A Case against Taxes and Quotas on High-Skill Emigration

Michael A. Clemens

Abstract

Skilled workers have a rising tendency to emigrate from developing countries, raising fears that their departure harms the poor. To mitigate such harm, researchers have proposed a variety of policies designed to tax or restrict high-skill migration. Those policies have been justified as Pigovian regulations to raise efficiency by internalizing externalities, and as non-Pigovian regulations grounded in equity or ethics. This paper challenges both sets of justifications, arguing that Pigovian regulations on skilled emigration are inefficient and non-Pigovian regulations are inequitable and unethical. It concludes by discussing a different class of policy intervention that, in contrast, has the potential to raise welfare.

JEL Codes: F22, J24, O15.

Keywords: brain drain, migration, immigration, emigration, mobility, labor, skill, education, human capital

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1 Introduction

Skilled workers have an increasing tendency to emigrate from developing countries (Docquier and Marfouk 2006). There is widespread fear that the departure of these doctors, engineers, and scientists can damage the development process, harming people in the countries migrants depart. This has sparked decades of research interest in policy tools whereby rich countries could tax, restrict, or ameliorate what is called the "brain drain" (Perkins 1966).

A variety of policy responses have been proposed. These include taxes on skilled migration, quotas on the numbers of skilled migrants, reductions in skilled migration by "self-sufficiency" in professions at the destination, and punitive actions against recruitment intermediaries. Each of these is roughly equivalent in its economic effects to a tax on high-skill migration.[1] Such regulations have been justified on grounds of efficiency, equity, and ethics.

This paper argues that most such taxes or quotas on skilled migration are neither efficient, nor equitable, nor ethical. It offers the first systematic policy analysis of the various arguments for and against skilled emigration within a clear economic framework of optimal taxation—with implications for policy makers and analysts in developing countries.

The paper begins by considering the case for Pigovian regulation of skilled emigration to raise efficiency in the face of negative externalities. It then considers arguments for non-Pigovian taxes and quotas on skilled migration, resting on redistributive or moral concerns unrelated to the inefficiencies produced by negative externalities. Finally, it identifies a class of policy approaches that can be welfare-enhancing while avoiding the shortcomings of taxes and quotas.

[1] In the same way that tariffs and quotas have similar effects on trade (Bhagwati 1968). For example, a quota on skilled migration is equivalent to a 0% tax on some migrants and a 100% tax on others, past a certain level. Recruitment bans and "self-sufficiency" policies force skilled migrants to expend additional resources on international job search, mimicking a tax.

2 Externalities and regulation of skilled emigration

"The harmfulness of skilled migration for origin countries has been long an undisputed tenet of economic theory, whence the label 'brain drain' " (Scalera 2012). Many economists consider this harm to be self-evident, given the plausible premise that the social product of many skilled workers must exceed their private product. "Do doctors earn the 'value of their social marginal product' when there are over 20,000 people per doctor?" ask Bhagwati and Dellalfar (1973). "Do gifted professors contribute only as much to LDCs as they earn?" It is indeed difficult to believe that a Ugandan doctor earning US$67 per month is earning the full value of her social product (Vujicic et al. 2004). This suggests that the doctor's departure would impose a net social loss. Theory then suggests that skilled emigrants could generally impose a negative static externality on those who do not migrate.

They could impose further negative externalities by other channels. Skilled emigrants could impede dynamic development processes that depend on the external effects of human capital (Lucas 1988; Azariadis and Drazen 1990). Emigrants' training often receives public subsidies, so that their departure saps public coffers (Lucas 2005, p. 117). And beyond these effects, Bhagwati and Hamada (1974) argue that skilled emigration distorts skilled wages at home so that stayers wastefully overinvest in skill, harms innovation, raises inequality, and "creates a sense of inadequacy" among stayers.

Many policymakers agree that skilled emigrants impose large negative externalities on non-migrants. The United Nations warns that "the emigration of skilled workers... undermines progress in the least developed countries" (UNCTAD 2007). The emigration of physicians, in particular, is reviled as a "fatal flow" (Chen and Boufford 2005) and "catastrophe" (Bach 2008), described by the chairman of the British Medical Association as "the rape of the poorest countries" (Carvel 2005).

Economists' traditional prescription to correct negative externalities is some form of the Pigovian tax (Pigou [1920] 2013; Sandmo 1980). If a social planner can charge the perpetrator of an externality for the harm done to the victim, the perpetrator internalizes this harm and makes socially efficient decisions. Social efficiency is achieved even if the proceeds of the tax

are not actually used to compensate the victim. This tax may be implemented literally as a tax or via a range of similar correctives: tax-equivalent quotas, capped-and-traded permits, or ex-post fines and punishments (Kaplow 2007).

A lengthy theoretical literature supports taxing skilled emigrants to internalize their negative externalities. Bhagwati (1972) famously proposed that skilled emigrants from developing countries to the United States be obliged to pay 15% of their income to their countries of origin for an indefinite period. He later justified this tax entirely on the basis of negative externalities, both technical and pecuniary (Bhagwati and Dellalfar 1973), while modifying the terms to 10% of migrants' income for 10 years after emigration. The purpose of the tax was to charge skilled emigrants for non-migrants' loss of migrants' social product, and origin-country governments' loss of training subsidies and foregone domestic tax revenue (Bhagwati and Hamada 1974). The 'Bhagwati tax' proposal was modified and elaborated by a community of scholars in the 1970s and 80s.[2] Over the past ten years, as skilled migration rates rise, the proposal has attracted renewed scholarly interest.[3]

Scholars have proposed various quotas and punishments on skilled emigration as well, policies that are roughly equivalent to a Pigovian tax in their justification and effect. Collier (2013) advocates a system of tax-equivalent quotas on immigration to rich countries justified by the same negative externalities in origin countries. Many recommend punitive compensation payments to the origin countries of skilled emigrants (e.g. Select Committee on Science and Technology 2004), particularly emigrant health workers (Bhargava 2005; Agwu and Llewelyn 2009; Mills et al. 2011), that equate to *ex post* taxes. A paper in a top scientific journal even called for the criminal prosecution of intermediaries who assist skilled emigration (Mills et al. 2008).

The principal opposition to such policies in the research literature has been that they would not go far enough, and would be insufficient to fully remedy the lack of skilled human re-

[2] A surge of research explored the optimality, incidence, and equilibrium effects of the tax (Hamada 1975; McCulloch and Yellen 1975; Bhagwati and Rodríguez 1975; Hamada and Bhagwati 1975; Bhagwati and Partington 1976; Bhagwati 1976, 1979; Webb 1985). Several papers assessed the practicalities of implementing the proposal, both in general (Oldman and Pomp 1975) and in the specific settings of the United States (Lucas 1975; Psacharopoulos 1975), United Kingdom (Balacs and Gordon 1975), and Canada (Devoretz and Maki 1975).

[3] A wave of recent research has advocated the Bhagwati tax anew (Desai et al. 2004; Kapur and McHale 2006; Wilson 2008; Docquier and Rapoport 2009; Wilson 2009; McHale 2009; Wilson 2011; Scalera 2012), as has Bhagwati (2009, 2010, 2012) himself.

sources in developing countries (OECD 2007, p. 199; Kinfu et al. 2009). But the proposals are more deeply flawed than this. The literature has not sufficiently considered the assumptions required to justify a Pigovian tax or tax-equivalent restriction on skilled emigration. The following section discusses three flaws in the *efficiency* case for an emigration tax—the argument for a Pigovian tax as a corrective for negative externalities at the origin. Non-Pigovian taxes are considered thereafter.

3 Flaws in the efficiency case for a Pigovian emigration tax

Pigovian taxes are designed to increase efficiency by internalizing externalities. Any Pigovian tax requires at least three ingredients. These are easily seen in Pigou's ([1920] 2013) canonical externality: pollution from a factory smokestack.

1. *A Pigovian tax requires knowing who will be charged.* We must know who is the perpetrator of the externality, whom to assign blame for the harm done to the public's lungs by breathing the factory's smoke.

2. *The perpetrator's actions must be sufficient to cause the harm.* In other words, the perpetrator must be able to take an action that, all else equal, removes the externality. It would not make sense to charge the smoke tax to, say, the janitor who cleans the factory floor; cleaning may be one of many jointly necessary inputs to running the factory, but it is far from sufficient to cause pollution. Thus no decision by the janitor would be sufficient to reduce pollution.

3. *We must know how much tax to charge.* This requires a way to discover the value of the external harm, net of any external benefits, such that when the harm is internalized the factory will refrain from producing socially inefficient levels of smoke.

Other regulatory instruments have similar requirements. A Pigovian quota is essentially a 100% tax on some people, and a 0% tax on others. This requires knowing who will be punished, requires targeting those whose actions are (singly or jointly) sufficient to cause the externality, and requires knowing the socially efficient level of smoke. The following discus-

sion, then, treats 'taxes' as shorthand for all such instruments.[4]

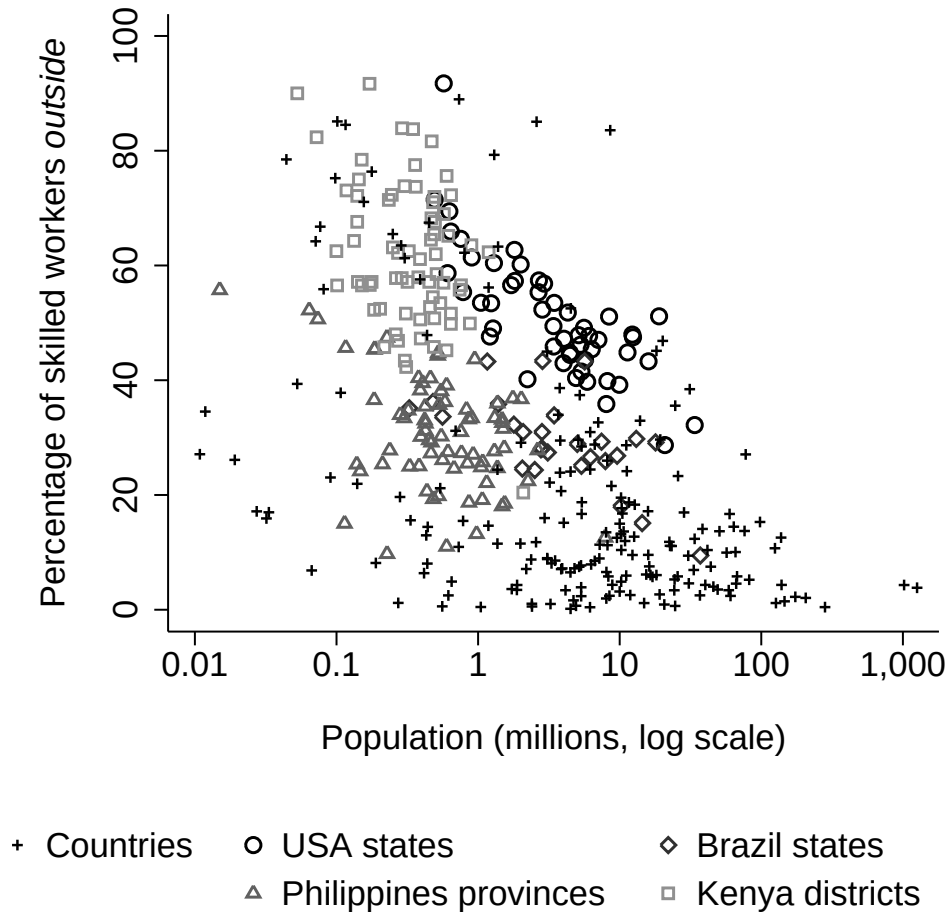
But a skilled migration tax is unlikely to meet these requirements. A starting point is to consider a tax on a different form of skilled migration: the movement of skilled workers *within* countries. Workers with tertiary training have a high propensity to migrate domestically—roughly as high as their propensity to migrate internationally. Figure 1 compares the international and domestic movement of skilled workers. Each hollow triangle is a country, where the vertical axis shows the fraction of skilled workers born in that country who live outside—in an OECD country.[5] The other points show domestic movement, *within* four selected countries, with 'outside' redefined as 'elsewhere in the country'. Each data point for the United States is one of the 50 states, and the vertical axis shows the fraction of skilled workers who live in the U.S. but outside their state of birth. The other points show the same data for the 26 states of Brazil, 79 provinces of the Philippines, and 70 districts of Kenya. Skilled workers leave small countries at rates comparable to the rates at which they leave small areas within countries.

Yet many would object intuitively to taxing domestic migration, even if the social product of skilled workers is high, even if their departure imposes a negative externality on residents of remote rural areas. Why not tax skilled Kenyans who leave Northeast Kenya? There might be several objections: Intuition suggests that limiting the movement of skilled Kenyans might be costly compared to other ways of mitigating the externality, such as broadening the skill base in rural areas or facilitating rural-urban mobility by *low*-skill Kenyans. Intuition furthermore suggests that skilled Kenyans cannot singlehandedly develop Northeast Kenya unless numerous other things change there, so deterring their departure *per se* might have little effect. And it would be very difficult to calculate the damage skilled migrants inflict on Northeast Kenya net of the benefits they bring.

[4] Pigou ([1920] 2013, II.IX.16) himself saw taxes and subsidies as simply a special case of such regulations. He wrote that "divergences between private and social net product [arise] out of a service or disservice rendered to persons other than the contracting parties. It is, however, possible for the State, if it so chooses, to remove the divergence in any field by 'extraordinary encouragements' or 'extraordinary restraints' upon investments in that field. The most obvious forms which these encouragements and restraints may assume are, of course, those of bounties and taxes".

[5] Here, a person is a 'skilled worker' if he or she is age 25 years or over and is educated beyond the secondary level. The numbers are from around the year 2000.

Figure 1: Skilled workers' tendency to move internationally is broadly similar to their tendency to move domestically



Note: 'Outside' has two different meanings. For "countries" it is the fraction abroad: the vertical axis shows the number of people born in each country age 25 or over who have attained tertiary education (completed 13 or more years of schooling) and resided in an OECD country in the year 2000, as a percentage of the number who resided either in their countries of birth or in the OECD. For states/districts/provinces within countries, the fraction 'outside' is redefined as the fraction living elsewhere in the country than one's state/district/province of birth. Source: International data from Docquier and Marfouk (2006). National-level data from Minnesota Population Center IPUMS project. Data for the USA, Brazil, and Kenya are for the year 2000, the Philippines for 1990 (the Philippines census data from 2000 do not include detailed place of birth for each individual). US state populations from http://www.census.gov/population/projections/SummaryTabA1.pdf, Brazil state populations from http://www.ibge.gov.br/home/estatistica/economia/contasregionais/tabela04.pdf, others calculated from raw microdata.

This intuition hints at why the existence of externalities is far from sufficient to justify a Pigovian tax. Of course, the international setting is somewhat different: It is typically infeasible, for instance, to mitigate any externality of high-skill mobility by fostering greater *low*-skill mobility. But what exactly is it about international migration, in contrast to domestic migration, that could meet the requirements of the tax? In the international setting, what would make us assign the entitlement to migrate to the state rather than to workers; make us more certain of the sufficiency of migration itself for the externality; and make us more confident of our ability to calculate net harms and benefits? A closer examination of each of these three requirements shows that a Pigovian tax on international skilled migration fails to meet all of them.

3.1 It is not efficient for migrants to be liable for the externality

A Pigouvian tax requires the assumption that someone holds the entitlement to be free of externality. Taxing a factory for smoke embodies the assumption that nearby residents are entitled to live nearby without smoke. Likewise, a Pigovian tax on skilled emigration embodies the assumption that the entitlement to make migration decisions belongs to the state, not the migrant. When a skilled worker emigrates, Bhagwati and Dellalfar (1973) assert that it is

> "logical and 'fair' that a tax be levied on him to compensate the LDC for its *grant of permission to emigrate* [as] a means of extracting, from *one's own professional manpower*, part of the 'surplus' that is accruing to it via the act of migration: the LDC then sharing, as a *reward for permitting migration* to higher-salary areas, in the differential return to the migrant manpower" [emphasis added].

The assumption that the state holds the entitlement makes the migrant the perpetrator of the externality. Coase (1959, 1960) showed that such intuitive assumptions of entitlements can be socially damaging, as they do not rest on a criterion of social efficiency. Almost every externality is inherently reciprocal. Returning to the smokestack example, the breathing of smoke is caused both by the factory's emissions *and* by the decision of people to live near the factory. The externality arises not from any unquestionable assignment of 'perpetrator' or 'victim' between the actors, but from the incompatibility of two actors' desires. Fining the factory for emissions would harm the factory, fining people for living near the factory would

harm the people.

Both of these taxes can eliminate the externality, but it can be wasteful to arbitrarily assign the entitlement to the people, and thus fine the factory. Suppose it happens to be cheaper to compensate residents for moving to a safe distance than than it is for the factory to reduce emissions. Both parties would be better off if they could negotiate a way for the factory to pay for residents to relocate. It seems appealing to entitle the people to remain and tax the factory—until we notice that *both parties, if they could come to a mutual agreement, would prefer a different outcome*. The intuitive entitlement can be socially inefficient, in that it does not allocate surplus in a way that everyone involved would prefer (Frank 2012, Ch. 6). Coase showed that when transactions costs prevent the parties from negotiating directly, economic efficiency requires the party with the highest cost of mitigating the externality to own the entitlement.

What, then, is the efficient allocation of the entitlement to emigrate? Who, to maximize social efficiency, should be liable for a tax? A numerical example suffices to show that entitlement need not rest with the state.

Consider the reciprocal externality when a newly-graduated nurse wishes to emigrate from Malawi to the United Kingdom. Malawi pays about US$30,000 for her training.[6] In Malawi she can earn US$3,000 per year, and suppose her social product is twice that. Over her whole career, her earnings in Malawi have net present value $32,500, and her social product $65,000. This means that if she migrates, she imposes a $65,000 harm on Malawians. By moving to the United Kingdom she can earn $40,000 per year, with a present value of $430,000—instead of the $32,500 present value of her labor at home, whose value at UK prices is about $92,000. So if she cannot migrate, she suffers a harm of about $338,000.[7]

[6]The all-in cost of a state-paid Registered Nurse degree in Malawi is about US$25,000 (Muula et al. 2006); assuming the marginal cost of $1 of public funds is $1.2 (Auriol and Warlters 2012), then the state's cost is $30,000. Grubel and Scott (1966) point out that the state can eliminate technical externalities in this case by training new workers.

[7]Malawian nurses earn about UK£150–160 per month (Grigulis et al. 2009, p. 49), while starting graduate nurses ('band 5') in the United Kingdom's National Health Service earn £22,000–24,000 per year (RCN 2014). Assume at 10% discount rate and a 43-year career, from age 22–65. The most recent (2012) 'PPP conversion factor (GDP) to market exchange rate ratio' for Malawi is 0.356 in World Bank data, and $32,500/0.356 ≈ $92,000. Then $430,000 – $92,000 = $338,000

Three different expenditures can eliminate the externality. The value of the negative externality can be paid in compensation: US$65,000. The nurse's cost of eliminating the externality (by not migrating) is $338,000. Malawi's cost of eliminating the externality (by training a new nurse) is $30,000.[8]

If the nurse and the government could negotiate, both would prefer for the nurse to migrate and pay the state to train a new nurse plus a little extra. They would both be worse off if the nurse were allowed to migrate and then forced to compensate the state for the harm of the negative externality. They would also both be worse off if the migrant were prevented from leaving and the state had to pay the migrant up to the maximum it would be willing to give in compensation.[9]

Coase showed that the state can mimic this mutually-preferred outcome, in the more realistic scenario where nurses and the state *cannot* directly negotiate. They might not be able to negotiate directly for various reasons. For example, the migrant's pledge to pay for training a new nurse might be time-inconsistent, or a group of nurses' agreement to pay for new nurse training might collapse under free-riding.

If the negotiated outcome is impossible, and the social planner then assigns the entitlement to the nurse, the state is liable to remove the externality. The cheapest option is for the state to train a new nurse. The nurse will migrate, and the socially efficient outcome is generated by regulation.[10]

If the situation were reversed, and it were cheaper for the nurse to eliminate the externality (by not migrating) than for the state (to train a nurse), the social planner would achieve social efficiency by assigning the migration entitlement to the state. The nurse would be liable for the cost of removing the externality, and her cheapest option would be to stay home.

[8] Strictly, the externality is eliminated if the state of origin *has trained* an additional skilled worker in preparation for the migrants' departure, not if the state begins training a new worker at the moment of the migrant's departure. So in this case the cost of training a 'new' nurse reflects the cost of having trained additional nurses to offset attrition via migration. If p is the probability of migration, this would mean training $1/(1-p)$ nurses.

[9] In the former case, the nurse is worse off, paying $65,000 instead of $30,000, and the state is worse off (it does not get the 'little extra'). In the latter case, the state is worse off (it must pay $30,000 to the nurse) and the nurse too is worse off (losing $338,000 for only $30,000 compensation).

[10] If the newly-trained nurse migrates, the problem begins again. But the current actors are not responsible for future actors' actions.

Table 1: Entitlements and mitigation costs in skilled emigration

Owner of entitlement to migrate:	*Cost of mitigation is lower for:* COUNTRY	*Cost of mitigation is lower for:* WORKER
COUNTRY	Ⓐ Outcome: **Leave** Liable: Worker Via: *Negotiation*	Ⓑ Outcome: **Stay** Liable: Worker Via: *Regulation*
WORKER	Ⓒ Outcome: **Leave** Liable: Country Via: *Regulation*	Ⓓ Outcome: **Stay** Liable: Country Via: *Negotiation*

Table 1 sets out the four possible outcomes. The state of the world is given by the two columns: either the country's cost of training a new worker is lower (left) or the migrant's cost of not migrating is lower (right). When transactions costs are low, the parties negotiate the solutions in the gray squares. When transactions costs prevent negotiation, the social planner maximizes social efficiency by either vesting the entitlement with the country (top) or the migrant (bottom), achieving the outcomes in the white squares to mimic the outcome the parties would have negotiated.[11]

Herein lies the waste of a Pigovian tax on migrants. Making the migrant liable for a Pigovian tax requires the assumption that the state holds the entitlement, and thus it is the state that doles out what Bhagwati and Dellalfar call the "permission to migrate". They assume that the state ideally continues to own this entitlement for migrants' entire lifetimes.[12] This is far from socially efficient in the (typical) case where the gain to migration massively exceeds the cost

[11] Alternatively the state can create institutions to reduce transactions costs, allowing the gray outcomes to be achieved, and making the parties even better off. We return to that theme in Section 5.

[12] "How long should an immigrant continue paying such a tax? In principle, it could be over a working lifetime—for that is how long the externalities could have operated . . . In practice, however, it seems unlikely that the host [countries] could be persuaded, in an imperfect world, to agree to tax immigrants in this fashion. . . " (Bhagwati and Dellalfar 1973). In order for migrants to be *ideally* held liable for the externality forever, notwithstanding the practical limitations of "an imperfect world", their state of origin must continue to own the "permission" for them to migrate until their death, wherever they live.

of training a new skilled worker. Social efficiency in this case requires the *state* to be liable, paying skilled workers at least some compensation for not migrating. Some governments have reached this conclusion. This occurred in Ghana, for instance, when the government caused substantial declines in physician emigration by roughly doubling physician wages in 1999 and further raising them in 2006 (Okeke 2013b; Antwi and Phillips 2013).

Making migrants liable to remove the externality requires a *reason* to vest the migration entitlement with the state. Whatever that reason is, in the typical case where migration gains exceed training costs, that reason cannot be social efficiency. It is even less efficient, as is sometimes proposed, for migrants to be liable for the social harm (rather than liable to pay the state's mitigation cost). That makes migrants worse off without making the origin country better off.

Why, then, do so many observers assume that the entitlement to skilled workers' migration is owned by the state? Of course, social efficiency is only one reason to endow one party or another with the entitlement. A social planner might choose to entitle the state rather than the migrant, if concerns of equity or ethics outweigh the resulting loss in efficiency. These are discussed in Section 4. But in this case the tax is not Pigovian, in the sense that a Pigovian tax seeks social efficiency by definition. Pigou's proposal was to get prices right so that the First Fundamental Welfare Theorem works again; a Pigovian tax is not levied for reasons of equity or ethics. Any equity or ethical reasons to entitle the state, then, do not defend a Pigovian tax.

3.2 A Pigovian tax assumes migration is *sufficient* for the externality

The rationale for a Pigovian tax rests on the assumption that the taxed activity is sufficient to cause the externality. The tax brings about social efficiency because, by internalizing social harm that exceeds private benefit, the tax makes it in the interest of the perpetrator to make the harm stop if the internalized cost exceeds the benefit. But what if the entity labeled as the perpetrator cannot take an action sufficient to make the harm stop?

In the smokestack example above, taxing the factory janitor for the social harm of the smoke cannot achieve social efficiency. The janitor is one of numerous inputs to smoke production,

all of which are collectively necessary for smoke. But the janitor is far from sufficient to cause smoke. Even if the taxed janitor's internalized cost exceeds the janitor's private benefit and this ends janitorial services at the factory, other inputs can substitute so that the effect on smoke and its harm is small or nil. The Pigou rationale is gone.

To what degree, then, is allowing skilled migration *sufficient* to cause social harm? An identical question is: to what degree does restricting skilled migration, all else equal, eliminate social harm?

There are two scenarios that might justify a Pigovian tax: Either the tax prevents an action that would have been sufficient to cause the externality, or the action still happens, but the revenue of the tax is sufficient to remedy the externality.

First consider the case where the tax deters emigration, as Bhagwati and Dellalfar (1973) intend. Is this sufficient to eliminate the negative externality? There is often a simple correlation between skilled migration and poor development outcomes. Mortality rates are higher, for instance, in countries with high skilled-worker emigration rates. Analysis in major scientific journals interpret this correlation as evidence that reducing migration, per se, will improve development outcomes (e.g. Chen et al. 2004).

There are two distinct problems with this interpretation. One is that in many countries of high emigration, emigration is caused by other forces that directly and simultaneously cause poor development outcomes. For example, negative growth shocks have a large effect on the emigration of physicians from poor countries (Okeke 2013a) and the same shocks have a large effect on health conditions, leading to high mortality rates (Baird et al. 2011). These shocks can harm health through many channels unrelated to the supply of physicians. Poverty means poor sanitation, poor nutrition, dangerous jobs, lower education, and reduced demand for health services, among other things that directly and independently cause mortality.

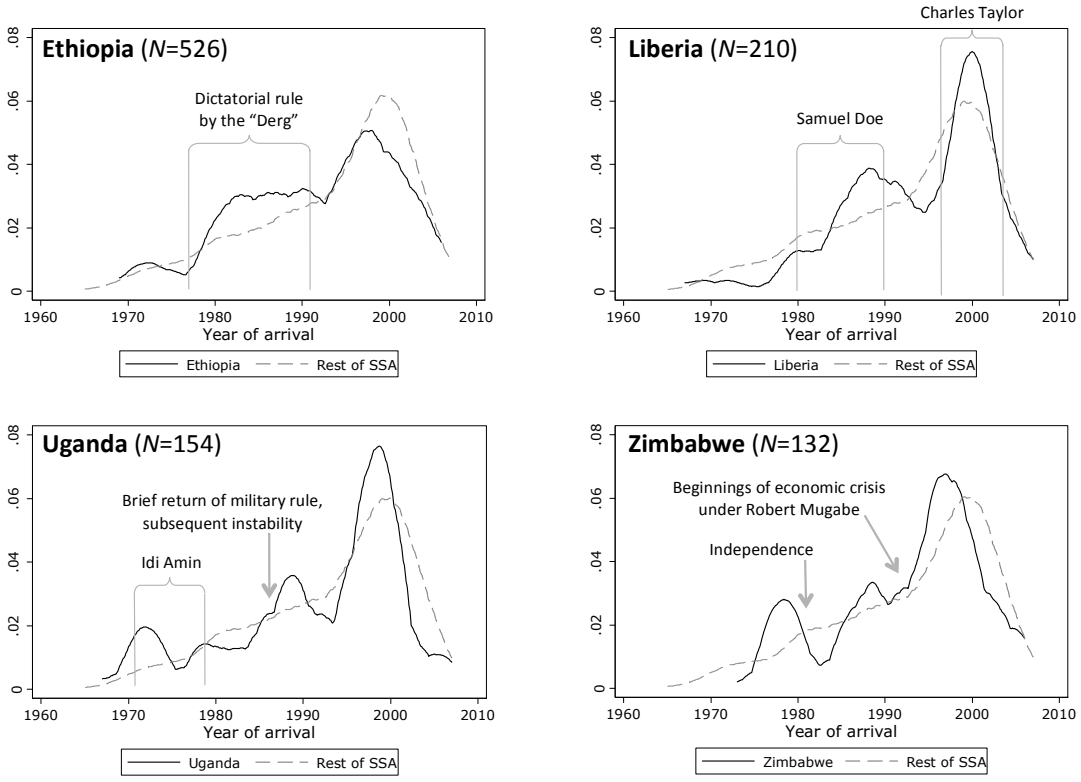
A separate problem is that the same forces that cause both emigration and poor outcomes also reduce the social product of skilled workers. For example, poor governance not only causes skilled workers to leave the country of origin, but also reduces the social product of skilled

workers at the origin. Consider Figure 2, which suggests that the emigration of skilled Africans was shaped by some of the 20th century's most disastrous governance. It shows African-born, tertiary-educated skilled workers living in the US in 2005-2007, and compares the years of arrival in the US of different groups of these workers. These are university graduates in all disciplines. In each panel of the figure, the solid line shows the distribution of years of arrival among skilled workers from one country, while the dotted line shows the same distribution for skilled workers from the rest of sub-Saharan Africa. In years where the solid line is higher than the dotted line, the share of that country's skilled-worker arrivals occurring in that year exceeds the share for the rest of the region.

Advocates of barriers to skilled migration often point to the scarcity of skilled workers in developing countries as evidence that their social product must be very high. But Figure 2 suggests the opposite. Skilled workers departed Mengistu's Ethiopia, Samuel Doe's Liberia, and Mugabe's Zimbabwe. The marginal social product of skilled workers was plausibly lower under those disastrous regimes, and for a long time after them, due to many of the same acts that caused migration. Poor governance not only means more emigration, then; it means that the negative externality from the marginal departure is lower. Both of these raise doubts about the ability of stopping migration, per se, to produce positive externalities at the origin.

There is little reason to believe that stopping skilled migration from these countries would have been sufficient to improve governance there. The emergence of good governance and the rule of law is fraught with coordination failures (Hoff and Stiglitz 2004; Dixit 2004). It is possible that reduced skilled migration is one *necessary* condition of improved governance, among several other simultaneously necessary conditions. But the policy levers for those other necessary conditions are unknown. Development policymakers have little evidence that *if* they could coercively deter skilled emigration from Haiti, Ethiopia, or Zimbabwe, *then* they would know just which bundle of several other necessary interventions to enact that would be jointly sufficient to produce good governance in those places—and be able to enact it. The existence of multiple equilibria does not justify any given necessary condition of shifting the equilibrium, unless policymakers are confident that the other necessary conditions are all known and all feasible.

Figure 2: Year of arrival for skilled African workers with higher education who arrived in the United States as adults (age 25+) and resided in the US during 2005–2007: Selected countries compared to rest of sub-Saharan Africa (SSA)



Source: United States American Community Survey pooled 2005–2007 Public Use Microdata Series. Plots show people by sub-Saharan African country of birth, with tertiary education ('some college' or greater) and working in a skilled job in the United States (occupation codes 0010 to 3650) whose year of arrival is at least 25 years after their year of birth. Kernel density plots shown (bandwidth 1.5, Epanechnikov kernel, weighted by sampling weight).

In medicine, too, the causes of emigration can simultaneously reduce skilled workers' social product. An African physician's social product might be shaped by low wages in the public health service, few rural service incentives, few performance incentives of any kind, a lack of adequate medical supplies and pharmaceuticals, a mismatch between her medical training and the health problems of the poorest, the absence of good schools for her children in rural areas, poor transportation infrastructure to reach patients most in need, or an abysmal sanitation system that makes attempts at primary care ineffective, among other forces (Filmer et al. 2000, 2002). A survey of thousands of African health workers showed that many of these same forces motivate them to migrate (Awases et al. 2004). In Kenya, Mozambique, and Ethiopia,

the capital city is home to less than 9% of the people but more than 50% of the physicians (Kenya Ministry of Health 2007, pp. 3, 20; Ministério da Saúde 2004, p. 67; de Laat and Jack 2008). These and other reasons may be why the numbers of doctors and nurses born in each African country who live abroad are not correlated with lower health worker densities, less general availability of health care, or worse generalized public health outcomes at home such as child mortality (Clemens 2007).

All of the above suggest that deterring migration may not be sufficient to confer a high social product at the margin. There is evidence that the same is true on average. Suppose that some migration tax were capable of having stopped half of all emigration by African-born physicians that has ever happened. Suppose, generously, that all the same people would have become doctors regardless. Certainly this would require an extremely high tax or a tightly-binding quota. The OECD (2007, p. 199) has shown that this would be sufficient to eliminate just 6% of the gap between current physician density in Africa and the level recommended by the World Health Organization.

Theory has greatly outstripped evidence on the effectiveness of deterring migration per se as a development strategy. There is at this time no real-world setting in which deterring health-worker migration per se has been shown sufficient to cause an improvement in health outcomes. More generally, there is no real-world setting in which deterring skilled-worker migration of any kind has been shown sufficient to cause development by any measure.

Second, suppose instead that the tax does not deter migration at all, but generates revenue for the origin-country government.[13] Is this sufficient to mitigate the externality? Many analyses of skilled emigration taxes simply assume this: "Since a share of migrants' larger income abroad is gained by left behind residents through the tax," writes Scalera (2012), "government internalises part of migration benefits and implements education policies more oriented to human capital accumulation."

But there is little theory or evidence supporting the notion that a migration tax is sufficient

[13] Although Bhagwati and Dellalfar (1973) justify the tax in part as a migration deterrent, Bhagwati and Partington (1976) states that the tax would affect migration "hardly at all". Psacharopoulos (1975) and Lucas (1975) find that a 10% tax would barely affect migration rates.

to cause human capital accumulation at the origin. On the demand side, an emigration tax would reduce the incentive to invest in human capital (McCulloch and Yellen 1975). On the supply side, even earmarked aid transfers are known to be substantially fungible (Pack and Pack 1993; Khilji and Zampelli 1994; Feyzioglu et al. 1998). So it is unclear that earmarked transfers would cause education provision.

A dramatic example is the case of African physician training. Mills et al. (2011) report that 19,940 physicians trained in some of the African countries with highest physician emigration are working abroad, in the principal destination countries.[14] They estimate that the cumulative cost of all education received by those physicians—including their primary and secondary schooling—is US$2.2 billion. In the last five years, the same nine origin countries have received over $82 billion in Official Development Assistance (DAC 2014). Suppose again that the marginal cost of public funds in Africa is $1.2 per $1 (Auriol and Warlters 2012). This means that just the last *six weeks* of development aid to those same nine countries would have been sufficient to pay for the full education, since childhood, of every physician who ever trained there and emigrated.

The case of Nigeria is illustrative: Mills et al. find that the medical training cost of every currently-practicing, Nigerian-trained doctor who has ever emigrated from Nigeria totals less than US$200 million.[15] Nigeria's government typically earns US$15–20 billion in oil revenue each year (Litwack 2013). Assume the same marginal cost of public funds as above. This implies that Nigeria could pay to replace all Nigerian-trained physicians now living abroad with just five days of oil revenue.

If available finance has not eliminated the externality from those physicians' departure, then that finance must not have been used to train physicians. This suggests that either the recipient governments have determined that the highest marginal social product comes from

[14]The origin countries are Ethiopia, Kenya, Malawi, Nigeria, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe. These are chosen because they cover the countries with the highest levels of physician emigration, both in absolute numbers and relative to the physician stock at home (Bhargava et al. 2011). The destination countries are the United Kingdom, United States, Canada, and Australia, which cover the vast majority of physician emigration from these origin countries.

[15]They find that 7,106 Nigerian-trained physicians are in the principal destination countries, and their medical training costs US$25,188 each, for a total of $179 million. Round up to $200 million to include minor destination countries.

expenditures other than training physicians, or that despite the high social product of training physicians, they are unwilling to spend marginal revenue on it. In either case, additional finance per se is unlikely to cause the training of new physicians. Mirrlees (1982) agrees that there are developing countries "where the use to which government revenues are put is not such as to make one assign them more weight than government revenue in a typical industrial country."

But the problem is deeper than just withholding tax revenue from a few rogue states. Bhagwati and Dellalfar (1973) suggest that certain odious regimes, chosen by the United Nations, should be unable to receive emigration tax revenue. Those emigrants should still be taxed, they say, and that revenue distributed to other governments as general aid. In Wilson's (2011) theoretical model, distributing revenue even to odious regimes is still beneficial. But we lack any empirical evidence that revenue to many governments will be sufficient to eliminate of the externality, even non-odious regimes. Nigeria, for example, is far from being considered a pariah state or odious regime. And if revenue is distributed to countries other than the country of origin, there is certainly no hope of internalizing any externality at the origin, so again such taxes must rest on non-Pigovian criteria.

We lack sound evidence that taxes are sufficient to undo any negative externalities arising from skilled emigration, either in general or in any specific case. To believe taxes are sufficient we would need evidence that they are sufficient to deter migration and deterred migration is sufficient to remove the externality; or that revenue from emigration taxes in particular is sufficient to undo the externality. Because we do not have such evidence, this too undoes any Pigovian justification for an emigration tax.

3.3 The correct size—and even sign—of a Pigovian tax is unknown

Set aside all of the problems discussed above. Suppose that we have somehow determined that 1) migrants are liable for negative externalities and 2) taxing them is sufficient to remove the externality. A Pigovian tax requires us to determine how much skilled emigrants should be charged for the net harm they do. What is the magnitude of the harm done at the origin? By what amount is it offset by positive effects at the origin? And how confident can we be

that the net externality is negative at all?

There are more or less two approaches: structural and reduced form. That is, either we can attempt to measure structural parameters for all the separate costs and benefits of skilled migration and add them up; or we can look for ways to measure the overall effect of skilled migration on origin countries. Both of these face major obstacles.

Beginning with the structural approach, we must first have a means of calculating the value of harms imposed by skilled emigrants on their countries of origin. In other words, we must have a means of estimating the positive externality that would be *sufficiently caused* if skilled workers do not migrate. Economists have found this measurement very difficult. One way to test for externalities of education is to observe developing countries where average education increased, and test whether overall output per worker went up by more than the private wage gains. Pritchett (2006, p. 683) reviews a large literature and concludes that "there is no particular evidence" that the overall output gain is systematically higher than the private gains from education. An important reason for this may be that poor institutions and policies in many developing countries constrain the productivity of human capital, such as by leading to high rates of unemployment among the young and educated (Rogers 2008; Hanushek and Woessmann 2008).

But set aside this problem too, and suppose that we could measure with certainty the gross negative externality of skilled emigration. The structural approach would still require us to measure the countervailing gross positive effects of skilled migration at the origin, in order to arrive at the net negative externality of skilled migration.

The most obvious of these positive effects is remittances. Workers overseas send over US$400 billion per year to developing countries, roughly triple the volume of all official aid (World Bank 2014). The average skilled migrant sends home more than an unskilled migrant, primarily because skilled migrants earn more (Bollard et al. 2011). African-trained physicians in the United States and Canada remit much more to their countries of origin than it cost to train them (Clemens 2011). A sample of skilled Nigerians in the United States, an average of 14 years after migration, remits US$6,000 per household per year to Nigeria (Osili 2007).

The effects of these flows on countries of origin are not well understood. But relative to the effects of departing skilled workers, the effects of remittances could be substantial. Take Haiti, where skilled migration rates are very high, but remittances equate to around one quarter of GDP. Some fraction of remittances must end up in public coffers, either via the value-added tax or, if remittances are spent on imports, via tariffs. Even if that fraction is small, it could rival in magnitude the amount spent on public subsidies for the training of skilled emigrants. We do not have good measures of these effects, but they could be large, and they are explicitly ruled out by existing analyses of the fiscal cost of emigration (e.g. Mills et al. 2011).

Beyond cash, skilled workers abroad interact in many ways with their home countries that have the potential for large positive effects. The more highly skilled emigrants from one country live in another, the more trade occurs between those countries (Rauch 1999; Felbermayr and Toubal 2012). The share of foreign direct investment that countries receive from the United States is positively correlated with the number of college graduates from that country present in the United States (Kugler and Rapoport 2007; Docquier and Lodigiani 2010; Javorcik et al. 2011). Scientific innovations arrive in many developing countries through interaction with skilled emigrants (Kerr 2008). Indian, Chinese, and Israeli immigrants to the United States, for example, have been crucial to the formation of manufacturing and information technology hubs in those countries (Saxenian 2006; Devane 2006; Wei and Balasubramanyam 2006). There is evidence that norms of democracy (Spilimbergo 2009) and fertility (Beine et al. 2013) are conveyed to developing countries through skilled emigrants.

Further positive effects at the origin arise if the prospect of migration causes workers to invest in more education. This could tend to offset human capital losses from migration if not all such workers are able to migrate or choose to exercise the migration option. This possibility was the subject of theoretical debate for several years (Mountford 1997; Stark et al. 1997; Stark 2005). More recently, we have initial empirical evidence that this effect is real in some countries and the effect substantial (Beine et al. 2008; Chand and Clemens 2008; Beine et al. 2011; Batista et al. 2012). Indeed, there can be little doubt that migration opportunities for Filipino nurses have shaped the decision of at least some migrants to train as nurses in the first place. The overall magnitude of this effect is unclear and must vary between countries. But theory is clear: by this channel, one of the effects of an emigration tax would be to decrease

investment in human capital (Docquier and Rapoport 2009).

An alternative to all of these structural approaches is the reduced-form approach: observe the empirical relationship between skilled emigration rates and some development outcome of interest. The central drawback of this approach is the difficulty of establishing causation. It is certainly the case that skilled emigration correlates across countries with various poor outcomes at the origin, including low skilled worker stocks, poor education, and poor health (Docquier et al. 2007; Rogers 2008; Bhargava and Docquier 2008). But it is very difficult in cross-country data to isolate the direction of causation, and many of the common instrumental variable approaches yield opaquely weak or opaquely invalid instruments (Bazzi and Clemens 2013). As noted above, poor development outcomes themselves are a major cause of skilled migration. The literature has faced challenges in persuasively purging that first-order endogeneity from cross-country correlations. It is very hard to identify forces that raise skilled migration without directly affecting development outcomes through other channels, so the hunt for transparently valid instruments may remain elusive.

Given these numerous conflicting effects, all varying greatly over time and place, there is little hope of setting the 'correct' Pigovian tax even if we knew that one must be set. This is a problem for all externalities: "There is," Coase (1988, p. 184) wrote, "no way in which the information required for the Pigovian tax scheme could be collected." For skilled migration in particular, Hamada and Bhagwati (1975) agree that "depending on which LDC is being discussed, and which occupation is the object of attention, the analysis of the welfare effects of the brain drain is likely to vary; and a generalized analysis could well be misleading." Even correctly assessing labor market conditions for skilled workers across the world in real time would be an enormous challenge, to say nothing of estimating the magnitude of all of the positive and negative effects of skilled migration for each occupation, country, and year. The positive effects of skilled emigration on India documented by Saxenian could scarcely have been imagined, and certainly not measured, by a hypothetical bureaucrat agreeing to Bhagwati's (1972) proposal to tax those same emigrants a generation earlier. Pigou himself came to doubt the practicability of such taxes to remedy any externality, writing that since "we cannot expect that any public authority will attain, or will even wholeheartedly seek, that ideal. Such authorities are liable alike to ignorance, to sectional pressure and to personal

corruption by private interest" (Barnett and Yandle 2009).

Substituting Pigovian quotas for taxes does little to help. In cases where a pollutant causes an externality but "we do not know how to calculate the required taxes and subsidies", writes Baumol (1972), we can "select some maximal level of this pollutant that is considered satisfactory and to seek to determine a tax on the offending inputs or outputs capable of achieving the chosen standard." But in our case this requires picking an efficient maximal level of skilled migration. This requires knowing, at that level, the balance of all of the above costs and benefits. Critically, it requires knowing the costs and benefits for which manipulating skilled migration, at that maximal level, would be *sufficient* to cause positive externalities.

And how do we know? Collier (2013, p. 218) considers it unquestionable that Haiti, with 75% of its university-educated abroad (Beine et al. 2007), is beyond Baumol's "maximal level" and skilled migration must be harming development. But in fact there is no evidence whatsoever that stopping the last percentage-point of skilled Haitians from leaving would have been sufficient to cause development in Haiti—to any degree and in any dimension. Consider again Figure 1. What is the socially efficient "maximal level" of skilled emigration from the small, remote districts of Kenya or islands of the Philippines at the upper left of the figure? We have little evidence that blocking the last percentage-point of those people from departing to Nairobi or Manila would have been *sufficient* to cause development in the places they came from. We have even less evidence that this would be effective for Haiti.

We simply do not know what the maximal level is. Baumol advocates "trial and error" to discover it, which might work when the outcome is unidimensional and easily measured with short-term feedback (such as counts of airborne particulate matter, in the smokestack example). It is much more difficult for the complex processes fostered by skilled migration, with long-term feedback: technology transfer, induced education, and democracy are long-term processes whose attribution to causes is complex.

Advocates of taxing skilled migration understand these difficulties. Bhagwati, writes Wilson (2007), "has long recognized that the magnitude and existence of such losses are highly uncertain, and therefore viewed the gains that developed countries experience from the brain

drain as a better justification for brain-drain-related transfers." But if the tax is set based on migrants' gains rather than non-migrants' losses, we are no longer speaking of a Pigovian tax. In other words, longtime advocates of skilled emigration taxes have conceded that the Pigovian justification based on externalities, so prominent in Bhagwati and Dellalfar (1973), is not valid.

There are numerous holes, then, in the case for a Pigovian tax on skilled emigration. And though advocates of such taxes and quotas have often mentioned externalities, perhaps they never intended those policies to internalize externalities or pursue efficiency. The clearest sign of this is that none of the proposals includes a worldwide Pigovian *subsidy* for migrants who *benefit* their country of origin.

4 Flaws in the case for a non-Pigovian tax

Pigovian taxes seek social efficiency, and can achieve it when tax liability is assigned to the party with the lowest cost of eliminating the externality. But there are reasons to tax other than social efficiency. Taxes and quotas are frequently imposed for reasons of equity, ethics, and fee-for-privileges. These are unrelated to externalities, and all have been advanced as alternative reasons for a skilled emigration tax. Non-Pigovian taxes are those that are "not imposed with the objective of reducing the level of the taxed activity" (Logue and Slemrod 2009).

In fact, Bhagwati (2012) has essentially renounced the original Pigovian justification of an emigration tax. He writes,

> A "set of concerns has surfaced in Africa, in particular, over the legal outflow of skilled, and even more importantly, highly skilled, people to developed countries. This outflow is supposedly a new and damaging 'brain drain,' with rich countries actively luring away needed skills from poor countries. This fear is misplaced. At the outset, we have to distinguish between 'need' and 'demand.' Yes, many African countries need skills. But they are unable to absorb them, owing to several factors associated with economic backwardness. ...Besides, simply holding people back, even if feasible, would do little for their countries. The 'brain' is not a static concept. Trapped in Kinshasa, under appalling conditions, the brain will drain away in less

time than it takes to get to New York."

In other words, Bhagwati appears to agree that a Pigovian tax does not make sense, for three reasons: the high relative costs to migrants of eliminating any externality, the insufficiency of non-migration to remedy any externality, and the substantial benefits of skilled migration. These were the arguments of the preceding section.

Nevertheless, Bhagwati (2009) notes, a tax could also be justified on other grounds: as a mechanism of redistribution of "rents" at the global level, as a repayment for citizenship services extended to emigrants, and as a repayment for training costs. A further potential justification he does not mention is ethical concerns; many countries ban the sale of one's own internal organs, for example—equivalent to a high punitive tax or a quota of zero—for reasons unrelated to efficiency, equity, or fee-for-privileges.

This section discusses three of these potential justifications: equity, ethics, and fee-for-privileges. The section thereafter discusses compensation for training costs.

4.1 Any equity basis for a skilled emigration tax applies to non-migrants

A common reaction to Coase's critique of Pigou is that reasons of equity, not efficiency, might motivate the social planner to confer entitlement rights on one party or another. In the smokestack example, suppose that it is cheaper for the factory to reduce its pollution than for the people living near the factory to move. But suppose further that the people are desperately poor and cannot afford to pay the factory's cost of reducing pollution, whereas the factory owners are extremely rich. Many would consider this sufficient reason to vest entitlement with the people and hold the factory liable, regardless of the fact that the outcome is socially inefficient. Coase is guided by willingness to pay, not ability to pay (Frank 2012, Ch. 7).

In the case of skilled migration, too, some analysts have justified taxes as a means of global redistribution, based on ability to pay rather than willingness to pay (e.g. Wilson 2007). In Table 1, this argument goes, it would be wrong to entitle migrants and insist that the country

of origin pay compensate them for not migrating—regardless of the relative mitigation costs—because skilled migrants are cash-rich and origin-country governments are cash-constrained.

We are no longer speaking of a Pigovian tax, then, since equity rather than efficiency is the proposed justification. But this leaves us with the same problem as before. When the proposed tax was Pigovian, to correct an externality, we needed a reason to entitle the country of origin and hold migrants liable. Coase showed that the reason could not be efficiency, since migration gains typically exceed training costs. If the proposed tax is not Pigovian but redistributive, we have the same problem in a different form. Why hold *migrants* liable, rather than holding all rich-country residents equally liable?

If the tax is redistributive, there may be an equity motive not to assign liability to the state of origin. But there is also no equity motive to assign liability to migrants in particular. There is no systematic evidence that skilled migrants are richer than skilled citizens in destination countries. And there is some evidence to the contrary. For example, foreign-trained nurses earn substantially less in the United States, for years after arrival, than American nurses (Schumacher 2011). A tax to fund developing-country governments would, if motivated by equity, be more heavily incident on skilled citizens than on skilled migrants.

But the tax advocated by Bhagwati (2009) and Wilson (2007) has exactly the opposite relative incidence. Migrants pay much *more* than citizens. During the time that skilled migrants are liable for an emigration tax, they would also be paying taxes in the destination country just like citizens there. Thus both migrants and citizens at the destination would be paying for global redistribution, through the portion of their taxes that supports humanitarian and development assistance. But migrants would be liable for an additional redistributive tax that citizens would not pay: the emigration tax. Whatever the justification is, it cannot be a redistributive justification so long as citizens at the destination are richer.

It might be possible to justify heavier incidence of a redistributive tax on migrants by appealing to different reference frames for migrants and citizens. There is evidence that migrants undergo a transition in reference frames when they migrate, at first comparing themselves to people at the origin and later comparing themselves to people at the destination (Stillman et

al. 2012). Perhaps, in the first few years after arrival in London, a Malawian nurse compares herself to nurses in Malawi and "feels" relatively rich, even if she earns less than British colleagues. But using this phenomenon to justify coercive taxation is terribly problematic. Can the Malawian state tell emigrants what their reference frame should be? If a skilled migrant earns half as much as native colleagues at the destination and feels relatively poor, even one month after arrival, can the origin country legitimately tell them that they "should" feel rich, given the even lower wages of their colleagues back home? Few Americans would think it right to charge higher taxes to an American scientist because she came from a poor background, and thus had a different reference frame than colleagues earning the same amount but who came from a rich background.

McHale (2009) argues that it is indeed fair to charge migrants higher redistributive taxes, since "it also seems unfair that an emigrant earning a given total income faces a lower rate of taxation than a worker back in the origin country would pay on that income. This is likely to happen since the worker in the poor home country is likely to reach the highest tax rates at a much lower income level." But here again, no justification is offered for why this equity criterion applies to migrants rather than citizens at the destination. If an American nurse lived in Malawi, he too would face the highest tax rate there at a much lower level of income. But that is not seen as a reason for redistributive taxation from the American nurse to the Malawian government. We are back to the unanswered question of why entitlement to the Malawian's earnings rests with Malawi. Whatever that is, it is not a redistributive reason.

In short, the equity argument for a migration tax is flawed for one of the same reasons that a the Pigovian justification is flawed: it does not offer a clear reason, other than axiom, why migrants in particular should be held liable. A redistributive tax on people in rich countries for the benefit of people in poor countries would apply equally to all workers in rich countries. But such taxes are already in place: all migrant-destination countries tax residents there (citizens and migrants) for globally-redistributive aid payments.

4.2 The weak ethical basis for a skilled emigration tax

Many real-world taxes or quotas rest on purely ethical motives, unrelated to efficiency or fairness. In the terminology of moral philosophy, consequentialists might assign entitlements based on efficient or fair outcomes, but deontologists might assign entitlements based on "certain bedrock principles that must be followed regardless of consequences" (Frank 2012, Ch. 6). Examples of taxes that are at least partly non-consequentialist are "sin taxes" on intoxicants and punitive fines on prostitution.

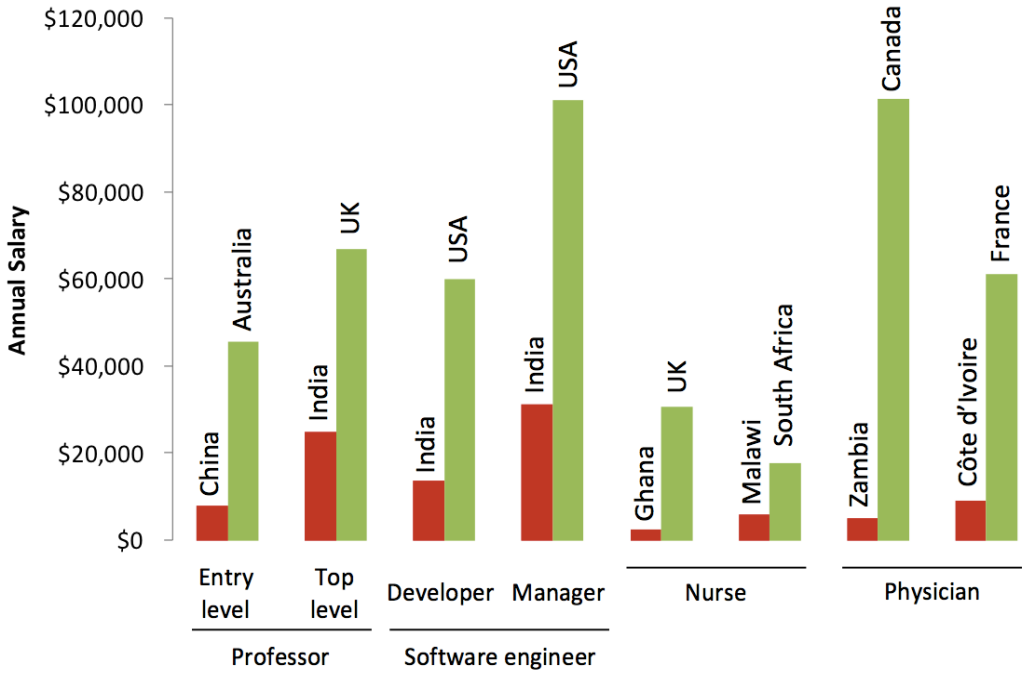
It is clear that many observers consider it flatly unethical to encourage the emigration of skilled workers, particularly health workers (e.g. Mills et al. 2008; Pittman et al. 2010; Runnels et al. 2011). If that is true, it must be ethical to discourage that emigration, such as with taxes or quotas. This offers another argument for vesting the migration entitlement with the state of origin, apart from the efficiency and equity arguments considered above.

Ethicists have taken up the question of taxes and restrictions on skilled emigration (e.g. Hidalgo 2012; Dumitru 2012; Oberman 2013), and I am not an ethicist. But the tools of economic policy are often deployed with an ethical rationale, so it is appropriate to discuss here some economic aspects of the ethical case for skilled emigration taxes.

First of all, skilled migrants suffer enormous losses when they cannot migrate. One obvious loss is earnings. Figure 3 shows relative wages for professors, software engineers, nurses, and doctors in a few major migration corridors. Reducing skilled emigration rates requires causing numerous individuals not to migrate, and for those individuals a large majority of their earning power is taken away. Another obvious loss is their freedom. All skilled workers from all countries have a the right to emigrate under international law.[16] A separate violation of freedom is that non-migration obliges skilled migrants to endure the conditions they have revealed that they do not wish to live under. Figure 2 suggests that any effective measures to

[16]The United Nations Universal Declaration of Human Rights states that "everyone has the right to leave any country, including his own" (Article 13.2). The International Covenant on Civil and Political Rights states that "everyone shall be free to leave any country, including his own" (Article 12.2) except when "necessary to protect national security, public order, public health or morals or the rights and freedoms of others". That is, international law presumes freedom to emigrate and places the burden of proof on those who would limit it, to demonstrate harm to others. Emigration cannot, then, be considered unethical apart from its demonstrated consequences.

Figure 3: Gaps in average professional salaries, selected country pairs



Note: Salaries are converted to annual US dollars and adjusted (by the original sources) for differences in purchasing power across countries. Professor salaries from Rumbley et al. (2008, p. 22), software engineer salaries from Commander et al. (2008), and nurse and physician salaries from Vujicic et al. (2004, Tab. 2).

reduce emigration from those countries could have forced skilled workers from those countries to live under regimes that many people in destination countries would not consider tolerable to themselves. Docquier et al. (2009) reveal that skilled-worker emigration rates are substantially higher among skilled women than skilled men in most developing countries—much higher in Afghanistan. A plausible contributor is structural barriers to professional achievement by skilled women. Obliging skilled women not to migrate implies obliging them to face that environment.

Beyond this, emigration taxes have been deliberately designed to harm even non-migrant skilled workers in developing countries. Hamada and Bhagwati (1975) consider it an attractive feature of emigration taxes that they would tend to reduce the expected wages of professionals in urban areas of developing countries, causing "diffusion" of human capital into

underserved rural areas. Shapiro (1977), lauding the tax proposal in Bhagwati and Partington (1976), agrees: "A concomitant benefit to that of lower rewards to emigration will be that lower salaries may be paid to remaining professionals, thus in part countering the distorting effect on income distribution of the present untaxed brain drain." Harm to non-migrant skilled workers is seen as a virtuous side-effect of such policies. Given that the enforcers in rich countries are much richer than the people they are deliberately harming, ethical problems arise.

It is frequently argued that regulation on skilled emigration—such as taxes or recruitment bans—are ethical provided that they preserve "freedom of movement" (e.g. McHale 2009; WHO 2010). Collier (2013, p. 200) justifies quotas or "ceilings" on immigration to rich countries by their deterrent effect on skilled emigration from countries like Haiti, while at the same time considering it "neither practical nor ethical" to restrict emigration. These authors do not explain how it is possible to tax or restrict skilled immigration to rich countries without coercively limiting free emigration from poor countries.

Consider the hypothetical case of a proposed tax on women who become lawyers. A large literature has shown, for example, that the skills and qualifications of schoolteachers in the US have declined sharply over the last half century because skilled women now have a much broader range of career choices available to them (Stoddard 2003; Corcoran et al. 2004; Bacolod 2007). The exodus of skilled women from the classroom might plausibly be the cause, in some sense, of a loss of positive externalities to schoolchildren. An observer with no regard for women's ambitions and fundamental rights might define this exodus pejoratively as "school drain". That observer might recommend a tax on female lawyers to compensate schools for the loss; a penalty for law firms that recruit women; or a "ceiling" on the number of women that law firms may hire. The same observer might consider it a virtuous side-effect of these policies that women's expected wages are reduced in general, forcing them to be more likely to seek out teaching jobs.

All of these policies strike us as profoundly unethical. Women did not choose to be born women. They have the right to pursue the same career choices as people who were not born women. It obviously violates those rights to tax their career decisions, punish the people who

hire them, or fix maximum numbers of women at law firms. The ethics of such policies are further darkened by the fact that the enforcers of those policies would most likely be men, who could not ever be subject to the same regulations. If indeed women's choices have negative external effects on schoolchildren, that might complicate the ethical picture. But no balanced assessment of these ethics could result in a clarion declaration that women who evade "school drain" taxes are unethical, that "active recruitment" of women is unethical, or that "ceilings" on female career choice are ethical.

It is likewise for simplistic declarations of ethics in the regulation of skilled migration. Migrants did not choose what country they were born in. And the people primarily enforcing emigration taxes, recruitment bans, or emigration quotas are intended to be people born in rich countries, who could never be subject to those policies.[17] It is certainly ethically problematic for people with birthright access to the high-paying jobs in Figure 3 to take actions deliberately harming others, safe in the knowledge that those policies could never be applied to themselves. If it is to be argued that these unethical acts are "worth it", because of their positive consequences at the origin, then we are back to consequentialism, and those positive effects of emigration regulations must be proven.

Many observers appear, however, to simply accept as a bedrock ethical principle that the migration entitlement rests with countries of origin, not with migrants. Under this strong assumption, only the first row of Table 1 is feasible. But this position is not internally consistent, even in purely ethical terms. If countries of origin claim ownership of skilled workers' positive effects, we should presume that they are equally willing to claim ownership of skilled workers' negative effects. If a skilled worker from Ghana commits a murder overseas, would the government or people of Ghana accept to be punished? If a skilled worker from India embezzles $10 million from a firm in New York, would the government of India accept to reimburse 10% of the firm's loss? And if the government of South Africa may tax a doctor for emigrating and thus not practicing medicine in South Africa, may the government also tax the same doctor for choosing to work at home, raising children, and not practicing medicine at all? May the government tax her for choosing not to become a doctor in the first place? In all cases, the public

[17] The Bhagwati and Partington (1976) tax is designed to be collected by destination-country governments. The WHO (2010) Code of Practice is designed to be enforced by rich countries. Collier's (2013) migration "ceilings" are intended to be enforced by migrant-destination countries.

loses medical services; but a tax on migrants is deemed ethical, while a tax on non-doctors is not. In short, the ethical principle that developing states own the entitlement to skilled workers' human capital has not been coherently elaborated and remains unconvincing.

4.3 The tax as a fee for "privileges of citizenship"

Advocates have also justified a skilled emigration tax as a fee for citizenship privileges. Bhagwati (1979) calls it a "curious anomaly" that developing-country citizens abroad enjoy "representation without taxation"—such as the right to vote, the right to own property, and the right of travel. For this reason he proposes that they be taxes only so long as they choose to retain citizenship in the origin country. This proposal receives support from Wilson (2007) and McHale (2009), among others. Bhagwati (2009) reports that, among the several rationales that have been floated over the past four decades, this one is the "rationale that finally became dominant".

This argument has a number of problems that have been inadequately explored. First, many developing countries restrict the voting of emigrants, such as by preventing expatriates from casting votes. A recent survey (Ellis et al. 2007) found that 100 countries do not allow voting from abroad. Many of those that do allow it place limits: the survey found that Bangladesh only allowed expatriate voting by government officers on official duty, South Africa allowed it for legislative elections only, Afghanistan for presidential elections only. This obstructs voting as it may be very costly for expatriates to visit their home countries for each and every election, particularly if their family moved with them.

Second, many developing countries *do* allow non-citizens to own property and to travel or work there: foreigners can own land in Egypt, South Africa, Ecuador, and numerous other migrant-origin countries. So these cannot be considered simply "citizenship privileges".

A further problem is that the retention of citizenship is not, for many skilled migrants, a choice. In the top migrant destination, the United States, skilled migrants with employment-based visas are forced to wait for years to change their citizenship. At the time of this writing, the waiting list for employment-based legal *residence* for "skilled workers and professionals"

(EB-3) is 11 years long for India, seven years long for the Philippines, and two years long for Mexico and mainland China (State Dept. 2014). After acquiring residence, workers must wait an additional five years before they can acquire United States citizenship.

For at least the first several years, then, skilled worker migrants to the United States do not have any alternative to retaining their origin-country citizenship—regardless of whether or not they are interested in its "privileges". During this entire period, of course, they must pay taxes in the United States, while being unable to vote. That is, skilled migrants are already subject to "taxation without representation", even if they desire representation in their country of residence but not in their country of origin. Freedom of movement has little meaning if it does not imply the ability to choose which social contract one belongs to.

Finally, Oldman and Pomp (1975) observe that conditioning the tax on retention of citizenship would create a large incentive for skilled migrants abroad to renounce their citizenship, and cut ties with the origin country. This has the potential to reduce many of the positive effects of skilled emigration noted above, such as fostering technology transfer and trade linkages.

5 Policy lessons: addressing the cost of education

The preceding sections argue against a policy approach to skilled emigration that involves coercive taxes and quotas or recruitment bans. What role for policy is left? There may be an efficiency justification for migrants to pay for part of the cost of their training, though not through a tax.

The analysis above proceeded on Coase's realistic assumption that transactions costs are high, preventing migrants and states from negotiating. In Table 1, this means that in the typical case where migration benefits exceed training costs, the more efficient policy is to entitle the migrant and have the origin-country pay to eliminate the externality by training a new skilled worker. But an even more efficient outcome is the upper-left quadrant, the agreement that the worker and country would come to if they could negotiate: The worker migrates but pays to train a new worker.

This opens the possibility for policy—targeted not at taxing or restriction migration itself, but on reducing transactions costs between skilled workers and their countries, allowing the most efficient outcome in which emigrant workers pay for new training or for their own training. This section discusses such policy opportunities. But first, it is important to discuss how much skilled workers would owe in such an agreement.

First, the households of migrant workers have already paid for substantial portions of their education, even when that education is fully publicly subsidized. Consider a Ghanaian child who attends public elementary school. Her parents pay for her education to the extent that they pay taxes—including excise taxes, value-added taxes, and import tariffs embodied in goods prices. Her parents pay for their neighbor's child to be schooled to the same extent that their neighbors pay for their own child to be schooled. If that child later emigrates, her household has already paid for her education.[18]

This would be true to a lesser extent for secondary and tertiary education, since many people in poor countries do not access higher levels of schooling. But it would be true to a greater extent for higher-income families—the families that do tend to access secondary and tertiary education—since higher-income families would tend to pay more in taxes, and thus they will have spent more for their neighbors' children's public schooling than their neighbors will have spent for their own children's public schooling. At any rate, it is overly simplistic to suggest that skilled emigrants owe their countries the full cost of schooling all the way back to elementary school, as many analysts do (Muula et al. 2006; Kirigia et al. 2006; Mills et al. 2011).

Second, many skilled emigrants have already provided several years of service prior to graduating. The average African doctor living in North America left more than five years after completing medical school (Clemens 2011). Consider what would be owed by a physician who emigrates at age 45. In a static sense, the migrant could eliminate the externality by paying to train a new physician. But in a dynamic sense, the emigrant has already given the country much of his or her career—which also reduces the externality. How fast, then, would the amount owed fall over time? While it is normal for countries and firms that sponsor training to expect a limited period of work from trainees in return, it would certainly be unusual

[18] David McKenzie and Lant Pritchett independently made this observation in personal communication.

for a country to require more than the several years that African emigrant physicians already typically serve.[19]

Suppose that, despite these two concerns, we have determined that skilled emigrants owe a certain amount to countries of origin to cover the cost of publicly-funded education of new skilled workers. A social planner could hypothetically try to achieve this outcome, such as by taxing migrants by the given amount and using it to train new skilled workers. Proposals for "compensation payments" of this type are common.

But there are numerous problems with *ex post* compensation payments for training costs. The biggest has been discussed above: because aid money is fungible, there is little evidence that *ex post* transfers from emigrant-tax revenue would be sufficient to cause human capital formation. The compensation payment would then be financing other types of government spending, which undermines its rationale. Furthermore, even if the compensation payment is spent on training skilled workers, it requires destination countries making the compensation payment to agree with the origin country's training priorities. Destination countries might believe that an origin-country's expenditure to train a specialist physician could have had greater health impact if it had been spent on public health measures—such as improved sanitation, basic hygiene education, community health workers, family planning, and HIV education. For this reason and because the training being paid for already occurred, political support for such payments would be tenuous. And calculating the proper compensation payment would involve estimating how long emigrants had worked in their countries before emigrating; this would require vast new data collection.

An alternative policy approach is an *ex ante* agreement between workers acquiring public education and the state that, if they wish to emigrate later, they will share in the cost of training a new worker. This is the efficiency-maximizing, upper-left outcome in Table 1. It requires transactions costs to be low enough for this negotiation to occur, and that requires

[19] Brazil and Turkey require home service in exchange for public scholarships for postgraduate study abroad. These require only a few years of service, however, therefore not encompassing the full value of the education funded. Colombia requires a single "rural year" of public service of its publicly-funded medical and dentistry graduates. Many firms ask for a work commitment of a few years in exchange for financing employees' graduate educations. But few such agreements extend to several years, and might be vulnerable to charges of indentured labor.

new institutions.

Clemens (2014) outlines how one form of these institutions could work, calling it a "global skill partnership", and describes numerous related arrangements that now exist. In such a partnership, employers in countries of destination could agree to finance the training of workers intending to emigrate, in exchange for a partial subsidy to the training of workers who wish to acquire skills but not emigrate.[20]

For example, consider a partnership in which a German hospital group agrees up front to finance the training of a nurse in Tunisia who has the intent to migrate to Germany. Both benefit greatly from the agreement: nurse training is about one tenth the cost in Tunisia compared to Germany, and nurse wages are about ten times higher in Germany compared to Tunisia. The employer's finance causes the training of this nurse, so there is no question of fungibility. The Tunisian government benefits in various ways: no public subsidy is lost when the trainee emigrates; the stock of nursing skills at the origin is not affected since training was undertaken for the purpose of migration; and the arrangement builds an internationally competitive training institution in the country of origin. Additional benefits would accrue to Tunisia if the arrangement requires employers to partially subsidize the training of a second nurse who does not intend to migrate. Even including such support for non-migrants' training, employers would save greatly from the partnership.[21]

Such an arrangement would achieve the most efficient outcome identified by Coase: the worker migrates and, in essence, uses the gains from migration to pay the cost of eliminating the externality—the cost of training—via the employer. But this *ex ante* agreement is superior to an *ex post* compensation scheme. First, unlike *ex post* compensation, the *ex ante* agreement would be sufficient to cause the training of a new worker. Fungibility of *ex post* cash payments means that they may or may not be sufficient to cause the training of a new worker. Second,

[20] Surveys suggest that large fractions of skilled workers in developing countries have little interest in migration. Earnings are far from the only determinant of skilled workers' migration decisions (e.g. George et al. 2013) and large shares of skilled migrants simply do not want to live abroad (Awases et al. 2004; Avato 2009).

[21] A full three years of nursing training in Tunisia can be less than US$10,000, compared to US$80,000–100,000 in Germany. Thus even conducting *one* of the three years in Tunisia rather than in Germany would save employers on the order of $20,000–30,000, whereas paying for half the training of a non-migrant nurse over a full *three* years would cost less than US$5,000. There are various options for how employers might recoup their investment. The nurse might commit to work for the hospital group that financed training, or pay off the obligation in cash while working for a different firm. Clemens (2014) discusses design options.

the required amount of an *ex ante* payment would be precisely known. As discussed above, the correct amount of an *ex post* payment is less clear.

Arrangements like this are currently difficult due to high transactions costs. New institutions could reduce transactions costs, and here there is a clear role for policy intervention to create such institutions. A pernicious effect of alternative ways to regulate skilled migration, such as recruitment bans, is that they obstruct the creation of just this type of training partnership—since it requires active recruitment of graduates. Such partnerships would also alleviate the concerns expressed by Mirrlees (1982) and Webb (1985) that skilled emigration would make origin-country governments less likely to subsidize education in general.

6 Conclusion

Over the last four decades, researchers have offered a shifting set of justifications for policies that tax or restrict the emigration of skilled workers from developing countries. Many of these rest on the idea that skilled emigration causes harm at the origin, but the case for Pigovian taxes and quotas in response is weak. Pigovian restrictions on skilled migration are inefficient, insufficient, and extremely difficult to calibrate.

Some economists who initially advocated Pigovian policies have shifted to non-Pigovian justifications for taxes and quotas on skilled migration. These include concerns about equity, ethics, and fee-for-privileges. But these too have critical failings. Equity justifications for emigrant taxation apply equally to high-income non-emigrants. Ethical justifications for emigration regulations tend to ignore profound ethical problems with taxing or restricting migrants. And fee-for-privileges justifications tend to ignore what privileges migrants really have and what value they place on them.

This paper argues that there is indeed a role for policy, in helping to ensure the most efficient outcome: skilled migrants should have the opportunity to enter into voluntary agreements to partially subsidize the training of new skilled workers at home if they wish to use their training abroad. This requires new institutions and innovative financing schemes, and policy can help

bring those about.

None of this is an argument that negative externalities from migration never exist. Rather, it is an argument about the proper response of regulation to those externalities. When a young Kenyan decides not to become a doctor, or an American doctor decides not to go work in Kenya, both of these decisions have external effects on Kenyans who might have received care. But few consider taxing or regulating those decisions. Many conditions must obtain before we would be willing to regulate a negative externality, and the argument here is that those conditions do not obtain for skilled migrants.

Beyond that, our evidence that skilled migration *must* produce negative externalities, net of its positive effects, is certainly not strong. For this reason it is time for researchers to stop using the pejorative term "brain drain" as a synonym for skilled migration, as is common in the literature (*inter alia* Collier et al. 2004; Docquier and Marfouk 2006; Docquier et al. 2007; Gibson and McKenzie 2011). Defining skilled migration in negative terms suggests a confidence about its net negative effects that the research literature does not justify.

The term "brain drain" may have been adequate for the inflammatory needs of the nationalistic British journalists who coined the term four decades ago (Winters 2009), but it is inadequate for the research literature or for level-headed policy discussion. Calling the rate of skilled worker movement the "brain drain rate" is just as value-laden as calling female labor force participation the "family abandonment rate", calling the Industrial revolution the "Great Farm Drain", or calling a tariff the "patriotic commerce charge". If researchers need a short, neutral term for skilled migration and skill circulation, one that captures the notion that ideas can flow with or without the movement of people, the term "skill flow" suffices.

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