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Oded Stark, C. Simon Fan

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Walter-Flex-Strasse 3

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Germany

Phone: +49-228-73-1861

Fax: +49-228-73-1869

E-Mail: [zef@uni-bonn.de](mailto:zef@uni-bonn.de)

<http://www.zef.de>

**The authors:**

**Oded Stark**, Center for Development Research (ZEF), University of Bonn, Bonn, Germany (contact: [ostark@uni-bonn.de](mailto:ostark@uni-bonn.de)).

**C. Simon Fan**, Lingnan University, Tuen Mun, Hong Kong (contact: [fansimon@ln.edu.hk](mailto:fansimon@ln.edu.hk)).

# Losses and Gains to Developing Countries from the Migration of Educated Workers: An Overview of Recent Research, and New Reflections

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## Abstract

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This paper synthesizes and extends recent research on “The New Economics of the Brain Drain.” In a unified framework, the paper shows that while recently identified adverse repercussions of the brain drain exacerbate the long-recognized negative impacts of the brain drain, longer-term consequences turn the brain drain into the harbinger of powerful gains. These gains have been studied already in recent research, or merit attention in future research.

## Kurzfassung

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Dieser Aufsatz bietet eine Darstellung und Erweiterung der jüngsten Forschungsarbeiten zum Thema "The New Economics of the Brain Drain". Die Autoren zeigen in einem vereinheitlichen Rahmen: während kürzlich erkannte ungünstige Auswirkungen des Brain Drain seine lang bekannten negativen Folgen verstärken, führt der Brain Drain längerfristig hingegen zu enormen Gewinnen. Diese Gewinne wurden bereits kürzlich wissenschaftlich untersucht bzw. sollten verstärkt auch in künftiger Forschung Beachtung finden.

## 1 Introduction

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Labor migration has long been a topic of intense interest in population research in general and in development economics in particular. The topic has been gaining added appeal in the era of globalization. Until recently, the received literature has taken a simple view on the consequences of the migration of educated people from developing countries: it results in a “brain drain” (for a systematic review see Bhagwati and Wilson 1989). A recent and growing literature, notably Stark, Helmenstein, and Prskawetz (1997, 1998), Mountford (1997), and Stark and Wang (2002), argues that the brain drain is accompanied by a beneficial brain gain. The new writings contend that compared to a closed economy, an economy open to migration differs not only in the opportunities workers face but also in the structure of the incentives that they confront: higher prospective returns to human capital in a foreign country impinge favorably on human capital formation decisions at home.

In a set of recent papers (Fan and Stark 2007a, 2007b, 2007c) we synthesize and extend the two strands of the received literature, and we analyze both the positive and negative impacts of the migration of educated workers in a unified framework. In this article we summarize our recent research, and elaborate the further implications of our work.

## 2 In the short run, the negative consequences of the migration of educated workers amount to more than a "brain drain"

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We extend the received literature of "harmful brain drain" by showing that in the short run, international migration can result in "educated unemployment" and in overeducation, as well as in a brain drain. Specifically, and in contrast with the literature that views the brain drain as the only negative consequence of international migration of educated or skilled workers, we identify three possible negative short-run consequences.

First, consistent with the "traditional" view, migration leads to a reduction in the "stock" of better-educated individuals, which in turn reduces the average income in the developing country.

Second, since some educated individuals who would otherwise have taken jobs are lured into further education only to end up unemployed, output shrinks. Indeed, in a number of developing countries, a large fraction of the educated workforce is unemployed. For example, in their influential development economics textbook, Gillis et al. (1996) allude to the Sri Lankan experience as a striking example, noting that half of the country's new university graduates were unemployed in the 1970s. Also, Mathew (1997) reports that in urban Kerala, India in 1983, the unemployment rate of university graduates was 11.34 percent for males and 25.69 percent for females, which is much higher than the unemployment rate of those who had no education (3.52 percent for males, and 1.52 percent for females), and the unemployment rate of those who had only primary education (6.73 percent for males, and 8.43 percent for females). More recently, Boudarbat (2004) shows that in 2000, the unemployment rate of university graduates in Morocco was about four times that of individuals with less than six years of schooling.<sup>1</sup> The phenomenon of educated unemployment in those developing countries contrasts sharply with the pattern of unemployment in developed countries. In the latter, the unemployment rate and educational attainment are strongly negatively correlated (Ashenfelter and Ham, 1979). In Fan and Stark (2007a), we present a model of "educated unemployment." We contend that "educated unemployment" is caused by the prospect of international migration, that is, by the possibility of a "brain drain." In a simple job-search framework we show that an individual's reservation wage in the labor market of the home country increases with the probability of working abroad.

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<sup>1</sup> There is a fairly large empirical literature that consistently documents such a phenomenon of educated unemployment in a number of developing countries. For additional evidence that in developing countries the incidence of unemployment is higher amongst the educated see Tenjo (1990) for Colombia, Dickens and Lang (1995) for Sri Lanka, and Serneels (2007) for Ethiopia.

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Consequently, workers who fail to line up employment abroad are less likely to immerse themselves immediately in work in their home country. Instead, they enter unemployment in order to engage in a repeated attempt to secure foreign employment. Thus, we provide a new explanation for the phenomenon of “educated unemployment” observed in developing countries. In Fan and Stark (2007c) we add to Fan and Stark (2007a) by re-examining the link between the prospect of migration and unemployment in a fixed-wage framework, suggesting that the prospect of migration results in involuntary unemployment in the domestic labor market. We argue that a sticky-wage model portrays accurately a setting in which, consistent with considerable empirical and policy-related research, a great many university graduates compete for relatively few jobs in the public sector where the wage rate is fixed. We develop a simple model showing that in a developing country, an increase in the probability of working abroad induces more individuals to acquire education, which leads to an increase in the labor supply of educated workers in the domestic labor market. Due to a sticky wage rate, the demand for labor is constant. We show that the increase in the probability of working abroad results then in an increase in the unemployment rate of educated workers in the domestic labor market.

Third, since the possibility of migration induces individuals in a developing country to acquire higher education, when some of these individuals end up remaining in the country, the returns to their education could be less than its costs. From their perspective, they are overeducated. If the country’s economy cannot “take off,” then these individuals’ overeducation is socially inefficient (in the short run). There is an interesting literature on “overeducation” which, in labor economics, is defined somewhat differently than in our setting. Using American data, Sicherman (1991) shows that overeducation can be partly explained by the mobility patterns of educated workers. In our setting, overeducation is explained by the migration prospect of educated workers.

In Fan and Stark (2007b) we conduct a simulation exercise showing that the costs of the two new negative consequences of migration introduced in our research work, namely “educated unemployment” and overeducation, can amount to significant losses for the individuals affected, who may constitute a substantial proportion of the educated individuals. However, in per capita terms, the cost of the brain drain can be relatively small if the proportion of educated individuals in the economy is small. The simulation further shows that as the wage gap between the foreign country and the home country widens, the average cost of educated unemployment, and that of overeducation, will increase too.



### 3 A brief brush with evidence: educated unemployment and overeducation in developing countries

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The perception that educated workers are sunk into voluntary unemployment at home, awaiting a job offer that is in line with their expectations, has received considerable attention in the development literature.<sup>2</sup>

In policy-related research, it is argued that the strong demand for a higher level education and the consequent phenomenon of educated unemployment are caused by international migration, which significantly increases the expected returns to education relative to the returns in a closed economy. For example, King (1987) who studies the brain drain and educated unemployment in the Philippines observes (p. 101): “In the case of the Philippines, however, a very high demand for college education has accompanied high rates of unemployment and underemployment and generally low real wages. Data on immigration ... reflect how the demand for education has been heavily influenced and encouraged by expected rates of return from employment in overseas labour markets. The horizons of Filipinos have expanded beyond the domestic market because of the tremendous number of professionals who found employment, career advancement and financial rewards overseas. In a situation where unemployment exists and international migration is seen as a form of relief, the decline in unemployment is only temporary, as the supply of professionals is increased by higher expected wages. In the long run, unemployment may even be aggravated. Government subsidy of the cost of education of emigrants, of inexperienced workers who replace them, and of a greater number of students wanting to enter the same profession will have to be absorbed by the economy. Even where the cost of education is fully paid by the individual, the demand for education increases in an occupation where there are already unemployed resources.”

Tullao (1982) who studies the problem of unemployed nurses in the Philippines states (p. 45): “The demand for nursing education in the Philippines is influenced significantly by international migration. The private profitability of investing in nursing education is greatly increased when the probability of emigration is included in the investment calculus. Filipinos would not demand nursing education in the light of low wages and limited employment opportunities in the domestic market as reflected in the low rate of return to nursing education without migration. These unattractive domestic employment prospects, and the cost of education

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<sup>2</sup> See, for example, Blaug (1970), and ILO (1971); Zocizoum (1980), and Muta (1990) alluded to below; and Tenjo (1990), Mathew (1997), and Boudarbat (2004) already referred to above.

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are, however, overpowered by the profitability of migration and the wage differential between foreign and domestic market, which make the expected rates of return to nursing education significantly higher than the returns without migration.”

Muta (1990) who seeks to understand the root causes of educated unemployment in Asia, states (p. 23): “Migration of the educated suggests that the demand for education has been heavily influenced and encouraged by the expected return from employment in overseas labour markets.”

Zoctizoum (1980) studies the problem of unemployment among educated young people in the French-speaking developing countries of Africa, which include the Central African Republic, Cameroon, the Ivory Coast, Benin, Gabon and Mali. Zoctizoum observes that the phenomenon of brain drain occurs in parallel with the phenomenon of educated unemployment. Zoctizoum writes (p. 106): “Most States are affected by an acute shortage of university graduates and skilled manpower, especially in technical occupations. Paradoxically, the ‘brain drain’ is increasing. African technicians, engineers and doctors are therefore numerous in Europe. A survey carried out in France in 1968 revealed that 6.4 per cent of the total number of workers from Africa and Madagascar living in France consisted of persons belonging to the ‘higher management’ category. This proportion was nearly 60 per cent higher than that of French ‘higher management’ in relation to the active French population.”

Finally, an interesting observation is that educated unemployment appears to have pervaded developing countries in which the official language is English (such as the Philippines, India, and Bangladesh in Asia (Muta)), or French (the former French colonies in Africa (Zoctizoum)). Education acquired in these countries is relatively readily transferable to the developed world, that is, skilled migration is viable. Consequently, these countries have simultaneously experienced a large-scale brain drain and educated unemployment.

## 4 Why is it that in the long run the migration of educated workers is a blessing in disguise to developing countries?

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As noted in Stark (2004, 2005), a recent growing literature on the “brain gain” has shown that when migration is probable, the brain drain script may have to be rewritten. For example, Stark and Wang (2002) identified conditions under which enhanced skills result in a higher per-capita output in the home country than would have been achieved if migration were not possible. This outcome arises (partly) because workers who do not end up as migrants work at home. But as they are equipped with the skills acquired in response to their probable migration, they are more productive.

In Fan and Stark (2007b) we add to this emerging literature by examining a framework of a “threshold externality” of human capital, which enables us to analyze the negative and positive impacts of migration in different periods, and to make welfare comparisons. We demonstrate that in the long run (“one generation down the road”), the legacy of a relaxation in migration policy prompts “take-off” of the economy. Drawing on studies by Azariadis and Drazen (1990) and Galor and Stark (1994) that link the long-run growth in a country’s output with the average level of the country’s human capital, we emphasize the role of a “threshold externality” of human capital in economic development. (Azariadis and Drazen (1990) and Pritchett (1997) provide evidence in support of the assumption of a threshold externality. Fan (2004) offers an explanation for the existence of the threshold externality in economic development by showing that a poor economy will engage in international trade, which will accelerate its growth, if and only if its average level of human capital is sufficiently high.) In a dynamic framework we show that the brain drain is accompanied by a “brain gain;” that the ensuing “brain gain” can result in a higher average level of human capital in the home country; that the higher average level of human capital can prompt “take-off” of the economy; and that the “take-off” can bite into the unemployment rate. Thus, we depict a setting in which rather than being to blame for human capital drain and output contraction, the migration of educated workers is the harbinger of human capital gain and output growth. An analysis of the entire dynamics associated with the response of educated workers to the prospect of migration therefore raises the intriguing possibility that what at first sight appears to constitute a curse is, in fact, a blessing in disguise. Our results are more dramatic than those reported in the received literature because in our present framework the prospect of migration is taken to entail both depletion of human capital and unemployment of human capital, which stacks the cards more firmly against viewing migration as a catalyst for growth.

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Our analytical predictions appear to be in line with empirical observations. For example, from 1960 to 1980 countries characterized by high rates of migration of skilled labor (such as India and Ireland) were among those countries that experienced the lowest rates of economic growth (Summers and Heston, 1991). However, since the late 1980s (that is, after approximately one generation), both India and Ireland have experienced rapid economic growth, which to a large extent has been due to an expansion of their skill-intensive information technology sector.<sup>3</sup>

Specifically, our recent and ongoing research suggests that the “brain gain” can be manifested via at least three channels.

First, overeducation can become dynamically efficient (due to the intergenerational externality effect of human capital) even though it may be statically inefficient. This is because children will tend to be better educated if they have educated parents. The importance of parental education to a child’s educational attainment has been consistently documented since the well-known Coleman report (Coleman et al., 1966).<sup>4</sup> There are numerous ways in which parents’ education may affect children’s educational attainment. For example, Sahota (1978, p. 20) estimates that “about 50 percent of cognitive development of children occurs by the age of three or four.” Bloom (1981) estimates that 80 percent of an individual’s potential intelligence is developed by age 8. Clearly, as suggested by Osberg (1984), almost all this early conditioning environment is created by a child’s parents, and it is in these early years that the basic personality traits of a child such as self-confidence and aspiration, which significantly affect the child’s future academic performance, are largely shaped. Some evidence (for example, Vernon, 1979) suggests that the home environment also affects children’s learning efficiency at school. In fact, the empirical literature seems to suggest that the effect of parental education is much greater than that of parental expenditure on children’s education. For example, based on his exhaustive survey of the existing literature, Hanushek (1996, p. 16) concludes that “schools (i.e., expenditure on children’s schooling) seemed relatively unimportant in determining student achievement, while families were the key element of student success.” Thus, parental education has a strong intergenerational (externality) effect. This implies that while overeducation is costly to the individuals affected in the current generation, it is a social benefit rather than a social waste from a long-term perspective.

Second, even increased “uneducated unemployment” may benefit the long-run development of a developing country. Acemoglu and Shimer (1999) show that individuals often do not spend enough time in job search. They argue that moderate unemployment insurance not only imposes risk sharing, but also increases output. By similar logic, the possibility of working abroad makes educated individuals more “picky” about domestic jobs. Since the educated

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<sup>3</sup> See, for example, Kapur and McHale (2003) on the link between migration and the growth of the IT sector in these countries.

<sup>4</sup> For a helpful survey see Hanushek (1996).

individuals who end up at home effectively spend more time searching for jobs in the domestic labor market, there will be a better match between skills and jobs, which implies that the jobs that are not suitable will be less likely to survive. From a long-term perspective, this further improves the industrial structure of the economy.

Third, the prevalence of employment opportunities abroad, where the skill mix and production technologies are vastly different from those at origin, could tilt the type of education sought in new directions; programming instead of engineering, biochemistry instead of law. The possibility that workers will acquire proficiencies in fields for which there is little current demand at home is often brought up as a criticism of the recent work on the beneficial brain drain: workers acquire skills that, while relevant abroad, may be of limited applicability at home. But it is possible, indeed intriguing, to consider turning this argument on its head. In general, the technologies in the “developed abroad” are inherently more advanced than those in developing countries. When  $N$  individuals acquire skills that are usable abroad, and when the probability of migration is  $0 < p < 1$ , the newly acquired knowledge of the  $(1-p)N$  individuals who end up staying at home could be the catalyst for technological change at home; such a change is initiated, or brought forward, by the presence of know-how that without the prospect of migration would have been lacking. This argument may not be exactly Say’s Law, which James Mill restated as “supply creates its own demand,” but it is in the spirit of that perception.

To a large extent, the exceptional recent rate of growth of the Indian economy (7.5 % last year) was made possible, fed, and oiled, by the immense strides in India’s Information Technology (IT) sector, and these strides, in turn, partly came about as a response to the lure of rewarding IT job opportunities abroad. This aspect of the brain drain could thus have been co-responsible for changing the course of Indian development, for tilting the economy away from agriculture and industry towards finance, information technology, and services. The brain drain could thus be seen as a catalyst not only for an expansion of the Indian economy (as in Fan and Stark, 2007b) but also its redirection - its skipping of several rungs in the ladder of technological progress.

As is well recognized, the phenomenal recent economic growth in India differs fundamentally from the phenomenal recent, and not so recent, growth in China (9.8% last year) in that China’s growth has been a product of its efficient, all-powerful government, whereas India’s growth has been largely unplanned. It is not a top-down affair; it is a bottom-up spectacle. In the balance sheet of state directives / individual initiatives, the inclinations of individuals, and the greater scope for translating these into action, played a larger role in India’s growth than in China’s.

India has managed to produce world-class private sector companies: Infosys, Ranbaxy, Reliance. Infosys is a consultancy and IT services company with 60,000 employees; Ranbaxy is a pharmaceutical company with 10,000 employees; and Reliance is an information and communication company with 40,000 employees. None of these marvels, which so successfully

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produce for world markets, would have attained this status but for the Indian-based supply of IT personnel. And that supply would not exist without the prospect of employment overseas. This possibility caused people to acquire skills for which the local demand was then slim. Yet their initiative was not muted by knowing that with probability  $(1-p)$  rewarding employment overseas will not be obtained. When the wage premium of overseas employment was sufficiently high,  $(1-p)$  was not a deterrent. At the time, human capital investments oriented towards overseas employment could have been considered a poor fit to the Indian needs; they were good for “foreign” work - work in other industries in other countries. From the point of view of the Indian economy of the time, they were a waste of human capital. But the people who got the “wrong” training were the precursors of the development of technologies, sectors, industries, and companies that in themselves were, in many ways, of the “foreign type.” They swiftly manned the ranks of the said *world*-oriented companies which not only could not grow while facing bottlenecks of skilled workers, but may very well have been conceived specifically to tap into the “miseducated” unutilized, or underutilized, pool. It is not (or not merely) that Indians who went abroad and returned home with enhanced skills were able to start producing in India as they did abroad; but that Indians waiting to work in fields that existed abroad but barely at all at home acquired locally the skills that brought “abroad” home. In a way, the failure of individuals to export themselves was conducive to the “import” of enterprises that could gleefully make use of the freshly-formed talent.

In summary, entrepreneurs assured of an adequate supply of workers trained to use advanced technologies could well be enticed to introduce these technologies at home once it was clear that the local workforce had become highly skilled. It is as if the brain drain, via the dynamic search for a higher level of education and skills it sets in motion, serves to loosen the grip of the traditional or obsolete technologies. It could even be anticipated that once the new technologies take hold, the returns to human capital within the country will be so raised that the initial “shock” of the brain drain will be replaced by a modified and home-based structure of incentives. In general, technological advance in developing countries can proceed in two ways: through gradual sequences in existing technologies, or by a leapfrog - where new technologies are adopted while skipping over revisions of existing technologies. Latterly, India has taken a huge leap into a high-tech service economy. Indirectly then, the brain drain could navigate a developing economy away from the former technological path onto the latter technological path. And lastly (and this could well constitute a fourth manifestation of the brain gain), when the returns to human capital at home are rising fast, especially in the wake of the new technologies “settling in,” it will not be all that surprising if a “reverse brain drain” is set in motion: skilled workers will return home to employ there the skills they have hitherto put to use abroad.

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