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*Can International Migration Ever Be Made a Pareto Improvement?*

by

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# Can International Migration Ever Be Made a Pareto Improvement?

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**Abstract**

We argue that compensating losers is more difficult for immigration than for trade and capital movements. While a tax-cum-subsidy mechanism allows the government to turn the gains from trade into a Pareto improvement, the same is not true for the so-called immigration surplus, if the redistributive mechanism is not allowed to discriminate against migrants. We discuss policy conclusions to be drawn from this fundamental asymmetry between migration and other forms of globalization.

**Outline**

## Non-Technical Summary

Rich countries typically protect their labor markets trough relatively tight restrictions on immigration, and they are typically more hesitant to enter international obligations for migration than they are for trade and capital flows. Yet, migration holds a huge potential for efficiency gains through migration, which implies a reallocation of labor towards countries with a higher marginal value productivity.

However, aggregate efficiency gains mask potentially unwelcome distributional effects. Arguably, compensating losers is an important part of any strategy to "save globalization", and it seems particularly important to secure the gains from international migration, since political resistance to immigration largely stems from alleged distributional effects.

Economists routinely point out that a simple redistributive mechanism of indirect goods and factor taxes can be used to turn gains from trade into a Pareto improvement. In many cases, efficiency gains may either be reaped through trade or factor movements. For instance, in the European integration may take place either through trade, or through labor flowing from east to west or a reverse movement of capital. Does the mechanism of Pareto improving redistribution that works for trade also work for immigration?

We show that gains from migration are much harder to turn into a Pareto improvement than gains from trade or gains from capital flows, for two reasons. First, unlike trade and capital flows, international migration involves movement of people. Secondly, any attempt to redistribute income from winners to losers in the immigration country is likely to be subject to a non-discrimination constraint, meaning that the redistributive mechanism must not discriminate against a person on the basis of ethnicity, or the status of being a migrant. Intuitively, with immigration this requires "perverse compensation". Immigrants surely belong to the winners of migration. Yet, in the receiving country they are indistinguishable, except for ethnicity, from native workers who suffer a loss and will, thus, be eligible for positive transfers. Non-discrimination then implies that the redistributive mechanism also works to the advantage of migrants. It is obvious that the efficiency gain from migration simply may not be large enough to pay for this "perverse compensation" in a Pareto improving redistribution.

We first show that discriminatory factor taxation has implications for a country's optimal policy with respect to migration and capital flows, even absent any distributive concern within a country. If such discrimination is possible, then a large, relatively capital abundant economy has an incentive to allow for immigration, and to restrict, or ban, capital exports. With a non-discrimination constraint, it has an opposite incentive.

We then use general equilibrium model to show that a capital abundant economy that receives a labor inflow, even though it does receive an immigration surplus, cannot rely on redistributive mechanisms to achieve a Pareto improvement, unless it discriminates against immigrants. The non-discrimination constraint negates a Pareto improving compensation of losers from immigration. This suggests that lowering destination countries' resistance against immigration may require relaxation of the non-discrimination constraint for redistributive policies.

# 1.    Introduction

Most people would argue that migration is the most difficult form of economic globalization, because it involves movement of *people*. It separates families and poses challenges of cultural diversity and social integration that are largely absent in other forms of globalization, say trade in goods and services, or capital movements. For these reasons, international migration receives special "treatment" in the international "rules of globalization". We have the WTO that governs trade in goods and services, and to some extent foreign direct investment, and we have the IMF watching over mobility of financial capital and foreign exchange markets. It is striking that there is no comparable institution of international surveillance and cooperation/"enforcement" regarding international migration; see Hatton (2007). Countries are conspicuously less willing to enter international obligations on migration than they are with respect to trade and capital movements. Indeed, retaining unrestricted national sovereignty in governing the inflow of foreign labor is commonly regarded as a "natural right" of every country; see Freeman (2006). The same is not true for trade and capital movements. Almost throughout the entire world, national labor markets are less open than markets for goods and financial assets. Rich countries' labor markets are typically protected by relatively tight restrictions on immigration, although sometimes in strange alliance with active recruitment for specific types of workers to alleviate certain shortages in the domestic labor market; see Hatton (2007).

In a similar vein, regional (or preferential) agreements are typically focused on liberalizing trade and FDI, more than on lifting immigration restrictions vis à vis member countries. The EU is a telling case. While freedom of labor movements was envisaged already in the Treaty of Rome signed in 1957, it took until the Single European Act of 1987 for member countries to start being serious about it. In contrast, free trade through the customs union had already been completed by 1968. And when the Central and Eastern European Countries (CCECs) opened up to the West in 1989/90, the subsequent attempts launched by EU countries towards a speedy integration of these countries through the so-called Europe Agreements were, again, mainly focused on trade liberalization and FDI. Indeed, enhanced trade was partly seen as a vehicle to *avoid* migration; see Layard et al. (1992).[1] Even more

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[1] Similar arguments have also played a role with respect to the US and Mexico in the political process leading to ratification of the NAFTA agreement.

strikingly, when some of the CEECs finally became members of the EU in 2004, the majority of incumbent countries have insisted on transitional agreements allowing them to keep their immigration restrictions vis à vis new member countries for a period of up to seven years, in blunt violation of existing EU law (Single Market); see also Boeri & Brücker (2005).

Yet, migration holds a huge potential for efficiency gains through reallocation of labor towards employment with higher marginal value productivity. Thus, the World Bank estimates that increasing the immigrant share in the high income countries' labor force from 6.0 to 8.8 percent by 2025 would generate a cumulative real income increase (at PPP) equal to 0.64 percent of world GNP. By far the largest share of this would accrue to migrants themselves, who would benefit from a real income increase of as much as 200 percent, while the net gain to natives in the receiving and sending countries would be 0.36 percent and 0.86 percent, respectively, of their GNP; see World Bank (2006).[2] For the 2004 enlargement of the EU, somewhat larger migration flows have been calculated, at least for countries like Germany and Austria, with simulated *net* gains well above one percent of the receiving country's GNP; see Kohler (2004).

However, as with other forms of economic globalization, these aggregate *net* gains mask distributional effects. Within the sending and the receiving country, there are typically winners and losers from migration. In such cases, economists almost routinely invoke the notion of compensation, in order to identify whether a certain change, say an inflow of labor, is beneficial to the economy at large. If winners could use some of their gain to compensate losers, such that nobody is left worse off, then economists speak of a *Pareto-improvement*. It is in this sense that statements about a potential welfare gain from globalization scenarios are to be interpreted.

In all likelihood, however, winners will not be sufficiently altruistic and/or well-informed for such compensation to happen without some form of government interference. Markets left to themselves are good at bringing about Pareto-optimal situations, but they do not (and are not meant to) care about winners and losers when forcing decentralized adjustment through the price mechanism. That is a job we usually assign to governments. Political

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[2] It should be pointed out here that in this statement migrants are to be interpreted as *new* migrants. According to the Word Bank simulation, pre-existing foreign workers (i.e., *earlier* migrants) are revealed to suffer a 6 percent real income loss. See also Winters, Walmesley, Wang & Grynberg (2003).

systems and/or governments should thus be judged on their ability to pursue efficiency-enhancing policies, coupled with mechanisms to compensate losers, so as to achieve a Pareto improvement. [3]

The mere *potential* of such compensation will, of course, not be enough to sustain political support of a policy, say a policy of opening domestic markets to globalization. It is worth remembering at this stage that, contrary to wide-spread belief, the first wave of economic globalization about 100 years ago did not abruptly grind to a halt due to the outbreak of the Great War in 1914. It had been undermined much earlier through a gradual erosion of political support, because of distributional changes; see Hatton & Williamson (2005). It thus seems natural to view *actual* compensation of losers as an important ingredient of any strategy to "save globalization", although it will probably not be enough; see Davidson, Matusz & Nelson (2007) and Rodrik (2007a,2007b). The same probably holds true for past and future enlargements of the EU, and it does so for both, incumbent and new countries.

If *actual* compensation of losers is important to secure efficiency gains from globalization, this begs two important questions. What does a practical compensation mechanism look like? And is compensation easier to achieve for some forms of globalization than for others? We shall argue in this paper that migration is special in that compensation is indeed systematically more difficult to achieve than with trade and capital movements. In many cases the same efficiency gains may be achieved through either trade, capital movements, or migration. Focusing on such cases, we show that, while trade and capital movements are amenable to a practical compensation mechanism that allows for a Pareto improvement, this same compensation mechanism is typically infeasible for a migration scenario.

The key difference that causes problems with compensation arises from the simple fact, emphasized at the outset, that migration involves *movement of people*, which is not the case with trade and capital movements. [4] It has long been recognized that this causes problems for welfare statements, since it also changes the welfare constituencies, i.e., the groups of people that we consider as constituting a country whose welfare we are interested in; see

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[3] Notice the difference between a Pareto-optimal situation and a Pareto improvement. In a Pareto-optimal situation, by definition, no Pareto-improvement is possible. However, a movement from a Pareto-inefficient to a Pareto-optimal situation may well make some people worse off, although it is clearly enhancing efficiency.

[4] Of course, capital movements may take place in combination with migration. Moreover, some forms of trade in services also involve migration. But for the sake of our argument, we compare "pure" forms of globalization.

Bhagwati & Srinivasan (2003). Our point, however, is more subtle. It has to do with the mechanism of compensation that the receiving country may employ in an attempt to turn the efficiency gain from immigration into a Pareto improvement for its people, whereby we consider immigrants to be part of the receiving country. Whatever the details of such a mechanism, we argue that in almost any immigration country it is likely to be subject to a *non-discrimination constraint*, meaning that any discrimination solely on the grounds of a person being a migrant is ruled out.

The tax-cum-subsidy (TCS) mechanism introduced by Dixit & Norman (1980,1986) to discuss compensation with respect to the gains from trade satisfies this non-discrimination constraint. While the mechanism works fine for trade, we show that it fails to turn the aggregate net benefit from immigration into a Pareto improvement for the receiving country. Our point is relatively easy to establish for the Dixit-Norman mechanism of TCS, but as will become evident, it is more general.

It is obvious that this asymmetry between migration and other forms of globalization might partly explain the observed preference of trade and capital movements over migration that we have mentioned above. A different explanation, which also works through a non-discrimination constraint in redistributive policies has been put forward by Wellisch & Walz (1998). They assume an egalitarian policy to start with, whereby the level of redistribution is determined so as to maximize a social welfare function, which is assumed to be identical across countries. Moreover, they assume a priori that mobile labor is on the recipient side of this policy, which is paid for by the other factor, assumed to be immobile across countries. By construction of the model, immigration will always involve an inflow of welfare recipients. Other things equal, this makes achieving a given level of utility for these workers more costly, provided that foreign workers may not be denied access to the redistributive policy. Obviously, trade becomes a preferred form of globalization over migration. Our approach is more general in that we do not rely on a social welfare function. Instead, we only assume that policy is interested in Pareto improvement. As will become evident, our approach is also much more general in terms of the type of labor movement allowed, and we also compare migration to capital movements, in addition to trade.

In a recent paper, Hammond & Sempere (2006) have dealt with the issue of perfect substitutability of trade and international migration from a normative perspective, also

addressing compensation. They prove the existence of a Pareto improving Walrasian equilibrium with migration, relative to a status quo with trade alone, under a suitable redistribution rule. Their proof overcomes the problem that labor mobility as a form of globalization, unlike trade, is likely to generate non-convexities in the sets of feasible plans for households that have to do with the need to move across space to sell small units of one's labor in locations with different wage rates. In their redistribution rule, however, Hammond and Sempere do not enforce a non-discrimination restriction of the sort that we emphasize in this paper.

The paper develops our argument in three sections. In section 2, we first discuss issues and concepts of compensation in a general way. Section 3 then treats implications that follow from the non-discrimination constraint when a country attempts to pursue "national advantage" through restrictive policies towards capital movements and migration. In section 3 we do not yet bother about compensating of losers from such policies. Section 4 then turns to compensation, demonstrating the impossibility of achieving a Pareto improvement through a TCS mechanism of compensation in a small country receiving an exogenous inflow of foreign labor. Section 5 closes the paper with a brief summary and some policy conclusions.

## 2.    On Compensation

In scenarios like migration where one must expect distributional effects, any reference to aggregate welfare based on individual preferences must rely on a compensation argument, unless one is willing to specify a Bergson-Samuelson-type social welfare function. In turn, the notion of compensation implies jurisdictions with redistributive power. Any satisfactory welfare analysis must reflect the jurisdictional environment in which compensation takes place. In the context of migration, there are but two such jurisdictions, i.e., the sending and receiving country. For some purposes it may be useful to treat migrants' well-being as part of the sending country's welfare, as suggested by Bhagwati & Srinivasan (1983). But considering issues of compensation, this seems questionable. The real-world status quo is that (legal) migrants leave their home country jurisdiction and enter the host country's

jurisdiction. In the following, we therefore treat migrants as subject to the immigration country's mechanism of compensating losers from scenarios of globalization.[5]

For trade integration, there is an elaborate theory of compensation that identifies ways of turning efficiency gains from trade into Pareto improvements for each country involved. Importantly, the required compensatory schemes are purely national and do not involve international transfers. Earlier treatments have relied on *lump-sum* compensation; see Samuelson (1962). However, lump-sum measures suffer from the fact that individuals have no incentive to reveal their true gains and losses. They have a clear incentive to overreport losses and underreport gains. On the grounds of technical feasibility, we therefore do not consider compensation through lump-sum transfers any further in this paper.

Dixit & Norman (1980,1986) have shown that the gains from trade may be turned into a Pareto improvements also by means of *indirect commodity and factor taxation*, which requires no more than observing the two price systems, respectively, in the two situations considered.[6] Arguably, this is still quite demanding, but it is clearly much more satisfactory than the notion of lump-sum compensation. It is striking that a comparable theory of compensation is lacking for gains from factor flows. A possible explanation might be that for Heckscher-Ohlin models trade and factor flows are widely regarded to be substitutes regarding the efficiency and factor price effects; see the classic treatment by Mundell (1957).[7] It may therefore seem natural to assume that they are equivalent also with respect to the possibility of a TCS-type compensation towards a Pareto improvement. Our subsequent analysis will show that this is true for capital flows, but not for migration.

The principle advantage of a tax-cum-subsidy (TCS) scheme is that it does not target individuals. It is thus less demanding in terms of information. Specifically, it does not require knowledge of private information, such as individual gains or losses. Hence, it does not suffer from the lack of an incentive to tell the truth about individual affectedness. The specific TCS system envisaged by Dixit & Norman (1980,1986) for a trade scenario relies

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[5] Throughout this paper migration is always meant to be *legal* migration.

[6] Focusing on a dynamic setting with investment in skill formation, Willman (2003) shows that a lump-sum compensation scheme may lead to strategic underinvestment that dissipates all gains from trade. Incentive problems arising (particularly in labor markets) even with tax-cum-subsidy schemes are discussed in Feenstra (2004, pp. 184ff).

[7] Of course, the case of perfect substitution does not arise under all conceivable circumstances. The crucial point is that comparative advantage and trade must be caused by endowment differences; see Markusen (1983).

on observations of "pre- and post-trade" goods and factor prices in the country concerned.[8] The TCS system is used in order to expose households to pre-trade (or autarchy) prices, thus ensuring the Pareto criterion, while exposing the production sector to post-trade prices, thus securing the efficiency gains. Feasibility of a Pareto improvement is guaranteed, if the TCS system satisfies the government budget constraint. Importantly, the Dixit-Norman TCS system is *strictly national* and does not involve any international transfer. Moreover, it achieves compensation without apparent discrimination based on individual characteristics. The Dixit-Norman result thus marks a major break-through, and it is still considered part and parcel of the celebrated gains from trade theorem. It suggests that Pareto superiority is a *practically relevant* argument of desirability for globalization scenarios that promise efficiency gains.

What seems to have gone unnoticed, however, is that this view does not extend to immigration scenarios, if the TCS mechanism is applied on an equal footing to natives and migrants. It probably safe to argue that consensus about political correctness, and sometimes even constitutional provisions, require that the host country's TCS system not discriminate against a person on the basis of ethnicity, or the status of being a migrant. We may speak of a *non-discrimination constraint*. When a Dixit-Norman-type TCS system is used to turn gains from trade into a Pareto improvement, this constraint will never be binding, but for migration it is.

Why should migration be different? The intuition is best illustrated for the extreme case of autarchy versus free trade. Thus, let us compare a scenario where migration leads to the same goods and factor prices (equalized across countries) as which otherwise be achieved through free trade, in each case compared to complete autarchy. We take the simple case of a 2x2x2-Heckscher-Ohlin world with capital and a single type of labor. According to the Stolper-Samuelson theorem, the trade scenario holds a real income gain for workers in the labor abundant country. In the migration scenario, the same income change is brought about by some labor moving from the labor abundant to the capital abundant economy. Hence, the redistributive system must work to the disadvantage of (would be) *migrants*. At the same time, *native workers* in the receiving country who are perfect substitutes for

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[8] The original proof in Dixit & Norman (1980, p.79) looks at the somewhat extreme comparison between free trade and autarchy, but the principle of compensation as such generalizes easily to more realistic scenarios that involve an efficiency gain.

immigrants will suffer a loss, again in both scenarios. Therefore, the compensation mechanism needs to work in their favor.

Now, if compensation may not discriminate on the basis of a person being an immigrant, then we are obviously facing a problem. A TCS compensation mechanism requires that migrants should be taxed, while the non-discrimination restriction in their new country of residence, where workers lose, requires them to be subsidized. Moreover, if the TCS system is restricted to residents, then the sending country, in its attempt to compensate losers, suffers from the fact that migrants' income is beyond the reach of its own TCS system. The key question then is whether the efficiency gains are large enough to accommodate the restrictions, such that the migration scenario can similarly be turned into a Pareto improvement. We shall see in section 4 below that this in not the case.

# 3.    Comparing capital movements and migration

A "punchline" of our paper will be that discrimination against foreigners and/or foreign factor income may be conducive, or even necessary, for Pareto improving compensation, if a certain efficiency gain is brought about by factor movements instead of trade. This type of discriminatory taxation is not new to the literature on factor flows. In the 1980s, trade economists were interested in comparing the incentives and possibilities for countries to pursue their national advantage in cases where they could chose at will whether to restrict (or even ban) capital or labor movements. National advantage is defined as net gains to original residents. Although that literature is not concerned with compensating losers within any country, it nonetheless instructive to recall the principal insight, because that insight relies on the possibility of discrimination against foreign factor owners. This generates an asymmetry regarding the optimal policy between the two types of factor flows, even in a world where they are perfect substitutes as regards world-wide efficiency of factor allocation.

To put our argument in a practical context, let us consider intra-European integration of the CEECs. It can be argued that, up to a point at least, efficiency can be increased either through western capital going east, or through eastern labor going west.[9] Let us assume, in

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[9] The most obvious case where migration would always be necessary for efficiency is one where the west has a an absolute Ricardian advantage in productivity levels, as for instance assumed in Davis & Weinstein (2002) for US immigration.

typical Heckscher-Ohlin fashion, that the two types of factor movements are indeed perfect substitutes as regards efficient factor allocation. Suppose, moreover, that trade alone, for whatever reason, does not lead to international factor price equalization. If the countries considered are small in that they are unable to influence factor prices through restricting factor flows, then they have no incentive to favor one type of factor movement over the other, as far as the net gain for their initial factor owners is concerned. Note that initial factor owners do not include eastern migrants that might end up in the west. However, from the next section it will follow that this indifference will vanish once governments bother about compensation, in which case the west will favor capital outflows to labor inflows.

But let us thus assume for the moment that compensation is no issue, and that the countries considered (east and west) are large. This means that investment of western capital in the east is subject to a diminishing capital rental. Moreover, the west may draw on eastern labor only subject to a rising wage rate.[10] This obviously generates an incentive for the west to impose restrictions on capital outflows and/or labor inflows. Let us first look at capital exports. As is well known, maximization of the national advantage requires that a large capital-exporting country restricts capital exports, say through a tax on capital income earned abroad, in order to ensure that the marginal return on *exporting* capital is equal to the marginal productivity of domestic employment of capital.[11] Suppose the optimal capital export is equal to $K^e$, generating a capital rental in the foreign economy equal to $r*$. Given the capital export tax, it must be true that the domestic capital rental is $r < r*$. Assuming for the sake of simplicity that technology is the same in both countries, this implies a lower aggregate foreign capital intensity $k* < k$, and a lower wage rate $w* < w$.

Suppose now that the foreign capital $K^e$ is repatriated, and is employed domestically with an amount of foreign labor equal to $K^e/k*$, producing the same output as it did in the foreign economy before. Ruffin (2004) calls the operation of $K^e$ with foreign labor $K^e/k*$ an "enclave production". For the time being, we ignore the question of how such an enclave production might be supported institutionally. However, with an eye on the

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[10] , We thus rule out factor price insensitivity due to Rybczynski-type reallocation in the sending or receiving country, respectively; see Leamer (1995).

[11] Notice the difference here between the marginal return of *employing* capital (of whatever origin) in the foreign (eastern) country, and the marginal return from *exporting* domestic (western) capital to the eastern country.

distributional issue, we may note that this leaves everybody equally well off as with capital exports, although there will be distributional effects relative to the initial equilibrium. But there is now an inefficiency in that the aggregate capital intensity in the "enclave economy" is different from the aggregate capital intensity of the domestic economy. Obviously, letting the enclave economy be absorbed by the domestic economy through unified factor markets should lead to a more efficient allocation of resources. If the domestic government introduces a discriminatory wage tax on foreign labor, such that foreign workers earn a net-of-tax wage rate equal to $w*$, then all of this efficiency gain ultimately accrues to natives in the domestic economy, and foreign labor will not be made worse off.

The institutional setup that would support such a situation is a domestic ban on all capital exports, combined with a discriminatory wage tax $t_w^*$ that ensures a net-of-tax wage rate equal to $w*$.[12] Note that, by construction of the argument, $w*$ is the *equilibrium* wage rate that obtains in the east if $K^e/k*$ labor has emigrated to the west. Hence a suitable discriminatory wage tax on foreign labor employed in the domestic economy is the only instrument needed, in addition to a complete ban on capital exports, to support this equilibrium. The equilibrium condition for migration, requiring equality of the (net) wage rates for migrants, is satisfied in this equilibrium. Note, however, that $K^e/k*$ need not be an *optimal* inflow of foreign labor. The condition of an optimal labor inflow requires equality between the marginal productivity of foreign labor employed domestically, which is equal to $\left(1+t_w^*\right)w*$ in this equilibrium, and the marginal cost of foreign labor. Since by assumption the economy is large, the marginal cost of foreign labor to the domestic economy is larger than the prevailing wage rate abroad. Therefore, this condition may, but need not, be satisfied in the equilibrium just described. A first-best policy may require a further adjustment of the discriminatory wage tax $t_w^*$.[13]

Now, given what we have said above about the feasibility of discriminating against immigrant labor, the policy just described must seem highly questionable, although it must be emphasized that the policy does not exploit the foreign economy, relative to the initial

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[12] See also Bhagwati & Srinivasan (1983) and Calvo & Wellisz (1983) for a description of this policy experiment. The principal underlying insight of this result is due to Ramaswami (1968).

[13] Under plausible, conditions, the policy described above will also entail goods price adjustments, which we have ignored in our analysis. Arguably, the principal insight is independent from this complication.

equilibrium, which is remarkable. But the principal insight underlying the policy, originally framed in the previous setup by Ramaswami (1968), carries over to an economy that would export labor and import capital in a laissez faire equilibrium. In our framework, it is relatively easy to see that applying the above logic, mutatis mutandis, to the eastern economy leads to a ban on emigration, coupled with a suitable discriminatory taxation of capital income. Arguably, such discrimination is deemed less odious than discriminating against resident immigrants. Indeed, it seems implied by the destination principle of international capital taxation, where capital income originating in any one country receives different tax treatment, depending on the residence of the factor owner. But there is a difference between this type of discrimination and the one implied by the optimal capital import policy of the eastern country. This policy is equivalent to a destination principle of capital income taxation which is applied in a discriminatory way by the capital importing country at *its own* full discretion (and not the discretion of the west), and to its own national advantage. This is difficult to imagine.

Obviously, the two countries' optimal policies described above are mutually exclusive. Assuming that the optimal policy of the western country is ruled out by the non-discrimination constraint, it still has an incentive to restrict capital exports, given the eastern country's optimal policy with respect to capital inflows. One could now go on describing an equilibrium outcome of policies, assuming some form of strategic interaction between governments. However, this is unlikely to generate new insights for our point of concern, which is Pareto improvement. We therefore move on to issues of compensation.

## 4.    Pareto improvement: An impossibility theorem

Existing political consensus as well as constitutions typically rule out the optimal "Ramaswami-policy" of a relatively capital abundant economy. Moreover, a discriminatory taxation of foreign capital income, although arguably less odious in principle, seems difficult to achieve for a capital importing economy in a manner required by the "Ramaswami-policy". Practically speaking, what we observe in the European context is a combination of both, a net labor inflow in the West and a net capital inflow in the East, both subject to policy influence, but not in single-minded pursuit of national advantage. What we also observe is governments that are to some extent worried by the distributional impacts of these factor flows.

Let us then assume that governments contemplate compensation of losers, but that they are constrained in doing so through "non-discrimination" as described above. We now ask a simple question: For an arbitrary inflow of labor into the capital abundant economy, will the government be able to implement a non-discriminatory mechanism of compensation, such that immigration will in the end be a Pareto improvement for natives of this economy?

In some sense, the literature seems to presume the answer to be yes, since it stresses that any country experiencing some factor inflow which is different in composition from the initial factor endowment benefits from a welfare increase; see Ruffin (1984). For the case of immigration, this welfare increase has been called an *immigration surplus*; see Borjas (1995,1999). However, such an aggregate welfare increase will arise if and only if the factor inflow is absorbed with changes in factor prices; see Felbermayr & Kohler (2007). Speaking of an aggregate net gain to natives in the face of such factor price changes presupposes the possibility of some mechanism of compensation. For the *gains from trade*, economist routinely refer to the possibility of employing a TCS mechanism of the type introduced by Dixit & Norman (1980,1986), in order to achieve a Pareto improvement. For the immigration surplus, the literature has so far not bothered to address compensation at all, presumably on the grounds that what is possible for the gains from trade should equally be possible for the immigration surplus. It turns out that this is impossible, if the TCS mechanism is subject to a non-discrimination constraint.

For the sake of simplicity, let us assume that the economy in question produces many tradable goods with world prices $p$ (denoted in vector form) under constant returns to scale and perfect competition. We assume that immigration does not change world market prices for traded goods. Moreover, we assume there are no non-traded goods, the country practices free trade, and there are no domestic distortions of any kind. This latter assumption is important, as it rules out second-best effects of immigration. We thus want to isolate the Pareto-improving potential of the "classic" immigration surplus. Denoting the economy's fixed endowment with a vector $v$, its gross national product (GNP) may be described by a function $g(p, v)$, which is convex in prices $p$ and concave in endowments $v$. The economy has an initial endowment $v_0$ and now receives an exogenous inflow of foreign labor $\Delta v \geq 0$. Note that we allow for many different types of labor with varying amounts of inflow, relative to initial endowments. We rule out any factor outflow for the

moment. The vectors of factor prices before and after migration are denoted by $w_0$ and $w_1$, respectively. Importantly these vectors include rentals for factors other than labor.

Note the similarities and differences of this scenario, compared with the scenario underlying the conventional gains from trade theorem. The trade scenario allows the economy to draw on foreign goods markets with given goods prices, differing from the country's autarchy prices. Trade flows are determined endogenously, subject to balanced trade and with given endowments. Our immigration scenario allows the economy to draw on the foreign labor market where wages are different. We could in principle also let $v$ adjust endogenously to equalize domestic and given foreign wage rates, thus assuming the equivalent of a small trading economy. However, it seems more realistic to assume an exogenous inflow of labor, say determined by immigration restrictions, and let domestic wages adjust instead, assuming for simplicity that production adjustments in the sending and receiving countries together are observed without changes in world market prices $p$. With an exogenous determination of the labor inflow, the details of the wage differential vis à vis the foreign economy become irrelevant.

Under the above assumptions, we have

$$g(p, v_0) = g_v(p, v_0) \cdot v_0 \quad \text{and} \quad g(p, v_0 + \Delta v) = g_v(p, v_0 + \Delta v) \cdot (v_0 + \Delta v) \tag{1}$$

$$w_0 = g_v(p, v_0) \quad \text{and} \quad w_1 = g_v(p, v_0 + \Delta v) \tag{2}$$

where a subscript $v$ indicates the gradient vector of the GNP-function. Note that all vector products are defined as inner products. Suppose now that the government wants to make sure that all natives are made no worse off after immigration than before. One way to do this is to introduce specific indirect factor taxes, such that each native factor owner will have the same net-of-tax income available as before migration. The tax vector that satisfies this requirement is $t = w_1 - w_0$. Of course, if for some factor $w_{i1} < w_{i0}$, then the mechanism implies a subsidy. A Pareto improvement is feasible, if the government budget from applying this TCS mechanism is *strictly positive*.

There are, of course, other redistributive mechanisms that the government may consider. But our choice here is not arbitrary. First of all, an indirect factor tax, by definition, satisfies the non-discrimination constraint emphasized above. And, equally important for our purpose, it has been shown that such a TCS mechanism does allow for a Pareto

improvement on the basis of gains from trade; see Dixit & Norman (1980) and Feenstra (2004).

The net revenue from a non-discriminatory implementation of the mechanism is equal to

$$B = \left(w_1 - w_0\right) \cdot \left(v_0 + \Delta v\right) \tag{3}$$

The immigration surplus may be written as

$$S = g\left(p, v_0 + \Delta v\right) - w_1 \cdot \Delta v - g\left(p, v_0\right) \tag{4}$$

which is simply the increase in GNP minus the wage payments to migrants. The net revenue from redistribution may be rewritten as

$$B = S + \left(w_1 - w_0\right) \cdot \Delta v \tag{5}$$

It can be shown that $S > 0$, whenever the composition of the inflow of factors is different from the initial endowment; see Felbermayr & Kohler (2007). If we assume that $v_0$ also involves factors *other* than labor, then this condition is satisfied, if $\Delta v > 0$ involves *only* labor.

But the presence of a positive immigration surplus alone does not guarantee feasibility of our TCS mechanism, meaning that $B \geq 0$. Indeed, it follows from concavity of the GNP-function that the second term in equation (5) is non-positive. Concavity implies

$$g\left(p, v_0 + \Delta v\right) \leq g\left(p, v_0\right) + g_v\left(p, v_0\right) \cdot \Delta v \tag{6}$$

$$g\left(p, v_0\right) \leq g\left(p, v_0 + \Delta v\right) + g_v\left(p, v_0 + \Delta v\right) \cdot \Delta v \tag{7}$$

Notice that inequality (7) implies that $S \geq 0$, which is in line with what we have just said, whereby $S > 0$ if and only if $w_1 - w_0 \neq 0$. Given (2), inequalities (6) and (7) together imply

$$\left(w_1 - w_0\right) \cdot \Delta v \leq 0 \tag{8}$$

which implies that the contribution of immigrants to the net revenue of the TCS mechanism is non-positive. But the government still has the immigration surplus $S$ to draw upon, in order to finance redistribution. However, it is easy to see that this will not be enough. We rewrite

$$B = w_1 \cdot \left(v_0 + \Delta v\right) - w_0 \cdot v_0 - w_0 \cdot \Delta v \tag{9}$$

Observing that the first two terms on the right are equal to $g\left(p, v_0 + \Delta v\right) - g\left(p, v_0\right)$, we realize from (6) that $B \leq 0$. This is our impossibility theorem: The *immigration surplus* does not permit a *Pareto improvement* through implementation of a TCS mechanism,

applied on an equal footing to natives and migrants. We should like to emphasize once more that this same TCS mechanism works perfectly fine for a Pareto improvement for the *gains from trade*.

How much discrimination would the government need to impose against immigrants for Pareto improvement to become feasible? Suppose that the government is able and willing to openly discriminate against migrants, but assume that it can do so only *uniformly* across all types of labor. Let $t^*(w_1 - w_0)$ be the vector of specific taxes/subsidies applied to foreign labor, with $0 \le t^* < 1$, while $w_1 - w_0$ is applied to native labor. In other words, we assume that a foreign worker receives a lower subsidy than a native worker of the same type, but also pays a lower tax, should compensation require that type of labor to be taxed.[14] The typical case that we have in mind is one where wage rates are lowered for of all types of labor where immigration occurs, and factor price increases occur only for factors where there is no inflow. However, in our general case with arbitrarily many types of labor, complementarities between different types of labor may (but need not) generate an outcome where some type of labor benefits from a higher wage, even though there is an inflow of foreign labor of that type, alongside immigration of other types of labor. Of course, $w_{i1} - w_{i0} > 0$ is ruled out, if there is no labor inflow other than $\Delta v_i > 0$. Note that $1 - t^* < 1$ measures the degree of discrimination.

It can be shown that such a discriminatory TCS generates net revenue

$$B = S + (w_1 - w_0) \cdot t^* \Delta v \tag{10}$$

where $S$ is the immigration surplus defined as in (4) above. We know from above that $S > 0$ whenever $w_1 - w_0 \ne 0$. Hence, unless the immigration surplus is zero to start with, $t^* = 0$ implies $B > 0$, which implies a Pareto improvement. This is the trivial solution of perfect discrimination. The interesting question is whether a Pareto improvement may also be achieved through less than perfect discrimination, i.e., with an interior value of $0 < t^* < 1$.

We may write (6) as

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[14] Of course, a more "efficient" way of discrimination would be to grant lower subsidies to foreign workers (if compensation requires some factor to be subsidized), and at the same time impose higher taxes on foreign labor (if compensation requires some factor to be taxed). This could still be implemented in a uniform way across all types of labor.

$$g(p, v_0 + \Delta v) = g(p, v_0) + \gamma(w_0 \cdot \Delta v) \quad \text{with} \quad 0 \le \gamma \le 1 \tag{11}$$

The "parameter" $\gamma$ measures the degree of concavity of the GNP-function. It should be noted, however, that $\gamma$ is specific to the labor inflow $\Delta v$, with the limiting case $\gamma = 1$ indicating a linear segment of the GNP-function (factor price insensitivity), in which case there will be no factor price change from $\Delta v$, i.e., $w_1 - w_0 = 0$. More specifically, $\gamma$ is determined by the second order derivatives of the GNP-function $g_{vv}(p, v_0) \cdot \Delta v$, as we shall see below. From (4), the immigration surplus may be rewritten as

$$S = \gamma(w_0 \cdot \Delta v) - w_1 \cdot \Delta v \tag{12}$$

Solving (10) for $B \ge 0$ then yields

$$1 - t^* \ge -\frac{1 - \gamma}{\Gamma} \quad \text{for} \quad \gamma < 1, \quad \text{where} \quad \Gamma := \frac{(w_1 - w_0) \cdot \Delta v}{w_0 \cdot \Delta v} \tag{13}$$

For $\gamma = 1$, we have $t^* = 1$.[15] What is the interpretation of condition (13)? We know from above that $0 \le \gamma \le 1$ and $(w_1 - w_0) \cdot \Delta v \le 0$. $\Gamma \le 0$ measures the extent to which the factor price change "devalues" the labor inflow, whereby strict inequality (no factor price insensitivity) is required for an immigration surplus to arise at all. For "marginal" immigration, the surplus vanishes, but we look at a discrete labor inflow, and $\Gamma$ captures the gain on infra-marginal units. The larger (in absolute value) these infra-marginal effects, the lower – other things equal – the required degree of discrimination $1 - t^*$. However, other things are not equal, since $\Gamma$ as well as $\gamma$ are both driven by the same forces. Unfortunately, however, they are inversely related. The larger absolute value of $\gamma$ (lower degree of concavity), the lower the absolute value of $\Gamma$, and $\gamma = 1$ implies $w_1 - w_0 = 0$. Without going into further details, the conclusion must therefore be that a uniform interior level of discrimination $1 - t^* < 1$ solving our problem need not exist. The intuitive reason is that factor complementarities may give rise to wage increases for immigrant labor, in which case our "discriminatory" TCS system works against the government's budget constraint.

Suppose that instead of an open discrimination, the TCS mechanism is inherently sensitive to the type of labor inflow. For instance, part of the labor inflow might be temporary, and

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[15] This is added for formal reasons only, since in this case $\Gamma = 0$, as mentioned above. In this case, the immigration surplus is zero and a Pareto improvement is trivially ruled out.

discrimination is allowed for temporary migrants. This is a partial relaxation of the non-discrimination constraint. Moreover, some of the foreign labor may enter the country without people taking residence. We may either think of cross-border commuting, or of certain types of services trade.[16] Wage income paid to such non-resident foreign labor may simply not be within reach of the domestic TCS mechanism. Again, we may view this as a partial relaxation of the non-discrimination constraint. Might such a relaxation help towards a Pareto improvement? Can we identify conditions under which this is possible?

Let $Z$ be a diagonal matrix such that element $z_i$ indicates the share of type-$i$ labor inflow which is takes permanent residence, $1 - z_i$ thus being the share which for the above reasons is beyond the reach of the TCS mechanism. The government budget (3) then reads as $B = (w_1 - w_0) \cdot (v_0 + Z \cdot \Delta v)$. We now approximate the vector of factor price changes as $(w_1 - w_0) \approx g_{vv}(p, v_0) \cdot \Delta v$, where $g_{vv}(p, v_0)$ indicates the negative semi-definite matrix of second-order endowment-derivatives of the GNP-function. We abstain from explicit distinction between row and column vectors, as the dimensional requirements for meaningful vector and matrix multiplication are obvious. The government budget of the TCS mechanism emerges as

$$B \approx v_0 \cdot \left[ M \cdot g_{vv}(p, v_0) \right] \cdot v_0 + v_0 \cdot \left[ M \cdot g_{vv}(p, v_0) \cdot Z \right] \cdot \Delta v_0 \tag{14}$$

In this expression, $M$ is a diagonal matrix of immigration rates, $\Delta v_i = m_i v_{i0}$.

Equation (14) may seem rather complex, but it is revealing. Again, a Pareto improvement requires that $B > 0$. The first term on the right-hand side of (14) is the immigration surplus $S$, which we know from above to be non-negative. Indeed, since we have assumed $v_0 \cdot M \neq v_0$, it is strictly positive. In other words, in the aggregate there is complementarity between immigration and domestic factors. The magnitude of the surplus is governed by the interplay between the migration rates in $M$ and the factor price effects given by the second-order derivatives of the GNP-function. This is the first bracketed term on the right. For instance, large immigration rates for labor with large positive cross-effects on other

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[16] The above view of services trade holds for some of the cases falling under Modes 1 and 2 of the GATS. See Bhagwati, Panagariya & Srinivasan (2004) for a discussion of different modes of trade in services provided for by the GATS.

factor prices where there is no inflow, but a large domestic endowment, are responsible for a large immigration surplus.

The second term of (14) captures the cost of applying the TCS mechanism to immigrants. Here, we observe a somewhat more intricate interaction between the pattern of complementarity, given by the matrix $\boldsymbol{M} \cdot g_{\boldsymbol{vv}}\left(\boldsymbol{p}, \boldsymbol{v}_0\right)$, and the pattern of permanent domestic residence of migrants, captured by the matrix $\boldsymbol{Z}$. Generally, if factors that are significant beneficiary of complementarity with respect to immigration are non-migrants, or migrants with a low share of domestic residence, then application of the TCS mechanism to migrants will generate low revenue. Similarly, if factors that suffer from substitutability with respect to immigration are also factors with a large inflow of migrants with permanent domestic residence (large $z_i$), this generates a large budgetary cost from applying the TCS mechanism. This type of interaction is captured by the second bracketed term in equation (14) above. The channels responsible for whether or not a Pareto improvement will result from a TCS mechanism with weakened non-discrimination are thus relatively easy to identify in principle, but it is very difficult to imagine that a government may target the matrices $\boldsymbol{M}$ and $\boldsymbol{Z}$ in a deliberate attempt to achieve a Pareto improvement without open discrimination in its compensation effort.

# 5.  Conclusions

Globalization has winners and losers. Arguably, compensating losers is important, in order to maintain political support for policies aiming at gains from globalization. Large international discrepancies in wage rates indicate that the gains from further migration are very large, indeed larger than gains from further trade or capital flows. Indeed, international migration seems a very powerful instrument in the fight against poverty. Unfortunately, it is also the form of globalization facing the largest political resistance. Rich countries are gating their labor markets through tight immigration restrictions. To a large extent, the explanation lies in wide-spread fear of unwelcome labor market effects in receiving countries, particularly regarding wages.

Economists routinely point out that efficiency gains facilitate compensatory mechanisms, in order to achieve a Pareto improvement. A well-known result states that the gains from trade may be turned into a Pareto improvement through a suitably designed system of indirect

taxes/subsidies on goods and factors. We have shown that the same is not true for gains from migration, if the tax-cum-subsidy system is to be applied on an equal footing to natives and migrants. Compensation thus seems inherently more difficult for migration than for other forms of globalization that do not involve movement of people. At the same time, the potential for efficiency gains from migration seems particularly large. One should add here that such gains may even accrue to the non-migrant part of the sending country, if the prospect of emigration enhances the incentives to human capital formation.[17]

We thus face an awkward finding. There is the plausible hypothesis that large gains from migration are negated by fear of distributional effects in receiving countries. And there is our result that compensatory mechanisms towards Pareto improvement that work for other forms of globalization do not work for migration, unless we allow for discrimination against migrants in the way the compensation mechanism is employed. What are we to conclude?

Accepting the political restriction that immigration should be made a Pareto improvement among natives of the receiving country, a possible conclusion seems to be that we must head for more redistribution from migrants to natives in the receiving countries. This is, indeed the conclusion drawn by Freeman (2006) who notes that „*the only way I can think of to increase the receptivity of destination countries to accept more immigrants would be (to) redistribute the benefits of immigration so that a greater share of the benefits flow to natives and a lower share to the benefits of migrants*" (p.165). The conclusion is delicate, however. One might argue that it puts too much weight on the welfare of (rich?) natives in receiving countries. Why should alleviation of world poverty through migration be put under the restriction that *all* rich country natives stand to gain?

However, if we do accept this restriction there seems no way to avoid the conclusion that we should rethink the requirement of non-discrimination in compensatory mechanisms employed to compensate losers from migration. One may hesitate, or even regard this as outrageous. But if the price of non-discrimination is maintaining tight immigration restrictions, we should not forget about the discrimination that is induced by these restrictions. It is discrimination among the would-be migrants, on sometimes dubious

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[17] Such a „brain gain" (as opposed to the oft-quoted „brain drain") arises, if skill formation is subject to a positive externality, and if some of those enticed into skill formation do not emigrate. This was first pointed out by Stark & Wang (2002).

grounds, between those who make it into the quota allowed and those who don't. And we should not forget about the cost involved in this type of discrimination, particularly the human toll caused by attempted illegal migration.

# References

Bhagwati, J., Panagariya, A. and T.N Srinivasan (2004), 'The Muddles over Outsourcing', Journal of Economic Perspectives, 18 (4), 93-114.

Boeri, T. and H. Brücker (2005), 'Why are Europeans so Tough on Migrants?', Economic Policy 20 (44), 629–703.

Borjas, G.J. (1995), 'The Economic Benefits from Immigration', Journal of Economic Perspectives, 9, 3–22.

Borjas, G.J. (1999), 'The Economic Analysis of Immigration,' in O. Ashenfelter andD. Card, (eds.), Handbook of Labor Economics 3A, Amsterdam: Elsevier Science BV9, Ch. 28.

Calvo, G.A. and S. Wellisz (1983), 'International factor mobility and national advantage', Journal of International Economics, 14 (1-2), 103-114.

Davidson, C., St. Matusz and D. Nelson (2006), 'Can Compensation Save Free Trade?' Journal of International Economics, 71 (1), 167 – 186.

Dixit, A.and V. Norman (1980), Theory of International Trade: A Dual, General Equilibrium Approach, Cambridge: Cambridge University Press.

Dixit, A. and V. Norman (1986), 'Gains from trade without lump-sum compensation', Journal of International Economics, 21 (1-2), 99-110.

Feenstra, R.C. (2004), Advanced International Trade, Princeton, N.Y.:: Princeton University Press.

Felbermayr, G. and W. Kohler (2007), 'Immigration and Native Welfare', International Economic Review 48 (3), 731-760.

Freeman, R. (2006), 'People Flows in Globalization', Journal of Economic Perspectives, 20 (2), 145-170.

Hammond, P.J. and J. Sempere (2006), 'Gains from Trade Versus Gains from Migration: What Makes Them so Different?' Journal of Public Economic Theory 8 (1), 145-170.

Hatton, T. J. (2007a), 'Should We Have a WTO for International Migration?' Economic Policy, 22 (50), 339-383.

Kohler, W. (2004). 'Eastern Enlargement of the EU: A Comprehensive Welfare Assessment', Journal of Policy Modeling, 26, 865-888.

Layard, Richard, Olivier Blanchard, Rudiger Dornbush & Paul Krugman (1992), East-West Migration. Cambridge: MIT Press.

Leamer, E. (1995), 'The Heckscher-Ohlin Model in Theory and Practice', Princeton Studies in International Finance, 77, Princeton, N.Y: Princeton University Press.

Markusen, J. (1983), 'Factor Movements and Commodity Trade as Complements', Journal of International Economics. 14 (3-4), 341-356.

Mundell, R. (1957), 'International Trade and Factor Mobility', American Economic Review 47 (3), 321-335.

Ramaswami. V.K. (1968), 'International Factor Movement and the National Advantage', Economica, 35, 309-310.

Rodrik, D. (2007), 'Saving Globalization from its Cheerleaders', Journal of International Trade and Diplomacy, 1 (2), 1-33.

Rodrik, D. (2007), One Economics, Many Recipes: Globalization, Institutions, and Economic Growth, Princeton, N.Y.: Princeton University Press.

Ruffin, R.J. (1984), 'International Factor Movements', in R.W. Jones and P.B. Kenen (eds.), Handbook of International Economics, vol. I, Amsterdam: North-Holland, pp. 237-288.

Samuelson, P. (1962), 'The Gains from International Trade Once Again', Economic Journal, 72 (288), 820-829.

Stark, O. and Y. Wang (2002), 'Inducing Human Capital Formation: Migration as a Substitute for Subsidies'. Journal of Public Economics, 86, 29-46.

Wellisch, D. and U. Walz (1998), , Why do rich countries prefer free trade over free migration? The role of the modern welfare state', European Economic Review 42, 1595-1612.

Willman, G. (2004), 'Pareto Gains from Trade: A Dynamic Counter-example', Economics Letters, 83, 199-2004.

Winters, L., Walmsley, T.L., Wang, Z.K. and R. Grynberg (2003), 'Liberalising Temporary Movement of Natural Persons: An Agenda for the Development Round', World Economy, 6 (8), 1137-1161.

World Bank (2006), Economic Implications of Remittances and Migration, Global Economic Prospects 2006, Washington D.C.