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If People were Money: Estimating the Potential Gains from Increased International Migration

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Abstract

In this paper we elaborate on the findings produced by an applied equilibrium model that is used to calculate the annual efficiency gains from free international migration. These findings suggest that we can expect significant gains from liberalizing international labour flows. In particular, we expand on two implicit aspects of the estimates: the actual number of migrants being generated by the various counter-factual scenarios, and the per-migrant cost/benefits associated with each. These estimates are then compared with contemporary migration flows and the findings of studies that analyse their economic impact. In light of these comparisons, we conclude that our original findings are not unreasonable.

Keywords: international migration, efficiency gains, immigration surplus, development, CGE models

JEL classification: C68, F22, J61, N30, O15

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> In the penultimate year of the Reagan presidency, the United States expelled over a million illegal aliens and was decidedly bullish about it. In the same year, the United States absorbed over two hundred billion dollars worth of direct foreign investment and was not even slightly sheepish about it. Australia, Great Britain, and, indeed much of the civilized and semi-civilized world has been doing much the same, albeit in a little less dramatic fashion, for the past decade or in some cases much more.
>
> The message is clear enough. Had immigrants been investments—had the people been money—their influx would have been welcomed with open arms. Instead, it was deeply resented and fiercely resisted.
>
> Robert E. Goodin (1992:6)

'If people were money…' This is the provocative title to Robert Goodin's opening salvo in an edited collection entitled *Free Movement*. In raising this hypothetical question, Goodin's intent (and that of the edited volume that followed) was to provoke a moral debate about the way in which the developed world has inconsistently prioritized international financial capital mobility, while limiting international labour mobility.

It is, however, possible to raise Goodin's question in a different light. Rather than focus on the moral issues raised by the lack of international labour mobility, we might ponder the economic consequences of allowing people the same freedom of mobility that we now grant money (or, for that matter, goods and services). This sort of pondering leads to two difficult and speculative questions that we address in the paper that follows: 'What sort of economic gains might the world expect to reap by liberalizing world labour markets?' and 'How realistic is the underlying framework used for estimating these gains?'

In raising these types of questions, we do not wish to imply that a free-migration scenario is likely, or that answers are easily obtainable or non-controversial. We are fully aware of the practical, empirical and methodological difficulties in addressing such speculative questions. In spite of these difficulties, the questions remain important and relevant enough to warrant focused attention. Indeed, previous counter-factual analyses and historical studies suggest that the gains could be very significant.

The relevance of the question is clearly evident when we juxtapose the lessons of two research themes in contemporary political economy. On the one hand, there is an established literature that links contemporary globalization to increased global income divergence. On the other hand, there is a relatively new literature that links economic integration and real wage convergence during an earlier (late nineteenth century) period of globalization. When we recognize that the most striking difference separating these two periods of globalization is the degree of labour mobility, we are left to wonder: 'What if today's globalization was also characterized by free labour mobility?' The next section juxtaposes these two literatures.

The main body of the paper expands on the findings of an applied equilibrium (AE) model that was originally produced for the UNU/WIDER Conference on 'Poverty, International Migration and Asylum'. Although the model is not designed to address the convergence question head-on, it generates estimates of the efficiency gains that the

world might expect to reap from increased international migration. After a brief introduction of that model (and its results), we turn to it to produce some new estimates with the aim of providing a 'reality check' for the model.

In short, AE models provide us with analytical skeletons of the relationship between international migration and economic growth. While these skeletons continue to develop, our immediate ambition is to hang some empirical meat on them. In particular, we wish to expand on two implicit aspects of the estimates being generated: the actual number of migrants being generated by the various scenarios, and the per-migrant cost/benefit associated with each. These estimates can then be compared with contemporary migration flows and the findings of studies that analyse their economic impact.

The results of these comparisons suggest that our model tends to generate very large flows of migrants across international borders. Even in the most reasonable (1 per cent) scenario, the model generates 44 million migrants (or about 5 per cent of the native population in the developed world). In addition, we find that the worldwide efficiency gains from this level of migration are also very large: indeed, they dwarf the anticipated impact of some of today's development strategies. Finally, the per-migrant gains generated by our model are much larger than those generated by an influential study of American conditions (Borjas 1999).

These comparisons encouraged us to adjust the model so that it would generate lower per-migrant gains. In doing this, we found ourselves squeezed by empirical constraints on the input side (with respect to the expected production efficiency differences separating rich and poor countries) and empirical constraints on the output side of our model (i.e., Borjas' estimates of per-migrant surpluses). The resulting model is a compromise that produces much smaller estimates for both migrant flows and efficiency gains. Even in this model, however, we find that the estimated efficiency gains from increasing migration are remarkably large.

We conclude by suggesting that the original model estimates are not unreasonable. If forced to decide whether we should rely on the empirically-grounded input estimates of the efficiency differences between richer and poorer regions (on the one hand), or tweaking the model to produce lower per-migrant gains, we would choose the former. As we adjust the model to produce lower estimates, the results become less plausible.

1 The puzzle

Two literatures in contemporary political economy provide the academic motivation for the question at hand. The first links globalization and global income inequalities. The second attributes income convergence in the late nineteenth century to cross-Atlantic migration flows. In juxtaposing the conclusions of these two disparate literatures, we are encouraged to ponder the convergence effects of international migration.

We begin with the literature that examines the economic consequences of contemporary globalization. As late as 1820, per capita incomes were fairly similar around the world. Of course, they were low (ranging from about US$ 500 in China and South Asia to about US$ 1,000-1,400 in the richest countries in Europe); but they were equal. Indeed,

the World Bank has estimated that roughly three-quarters of the world's population then lived on less than US$ 1 a day (World Bank 2000: 45).[1] Since then, however, per capita incomes have grown tremendously in the world's richest countries (e.g., in Europe they have grown more than tenfold in real terms), while incomes for the world's vast majority stagnated (indeed, by some measures, these have actually declined). Not surprisingly, the result has been an increased spread in economic inequality.

Economic historians have long noted the growing income gap between rich and poor nations.[2] Kuznets' classic (1966) *Modern Economic Growth* focused on how a small but growing group of nations was able to combine industrialization, technical innovation and institutional and political developments to produce impressive records of economic growth. Later, Kuznets (1971) began to calculate the income differentials between rich and poor countries, finding a significant increase over time. Bairoch (1971, 1982) recorded similar findings. While the statistical material began to congeal, a consensus developed over the increasing income gap separating rich from poor.[3] As Glenn Firebaugh (1999: 1601) has suggested: 'Over the long haul, then—from the late eighteenth century through much of the twentieth—national incomes diverged. No one disputes that'.[4]

Influential international organizations (such as the World Bank, UNCTAD, and the UNDP) have all referred to the growing international income gap, and placed it in the context of contemporary globalization. These institutions have relied on a number of indicators to prove the point—some more systematically than others. For example, the World Bank (2000: 51) reports than in 1995, per capita GDP in the richest 20 countries was 37 times higher that in the poorest countries—an increase from 18 in 1960. In a similar fashion, UNCTAD (1997: 81) refers to an 'enormous increase in the income gap between the richest and poorest quintiles of world population'.[5]

The UNDP's 1999 *Human Development Report* is probably the most influential international report on income inequalities; it is the provocative focus for the current flurry of statistical activity. While the UNDP report begins with a number of descriptive statistics, the measure of income inequality that has received the most academic attention is the UNDP's income ratio. Using the ratio between the income of the quintile of the world's population living in the richest countries, and the income of the quintile living in the poorest countries, the UNDP (1999: 3) found inequality increasing from 30:1 (in 1960) to 60:1 (in 1990), to 74:1 (in 1997).

This study has provoked resurgence in interest on the question of income inequalities and its relationship to economic globalization, and a few critical voices have begun to

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1 Figures are in constant 1990 US dollars, adjusted for differences in purchasing power parity.

2 And, of course, the post-war convergence among rich countries, ala Gerschenkron (1952), Abramovitz (1979, 1986) and Maddison (1982, 1991).

3 For example, see Pritchett (1995); Sheehey (1996), Maddison (1995) and Sachs and Warner (1995). See also the overview in Firebaugh (1999: table 1).

4 The exceptions, of course, are two: the postwar OECD and the Atlantic economy convergences. For the latter, see the discussion below.

5 See the forward to Sala-i-Martin (2002) for an entertaining collection of what he sees to be the exaggerated claims in this area.

emerge. Most notably, Sala-i-Martin (2002) is critical of the 'disturbing rise' in claims about global inequality.[6] The conclusions generated by this latest wave of research are less clear, as there are significant methodological and conceptual differences that separate the studies.[7] While these differences appear to be academically significant, their political significance can be easily exaggerated. Even the most optimist accounts of declining income inequalities show a very modest decline over time. In short, it is not necessary to enter into the details of this debate to recognize that contemporary globalization is not generating substantial income convergence.

This brings us to the second literature that motivates the current project. This work explicitly engages the role of international labour mobility in the context of an earlier period of globalization, and makes frequent references to the similarities to, and differences with, contemporary globalization.

International labour mobility is one of the most striking differences that separate the character of contemporary globalization from that of an earlier era. While the degree of commercial and financial integration was relatively similar at the end of the nineteenth and 20th centuries, the previous bout of globalization was awash with enormous waves of voluntary migration across the Atlantic.[8] These migrants, totalling some 50 million in the century following 1820, were unhindered by national immigration controls or restrictions.[9] Recent work by O'Rourke, Jeffrey Williamson, and Timothy Hatton links substantial income convergence across the Atlantic economy to these waves of international migrants.

In *The Age of Mass Migration*, Hatton and Williamson (1998) document the ways by which mass migration contributed to the striking convergence of living standards found in the poor and rich countries that straddled the Atlantic.[10] Their comprehensive study addresses several aspects of the great Atlantic migration, but their most interesting finding (in the present context) is their conclusion that 'mass migration accounted for 208 percent of the real wage convergence observed in the Atlantic economy between 1870 and 1910' (1998: 227).[11]

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6 See Melchior *et al.* (2000) for an earlier and similar version of this argument.

7 In particular, those studies that rely on market or official foreign exchange rates tend to support the research conclusions of earlier scholars: there has been a growing increase in income inequalities since the 1960s. However, those who rely on purchasing power parity (PPP) exchange rate calculations find a slight decrease in inequality since the 1960s. In addition, many of the conclusions in these studies hinge critically on whether or not China is included (and the weight it is given).

8 For some explicit comparisons of the two periods of globalization, see James (2001); O'Rourke and Williamson (1999); Bordo *et al.* (1999).

9 This is not to deny that there were/are significant economic and social costs associated with international migration. The migration figure comes from Hatton and Williamson (1998: 7).

10 This experience stands in rough contrast to developments beyond the Atlantic economy. There appears to be no evidence of convergence when central, south and east European countries are added. Nor does the evidence improve when China, Egypt, India, Turkey and the rest of Asia and the Middle East are added to the analysis (O'Rourke and Williamson 1999: 25).

11 The percentage convergence explained is the counterfactual-actual ratio of change in ln[dispersion]. The large numbers are explained by the fact that the convergence effect of labor migration may be offset by the divergence effects of other factors. The total convergence effects will, of course, sum to 100 per cent. See Hatton and Williamson (1998: 228ff) for a discussion.

This is not to ignore the important effects of other forms of market integration. In a related study, O'Rourke and Williamson (1999: 165) estimated that the effects of mass migration on wage convergence were more modest (just 125 percent) in light of the influence of other international factors (e.g., capital mobility). This study explicitly searches for the influence of other integration factors (i.e., trade, finance and capital market integration), but with little success. They argue that, '[i]n theory, the forces of late-nineteenth-century convergence should have included commodity price convergence and trade expansion, technological catch-up and human capital accumulation, but in fact mass migration was the central force' (ibid).

The effect of this potent cocktail of global factors is best illustrated in the remarkable Scandinavian catch-up at the turn of the last century. Scandinavia suffered from very high levels of emigration (especially in Norway), but it also enjoyed substantial inflows of international capital. As a result, real wages in Scandinavia managed to grow at almost three times the rate of those in the European industrial core (O'Rourke and Williamson 1999: 19).

While a 'capital-chasing labour offset' is an important component of the income convergence that characterized the Atlantic economy during the last era of globalization, our focus will remain firmly trained on the dominant position played by labour migration. This focus reflects a practical compromise until a model can be produced where capital and labour flows more accurately reflect the historical record (i.e., as complements, not substitutes).[12] In the meantime, we take refuge in O'Rourke and Williamson's (1999: 166) observation: 'The convergence power of free migration, when it is tolerated, can be substantial given the late-nineteenth-century evidence. Convergence based on technological or accumulation catch-up in closed economy models miss the point. The millions on the move in the late nineteenth century did not'.

It is in the context of comparing the convergence effects from two different periods of globalization that the potential economic gains from increased international labour mobility become relevant. Of course, to agree that a question is relevant or important is not to agree about how to answer it. We suggest that a well-grounded AE model is a first step in the right direction.

2 Background analysis

In this section we introduce a model that produced our analytical point of departure. We then adjust the model to generate some new estimates—estimates that are more readily comparable with existing research in the field. In particular, we use the model to run five scenarios covering different levels of migration; we then generate estimates of the number of migrants and the economic costs/benefits associated with each of these scenarios.

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12 The lack of capital mobility in this model likely exaggerates the returns/losses for labor and capital in both sending and receiving countries. Since we expect capital to follow labor (as it did in the previous era of globalization); the migration effect on the real wage in both regions will be attenuated. Likewise with respect to the returns on capital: in receiving countries, capital inflows will mute the rise in the return to capital; in sending countries, capital outflows will mute the fall in return to capital. See Hatton and Williamson (1994: 22ff), for a description of these effects in the nineteenth century.

In 1984, Hamilton and Whalley developed the first AE model for calculating the efficiency gains from increased international migration flows. This relatively simple model produced phenomenal results: finding that the annual gains from free labour mobility could exceed the (then) worldwide GDP. In particular, their unadjusted estimates produced gains that ranged from US$ 4.7 to US$ 16 trillion, at a time (1977) when worldwide GNP was just US$ 7.82 trillion (Hamilton and Whalley 1984: Table 4).

Conceptually, Hamilton and Whalley's argument can be divided into three parts. First, they assume there is a fixed supply of (worldwide) labour and full employment throughout the world. This labour supply, fully employed, produces a single output that is homogeneous across regions. Second, they use (regional) CES production functions to estimate differences in the marginal productivity of labour (MPL) across regions. These differences are assumed to be the result of barriers to mobility. Finally, they estimate how labour would reallocate in the absence of these barriers and measure the associated efficiency gains. In short, Hamilton and Whalley assume that wage rate equalization is achieved through unimpeded international labour flows (not via the traditional factor price equalization theorem). An outline of their method is provided in Table 1.

Table 1
Method for calculating global efficiency effects of modifying immigration controls

- For each region, an aggregate CES function is used:

$$Y_i = \gamma_i \left[\delta_i K_i^{-\rho_i} + (1-\delta_i) L_i^{-\rho_i} \right]^{1/-\rho_i},$$

- where γ_i is a constant (defining units of measurement), δ_i is a weighting parameter, $\sigma_i = 1/(1 + \rho_i)$ is the elasticity of substitution between factor inputs, K_i and L_i are capital and labour service inputs, and Y_i is value added in region *i*.

- The elasticity of substitution, $\sigma = 1/(1+\rho)$, is assumed to range from 0.5 to 1.5 (where ρ is the substitution parameter). As $\rho \to 1$, the CES tends to the Cobb Douglas function; and as $\rho \to 0$ it tends toward the Leontief (fixed coefficient function). Obviously, where $\rho = 1$ or $\rho = 0$, the functions are undefined.

- From the assumption that factors receive their marginal product in each region in the presence of existing controls, values of δ_i are determined from the ratio of first-order conditions:

$$\delta_i = \left(\frac{K_i^{1/\sigma_i}}{L_i^{1/\sigma_i}} \right) \Big/ 1 + \left(\frac{K_i^{1/\sigma_i}}{L_i^{1/\sigma_i}} \right)$$

- Units are assumed for the output produced in each region such that one unit sells for US$ 1. The GDP value for the region, K_i, L_i, ρ_i, and γ_i are used to solve for δ_i.

- An iterative procedure is then used to calculate the change in labour allocation after a modification of immigration controls consistent with: (a) equalized MPL in all regions; and (b) full employment of the fixed labour supply.

Source: Moses and Letnes (2002).

Table 2
1977-98 Comparison of efficiency gains
Comparison of annual worldwide efficiency gains from global removal of immigration controls – unadjusted and adjusted 3-region calculations (US$ trillion)

	Elasticities of substitution in production in all regions				
	1.5	1.25	1.0	0.75	0.5
No adjustments					
1977	8.50	7.97	7.19	5.93	3.69
1998	41.70	38.63	34.08	26.71	15.38
% gains relative to total real GDP					
1977	109.5	102.7	92.7	76.4	47.6
1998	118.1	109.4	96.5	75.6	43.6
Adjustments					
PW + EU3 & EU5					
1977	0.73	0.66	0.58	0.47	0.34
1998	4.33	3.91	3.39	2.75	1.97
% gains relative to total real GDP					
1977	9.4	8.5	7.5	6.1	4.4
1998	12.3	11.1	9.6	7.8	5.6

Notations for adjustments:

PW - Population workforce adjustment.

EU3 & EU5 - Labour efficiency units correction using factors of 1:3 and 1:5 for the medium and low human development regions, respectively.

Source: Moses and Letnes (2002).

Formally, Hamilton and Whalley generated marginal revenue product schedules directly from aggregate production functions for seven world regions. For each region they constructed a CES production function where they specified the substitution parameter, ρ_i. This implies a value for the elasticity of factor substitution in production for each region. To determine the weighting parameters, δ_i, they determined the first-order conditions for cost minimization, used observations on factor use and factor returns in each region, and assumed that factors were paid their marginal products before the immigration controls were removed. The scale parameter, γ_i, was then determined in the production function for each region. These estimated production function parameters were then used to calculate the change in labour allocation across regions after the removal of immigration controls. In the removal case, an equalized marginal revenue product of labour across regions was found, consistent with full employment of the fixed worldwide labour supply.

In a recent paper, we overhauled Hamilton and Whalley's analysis to provide more contemporary measures of the potential economic gain from liberating national labour markets.[13] Relying on an updated model and data for three world regions, we found that both the efficiency and the distributional gains from liberalizing world labour markets remain significant. These estimates are similar to those produced by Iregui (2003) in her contribution to the UNU/WIDER conference (at the point where they are comparable), though her model is more sophisticated and addresses different conceptual scenarios.

13 Moses and Letnes (2002). We refer the interested reader to this piece to trace the architecture and mechanics of the model employed below.

In particular, the world efficiency gains derived from a full relaxation of migration controls could be as high as US$ 3.4 trillion. As world GDP in 1998 was substantially larger than in 1977, our diachronic comparison in Table 2 compares the unadjusted and adjusted results in terms of relative GDP. Here we see a substantial increase in efficiency gains over time, especially in the adjusted cases. Indeed, in our middle scenario—where elasticities of substitution were set to one in all regions—we find that the relative gains increased from 7.5 per cent to 9.6 per cent of world GDP over the intervening 21 years.

Another important result from this analysis is that the largest efficiency gains are reaped in the initial phases (or smallest levels) of migration. For example, a ten percent elimination of wage differentials (our surrogate for a 10 per cent increase in migration) generates about 23 per cent of the total potential gain.[14] This has enormous political significance, as it suggests that even a small liberalization of national labour market controls could bring substantial economic gain.

3 A new turn

The problem with AE analyses is that they remain hopelessly speculative. For example, the analysis sketched above provides no clear picture of how many migrants are being generated by the different scenarios, or (consequently) how the size of these flows relate to existing levels of international migration. As many of the adjustment mechanisms are internal to the model itself, there are few explicit reference points onto which the empirically-minded reader might grab.

This section will develop two important aspects of the model. We begin by mapping the size of the migrant flows necessary for the model to generate the sort of gains reported. Once quantified, we can compare these projections against current migration levels. With migration figures in hand, we can then estimate the per-migrant gains generated by the model (and how they are distributed), and these estimates can then be compared to others. By producing these kinds of estimates we hope to provide a better empirical reference point from which we can evaluate the model.

To generate these new estimates, we consider five scenarios from our previous analysis. Considering that the relative size of the efficiency gain varies with the level of immigration, and that the largest gains are generated in the initial levels of migration, we focus on four potential scenarios that correspond to an increasing liberalization of migration controls (1 per cent, 10 per cent, 30 per cent and 100 per cent liberalization).[15] In addition, we add a baseline scenario that represents today's level of international migration. Obviously, readers who are less inclined to speculation should focus on the first three scenarios (0 per cent, 1 per cent and 10 per cent increase). In order to run these new scenarios, we fix the adjustable parameters in the model, relying

14 C.f., Moses and Letnes (2002: Table 7a) [i.e., elasticity of substitution in production in all regions = 1, population workforce adjustment and labor efficiency units correction (using factors of 1:3 and 1:5), adjusted 3-region calculation]

15 Actually, the model is simply producing estimates of the consequences of a 1 per cent, 10 per cent, 30 per cent and 100 per cent elimination of wage differentials. We use this as a surrogate for labor market liberalization.

on estimates grounded in the broader empirical literature. In practice, this means we assume that elasticities of substitutions are equal to one across all three regions, and we adjust the model for efficiency (1:3 and 1:5 for the medium and low HD regions respectively) and workforce (0.48, 0.41, and 0.41 for the High, Medium and Low HD regions respectively) concerns.[16]

3.1 Migrant flows

The first step is to generate estimates of the size of the migrant flows that are associated with the different scenarios produced by the model. As noted earlier, these gains are reaped unevenly across migration levels: the largest efficiency gains (in relative terms) are for the initial units of migrating labour, since the marginal product differences are largest in the initial stages of development. In other words, we found that a substantial portion of the total gains can be generated by a relatively small relaxation of international migration controls.

With the basic model in place, we ran four counterfactual scenarios; the results of which are presented in Table 3. The 0 per cent scenario takes the actual level of migration as its point of departure. These figures correspond to the UN Population Division's (2001: 139) estimate for the average annual net number of migrants over 1990-2000. Although the UN Population Division's regional categories do not directly overlap with our own, the discrepancy with our three-region aggregation is small.[17] This provides us with a good starting point for evaluating the size of the migrant flows under the various scenarios. The estimated number of migrants for each scenario and region are found on the left side of the table; on the right side are the estimated efficiency gains. The figures in parentheses represent the reference ratio value: i.e., the ratio of the regional population[18] and the regional GDP for each estimate.

So what do these figures tell us? Let us begin with the left side of the table. For starters we know that even a small increase in the migration level (1 per cent) corresponds to a phenomenally large increase in the number of migrants (given the benchmark figure of 2.48 million). In particular, the first (1 per cent) scenario depends on about 44 million people emigrating from the low and medium developed countries to the developed world. The second (10 per cent) scenario depends on 432 million people moving (roughly divided between low and medium sending countries). The practical obstacles associated with the 100 per cent scenario are clearly evident when we note that about two-thirds of the medium human development (MHD) population (ca. 2.4 billion people) will find incentives to migrate in this scenario.

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16 See Moses and Letnes (2002) for our justification in choosing these parameters.

17 A second caveat is in order. Our dataset contains only 120 countries, while the UN includes all countries of the world. On both counts, the differences are not large and should not affect the outcome of our estimations. A more detailed description of this, or any other, aspect of the analysis can be obtained by contacting the authors.

18 The total population is only 5.11 trillion, as we do not have data on all countries in the world.

Table 3
Migrant size and efficiency gains, five scenarios

Scenario	Number of migrants [millions]			Efficiency gains [billions]			
	LHD	MHD	HHD	LHD	MHD	HHD	Total
0	0.086 (0.00016	-2.48 (-0.00072	2.39 (0.003)	0.0	-6.0 (-0.00046	38.0 (0.040)	32.0 (0.001)
1%	-24.86 (-0.034)	-19.29 (-0.006)	44.15 (0.047)	-22.0 (-0.023)	-50.0 (-0.0038)	155.0 (0.007)	84.0 (0.003)
10%	-214.96 (-0.290)	-217.22 (-0.063)	432.19 (0.465)	-198.0 (-0.211)	-566.0 (-0.044)	1,537.0 (0.072)	774.0 (0.025)
30%	-471.22 (-0.637)	-752.93 (-0.219)	1,224.15 (10.316)	-472.0 (-0.502)	-2,014.0 (-0.156)	4,465.0 (0.208)	1,978.0 (0.063)
100%	-702.67 (-0.950)	-2,372.14 (-0.690)	3,074.81 (3.306)	-820.0 (-0.872)	-7,127.0 (-0.552)	11,338.0 (0.529)	3,391.0 (0.108)
Reference	740	3,440	930	940	12,920	21,450	31,310

Notes: HHD = High human development states;
MHD = Medium human development states;
LHD = Low human development states.
The reference figures are each region's population and PPP GNP. Figures in parentheses ( ) are the relative ratios, based on the respective reference value (regional population) and (regional GDP).

Source: Actual migrant figures (in the 0% scenario) come from the UN Population Division (2001); Population and GNP figures are from Moses (2002: Table 2).

To contextualize these figures, we can estimate the size of the (e/i)mmigrant flow as a percentage of a given region's population. Thus, today's immigrant stream into the high human development (HHD) world constitutes just .3 per cent of the domestic population in that region. With the one percent scenario (44.15 million people) the relative size of the inflow remains fairly small: just 4.7 per cent of the population in the HHD world. In the 10 per cent scenario, however, the number of immigrants to the developed world is approaching half of the existing population, with the largest share of the sending country population coming from the poorest countries (nearly 30 per cent of the low human development (LHD) population is emigrating).[19]

Another measure of relative influence can be derived by returning to Goodin's hypothetical question: what if people were money? Following Goodin's approach, we can compare each region's relative reliance on foreign direct investment (FDI) with the relative size of the projected migrant flows in each scenario (Goodin 1992: 14). In this light, the number of migrants is rather large—even in the smallest (1 per cent) scenario. For example, the size of the FDI flow into the HHD region constitutes about 2.4 per cent of its real GDP (whereas they are only 0.9 per cent and 0.5 per cent in the MHD and LHD scenarios, respectively). In other words, by adopting the 1 per cent scenario, the richest countries would be accepting a level of immigration that is relatively higher

19 An equal number of workers come from the MHD region in this scenario, but they only represent about 6 per cent of that region's population.

than its current reliance on foreign capital.[20] This volume of migration is large in a historical context as well: e.g., Simon (1999: 28) shows that working-age immigration to the US, at its peak in 1910, represented only 2.8 per cent of the native population.[21]

We can now turn to the right side of the table, and consider the efficiency gains associated with each scenario. It is our analytical ambition to map the gains that might be reaped by a relaxation of immigrant controls. In today's political context, however, the more reasonable scenario may be to consider the costs associated with closing off international migration all together. The first (0 per cent) scenario estimates the efficiency gains associated with today's level of international immigration (i.e., 2.39 million migrants), and suggests that the existing situation benefits the world by about US$ 32 billion (or 0.1 per cent of world GDP). Should immigration be radically curtailed, it would appear that the largest losers would reside in the richest countries, as it is here that the model generates the largest gains (US$ 38 billion).

In the other four scenarios, gains accumulate for the HHD region, and these are substantial at the higher migration scenarios. This is a function of the simple model employed. Still, this result is rather counter-intuitive, given the nature of much political debate about restricting immigration (and in light of the existing studies on the impact of immigration into developed countries). In the 1 per cent scenario, the world economic gain is estimated at US$ 84 billion, or 0.3 per cent of the world's (1998) GDP. The gains jump considerably when we consider the 10 per cent scenario—here the world can expect to enjoy a US$ 774 billion windfall by allowing 432 million people to migrate

How large are these gains relative to the impact of other development strategies? When we contrast the (US$ 84 billion) gain generated by the 1 per cent scenario against the estimated gains associated with alternative development strategies, the difference are both large and illuminating. For example, official development assistance from the OECD's DAC countries was estimated to be about US$ 51.4 billion in 2001,[22] and the IMF's current plan for debt relief will cancel just US$ 40 billion of debt (IMF 2002)! If our estimates are correct, a small increase of international migration could produce economic gains that would surpass the target values of two important poverty relief strategies.

On the other hand, other liberalization schemes are expected to generate even larger effects—closer in size to those produced by our 10 per cent scenario. For example, the UNDP (2000: 4) suggests that developing countries loose annual agricultural export earnings to the tune of US$ 700 billion because of tariff and non-tariff barriers. In this context, a 10 per cent liberalization of migration controls might produce the same sort of economic gain as a full liberalization of agricultural trade. Finally, FDI to the

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20 Of course, one can question whether this is the appropriate indicator. We are simply following, Goodin's (1992) lead, in using FDI *inflows*/GDP. If we consider the relative (FDI) *stock*, the share is much larger: 13.1 per cent (HHD), 6.0 per cent (MHD) and 4.7 per cent (LHD).

21 On the other hand, the reader will recall that the last period of globalization experienced 50 million Atlantic migrants (stretched out over a century), at a time when the world population was significantly smaller.

22 The Development Assistance Committee (DAC) is the principal body through which the OECD deals with issues related to co-operation with developing countries. DAC assistance accounts for at least 95 per cent of worldwide ODA. See OECD (2001a and 2001b).

developing world in the year 2000 totalled US$ 1.9 trillion (Letnes 2002: 47), a significantly larger sum of money. In both these latter examples, the gains are closer in magnitude to those produced by our 10 per cent scenario, but will likely have very different distributional consequences.

3.2 Per-migrant benefit

Now that we have estimated the size of the migrant flows and efficiency gains associated with each scenario, we can produce estimates of the costs/benefits associated with each. These estimates can then be compared against estimates generated by other, related, studies.

For our reference value, we rely on a formula used by Borjas' (1995, 1999) work on the US's 'immigration surplus':

$$-\tfrac{1}{2}sem^2, \qquad (1)$$

where s is labour's share of national income, e is the drop in native wages due to migration, and m represents the share of the labour force which is foreign born (1995: 7).

Borjas estimates that the immigrant surplus for the United States was about 10 billion dollars at the end of the millennium.[23] As this estimate relies on migrant stocks (i.e., share of the foreign-born population), not annual immigrant flows, an estimate of the 'per-migrant' gain to the United States can be generated by dividing this surplus by the number of foreign born residents (ca. 25 million): a mere US$ 400 per immigrant.

To expand on the American example, we can employ the same percentage figure (i.e., 0.1 per cent of GDP)[24] to the larger sample of HHD countries. By employing the same formula to comparable OECD data (where data are available), we can expect that the immigrant surplus for the OECD sample to be about US$ 23.4 billion.[25] As there were 56.7 million foreign-born residents in this sample group,[26] the per-migrant surplus for the developed (OECD) world can be estimated at US$ 413.

These estimates are very small compared to the sort of per-migrant gains generated by our model. The simplest way to calculate these figures is to divide the number of migrants generated in each scenario by its estimated efficiency gain. As Table 4 illustrates, these per-migrant gains can be broken down by region. From these figures it would appear that the relative gain/loss per migrant changes little from scenario to scenario: the richest countries tend to benefit by about US$ 3,600 per migrant, whereas

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23 In the United States case, Borjas argues s =0.7, e = -0.3, and m = 0.1, so that the US immigrant surplus is about 0.1 per cent of US GDP (which was ca. 10 trillion dollars in 1998). See Borjas (1999: 87, 91).

24 We use the same percentage figure, as the labor share, wage effects and migrant share data are relatively similar in the broader OECD sample. In particular, if we assume that s = .687 (Gollin (2002), 2nd adjustment); e = -0.3 (same as Borjas); m = 0.07 (Coppel *et al.* 2001: 10): we still end up with the same figure: 0.001. See Moses and Letnes (2002) for a justification of the choice of values.

25 Total GDP for this sample is US$ 23.4 trillion (OECD Main Economic Indicators).

26 Coppel *et al.* (2001: 10).

the middle-income and poorest countries tend to loose (about US$ 1,000 and US$ 2,700 respectively).

Despite the different results produced by these two approaches, they build on remarkably similar foundations. Central to each approach is the elasticity of factor prices for labour (i.e., *e* in equation 1). From his research on the US case, Borjas (1999: 91) estimated that a 10 per cent increase in immigrants would reduce the native wage by about 3 per cent.[27] This figure is remarkably similar to the estimates generated by our model, as evidenced in Table 5: in the 10 per cent scenario, our model generates a decline in wage rates to the non-migrant population of the HHD at 3.1 per cent. What is perhaps the most surprising observation in Table 5, however, is the fact that a full liberalization of migration controls (which would unleash a migrant flow of about three billion people!) would only decrease HHD wages by 17.6 per cent! If accurate, this seems a relatively small price to pay for the sort of efficiency gains that are generated by the model.[28]

Table 4
Per-migrant cost/benefit, four scenarios

	Per-migrant cost (-) or benefit (+), US$		
Scenario	LHD	MHD	HHD
1%	-885	-2,592	3,511
10%	-921	-2,606	3,556
30%	-1,002	-2,675	3,647
100%	-1,167	-3,004	3,687

Table 5
Effect on labour and capital returns, four scenarios

	% Change in wage rates to non-migrating labour			% Change in return to capital by region		
Scenario	LHD	MHD	HHD	LHD	MHD	HMD
1%	1.1	0.2	-0.3	-2.3	-0.4	0.7
10%	11.4	2.1	-3.1	-21.0	-4.4	7.2
30%	37.3	8.0	-8.5	-50.2	-15.6	20.8
100%	155.2	44.1	-17.6	-87.1	-55.2	52.8

3.3 A new twist

Borjas' approach for estimating per-migrant surpluses suggests that our own estimates are too large: almost nine times larger! In light of this observation, we thought it would be worthwhile to run our model with new efficiency adjustments in order to produce

27 Borjas, in turn, builds on Hamermesh (1993).

28 To put this in a comparative context, the OECD estimates that the cumulative effects of an ageing population in the EU will reduce its living standards by about 18 per cent (Turner *et al.* 1998). In other words, the developed world might expect an 18 per cent drop in living standards if immigration *doesn't* occur! See Coppel *et al.* (2001: 20ff).

lower per-migrant efficiency gains. This model can then be used to generate new estimates of the migration flows and efficiency gains associated with each of the scenarios used above.

This strategy is not without difficulties.[29] First of all, it is important to recall that our own (original) efficiency adjustments were already grounded in the empirical literature. In particular, Acemoglu and Ziliboth (2001: 593) find that the difference in output per worker between rich and poor countries in their sample ranges from between 1:2 and 1:5 (most of the variance results from the different models being tested). On the basis of their study, we argued that the most reasonable efficiency adjustments between the HHD region and the MHD region would be 1:3, between the LHD region and the HHD region: 1:5.[30] Thus, in order to produce the sort of per-migrant efficiency gains generated by Borjas' approach, we need to assume that the efficiency differences separating rich and poor countries of the world are much larger than is usually assumed (and verified empirically).

Worse, the model's interpretative utility sinks drastically when we try to amplify the efficiency differences sufficiently to produce estimates of the same magnitude as generated by Borjas' approach (i.e., US$ 413). In fact, when these efficiency adjustments are raised too high, people in our model start migrating from the HHD to the MHD. This simply will not do![31] As a result, we have chosen to run the model with efficiency adjustments on the order of 1:5 and 1:10 (the HHD:MHD and HHD:LHD efficiency ratios, respectively). These are the largest efficiency adjustments that the model would embrace without producing implausible migration back-flow (from rich countries to poor countries).

With these new efficiency adjustments, our model produces per-migrant efficiency gains that are somewhere between the estimates generated by Borjas' approach (US$ 413) and those of our original model (see Table 6). For example, the per-migrant gains to the HHD world are generally about US$ 1,500, compared to the US$ 3,500 dollar gain in the original model (c.f. Table 4). Note, however, that the per-migrant losses in both the LHD and MHD worlds have not changed much from the scenario depicted in Table 4.

These larger efficiency adjustments (and smaller per-migrant gains) correspond to much lower levels of international migration and smaller overall efficiency gains. Table 7 represents the equivalent of Table 3, but with estimates generated on the basis of the

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29 An alternative strategy is to freeze the model and simply paste Borjas' per-migrant gains onto our model's estimates for the number of migrants in each scenario. This would produce lower, but still quite significant, efficiency gains. For example, in the 10 per cent scenario, the world efficiency gain would be estimated to be about US$ 178 billion (e.g., 432,190,000 migrants, each generate US$ 413).

30 In the original Hamilton and Whalley (1984) piece, even *smaller* efficiency adjustments (1:2 and 1:3) were employed.

31 The model uses the efficiency factor to reduce the incentive to migrate as it increases the MPL in the MHD and the LHD regions. For this reason, these regions will—at certain efficiency factors—have higher MPLs than the HHD region. This explains the out-migration. It should be possible to redesign the model such that the increased efficiency factors will only reduce the efficiency gains—this would allow us to overcome this counter-intuitive result, and increase the efficiency adjustments even more. However this 'solution' would not address the underlying problem of adopting efficiency adjustments that are much larger than those justified by the empirical literature.

new efficiency adjustments. Compared to the original model, we see that an even larger share of the overall anticipated gain is generated at the initial stages of migration.[32] Equally significant is the fact that the 1 per cent scenario seems less politically threatening—as it relies on just 12 million people moving to the developed world (or about 1.3 per cent of the HHD population). This relatively small amount of people can be expected to generate an efficiency gain of about US$ 18 billion in the HHD region.

Obviously, these new efficiency adjustments produce much lower returns to both capital and labour in each of the various scenarios—as evidenced in Table 8. In the 1 per cent scenario, the effect on factor returns is almost nothing. Indeed, in all of these scenarios, the anticipated (negative) effect on wages is muted. This is a problem when we recall that Borjas finds a 10 per cent increase in emigration leading to a 3 per cent drop in the native wage in the HHD region (as did our original model). The new model's estimates are nowhere near this level of elasticity. Indeed, even in our 100 per cent scenario, workers in the developed world cannot expect that kind of fall in their wages! In return, workers in the poorest countries can expect a phenomenal (50.7 per cent) increase in their wages! Of course, the flip side of this reward is that domestic capital owners in the developing world experience a whopping decline in their expected rate of return.

In both versions of our model, the distributional shortcomings are clearly evident: all the efficiency gains are accrued in the developed world. Given the simple nature of the underlying model, this outcome is difficult to avoid. Nevertheless, we doubt that this is the case in practice. We can think of several reasons why emigration might improve economic conditions in the developing world—but the form of the current model does not afford us much opportunity for incorporating them.[33] Future models will need to address this important shortcoming if we are to come to grips with the potential impact of migration on development.

Table 6
Reduced per-migrant cost/benefit (efficiency correction 1:5 & 1:10)

	Per-migrant cost (-) or benefit (+), US$		
Scenario	LHD	MHD	HHD
1%	-905	-2,770	1,483
10%	-895	-2,576	1,486
30%	-932	-2,583	1,537
100%	-1,033	-2,604	1,722

32 In the original model, a 1 per cent liberalization of migration secures 2.5 per cent of the total anticipated gain (see Table 3). In the new model, the 1 per cent scenario corresponds to a 2.9 per cent share of the anticipated gain. Indeed, 63 per cent of the total anticipated gain in the new model can be captured by just a 30 per cent liberalization.

33 As Riccardo Faini's contribution describes, some authors have argued that the incentive to acquire skills may be strengthened by the prospect of being able to migrate. On another front, the historical record is quite clear about the European wage-benefit associated with emigration in the late nineteenth century. Finally, it has been estimated that migrants send home, on average, about US$ 1,000 a year in the form of remittances (Harris 2000: 98). If the level of remittances is this high, the per-emigrant gain to the sending country could be nearly as large as the per-migrant efficiency gain generated by the revised model (ca. US$ 1,500).

Table 7
Reduced migrant size and efficiency gains (efficiency correction 1:5 & 1:10)

	Number of migrants [millions]			Efficiency gains [billions]			
Scenario	LHD	MHD	HHD	LHD	MHD	HHD	Total
0%	0.086 (0.00016)	-2.48 (-0.00072)	2.39 (0.003)	0.0	-6.0 (-0.0004	38.0 (0.040)	32.0 (0.001)
1%	-11.05 (-0.015)	-1.08 (-0.0003)	12.13 (0.013)	-10.0 (-0.011)	-3.0 (-0.0002)	18.0 (0.0008)	5.0 (0.0002)
10%	-104.75 (-0.142)	-11.88 (-0.003)	116.63 (0.125)	-94.0 (-0.100)	-31.0 (-0.002)	173.0 (0.008)	49.0 (0.002)
30%	-264.60 (-0.358)	-46.61 (-0.014)	311.21 (0.335)	-247.0 (-0.263)	-120.0 (-0.009)	478.0 (0.022)	111.0 (0.004)
100%	-559.71 (-0.756)	-223.17 (-0.065)	762.88 (0.820)	-558.0 (-0.594)	-581.0 (-0.045)	1,314.0 (0.060)	175.0 (0.006)
Reference	740	3,440	930	940	12,920	21,450	31,310

Note: See Table 3 and text for clarification and sources.

Table 8
Reduced effect on labour and capital returns (efficiency correction 1:5 & 1:10)

	% Change in wage rates to non-migrating labour			% Change in return to capital by region		
Scenario	LHD	MHD	HHD	LHD	MHD	HMD
1%	0.5	0.0	0.0	-1.1	0.0	0.1
10%	4.9	0.1	-0.4	-10.0	-0.2	0.8
30%	14.9	0.4	-1.0	-26.2	-0.9	2.2
100%	50.7	2.1	-2.7	-59.3	-4.5	6.1

Although our model focuses on the estimated efficiency gains from increased labour migration, it is important to remember that the underlying logic of the approach assumes dramatic international wage convergence. In this model, workers will continue to move as long is there is an international wage gap to exploit. This convergence alone will generate very important distributional consequences that are not particularly evident in our results.

4 Conclusion

We can now provide a provisional answer to Goodin's opening query. If people were money, and enjoyed the same freedom of mobility enjoyed by finance today, the world could expect an efficiency gain as high as US$ 3.4 trillion. This is an enormous windfall which could have phenomenal consequences for economic development and global income convergence. However, these consequences hinge critically on their distribution—an aspect of the model which remains underdeveloped.

The main objective of this paper has been to try and provide the model with some better empirical grounding, from which we can evaluate the reasonableness of its estimates. In

this context, our focus has been on two important aspects of the model: the number of migrants being generated by various scenarios, and the estimated per-migrant benefit associated with them. Along both of these fronts, it appears as though the model produces very large estimates. The number of migrants associated with each scenario makes even the smallest scenario politically untenable. Worse, the per-migrant gains being generated are almost nine times larger than those being generated by other studies.

Although the efficiency gains from the original model are large, they stand on reasonable empirical assumptions about the relative efficiency differences that separate rich and poor countries. When we modify the model to produce smaller per-migrant gains, we end up challenging these assumptions and generating migration flows which are clearly unreasonable (e.g., from rich to poorer countries). In this light, we wonder if the original model is not producing better estimates of the anticipated gain. Seen from a different perspective, this light might cast a shadow over the relatively small size of the immigrant surplus generated by Borjas' approach.

Even if we accept the modified model, in spite of its evident shortcomings, the estimated gains from increased migration remain significant (albeit lower). Liberalizing immigration restrictions may provide the fastest and easiest ways of diminishing international wage gaps. We are, after all, talking about a significant amount of new wealth being generated by matching international supply with its potential demand. These are the same sort of lessons being generated by newer economic history on the role played by labour migration during the previous era of globalization. To better understand these lessons, we believe that a better AE model can be constructed—one built on more realistic foundations—in order to document the potential gains and their distribution.

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