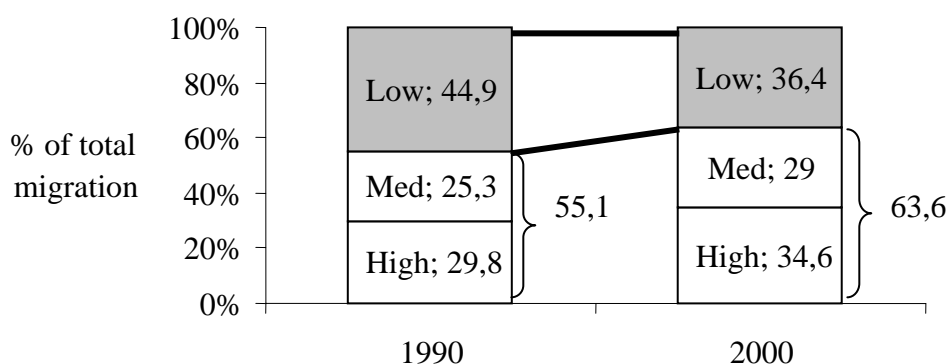
Although it is hard to measure international migration, estimates according to United Nations (2002) show that migration in general has increased in the last years: in 1990 there were 154 millions of immigrants and in 2000 the number was 175 millions. This means that during the period 1990-2000, migration flows have increased in 13.63% whereas the population change in the same period was 15.26%. This suggests that compared to the population change, the migration flow is not a dramatic issue, but still is expected to grow more as a result of the world globalization process (DM).

In any case, it is important to analyze the composition of migration and see if there are important changes and if brain drain is an important issue.

### 2.1 Composition of migration

The composition of immigrants has changed: in 1990 almost 50% were unskilled while in 2000 this figure was only 36%. Migrants with secondary and tertiary education were half of the total amount of migrants back in 1990 and in 2000 they represented 63.6% as it can be seen in the following Figure:

**Figure 3: Composition of Immigrants in the World by Education**



Source: DM. The authors refer to high skill as having more than 13 years of education, medium from 9 to 12; and low from 0 to 8.

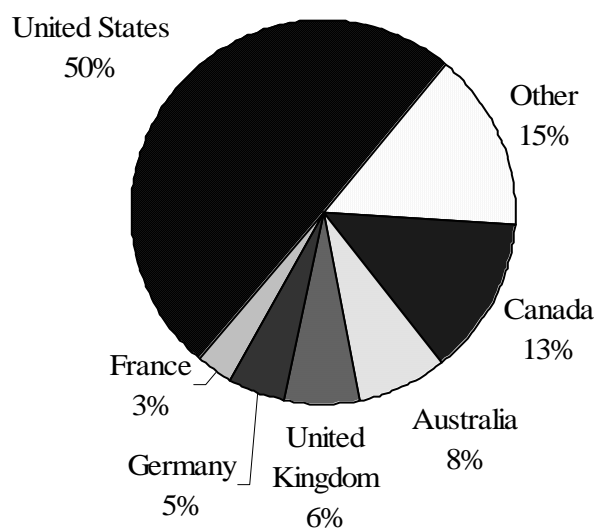
Thus with time, the stock of better educated migrants has increased and its share has become more important.

## 2.2 Composition of skilled migration

According to DM the observed growing brain drain can be due to the fact that some countries have implemented quality-selective immigration policies as Australia, New Zealand, United States and Canada. The European countries have had traditional immigration policies like reunion family or asylum seekers, but still brain drain to these countries is expected to increase since they have demographic and aging problems.

From the world migration, 53% represented migration to OECD countries in 1990 and 60% in 2000 (United Nations, 2002). According to estimates from DM 90% of the total high skilled migration went to OECD countries. In 2002 20.4 million high skilled immigrants were coming to the OECD countries and the main recipient countries of this flow of workers were United States, Canada, Australia, United Kingdom, Germany and France, as it can be seen in the following Figure:

**Figure 4: Composition of skilled migration by destiny country 2000**



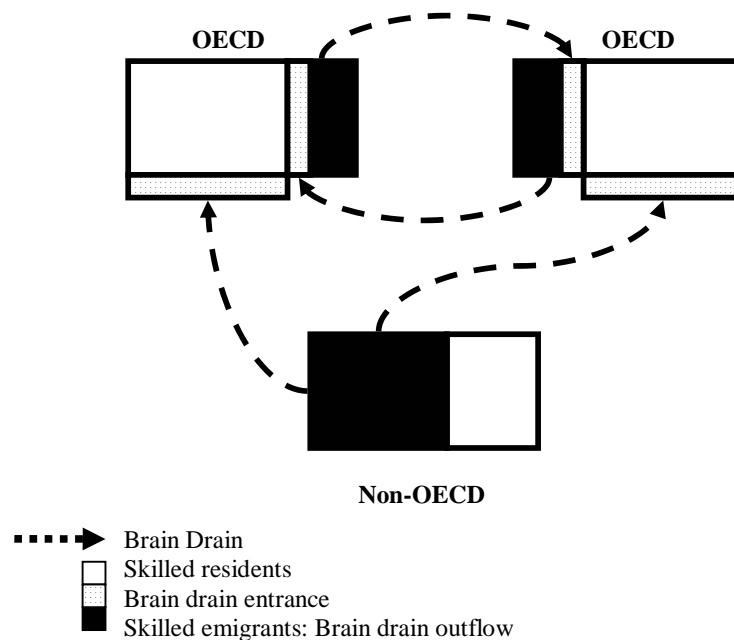
Source: DM

### 2.3 Global trend

In DM, they pointed out that the world trend in general is that the skilled labor force is growing, from which some stay in their country (residents) and others migrate. This trend differs from country to country: the increase in high skilled emigrants from OECD countries is less than the increase in highly skilled residents in OECD countries which means that more skilled people are staying at home than going out of the richest countries.

Meanwhile the increase in high skilled emigrants from non-OECD countries is higher than the increase in high skilled residents in non-OECD countries. These observations suggest that poor countries have more skilled people going abroad than skilled people staying at home.

**Figure 5: Global trend of the brain drain**



If this trend keeps on going, the middle and low income countries will end up with residents with low skills compared to the rich countries.

It looks as if the lower and medium income countries are losing qualified human capital and the richest ones are gaining skilled labor force. But still there are more effects to analyze, since there are externalities from migrating.

### 3 Brain Drain: Economic Theory

This section is based on economic theory models found in literature. The results are divided in 3 sub-groups: the ones that think skilled migration can be either good or bad, the ones that think it is bad and those who say it is an inevitable process of our globalized world.

#### 3.1 Migration is Bad

Based on endogenous growth models, this literature states that emigration is harmful for the people that stay in the origin country (residents). The main arguments are threefold. First, education of skilled people is paid by residents through taxes, so when skilled people leave the country, residents lose their investment made on education<sup>5</sup> (CKW).

Second, the skilled people that are migrating are being paid too low in their home country, consequently they go abroad in order to be paid by their real contribution. The contribution of emigrants in their origin country is higher than their actual wage; emigrants are actually cheap in their home country compared to all of what they are contributing. Thus, when skilled people migrate, the home country loses valuable resources.

Finally these models allow for distortions in the labor market: a specific wage setting and education financed by the public sector. Thus a welfare loss takes place when migration occurs.

##### 3.1.1 The Model

Two types of labor are assumed: skilled and unskilled, which are used to produce two different outputs in each country:

$$M_s = F_s(L_s) \text{ and } M_u = F_u(L_u) \rightarrow M = M_s + M_u$$

$$M_s^* = F_s(L_s^*) \text{ and } M_u^* = F_u(L_u^*) \rightarrow M^* = M_s^* + M_u^*,$$

where L and M are labor and output respectively, and the subscripts s and u stand for skilled and unskilled. Variables denoted with \* are for the foreign (destiny) country and without are for the home country.

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<sup>5</sup> Perhaps the cost of tertiary education in most cases is financed by private sector, but still the primary and secondary levels of education financed by the public sector are lost when people emigrate (CKW)

Two distortions are assumed: a specific wage setting and skilled education financed by taxes. The determination of salaries depends on a given probability to migrate and some assumptions:

- Expectations over education: the expected return (measured by the wage,  $w$ ) to education is higher than the expected return to not getting education:

$$E(w_s) - k > E(w_u),$$

where  $E(w_s)$  is the expected wage of a skilled person,  $k$  is a fixed cost of studying, and  $E(w_u)$  is the expected wage of an unskilled person. Accordingly, there will be incentives to acquire higher education levels.

- Two mechanisms through which salaries abroad and at home are related:

*Emulation*: if salaries of skilled people increase abroad, the same will happen with salaries of skilled people at home and vice versa ( $w_s^* \leftrightarrow w_s$ ).

*Leap frogging*: if salaries of skilled people increase at home, then salaries of unskilled people will also increase at home ( $w_s \rightarrow w_u$ ).

The labor market balance in a country is:

$$N_s + N_u = N,$$

where  $N$  is the total labor force, active and no active workers, and also divided into skilled and unskilled labor. The skilled labor force is divided into an exogenous flow of emigrants ( $Z_s$ ) that may be employed or unemployed in the home country, unemployed people ( $U_s$ ) and people actually working ( $L_s$ ):

$$N_s = L_s + U_s + Z_s.$$

The unskilled labor force is determined in the same way with the exception that there are not unskilled people migrating (migration is only assumed to occur for skilled people):

$$N_u = L_u + U_u.$$

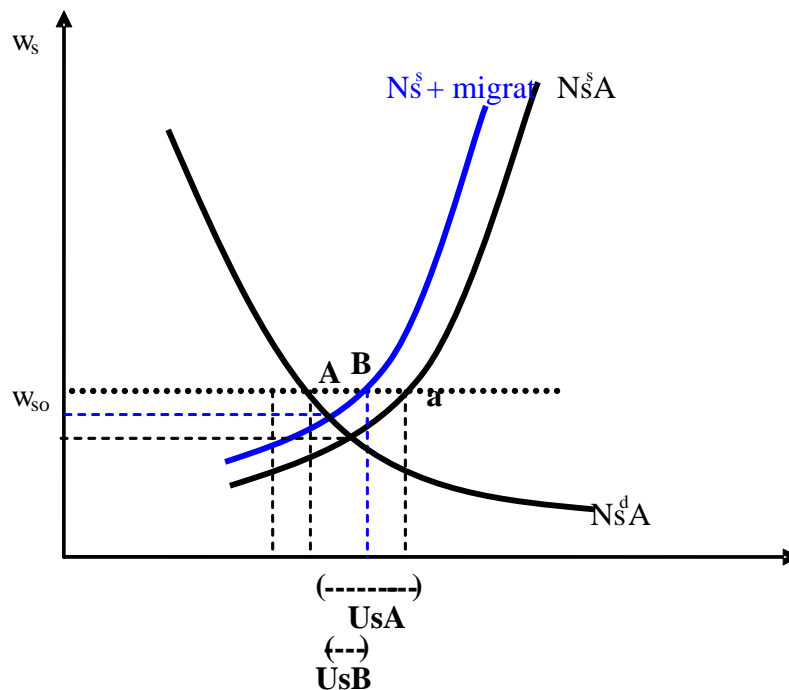
The next sub-section analyzes the effect of skilled migration over welfare variables for the home country.

### 3.1.2 Effect of emigration of skilled people on unemployment

When brain drain occurs (emigration of skilled people), unemployment of skilled people may be reduced, since a proportion of the emigrants may have been unemployed. Given that less skilled workers are available, the ones left will be valued more, making their return higher (higher expected returns to education) in the home country, under the assumption that the elasticity of the labor demand is elastic enough<sup>6</sup>.

In Figure 6 it can be seen the behavior of the skilled labor market at the home country. We depart from a situation where there is unemployment of skilled people ( $UsA$ ): for some reason at the initial salary  $w_{so}$ , there are more people willing to work (a) than firms willing to hire workers (A). When emigration occurs, the skilled labor supply will be contracted: less skilled people is in the domestic market. Since we have started from a situation where there is unemployment, unemployment of skilled people is diminished (to  $UsB$ ).

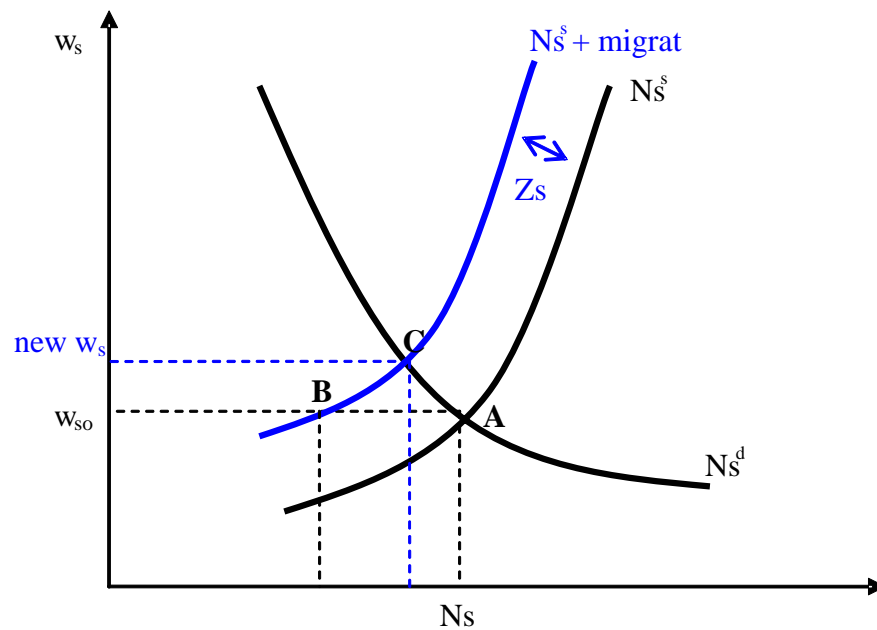
**Figure 6: Emigration of skilled people when skilled people are initially unemployed**



<sup>6</sup> Elastic enough means is not inelastic but neither fully elastic.

Figure 7 shows the outcome when all skilled people are initially employed. We start in a point A, where salaries are at the level of  $w_{s0}$  and labor supply meets the demand. After migration occurs, in the short run we move from A to B where skilled labor demand is higher than skilled labor supply. Then, in the long run, when firms realize that skilled people are a scarce input, they will end up paying higher salaries until the gap is closed. We go from B to C where we see a higher supply of skilled workers compared to the initial salary ( $w_s$ ). We end up there also due to the emulation mechanism where higher skilled salaries abroad will affect in the same direction to skilled salaries at home.

**Figure 7: Emigration of skilled people when skilled people are initially employed**



The new salary will have an impact on unemployment of other sectors through the wage setting mechanism. Through the leap frogging mechanism, since skilled salaries at equilibrium are higher, unskilled wages will increase as well, and firms will hire less people because they become more expensive. Thus employment of unskilled people will be diminished.

The output will be lower, since there is lower employment of skilled people in the home country without any offsetting effect from the unskilled sector. Besides, since

education is subsidized and paid by residents, an outflow of people will be costly. Moreover, having less skilled people can increase the cost of studying.

For those who emigrate, salary will be higher abroad, meaning that they were receiving less than their marginal productivity: they were actually cheap in the home country for all of what they were producing. So the home country loses valuable resources when skilled people emigrate. As a result, these kinds of models have advised that migration should be restricted; it was even suggested to tax the brain drain.

### **3.1.3 Critics**

A strong critique of these models is that they treat the skilled emigrants as given, while in reality this is not true. The number of skilled emigrants is a result of different factors, which are changing constantly. For instance, if the destination country lowers barriers, the stock of educated emigrants could increase as well as if opportunities of employment are widened. In next section's model we will see that the skilled emigrants stock is endogenous and it depends on the probability of skilled migration, the initial stock of human capital, wages abroad and private costs.

Another critique is focused on the assumption that unskilled migration does not exist. This is not realistic. According to the data, we have seen that unskilled migration occurs in a very important fraction, and some years ago it used to be the main source of emigrants, but of course we have seen that whenever education increases, they will migrate more.

In CKW the results of these kinds of models do not rely on empirical evidence. Additionally, there is no attention to heterogeneity of countries like country size, or technological changes that influence the movement of people.

## **3.2 Migration can be Good**

This literature basically points out that migration can improve human capital in the origin country and consequently generate higher levels of growth and welfare. The mechanism is the following: since salaries for skilled people are higher abroad, by migrating, skilled people have higher chances to get higher returns of education. Then, people will find it

attractive to increase their education (DM). This result will hold only for appropriate low levels of probability of migration.

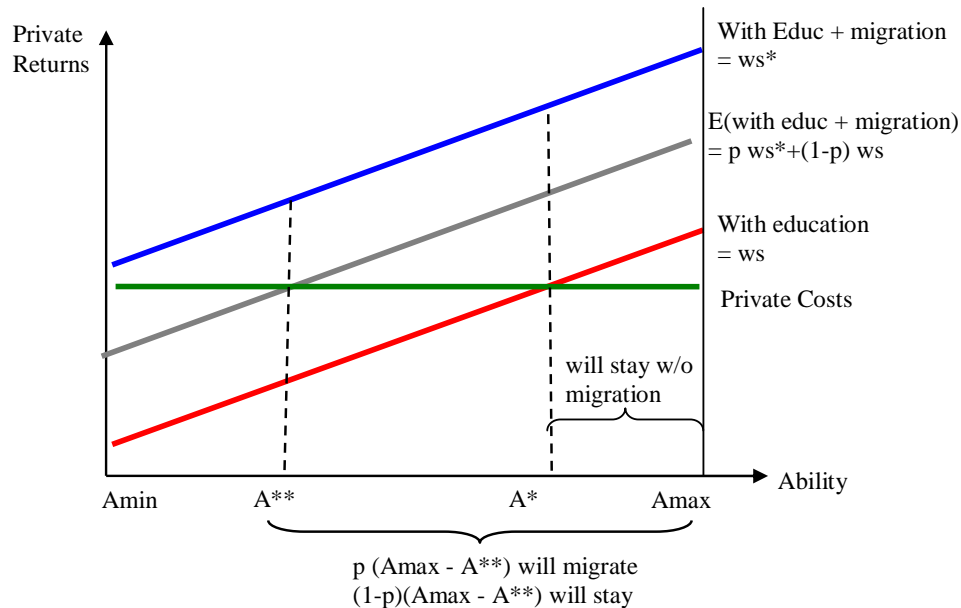
These kinds of models are based in three important characteristics. First, it is assumed that increasing the average skill of the home country is desirable, mainly because skills can be transmitted through generations. Second, the models assume that those who emigrate will come back (temporary migration). Third, they assume that the beneficial brain drain will create incentives to acquire education in order to migrate but leaves some skilled workers at home.

### 3.2.1 Model

- Salaries for skilled workers abroad ( $w_s^*$ ) are higher than at home ( $w_s$ ), and are exogenously given.
- The probability to migrate is exogenous ( $p$ )
- Ability ( $A$ ) is uniformly distributed between  $A_{max}$  and  $A_{min}$
- Education leads to private return which increases with Ability and its cost is exogenously given.

Figure 8 describes the logic of the model. Somebody with education (red line) will find it profitable to get a higher education if his private returns are equal or higher to the private costs (green line). Therefore, educated people will receive positive benefits from  $A^*$  to  $A_{max}$ .

If educated people migrate, returns will be higher (blue line), but there is a chance that educates people will not migrate, so the expected return with a chance of migration will be weighted with  $0 < p < 1$  and thus situated in between the no-migration returns and migration returns (gray line).

**Figure 8: Private returns and Ability**

With a chance to migrate, people will find it profitable to acquire education from  $A^{**}$  to  $A_{max}$ . A proportion will migrate:  $p (A_{max} - A^{**})$ , and the rest will stay at home:  $(1-p)(A_{max} - A^{**})$ .

Let's assume that the social benefits (SB) are a proportion  $d$  of the stock of remaining educated people. Then, when there is no chance of migration the SB will be:

$$SB_{nm} = d (A_{max} - A^*),$$

whereas when there is a chance of migration of  $p$ , SB will be:

$$SB_m = d(1-p)(A_{max} - A^{**})$$

The question is: which one is higher? If society benefits from migration more than without it, then migration is good. But if benefits are higher without migration, then migration is bad:

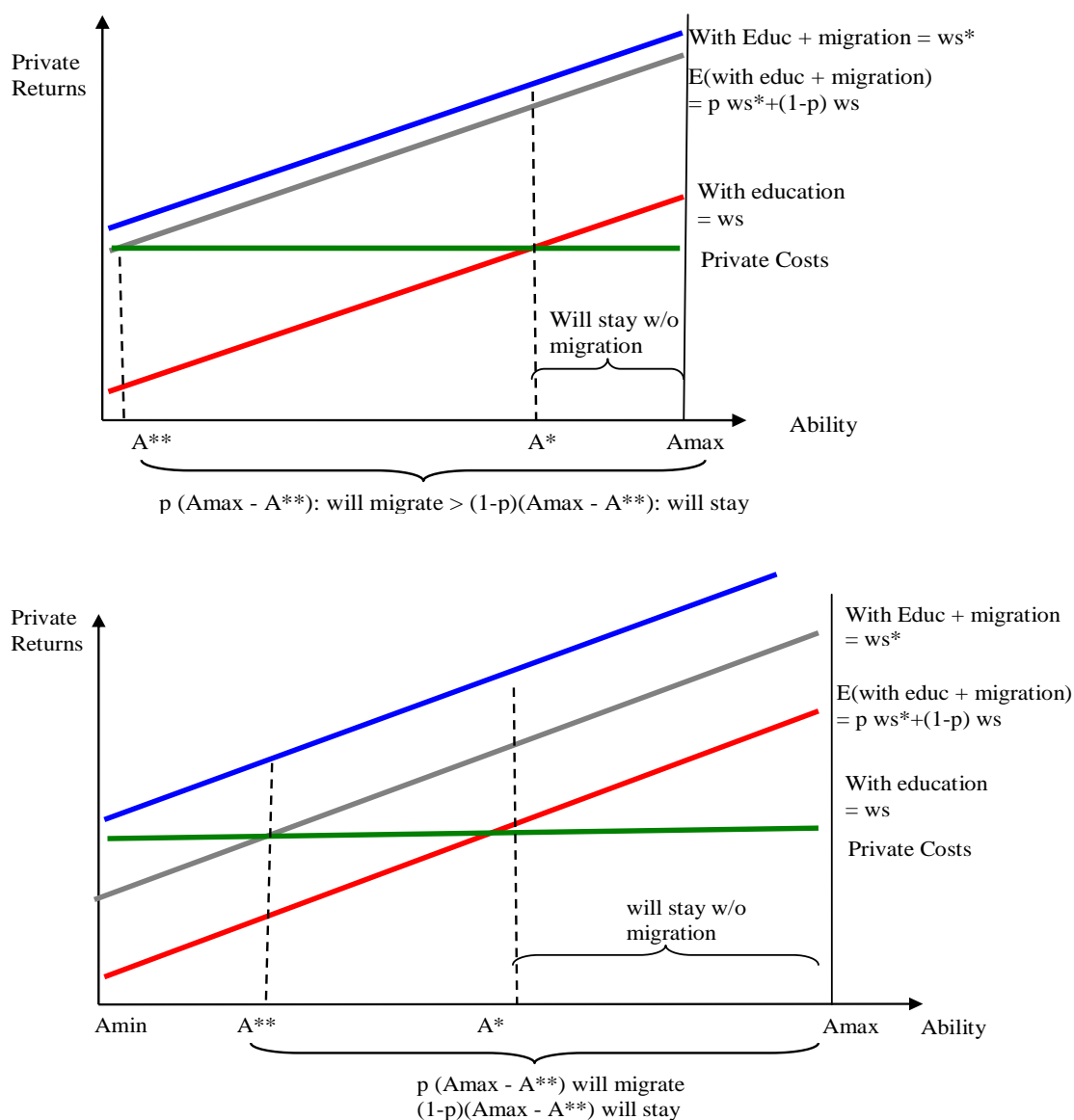
$$SB_{nm} = d (A_{max} - A^*) < d(1-p)(A_{max} - A^{**}) = SB_m \rightarrow \text{migration is good}$$

$$SB_{nm} = d (A_{max} - A^*) > d(1-p)(A_{max} - A^{**}) = SB_m \rightarrow \text{migration is bad}$$

The result will depend on the probability of migration and the initial stock of qualified people. Under a partial effect analysis; if the probability of migration is too high, the country will be better without migration than with migration (see the upper part of

Figure 9). The explanation is that with high probability of migration, too many people will leave the country, consequently a low proportion of the qualified people will remain at home and low benefits will be expected for the country. On the other hand, if the probability is low, the country will benefit from migration, because more qualified people will remain at home.

**Figure 9: Migration is bad under high probabilities of migration and high stock of human capital<sup>7</sup>**



<sup>7</sup> Migration is good under low probabilities of migration and low stock of human capital

Regarding the initial stock of educated people ( $A_{max}$ ), if this is too high the country will lose from migration (see lower part of Figure 9). The reason is that when  $A_{max}$  is high, the  $SB_{nm}$  is higher than  $SB_m$  (from the earlier equations:  $d > d(1-p)$ ). In the same way, if the stock of educated people is low the country will benefit from migration, due to the higher incentives to acquire education.

Therefore migration can be good or bad. The result will vary with the probability of migration and the initial stock of human capital, which differ from country to country. The next section presents the results of a research per country.

### **3.2.2 Empirical Findings: who wins and who loses**

Beine, Docquier and Rapoport (2003) (BDR) did empirical work in order to see if there are indeed beneficial gains from skilled migration and to determine which countries would be winning and which ones would be losing. The authors showed a beneficial brain drain through two facts: the probability to migrate tends to increase human capital formation in poorer countries, and the stock of human capital tends to influence growth positively.

They distinguished countries in two groups. The first group, “winners”, is composed by the countries that benefit from migration, mainly because they accumulate human capital (brain effect), see Table 1. These countries would benefit from higher migration especially if their migration rate is low and if they lack enough human capital.

The second group, “losers”, is composed by the ones that do not benefit from migration because they lose too many migrants (drain effect), see Table 1. These countries would benefit more if the emigrants would come back or if the rate of migration would be lower. Typical countries found in this group are the ones with high rates of migration, and ineffective education and training systems. According to Schiff (2006), the empirical finding of these models can be resumed in Figure 10.

**Table 1: Winners and Losers from Migration**

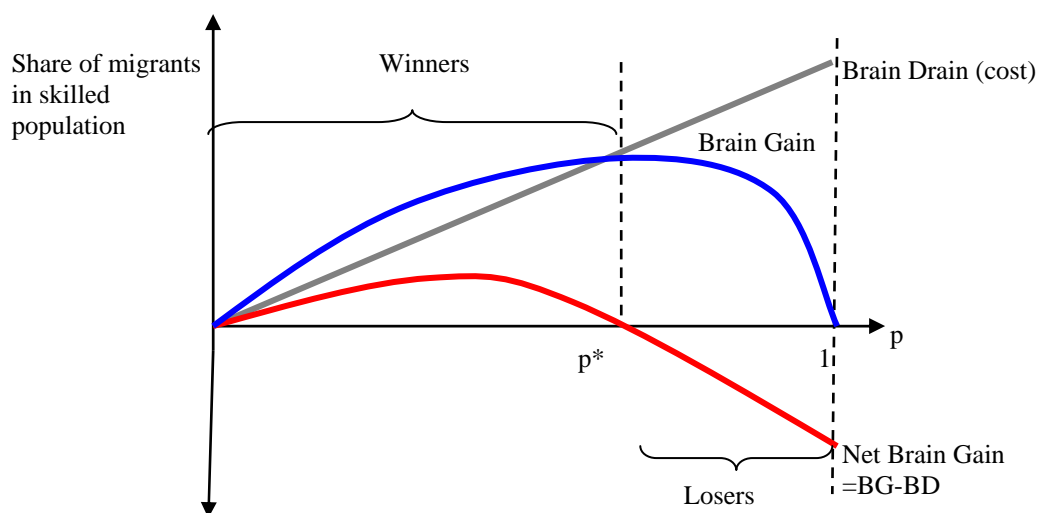
<b>Winners</b>	<b>Losers</b>
Brazil	Thailand
Colombia	Venezuela
Paraguay	Bolivia
India	Argentina
China	Egypt
Honduras	Mexico
Guatemala	Uruguay
Indonesia	Chile
Pakistán	Perú
	El Salvador
	Ecuador
	Costa Rica
	Dominican Republic
	Nicaragua
	Philippines
	Trinidad-Tobago
	South Korea
	Panama
	Guyana
	Jamaica

Source: Taken from BDR

All variables are measured in proportion to skilled labor force. The probability of skilled migration,  $p$ , is measured as the share of the skilled migration over the skilled labor force. Then the brain drain line, the share of skilled migration, will be measured in the same way on the horizontal and vertical axis (a 45-degree line).

The brain gain increases with low values of the proportion of skilled people and decreases with high values of the share of skilled people over the total skilled population. The explanation, as stated above, is that if the country has high initial stock of educated people it will not benefit from migration (no brain gain).

**Figure 10: Brain Gain, Brain Drain and Net Brain Gain**



Source: Schiff, 2006

So the net brain gain, measured as the difference between the brain gain and brain drain will be positive with low values of  $p$  and negative with high ones. The critical point is  $p^*$  where there is no net benefit, since the brain gain and brain drain are equal.

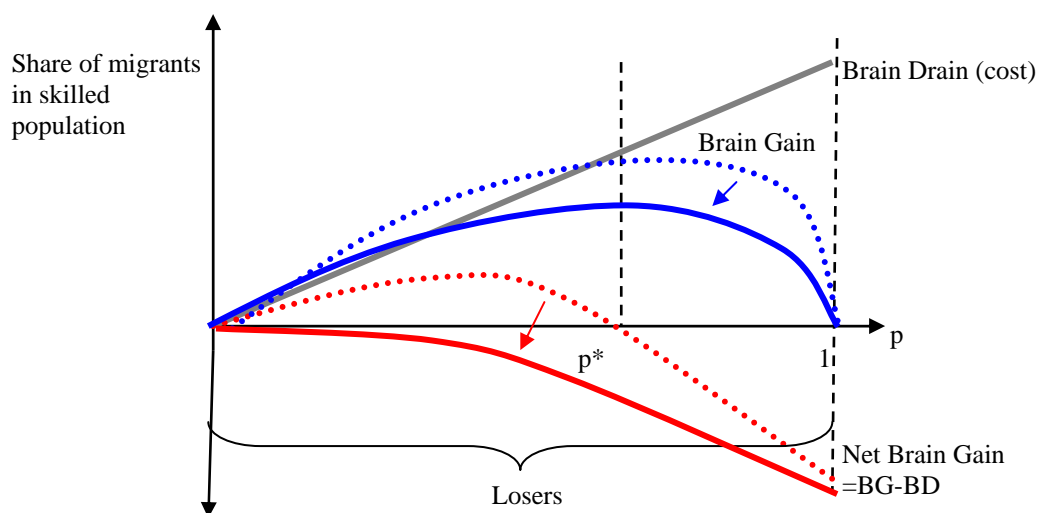
### 3.2.3 Critics

According to Schiff (2006) these kinds of models exaggerate the benefits of migration of skilled people and do not take into account other factors that are costly. He says that if all costs would be taken into account, the former figure would look like Figure 11, where everybody loses from migration.

These forgotten costs include different aspects. Firstly, when skilled people migrate, the average ability in the origin country will be lower (as stated in section 3.1). Moreover, as the loss of people will be of the most qualified ones, countries that lack skilled people will experience higher losses.

Secondly, since in real life unskilled people migrate as well and gain benefits, expected returns on education abroad will be lowered. Consequently, once unskilled migration is taken into account, it may not be attractive for skilled people to migrate anymore.

**Figure 11: Brain Gain, Brain Drain and Net Brain Gain under Schiff research**



Thirdly, benefits from education will depend on variables that are uncertain like the education success, migration policy in the destination country, possibilities of having a job abroad, and the number of other immigrants. Another example is when a skilled person emigrates to get a higher salary but ends up with a lower one; this is called “brain waste”. Accordingly the decision to migrate depends on some risks, which were not taken into account.

Fourthly, it is likely that the opportunity cost to study abroad could be higher and differ from the home opportunity cost, pushing migration costs higher<sup>8</sup>.

Finally, the increase in human capital may not always be beneficial since its finance can be expensive for the public sector. If the public consumption were to be kept constant, the government would have to increase taxes, diminish subsidies, lower the expenditures in other sectors or borrow money. Moreover, students will pay fewer taxes, and normally students consume less, then the private consumption will be lower. Schiff argues that while people are studying they earn less income, consequently making them spend less on other important things, like health care. Both lower public and private consumption will have a negative impact on growth and welfare.

<sup>8</sup> For example the immigrant can get sick and stop studying while being abroad. The figures follow the same logic.

### **3.3 Migration is inevitable**

This literature is based on economic geographic models, which are explained in CKW<sup>9</sup>. These models analyze two important facts linked to skilled migration: labor mobility and the tendency of uneven development in the world. The argument of skilled migration is that the uneven development between countries is a result of industrial concentration (IC) (also called agglomeration), which means that industries are concentrated in some countries. Thus we have countries that are industrialized and some others that are not (agricultural countries). Industrial countries require skilled labor, thus when the concentration occurs, brain drain will occur (skilled immigration to the industrialized countries).

The IC has two main determinants: the trade costs and economies of scale. If a country has economies of scale, which means that a country has advantages to produce in large scale, the IC will be higher in that country, it will attract skilled labor.

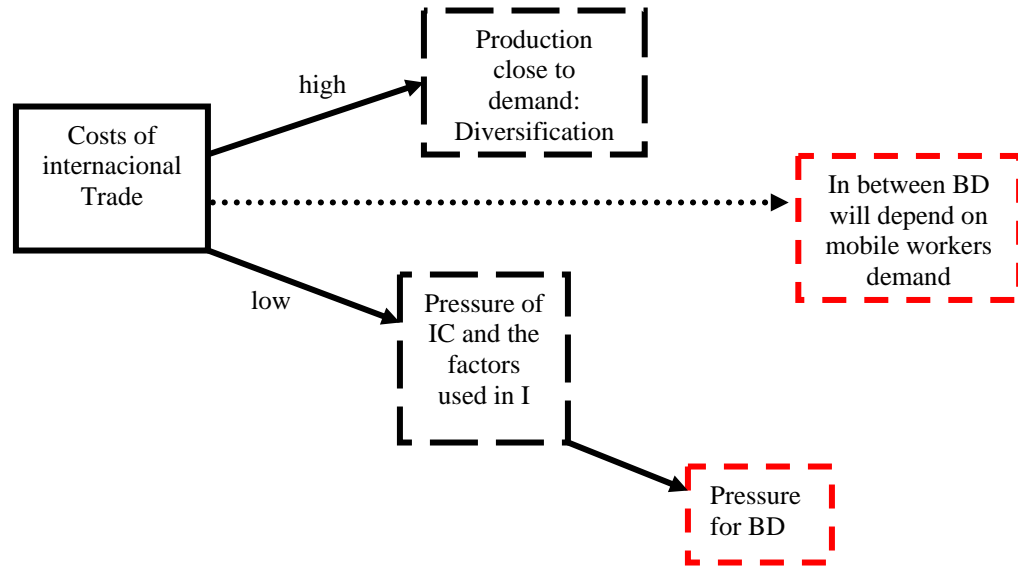
Regarding trade costs, it is argued that if these are high, it will be less likely that an IC takes place. The mechanism is that with high trade costs, local producers prefer to stay close to the demand and will not trade as much as they could.

If the industry in one country rises, more labor is required and the demand of industrialized output will be higher, making the local producers produce more, and the output and the labor demand will be augmented. Thus in the process of IC (if costs of trade are low) high skilled migration will occur from the agricultural country to the industrialized.

Having two identical countries, the model predicts two possible outcomes. The first is that an IC occurs thanks to less trade costs. The second is that the opposite of IC will happen: diversification, due to higher trade costs (see Figure 12). In between these two extremes there will be a stable equilibrium, which will depend on the demand of mobile workers. If the demand for immobile workers is higher than the demand of mobile workers, there will not be any IC. But if the demand of mobile workers is higher than that of immobile workers, IC happens and Brain Drain occurs.

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<sup>9</sup> The main contributions to this literature were in Fujita, Krugman, Venables.1999. The spatial economy: cities, regions, and International Trade. MIT press, Cambridge MA. and Krugman.1991. Increasing returns and economic geography. Journal of Political Economy. V99,n3 (June), pp.483-499

**Figure 12: Brain Drain Pressure and Trade Costs**

### 3.3.1 Brain Drain Pressure

Brain drain pressure depends on changes of parameters of the world economy and the costs of international trade, which include costs of transportation, barriers to trade, to migration, and so on.

The conclusion of these kinds of models is that uneven development, and therefore Brain Drain, is a natural phase of global development, even if countries start from identical positions.

### 3.3.2 Critics

According to CKW, these models take the stock of skilled people as given, so they cannot connect the links between migration and human capital formation. They cannot model return migration or network effects. If they would allow positive spillovers between IC and BD (like Human Capital formation), the world output would be higher, thus the origin country would benefit.

It is argued that if trade costs fall from really high levels, the origin country would not benefit because it would be losing its skilled people. Contrary to that, if trade costs were even lower, the origin country would benefit by buying cheaper industrialized goods.

## Conclusions

This paper tried to answer some questions regarding migration, especially skilled migration, and its effects on developing countries. The first issue analyzed was the determinants of migration. It was found that persons are more willing to migrate if they have a social network with existing immigrants, speak the same language as in the destination country, come from a former colony and their country trade more with the destination country, or if the environment of their country is not attractive. It was also found that more educated people are more willing to migrate.

The global trend of labor mobility showed that developing countries are running out of skilled people; they are migrating at high rates. The impact of this fact on developing countries will vary depending on the facts we assume are important for the countries.

On the one hand, if education is financed by taxes and if we introduce a specific wage setting (i.e. emulation and leap frogging), a higher migration will increase unskilled labor unemployment, and less skilled labor force will be available and/or skilled labor unemployment will be reduced. Therefore output will be lowered in the origin country, suggesting that migration is bad. Yet, this result excludes spillovers from migration to human capital formation, and also excludes the possibility of unskilled migration, taking the stock of skilled people as exogenously given.

On the other hand, if spillovers are included, if emigrants return to their countries, and if the stock of skilled people is endogenized, higher salaries of skilled people abroad and positive chances to migrate could motivate people to get higher education. With higher levels of human capital, developing countries will grow more. An empirical study supported this result and found that countries benefit more from emigration if their migration rate is low and if they lack human capital, and countries will lose if the proportion of emigrants is too high. So migration for some countries cannot be that bad. Nevertheless they have also excluded the possibility of unskilled migration and the risk of brain waste among other risks that could make losses from migration.

From another point of view, the global trend is a result of industrial development, thus brain drain pressure occurs when countries trade more (thanks to low costs of trade). Under this scope skilled migration is a natural process of development.

All the theories analyzed cannot converge into a single conclusion, some exclude aspects that others include and vice versa. In any case, there are lessons to learn. First, it is important to take into account the education spillovers from migration. Second, all kind of costs and risks should be estimated. And finally we need to deal with the inequalities of the globalized world in which we are living and perhaps try to maximize the benefits and reduce costs of something that is inevitable: migration.

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