

The benefits of international student mobility.

A comparison between Chinese and Indian students in Germany

by *Béatrice Knerr*
Rebecca Tlatlik & Zhao Xi

Contact: knerr@uni.kassel.de

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1. Introduction

Over the last decade, international mobility of students has increased tremendously. In 2009 more than 2.5 million students were studying outside their own country, corresponding to more than a doubling within a decade, and it is predicted that this number will rise to about seven million by 2020 (UNESCO 2009). While at the same time the composition of the major destination countries has remained largely stable, with the main hosts being the United States, United Kingdom, Germany, France and Australia, the share of “frequent movers” has significantly expanded. Parallel to that, the global competition for highly qualified labour force has become stiffer, in particular with regard to specialists in the so-called MINT qualifications: mathematics, informatics, natural sciences and techniques. In this global “war for talents” international students¹ have come more and more into the focus. Countries of origin, host countries as well as third countries are trying to attract them after their graduation, and those who have studied in the “right” areas usually have many options. The major “global players” in terms of the number of students abroad are China and India. Both countries are sending an increasing amount of “semi-finished human capital” (Khadria 2012) for up-grading to institutions of higher education all over the world, a large share of them to most prestigious universities. After their graduation they are considered as a valuable asset for economic progress in host, origin and third countries, and many of them are faced with the decision which of the various options offered to them would bring the highest benefit.

Against that background, investigating the questions who bears the costs of up-grading these students, and who will finally benefit from that is an exciting exercise.

The answers to these questions are highly relevant for the countries of origin as they essentially touch the issue which policy strategy is the most beneficial for the nation: having a large number of

¹ According to the OECD, international students are those who travel to a country different from their own for the purpose of tertiary study. Despite that, the definition of international students varies in each country in accordance to their own national education system.

students spread across all levels of higher education, or focusing on sending a few, concentrating in highly demanded subjects at the upper level of the education qualifications, like PhD and post-doc programs. It is also relevant for the host country which considers the foreign students as a potential resource of human capital; in this context the major questions are which groups concentrate in the most needed qualifications, and which groups tend to stay more in the country after their graduation. Finally, it is relevant for the international students themselves who are looking for the most profitable mobility strategy.

Looking closer at the national sub-groups and their study and movement behavior demonstrates that the answers to these questions are nation-specific. By comparing Indian and Chinese international students we try to find first answers to the questions raised. We consider them in the host country of Germany, a major destination (ranking on the 4th place in hosting international students in 2010 (Atlas of Student Mobility 2010), and at the same time one of the countries which presently makes tremendous efforts to retain specific human capital within its borders, by concentrating on those of sought-after specializations, first of all in MINT qualifications².

2 Research questions

The key questions we try to answer are: what are the net benefits of the mobility for

- international students?
- the host country (in our case Germany)?
- the country of origin (in our case India and China)?
- the third country?

Hypotheses and sub-hypotheses mirroring these questions are to be derived from the theoretical background and from the state of research.

3 Theoretical framework

Our theoretical framework is based on the pioneering work of Gary Becker (1964) and Theodore William Schultz (1978) who laid the foundations of the human capital theory which establishes a relationship between investment in education and its returns³. Human capital embodied in the skills knowledge and competencies individuals possess through education and training, can offer a return in terms of earnings in the labour market and in achieving economic growth in the country in which they stay. Related to that, our investigation is also based on Becker's time allocation theory which basically says that individuals seek to maximize their utility over their lifetime by investing in their human capital (essentially by education and training), taking into consideration the expected additional income they can earn later on, as well as their time preferences, expressed in their individual discount rate.

In the 1960s the theory of human capital was fully developed and dominated the economics of education. Acquiring human capacities involves costs and benefits and in this context is analysed within a frame of economic decision making. Costs include direct expenses and earnings foregone by students engaged in labour mobility (Mincer, 1984). The rate of return on investment in education and training is related to the increase in future income generation, i.e. higher returns on that investment. For identifying the rate of return for human capital investment it has to be considered

² For attracting a higher share of the student population, Germany, for example, has introduced the international Bachelor/Master system and offers more and more subjects in English. Also, after their graduation, students have a chance to stay in the country for two years in order to find a suitable job.

³ There has been some critique to Becker's model which presently is less relevant to our research and also is not mentioned here due to space limitations; see in particular Pollack 2002).

like an investment in physical capital, and for that purpose some form of “Mincerian earnings function” (Buxton *et al*, 1998) is established.

The combination of international migration and education is an extension of the human capital approach. Sjaastad (1962) was the pioneer to apply the concept of human capital investment to migration decisions; he treated migration as an investment involving costs and rendered returns which affect an individual’s decision to move. In that process, the potential migrant weighs the present discounted value of the expected returns in alternative destinations and compares them to those in his present location. Complementary investments like occupational upgrading, on-the-job training, and experience are as important as the movement itself. The student decides where to study based on the expected future benefits as compared to the costs. The acquisition of tertiary education in a foreign country may yield a higher return in the home country’s labour market (Dustmann and Kirchkamp, 2002). While countries can potentially benefit from the knowledge transfers by their graduate students abroad (Santiago *et al*, 2008), at the same time the out-migration of people endowed with a high level of human capital could be detrimental for the country of origin (so-called “brain drain”) (Beine *et al* , 2001). The literature puts forward positive feedback effects of the brain drain on sending countries in terms of remittances, return migration, diaspora externalities, quality of governance, and increasing returns to education (Docquier, 2006).

4 State of research

Many countries benefit from the knowledge transfers by their graduate students who are abroad (Santiago *et al*, 2008). At the same time the out-migration of people endowed with a high level of human capital could involve high costs to the country of out-migration as, for example, shown by Cali (2012).

At the same time, out-migration of highly-qualified for further studies and follow-up work abroad may provide a net benefit to the country of origin due to remittances, depending also on the scarcity of the specific qualifications involved (see for a case study on Jordan Zaqq 2006). Highly-qualified returnees who have worked after having been employed abroad) are an asset to the origin’s economic development (Istaideyeh 2011).

Mobility behaviour of students is also gender specific. As found by Denavi, female Iranians are more inclined to stay in Germany as their male counterparts (Sudeh Denavi 2012).

A significant impact on human capital acquisition abroad is exercised by personal well-being. So, Syafitri *et al*. showed for the case of Indonesian students in Germany that the success of studies is endangered by adverse conditions like language problems, food and adverse weather which lead to a high share of pre-graduation returns (Syafitri, Sibarani, Knerr 2012).

5 Empirical framework

Germany is affected by an increasing lack of highly qualified specialists in IT, engineering, and health professions. Every year 20,000 engineers less than required graduate in Germany which is assessed to bring a loss of € 3.5 billion to the German economy in form of profits forgone. More than 30,000 IT specialists are lacking, and the number is growing. Germany’s policy strategy is to attract foreign students and to keep them in the country after graduation (Plünnecke and Koppel 2009). Hence, Germany is joining the global competition for highly-qualified expatriate labour force and has recognized that foreign students are a valuable resource.

Germany has succeeded to attract a large number of Chinese students, many of whom might stay in the country after graduation and contribute its economic development. Indian students are only a small share of Germany’s international students, but they cluster in the subjects which are particularly important for the German economy (Table 1), and hence receive special policy attention.

Table 1: The 10 most popular subjects of international Master students in 2011 (the ten most important countries of origin)

Rank	Subject	Total	Percentage of Indians	Rank
1	Economics	4854	7,97	4
2	Electrical engineering	2891	23,21	2
3	Mechanical and process engineering	2696	13,69	2
4	Computer science	2311	20,29	2
5	Music/Musicology	1925	n.a.	>10
6	German studies	1154	n.a.	>10
7	Law	997	n.a.	>10
8	Civil Engineering	901	11,76	3
9	Engineering	700	22,86	2
10	Architecture/Interior design	546	6,26	>10

Source: Own calculations based on: DAAD/HIS. Wissenschaft Weltoffen 2012. Online: 2011. <http://www.wissenschaftweltoffen.de/daten/1/5/8> . Accessed: 2012-10-17.

6 Methodology and data base

We calculate the net benefits for (1) the students; (2) the country of origin; and (3) the host country by a cost benefit approach.

For that purpose we disaggregate the international students in Germany into three groups: family (resp. self-) financed, holders of scholarships from the country of origin; holders of scholarships from a German institution.

In the first step we calculate cost-return analyses, in a second step we include intangibles (external effects) to arrive at a cost-benefit analysis with partly qualitative elements.

For the students, a) the costs considered are those of moving (if not taken over by the donor of the scholarship; in that case they are zero), the opportunity costs of income forgone over the time of the studies, and the livelihood expenses over the time they stay in Germany, while b) the benefits are essentially the scholarships received (if applicable), and the future additional earnings. Intangibles (external effects) considered are, among others, gaining cultural experiences, missing friends and relatives, feeling of loneliness, language problems, cultural conflicts, well-being affected by food and adverse weather; they were identified by Likert-scales. All future costs and returns are discounted. Risks are taken into account.

For the host country, cost involved are scholarships paid out (if applicable), and costs do education while benefits accrue mainly in form of graduates' contribution to the domestic economy, if they take up a job there after graduation. Intangibles are cultural exchange, enhancement of business relations and others.

Similarly, the costs and benefits for the country of origin include scholarships (if applicable) and contribution to the domestic economy if the graduates return. In addition, the graduates might send remittances to their country of origin if they take up a well-paid job abroad, which constitutes an additional benefit for the national economy. Also, intangibles are similar to those accruing to the host country, like cultural exchange and support in business relationships.

The third country, to which the students might move to work after graduation, would reap pure benefits in terms of the contribution of the labour force provided.

We tentatively started with the following assumptions which might later on be modified and extended:

- Wage rates correspond to the marginal returns of labour.
- External effects other than intangibles are not considered.
- Students stay in Germany for three years
- The graduates work for 20 years after their graduation.
- The rate to be applied for discounting future benefits and returns is the same in all countries.

Our investigation is based on an extensive literature review and several pilote surveys among students in the region around Göttingen, one of Germany's most highly ranked and elite universities (non-representative, with case study character). Secondary data are taken from various national statistics.

7 Preliminary results and conclusions

While India sends comparatively few students (although with an increasing trend) to Germany, their transferred human capital (in-going as well as out-going) is at a comparatively high, even top level. Indian students in Germany cluster in master, post-graduate, PhD and post-doc programs, often in excellent research institutions, while Chinese students are much higher in number (in fact the largest group of international students in Germany, but are mostly found at lower study levels. We also expect that third countries, first of all the U.S. reap a comparatively high share of the returns from investment in human capital done in the countries of origin and in the countries of studies.

Our first results based on roughly estimated figures suggest that

- students generally benefit from their studies abroad.
- countries of origin tend to lose significant amounts, in particular if the students have received domestic scholarships and do not return (non-returnees make up a significant share of both Chinese as well as Indian students; however Indians tend to return after some years while Chinese graduates seem to stay abroad for longer). Altogether this seems to apply in particular to China, and less to India.
- The host country (Germany) tends to lose in monetary terms in particular as it does not levy any or only low study fees, while the education costs are high, many scholarships are given, and a comparatively low share of the foreign graduates stay in the country.
- Third countries (which in most cases are the USA) reap most net benefits as they receive finished highly-qualified human capital at no or marginal expenses.

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