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Abstract

This paper provides a framework and estimates of Enrollment Rates per natural and combines them with previous Income and Child Mortality per natural estimates by Clemens and Pritchett (2008) to produce a Human Development Index Per Natural. The methodology is applied for 1990 and 2000 to provide estimates of growth rates of this measure over the period. The paper also develops and illustrates a framework for estimating an education place premium, and discusses how it is related to per natural measures. The peoples of the least developed countries stand to gain the most from international migration, but there are potentially significant gains to migration between developing countries as well.

Keywords: Migration, Human Development, Education

JEL Classification: F22, O15, O24

I. Introduction

Conventional measures of human welfare are defined over a given geographical space. Most avenues for social and economic progress involve decisions households and governments make within a given territory, so this approach generally does not impose an ad hoc restriction on the kinds of decisions that are encompassed by such measures. Households may decide to spend more or less resources on education or health, or to participate in the labor market or not, and for the most part, these decisions are made (and modeled) within a particular country or territory; similarly, government policy (taxes, infrastructure investment or monetary policy) is circumscribed to the area within certain administrative borders.

One significant decision individuals and households often make is to change their place of residence in search for better labor market opportunities, access to basic services, infrastructure, or better living conditions more generally. Standard measures of welfare that are circumscribed to a particular territory by definition exclude individuals who choose to relocate. Clemens and Pritchett (2008) propose a useful approach to measurement of per capita income across countries: estimate the average per capita income of foreign-born individuals in every OECD country by country of birth and average that with per capita income at home and get a "per natural" measure of income, where not only people residing in the home country are counted, but also the incomes of those who migrated at some point in their life and now enjoy a (generally higher) living standard than they did at home. Clemens and Pritchet (2008) show that for many countries the difference between GDP per capita and income per natural can be very large, which suggests that a measure that takes in to consideration a family's decision to move internationally can be very informative about the importance of migration as a welfare improving decision for the household.

This paper takes this research one step further and does two things: first, it provides estimates of an educational outcome "per natural" which combined with the Clemens and Pritchett (2008) income and child mortality per natural estimates, results in a Human Development Index (HDI) per natural as well. Second, it implements analogous calculations for 1990, and thus obtains estimates of growth rates in per natural measures as compared to the standard national indicators. These extensions are consistent with the view that human welfare cannot be measured in one

dimension, and will allow a better understanding of the changing role (at least over the period between 1990 and 2000) that migration has had in improving the living standards of people all over the world.

For closer comparability with the HDI, the educational outcome that we focus on is total gross school enrollment rates, and since migration is most likely to have an effect on the schooling outcomes of the children of migrants and not on adult migrants themselves, the proposed approach is to measure the enrollment rate of the children of migrants. It is shown that simple adjustments can be made to the estimated rates to make them comparable to the officially published rates for the entire population in each country of study.

This paper shows that the differences in wellbeing between people born in the same country but residing in different places in the world, can be astonishing. Part of those differences are very likely due to the fact that the people who migrate, for one reason or another, are different from those who don't, and these differences may explain both the migration decision and the welfare difference, however, in many cases the differences are so large that it is difficult to imagine that the place where they've chosen to live doesn't also play a significant role in the observed outcomes through better labor market opportunities, access to services, infrastructure, etc.

The first section of the paper lays out the details of the estimation of the enrollment rates per natural and shows the estimates for each country in the sample for the year 2000. The next section uses those estimates and the data from Clemens and Pritchett (2008) to show the estimated differences in income, education and health between people residing in their country of birth and those abroad, and combines the three per natural measures to produce the HDI per natural for the year 2000, along with a discussion of the issue of the gains to migration and the place premium. The following section shows results from applying the methodology for 1990 and a comparison of the growth rate of national and per natural human development, highlighting the changing role of international migration in the welfare of peoples.

II. Estimating Enrollment Rates Per Natural

Building on the methodology proposed by Clemens and Pritchett (2008) for estimating income according to people's country of birth instead of country of residence, this section proposes a way to measure another key human development outcome using people are the central unit of analysis instead of particular territories: school enrollments. The goal is to obtain estimates of enrollment rates of peoples across the world regardless of the country they reside at the time they are calculated. In theory, one should obtain the total number of individuals of school-going age all over the world, organized by country of birth of their parents, and then ask what fraction of them are in fact attending school. This number gives an alternative view of this dimension of human well being, it gives enrollment rates for people of each country in the world (in fact, their children's) regardless of where they reside, highlighting the fact that the outcomes we observe of these peoples are the result of many circumstances and decisions, one of which is movement across international borders.

Regrettably, these rates cannot be exactly calculated for each country of origin and each country of destination in the world because the data required to do it is not available, however, it is possible to estimate what these enrollment rates are, by linking up different sources of information and making some simplifying assumptions. In any effort of this sort, is it best to be conservative about assumptions that are made along the way, and we show below that for various reasons, the figures estimated here, represent conservative estimates of the differences between enrollment rates of the children of naturals of a given country, and the corresponding rates at home.

This section describes the steps taken to arrive at "per natural" enrollment rates, and shows the estimated rates and their difference with the officially published rates used for the calculation of the Human Development Index for the year 2000. The analysis of these results in conjunction with previous findings by Clemens and Pritchett (2008) may lead to interesting insights about the way different human development outcomes are related to international migration, and about the relative weight that individuals may place on different aspects on their welfare when deciding to move.

II.1. Methodology

The United States Census of 2000 contains information on each respondent's country of birth, schooling attendance and attainment, age, income, and many other individual and family characteristics. I estimate school enrollment rates of individuals of school going age according to the country of birth of their mother, which provides the baseline description of how the children of migrants fare in terms of school enrollment when they are away from home. We wish to estimate this same vector for every other country for which it is possible, and to do this, we construct a simple model that relates these calculated enrollment rates for each country of birth in the US to a series of variables that are available for other countries in the world and which we can use to infer enrollments of immigrants' children outside the United States.

Also from the US Census, we estimate children's enrollment rates by the mother's level of educational attainment: primary, secondary and tertiary education, separately. From Docquier and Marfouk (2005) we have information on the fraction of migrants to each country in the OECD that has attained primary, secondary and tertiary education. We then multiply these variables by the enrollment rate of children of mothers with the corresponding level of education in the US and obtain three new variables which form the core of our prediction for other countries. Table 1 shows the results of regressing enrollments by mother's country of birth in the US on these three variables and on regional dummies as well as other characteristics such as the distance to the country of origin, the fraction of the diaspora residing in the OECD that resides in the US, the land area of the country of origin of the mother, and the size of the diaspora in the US. It is clear from the table that the bulk of the explanatory power of the model comes from the fraction of immigrants from each country of origin that are primary, secondary and tertiary educated: once the regional dummies are introduced (regression 2), 82% of the variation in enrollment rates is explained; the additional variables increase the model's explanatory power to 85%.

Table 1. Correlates of School Enrollments of children of foreign born mothers in the US

	1	2	3
Contribution to enrollments from primary educated migrants	0.576 (11.63)	0.502 (10.75)	0.499 (11.15)
Contribution to enrollments from secondary educated migrants	0.699 (9.05)	0.633 (9.19)	0.665 (9.35)
Contribution to enrollments from tertiary educated migrants	0.671 (16.26)	0.622 (15.91)	0.627 (16.44)
Ln of distance to country of birth			-0.015 (-1.94)
Ln of fraction of OECD resident diaspora in the US			-0.013 (-3.00)
Ln of land area of country of birth			0.001 (0.84)
Ln of size of diaspora in the US			0.004 (1.56)
Region dummies	No	Yes	Yes
Constant	0.353 (6.97)	0.404 (8.56)	0.530 (6.99)
R-squared	0.75	0.82	0.85
Obs	118	118	117

With this model in hand, it is straightforward to predict school enrollment rates of children of foreign-born mothers in every country for which we there is data on educational attainment of migrants, which in this case is only OECD countries. These are, therefore, our estimates of school enrollment of children of naturals of most countries in the world, who in 2000 resided in

the OECD. The estimated average enrollment for each country of birth of the mother is the following:

$$ENROLL_i = A \cdot fmig_i \cdot \sum a_{ij} PENROLL_{ij} + (1 - fmig_i) \cdot ENROLLHDI_i \qquad (1)$$

Where $PENROLL_{ij}$ is the predicted enrollment of the children of mothers born in country i, residing in country j and a_{ij} is country i's diaspora residing in country j as a fraction of that country's diaspora in the OECD. $ENROLLHDI_i$ is the published gross enrollment rate for 2000 in the HDR for country i, *fmig* is the fraction of country i's naturals that reside outside their country of birth. Constant *A* is an adjustment factor explained below.

There are two key differences in the standard Gross Enrollment calculation reported in the HDR and the ones obtained here, which make it necessary to adjust estimated enrollment rates so they are comparable to official rates:

1) Enrollment rates reported in the HDR come from administrative data on the number of individuals enrolled in each particular grade level, and census estimates of the school-age population for each level, while the estimates presented here are all based on self reported school attendance by age group from the US 2000 Census and then extrapolated to the rest of the world.

2) Official enrollment rates include the entire population: they include every person enrolled (numerator) and every person of school age (denominator). The figures presented here are estimates of enrollment rates of individuals who still live with their mothers, so individuals who move away from home to college are not counted.

It is necessary to understand the magnitude of these differences in order to make the appropriate adjustment to estimated enrollment rates (adjustment factor *A* in equation 1). We can use the US Census and official HDI enrollment rates for the US to measure how important these two effects are. For instance, estimating total gross enrollment rates from the US Census for the year 2000 gives a value of 0.998, while the official figure for that year is 0.917 a gap arising from differences in the administrative records and self-reporting on school attendance. This implies that our estimates would, simply due to the use of self-reports instead of administrative data,

overestimate the official figure by 8.85%. We can also use the US Census to estimate enrollment rates of individuals who still live with their mother, which is 1.039, 4.14% higher than the 0.998 referred to before. These numbers suggest that the enrollment figures used here for the US overestimate the official rate by 13.32%. Analogous calculations using the 2001 Census data for Spain, gives an overestimate of 17.1%. We adjust the estimated enrollment rates of immigrants around the world for every country of birth by scaling them down by the US factor of 0.882 (ENROLL_1 in table 2) and the Spanish factor of 0.854 (ENROLL_2 in table 2), and thus obtain estimates that are comparable to those published officially.

II.2. Estimates of Enrollment Rates Per Natural

Table 2 presents the estimated enrollment rates of children of foreign born mothers using both adjustment factors derived from the US and the Spanish Censuses, the officially published gross enrollment rate for each country from the HDR, and the difference between ENROLL_1 and ENROLL_HDI. The last column of the table also shows the enrollment rate of naturals of each country that live outside their country of birth (Using the US adjustment factor) in any of the OECD countries. The per natural measure is essentially a weighted average of this number and the officially published rates.

Table 2. Estimated Enrollments of children by mother's country of origin using US (1) and SPAIN (2) adjustment factors

Mother's country of birth	ENROLL	ENROLL	ENROLL_	Differenc	ABROAD
ERITREA	42.14	41.64	32.55	27.93%	83.68
GRENADA	85.00	83.05	72.98	13.80%	90.70
GUYANA	85.07	83.42	75.57	10.39%	92.40
DOMINICA	83.96	82.18	74.84	9.81%	89.32
TRINIDAD AND TOBAGO	74.22	73.43	67.70	8.46%	91.56
JAMAICA	81.71	80.57	74.34	8.38%	93.40
SAMOA (WESTERN)	78.61	77.13	71.58	7.76%	84.37
SENEGAL	35.11	34.99	32.51	7.62%	98.56

AFGHANISTAN	48.79	48.56	45.34	7.11%	87.89
MOROCCO	54.26	53.99	50.51	6.89%	92.51
ALBANIA	72.89	72.15	68.16	5.86%	85.50
EL SALVADOR	67.82	67.35	63.65	5.82%	88.31
BAHAMAS	69.74	69.37	65.92	5.23%	97.82
BELIZE	75.01	74.39	70.73	5.18%	90.69
CAPE VERDE	75.96	75.00	71.37	5.08%	84.20
GHANA	48.51	48.38	46.44	4.19%	97.96
ARMENIA	75.20	74.48	71.72	3.84%	84.62
FIJI	76.33	75.81	73.07	3.74%	91.22
AZERBAIJAN	69.22	68.79	66.39	3.62%	83.71
CROATIA	72.75	72.30	70.01	3.28%	87.17
LEBANON	81.43	80.95	78.41	3.24%	97.90
NICARAGUA	72.01	71.66	69.51	3.09%	89.49
PAKISTAN	37.72	37.65	36.55	3.01%	90.47
CYPRUS	75.84	75.31	73.27	2.78%	86.61
MOLDOVA, REP. OF	73.63	73.14	71.24	2.66%	84.37
IRAQ	54.17	54.06	52.71	2.56%	92.59
GUATEMALA	60.07	59.91	58.44	2.51%	88.50
HONDURAS	63.59	63.42	61.94	2.40%	89.13
GEORGIA	76.80	76.19	74.41	2.39%	84.86
DOMINICAN REPUBLIC	73.26	72.94	71.24	2.39%	89.10
SRI LANKA	64.40	64.25	62.75	2.39%	96.40
JORDAN	78.35	78.00	76.20	2.37%	94.81
YEMEN	51.66	51.57	50.40	2.32%	95.12
MEXICO	72.97	72.66	71.07	2.24%	88.25
MALAYSIA	71.78	71.60	70.04	2.22%	100.57
HONG KONG, CHINA (SAR)	78.37	78.07	76.37	2.22%	96.15
SLOVAKIA	74.32	74.03	72.43	2.21%	91.96
PARAGUAY	72.18	71.97	70.42	2.20%	95.10
CUBA	76.90	76.56	75.00	2.09%	91.56
ALGERIA	69.68	69.52	68.11	2.07%	97.05
LITHUANIA	90.00	89.68	87.96	1.96%	109.82
NEPAL	57.06	56.98	55.95	1.84%	95.86
KUWAIT	79.57	79.35	78.00	1.73%	100.82
CAMBODIA	51.57	51.50	50.64	1.70%	87.76
ROMANIA	69.60	69.43	68.28	1.68%	91.13
SYRIAN ARAB REPUBLIC	57.54	57.47	56.55	1.62%	95.39
BANGLADESH	59.26	59.17	58.23	1.61%	90.62
ETHIOPIA	27.57	27.55	27.13	1.55%	104.90
LIBERIA	58.37	58.29	57.41	1.54%	94.61

COLOMBIA	71.58	71.45	70.52	1.32%	94.70
VIET NAM	64.43	64.35	63.59	1.20%	95.68
PANAMA	77.50	77.30	76.39	1.19%	92.96
KENYA	53.69	53.66	53.13	0.99%	99.75
SWITZERLAND	85.30	85.09	84.26	0.98%	100.19
COSTA RICA	66.83	66.74	66.11	0.95%	90.43
TANZANIA, U. REP. OF	32.54	32.52	32.22	0.94%	96.95
MYANMAR	47.41	47.38	47.00	0.81%	93.32
BULGARIA	79.75	79.41	78.80	0.77%	86.61
HUNGARY	81.08	80.94	80.33	0.76%	96.43
VENEZUELA	67.84	67.79	67.30	0.73%	98.50
TURKEY	69.74	69.59	69.09	0.72%	79.81
EGYPT	76.15	76.05	75.52	0.71%	94.73
UZBEKISTAN	74.56	74.34	73.85	0.67%	82.52
URUGUAY	84.89	84.64	84.13	0.61%	92.99
CHILE	78.26	78.16	77.69	0.61%	93.65
INDIA	55.10	55.08	54.75	0.60%	94.70
ISRAEL	89.20	88.84	88.35	0.55%	95.38
IRAN, ISLAMIC REP. OF	69.70	69.66	69.32	0.49%	96.84
NIGERIA	55.31	55.29	55.02	0.49%	103.52
PHILIPPINES	82.02	81.89	81.53	0.44%	92.81
SOUTH AFRICA	76.18	76.13	75.81	0.42%	100.76
THAILAND	69.47	69.44	69.19	0.35%	92.53
INDONESIA	62.92	62.89	62.67	0.35%	94.77
BARBADOS	89.50	88.37	88.11	0.29%	91.67
CZECH REPUBLIC	74.34	74.23	74.02	0.29%	81.79
BOLIVIA	84.05	83.92	83.70	0.26%	91.48
UGANDA	66.31	66.29	66.15	0.21%	96.59
PERU	86.72	86.62	86.44	0.21%	94.95
CHINA	70.52	70.51	70.38	0.18%	96.99
GERMANY	89.48	89.33	89.17	0.18%	95.39
UNITED KINGDOM	90.57	90.36	90.24	0.13%	94.89
JAPAN	83.15	83.13	83.05	0.09%	96.71
KOREA, REP. OF	89.90	89.80	89.72	0.09%	95.13
SAUDI ARABIA	76.62	76.61	76.56	0.06%	93.48
BELARUS	87.24	86.72	86.67	0.06%	89.79
UNITED STATES	91.71	91.69	91.68	0.01%	95.15
BRAZIL	90.27	90.25	90.24	0.01%	94.56
AUSTRIA	91.25	91.04	91.06	-0.02%	93.76
ARGENTINA	91.73	91.67	91.69	-0.02%	93.49
UKRAINE	84.78	84.42	84.45	-0.04%	86.98

NORWAY	97.82	97.70	97.76	-0.07%	99.24
POLAND	86.07	85.90	85.96	-0.07%	87.85
FRANCE	92.01	91.92	91.99	-0.08%	92.67
ITALY	81.00	80.84	80.91	-0.08%	82.43
CANADA	94.65	94.52	94.60	-0.09%	95.68
RUSSIAN FEDERATION	87.94	87.72	87.86	-0.17%	88.82
SPAIN	92.11	92.02	92.19	-0.18%	89.73
DENMARK	95.83	95.70	95.95	-0.26%	93.10
AUSTRALIA	113.10	113.04	113.39	-0.31%	99.35
GREECE	81.02	80.74	81.07	-0.41%	80.61
SWEDEN	112.09	111.98	112.56	-0.52%	98.27
NEW ZEALAND	98.64	98.26	98.82	-0.57%	97.27
BELGIUM	106.39	106.26	106.93	-0.62%	94.61
NETHERLANDS	97.94	97.81	98.69	-0.89%	83.71
FINLAND	103.34	103.15	104.08	-0.89%	92.43
IRELAND	90.36	89.73	90.94	-1.33%	88.32
PORTUGAL	89.92	89.44	91.64	-2.40%	82.38

The last column of this table clearly shows that for many countries in the sample, especially the least developed, there are very large differences between the enrollment rates their populations attain at home and that of the children of migrants from those countries in the OECD. The combination of this difference and the fraction of the country's population that has migrated to the OECD yields the per natural estimate, so a country like China, which has an abroad enrollment rate of over 90% and an official rate of 70%, only shows a difference of 0.18% between the official measure and the per natural measure because a relatively small fraction of people born in China live abroad. For many countries, however, there is a large enough fraction of naturals that have migrated abroad that the per natural measure differs significantly from the national rate: 40 of the 107 countries (37%) in the sample display a difference of over 2%, and 15 (14%) a difference of over 5%.

As expected, for very high human development countries, the estimated difference is around zero, since migration between OECD countries is unlikely to lead to very different enrollment rates of children.

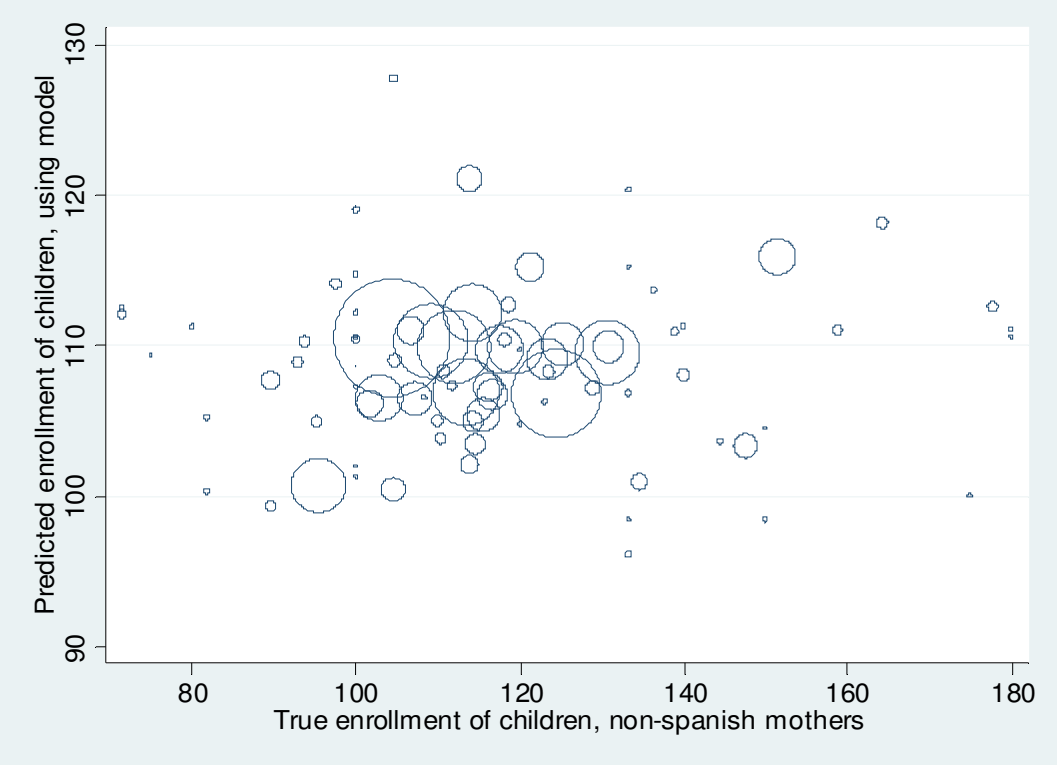
II.3. Consistency of predicted enrollments

In order to check whether the predicted rates for each country of birth of the mothers in each OECD country are reasonable, we use the 2001 Census from Spain to calculate the enrollment rates of children of migrant mothers and compare them with the prediction from the model of Table 1. Table 3 shows these values along with the number of observations used to calculate the true value from the Census and the error as a percentage of the true value. For the countries that have more than 300 Observations, the model tends to under-predict enrollments, except for Morocco, for which the model predicts a 6% higher enrollment than is observed of the children of Moroccan mothers in Spain. Considering that 31.1% of the Moroccan diaspora (in the OECD) resides in Spain, the estimated "per-natural" enrollment for Morocco using the true value instead of the predicted value, would be 52.66, still 4.26% higher that the official rate. This suggests that the estimates obtained here are conservative, and yet show significant differences for many of the poorest countries of the world. Figure 1 plots the true versus the predicted enrollment rates for all countries of birth of mothers (regardless of sample size) but weights each point by the number od observations used to estimate the true value. The figure also shows that for the most reliable estimates of the true enrollment rates, the model used here provides fairly conservative values, which implies that the numbers reported are probably close to the lower bound on the true value of enrollment rates "per natural."

Table 3. True and predicted enrollment rates of children of migrants by country of origin of the mother (with more than 300 observations in the 2001 Spanish Census)

Mother's Country of Origin	Observations	TRUE VALUE	PREDICTED VALUE	ERROR
Morocco	5305	104.40	110.48	6%
France	3100	124.44	106.76	-14%
Ecuador	2112	109.22	110.26	1%
Colombia	2111	111.96	109.90	-2%
Argentina	1693	113.44	106.88	-6%
Germany	1622	130.75	109.48	-16%
Venezuela	1328	114.25	112.13	-2%
Portugal	1165	95.48	100.66	5%
United Kingdom	1139	119.50	109.89	-8%
Peru	899	117.52	109.71	-7%
Dominican Republic	848	102.87	106.47	3%
Cuba	745	125.26	110.07	-12%
Brazil	630	123.40	109.09	-12%
Switzerland	535	151.48	115.88	-24%
Uruguay	448	107.25	106.43	-1%
Romania	442	115.57	105.36	-9%
Belgium	409	130.87	109.87	-16%
Chile	361	116.67	106.68	-9%
United States	346	116.11	107.22	-8%
Mexico	341	121.31	115.20	-5%

Figure 1. Predicted and true enrollment rates of children of migrants to Spain, weighted by the accuracy of the calculation of the true value.



III. HDI Per Natural: Combining Income, Enrollment and Child Mortality

In order to expand the scope of the per natural measurement, using Clemens and Pritchett's (2008) income and child mortality per natural estimates, we construct an education, a health and an income index each between 0 and 1 and then aggregate them into a single HDI per natural measure. The normalization of the enrollment rate and of income is done in the same way as the UNDP does for its official standard HDI. Enrollment rates are capped at 100 and log GDP per capita is also capped at log(40000), so a country with per capita income of USD 40000 or more will have an income index of 1 and countries below 40000 will have a score proportional to the difference between its log GDP and log(40000). Since child mortality is not a part of the HDI, we cannot replicate a procedure there as well, but we take a similar approach as with income: a distance measure is created between the country with the lowest child mortality, which gets an

index value of 1 and the country with the highest mortality, which gets the lowest value in the sample. Specifically, the index is:

$$CH\_MORT\_IDX_i = 1 - (CH\_MORT_i / (HI\_MORT - LO\_MORT))$$

Where CH_MORT is country i's mortality, and HI_MORT and LO_MORT are the highest and lowest observed mortality rates in the sample.

The HDI per natural calculated here is the simple average of these three components, in parallel, a reduced version of the HDI is constructed for comparability. This reduced version excludes literacy and uses child mortality as the health component in place of life expectancy. Table 4 presents the estimated values of the HDI per natural along with the corresponding difference with each country's national comparable HDI for the year 2000, sorted from highest to lowest difference.

Table 4. Human Development Index Per Natural, year 2000

Country	HDI_red00	HDI_NAT00	DIFF_2000	Cumulative Pop
LIBERIA	0.336	0.455	35.5%	0.05%
ETHIOPIA	0.336	0.438	30.6%	1.30%
NIGERIA	0.398	0.517	30.0%	3.53%
TANZANIA, U. REP. OF	0.341	0.437	28.0%	4.14%
SENEGAL	0.428	0.531	23.9%	4.32%
TRINIDAD AND TOBAGO	0.676	0.822	21.7%	4.35%
ERITREA	0.459	0.540	17.6%	4.41%
CAMBODIA	0.505	0.582	15.3%	4.64%
GUYANA	0.705	0.808	14.7%	4.65%
THAILAND	0.679	0.777	14.5%	5.74%
UGANDA	0.522	0.597	14.4%	6.18%
KENYA	0.502	0.560	11.6%	6.74%
YEMEN	0.484	0.532	10.0%	7.07%
GHANA	0.538	0.586	8.8%	7.43%

JAMAICA	0.760	0.820	7.8%	7.47%
SAMOA (WESTERN)	0.715	0.770	7.8%	7.48%
MYANMAR	0.526	0.564	7.3%	8.30%
BELIZE	0.749	0.803	7.1%	8.30%
PAKISTAN	0.494	0.528	6.9%	10.89%
ALBANIA	0.690	0.736	6.7%	10.94%
NEPAL	0.556	0.590	6.2%	11.38%
INDIA	0.585	0.617	5.5%	30.11%
EL SALVADOR	0.715	0.750	4.9%	30.22%
AZERBAIJAN	0.626	0.655	4.6%	30.37%
CAPE VERDE	0.740	0.774	4.6%	30.38%
BANGLADESH	0.586	0.609	4.0%	32.87%
LEBANON	0.770	0.800	3.9%	32.94%
GUATEMALA	0.675	0.701	3.9%	33.14%
FIJI	0.772	0.803	3.9%	33.16%
NICARAGUA	0.710	0.736	3.8%	33.25%
HONDURAS	0.680	0.705	3.7%	33.36%
MOLDOVA, REP. OF	0.679	0.703	3.6%	33.43%
ARMENIA	0.710	0.734	3.4%	33.49%
MOROCCO	0.650	0.672	3.4%	34.01%
DOMINICAN REPUBLIC	0.748	0.772	3.1%	34.16%
ALGERIA	0.732	0.752	2.8%	34.71%
UZBEKISTAN	0.650	0.666	2.6%	35.15%
CUBA	0.782	0.802	2.6%	35.35%
BOLIVIA	0.704	0.722	2.6%	35.50%
PHILIPPINES	0.767	0.786	2.5%	36.86%
VIET NAM	0.681	0.698	2.4%	38.28%
INDONESIA	0.676	0.692	2.3%	42.07%
SOUTH AFRICA	0.764	0.782	2.3%	42.88%
GEORGIA	0.698	0.714	2.2%	42.97%
PANAMA	0.789	0.806	2.2%	43.02%
JORDAN	0.762	0.777	2.0%	43.11%
PARAGUAY	0.742	0.757	2.0%	43.20%
EGYPT	0.730	0.743	1.8%	44.39%
PERU	0.790	0.804	1.8%	44.85%
SRI LANKA	0.720	0.732	1.7%	45.19%
IRAN, ISLAMIC REP. OF	0.742	0.755	1.7%	46.37%
MEXICO	0.790	0.803	1.6%	48.16%

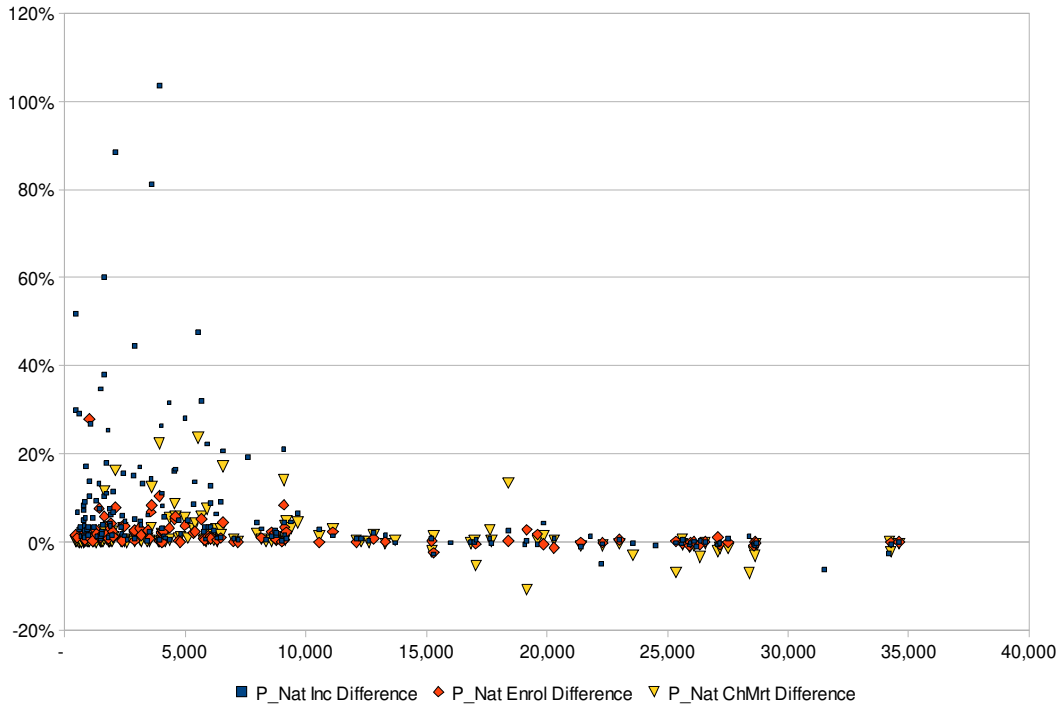
TURKEY	0.746	0.758	1.6%	49.38%
SYRIAN ARAB	0.691	0.702	1.5%	49.67%
COLOMBIA	0.770	0.780	1.4%	50.42%
CROATIA	0.812	0.823	1.3%	50.50%
LITHUANIA	0.865	0.876	1.3%	50.56%
CHINA	0.729	0.738	1.2%	73.30%
SAUDI ARABIA	0.807	0.816	1.0%	73.67%
SLOVAKIA	0.829	0.837	1.0%	73.77%
CYPRUS	0.866	0.873	0.9%	73.78%
KUWAIT	0.877	0.884	0.8%	73.82%
HUNGARY	0.861	0.867	0.7%	74.01%
BARBADOS	0.904	0.910	0.7%	74.01%
VENEZUELA	0.760	0.765	0.7%	74.45%
URUGUAY	0.847	0.853	0.7%	74.51%
UKRAINE	0.800	0.805	0.7%	75.38%
BRAZIL	0.830	0.835	0.6%	78.50%
CHILE	0.833	0.838	0.5%	78.78%
BULGARIA	0.809	0.813	0.5%	78.92%
COSTA RICA	0.788	0.791	0.4%	78.99%
MALAYSIA	0.808	0.811	0.4%	79.41%
SWITZERLAND	0.923	0.926	0.4%	79.54%
POLAND	0.872	0.874	0.3%	80.23%
ISRAEL	0.926	0.929	0.3%	80.33%
CZECH REPUBLIC	0.857	0.859	0.3%	80.52%
ARGENTINA	0.887	0.889	0.3%	81.18%
NEW ZEALAND	0.952	0.954	0.2%	81.25%
AUSTRALIA	0.971	0.973	0.2%	81.59%
UNITED STATES	0.957	0.960	0.2%	86.69%
JAPAN	0.918	0.920	0.2%	88.96%
KOREA, REP. OF	0.901	0.903	0.2%	89.80%
GERMANY	0.935	0.937	0.2%	91.28%
UNITED KINGDOM	0.941	0.942	0.2%	92.33%
FRANCE	0.946	0.947	0.1%	93.39%
GREECE	0.884	0.886	0.1%	93.59%
RUSSIAN FEDERATION	0.843	0.844	0.1%	96.23%
SWEDEN	0.975	0.977	0.1%	96.38%
BELGIUM	0.975	0.976	0.1%	96.57%
AUSTRIA	0.948	0.949	0.1%	96.71%

SPAIN	0.938	0.939	0.1%	97.43%
NORWAY	0.982	0.982	0.0%	97.51%
CANADA	0.958	0.959	0.0%	98.06%
ITALY	0.899	0.899	0.0%	99.10%
FINLAND	0.974	0.975	0.0%	99.19%
BELARUS	0.826	0.826	-0.1%	99.37%
NETHERLANDS	0.973	0.972	-0.1%	99.65%
DENMARK	0.965	0.964	-0.1%	99.75%
IRELAND	0.927	0.925	-0.2%	99.82%
PORTUGAL	0.914	0.907	-0.7%	100.00%

The table shows that of the 100 countries for which this estimation was possible (5.58 Billion people), 47% had a difference of more than 2% between the country's comparable HDI and HDI Per Natural, representing approximately 43.2% of the world population. The difference is over 10% for 13% of countries, just under 400 Million people. As expected, the estimated differences are largest for the least developed countries. The maximum difference between income per natural and GDP per capita in the sample is 104%, while the maximum difference between per natural enrollment and official enrollment is 28% and for child mortality the maximum difference is 24%. The greatest differences across populations occur in income, which suggests that this aspect of human welfare explains most of the HDI difference between the per natural and the national measure.

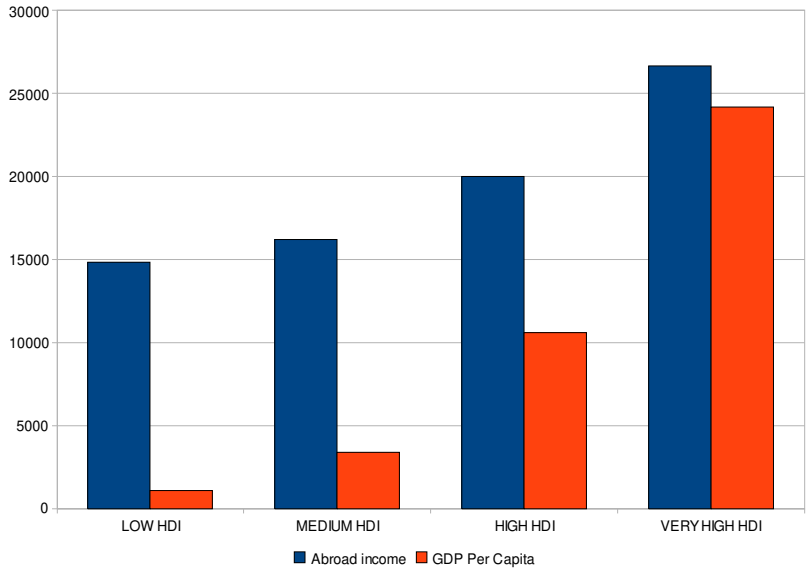
Figure 2 shows the percentage difference between per natural and national measures for populations from all countries in the sample, by level of GDP per capita. It shows that the observed differences in income are generally much larger than for health and education, and that in all three dimensions, the differences become significantly large for countries below US $ 10,000.

Figure 2. Differences in Per Natural and National Measures for levels of GDP per capita



Higher per natural measures stem from a large diaspora combined with large welfare differences. As part of the estimation procedure, we have estimated the value of income, enrollment and child mortality of peoples outside their country of origin. A comparison of how well these people fare abroad and the conditions of those who stay, gives a closer idea of the magnitude of the welfare gain from migration; although there may be many differences in observable and unobservable individual level characteristics which preclude an interpretation of this comparison as a true migration gain, the magnitudes and cross country patterns give us a sense of which countries may benefit the most and therefore where we are likely to find the strongest incentives to move internationally.

Figure 3. Income Abroad and GDP Per Capita by level of development



Analogous comparisons can be made with education and health, for which a similar pattern emerges. Figures 4 and 5 show that migrants from the lowest HDI countries are the ones that stand to gain the most from moving abroad.

Figure 4. Abroad and National Total Gross Enrollment Rates

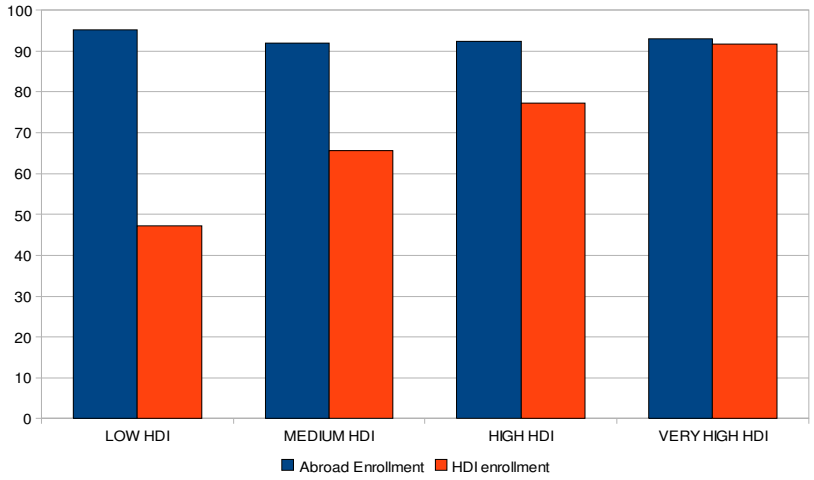
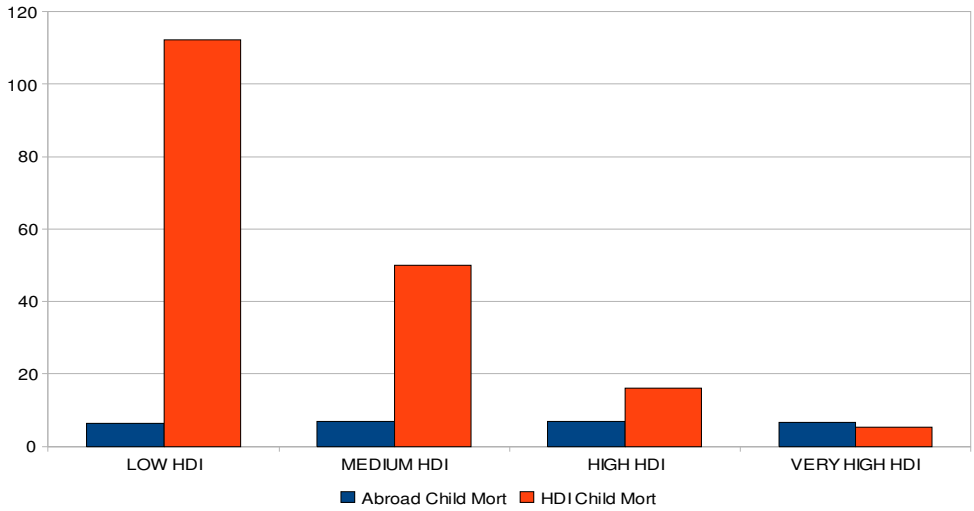


Figure 5. Abroad and National Child Mortality Rates



IV. Gains to Migration

The coarsest estimate one can make of the gains to migrating internationally is the simple difference in standards of living across countries, the problem with that measure of course is that the people residing in various countries are probably very different in many respects and are therefore not comparable. One view of the estimates presented here is that when we look at the income, health and education outcomes of naturals of a given country both in the country of origin and at destination countries, we are moving one step forward in making a more reasonable comparison and thus getting closer to an estimate of the gains to migration.

It is still true, however, that comparing migrants to non-migrants from a given country does not provide the quantity of interest, since migrants can have higher education than non-migrants, higher wealth, better health, or other observable differences that can have an effect both on the migration decision and on the observed outcomes in the country of destination. Clemens, Montenegro and Pritchett (2008) address these issues by comparing observably identical workers between several countries of origin and the US to estimate the wage premium attained by these workers as a consequence of moving to the US labor market. They provide evidence that for observably identical workers, the wage gains can be huge, ranging from over a 15-fold difference to just under double in the lowest case, with a median of a 4-fold increase in wages.

Although these estimates are much better than those calculated from aggregate data, they still don't account for the fact that migrants may differ from non-migrants in non-observable ways. For the countries for which Clemens, Montenegro and Pritchett (2008) are able to correct for this source of bias (Philippines, Mexico and South Africa), they find significant a wage premium in the order of a doubling or tripling of wages, associated with migration to the United States for observably and unobservably identical workers. Their estimated annual earnings gain for a median country in their sample is US $10,000, which is larger than the GDP per capita of over 72% of countries in the world.

IV. 1. Education place premium

We are also interested in better understanding the gains to migration in other dimensions of human welfare. Here we lay out a procedure to estimate place premia in education outcomes using individual level data for origin and destination countries and apply it to Nicaraguan immigrants to Costa Rica. The methodology is closely related to that proposed by Clemens, Montenegro and Pritchett (2008), but bears on a different conceptual framework.

As the educational outcomes of adult migrants are unlikely to change very much upon arrival at the destination country, we focus here on the children of migrant households. Specifically, the outcome being observed is whether children in the household who are of school going age, are in fact enrolled in school. This measure has the advantage that it is directly linked with aggregate school enrollment, a popular indicator of schooling outcomes. The question being asked, therefore, is whether the likelihood of a child being enrolled in school changes when the family voluntarily moves to from one country to another, and if so, by how much. The analysis should be independent of the pair of countries analyzed, though the estimated gains will certainly differ across pairs of countries.

Among the leading determinants of school achievement of children, be it measured by test scores, enrollment or attainment, are the socioeconomic characteristics of their household (Hsieh and Urquiola, 2006; McEwan, Urquiola and Vegas (2008)); there are several channels through which higher parents' education can translate into better schooling outcomes: higher incomes, better quality family time and a learning environment at home, and direct transmission of innate ability. Also important is the availability of schooling services at a relatively low cost and a social safety net that helps keep the children in school during economic downturns. School enrollments can change due to a number of factors when a family crosses the border to another country, the large estimated gain in earnings suggests that better incomes are likely to be a very significant part of the story, but other factors such as the availability of teachers and schools, the quality of infrastructure and the efficiency and cost of the transportation system, may be important as well.

The natural starting point of any attempt to measure the gains to migration is a comparison of the observed level of the outcome of interest (enrollment rates or wages for example) between the two countries. This aggregate figure will include the entire population residing in each country (nationals and foreigners) and is the way differences in development are normally described. So someone moving from a country with a 60% total enrollment rate to another with an 80% rate should be doing much better after the move. However, since we may expect there to be differences in how locals and migrants fare in the educational system, it is necessary to look at the particular migrant population of interest in the destination country and compare their outcomes with those back home; this is the kind of exercise carried out above for income, school enrollments and child mortality. Yet, as argued, this is still insufficient, since the migrants themselves may be younger, better educated, more entrepreneurial or just different in some other observable or unobservable way. The purpose Clemens, Montenegro and Pritchett (2008) and of the present analysis is to move closer to an adequate comparison of individual level outcomes that leads to a better estimate of the gains to moving across international borders. We use micro data to control for observable characteristics of individuals and families on both sides of the border and then use information on migration decisions in the country of origin to adjust the estimates for any remaining unobservable differences between migrants and non migrants. The next sub section describes the precise procedure.

IV.2. Methodology

Because the nationals of the origin country who currently reside in the destination country may be very different from the nationals who stayed at home, both in observable characteristics such as their level of education or their age, as well as in unobservable characteristics such as intelligence or entrepreneurial drive, it is necessary to take these into consideration when comparing those who migrated to those who didn't.

Consider the following simple binary choice model. Let y=1 if the child is enrolled in school and y=0 if he/she is not, then:

$$y = \begin{cases} 1 & \text{if } y^* \geq 0 \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

Where $y^* = X\beta + u$ and where *X* includes a number of observable individual and household level characteristics. It is well known that depending upon the distributional assumptions made about the error term *u*, the resulting empirical specification for estimating the probability of enrollment at the individual level, will be different. The challenge of identifying the effect of migration on the probability of enrollment can be illustrated using the predicted probabilities from the preceding binary choice model. Let $P[E \mid C, d]$ be the probability of enrollment (E) of children who live in country (C) and whose family made the choice (d) of moving or not (d=M for migrants and d=S for stayers). The pure impact of migration would be $P[E \mid C, M] - P[E \mid C, S]$, however, it is not possible to observe the second term in this expression since a foreign family and their children cannot be observed both living in the destination county C and having decided not to migrate. This is the fundamental problem of identification of this relationship. Turning to the specific example of Nicaraguan immigrants in Costa Rica, given the micro data, we can estimate:

$$RAW\_DIFF = P[E \mid CRI, M] - P[E \mid NIC, S]$$

Adding and subtracting $P[E \mid CRI, S]$ we get

$$RAW\_DIFF = P[E \mid CRI, M] - P[E \mid CRI, S] + P[E \mid CRI, S] - P[E \mid NIC, S]$$

$$RAW\_DIFF = PREMIUM + BIAS \quad (2)$$

The first two terms form the quantity we are interested in (*PREMIUM*), and the last two form the error we commit by using the raw difference as our estimate (*BIAS*). This bias will be positive whenever the enrollment rates of those who migrated, had they stayed would have been higher than the enrollment rates of those who stayed (i.e. positive selection), and negative if it were the other way around.

IV.3. Estimating the probability of school enrollment

Following Angrist and Krueger (2001), we use a simple linear probability model to obtain a prediction function for the probability of children's school enrollment in Nicaragua, based on the 2001 LSMS micro data, and analogously for Nicaraguans in Costa Rica using the 5% sample of the 2000 Census, available through the IPUMS International Project at the University of Minnesota.

The outcome variable is whether the children aged between 7 and 22 are currently enrolled in school, and the variables used to predict it are age, gender, number of children in the household, an indicator for the household being located in a rural area, age and educational attainment of the household head, an indicator for two-parent households, and due to the lack of earnings data in the Costa Rican census, a series of variables that proxy for household wealth: whether the floor is of a quality material, whether the household owns the dwelling, and whether the household has a direct connection to piped water and electricity.

With this model in hand, we wish to compare two children with the same observable characteristics on both sides of the border (RAW_DIFF). Consider an 8 year old girl, with one sibling in the household, residing in an urban area, where the household head is 35 years old, has completed secondary schooling in Nicaragua, has a partner living in the household, and where the family owns the dwelling, which has floors of good material and has piped water and electricity. Table 5 shows that this child has a probability of 0.63 of being enrolled in school if she lives in Nicaragua and 0.83 if he lives in Costa Rica.

Table 5. Predicted Probability of Enrollment (Nicaraguans in Costa Rica and at home)

	Nicaraguans in Costa Rica (recent)	Nicaraguans in Nicaragua	Comparison value
Child's Age	-0.0191	-0.0040	8
Male Child	0.0000	-0.0424	0
Children in HH	0.0150	0.0202	2
Rural HH	-0.0800	0.0000	0
Age of HH Head	0.0000	-0.0035	35

Educ. Attainment of HH Head	0.0839	0.0602	3
Both Parents in HH	0.0000	0.0270	1
Floor in Good Condition	0.1093	0.0000	1
HH Owns Dwelling	0.0000	0.0000	1
Piped water to home	0.0000	0.0775	1
Electricity connection	0.0000	0.1052	1
Constant	0.5879	0.3490	

Predicted Value for comparison child	0.8260	0.6251

This provides the first estimate of interest: RAW DIFF is 0.2. However, from the discussion above, we know that if any unobservable factors are positively correlated both with migration and with the probability of being enrolled in school, this will be an overestimate of the effect of migration from Nicaragua to Costa Rica on children's school enrollment. Even if we cannot directly estimate $P[E \mid CRI, S]$, we can get a reasonable approximate estimation from the subset of households in Nicaragua that have had an international migrant in their family. Under the assumption that the distribution of unobservable characteristics of households with international migrants but where at least one member remains behind is similar to the distribution of unobservable traits of families where all members migrate, it is possible to estimate the size of the BIAS term in (2).

Panel and retrospective data on migration

The Nicaraguan 2001 LSMS survey is a follow up of the 1998 LSMS conducted just months before Hurricane Mitch devastated an important fraction of the territory. Approximately 77% of the children (and their households) in the 2001 sample had been interviewed in 1998, and in both years there is a question on whether the household had an international migrant that was not present at the moment. In 2001 there is also a question on whether an individual has ever had an

international migration experience and the person's age when that first occurred. We adopt two alternative definitions of a migrant household: the first, and generally preferred, is a household that had no international migrants in 1998 but reported having at least one international migrant in 2001, the second, is whether the household reported having an international migration experience ever.

We estimate the same model described above and obtain an analogous predicted value for the same observably identical child for migrant and non-migrant households under both definitions. The result is shown in Table 6. The difference in the predicted enrollment probability for the observably identical child between migrant and non migrant families is almost 0.06 under the panel definition, and just over 0.08 under the retrospective definition, which are in each case the corresponding BIAS estimates. These figures imply an estimated gain in the enrollment probability (PREMIUM) of approximately 0.14 under the preferred definition and around 0.12 under the alternative definition. The comparable value to those reported in Clemens, Montenegro and Pritchett (2008) would simply be calculated as $PREMIUM\_\text{Re} = (P[E \mid CRI, M] - BIAS) / P[E \mid NIC, S]$ and in this case gives a value of 1.23 (see Table 6).

Estimates of school enrollment rates obtained from household micro level data do not coincide exactly with the administrative (official) data on enrollment rates. As was discussed in the section on the estimation of enrollment rates per natural, there are two sources of differences, the first is that in one case enrollment is self reported and in the other it comes from administrative records, the second is that in the data used here, the calculations are restricted to children living with their parents. These factors often imply that enrollments are over estimated in the micro data. The degree of overestimation is slightly higher in Costa Rica than in Nicaragua, so the estimated premium is adjusted downwards by approximately 5.5%, in addition, since the micro data from Costa Rica corresponds to the year 2000 and for Nicaragua it corresponds to 2001, we are effectively ignoring any progress in enrollment rates that Costa Rica made between 2000 and 2001, which according to official statistics, was about 3.4%. Combining these effects and adjusting the estimated gain from migration, gives a final adjusted PREMIUM of 1.2 if scaled as

in Clemens, Montenegro and Pritchett (2008), this is PREMIUM_Re (Survey Adjusted) in Table 6.

Table 6. Predicted Probability of Enrollment for migrant and non-migrant households (Nicaragua)

	Nicaraguans without a Migrant (TRUE PANEL)	Nicaraguans with a Migrant (TRUE PANEL)	Nicaraguans without a Migrant (RETROSPECT)	Nicaraguans with a Migrant (RETROSPECT)	Comparison value
Child's Age	-0.0067	-0.0172	-0.0029	-0.0053	8
Male Child	-0.0430	0.0000	-0.0287	-0.0401	0
Children in HH	0.0170	0.0177	0.0256	0.0191	2
Rural HH	0.0000	0.0000	0.0000	-0.0462	0
Age of HH Head	-0.0035	0.0000	-0.0026	-0.0043	35
Educ. Attainment of HH Head	0.0606	0.0677	0.0726	0.0532	3
Both Parents in HH	0.0552	0.0000	0.0000	0.0000	1
Floor in Good Condition	0.0000	0.0000	0.0000	0.0000	1
HH Owns Dwelling	0.0000	0.0000	0.0000	0.0418	1
Piped water to home	0.0552	0.0000	0.0736	0.0749	1
Electricity connection	0.1007	0.0000	0.1157	0.0836	1
Constant	0.4160	0.6239	0.2261	0.4464	
Predicted Value for comparison child	0.6679	0.7245	0.5694	0.6522	
BIAS		0.0566		0.0828	
RAW_DIFF		0.2009			

PREMIUM	0.1443	0.1181
PREMIUM_Re	1.2309	1.1889
PREMIUM_Re (Survey-adjusted)	1.2007	1.1586

These estimates suggest that migration between developing nations may also potentially have very significant impacts on family welfare, in this case an increase in over 20% in the probability of being enrolled in school for the children of Nicaraguan migrants into Costa Rica. It is very difficult to think of any internal educational policy in Nicaragua that could lead to such a large increase in enrollments in that country in a short period of time.

A bit of policy context can help better understand the estimated impact of migration on educational outcomes. Costa Rica's Constitution (1949) establishes free of charge and compulsory pre school and primary education for everyone as well as a minimum public sector education budget of 6% of GDP. In 1957, the Education Code laid down the basic principles of the country's education system, which would permeate into curricular design and administrative decisions regarding students and other policies:

1) The promotion of a sense of civic duty and awareness of rights, freedoms and a sense of responsibility and respect for human dignity

2) The development of individual personality

3) The preparation of citizens for democracy, reconciliation of self interest and the community's wellbeing

4) The stimulation of solidarity and human understanding

In 1994, the Education Council set forth a long term vision in "Education Policy towards the 21st Century", which placed an emphasis on the quality of education and on equal access, underscoring the same principles ascribed to previously.

The Ministry of Education's Strategic Plan (2002) had several key guidelines, some of which were: 1) Guaranteeing access to the poor and extreme poor, 2) significant increase in

infrastructure, 3) school dining rooms, 4) transportation for secondary school students, 5) scholarships for secondary and tertiary school students, 6) free transportation for handicapped, 7) decentralization of the system's administration, 8) Increase community participation, 9) increase informational and managerial efficiency in general. This strategic plan was accompanied by a "Accion Plan for Education for All 2003-2015". These elements suggest that Costa Rica's more developed institutional endowment for the provision of education is readily made available to the children of migrants from Nicaragua, which is probably related to the observed gain in enrollment probability.

V. HDI Per Natural Over Time

Using essentially the same methodology as we used in sections II and III, we estimate enrollment rates, child mortality and income per natural for the year 1990, using incomes of foreign born residents in the United States, as recorded in the Census of 1990, and their children's school enrollment rates at all levels. Docquier and Marfouk (2005) contains the educational composition of adult migrants to OECD countries from every other country for 1990 as well, which allows a similar model as that used for the 2000 data. We can thus provide a view of the evolution over time of the per natural measure and whether countries of different levels of development. Table 7 shows the estimated values of both the HDI per natural, its comparable (reduced) version for 1990 and 2000 and the growth rates of each. The data in the table are sorted according to the difference between the growth rate of the per natural measure and the national measure, and shows that the poorest countries are at the top and the bottom. This fact is better illustrated in figure 6, which plots the difference in the growth rates of the two measures against per capita GDP in 1990.

Table 7. HDI Per Natural and Comparable HDI, 1990, 2000 and Growth rates

	HDI_red90	HDI_NAT90	HDI_red00	HDI_NAT00	HDI_Growth	HDI_NAT Growth

ETHIOPIA	0.363	0.371	0.336	0.438	-7.48%	18.13%
NIGERIA	0.482	0.483	0.398	0.517	-17.43%	7.06%
TANZANIA, U. REP. OF	0.427	0.435	0.341	0.437	-20.06%	0.57%
SENEGAL	0.507	0.535	0.428	0.531	-15.50%	-0.90%
UGANDA	0.480	0.486	0.522	0.597	8.66%	22.80%
TRINIDAD AND TOBAGO	0.773	0.810	0.676	0.822	-12.61%	1.49%
THAILAND	0.689	0.692	0.679	0.777	-1.44%	12.27%
YEMEN	0.480	0.487	0.484	0.532	0.65%	9.26%
KENYA	0.595	0.605	0.502	0.560	-15.63%	-7.32%
BELIZE	0.733	0.740	0.749	0.803	2.22%	8.39%
INDIA	0.575	0.581	0.585	0.617	1.74%	6.20%
SAMOA (WESTERN)	0.691	0.715	0.715	0.770	3.42%	7.72%
GHANA	0.555	0.581	0.538	0.586	-2.95%	0.80%
PAKISTAN	0.479	0.497	0.494	0.528	3.01%	6.26%
HONDURAS	0.667	0.672	0.680	0.705	1.81%	4.89%
ARMENIA	0.728	0.732	0.710	0.734	-2.44%	0.37%
GEORGIA	0.768	0.764	0.698	0.714	-9.09%	-6.61%
DOMINICAN REPUBLIC	0.698	0.705	0.748	0.772	7.21%	9.42%
SOUTH AFRICA	0.809	0.811	0.764	0.782	-5.59%	-3.68%
INDONESIA	0.649	0.652	0.676	0.692	4.23%	6.09%
CROATIA	0.804	0.802	0.812	0.823	1.04%	2.57%
NEPAL	0.537	0.563	0.556	0.590	3.36%	4.82%
SLOVAKIA	0.829	0.826	0.829	0.837	-0.02%	1.30%
PHILIPPINES	0.754	0.764	0.767	0.786	1.69%	2.92%
IRAN, ISLAMIC REP. OF	0.710	0.714	0.742	0.755	4.59%	5.65%
SAUDI ARABIA	0.729	0.730	0.807	0.816	10.67%	11.70%

GUATEMALA	0.610	0.628	0.675	0.701	10.71%	11.71%
PERU	0.735	0.743	0.790	0.804	7.40%	8.24%
CHINA	0.630	0.633	0.729	0.738	15.69%	16.47%
ALGERIA	0.716	0.731	0.732	0.752	2.22%	2.87%
PANAMA	0.748	0.761	0.789	0.806	5.45%	5.98%
LITHUANIA	0.842	0.848	0.865	0.876	2.76%	3.27%
BRAZIL	0.741	0.742	0.830	0.835	11.95%	12.41%
CANADA	0.968	0.965	0.958	0.959	-0.96%	-0.63%
VENEZUELA	0.769	0.772	0.760	0.765	-1.19%	-0.87%
FINLAND	0.933	0.931	0.974	0.975	4.41%	4.68%
UNITED STATES	0.948	0.947	0.957	0.960	1.04%	1.30%
COLOMBIA	0.728	0.736	0.770	0.780	5.78%	6.03%
SWITZERLAND	0.889	0.891	0.923	0.926	3.75%	3.97%
JAPAN	0.896	0.896	0.918	0.920	2.46%	2.65%
AUSTRALIA	0.882	0.882	0.971	0.973	10.13%	10.32%
FRANCE	0.910	0.909	0.946	0.947	3.99%	4.17%
BELGIUM	0.908	0.908	0.975	0.976	7.34%	7.51%
HUNGARY	0.814	0.818	0.861	0.867	5.78%	5.94%
JORDAN	0.688	0.701	0.762	0.777	10.79%	10.93%
NETHERLANDS	0.924	0.922	0.973	0.972	5.28%	5.41%
SPAIN	0.900	0.900	0.938	0.939	4.24%	4.38%
GERMANY	0.884	0.884	0.935	0.937	5.83%	5.93%
AUSTRIA	0.899	0.899	0.948	0.949	5.43%	5.52%
NORWAY	0.915	0.914	0.982	0.982	7.35%	7.43%
ARGENTINA	0.827	0.829	0.887	0.889	7.26%	7.33%
SWEDEN	0.882	0.883	0.975	0.977	10.57%	10.60%
SYRIAN ARAB REPUBLIC	0.715	0.726	0.691	0.702	-3.38%	-3.37%
UNITED KINGDOM	0.880	0.882	0.941	0.942	6.86%	6.84%
KOREA, REP. OF	0.850	0.852	0.901	0.903	6.05%	5.96%

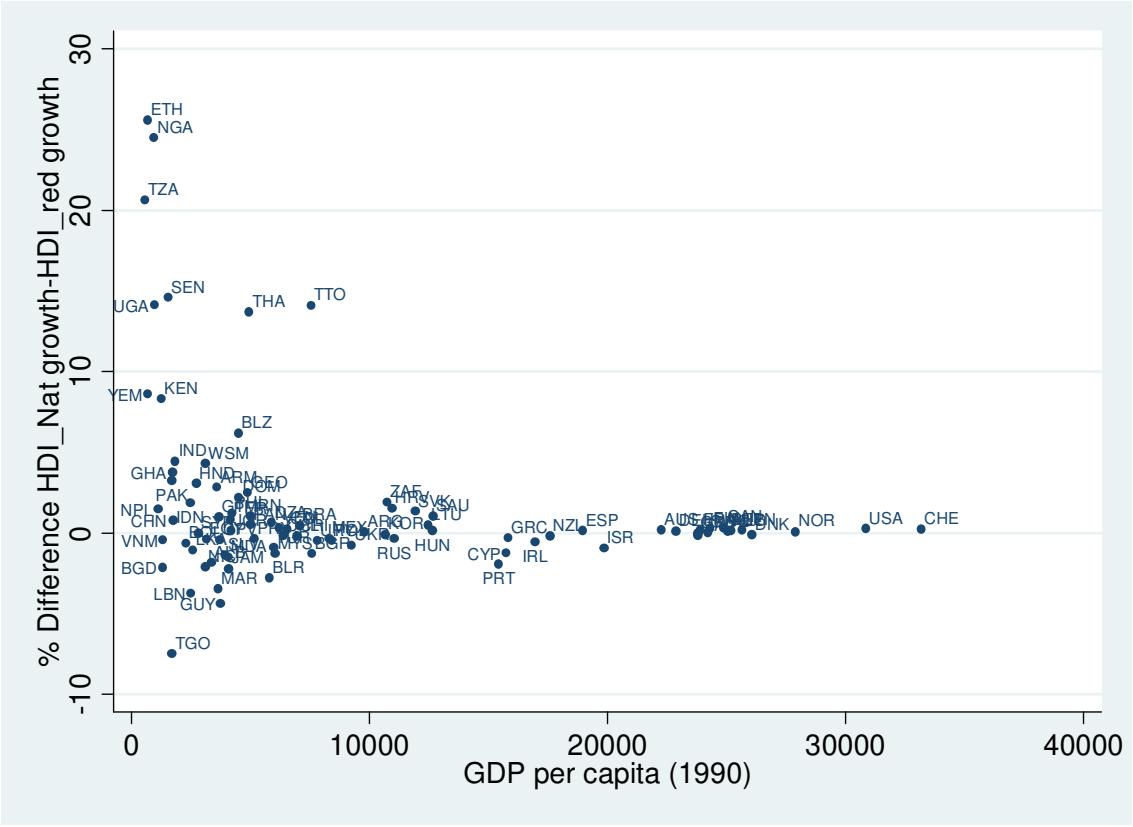
DENMARK	0.910	0.909	0.965	0.964	6.13%	6.03%
CHILE	0.782	0.787	0.833	0.838	6.62%	6.46%
ITALY	0.867	0.868	0.899	0.899	3.69%	3.54%
NEW ZEALAND	0.880	0.884	0.952	0.954	8.16%	7.97%
COSTA RICA	0.762	0.766	0.788	0.791	3.49%	3.29%
GREECE	0.865	0.868	0.884	0.886	2.29%	1.98%
RUSSIAN FEDERATION	0.859	0.863	0.843	0.844	-1.82%	-2.16%
MEXICO	0.751	0.766	0.790	0.803	5.20%	4.85%
PARAGUAY	0.704	0.721	0.742	0.757	5.37%	5.01%
EGYPT	0.673	0.688	0.730	0.743	8.36%	7.98%
VIET NAM	0.593	0.610	0.681	0.698	14.76%	14.32%
CAPE VERDE	0.668	0.702	0.740	0.774	10.69%	10.23%
POLAND	0.816	0.823	0.872	0.874	6.78%	6.30%
URUGUAY	0.811	0.820	0.847	0.853	4.45%	3.97%
IRELAND	0.882	0.885	0.927	0.925	5.13%	4.56%
BOLIVIA	0.617	0.636	0.704	0.722	14.21%	13.56%
UKRAINE	0.820	0.832	0.800	0.805	-2.52%	-3.29%
TURKEY	0.669	0.685	0.746	0.758	11.45%	10.54%
ISRAEL	0.874	0.885	0.926	0.929	5.95%	5.00%
SRI LANKA	0.708	0.728	0.720	0.732	1.65%	0.58%
CYPRUS	0.813	0.830	0.866	0.873	6.43%	5.18%
BULGARIA	0.804	0.819	0.809	0.813	0.52%	-0.77%
MALAYSIA	0.742	0.754	0.808	0.811	8.88%	7.57%
EL SALVADOR	0.674	0.716	0.715	0.750	6.15%	4.79%
MOLDOVA, REP. OF	0.749	0.789	0.679	0.703	-9.43%	-10.95%
ALBANIA	0.718	0.781	0.690	0.736	-3.92%	-5.78%
PORTUGAL	0.843	0.852	0.914	0.907	8.42%	6.49%
NICARAGUA	0.654	0.692	0.710	0.736	8.49%	6.39%
BANGLADESH	0.478	0.506	0.586	0.609	22.66%	20.53%

JAMAICA	0.723	0.797	0.760	0.820	5.15%	2.94%
BELARUS	0.816	0.838	0.826	0.826	1.32%	-1.46%
MOROCCO	0.594	0.634	0.650	0.672	9.46%	6.01%
LEBANON	0.723	0.778	0.770	0.800	6.55%	2.82%
GUYANA	0.674	0.807	0.705	0.808	4.53%	0.15%
TOGO	0.572	0.595	0.681	0.663	19.00%	11.50%

Twenty percent of the countries for which it is possible to estimate these indicators exhibit a difference of 2 percentage points or more in the growth rate of per natural HDI and their corresponding national HDI. Again, the largest observed differences are displayed by the poorest countries in the sample; for example, Ethiopia's National Human Development regressed by 7.5% between 1990 and 2000, but its people's HDI increased by 18% over the same period, a similar pattern is observed for other African and Asian peoples. Over this period, for many of the poorest nations in the world, bettering human development relied increasingly on the possibility of moving across international borders.

Figure 7 also shows that poorer countries are also those with the smallest (most negative) differences in per natural and national HDI growth rates. For wealthier countries, the differences gradually approach zero. One interpretation of this fact is that the data from poorer countries is of worse quality and is therefore more noisy, however, the asymmetric variability in the data suggests that this possibility is unlikely to be the entire explanation.

Figure 7. Difference in Growth Rates of HDI per natural and national measures vs. GDP Per Capita



VI. Concluding Remarks

This paper has extended the estimation of income per natural to Human Development per natural by combining Clemens and Pritchett's (2008) income and child mortality estimates with new enrollment rate per natural values. The methodology was also used to obtain new estimates of the HDI per natural for 1990 and growth rates between 1990 and 2000 calculated. A discussion of the link between per natural measures and the gains to migration is provided and illustrated in detail with new estimates of an education place premium between Nicaragua and Costa Rica.

Per natural welfare measures are not estimates of the gains to migration, they are an alternative representation of the welfare of people, regardless of their place of residence. As an intermediate

step to calculating these measures, we estimate outcomes of populations from different countries away from their place of birth, and this can be seen as a stepping stone towards estimating the actual gains o migration, which require careful consideration of the influence of observable and unobservable individual characteristics on outcomes and the migration decision.

There are two key conclusions from this analysis. The first is that poorer nations stand to gain the most from international migration, and the second is that even if we consider migration between developing nations, these gains can be quite significant.

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