

CHAPTER 6

Absent Talent: Out of Sight, Out of Mind?

What does a country lose when a significant fraction of its skilled workforce leaves? For one thing, those remaining behind (TRBs) may be made worse off. The effect on TRBs can be assessed by measuring the direct economic loss due to absent talent. We call this measure the *emigration surplus*—the difference between a comprehensive measure of the value that emigrants would have added in the home economy and the income they would have received. This measure momentarily ignores any benefits from interactions and transactions with the diaspora and from later (capital-augmented) emigrant returns.

This surplus helps guard against the possibility of underestimating or overestimating losses. Those who are sanguine about the extent of such losses tend to view the economy in terms of a “lump of labor,” which seems a natural response in an environment of unemployment or underemployment. In the extreme, people of this persuasion assume that there is a fixed amount of work to be done, so that when some workers emigrate, their jobs are taken over by others, with no loss of total output. Indeed, many think that TRBs gain when emigration occurs, given that they will receive the abandoned jobs. However, recent literature on unemployment leads us to believe that a country’s unemployment rate is by and large independent of the size of its labor force.¹ To put it a bit differently,

1. See, for example, Layard, Nickell, and Jackman (1991).

we assume that supply creates its own demand, where jobs created for skilled workers are similarly destroyed when these workers leave.

As for those who tend to exaggerate the harm done to TRBs, some would go as far as to measure it in terms of the reduction in GDP. Although the overall size of the economy may be relevant in some cases—such as international influence or national defense—it is not a good gauge here because much of the lost GDP was accruing to the emigrants in the first place.² Others would measure the harm by the public cost of emigrants' education. However, this cost is sunk at the moment of emigration; its measure is irrelevant to the way in which the TRBs are affected when a significant portion of the labor force leaves.³ It makes more sense to consider the loss to the economy when a worker with given skills—however acquired—is absent from the economy. The first step is to set a benchmark for the lost surplus due to emigration.

The Benchmark Case

The benchmark case is a simple one: it consists of a closed economy producing a single good (GDP) with skilled workers, and having other factors of production under constant returns-to-scale technology, competitive markets, and no fiscal system (figure 6-1). For any given supply of skilled workers, the area under the marginal value product curve for skilled workers is a measure of the total income of the economy. To see the impact of skilled emigration on the income of TRBs, one can compare their pre- and postemigration income. The shaded area in figure 6-1 shows the size of the aggregate loss to TRBs.⁴ A loss stems from the difference between an emigrant's marginal value product (benefit to TRBs) and the wage paid (cost to TRBs). With diminishing returns to skilled workers, skilled emigration pushes up the domestic wage.⁵ Since

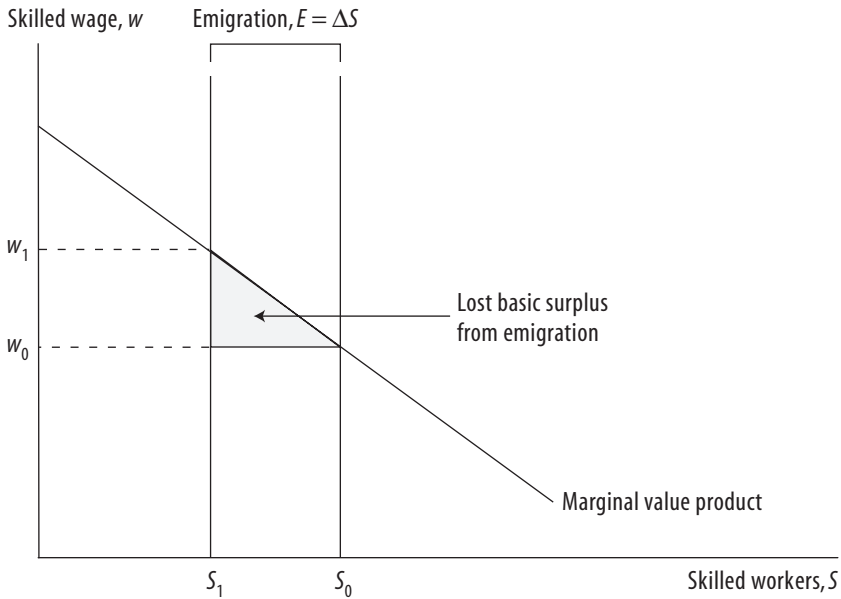
2. GDP per capita is also a misleading indicator. Skilled emigration will change the composition of the labor force and thus could drive down average incomes without the incomes of TRBs being affected.

3. As noted in chapter 5, a high prospect that an individual will emigrate is likely to make the government more reluctant to fund large education costs. To the extent the TRBs are adversely affected by the government's reduced role in funding education, this is a cost of human capital mobility.

4. Skilled emigration has distributional implications in addition to this loss of aggregate surplus. The skilled workers who remain clearly gain as their wage goes up. If we make the plausible assumption that skilled workers had above-average incomes *before* the emigration, then the emigration will make the distribution of income more unequal.

5. The wage gain will become larger as other factors become less substitutable for skill. We assume that the supply of domestic skilled labor is perfectly inelastic.

Figure 6-1. Lost Surplus from Emigration



in a competitive labor market skilled workers are paid the value of their marginal product, the loss of a *single* skilled worker will have no effect on the aggregate surplus of TRBs—the lost value of marginal production is exactly equal to the marginal cost of the worker.

It is clear from figure 6-1 that this is not true for the loss of multiple skilled workers. Moreover, the total loss approximately rises with the square of the number of emigrants. The size of the loss can be approximated by using the formula for the area of a triangle. Expressing this loss as a share of total income yields the formula,

$$\frac{Loss}{GDP} = \frac{1}{2} \times \epsilon \times s \times \left(\frac{Skilled\ Emigration}{Skilled\ Labor\ Force} \right)^2,$$

where ϵ is the elasticity of the skilled wage with respect to the skilled-labor supply and s is the skilled worker share of GDP.⁶ To better understand the source of this loss, note that we are comparing the value lost

6. See Borjas (1995).

Table 6-1. Illustration of Static Losses Borne by TRBs Owing to Skilled Emigration^a

<i>Emigrant share of skilled labor force</i>	<i>Lost basic surplus, $\epsilon = 0.5$</i>	<i>Lost fiscal surplus, $t = 0.2$</i>	<i>Lost spillovers, $s = 0.1$</i>	<i>Lost surplus, specialized skills, $\epsilon = 0.5$</i>
0.1	0.01	0.02	0.01	0.1
0.2	0.02	0.04	0.02	0.2
0.3	0.05	0.06	0.03	0.3
0.4	0.08	0.08	0.04	0.4
0.5	0.13	0.10	0.05	0.5

Source: Authors' calculations.

a. Expressed as a fraction of the preemigration skilled wage bill.

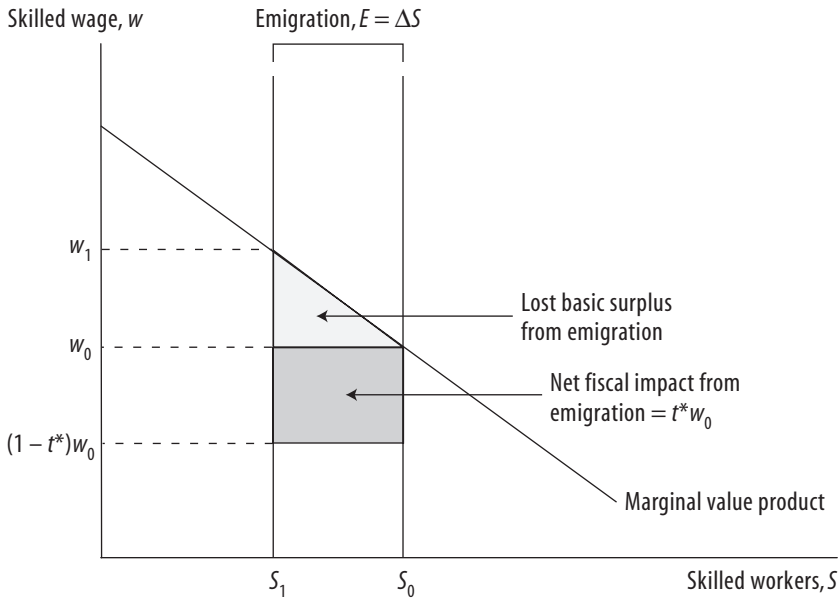
from workers leaving with the wage they were paid before *anyone* left. The real source of the emigration loss is not that the *wage* is pushed up (though it will be in a competitive skill market), but that the *marginal value product* of remaining workers is pushed up as others leave (see figure 6-1).⁷ For example, the emigration of a few software engineers will drive the marginal value product of remaining software engineers above the level they were all initially being paid. If more software engineers continue to leave, the loss in value to TRBs will be strictly greater than the amount of money earned by the engineers *before any of them had left*.⁸

As an illustration, table 6-1 shows the lost surplus as a share of the preemigration wage bill for different levels of skilled emigration. It is assumed that a 1 percent reduction in the skilled labor force increases the skilled wage by 0.5 percent. Clearly, the losses are minimal at low levels of emigration, but they become quite substantial as the skilled emigration rate rises. As discussed in chapter 2, a number of smaller

7. An extensive empirical literature describes attempts to measure the effect of immigration on local wages (for surveys, see Borjas, 1994; and Friedberg and Hunt, 1995). These studies fall into three main types: area studies that compare wages across labor markets receiving different numbers of immigrants; natural experiments that look for immigration changes that are independent of developments in local labor markets; and calibration studies that examine how relative factor supplies affect relative wages for different skill groups and then calculate how immigration with a given skill mix affects relative wages. Advocates of the latter method argue that the first two types fail to account for native outflows in response to immigrant inflows; they also tend to find small wage effects (see Card, 1990; and Altonji and Card, 1991). The third type of study tends to find larger wage effects (see Borjas, Freeman, and Katz, 1996).

8. To identify such losses, we consider the skilled emigration in total with the initial wage as our reference point, rather than taking each emigrant individually and previous emigration as given.

Figure 6-2. Net Fiscal Impact of Emigration



countries have lost large fractions of their more educated population, implying relatively large losses even in this benchmark model.

Fiscal Effects

Skilled workers are typically net contributors to a country’s fiscal system. Given relatively large incomes and progressive income taxation, skilled workers will usually add more to tax revenue than they do to government expenditures. Thus savings that might accrue when they emigrate—such as lower public health system expenditures—will be swamped by tax losses.

Figure 6-2 adds a very simple fiscal system to the benchmark model by letting skilled workers face a net tax rate of t . The net fiscal loss from a given level of skilled emigration is then easily calculated as the product of the tax rate and the wages of the lost workers. Again, to illustrate the size of the possible loss table 6-1 also shows the fiscal loss as a percentage of the preemigration skilled wage bill at various emigration rates for a net tax rate of 20 percent. The loss is relatively important even at low

emigration rates but is surpassed by the lost basic surplus at high emigration rates.

As far as we know, Mihir Desai and his colleagues provide the only detailed attempt to estimate the fiscal loss for a major skilled emigration stream, that from India to the United States.⁹ As documented in chapter 2, Indian-born emigrants in the United States appear highly skilled on a relative scale of educational and income attainments. To assess net fiscal losses, Desai and his colleagues estimated what Indians residing in the United States would earn if they lived in India and then combined the resulting counterfactual income distribution with details of India's fiscal system. They estimated the counterfactual incomes in two ways. The first and most straightforward approach was to convert observed U.S. incomes to the purchasing power equivalent in Indian incomes. Although this is likely to overstate the expected Indian incomes in some cases, occupation-based salary comparisons suggest that this is not a bad assumption for many highly skilled occupations. Second, the authors ran observed human capital characteristics through an estimated model of Indian earnings and participation to generate the counterfactual distribution. The human capital characteristics are based on the Current Population Survey, and the Indian earnings/participation model is based on National Sample Survey data. This approach yields considerably lower income estimates, which are likely to be significantly biased because of the huge positive selectivity of Indian emigrants (see chapter 2). Using purchasing power parity for most of their calculations, the authors found fiscal impacts to be quite large, ranging from 0.24 percent to 0.58 percent of India's GDP.¹⁰ Although the Indian-born population residing in the United States represents just a tiny fraction of the total Indian-born population, its skill intensity means that the fiscal impact is substantial.

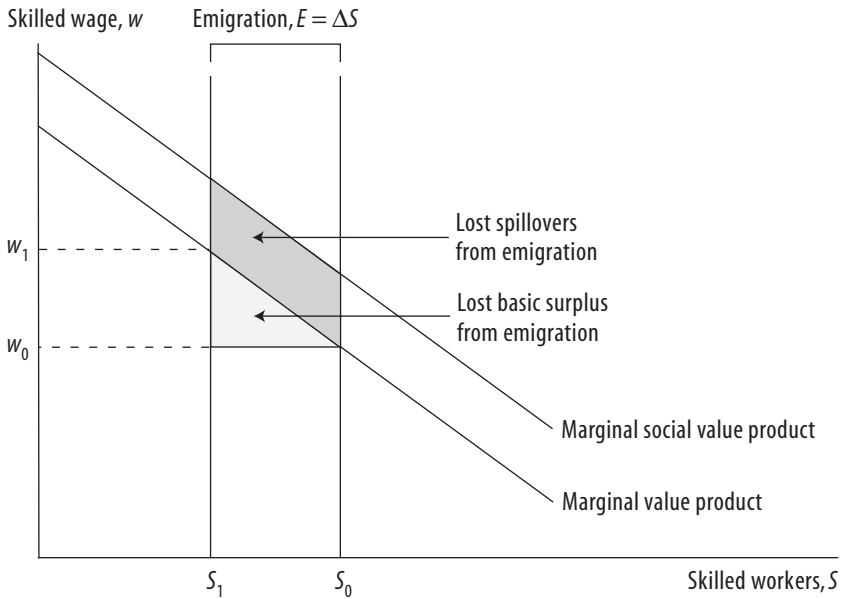
Spillovers

Another assumption of the benchmark model is that the marginal social value of skilled workers is equal to the marginal private value. There is strong reason to suspect that their knowledge spills over to others in the economy. Such spillovers may be especially important in a developing

9. Desai, Kapur, and McHale (2003).

10. In calculating the expenditure savings from emigration, they err on the side of overestimation by including the per capita savings of all classes of expenditure except interest payments and national defense.

Figure 6-3. Lost Spillovers from Emigration



country where knowledge about best technological practices, organization methods, and the like is lacking. Two conditions must be met for spillovers to be relevant to the size of the emigration surplus loss: (1) the spillovers must be disproportionately localized, so that other local workers gain from their proximity to the skilled worker; and (2) once a skilled worker has moved, the tendency for knowledge to flow back to his or her former home through enduring relationships cannot be too strong.

Figure 6-3 crudely captures the implications of such spillovers for the size of the lost surplus by showing a marginal social value product curve that lies above the marginal private value product curve. The vertical gap between the curves measures the size of the spillover stemming from a given worker.¹¹ Table 6-1 illustrates how the total value of lost spillovers changes with the emigration rate, assuming that the value of spillovers is equal to 10 percent of the workers' private value. In this simple example, the value of lost spillovers rises linearly with the emigration

11. Of course, not all external effects are positive. One possible positive impact of emigration is reduced congestion.

rate, and, as in the fiscal case, loss is experienced even when a single skilled worker leaves.

Such spillovers are anathema to economists because knowledge flows “are invisible; they leave no paper trail by which they can be measured and tracked, and there is nothing to prevent the theorist from assuming anything about them that she likes.”¹² It has been found, however, that patent citations can be used to crudely track knowledge flows between inventors.¹³ Of course, knowledge flows between inventors even in the absence of citations; and, conversely, citations take place even when knowledge does not directly spill over between the inventors concerned.¹⁴ Thus citations are, at best, a crude proxy. Still, the results of one inventor survey are “consistent with the notion that citations are a noisy signal of the presence of spillovers.”¹⁵

Patent citations also meet the criterion of disproportionate localization in that they tend to occur with disproportionate frequency at the location of the originating inventor.¹⁶ This finding was recently confirmed in a large sample, in which knowledge also appeared to flow disproportionately to inventors’ *prior* locations.¹⁷ However, the prior location premium is only about half the size of the current location premium, implying that spillovers are reduced when the inventor leaves.

The value of spillovers, and “learning by copying,” depends on the ability (and human capital) of the developing country. A related concept—“demonstration effects”—is also important for developing countries. Although firms there may have poor knowledge about the activities at which they could be internationally competitive, they may be able to quickly copy what is demonstrated to be successful. A model in which the amount of experimentation can be suboptimally low illustrates that the loss of skilled workers and potential entrepreneurs through emigration will compound the lack of experimentation and leave a developing country even more short of successful domestic role models.¹⁸

12. Krugman (1991, p. 53).

13. Jaffe, Trajtenburg, and Henderson (1993).

14. For example, a patent examiner might demand that a certain citation be made as a means of delineating the scope of a patent.

15. Jaffe and others (1993, p. 400).

16. Jaffe and others (1993).

17. Agrawal, Cockburn, and McHale (2003).

18. For detailed discussion of demonstration effects, see Hausman and Rodrik (2002). In chapter 7, we consider the role that the diaspora can play in changing stereotypes about the country through demonstrations of capabilities.

Specialized Skills

Up to now we have assumed that even skilled workers can be treated as a homogeneous mass, with wages determined in competitive skill markets. However, this assumption could lead us to seriously underestimate the lost surplus stemming from the departure of certain workers with specialized skills, such as a country's few pediatric surgeons. Suppose that a surgeon is adding value equal to \$100,000 a year working in a government-run hospital and could earn \$40,000 in private practice. If bargaining between the government and the surgeon leads them to split the surplus, the surplus accruing to the employer will be \$30,000.¹⁹ If an opportunity arises for a job abroad at a salary of \$120,000 (net of moving costs), the surgeon will leave and the surplus will be lost.²⁰

There is an obvious similarity here between the loss that results from the absence of specialized skills and Paul Romer's analysis of the loss of surplus that results when trade barriers reduce the range of available imported inputs.²¹ In Romer's model, sellers of imported goods have monopoly power on the domestic market but cannot appropriate the entire consumer surplus because they charge a single price to domestic customers. However, it will not be profitable to import the good if the fixed costs of importation are too high, regardless of the consumer surplus. Romer shows that a reduced range of available inputs can severely affect the economy's aggregate output.

Imagine now that the individual is selling engineering services, rather than distributing an imported product. The best salary available abroad can be considered part of the fixed opportunity cost of being in business domestically. If this "cost" rises owing to reduced immigration restrictions in some rich country, then the individual (and the surplus) may be lost.²² Again, the reduced range of available skills could substantially harm aggregate output. In appendix A, we use Paul Romer's work as a guide in developing a simple model of aggregate output in an economy

19. Alternatively, if restrictions on public sector pay mean that the government can only pay \$70,000 to the surgeon, the surplus going the government is again \$30,000.

20. Even a foreign offer of \$75,000 will be enough to entice the surgeon away if public sector pay scales prevent any move from being made to try to retain the coveted skill.

21. Romer (1993).

22. To get a rough sense of the possible loss, consider the engineer who faces a downward-sloping linear demand curve for his services and can supply extra units of the service at constant marginal cost. In this case, the consumer surplus is exactly half the engineer's total revenue.

with specialized skills. The core of the model is a constant returns-to-scale aggregate production function, in which homogeneous unskilled workers are combined with specialist skilled workers to produce a final output (GDP). Unlike the final goods producers, the specialists are imperfectly substitutable for one another, and they sell their services in monopolistically competitive markets. To calculate the surplus loss to TRBs, we construct an experiment of removing a certain fraction of skilled emigrants from the economy. The result strikingly demonstrates the loss as rising linearly with the emigration rate. Thus, unlike the benchmark model with homogeneous skills, there is a first-order surplus loss. Moreover, for any given emigration rate, the loss is larger the less substitutable the specialists are for one another.

The output loss from the absence of particular specialists is, of course, related to the importance of the role that they play in the economy. Michael Kremer's model of a production process that has multiple tasks—all of which must be completed successfully for there to be final output—suggests the availability of specialized skill can actually be essential.²³ In the extreme, the absence of that skill can stop all production. One activity for which certain highly skilled emigrants may be close to indispensable is building domestic institutions.

Absent Institution Builders

Before World War I, when German science was at its peak, more than half the Nobel prizes in science went to Germany. After Hitler came to power in 1933, Jewish scientists were dismissed en masse from their jobs. Hitler cared little for the damage this would cause German science. "If science cannot do without Jews, then we will have to do without science for a few years," he told physicist Max Planck.²⁴ As a result, nearly 2,000 Jewish scholars and scientists left Germany for the United States and Britain, having been dismissed or prematurely retired from government service by the Nazi regime because they were not of "Aryan" descent. This movement, though tiny in terms of the number of people it involved, had profound consequences for global science. Within a decade, the locus of global science and technology had moved from Germany to the United States, and English replaced German as the lingua

23. Kremer (1993).

24. Cornwell (2003, p. 34).

franca of science. When an Einstein moves across borders, the loss is not equivalent to that of a single Ph.D. who can be replaced fairly easily. Clearly, people of exceptional talent have a highly nonlinear impact on industrial societies. Perhaps this is also the case for developing countries.

The loss of scarce human capital may be more debilitating than recognized up to now, as recent endogenous growth theories suggest.²⁵ At least one endogenous growth model shows that the migration of highly skilled workers reduces income levels and long-term economic growth.²⁶ The brain drain may have an even more inimical effect on the institutions of the countries of origin. Although institutions are considered the *sine qua non* of development, how successful institutions actually develop is still poorly understood.

One might argue that other factors notwithstanding, successful institutional development generally depends on having a critical mass of individuals with high levels of human capital. They are certainly crucial in the *initial* stages of institutional development, even though the criteria for determining an institution's success rest on whether its fortune is independent of the behavior of particular individuals. To take the United States as an example, it has been argued that an intellectual vanguard of university-trained professionals, economists, and other progressive thinkers was among its most valuable state-building resources during the early twentieth century.²⁷ These individuals played key roles in developing a more professional and bureaucratic state by providing new ideas about better organization and the exercise of power. Intellectuals also played an important role in advancing various ideas about how to build welfare states in Europe and North America.²⁸ Similarly, think tanks, research institutes, and university academics (especially economists) have influenced economic policymaking.²⁹

To the extent that these ideas are valid, the most adverse consequences of the brain drain may fall on institutional development in the country of origin, which will find it all the more difficult to retain those individuals critical for institution building as the global market increasingly sets their reservation wages. International flows of human capital

25. Lucas (1988); Barro (1991).

26. Haque and Kim (1995).

27. Skowronek (1982).

28. Rueschemeyer and Skocpol (1996).

29. Skowronek (1982); Rueschemeyer and Skocpol (1996); Domhoff (1998).

can have a particularly devastating effect on institutions of higher education, the wellspring of future human capital (see appendix B).

The global demand for Indian information technology (IT) professionals illustrates the consequences of increased human capital flows. As of 2000, India's educational institutions were turning out 178,000 engineers a year, about 92,000 being qualified in IT-related disciplines.³⁰ In 1998, 34,000 Indian students and 30,000 Indian professionals immigrated to the United States. Including those leaving for other countries, about a fifth of India's annual output of engineers left the country. Although the overall annual output of IT professionals from India exceeds that of the United States, their quality is much weaker, hamstrung by low faculty-to-student ratios (1:45). Moreover, to increase the output, India would need a cadre of well-qualified faculty, but such individuals are currently in very short supply. India's output of master's and Ph.D. students is barely 3 percent of the U.S. output, and more than 60 percent of postgraduate seats in engineering colleges are vacant. The consequent low output of postgraduates has serious implications for the training of future generations, given that India's technical education system already has about 10,000 teaching vacancies.³¹

Indeed, higher education's severe problems in most developing countries are both the result and cause of the brain drain, as illustrated by the post-cold war collapse of Russia's institutions of higher education, once among the strongest establishments in the country. All the same, institutional weakening need not be an inevitable result. For one thing, growth and immigration could increase the pool of students. As noted in chapter 5, emigration to a higher returns-to-skill country might provide an incentive to invest in human capital in the source country rather than deplete it. The level of human capital formation in the source country can therefore be positively correlated with the probability of emigration.³² Additionally, the technology of education can change, thereby allowing for higher faculty-to-student ratios. Furthermore, a reverse brain drain driven by rising wages and opportunities that are themselves a product of growth—as was the case in Ireland, Taiwan, and South Korea and, to a more limited extent, is happening in China and India—could again augment the supply pool.

30. See www.education.nic.in/htmlweb/itdiscussionpaper1.htm#Introduction.

31. World Bank (2000, annex 1, para. 23).

32. Vidal (1998).

One area of the world that has experienced severe loss of local talent is Africa. Its experience in this regard dates back a few centuries and hence provides a particularly interesting case study.

The Case of Africa: Past and Present

Several hundred years ago, Africa experienced the equivalent of today's brain drain in the loss of young able-bodied men captured by the slave trade.³³ No region of the world suffered this depredation as much as Africa. Although the precise numbers are uncertain, estimates range from 10 million to 28 million forced into slavery, divided almost equally between the Atlantic, North African, and Middle Eastern coasts. Although extensive, the literature on slavery has focused mainly on the effects on either the slaves or on the "new world." Much less is known about the effects on TRBs and Africa itself. As the global community grapples with the political and economic travails of contemporary Africa, it is interesting to speculate about the extent to which they stem from the long-term institutional consequences of forced migration.

Over the course of four centuries, Africa's economic, political, and social institutions have been drastically transformed. To what extent did the slave trade influence this transformation through its impacts on demographics, social structures, and the slave trade within the continent? Although there is general agreement that by the end of the seventeenth century, the European demand for slaves had brought about a profound transformation of African societies, the overall impact of the slave trade on Africa is strongly disputed.

The one clear consequence was that it reduced the supply of labor, making the control of labor the key to power. Power shifted from kings and village headmen, bound to their followers by complicated networks of mutual obligation and exchange, to armed men who gathered around them an often-disproportionate circle of female dependents and slaves. Enslaved men were frequently passed on to new owners and, sometimes, new countries. External conflicts centered primarily on the various struggles to exercise control over a people, and captives became the principal spoils of war. The deep social disruption led to the increased practice of holding slaves within Africa's borders, thereby intensifying

33. Our discussion of the slave trade is based on Rodney (1981); Inikori (1982); Law (1991); Ewald (1992); Iliffe (1995); Spear (1996); and Thornton (1998).

their exploitation and exemplifying what has come to be known as the “transformation thesis.” The institutional effects were manifold. Slaves were used by political elites to increase their power, which led to the development of increasingly centralized but also more autocratic states. Household dynamics changed as well. High fertility regimes became institutionalized to ensure large families of potential workers. Women married young and were valued by the number of children they bore. The social status of men was similarly based on the number of wives and children to which they held claim.

While many scholars assert that the slave trade led to dependency and economic inequality, others argue that the scale at which trading occurred was not large enough to have had a major impact on African economic and political conditions, with certain exceptions in some coastal regions. According to this school of thought, slavery was an already widespread and indigenous practice in Africa, and Europeans simply tapped into the existing market.

The Atlantic slave trade transformed African political economies because they were particularly vulnerable to merchant capitalism’s network of credit and debt. Africans eagerly accepted European goods on credit, transforming cloth into the ultimate value—rights over people. But the bargain eventually backfired on African debtors. In order to pay, they surrendered the dependent men, women, and children who composed their most valued possession. Thus, according to this theory, many slaves were produced by debt and foreclosure rather than by open and massive violence. Whether or not slavery was an already established institution before Europe became involved in the trade, it caused much demographic damage, especially on a regional and local level. If slaves had not been forced to emigrate, scholars argue, Africans would have numbered almost 100 million instead of 50 million in 1850. Still, because the majority of those exported were men, the number of child-bearing women, and therefore the potential for future population growth, was less drastically reduced. However, the loss of adult males had damaging impacts on sex ratios, dependency rates, and perhaps the sexual division of labor. While one could speculate about the extent to which the absence of this dynamic group affected innovation in Africa, it is clear that the massive social disruptions considerably enfeebled African societies, thus paving the way for an even more disruptive colonial rule and its unhappy aftermath.

In more recent years, international migration from Africa has been more human capital intensive entailing the loss of the middle class, the

Table 6-2. Estimates of the Brain Drain from Africa: Emigration Rates for Tertiary Educated, 2000^a

<i>Percent</i>	<i>Country of residence</i>
More than 50	Cape Verde, Gambia, Seychelles, Somalia
25–50	Angola, Equatorial Guinea, Eritrea, Ghana, Guinea Bissau, Kenya, Liberia, Madagascar, Mauritius, Mozambique, Nigeria, Sao Tome and Principe, Sierra Leone
5–25	Algeria, Benin, Burundi, Côte d’Ivoire, Cameroon, Chad, Comoros, Republic of the Congo, Democratic Republic of the Congo (formerly Zaire), Djibouti, Ethiopia, Gabon, Guinea, Malawi, Mali, Mauritania, Niger, Morocco, Rwanda, South Africa, Senegal, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe
Less than 5	Botswana, Lesotho, Burkina Faso, Central African Republic, Egypt, Libya, Namibia

Source: Docquier and Marfouk (2004).

a. Percentage of nationals with university education living abroad.

bourgeoisie, which historically has played a critical part in the evolution of Western democracies. The relative scarcity of human capital in that region and the high levels of migration have meant that the loss is particularly problematic. In 1990 about 95,000 African-born individuals residing in the United States had a tertiary education.³⁴ Since the estimates for OECD countries are much less reliable, we extrapolate from reports indicating that the United States received about half the total OECD migration in 1990. That information, plus the strong historical links and geographical proximity between Africa and Europe and the continued economic and political travails of the continent, leads us to estimate the number of Africans with a tertiary education outside Africa to be about 200,000. According to another estimate, there are about 100,000 highly qualified Africans working in OECD countries, which constitutes nearly a third of its skilled workforce and is about the same as the number of foreign experts working in Africa.³⁵ In addition, about 23,000 academics migrate out of Africa each year

The loss of human capital in African countries has reached alarming levels (table 6-2). In 2000, 31.4 percent of African immigrants had a tertiary education, whereas the proportion in the continent’s population was just 3.6 percent.³⁶ Along with Central America, countries in Eastern

34. Carrington and Detragiache (1998).

35. IOM (1999).

36. Docquier and Marfouk (2004).

and Western Africa had the highest emigration rates of the highly skilled, as well as the biggest increase between 1990 and 2000.

In 2002 Africa's biggest loss of highly trained professionals to emigration occurred in Ethiopia, followed by Nigeria and Ghana. The migration from Ethiopia has led to a serious shortage of faculty in that country. In 2002 one-third of medical doctors in the country had reportedly left Ethiopia to reside in other countries.³⁷ By contrast, under the program titled the Return of Qualified African Nationals, which ran from 1995 to December 1999, just 66 Ethiopians returned to their country.

Owing to positive selection, the average quality of emigrants is usually greater than that of the human capital staying behind. This could have several effects on investment and growth. For instance, some researchers report that the entrepreneur's level of education helps explain variances in the growth of African private enterprises.³⁸ If firms cannot grow because there is a dearth of educated entrepreneurs, the substantial loss of human capital might be one reason why the private sector of African countries has responded poorly to macroeconomic adjustment, and also why foreign direct investment (FDI) has focused on only a limited number of developing countries in recent years, despite a significant increase in flows. Human capital, some argue, is one of the most important determinants of FDI inflows, and its role has been increasing in recent years.³⁹ Nevertheless, as long as a threshold level of human capital remains in the sending country, international migration may give a reputational signal to investors abroad, thereby increasing the likelihood of investment in that country.

Sector-Specific Effects

Aggregate losses of human capital conceal substantial sector-specific effects. Broad measures of human capital migration shed little light on specific areas of production or even individual countries. In the health care sector, the loss of physicians providing direct services in clinics and hospitals will have a greater short-term negative impact on the health status of residents than the loss of those employed in health research.

37. Michael Eskinder, "Ethiopia the Most Affected by Brain Drain in Africa," *Daily Monitor* (Addis Ababa), November 8, 2002.

38. Ramachandran and Shah (1998).

39. Noorbakhsh, Paloni, and Youssef (2001).

However, the latter loss may be greater over the long term. Similarly, even when specific occupations are taken into consideration, the country in which these losses are occurring is relevant. The loss of Jamaican nurses poses much greater challenges to that country than the loss of the same labor supply in the Philippines, given the latter's strategy of exporting labor. Three sectors in particular seem to have been hit hard: education, research, and health.

In education, some 10 to 15 percent of the estimated 200,000 teachers hired each year in the United States are foreigners, often from the Philippines and India; most are hired to teach math and science subjects in inner-city schools. The teachers arrive with H-1B visas that are good for six years and allow them to convert to immigrant status. Many Filipino teachers wind up in midsize school districts in Southern California, in part because they are "highly qualified" licensed teachers. Pay in the United States usually starts at about \$30,000 a year, compared with \$5,000 in the Philippines. Most of the teachers arrive in debt, owing a \$7,500 fee to a head-hunting firm, later falling further into debt renting apartments and adjusting to the U.S. lifestyle.⁴⁰ Given the much lower educational attainments in the source countries, the welfare loss that those countries accumulate from teachers' migration is likely to be greater than the gains to the (richer) receiving country. However, this depends largely on what fraction returns (see chapter 9).

Jamaica, which has a bilateral hospitality worker program with the United States and a Schoolteacher Work Program with the United States and Great Britain, has seen a large outflow of trained employees leave to work temporarily in more developed markets abroad. In principle, this short-term negative impact can be addressed through Jamaica's well-developed infrastructure for training hospitality workers. However, this would require a generally predictable growth in overseas demand. Similarly, under the Schoolteacher Work Program, Jamaican teachers are recruited to meet shortages in inner-city schools in the New York and London areas. Under the direct recruitment drive, without the involvement of the Jamaican government, more than 500 teachers left Jamaican classrooms in 2001 to take up temporary assignments in host countries. The loss of approximately 3 percent of the Jamaican teacher workforce, many of whom were from the more experienced and qualified population, proved to be a large shock to the Jamaican school system. The

40. Joe Mathews, "The New Import: Teachers," *Los Angeles Times*, August 10, 2002.

country does not have a competitive infrastructure for the training of teachers, a process that takes more than four years. The Jamaican government is now seeking to control the outflow of teachers.⁴¹

In an open economy, one can easily imagine that institutional inflexibilities (such as wages in public sector educational institutions) might cause growing problems for training the next generation of human capital (for an analysis of open economy effects, see appendix C). Thus the exporter of human capital could face a decline in the quality of its human capital over time. Higher education continues to be predominantly concentrated in the public sector, and it is here that the problems and consequences are more worrying, considering the effect on the quality of training of future generations. The bureaucratization of higher education, the prevalence of extreme politicization, and the perpetuation of a system in which quantity vastly trumps quality and inputs alone are monitored will not attract talent, especially if that talent has alternatives to working at home. Where a market is no longer confined within national boundaries, innumerable college teachers in developing countries with the requisite human capital are willing to work in high schools in developed countries, or, in fact, in any other profession, so long as they leave. As developed countries use selective screening tools, a vicious cycle ensues, in which individuals at the upper end of the human capital distribution emigrate and leave behind a pool of poorer quality. This not only prompts others at the higher end to also consider leaving but also discourages anyone who has left in the past from returning home, thereby ensuring that mediocrity becomes entrenched in these institutions.

An important long-term consequence is a further weakening of indigenous research focused on local problems. Researchers require complementary inputs, and this is one reason why the productivity of researchers is much greater in developed countries than in developing ones. Still, the problems they study are much less geared to the problems afflicting the latter. For instance, development economics is, for the most part, a peripheral field in mainstream economics.⁴² Unfortunately, the only answer to increase the supply of human capital, more by default than by design, appears to be private sector higher education. This

41. Brown (2003).

42. Bardhan (2001). According to Glenn Ellison, the fraction of development-related papers in the most prestigious journals has declined from 3.8 percent in the 1970s to 1.6 percent in the 1990s. See Ellison, "The Slowdown of the Economics Publishing Process" (econ-www.mit.edu/faculty/gellison/papers.htm, table 19, appx. B [accessed June 2000]).

creates a new set of problems, given that the private sector often concentrates on maximizing profits rather than on attempting to build institutions to serve the public good and enhance public welfare.

Moreover, international recruitment is a growing industry, especially with regard to health care. Companies that were initially established to bring foreign nurses into the United States broadened their business to include teachers, charging them up to \$7,500 each as well to arrange a U.S. job. The United Kingdom's National Health Service already recruits nurses from overseas because of local shortages, with an estimated 30,000 working in hospitals across the country.⁴³ There is an increasing and worldwide demand for nurses that spans the Netherlands, Italy, Norway, the United Kingdom, Canada, Ireland, Japan, Singapore, Guam, the United States, New Zealand, and Australia. The Philippines, the single largest supplier of nurses to the world, is itself facing difficulties in certain specialties, for instance, in hiring emergency room nurses.

During the 1960s in Thailand, more than a third of new medical graduates, who had received a hugely subsidized education, permanently left their homes for the United States. The Thai government implemented a range of policies to deal with the phenomenon, including compulsory public work for a certain period of time, increased supply of doctors, as well as greater opportunities for specialization and higher salaries. In the case of medical professionals, the external brain drain exacerbates the internal brain drain, causing the movement of health care professionals from rural to urban areas. Although Thailand recently had a 300 percent oversupply of private hospital beds, more than 20 rural district hospitals were functioning without a single full-time medical doctor.⁴⁴ Meanwhile, the number of foreign medical graduates in the United States rose from 57,000 to 150,000 between 1970 and 1993, with India, Pakistan, and the Philippines accounting for 45 percent of all international medical graduates by 1993. This amounts to about 20 percent of the total stock of doctors in India. Immigration of skilled workers raises the returns to those left behind, and, as in India and Thailand, the migration of physicians has also resulted in a decline of health care workers in rural areas. South Africa is witnessing a somewhat different trend, in that health care professionals have been going to the United Kingdom for only a few months at a time. The situation would be even better if instead of GATS Mode 4 (South African physicians flying to the

43. See <http://news.bbc.co.uk/2/hi/health/1513394.stm>.

44. Wibulpolparsert (2003).

United Kingdom), the country were to move to GATS Mode 2 (patients coming to South Africa for treatment) through the promotion of health tourism.⁴⁵

The world of sports is perhaps the most visible area in which human talent is globally mobile.⁴⁶ Coaches, players, and physiotherapists are all being courted internationally to work in a variety of sports. U.S. basketball leagues (both college and professional), global football (soccer) leagues, and international cricket have all catalyzed the development of an international athletic market. The more competitive a sport and the more money at stake, the more openly countries and teams appear to access the global pool of talent without the fear of nationalist backlash.

In cricket's last World Cup, 10 of the 14 teams had foreign coaches and training staff—something that would have been unheard of even a decade ago. U.S. professional sports—baseball, basketball, and ice hockey—reflect a similar migration of talent. Although international players have been part of the National Basketball Association (NBA) since the late 1940s, the number did not reach double digits until the mid-1980s. The first foreign player was drafted in the first round in 1986. By 2003 the NBA draft “had a bigger foreign influence than ever before,” consisting of 73 players from 34 countries, and for the first time a foreign player was the number-one draft pick and had not played college ball. In the 2002 draft, nearly a quarter of total picks (12 of 52) went to foreign athletes; in fact, 5 of the first 16 were foreign (from Africa, Europe, and China).⁴⁷ With basketball becoming a global game, the rosters of the NBA have swollen with players from a variety of countries around the world, who are drawn by the sheer talent, competition, and much higher salaries.

The contentious debates regarding the effects of this system on African soccer seem to parallel the opposing views on the effects of human capital flows on the source countries in general. In soccer's last World Cup, Senegal pulled off a dramatic victory when it beat favored

45. GATS distinguishes between four modes of supplying services: Mode 1 is the cross-border supply of services from the territory of one member to another member; Mode 2, consumption abroad, involves a service consumer going to another member's territory to obtain a service; in Mode 3, commercial presence, a service supplier of one member establishes a territorial presence in another member's territory to provide a service; and Mode 4, presence of natural persons, consists of nationals of one member entering the territory of another member to supply a service.

46. Our discussion of the sports drain is based on Armstrong and Guilianotti (2001); Lanfranchi and Taylor (2001); and Foer (2004).

47. See <http://cbs.sportline.com/b/page/pressbox/0,1328,5669795,00.html>.

France. Every member of the Senegalese team had played in European leagues—the most competitive (and lucrative) in the world—while abstaining from joining their national team until a new French coach was hired. All 10 nominees for the 2001 African Footballer of the Year played in international leagues outside Africa. And by the mid-1990s, more than 350 African footballers had migrated to first- and second-division European leagues. At the start of the new millennium, this figure had more than doubled (to 770), and an additional 145 Africans were also playing in the lower reaches of European leagues. Many others had joined leagues in Asia. When African countries play each other, their biggest problem is coordinating their star players' national and club commitments, as national teams are often composed entirely of players who have contracts with international leagues during regular season play.

Africa's potential bounty of relatively cheap soccer talent has attracted a large network of agents, who are either talent speculators or venture capitalists dealing in human capital. In the absence of regulatory systems similar to those in Europe, these agents frequently offer positions to boys as young as 15 or 16, with contracts that contain confusing stipulations as to agents' percentages of salaries and transfer fees.

Still, the export of African football talent is not a process solely initiated and driven by European interests, and African players are not consistently duped into signing exploitative contracts. The lure of European football is extremely enticing for African players, and many perceive "making it" in Europe as one of the few opportunities to escape the harsh economic realities of life in many parts of the African continent. And some of the best players continue to give time and money to their national team and their country of origin even after moving overseas.

The dominant European view is that African soccer has benefited from the export of its skilled talent, and that the recent success of African national teams is migration-contingent. Besides helping their bank balances, playing in the world's most competitive leagues has enhanced these players' individual and team skills. Thus African countries can rely on players who have not only improved their own skills but also transferred better playing techniques to their home-based compatriots. Moreover, much as the brain drain might enhance expected returns to education, the possibility of playing in Europe and striking it rich ensures that young African soccer players will try even harder, thereby creating a stronger pool in Africa. The visibility of the most prominent European-based Africans has made a significant contribution

to the popularity of soccer within the continent. If anything, according to this viewpoint, the migration of elite talent has had a positive impact on the game in Africa.

Others are more pessimistic, however, complaining that the “expropriation” of Africa’s playing resources is actually undermining the development of the game on the continent. The loss of talent lowers the standard of the game in local soccer leagues, so attendance, gate receipts, and media interest all go down. African national teams suffer too, plagued by the difficulties in procuring player releases from European clubs. African critics charge that Europe’s “de-skilling” of African football is another manifestation of exploitation comparable to the economic imperialism of the colonial period.

Both the Confederation of African Football and Fédération Internationale de Football Association (FIFA) have tried to remedy the situation. For example, the African Club Champions League was established in 1997 to provide top-level club competition as well as create the administrative structures and economic incentives necessary to encourage players to remain with African clubs. However, such measures are unlikely to prevent European clubs from continuing their recruitment practices. In recent years, a number of the top ones have established training schools and academies in Africa, in some cases even acquiring stakes in clubs. Many within both Africa and FIFA fear that arrangements such as these will soon multiply and become but a front for the systematic draining of the domestic African game.

Conclusion

During the past few decades, developing countries have begun to recognize some of the positive effects of the brain drain. Nonetheless, our analysis of the “absence” effect confirms intuition, which tells us that the displacement of scarce talent ill serves the country from which it stems. Although the literature has focused largely on the adverse economic effects of such displacement, the institutional and political effects are no less important.

Because developing countries have a limited middle class to begin with, when this segment leaves in droves in the aftermath of economic and political crisis, democratic consolidation may well become more difficult. Recalling Barrington Moore’s classic dictum, “No bourgeoisie, no democracy,” one might easily conclude that their absence has translated into the wider problems associated with nation building. Data from the

World Values Surveys appear to indicate a strong positive relationship between support for democracy, education, and class, though gender and age have little effect. Therefore the fact of positive selection (by education) of migration from virtually all sending countries might weaken support for democracy.⁴⁸ If migrants moving to the United States from Mexico have more education than those who stay, that alone could shift societal support for democracy (by lowering the average levels of education of those left behind). Similarly, current patterns of emigration from Argentina seem to be dominated by middle-class professionals who are more educated than those left behind, thus creating possibly negative effects for the support for democracy. Still, income appears to have an equal (or even larger) effect than education in this regard.

To further complicate matters, the migration of lower-income workers generally raises rather than reduces the incomes of that segment of the population, by both reducing the labor supply and increasing financial remittances to their families. If TRBs are less educated but have more income, how does that affect the support for democracy? Furthermore, diasporic networks have the capacity to transmit ideas, making it possible to reshape the attitudes of households with family members in democratic countries (as in the case of Moroccan workers in Spain). Thus, if these mechanisms dominate, the combination of higher incomes and “social remittances” from family members may increase rather than reduce support for democracy.

48. See Feleciano (2003).