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Income per natural: Measuring development as if people mattered more than places

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Abstract

It is easy to learn the average income of a resident of El Salvador or Albania. But there is no systematic source of information on the average income of a *Salvadoran* or *Albanian*. We create a first estimate a new statistic: income per natural—the mean annual income of persons born in a given country, regardless of where that person now resides. If income per capita has any interpretation as a welfare measure, exclusive focus on the nationally resident population can lead to substantial errors of the income of the *natural* population for countries where emigration is an important path to greater welfare. The estimates differ substantially from traditional measures of GDP or GNI per resident, and not just for a handful of tiny countries. Almost 43 million people live in a group of countries whose income per natural collectively is 50% higher than GDP per resident. For 1.1 billion people the difference exceeds 10%. We also show that poverty estimates are very different for national residents and naturals; for example, 26 percent of Haitian *naturals* who are not poor by the two-dollar-a-day standard live in the United States. These estimates are simply descriptive statistics and do not depend on any assumptions about how much of observed income differences across naturals is selection and how much is a pure location effect. Our conservative, if rough, estimate is that three quarters of this difference represents the *effect* of international migration on income per natural. This means that departing one's country of birth is today one of the most important sources of poverty reduction for a large portion of the developing world. If economic development is defined as rising human well being, then a residence-neutral measure of well-being emphasizes that crossing international borders is not an *alternative* to economic development, it *is* economic development.

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Measuring development as if people mattered more than places

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1 INTRODUCTION

Most of humanity was born in a "low-income" or "lower middle-income" country (World Bank 2007). How much money do those people earn each year? No one knows. Armies of statisticians have spent decades carefully estimating how much people *in* poor countries earn or produce. It is a simple matter to learn the income or output of a person who resides in El Salvador or Albania. But no one has made systematic estimates of the income of a typical *Salvadoran* or *Albanian*.

If we interpret income per capita to indicate material welfare, this is unsatisfactory. While production has a place, people, not patches of earth, have well-being. The focus on income per resident has rested more on the spread and use of national accounts data and on statistical cost and convenience than on conceptual or welfare-theoretic foundations. But if income per resident is used as the measure of Salvadorans' welfare it leads to untenable conclusions: if a Salvadoran moves from the countryside to San Salvador to get a factory job that raises her income 30%, this will be recorded as a welfare improvement for Salvadorans on average, but a 500% increase in income from a factory job in Texas does not (with, at best, only the portion remitted to residents counted).

Here we suggest and estimate a new statistic: income per natural,[1] the mean per person income of those *born* in a given country, regardless of where they now reside. Income per natural differs substantially from income per resident. This is obviously true of small countries with large emigration—Guyana, Jamaica, Liberia—but it is not limited to a handful of tiny nations. 42.8 million people live in countries whose income per natural is 50% higher than its income per resident; 235 million people live in a group of countries where the difference is 20% or more, and for 1.1 billion people the difference is 10%. The estimates of differences in income per natural are consistent with estimates of the

[1] The *Oxford English Dictionary* defines a "natural", in this sense, as a "person … of or from a designated region". It notes that this usage is rare in modern times, but we resurrect it here because no other word fits. We prefer "income per natural" to "income per national", since "national" is often a synonym of "citizen", and we prefer it to "income per native", which connotes those who are *not* foreign-born rather than those who are native to a given foreign country.

differences in other indicators calculated on residence or natural basis such as poverty or child mortality.

2 METHOD

As we are the first to estimate income per natural we have to rely on the information currently available and a reasonable set of methods to create what we regard as a plausible first cut, not a polished diamond. If, as we hope, people recognize the value of empirical measurement of the concept of income per natural, then more and better data can be collected and finer, more sophisticated methods used. But anyone familiar with the realities of national accounts estimation (particularly in its early phases and in current practice in poorer countries) or the construction of estimates of purchasing power parity will be aware of the necessary limitations of our results.

Our method is simple. First we estimate household income per person by country of birth for the foreign-born in the US using the "long form" of the 2000 US census, which asked respondents to provide their annual household income. Second we use this information to construct regression-based estimates of household income per person for the foreign-born by country of birth in the rest of the high-income OECD countries. Third, we use estimates of populations in the OECD by country of birth to estimate the average income of naturals residing in the OECD. Finally, we combine these data with GDP per resident at purchasing power parity to achieve estimates of income per natural for almost all countries on earth.

We begin with the United States because data on the incomes of the foreign-born by country of birth in the US are readily available in Census format.[2] As the US is the top destination country for the world's migrants to the OECD, this means that most migrant-sending countries in the world are represented. The US census 5% Public Use Microdata Sample (PUMS) from the year 2000 provides specific country of birth, household

[2] No such question exists in the last censuses of the United Kingdom and France, the next two most important destination countries in the OECD. Smaller surveys in other important destination countries collect income information alongside country of birth, such as the Luxembourg Income Study (LIS) surveys in France and Germany, but the comparatively small samples cover very few countries of origin. Most LIS surveys contain no data on country of birth.

income, and household size for 1,256,341 foreign-born individuals between the ages of 18 and 64 (inclusive), from 147 countries. Each country of origin is represented by a minimum of 315 unweighted respondents (Kosovo), a maximum of 364,936 (Mexico), and a median of 1,887. We calculate household income per person (rather than individual wages or income) in order to capture the welfare of those who do not earn income—such as spouses who work in the home and dependents. These averages by country of origin are weighted by the census person-weight. We use self-reported income; Bound and Krueger (1991) use individually-matched income data from the US census and Internal Revenue Service to establish that census self-reported income differs on average from actual income by only around 1%.

2.1 Correlates of foreign-born income per capita in the US

Most OECD countries have demographic information on the foreign born but not income. We therefore estimate a simple reduced-form regression of the household income per person for the foreign-born in the US as a function of variables specific to migrant-sending countries or migrant-destination pairs that are reported for all sending countries and other OECD destination countries. We then use the resulting coefficients to estimate household income per person by country of birth in all OECD destination countries. For instance, to estimate the income of Albanians in France, we use the average income in France adjusted for the predicted ratio of Albanian to French average using characteristics of Albania (e.g. resident income per capita, distance to France), the Albanians in France (e.g. fraction with tertiary education), and the Albanians worldwide (e.g. fraction of all Albanians not in Albania who reside in France).

Table 1 presents OLS regressions with the natural logarithm of mean foreign-born household income per person as the dependent variable, where each observation is one country of origin. The first column shows that 33% of the cross-country (of birth) variance is explained by GDP per capita in the country of origin. The explained variance rises to 54% in the second column with the inclusion of regional dummy variables.

The third column includes the fraction of the foreign-born in the US that have completed tertiary education, and the fraction that have completed only primary education or less. The fraction of the diaspora that has completed tertiary education is strongly and statistically significantly correlated with foreign-born household income per capita.[3]

The fourth column includes a mix of sending-country, sending country in US, and world diaspora (country-of-birth in all destinations) characteristics:

- Origin-country gross tertiary enrollment, intended as a rough measure of the strength of education systems in the migrants' countries of birth, which is positively correlated with income in the US.
- We use the data from Parsons et al. (2007) on all bilateral stocks of sending and host country populations to estimate the fraction of the foreign-born from that country living anywhere on earth who live in the US and the fraction of the foreign-born from that country living in the OECD who live in the US. The estimates suggest income in the US is positively correlated with the worldwide diaspora fraction in the US but negatively correlated with the OECD-wide fraction.[4]
- Migrants from larger countries earn more in the US, all else equal, possibly as size (land area) in the country of origin is a proxy for the availability of domestic migration opportunities which exerts selection on the composition of international migrants.
- The absolute size of the diaspora in the US is negatively correlated with income, again, consistent with a large diaspora lowering risk and informational barriers to lower-earning immigrants.
- The fraction of the diaspora in the US comprising refugees is negatively correlated with income, as several studies have documented (e.g. Husted et al. 2000).

[3] For this variable we happen to use the estimates of Dumont and Lemaître (2005), which cover the 2000 census round. A closely related but more ample database, covering two census rounds, has been compiled by Docquier and Marfouk (2005). For our purposes, which focus on the 2000 census round, the choice between the two was arbitrary.

[4] Either of these might be positively or negatively correlated with destination-country income: a larger diaspora might provide better information to other migrants about job opportunities in the destination, but it might also lower the barrier to migration for those with less earning potential. A large diaspora also allows formation of origin-specific agglomerations in destination countries, with potential positive and negative effects on earnings (e.g. Cutler, Glaeser, and Vigdor 2007).

- Distance to the US and contiguity with the US are not statistically significantly correlated with income.
- Origin in an English-speaking country is positively correlated with income but not to a statistically significant degree.
- Finally, a dummy variable for high-income Middle East petroleum exporters is included (Bahrain, Kuwait, Qatar, Saudi Arabia, and United Arab Emirates) to account for the extreme concentration of national income in the hands of a few individuals. Without this dummy the model overestimates income for the Saudi-born and Kuwaiti-born by about 40%.

The reduced form regression predicts 89% of the cross-country variance in foreign naturals' income per person in the United States for the 118 countries for which all data are available.[5] Using the estimated coefficients from Table 1 to predict in-sample values of income per natural in the US gives an average error for any given country of origin of 0.65%, with a standard deviation across countries of 11.52% and a maximum absolute value of 28.7% (Cameroon). Figure 1 scatters predicted income per person of foreign nationals by country of birth as a fraction of US-average income per person against the observed average values from the census data. The correlation between the two is 0.937. The dashed lines show estimation errors of ±20%. Positive errors are of special interest since they will lead to *over*estimates of income per natural. The figure suggests that the model does not overestimate income per capita of the foreign-born by more than a third.

We illustrate the estimates with a closer look at two countries whose naturals have similar average household incomes per person in the US: Mexico ($9,991) and Somalia ($9,472). While GDP per capita in Mexico at PPP ($9,197) greatly exceeds that in Somalia ($600), which would correlate with higher incomes among those resident in the US, the fraction

[5] Because the regressand comes from an average based on samples of different sizes—notably a much larger number of Mexican-born than other countries' naturals—we might be concerned about inefficiency of OLS relative to weighted least-squares. Worse, if the model is substantially misspecified, alternate weightings might meaningfully alter the coefficient estimates. When the regressions in Table 1 are repeated with each country weighted by the inverse of the log of its naturals' sample size in the US census microdata, however, the coefficient estimates barely change, and then only in the second decimal place by one or two points.

of Somalian-born US residents with tertiary education (0.147) is almost triple that of the Mexican-born (0.053), which tends in the other direction. Of secondary importance are the greater fraction of Somalian-born in the US who are refugees, and the much greater size of the Mexican-born diaspora in the US. The net result—displayed in detail in Appendix 2—is that the regression coefficients estimate well the similar values of income per person for Mexico-born in the US (predicted $10,014, or 0.289 of the US average) and Somalian-born in the US (predicted $8,879, or 0.257 of the US average).

2.2 Estimating foreign-born income per capita in other OECD countries

The overall obstacle of estimating the income of Cambodian *naturals* is the lack of estimates of income of Cambodians outside of Cambodia. Here we make the heroic assumption that values of foreign-born income in the US *as a fraction of destination-country GDP per capita* predicted by this regression hold roughly true for all other high-income OECD destination countries. For example, the observed average household income of a Cambodian-born person in the US in 2000 was $12,952. The model predicts $13,159, which is 38% of US income per capita in 2000 ($34,599). We estimate the income of Cambodians in France by using the estimated coefficients with Cambodian data for the Cambodia specific variables (e.g. tertiary enrollment) and Cambodia-France-specific data for the bilateral right-hand side variables (e.g. fractions of Cambodia in France with tertiary degree, distance Cambodia to France).

That is, we estimate $y^*_{i,j}$, the income per capita of those born in origin country *i* living in destination country *j*, by $\hat{y}^*_{i,j} = \left(y_j / y_{USA}\right)\left(e^{X\hat{\beta}}\right)$, where y_j is GDP per capita at PPP in *j*, $\hat{\beta}$ is the vector of coefficient estimates in column 4 of Table 1, and *X* is a vector of sending-receiving country characteristics $x_{i,j}$. The model predicts that average household income per person of the Cambodian-born living in France was 37% of French income per capita ($25,944 at purchasing power parity) thus $9,593.

We will show below that the application of US coefficients to all other countries, though obviously a strong assumption, is a plausible procedure and moreover, almost certainly does not lead to tremendous *over*estimates of the gap between income per natural and GDP per capita.

We do not assert that the regression model is an identified structural model that estimates behavioral or deep parameters, or that we have any reason to believe that the estimated coefficients can be extrapolated to other contexts. That said, we have no reason to believe that they *cannot* be extrapolated to other contexts. We wish to estimate the wages of Cambodians in France and we assume the partial correlation between tertiary education of Cambodians in France and the income of Cambodians in France is exactly that estimated for the US. The alternative is to assume that all of the regression coefficients (except the constant) are zero and predict exactly the same ratio of income for all countries of birth in France as observed in the US. While, as a *methodological* assumption for framing hypothesis testing in classical statistics the assumption coefficients were zero is defensible we know that the assumption that all parameters are zero (which obviously produces an R-squared of zero) is emphatically rejected for the US. So, while we would prefer to have country-specific data (which would mean that we would not need coefficients) or country-specific parameters (which would improve the quality of the prediction for each country), or draw on reduced form parameters from a large number of countries, it seems more plausible to use coefficients from the US than to assert zeros. In any case, below we report estimates using all zero coefficients as a robustness check.

After completing the first draft of this paper the data from the 2001 Australian census have become available to us, and this census does ask questions about both household income and country of birth. This allows us an extraordinarily clean test of the "out of sample" predictive power of the US coefficients. There are 108 countries of birth for which the Australian Bureau of Statistics can estimate household income per capita by

country of birth based on a sample of 1,000 individuals or more, of which the regression model in Table 1 predicts a value for 99 countries.[6] There are three points.

First, Figure 2 compares the true ratios of household income per capita among the foreign born to the national average, by country of birth, and the model's estimates. The correlation between predicted and actual household income per capita of the foreign-born as a fraction of the national average is 0.749. The use of the US coefficients in predicting country of birth specific wages vastly outperforms assuming coefficients of zero.

Second, the model works in explaining the variation in Australia because the model works, not because the country-of-birth predictions are the same for the US and Australia. Take again the example of Somalia and Mexico, whose naturals' incomes were predicted to be much lower than those of average US residents. In Australia, Somalian naturals are predicted to have a low income and Mexican naturals an income more than twice as high. The correlation between the US predicted and the Australia actual wage ratios is only 0.594, which means that the specifics of the Australian-country of birth data are adding to the predictive power.

Third, our procedures do not "center" the results and it turns out the model tends to underestimate wages of foreign-born in Australia. The model overestimates in only five cases, with a maximum overestimate of 6.6% (Taiwan), and underestimates in 94 cases. Thus the US-based model does not produce large systematic overestimates of income per capita among the foreign born in a major non-US destination country.

We illustrate the out-of-sample estimation by considering its predictions for income-per-person among the foreign-born in Australia, returning to the cases of Mexico and Somalia. True average annual household income per person in Australia in 2000 was A$19,292, while among the Mexican-born it was A$22,360 (1.16 of national average) and among the Somalian-born it was A$7,748 (or 0.402 of national average). The

[6] We made a similar request to Spain's Instituto Nacional de Estadística, but the small survey on which they based their estimates of household income per capita by country of birth only allowed them to produce such estimates for six foreign countries (four outside of Europe).

regression estimates from Table 1 suggest that if the Mexican-born diaspora in the US had the same right-hand side characteristics of the Mexican-born diaspora in Australia, their income per person would be estimated as 0.757 of the US average; if the Somalian-born in the US had the same traits as the Somalian-born in Australia, their income per person would be estimated as 0.329 of the US average. The regression coefficients obtained from US data alone thus successfully predict that incomes among the Mexican-born in Australia are more than double those among the Somalian-born, even though incomes in these two groups are similar in the US.

The primary reason for this—displayed in Appendix 2—is that the fraction of Mexican-born in Australia with tertiary education (0.561) is tremendously higher than for Mexican-born in the US (0.053). Also important is the scarcity of the Mexican born in Australia (home to just 0.01% of the OECD-resident Mexican diaspora) compared to the US (98.4% of the OECD-resident Mexican diaspora). The example points out a key feature of the estimation technique: its results are not driven only by differences between the US and Australia (in which case the predicted ratio of Mexican-born incomes to Somalian-born incomes would be identical in the two destinations), but rather rest to an important degree on variance in sending-country characteristics.

2.3 Global estimates of income per natural

Let y_i be income per resident in the origin country at purchasing power parity, $y^*_{i,j}$ be income per capita of those born in origin country *i* living in destination country *j*, N_i be the population of origin country *i*, and $N^*_{i,j}$ be the stock of people born in *i* living in *j*. Income per natural is simply $\tilde{y}_i \equiv \left[y_i N_i + \sum_j \left(y^*_{i,j} \right) \left(N^*_{i,j} \right) \right] \Big/ \left[N_i + \sum_j N^*_{i,j} \right]$. Letting y^*_i represent population-weighted average income per capita of those born in origin country *i* living in an OECD country, N^*_i represent the number of people from *i* living abroad, and abbreviating $\theta_i = N_i / \left(N_i + N^*_i \right)$ and $\theta^*_i = N^*_i / \left(N_i + N^*_i \right)$, then $\tilde{y}_i = y^*_i \theta^*_i + y_i \theta_i$ and the percent difference between $\tilde{y}_i$ and y_i simplifies to

$$\frac{\widetilde{y}_i}{y_i} - 1 = \theta_i^* \times \left(\frac{y_i^* - y_i}{y_i} \right). \qquad (1)$$

Table 2a gives $\widetilde{y}_i$ and y_i, with the percent difference (1) for 211 countries. (Table 2b repeats the same information, sorted by region and descending percent difference between income per natural and GDP per capita.) We deliberately choose GDP per capita rather than GNI per capita as y_i to avoid double-counting workers' remittances.[7] Note that GDP per resident for Guyana is similar to that of Guatemala and Paraguay, but income per natural is similar to that of Brazil and Malaysia.

Figure 3 plots these percent differences against origin-country population. Predictably, income per natural departs most substantially from GDP per resident for small nations. Less predictably, the difference is notable in several countries that are quite large, such as the Philippines, Vietnam, and Morocco. In 12 countries income per natural differs from GDP per resident by more than 30%, in 20 countries by more than 20%, in 39 countries by more than 10%, and in 62 countries by more than 5%.

Figure 4 considers the difference between collective income per natural and collective GDP per resident for groups of countries. The countries are ordered left-to-right by descending country-level difference between income per natural and GDP per resident. The leftmost point in the graph shows Guyana, the country with the highest percent difference (104%). The second-highest country-level percent difference belongs to Samoa, so the next point to the right shows the difference between income per natural and GDP per resident in Guyana and Samoa collectively, as if they were a single country. The points proceed rightward adding one country at a time to the group.

[7] Income per natural is fundamentally different from Gross National Income per capita. The former includes income to all people living outside their country of birth regardless of how long, while the latter includes only income to nationals of a country who reside temporarily abroad for less than one year. According to the OECD (2007), "GNI is defined as GDP plus net receipts from abroad of wages and salaries and of property income. Wages and salaries from abroad are those that are earned by residents, that is, by persons who essentially live and consume inside the economic territory but work abroad (this happens in border areas on a regular basis) or for persons that live and work abroad for only short periods (seasonal workers) and whose centre of economic interest thus remains in their home country. Guest-workers and other migrant workers who live abroad for twelve months or more are considered to be resident in the country where they are working. Such persons may send part of their earnings to relatives at home, but these remittances are treated as transfers between resident and non-resident households and do not enter into net receipts from abroad of wages and salaries."

The line connecting these points crosses the 50% mark at a collective population of above 42.8 million. This means that 42.8 million people in the year 2000 lived in a group of countries whose collective income per natural differed from their collective GDP per resident by more than 50%. Further to the right, we see that 235 million people lived in a group of countries where the difference was 20%, and for 1.1 billion people the difference was 10%. Clearly, income per natural departs substantially from GDP per resident for a large fraction of the world's population, not solely for a handful of tiny states.

How much of the cross-country variance in income per natural is due to income gaps between sending and receiving countries $\left(\frac{y_i^* - y_i}{y_i}\right)$, and how much is due to variance in diaspora size across countries of origin (θ_i^*)? For example, income per Pakistani natural goes up with the gap between incomes of those living in Pakistan those living in the UK, and also goes up with the number of Pakistanis living in the UK. Figure 5 plots the percent difference in natural population and origin-country resident population on the horizontal axis, and the percent difference in naturals' income per capita *in OECD destination countries* and origin-country GDP per resident on the vertical axis. The dashes mark the 45° line $\left(\theta_i^* = \left(\frac{y_i^* - y_i}{y_i}\right)\right)$. Note that the percent differences are so large in some cases that both axes are on a $\log_{10}$ scale.

The overwhelming determinant of the variance in income per natural is the income gaps. The vast majority of countries lie far to the upper left of the 45° line. Even countries with a very high proportion of naturals abroad have income gaps much, much higher: for Jamaica $\theta_i^* = 0.325$ and $\left(\frac{y_i^* - y_i}{y_i}\right) = 3.31$. Below the line are traditionally sending countries whose domestic economy has improved—such as Ireland. Interestingly, Mexico lies directly on the line: Household income per capita for Mexican-born in the US in 2000 was $9,991, and Mexican GDP per resident at purchasing power parity is

$9,197. So Mexican income per natural would go up by roughly the same percentage due to a given percentage increase in the income gap or the same percentage increase in the number of Mexicans living in the US.

2.4 Robustness

There are several reasons to believe that these estimates of income per natural are conservative and are likely to understate, rather than overstate, the true gaps between income per natural and GDP per capita. First, due to lack of data, we omit consideration of non-OECD middle- to high-income destination countries, such as Saudi Arabia, Singapore, and South Africa. Since a substantial fraction of Asian migration goes to Singapore (e.g. Indonesian workers) or the Gulf (e.g. Nepali and Bangladeshi) income per natural for these countries will be particularly understated. Second, we omit consideration of emigrants' children born in the destination country, as we consider only that portion of each household with foreign-born members that was in fact born in the origin-country. Third, the census data on diaspora stocks we use are likely to omit large numbers of undocumented migrants who, although they might be making lower wages than documented and recorded workers in the destination country, are making more in the destination country than they would at home. Fourth, comparison of the model's predictions to true foreign-born household income per capita in Australia—the most important non-US destination country where data permit the comparison—suggests that if anything the model substantially underestimates those incomes.

It is nonetheless hypothetically possible that for an important destination country the out-of-sample predictive power of the model is very poor, and that estimates of income per natural in major origin countries for that destination country are correspondingly biased—in some cases possibly biased upwards.

We check this by repeating the entire exercise omitting the predictive model entirely, essentially just assuming that all of the coefficients are zero, with a highly simplifying and conservative assumption: that the income per capita of all foreign-born persons living

in high-income OECD countries is 35% of the destination country's GDP per capita. This restriction underpredicts true income per capita of foreign-born in the US for 121 out of 130 countries of origin; among those countries where income per capita is underpredicted, the average error is –30.0 percentage points. For Australia this underpredicts for *all* countries in the sample, with an average error of –60.5 percentage points.[8]

Even under this hyper-conservative assumption about migrant earnings, there are 10 (rather than 12) countries in which income per national differs from GDP per resident by more than 30%, 18 (rather than 20) where it differs by more than 20%, 36 (rather than 39) by more than 10%, and 51 (rather than 62) by more than 5%. And under this conservative assumption, there are 41 million (rather than 42.8 million) people living in a group of countries whose collective income per natural differs from their collective GDP per resident by more than 50%; 139 million (rather than 235 million) in a group of countries where the difference exceeds 20%, and 0.9 billion (rather than 1.1 billion) in a group for which it exceeds 10%. This suggests that the prior estimates cannot be biased upwards to a very large degree by unobserved deficiencies in the US regression equation's out-of-sample predictive power.

2.5 Poverty headcounts and income per natural

Until now we have considered only mean income per natural, without regard for its distribution. Table 3 explores how poverty headcount estimates might change if income per natural were the standard rather than income per resident, using only a single destination country. Since for poverty calculations we need estimates of the distribution of income we consider *only* those people from each country of birth—Haiti, India, and Mexico—who live either in their home country or live abroad in the United States, and for which sufficient observations exist in the US data, omitting consideration of those who reside abroad in other destination countries and other source countries. The table

[8] The lowest is Somalia, whose naturals' average household income per capita in Australia is 40.2% of the Australian average. Two countries have lower values in the Australian census data but are dropped from the sample due to very small samples: Federated States of Micronesia (30.0%, N = 3) and São Tomé & Príncipe (30.5%, N = 12). Figure 2 retains only countries whose estimates arise from samples of 1,000 individuals or more.

uses three different standard of "poverty"—the $1/day[9] (destitution) and $2/day (low poverty) standards commonly used by the World Bank, and the $10/day standard of "global poverty" advocated by Pritchett (2006).[10]

By the $2/day standard, the number of non-poor people increases about 36% for Haiti, 17% for Mexico, and about 1% for India if we consider the population residing in both the country of origin and the US together rather than the country of origin alone. At the $2/day standard for poverty, around a quarter of non-poor Haitians live in the US and about one seventh of non-poor Mexicans.

At the $10/day standard of "global poverty" the number of non-poor increases 457% for Haiti, 74% for Mexico, and 37% for India when naturals are considered rather than just residents. At a global poverty standard 82% of the non-poor Haitian-born reside in the US; 43% of non-poor Mexicans, and 27% of non-poor Indians. About half of all Mexicans who have achieved even a standard of living unthinkably low to most readers of this paper have done so while living in the US. Four out of five Haitians who have escaped poverty by this global standard have done so in the US. These differences are substantial, and all underestimate the differences in poverty rates that would arise if all destination countries were included. For many important developing countries, then, international migration is not an alternative to poverty reduction; it is today among the *principal sources* of poverty reduction.[11]

[9] We use the accepted nomenclature of "dollar a day" even though with inflation these are all about 50 percent higher in current PPP versus the 1993 base.

[10] The 10$/day is an upper bound for poverty as it corresponds to the lower bound of OECD country poverty on the principle that a global poverty line should not be discriminatory by nationality and what OECD countries consider poor for their own citizens ought to be applied at the global level (Pritchett 2006).

[11] Beegle et al. (2008, Table 4) give remarkable evidence that the same may be true *within* very poor developing countries. They track 4,432 people surveyed while living in the rural Kagera region of Tanzania between 1991 and 1994, and then recontacted in 2004. Over this period, real consumption per capita increased among those who had left Kagera by an amount over nine times greater than that by which it increased among those who had stayed in their villages. Although real consumption per capita in the early 1990s of those who would later leave Kagera was very similar to that of those who did not, by 2004 real consumption per capita among the leavers was about 2.5 times that of those who had stayed in their villages. While selection could explain a small portion of these differences, it is difficult to imagine what even the most able individuals could have done to raise consumption growth by 800% if obliged to stay in their remote villages. Beegle et al. also employ instrumental variables based on rainfall and family structure to address selection bias and arrive at substantially identical results.

3 THE EFFECT OF MIGRATION ON INCOME PER NATURAL

The simple gap between GDP per resident and income per natural does not indicate average welfare gains caused by the opportunity to emigrate. Put differently, it does not show the average welfare loss that would have occurred if emigrants had not been able to emigrate. There are two reasons why counterfactual income per capita for the diaspora, had they not been able to leave, might differ from origin-country GDP per resident: labor supply effects and selection effects. The labor supply effect is that emigrants' departure from the origin country might have affected GDP per capita there, either positively or negatively, and their arrival in the destination country might have affected income per capita there, either positively or negatively. The selection effect is that emigrants might be selected, either by themselves or by migration regulators, to have more or less earning potential than the average origin-country resident. We consider each of these in turn.

Let $\bar{y}_i$ be counterfactual income per capita of those remaining behind *if* those living abroad had not left, and $\bar{y}_i^*$ be weighted average counterfactual income per capita of those living abroad *if* they had not left. Rearranging identity (1) gives the decomposition

$$\frac{\widetilde{y}_i}{y_i} - 1 = \underbrace{\left(\frac{\theta_i^*}{\bar{y}_i}\left(y_i^* - \bar{y}_i^*\right)\right)}_{\text{True effect of emigration}} \underbrace{\left(\frac{\bar{y}_i}{y_i}\right)}_{\text{Labor supply}} \underbrace{\left(\frac{y_i^*/y_i - 1}{y_i^*/y_i - \bar{y}_i^*/y_i}\right)}_{\text{Selection}}. \tag{2}$$

The first parenthetical term in (2) is the percent change in income per natural *caused* by migration, i.e. compared to the counterfactual of no migration. This term can differ from (1), the strictly factual percent difference between income per natural and income per resident, for two reasons, captured by the following two terms. The second term of (2) gives the degree to which (1) departs from this *causal* percent difference due to labor supply effects, and the third term gives the difference due to selection effects. Intuitively, if $\bar{y}_i < y_i$ then emigration may have pushed up the incomes of those remaining behind by decreasing the labor supply at home, which makes the factual percent difference (1) an

underestimate of the causal difference. On the selection side, if $\bar{y}_i^* / y_i > 1$, then emigrants would have been making much more than non-migrants even if they had not left, so the factual difference *over*estimates the causal impact.

3.1 Labor supply

To the extent that emigration raises average incomes in the sending country, the labor supply term in equation (2) is less than unity. For the mass of unskilled workers in developing countries, departure of a substantial fraction of the workforce might be expected to exert upward pressure on wages. Anecdotes of this phenomenon are abundant. O'Rourke (1994) finds that mass emigration from Ireland in second half of the 19th century—roughly one third of the population—caused per capita income there to increase by between 5 and 25 percent by 1908 compared to a no-emigration counterfactual. Lucas (2005, p. 90) presents evidence that large-scale emigration from Pakistan and the Philippines in the late 20th century has raised sending-country wages by roughly one third within specific sectors such as construction and manufacturing. Mishra (2007) finds that massive migration from Mexico to the US in the decades leading up to the year 2000—roughly 16% of working age males—caused an 8% rise in the national average wage of Mexican workers in Mexico. Borjas (2008) finds evidence that emigration from Puerto Rico to the US, amounting to about 30% of the Puerto Rican population by 2000, may have raised low-skill wages in Puerto Rico by roughly 10%.

It is theoretically possible, particularly in the case of skilled workers, that large-scale departures could alter the productivity of those remaining behind and materially decrease average incomes there. No reliable empirical evidence of this phenomenon exists. On the contrary, there are three reasons to presume the opposite tendency in many countries. First, a substantial literature documents instances in which skilled emigration has contributed directly to the formation of important growth industries in the sending country, such as in Taiwan and India (Saxenian 2002). Second, emigration itself can encourage the formation of domestic human capital stocks: Although 24% of Cape Verde-born university graduates live abroad, Batista et al. (2007) give suggestive survey

evidence that the stock of university graduates *in* Cape Verde would be *lower* in the counterfactual of no emigration—opportunities abroad appear to encourage study for a substantial fraction of those who do not end up leaving. Likewise, although the Philippines is by far the number one origin country of nurses working abroad, the World Health Organization's *Global Health Atlas* shows that the Philippines despite its poverty has more nurses per capita than Austria. Third, for the poorest countries, other forces unequivocally dominate as determinants of GDP per capita: It is ludicrous to suppose that incomes in Liberia or Zimbabwe would be much higher now if skilled workers had been trapped there for the past decade (Pritchett 2007). All of these suggest that the labor supply term in equation (2) may be less than unity, often or even generally. There is no strong evidence to suggest that it is generally greater than unity.

There is substantial evidence that remittance receipts can reduce labor supply in some recipient households, which tends to raise $\bar{y}_i / y_i$ and make the left-hand side of (2) tend to overestimate the pure effect of migration. This tendency, however, is too small to be substantial for the present purpose. Hanson (2005) and Amuedo-Dorantes and Pozo (2006) find that remittance receipts cause declines in labor force participation and hours supplied by rural Mexican women, on the order of 5-10%. Consider that 1) the effect is not observed among rural men or among urban men or women, 2) only 5.5% of the individuals in the 2002 National Household Income and Expenditure Survey of Mexico live in remittance-receiving households, and 3) income per capita among remittance-receiving households is substantially lower than average income per capita. Together, these mean that the reduction in overall GDP per capita due to remittances, even in one of the world's top migrant-sending countries, can only be a tiny fraction of one percent. This phenomenon, therefore, could only cause the left-hand side of equation (2) to overestimate the true effect of migration by an insubstantial amount. The effect would be even further attenuated if withdrawals from the labor force exert upward pressure on wages in general equilibrium, or if remittances cause investments that raise the productivity of rural land, as has been found in Mexico (Taylor and López-Feldman 2007) and Morocco (de Haas 2006).

3.2 Selection

Equation (2) suggests that positive selection of migrants makes the factual difference between income per natural and GDP per resident tend to be larger than the strictly *causal* effect of migration on income per natural. It also shows, however, that this difference can be small when international wage gaps are large, even in the presence of very strong positive selection. Here we use examples of estimated counterfactual wages from Mexico, India, and Tonga to show that this difference is typically smaller than about 20%.

Mexican laborers in the US. Fernández-Huertas (2006) finds that counterfactual wages for male Mexicans working in the United States are in fact slightly lower than non-emigrant wages, using a nationally-representative longitudinal dataset allowing for the construction of counterfactuals based on both observed and unobserved migrant characteristics. This would suggest that for Mexicans in the US, the difference between income per natural and income per resident in Mexico slightly underestimates the causal effect of migration on income per natural as there is negative rather than positive selection. Fernández-Huertas' estimates differ from those of Chiquiar and Hanson (2005), who find that migrants' counterfactual wages are slightly higher, using less desirable cross-sectional data and thus constructing their counterfactual wages using only observed migrant traits such as education. They find that Mexican male wage earners' average hourly wage in the US is roughly $8.7, for Mexican residents it is roughly $1.2, and the emigrants' counterfactual wage is on the order of $1.8.[12] Under these conditions the selection bias term in (2) is 1.087. For Mexicans in the US, then, if selection is in fact negative, the difference between the factual and causal estimates is less than one; even if the selection is positive, the difference due to selection on observables is less than 9%.

***Indian software industry workers in the US*.** Commander et al. (2004) report the results of a firm survey on the wages of comparable workers in the US and Indian software

[12] Chiquiar and Hanson (2005) do not explicitly calculate a counterfactual average wage. We take the factual wages from their Table 2 (p. 249), and estimate the counterfactual wage by 1) noting that their Figure 4 (p. 266) suggests a the natural logarithm difference between the modal counterfactual emigrant wage and resident wage is on the order of 0.4, thus 2) the counterfactual average wage is roughly equal to $1.2+e^{(\ln 1.2)+0.4} = 1.8$.

industries. Table 4 shows their wage figures for 1999, the year closest to the 2000 census data used in the rest of this paper, and the resulting estimates of the selection term in equation (2). For all workers except top management, the difference term is on the order of 1.2. This is very likely a substantial overestimate of the difference term for *all* Indian workers in all industries, since selection among software engineers relative to the whole Indian population is very likely to be much larger than selection among Indian emigrants in all industries relative to the whole Indian population. It does, however, only capture selection on observable traits.

Tongan workers in New Zealand. McKenzie, Gibson, and Stillman (2006) report careful measures of the income gains to Tongan migrants to New Zealand, utilizing a visa-lottery natural experiment that allows selection effects to be excised from aggregate effects, including selection on unobservable migrant traits. They find that lottery-winning migrants earn NZ$424.5/week, lottery-losing non-migrants earn NZ$104.1/week, and non-applicants earn NZ$41.4/week. The selection term in equation (2) is then 1.197. They find that 52% of the difference between lottery-applicants' wages and non-applicants' wages can be explained by observable age, education, gender, marital status, height, and migrant network. Thus the difference term using counterfactual wages constructed solely on observable traits would be 1.094.

Figure 6 summarizes the above calculations. The available studies suggest that the value of the selection term in equation (2), including selection on unobserved traits, is probably less than 1.33 in most poor developing countries. Put differently, in poor developing countries a conservative estimate is that more than three quarters of the difference between income per natural and income per resident reflects the *effect* of migration on income per natural.

4 INFANT MORTALITY PER NATURAL

A similar exercise to the comparison of income per natural can be performed for any common development indicator. We calculate infant mortality per natural simply as

$$\widetilde{m}_i = \left[m_i b_i N_i + \sum_j m^*_{i,j} b^*_{i,j} N^*_{i,j} \right] \Big/ \left[b_i N_i + \sum_j b^*_{i,j} N^*_{i,j} \right] \quad (3)$$

Where $m^*_{i,j}$ is infant mortality for parents born in country *i* residing in *j*, and $b^*_{i,j}$ is the crude birth rate per person born in country *i* residing in *j*. Here we assume $m^*_{i,j} = m_j$, i.e. that the infant mortality rate of the foreign-born is that of their country of destination. Regarding crude birth rates we present two cases: We give alternate results assuming $b^*_{i,j} = b_j$, i.e. that foreign-born people have the same crude birth rate as the country of destination, or assuming $b^*_{i,j} = b_i$, that foreign-born people have the same crude birth rate as the country of origin.

The assumption $m^*_{i,j} = m_j$ tends to underestimate the difference between infant mortality per natural and per resident for developing countries, since infant survival and other health outcomes are typically *better* among the foreign-born than the native-born in rich countries. This somewhat counterintuitive phenomenon is known as the "healthy immigrant effect" (Hyman 2001) or the "epidemiologic paradox" (Markides and Coreil 1986). Mortality among infants born to Mexican immigrant women in the US is roughly 10% lower than that among infants of non-Hispanic, white native-born women (Hummer et al. 2007). Similar results have been found for US immigrants from other low-income countries besides Mexico (Singh 1996), for immigrant women's perinatal health in Canada (Ray 2007), and for many other destination countries and health indicators. Here we err on the side of a smaller difference between infant mortality per natural and per resident by denying the health immigrant effect and simply assuming that infant mortality among the foreign born is equal to that among the native born.

Figure 7 shows what Figure 4 would look like if the same exercise were carried out for infant mortality per natural, for both versions of equation (3). All countries on earth have been ordered from left to right, starting with the country with the highest differential between infant mortality per natural and per resident (Guyana). Countries are added to the group one by one, such that the country added at each step is the one among the

remaining countries that maximizes the collective differential between infant mortality per natural and per resident. The horizontal axis shows cumulative population of these groupings. The vertical axis shows the absolute difference between the infant mortality rate per natural for each grouping collectively—as if it were a single country—and the rate per resident. The upper line assumes that naturals' crude birth rate is identical to that of the country they reside in; the lower line assumes that their crude birth rate is that of the country in which they were born.

The figure suggests that several hundred million people live in a group of countries whose collective infant mortality per natural is roughly three points lower than their collective infant mortality per resident. This difference, for all developing countries collectively, amounts to between 19,000 infant deaths (assuming $b^*_{i,j} = b_j$) and 43,000 infant deaths ($b^*_{i,j} = b_i$) every year.

To what degree does migration itself *cause* infant mortality per natural to differ from infant mortality per resident? These correlations *understate* the causal relationship to the degree that migration itself has lowered infant mortality in the country of origin; Donato el al. (2001) and Frank (2005) find that migration causes improved child health in Mexican households. On the other hand, the correlations *overstate* the purely causal portion of the relationship to the extent that parents whose children are less likely to die are more likely to emigrate. While there is evidence of such selection on observable and unobservable characteristics (Landale 2000), Singh (1996) finds that poor-country immigrants' advantage in infant mortality changes very little when one controls for a variety of observable traits such as maternal age, marital status, education, birth plurality/order, place of residence, and prenatal care. The public health literature generally finds that a large portion of the difference is *caused* by migration: "[E]xplanations ascribing immigrants' mortality advantage to migrant selectivity, pre-modern cultural practices, or an artifact of population recording practices are insufficient" (Anson 2004).

We can approximate the magnitude of selection via income-disaggregated infant mortality levels. In India, average infant mortality is about 62 per thousand live births, but for the richest quintile of the population it is only 38 (UNDP 2007, pp. 309, 317). In the United States, average infant mortality is about 7 but for the *poorest* quintile it is approximately 14 or less.[13] Thus while the gap between average infant mortality in India and the United States is 55 points, an average person from the top income quintile of India who moved to the *bottom* quintile of the US would experience a drop of only 24 points. We interpret this to mean that selection can account for no more than about half of the gap between infant mortality per natural and per resident for India; the other half likely represents a causal relationship between movement and the decline.

This speaks is part to one possible concern about the income per natural estimates. In comparing income of naturals at home and abroad there is a suspicion that the reported income differences—even though they are adjusted by purchasing power parity exchange rates—somehow overstate income differences and that "real" income of a Haitian in the US at 10$/day is not actually as high as a Haitian in Haiti at the same PPP adjusted income. While certainly the overall utility must take into account dimensions of living abroad, possible discrimination, alienation, and relative position in the income distribution with whatever feelings that may cause. But on the narrower question of material well-being the question is whether PPP somehow, in spite of its best efforts, gets it wrong and material well-being is not as different as reported. One way to address this is to compare objective indicators of material well-being and compare those at similarly measured levels of PPP income. So, for instance, do Haitians at 10$/day in the US have a lower or higher child mortality rate than Haitians at 10$/day in Haiti? By all indicators we have compared, there is no evidence that income measures *over*state material well-being, and in fact, as the relative prices of publicly provided goods (e.g. security,

[13] The most recent systematic survey of infant mortality by income level in the United States is reported in CDC (1995), which finds that in 1988 infant mortality in households below the poverty level was 13.5. In that year the overall US infant mortality rate was 9.0 (CDC 2007, Tab. 23). This is probably an overestimate of infant mortality in the lowest quintile, since the poverty line in 1988 was a household annual income of $12,092 for a family of four, but in 1988 the lowest quintile of US household incomes were those below $18,047 (US Census Bureau 2007). According to CDC (2007, Tab. 23) the country average infant mortality was 6.9 for the period 2001-2003. If the same ratio of infant mortality in the lowest quintile to average infant mortality holds in 2001-2003 as in 1988, this suggests an infant mortality in the lowest quintile of 10.3. As a check on this estimate, CDC (2007, Tab. 23) reports that infant mortality among African-Americans in Mississippi during 2001-2003 was 14.7. We therefore assume, conservatively for the present purpose, that bottom-quintile infant mortality in the US is 14.

education, health, sanitation) are almost certainly much lower in developed than developing country settings, existing PPP differences that focus on private goods alone almost certainly substantially *under*state material well-being.

5 CONCLUSION

It is common to suppose that poor countries have such high populations that emigration can never occur at levels high enough to meaningfully raise the average standard of living of those born there. By this reasoning, migration cannot be a development strategy any more than the lottery can be a career strategy.

Eubulides of Miletus, a Greek logician of the 4th century BCE, formulated a paradox known as the *sorite*s ("heaps"): One grain of wheat is not a heap of wheat, and if one grain is not a heap then two grains are not a heap, and if two are not then three are not—therefore ten million grains of wheat do not constitute a heap. Eubulides' purpose was to point out the inherent indeterminacy of the word 'heap'. Of course there is a point, an inescapably arbitrary one, at which a collection of grains *is* a heap.

By the same token, there is a certainly a degree of migration at which migration *becomes* economic development for the people from a particular place. If sea levels were to rise just 7½ feet (2.3m), all 300,000 current residents of the low-lying nation of the Maldives would become emigrants. Income per *resident* (zero) would cease to contain information about Maldivians' welfare, or the degree to which they produce, consume, or exchange goods and services. The question is not whether migration *can* be economic development, but rather *at what point* do we consider migration an important form of economic development? Only numbers can suggest an answer to this species of question.

The initial estimates made here do point toward an answer. Over a billion people live in countries whose collective income per capita would rise more than 10% if considered as income per natural rather than income per resident. Put differently, for those billion people *departure from the country* is one of the largest national "industries" in terms of

its contribution to average material welfare per person of naturals. It is likely that by a reasonable international standard of poverty, two of every five living Mexicans who have escaped poverty did so by leaving Mexico; for Haitians it is four out of five. And on the order of tens of thousands of infant deaths are prevented each year for the sole reason that those infants' parents left poor countries. Although there is no clear point at which migration becomes development, we suggest that by any reasonable standard a very large part of the developing world is already past that point.

This is not at all an abstract observation. Measuring economic progress as if migration is not a form of development leads to bizarre conclusions by making a line in the sand the only consideration. If a Nicaraguan woman working in Arizona sends $200 a month to her impoverished spouse in Nicaragua, that can spur 'development' by common wisdom. But if her spouse goes to join her in Arizona and acquires a $2,000 per month lifestyle, that is not considered 'development'. The woman and her spouse would likely disagree. On the sending-country side, should the Federated States of Micronesia be subsidizing education that prepares its workers for the local labor market or the global labor market? The government will arrive at very different policies depending on whether or not it sees migration as a form of development.

James Scott's (1998) *Seeing Like a State* profoundly illustrates how nation-states use statistics to reduce people's lived reality to statistics amenable to state enumeration and control. Few developing-country governments arrange their interventions in such a way as to maximize the welfare of their people rather than their place. Likewise, few rich-country governments set their policies related to immigration or development assistance in due consideration of their effect on people rather than places. As long as most people stayed put and international welfare disparities were small, acting as if patches of ground had welfare of their own made little difference to people's lives. But that era is ending, and we need to prepare the statistics to see the real, not imagined, world.

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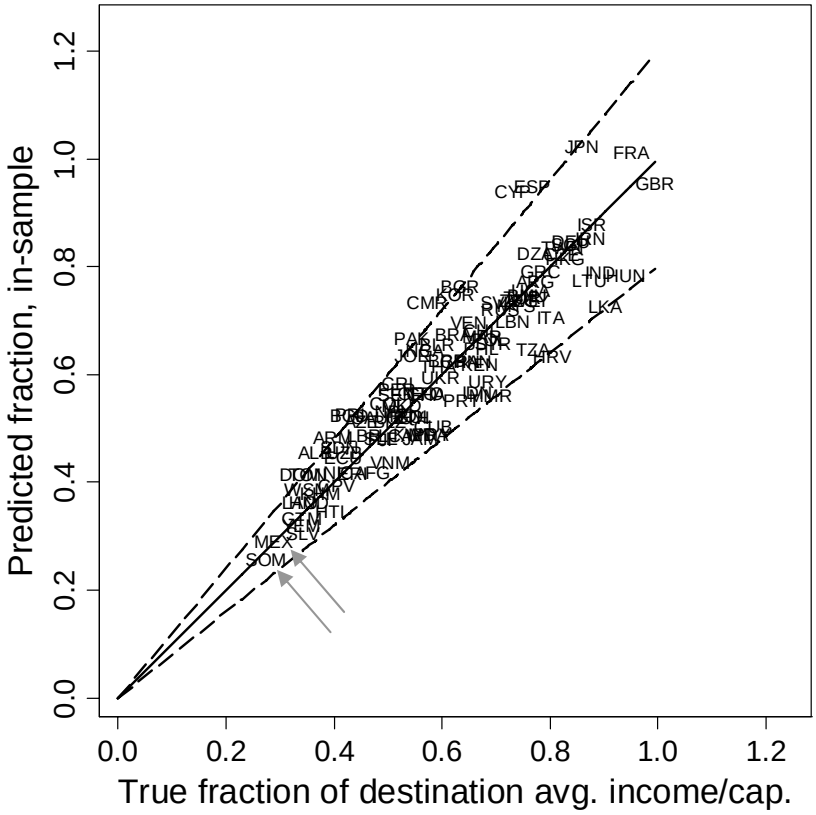
Table 1: Correlates of household income per capita among the foreign-born in the United States

Dependent variable: Average ln Household income per person for those born in each sending country and residing in the United States in 2000 (one observation per country of birth).

ln GDP per capita at PPP in country of birth	0.18	0.21	0.14	0.14
	(7.93)	(6.14)	(5.53)	(5.60)
ln Fraction of diaspora with tertiary education			0.45	0.39
			(6.24)	(6.33)
ln Fraction of diaspora with primary education or less			0.04	0.06
			(0.57)	(1.08)
ln Gross tertiary enrollment in country of birth				0.04
				(2.20)
ln Fraction of worldwide diaspora residing in US				0.11
				(4.48)
ln Fraction of OECD-resident diaspora residing in US				–0.06
				(2.44)
ln Land area of country of birth				0.03
				(3.22)
ln Size of diaspora in US				–0.05
				(3.07)
Fraction of US diaspora that is refugees				–0.44
				(4.29)
ln Distance to country of birth				0.01
				(0.14)
Dummy for country of birth contiguous to US				–0.10
				(1.15)
Dummy for common official language with US				0.04
				(1.34)
Dummy for oil-exporting Middle East				–0.47
				(4.72)
Region dummy: Latin America & Caribbean		–0.37	–0.23	–0.18
		(5.17)	(4.65)	(3.88)
Region dummy: Eastern Europe & Central Asia		–0.11	–0.22	–0.09
		(1.46)	(3.26)	(1.35)
Region dummy: Middle East & North Africa		–0.09	–0.23	–0.02
		(0.93)	(2.69)	(0.43)
Region dummy: Sub-Saharan Africa		0.06	–0.14	–0.01
		(0.41)	(1.45)	(0.14)
Region dummy: East Asia & Pacific		–0.27	–0.27	–0.17
		(2.88)	(5.08)	(2.39)
Region dummy: South Asia		0.07	–0.23	0.05
		(0.50)	(1.96)	(0.43)
Constant	8.36	8.34	9.53	9.57
	(40.91)	(24.49)	(32.32)	(26.32)
N	130	130	129	118
R^2	0.326	0.536	0.803	0.893
Adjusted R^2	0.321	0.509	0.788	0.872

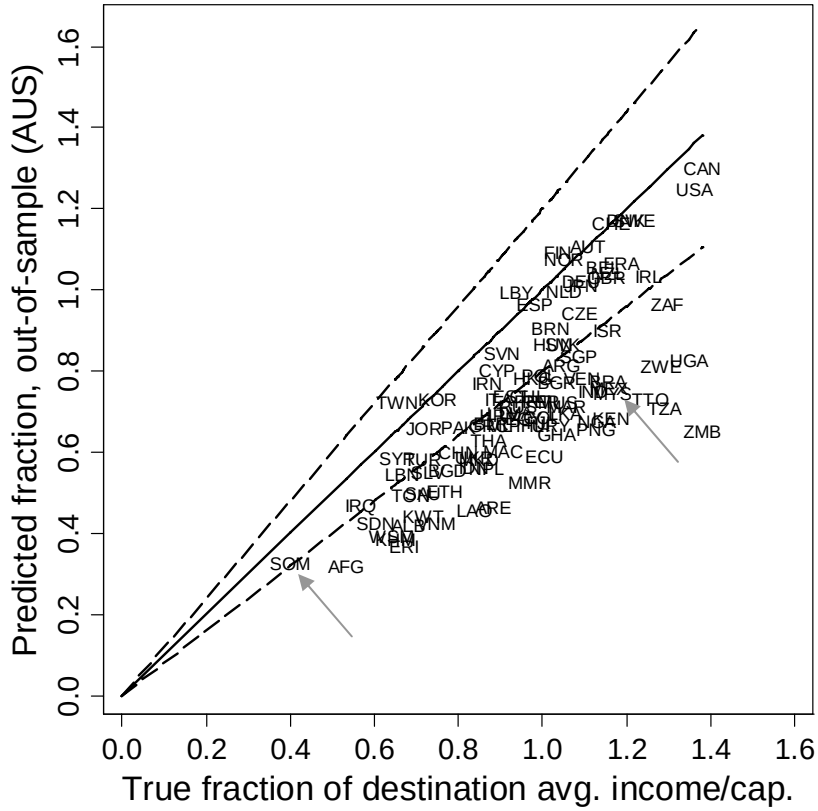
Absolute value of robust t-statistics in parentheses. Omitted region dummy covers high-income OECD countries.

Figure 1: In-sample predictive power of the model of foreign naturals' income per capita in the United States as a fraction of American-born income per capita



Gray arrows point to Somalia and Mexico. The solid line is a 45 degree line, flanked by dashed lines showing a ±20% error. The horizontal axis shows the true ratio of household income per capita for residents of the United States in 1999 by country of birth to household income per capita of native-born Americans. The vertical axis shows the ratio predicted by the regression model in Table 1.

Figure 2: Out-of-sample predictive power of the model of foreign naturals' income per capita in Australia as a fraction of Australian-born income per capita



Gray arrows point to Somalia and Mexico. The solid line is a 45 degree line, flanked by dashed lines showing a ±20% error. The horizontal axis shows the true ratio of household income per capita for residents of Australia in 2000 by country of birth to household income per capita of native-born Australians. The vertical axis shows the ratio predicted by the regression model in Table 1. The graph only shows countries of birth for which the true average income per capita is based on a sample of 1,000 or more individuals in the Australian census.

Table 2a: Global estimates of income per natural in the year 2000, compared to sending-country GDP per capita at purchasing power parity.

Country	GDP/cap.	inc/nat.	% diff
AFGHANISTAN	800	867	8.4
ALBANIA	1,650	2,641	60.0
ALGERIA	5,327	5,782	8.6
ANGOLA	1,462	1,573	7.6
ARGENTINA	12,090	12,175	0.7
ARMENIA	2,417	2,796	15.7
ARUBA	21,800	22,091	1.3
AUSTRALIA	25,619	25,728	0.4
AUSTRIA	28,619	28,423	-0.7
AZERBAIJAN	2,474	2,510	1.5
BAHRAIN	13,700	13,683	-0.1
BANGLADESH	1,543	1,571	1.8
BARBADOS	18,400	18,871	2.6
BELARUS	4,801	4,892	1.9
BELGIUM	27,166	27,071	-0.3
BELIZE	5,680	7,497	32.0
BENIN	974	1,007	3.4
BERMUDA	31,500	29,535	-6.2
BOLIVIA	2,386	2,528	5.9
BOTSWANA	8,349	8,398	0.6
BRAZIL	7,193	7,230	0.5
BRUNEI DARUSSALAM	25,600	25,496	-0.4
BULGARIA	6,064	6,271	3.4
BURKINA FASO	986	1,002	1.6
BURUNDI	650	672	3.4
CAMBODIA	1,730	1,921	11.1
CAMEROON	1,877	1,956	4.2
CANADA	27,507	27,735	0.8
CAPE VERDE	4,555	5,291	16.2
CAYMAN ISLANDS	24,500	24,312	-0.8
CENTRAL AFRICAN REP.	1,209	1,251	3.5
CHAD	801	811	1.3
CHILE	9,128	9,278	1.6
CHINA	3,939	3,962	0.6
COLOMBIA	5,945	6,149	3.4
COMOROS	1,718	2,027	18.0
CONGO, REPUBLIC OF	1,055	1,337	26.7
COSTA RICA	8,170	8,417	3.0
CÔTE D'IVOIRE	1,582	1,644	3.9
CROATIA	9,112	9,512	4.4
CUBA	4,000	5,056	26.4
CYPRUS	19,167	19,233	0.3
CZECH REPUBLIC	15,222	15,337	0.8
DENMARK	28,676	28,604	-0.3
DJIBOUTI	1,857	1,999	7.7
DOMINICAN REPUBLIC	5,400	6,137	13.7
ECUADOR	3,229	3,660	13.4
EGYPT	3,526	3,609	2.4
EL SALVADOR	4,597	5,356	16.5
EQUATORIAL GUINEA	5,103	5,355	4.9
ERITREA	1,022	1,163	13.8
ESTONIA	9,388	9,814	4.5
ETHIOPIA	814	844	3.7
FIJI	4,991	6,397	28.2
FINLAND	25,912	25,750	-0.6
FRANCE	25,944	25,907	-0.1
GABON	6,175	6,330	2.5
GAMBIA, THE	1,631	1,802	10.5
GEORGIA	1,998	2,134	6.8
GERMANY	25,343	25,312	-0.1
GHANA	1,920	2,040	6.2
GREECE	17,059	17,164	0.6
GUATEMALA	4,048	4,379	8.2
GUINEA	1,974	2,006	1.6
GUINEA-BISSAU	863	1,012	17.3
GUYANA	3,922	7,985	103.6
HAITI	1,619	2,234	38.0
HONDURAS	2,872	3,305	15.1
HONG KONG	26,203	25,907	-1.1
HUNGARY	12,815	13,079	2.1
ICELAND	28,385	28,765	1.3
INDIA	2,364	2,405	1.7
INDONESIA	2,904	2,924	0.7
IRAN	5,804	5,999	3.4
IRAQ	2,900	3,053	5.3
IRELAND	20,300	20,449	0.7
ISRAEL	23,006	23,140	0.6
ITALY	21,400	21,170	-1.1
JAMAICA	3,596	6,517	81.2
JAPAN	26,089	26,128	0.1
JORDAN	4,109	4,341	5.6
KAZAKHSTAN	4,343	4,368	0.6
KENYA	1,033	1,140	10.4
KOREA, REPUBLIC OF	13,300	13,504	1.5
KUWAIT	19,599	19,500	-0.5
KYRGYZ REPUBLIC	1,496	1,509	0.9
LAOS	1,505	2,028	34.7
LATVIA	7,972	8,325	4.4
LEBANON	4,336	5,708	31.6
LESOTHO	2,592	2,603	0.4
LIBERIA	463	703	51.8
LIBYA	12,300	12,395	0.8
LITHUANIA	8,715	8,950	2.7
LUXEMBOURG	34,200	33,319	-2.6
MACAU	19,078	18,967	-0.6
MACEDONIA	6,053	6,586	8.8
MADAGASCAR	843	919	9.1
MALAWI	583	600	2.9
MALAYSIA	8,570	8,684	1.3
MALDIVES	3,900	3,922	0.6
MALI	785	825	5.1
MALTA	17,628	17,766	0.8
MARSHALL ISLANDS	2,900	4,193	44.6
MAURITANIA	1,894	1,964	3.7
MAURITIUS	9,673	10,309	6.6
MEXICO	9,197	9,276	0.9
MICRONESIA	6,464	7,057	9.2
MOLDOVA	1,311	1,433	9.3
MONGOLIA	1,530	1,567	2.4
MOROCCO	3,578	4,092	14.4
MOZAMBIQUE	799	838	4.9
MYANMAR	1,800	1,820	1.1
NAMIBIA	5,838	5,876	0.7
NEPAL	1,325	1,341	1.2
NETHERLANDS	28,576	28,413	-0.6
NETHERLANDS ANTILLES	16,000	15,981	-0.1

Table 2, continued

Country	GDP/cap.	inc/nat.	% diff
NEW ZEALAND	19,849	20,702	4.3
NICARAGUA	3,110	3,640	17.0
NIGER	678	687	1.3
NIGERIA	854	900	5.3
NORWAY	34,264	34,096	-0.5
OMAN	12,602	12,626	0.2
PAKISTAN	1,880	1,957	4.1
PALAU	7,600	9,063	19.2
PANAMA	6,046	6,811	12.7
PAPUA NEW GUINEA	2,343	2,421	3.3
PARAGUAY	4,094	4,145	1.2
PERU	4,722	4,960	5.0
PHILIPPINES	4,030	4,475	11.0
POLAND	10,548	10,842	2.8
PORTUGAL	15,300	14,881	-2.7
PUERTO RICO	22,243	21,143	-4.9
QATAR	17,000	17,002	0.0
RUSSIA	7,006	7,066	0.9
RWANDA	931	957	2.8
SAMOA	2,100	3,957	88.4
SÃO TOMÉ AND PRÍNCIPE	1,801	2,258	25.4
SAUDI ARABIA	9,000	9,017	0.2
SENEGAL	1,427	1,616	13.3
SIERRA LEONE	463	602	30.0
SINGAPORE	23,563	23,524	-0.2
SLOVAKIA	11,126	11,287	1.4
SLOVENIA	16,829	16,846	0.1
SOMALIA	600	775	29.1
SOUTH AFRICA	8,764	8,905	1.6
SPAIN	22,313	22,230	-0.4
SRI LANKA	3,442	3,652	6.1
ST LUCIA	5,895	7,208	22.3
SUDAN	1,506	1,527	1.4
SURINAME	5,530	8,163	47.6
SWAZILAND	4,167	4,205	0.9
SWEDEN	26,359	26,440	0.3
SWITZERLAND	27,100	26,924	-0.6
SYRIAN ARAB REPUBLIC	3,161	3,284	3.9
TAIWAN	16,100	16,313	1.3
TAJIKISTAN	809	817	1.0
TANZANIA	524	559	6.7
THAILAND	6,319	6,378	0.9
TOGO	1,358	1,411	3.9
TONGA	6,568	7,926	20.7
TRINIDAD AND TOBAGO	9,078	10,984	21.0
TUNISIA	6,276	6,676	6.4
TURKEY	6,470	6,539	1.1
TURKMENISTAN	3,414	3,420	0.2
UGANDA	1,167	1,230	5.4
UKRAINE	4,035	4,165	3.2
UNITED ARAB EMIRATES	17,700	17,669	-0.2
UNITED KINGDOM	26,558	26,581	0.1
UNITED STATES	34,599	34,583	0.0
URUGUAY	8,777	8,966	2.2
UZBEKISTAN	1,497	1,516	1.3
VANUATU	3,127	3,273	4.7
VENEZUELA	5,756	5,889	2.3
VIETNAM	2,016	2,249	11.6
YEMEN, REPUBLIC OF	822	843	2.6
ZAMBIA	785	841	7.1
ZIMBABWE	2,498	2,613	4.6

Table 2b: Global estimates of income per natural in the year 2000, compared to sending-country GDP per capita at purchasing power parity. Sorted by region and descending order of percent difference between income per natural and GDP/capita.

EAST ASIA/PACIFIC

Country	GDP/cap.	inc/nat.	% diff
SAMOA	2,100	3,957	88.4
MARSHALL ISLANDS	2,900	4,193	44.6
LAOS	1,505	2,028	34.7
FIJI	4,991	6,397	28.2
TONGA	6,568	7,926	20.7
PALAU	7,600	9,063	19.2
VIETNAM	2,016	2,249	11.6
CAMBODIA	1,730	1,921	11.1
PHILIPPINES	4,030	4,475	11.0
MICRONESIA	6,464	7,057	9.2
VANUATU	3,127	3,273	4.7
PAPUA NEW GUINEA	2,343	2,421	3.3
MONGOLIA	1,530	1,567	2.4
MALAYSIA	8,570	8,684	1.3
MYANMAR	1,800	1,820	1.1
THAILAND	6,319	6,378	0.9
INDONESIA	2,904	2,924	0.7
CHINA	3,939	3,962	0.6

EASTERN EUROPE/CENTRAL ASIA

Country	GDP/cap.	inc/nat.	% diff
ALBANIA	1,650	2,641	60.0
ARMENIA	2,417	2,796	15.7
MOLDOVA	1,311	1,433	9.3
MACEDONIA	6,053	6,586	8.8
GEORGIA	1,998	2,134	6.8
ESTONIA	9,388	9,814	4.5
CROATIA	9,112	9,512	4.4
LATVIA	7,972	8,325	4.4
BULGARIA	6,064	6,271	3.4
UKRAINE	4,035	4,165	3.2
POLAND	10,548	10,842	2.8
LITHUANIA	8,715	8,950	2.7
HUNGARY	12,815	13,079	2.1
BELARUS	4,801	4,892	1.9
AZERBAIJAN	2,474	2,510	1.5
SLOVAKIA	11,126	11,287	1.4
UZBEKISTAN	1,497	1,516	1.3
TURKEY	6,470	6,539	1.1
TAJIKISTAN	809	817	1.0
KYRGYZ REPUBLIC	1,496	1,509	0.9
RUSSIA	7,006	7,066	0.9
CZECH REPUBLIC	15,222	15,337	0.8
KAZAKHSTAN	4,343	4,368	0.6
TURKMENISTAN	3,414	3,420	0.2

HIGH INCOME

Country	GDP/cap.	inc/nat.	% diff
NEW ZEALAND	19,849	20,702	4.3
KOREA, REPUBLIC OF	13,300	13,504	1.5
ARUBA	21,800	22,091	1.3
ICELAND	28,385	28,765	1.3
TAIWAN	16,100	16,313	1.3
CANADA	27,507	27,735	0.8
MALTA	17,628	17,766	0.8
IRELAND	20,300	20,449	0.7
GREECE	17,059	17,164	0.6
ISRAEL	23,006	23,140	0.6
AUSTRALIA	25,619	25,728	0.4
CYPRUS	19,167	19,233	0.3
SWEDEN	26,359	26,440	0.3
SAUDI ARABIA	9,000	9,017	0.2
JAPAN	26,089	26,128	0.1
SLOVENIA	16,829	16,846	0.1
UNITED KINGDOM	26,558	26,581	0.1
QATAR	17,000	17,002	0.0
UNITED STATES	34,599	34,583	0.0
BAHRAIN	13,700	13,683	-0.1
FRANCE	25,944	25,907	-0.1
GERMANY	25,343	25,312	-0.1
NETHERLANDS ANTILLES	16,000	15,981	-0.1
SINGAPORE	23,563	23,524	-0.2
UNITED ARAB EMIRATES	17,700	17,669	-0.2
BELGIUM	27,166	27,071	-0.3
DENMARK	28,676	28,604	-0.3
BRUNEI DARUSSALAM	25,600	25,496	-0.4
SPAIN	22,313	22,230	-0.4
KUWAIT	19,599	19,500	-0.5
NORWAY	34,264	34,096	-0.5
FINLAND	25,912	25,750	-0.6
MACAU	19,078	18,967	-0.6
NETHERLANDS	28,576	28,413	-0.6
SWITZERLAND	27,100	26,924	-0.6
AUSTRIA	28,619	28,423	-0.7
CAYMAN ISLANDS	24,500	24,312	-0.8
HONG KONG	26,203	25,907	-1.1
ITALY	21,400	21,170	-1.1
LUXEMBOURG	34,200	33,319	-2.6
PORTUGAL	15,300	14,881	-2.7
PUERTO RICO	22,243	21,143	-4.9
BERMUDA	31,500	29,535	-6.2

LATIN AMERICA/CARIBBEAN

Country	GDP/cap.	inc/nat.	% diff
GUYANA	3,922	7,985	103.6
JAMAICA	3,596	6,517	81.2
SURINAME	5,530	8,163	47.6
HAITI	1,619	2,234	38.0
BELIZE	5,680	7,497	32.0
CUBA	4,000	5,056	26.4
ST LUCIA	5,895	7,208	22.3
TRINIDAD AND TOBAGO	9,078	10,984	21.0
NICARAGUA	3,110	3,640	17.0
EL SALVADOR	4,597	5,356	16.5
HONDURAS	2,872	3,305	15.1
DOMINICAN REPUBLIC	5,400	6,137	13.7
ECUADOR	3,229	3,660	13.4
PANAMA	6,046	6,811	12.7
GUATEMALA	4,048	4,379	8.2
BOLIVIA	2,386	2,528	5.9
PERU	4,722	4,960	5.0
COLOMBIA	5,945	6,149	3.4
COSTA RICA	8,170	8,417	3.0
BARBADOS	18,400	18,871	2.6
VENEZUELA	5,756	5,889	2.3
URUGUAY	8,777	8,966	2.2
CHILE	9,128	9,278	1.6
PARAGUAY	4,094	4,145	1.2
MEXICO	9,197	9,276	0.9
ARGENTINA	12,090	12,175	0.7
BRAZIL	7,193	7,230	0.5

MIDDLE EAST/NORTH AFRICA

Country	GDP/cap.	inc/nat.	% diff
LEBANON	4,336	5,708	31.6
MOROCCO	3,578	4,092	14.4
ALGERIA	5,327	5,782	8.6
DJIBOUTI	1,857	1,999	7.7
TUNISIA	6,276	6,676	6.4
JORDAN	4,109	4,341	5.6
IRAQ	2,900	3,053	5.3
SYRIAN ARAB REPUBLIC	3,161	3,284	3.9
IRAN	5,804	5,999	3.4
YEMEN, REPUBLIC OF	822	843	2.6
EGYPT	3,526	3,609	2.4
LIBYA	12,300	12,395	0.8
OMAN	12,602	12,626	0.2

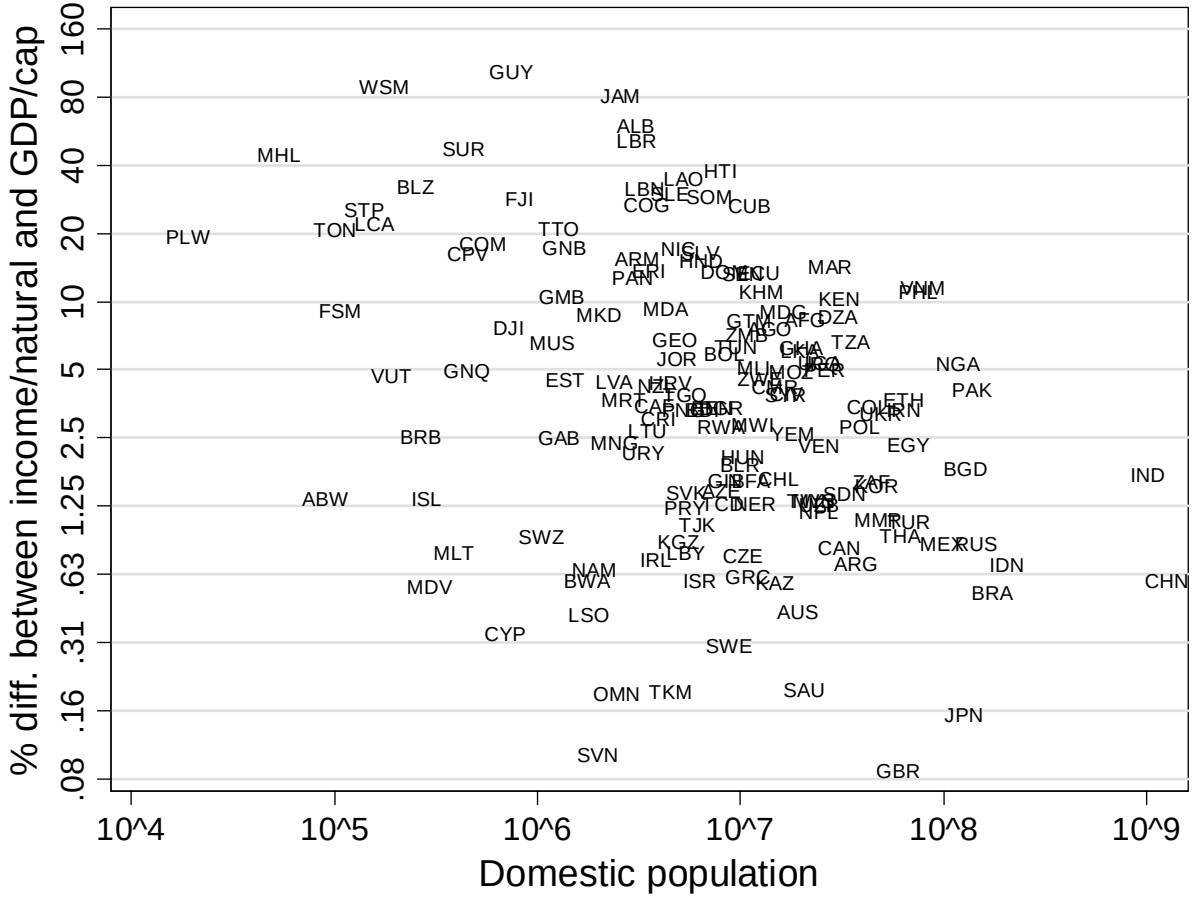
SOUTH ASIA

Country	GDP/cap.	inc/nat.	% diff
AFGHANISTAN	800	867	8.4
SRI LANKA	3,442	3,652	6.1
PAKISTAN	1,880	1,957	4.1
BANGLADESH	1,543	1,571	1.8
INDIA	2,364	2,405	1.7
NEPAL	1,325	1,341	1.2
MALDIVES	3,900	3,922	0.6

SUB-SAHARAN AFRICA

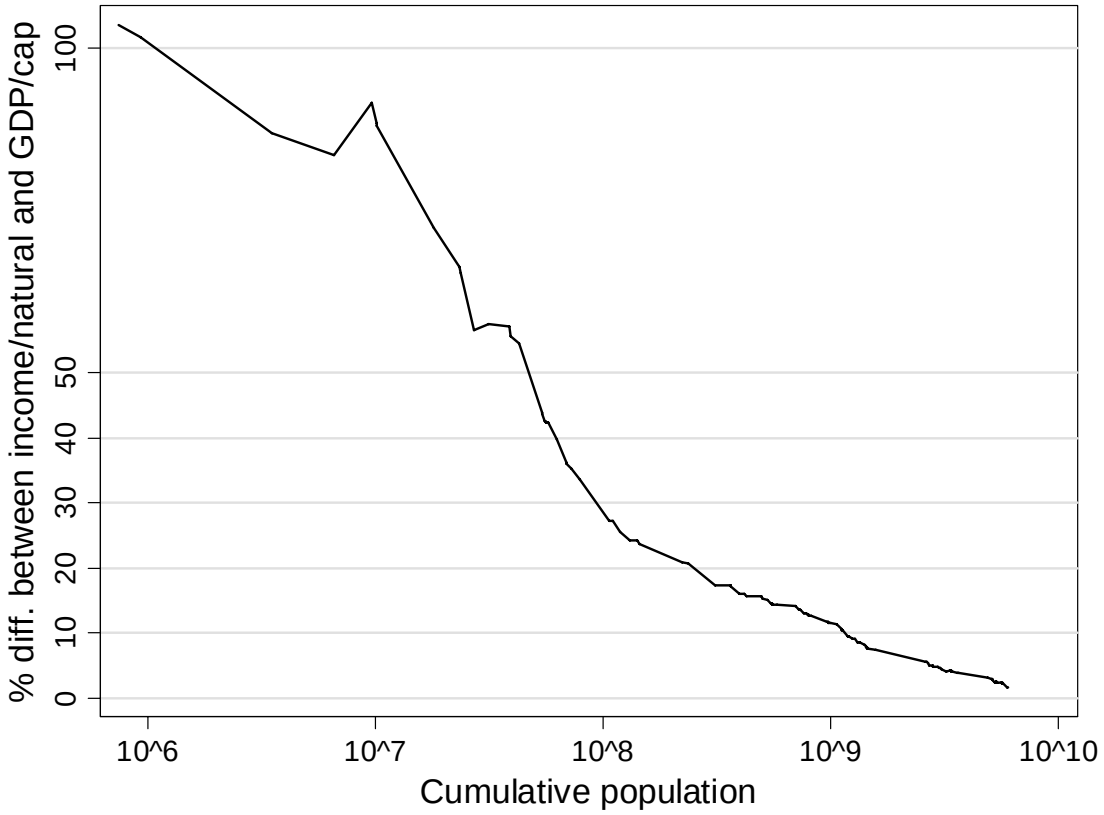
Country	GDP/cap.	inc/nat.	% diff
LIBERIA	463	703	51.8
SIERRA LEONE	463	602	30.0
SOMALIA	600	775	29.1
CONGO, REPUBLIC OF	1,055	1,337	26.7
SÃO TOMÉ AND PRÍNCIPE	1,801	2,258	25.4
COMOROS	1,718	2,027	18.0
GUINEA-BISSAU	863	1,012	17.3
CAPE VERDE	4,555	5,291	16.2
ERITREA	1,022	1,163	13.8
SENEGAL	1,427	1,616	13.3
GAMBIA, THE	1,631	1,802	10.5
KENYA	1,033	1,140	10.4
MADAGASCAR	843	919	9.1
ANGOLA	1,462	1,573	7.6
ZAMBIA	785	841	7.1
TANZANIA	524	559	6.7
MAURITIUS	9,673	10,309	6.6
GHANA	1,920	2,040	6.2
UGANDA	1,167	1,230	5.4
NIGERIA	854	900	5.3
MALI	785	825	5.1
EQUATORIAL GUINEA	5,103	5,355	4.9
MOZAMBIQUE	799	838	4.9
ZIMBABWE	2,498	2,613	4.6
CAMEROON	1,877	1,956	4.2
CÔTE D'IVOIRE	1,582	1,644	3.9
TOGO	1,358	1,411	3.9
ETHIOPIA	814	844	3.7
MAURITANIA	1,894	1,964	3.7
CENTRAL AFRICAN REP.	1,209	1,251	3.5
BENIN	974	1,007	3.4
BURUNDI	650	672	3.4
MALAWI	583	600	2.9
RWANDA	931	957	2.8
GABON	6,175	6,330	2.5
BURKINA FASO	986	1,002	1.6
GUINEA	1,974	2,006	1.6
SOUTH AFRICA	8,764	8,905	1.6
SUDAN	1,506	1,527	1.4
CHAD	801	811	1.3
NIGER	678	687	1.3
SWAZILAND	4,167	4,205	0.9
NAMIBIA	5,838	5,876	0.7
BOTSWANA	8,349	8,398	0.6
LESOTHO	2,592	2,603	0.4

Figure 3: Percent difference between income per natural and GDP per resident, versus origin-country population



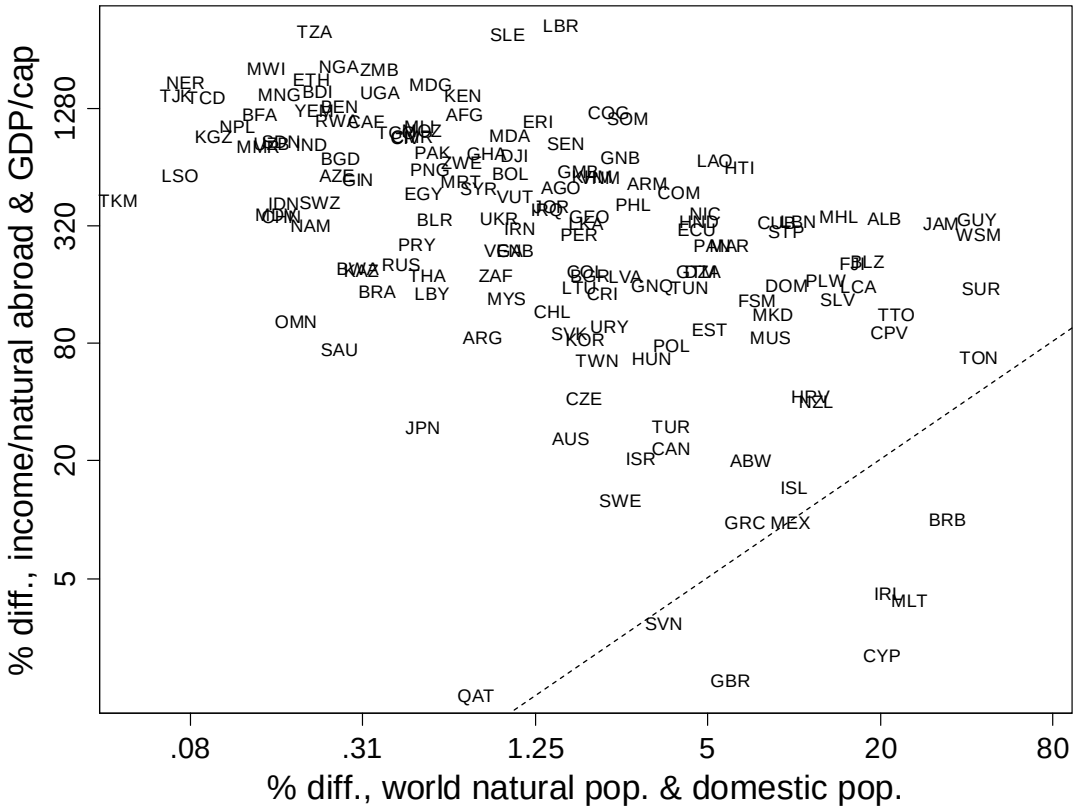
Both axes in $\log_{10}$ scale. The horizontal axis shows population residing in each country. The vertical axis shows the percent difference between income per natural and GDP per capita at PPP.

Figure 4: Difference between income per natural and GDP per resident in a cumulative population ordered left-to-right by the single-country percent difference



Horizontal axis in $\log_{10}$ scale, vertical axis in linear scale.

Figure 5: Decomposition of cross-country variance in income per natural



Dashes show 45° line. Both axes in $\log_{10}$ scale. The horizontal axis shows the percent difference between total global population born in each country and the total population residing in each country. The vertical axis shows the percent difference between the average income of naturals of each country who reside abroad (exclusive of those who reside in their country of birth) and GDP per capita at PPP of the country.

Table 3: Nonpoor people residing in origin country and in the United States, by country of birth

Country of birth	Population (millions)			Nonpoor (millions)						% of all nonpoor residing in US
	At origin	In US	Total	At origin	*% nonpoor*	In US	*% nonpoor*	Total	*% nonpoor*	
Poverty line $1/day										
Haiti	7.9	0.6	8.5	3.5	*44.0%*	0.6	*96.0%*	4.1	*47.7%*	14.1%
India	1015.9	1.3	1017.2	631.7	*62.2%*	1.3	*97.7%*	633.0	*62.2%*	0.2%
Mexico	98.0	13.1	111.1	90.8	*92.7%*	12.7	*96.8%*	103.5	*93.1%*	12.3%
Poverty line $2/day										
Haiti	7.9	0.6	8.5	1.6	*20.2%*	0.6	*95.1%*	2.2	*25.4%*	26.2%
India	1015.9	1.3	1017.2	175.8	*17.3%*	1.3	*97.4%*	177.0	*17.4%*	0.7%
Mexico	98.0	13.1	111.1	73.4	*74.9%*	12.6	*96.0%*	86.0	*77.4%*	14.6%
Poverty line $10/day										
Haiti	7.9	0.6	8.5	0.1	*1.4%*	0.5	*81.9%*	0.6	*7.0%*	82.0%
India	1015.9	1.3	1017.2	3.2	*0.3%*	1.2	*93.4%*	4.4	*0.4%*	27.2%
Mexico	98.0	13.1	111.1	13.4	*13.7%*	9.9	*75.5%*	23.3	*21.0%*	42.5%

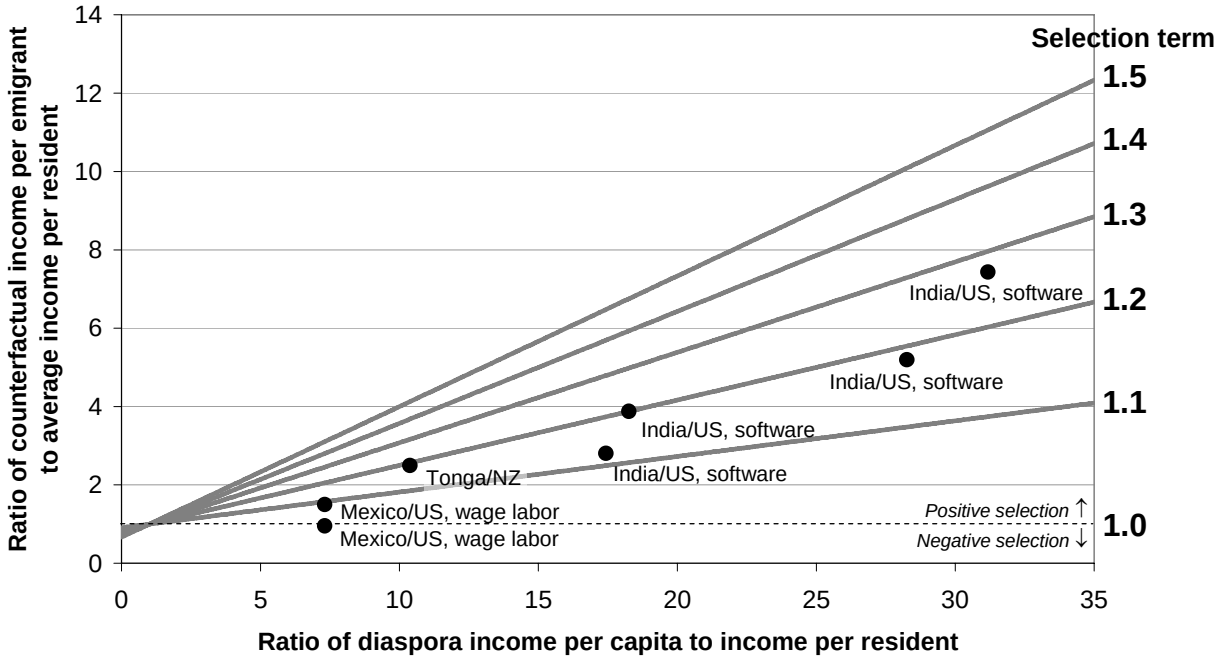
Poverty headcount estimates from 2001 (Haiti), 1997 (India), and 2000 (Mexico) are from the World Bank's Povcalnet. US-resident population and income estimates for 1999 are from the US Census 5% Public Use Microdata Series for the year 2000. Following standard practice, the "$1/day" standard is $32.74/month, "$2/day" is $65.48/month, and "$10/day" is $327.40/month. "% of all nonpoor residing in US" means the percent of the nonpoor who collectively reside in either the country of origin or the United States who reside in the United States.

Table 4: Counterfactual wages of Indian-born software industry workers in the US

Workers	US wage, y_i^*	False counterfactual (GDP/cap.), y_i	True counterfactual, $\bar{y}_i^*$	Difference term $\frac{y_i^*/y_i - 1}{y_i^*/y_i - \bar{y}_i^*/y_i}$
Managers	83,762	2,311	20,391	1.29
Conceptualizers	72,291	2,311	17,178	1.27
Developers	64,448	2,311	11,916	1.18
Modifiers	42,068	2,311	9,071	1.20
Supporters	40,115	2,311	6,490	1.12

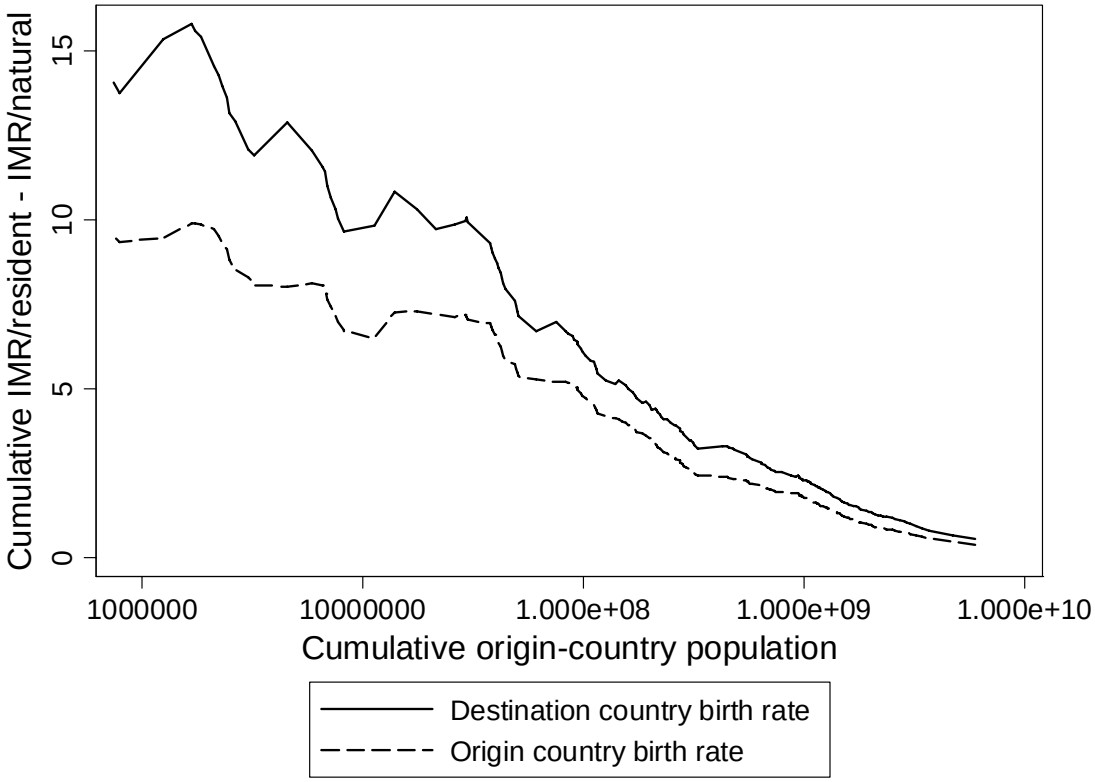
All dollar amounts are 1999 dollars per year at purchasing power parity. US wages and true counterfactual wages are from Commander et al. (2004), and GDP per capita is from the World Bank's *World Development Indicators 2007*. y_i^* is income per person in destination country, y_i is income per resident in origin country, and $\bar{y}_i^*$ is counterfactual income per person if migrants had not left origin country.

Figure 6: Size of the selection term in different scenarios



Dots show estimates of the selection term calculated in the text of Section 3.2. Gray lines show the value of the selection term in equation (2) at different values of y_i^* / y_i (horizontal axis) and $\bar{y}_i^* / y_i$ (vertical axis). Indian software industry top managers not shown.

Figure 7: Absolute difference between infant mortality per natural and per resident in a cumulative population, chosen left-to-right to maximize the collective differential for each new grouping



Vertical axis shows the absolute differential between the infant mortality rate per natural measured for the cumulative group of countries and the infant mortality rate per resident for the same group. Countries are added to the group left to right, beginning with the country for which the differential is greatest (Guyana), and adding one country at each step to the right, chosen from among the remaining countries so as to maximize the differential from among all possible aggregations at that step. The solid line assumes that naturals abroad have the destination-country crude birth rate; the dotted line assumes they have the origin-country crude birth rate.

Appendix 1
Data summary and sources

Summary statistics for Table 1 dataset

Variable	Obs	Mean	Std. Dev.	Min	Max
ln income/natural	130	9.956466	.3497694	8.97702	10.59926
ln GDP/cap at PPP	4739	8.526976	1.169391	6.137727	10.56618
ln tertiary educ. frac.	3820	–1.26909	.6001354	–5.075174	0
ln primary educ. frac.	3769	–1.337871	.6853708	–4.582833	0
ln tertiary enrollment	4256	2.553927	1.3495	–1.609438	4.574711
ln world frac. in dest.	4588	–6.512936	2.693019	–14.11462	–.0826165
ln OECD frac. in dest.	4588	–5.570897	2.579269	–13.50135	0
ln land area	4739	10.98639	2.890235	.6678294	16.61165
ln size diaspora	4588	5.923727	3.107219	0	16.04947
Fraction refugees	4588	.0578732	.7223542	0	43.03552
ln dist. to ctry. birth	5152	8.673961	.8519143	2.951104	9.88258
Contiguous	5152	.0122283	.1099139	0	1
Common official lang.	5152	.1383929	.3453454	0	1
Oil-exporting Mid. East	5518	.0208409	.1428644	0	1
Latin Am./Carib.	5518	.1583907	.3651401	0	1
E. Europe/Central Asia	5518	.116709	.3211023	0	1
Mid. East/No. Africa	5518	.0873505	.2823736	0	1
Sub-Saharan Africa	5518	.1959043	.3969312	0	1
E. Asia/Pacific	5518	.141718	.3487923	0	1
South Asia	5518	.0333454	.1795532	0	1

Data Sources for income per natural calculation

Household income per capita of foreign born in the United States: The data come from the Public Use Microdata Sample of the 2000 US Census. First, each person in the individuals file is matched to a household from the households file. Household income per capita for each individual is then calculated by dividing "Household Total Income in 1999" by "Number of Person Records Following This Housing Record". All individuals born in the US are then dropped, and household income per capita is averaged across all foreign-born individuals separately by country of birth.

Household income per capita of foreign born in Australia: The data were prepared in custom extract from the master 2001 census file by the Information Consultancy Service of the Australian Bureau of Statistics, December 19, 2007. The extract consists of a crosstabulation of birthplace of individuals by average household income per person, and average household income per capita of individuals for persons enumerated at their usual residence on census night.

GDP per capita at Purchasing Power Parity: World Bank's *World Development Indicators 2007* and CIA *World Fact Book* (various years). Figures are for the year 2000 or closest available year. GDP per capita at PPP is assumed to be the same in Liberia as in Sierra Leone.

Fraction of diaspora with tertiary education, and fraction with primary education or less: Calculated from data in Dumont and Lemaître (2005). Includes people aged 15+ living in all OECD countries, at the time of the last census (circa 2000).

Fraction of worldwide diaspora residing in each receiving country: Data are from Parsons et al. (2007). The numerator is the number of people born in each sending country living in the receiving country in 2000, and the denominator is the number of people born in that sending country living anywhere outside the sending country in 2000.

Fraction of OECD-resident diaspora residing in each receiving country: Data are from Parsons et al. (2007). The numerator is the number of people born in each sending country living in each OECD receiving country in 2000, and the denominator is the number of people born in that sending country living anywhere in the OECD in 2000.

Land area: World Bank's *World Development Indicators 2007*. In square kilometers.

Size of diaspora in each receiving country: Parsons et al. (2007).

Fraction of diaspora that is refugees: Refugee populations in 2000, by origin and destination country, come from the United Nations High Commission for Refugees (UNHCR) Online Population Statistics Database, http://www.unhcr.org/statistics, downloaded July 31, 2007. The database defines refugees as "persons recognized as refugees under the 1951 Convention/1967 Protocol, the 1969 OAU Convention, in accordance with the UNHCR Statute, persons granted a humanitarian or comparable status and those granted temporary protection."

Population: UN Population Division *World Population Prospects* database, 2006 revision, http://esa.un.org/unpp, downloaded July 31, 2007.

Distance to country of birth, dummy for country of birth contiguous to destination country, dummy for common official language with destination country: All are from the Centre des Études Prospectives et d'Informations Internationales (CEPII) bilateral distance database, http://www.cepii.fr/anglaisgraph/bdd/distances.htm, downloaded July 31, 2007.

Dummy for oil-exporting Middle East: Includes Saudi Arabia, Kuwait, Bahrain, Qatar, and United Arab Emirates.

Poverty headcounts: World Bank Povcalnet, download August 13, 2007: http://iresearch.worldbank.org/PovcalNet/jsp/index.jsp

Data sources for infant mortality per natural calculation

Bilateral stocks of foreign-born are from the Global Migrant Origin Database, Ver. 4, from the Development Research Center on Migration, Globalization and Poverty (http://www.migrationdrc.org/research/typesofmigration/global_migrant_origin_database.html, accessed 7 November 2007).

Crude birth rates (CBR), population, and infant mortality rates (IMR) for sending countries and host OECD coutnries are from the World Bank's *World Development Indicators 2007*. The CBR is recorded per 1,000 people, and IMR is recorded per 1,000 live births. For most countries, CBR and IMR data were available in 2000, and in the few countries where such data were missing, a linear interpolation was applied using the nearest available observations.

Appendix 2

Example estimation of foreign-born income/person for Somalia and Mexico

The vertical axis of the figure shows the product of the respective coefficient from Table 1, column 4, and the value of the respective variable for each migrant-sending and migrant-receiving country pair.