

# **The Circulation Migration of the Skilled and Economic Development**

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There is renewed interest in the effects of the flow of human capital out of low-income countries

However, in this discussion there is an under-appreciation of:

A. How much of the skill residing in low-income countries is produced in high-income countries

A. Four countries - United States, Great Britain, Australia, Canada - provide over 525,000 student visas per year

B. United States - over 250,000 student visas issued in 2004 (compares with 73,212 employment visas for permanent immigrants screened for skill)

C. UNESCO estimates over 2.5 million foreign students in the world

B. How many “permanent” skilled migrants and those who migrate to acquire additional schooling (and get good jobs) return to their home country

Thus, little is known about the international *net* flow of high-skill human capital and its effects on developing countries

The immigration literature has three deficiencies in studying the determinants of who immigrates or who returns:

1. Existing frameworks and data up to now inadequate to describe appropriately measures of gaps in rewards to skill across countries
2. Empirical analyses lump together immigrants selected via family reunification rules and those selected on the basis of skill and jobs. Decision rules are likely to be quite different for the two groups.

Indeed, permanent resident aliens in the US are admitted mostly (90%) based on family criteria and subject to country ceilings - standard models of self-selection may not be adequate to understand international flows of people (networking and marriage market more relevant).

3. No representative data bases have tracked either foreign students or immigrants over time enabling estimates of return rates up to now.

I will consider today three questions:

A. How inefficient is the global allocation of workers and how large are the gains from increased international migration?

How do you measure these gains? Standard GDP comparisons are not ok

B. How would re-allocating high-skill workers from low to high wage areas affect low-wage countries?

C. What is the relationship between the *net* international flow of skilled persons and the development of low-income countries?

Which countries benefit the most, least from skill migration?

Use simple analytics combined with new data on immigrants, foreign students and out-migrants:

Two main data sources, newly available:

A. New Immigrant Survey (NIS): 4% sample of all US adult (18+) permanent resident aliens who received their visas between April and November 2003 (N=8,575).

B. New Immigrant Pilot Survey (NISP): sample of all US adult (18+) permanent resident aliens who received their visas in July and August or 1996 (N=1,032).

Plus, immigration survey of Australia, ILO data on international wages, and data bases on students in the United States.

Two sets of mechanisms discussed for how international movements of the skilled affect sending countries:

A. Direct short- and long-run effects on wages in sending countries:

Distinguishing between changes in prices of skill, skill composition effects, and skill upgrading incentives

B. Return migration: brain drain, brain gain issues and evidence

Consider large biases in recent World Bank estimates of brain drain from low-income countries based on census data

Look at determinants of the foreign students inflows and the return rates of foreign students and skilled “permanent” immigrants

First, consider the source of the migration/ labor mis-allocation problem:

differing cross-country rewards for skills

What are wage differences for comparable workers across countries?

One example: Construction carpenter monthly wage (ILO, 1995)

India: \$42                  Mexico: \$125                  Korea: \$1113                  US: \$2299

Problem: carpenters in India may have much lower schooling than carpenters in the US, or even Korea

Does not capture gains from migration of a person of a given skill

Per-capita GDP gaps are used in most analyses of the determinants of migration:

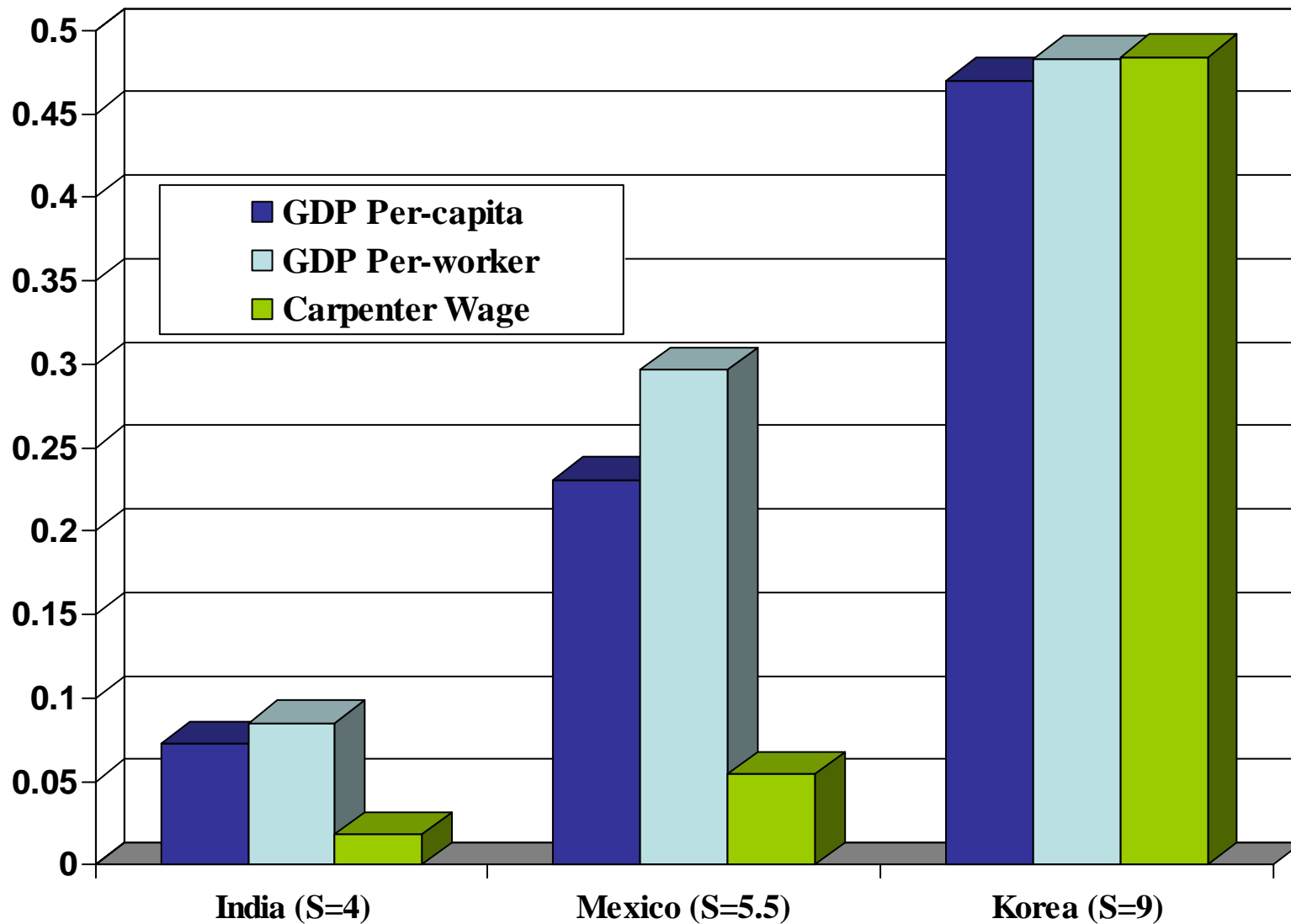
But, cross-country variation is due to differences in the proportion of the population in the labor force and in skill levels, not just rewards to skills

Per-worker GDP also not adequate

Workers vary substantially in skill across countries

Does it matter?                  Yes

**Ratio of Sending Country to US “Wages” for Three Sending Countries in 1996,  
By Measure**



## Skill Price Model and the Identification of Cross-Country Skill Rewards

Simplest economic model: one-skill model illustrates main direct effects of migration and is key to understanding the migration of skills across countries

The worker  $i$ 's wage  $W_{ij}$  in home country  $j$  is

$$(1) \quad W_{ij} = \omega_j x_i,$$

where

$x_i$  = the skill level of the worker (amount of skill units)

$\omega_j$  = the amount each unit of skill is valued in the economy in which the worker is located = the skill price

Variation in wages across workers *within* a country is due to variation in skill levels

Variation in the average wages of workers *across* countries is due to inter-country differences in: (a) average skill levels  $x_i$  and (b) skill prices  $\omega_j$ .

Increasing incomes in a country thus entails increasing either (a) the price paid for skills or (b) skill levels.

Much attention to raising skills in low-income countries (greater access to education, improved school quality)

But, why skill prices - rewards to skills - differ across countries is really the key question of development economics

Suspects: natural endowments (geography), population density, the level of technology, the amount of capital, the amount of aggregate skill or on a deeper level - the quality of institutions.

The question today is how international migration affects skill levels, skill prices and the determinants of skill prices

The model has implications for the number and quality (skill composition) of immigrants from and to a country:

The expected initial earnings that worker  $i$  in  $j$  could earn in destination country  $u$  (ignoring for simplicity skill transferability) is given by

$$(2) \quad pW_{iu} = \omega_u x_i,$$

where  $\omega_u$  = the destination-country skill price

$p$  = the probability of obtaining a permanent destination-country job.

The economic gain from migrating from  $j$  to  $u$ ,  $G_{ij}$ , for worker  $i$  is

$$(3) \quad G_{ij} = x_i[p\omega_u x_i - \omega_j(1+\pi_j)] - C_j.$$

where  $C_j$  = direct costs of migrating

$\pi_j W_{ij}$  = time costs of migrating

## Implications of the skill-price migration model

1. Higher-skill persons always have greater gains from out-migration, for a given skill price gap (selectivity)

Thus, immigrants from high skill price countries will be more skilled on average than those from low skill price countries

2. The higher the domestic skill price the lower is the gain from out-migration (magnitude)

Thus, there will be fewer immigrants from high skill price countries

3. Schooling acquired in the destination country may increase  $p$  and thus facilitate migration (and skill transferability too)

4. The lower the domestic skill price the more an increase in skill increases the gain from migrating;

Thus is, increasing access to schooling in low skill-price countries can lead to higher rates of out-migration

But, how do we know what skill prices are around the world?

And, isn't using differences in per-capita GDP good enough to gage the gains from migrating (as used in almost all studies of the determinants of migration)?

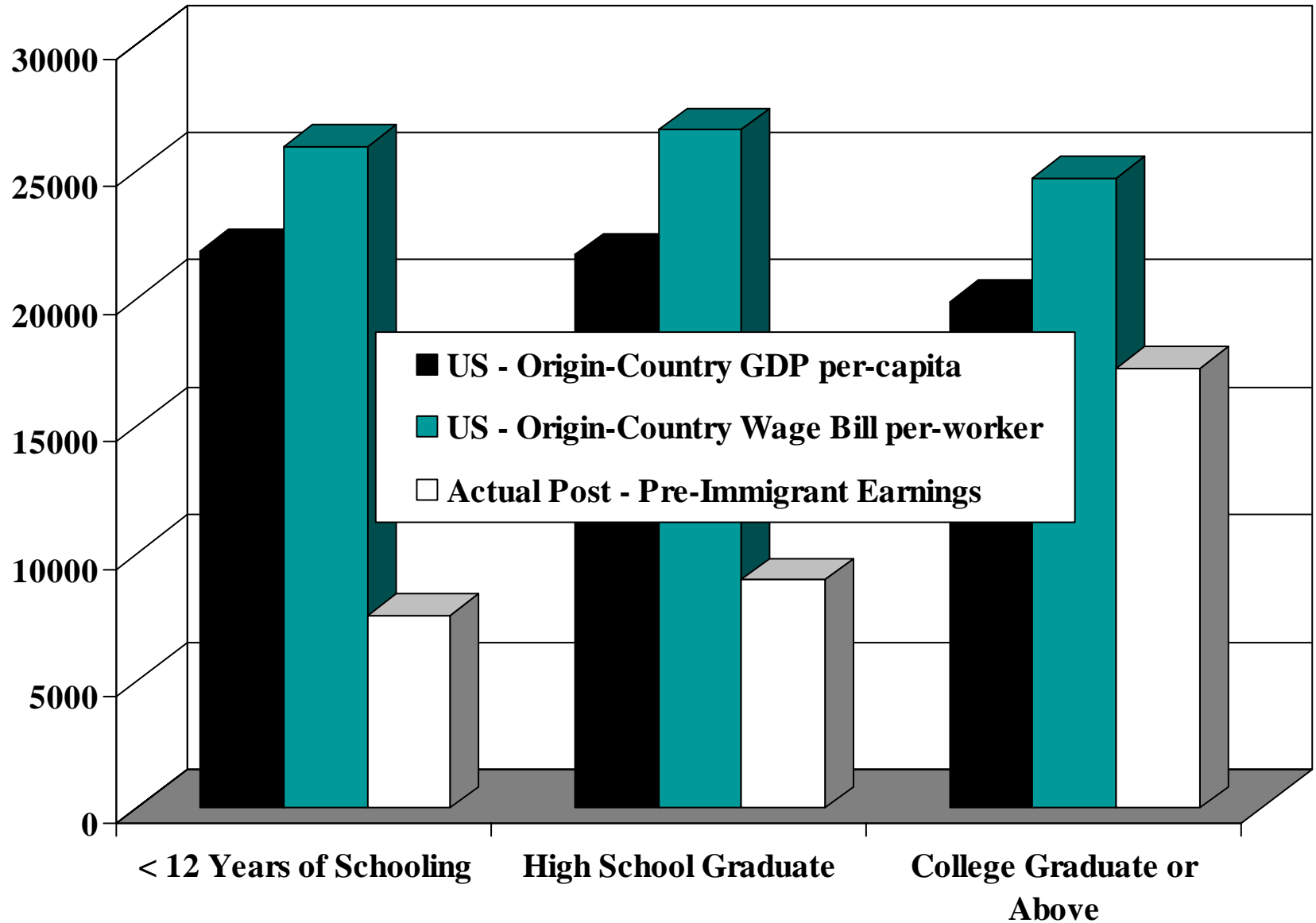
In fact, variations in the skill price and GDP per-capita can have opposite effects on migration -

A rise in the skill price at home lowers the gain from migration, for given direct migration costs

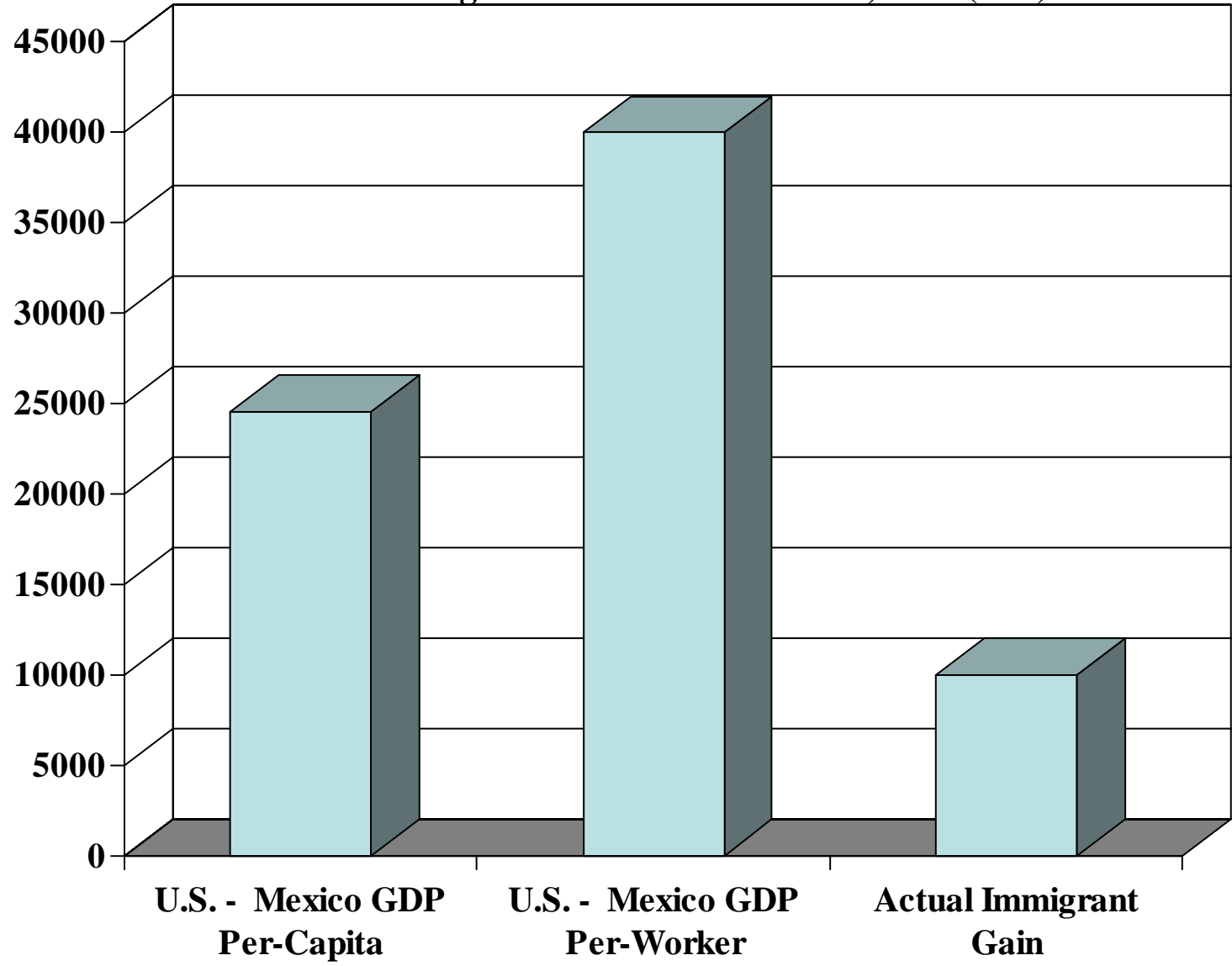
For a given skill price, higher per-capita GDP may facilitate financing of the direct costs of migration.

And, what about within-country inequality and its effects on emigration (as highlighted by George Borjas)?

**Alternative Measures of the Net One-year Benefit from the U.S. Immigration of One Person,  
by Schooling Level: All U.S Employment and Spouse Immigrants, 1996 (NIS-P)**



**Alternative Measures of the Net One-year Benefit from the Immigration of One Person:  
Adult Mexican Immigrants to the United States, 2003 (NIS)**



## Estimating World Skill Prices

Requires comparable information on the earnings of workers of the same skill across all countries of the world

Three sources of information:

A. *New Immigrant Survey-Pilot (NIS-P), 1996*: provides earnings of new US immigrants in their last job in their home country

Advantages:

1. Information obtained from common questionnaire
2. Information obtained on worker's schooling, age, experience

Disadvantages:

1. Selective sample: model implies immigrants positively selected on unobservables
2. Sample size: 332 workers for 54 countries

B. *Occupational Wages Around the World (OWW)*, Freeman and Oostendorp: provides monthly earnings (estimated) for workers by occupation and industry

Advantages:

1. Large sample size: 4942 observations in a single year (1995)
2. Meant to be non-selective

Disadvantages:

1. Information not necessarily comparable across countries
2. Number of countries represented is small in any one year: 67
3. No information on the education or age of workers (see carpenters!)

**C. *New Immigrant Survey (NIS), 2003 Baseline***: provides earnings of new US immigrants in their last job in their home country

Advantages:

1. Information obtained from common questionnaire
2. Information obtained on worker's schooling, age, experience, and occupation
3. Sample size: over 2200 workers for 130 countries

Disadvantages:

1. Selective sample: model implies immigrants positively selected on unobservables

Table 1  
 Characteristics of Global Earnings Data Sets

Data set/variable	1996 NIS-P Home- Country Workers	OWW, 1995	2003 NIS Home- Country Workers
Mean annual earnings of respondents (US\$)	14,719 <sup>a</sup> (2602)	10,208 <sup>b</sup> (13289)	23,250 <sup>a</sup> (54596)
Mean age of respondents	34.6 (8.53)	-	33.5 (11.1)
Mean years of schooling of respondents	14.4 (4.5)	-	13.9 (3.7)
Number of industries	-	49	-
Number of occupations	-	161	363
Number of countries	54	67	130
Number of workers	332	4,924	2,823

a. PPP-adjusted, full-time earnings

b. Exchange rate adjusted, country-specific calibration with lexicographic imputation

Estimation of skill prices from micro data on wages “around the world”:

Assume the number of skill units of a worker is a function of schooling, occupation and an unobservable skill endowment; for example:

$$(4) \quad x_{ij} = \mu_{ij} \exp(\beta S_{ij} + \mathbf{I}_{ijk} \boldsymbol{\gamma}_k),$$

where  $S_{ij}$  = schooling,  $\beta$  = schooling “return”,  $\mu_{ij}$  = skill endowment (schooling missing in OWW)

$\mathbf{I}_{ijk}$  = a vector of occupation dummies for worker  $i$  in country  $j$

$\boldsymbol{\gamma}_k$  = a vector of occupation coefficients

Then the log of worker  $i$ 's wage in country  $j$ , from (1), is

$$(5) \quad \ln(W_{ij}) = \ln \omega_j + \beta S_{ij} + \mathbf{I}_{ijk} \boldsymbol{\delta}_k + \ln \mu_{ij}.$$

The intercepts in (5), which are allowed to differ across countries, provide the log of the skill price for each country represented in the data.

What is the relationship between GDP and skill prices?

Assume aggregate output  $Y_j$  in country  $j$  is produced according to Cobb-Douglas technology:

$$(8) \quad Y_j = AL_j^\alpha \Pi K_{nj}^\gamma,$$

where  $K_{nj}$  = country  $j$ 's stock of non-labor resources (e.g., land, capital, minerals)

$L_j$  = country  $j$ 's aggregate stock of labor in skill, given by

$$(9) \quad L_j = N_j(a(x_{ij})),$$

where  $N_j$  = the total number of workers in  $j$  and  $a()$  is an inverse function yielding the average skill units per worker in country  $j$  in terms of observables.

The skill price  $\omega_j$  is the marginal product of an efficiency unit of labor, given by

$$(10) \quad \omega_j = \alpha Y_j / N_j (a(x_{ij}))$$

Thus,

$$(11) \quad \text{Ln}(\omega_j) = \text{Ln}\alpha + \text{Ln}(Y_j/N_j) - \text{Ln}(a(x_{ij}))$$

or, for the individual worker data on wages from the NIS-P, for example

$$(12) \quad \text{Ln}(W_{ij}) = \text{Ln}\alpha + \text{Ln}(Y_j/N_j) - \text{Ln}(a(x_{ij})) + \beta S_{ij} + \text{Ln}\mu_{ij}$$

(11) and (12) imply that aggregate output *per worker* is positively and average skill levels are negatively correlated with skill prices across countries

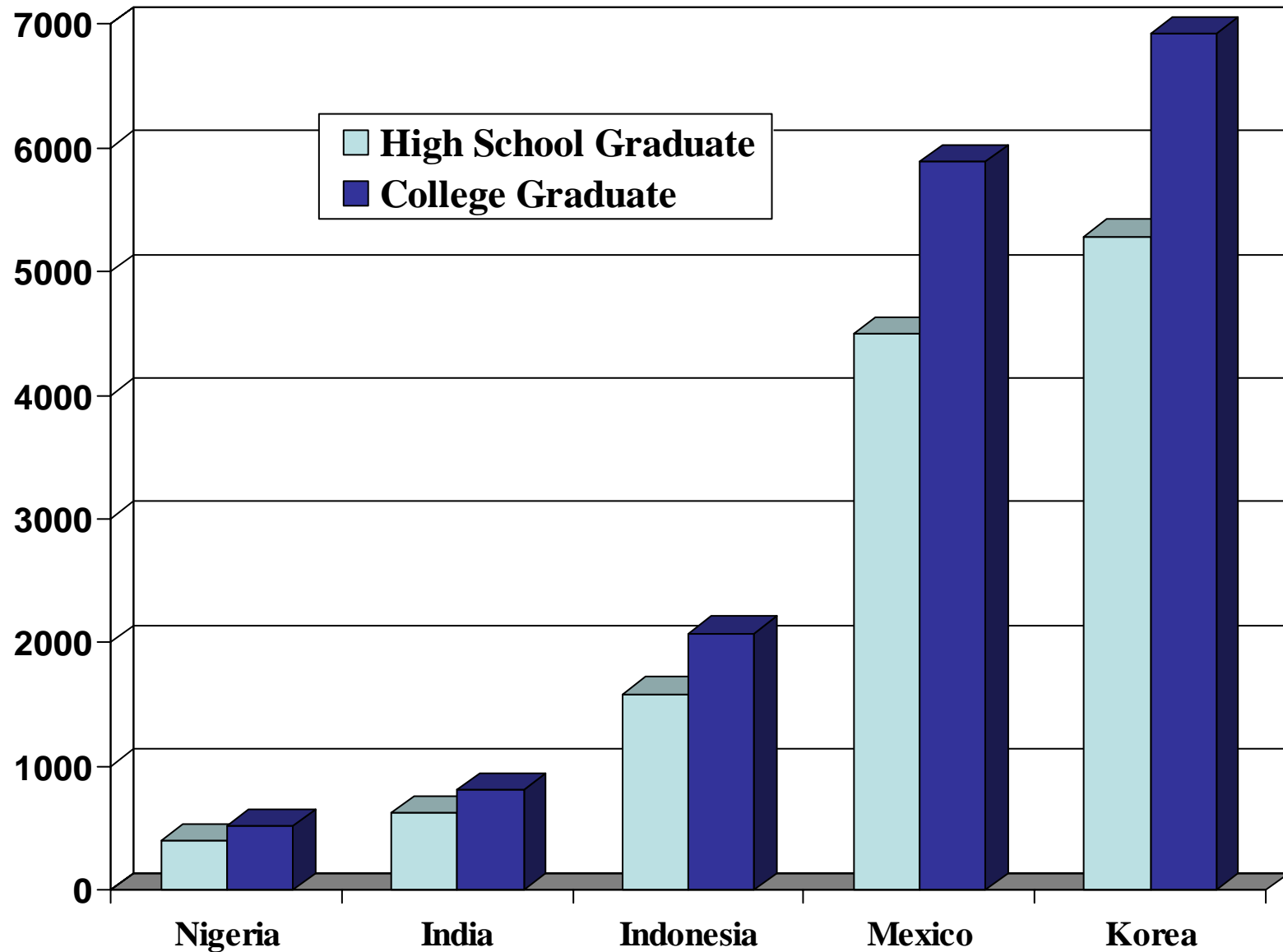
Estimating (11) or (12) should yield a coefficient of 1.0 on the log of output per worker and a coefficient with a minus sign for the log of the aggregate skill measure

Table 2  
Estimates of the Determinants of the Country Log Skill Price

Sample	US Immigrant Home Wages (NIS-P)		OWW Wages
Variable/Estimation Procedure	GLS	GLS -SC	GLS
Country characteristics:			
Log GDP per worker	1.41 (5.01) <sup>a</sup>	1.35 (5.21)	1.10 (10.4)
Log mean schooling	-1.77 (3.18)	-1.97 (3.23)	-.330 (1.47)
Log teacher-pupil ratio, primary schools	-1.90 (3.68)	-2.17 (3.80)	-.509 (1.83)
Log teacher-pupil ratio, secondary schools	1.44 (2.51)	1.36 (2.56)	.457 (1.60)
Immigrant skill characteristics:			
Schooling	.0683 (3.50)	.0745 (3.79)	-
Age	.0428 (4.32)	.0436 (4.50)	-
$\lambda$	-	.800 (1.46)	-
Constant	-1.02 (2.10)	.713 (2.04)	-3.75 (2.60)
Number of countries	54	54	57
Number of immigrants	332	332	-
R <sup>2</sup>	.35	.36	.82

a. Absolute value of t-statistics corrected for clustering at the country level in parentheses. Source: Rosenzweig (2006)

**Estimated (Purchasing-Power Adjusted 1996) Earnings of High School and College Graduates,  
Across Selected Countries Around the World**



How well does the variation across countries in (estimated) skill prices predict the number and skill composition of immigrants by country?

In Jasso and Rosenzweig (2005), the NIS and the Longitudinal Survey of Australian Immigrants were used to compute:

- A. The number of skilled immigrants (employment-based principal applicants) by country of origin to the US and Australia
- B. The average schooling level of the skill/employment immigrants by country of origin for US and Australian immigrants

How well does the cross-country variation in estimated skill prices predict the number of student visas issued per country?

Use State Department information on F-1 student visas issued by country, averaged over 2003-2004 (excludes Canada)

Both data sets include the distance of the sending country to the receiving country, GDP per adult-equivalent, measures of school quality, the number of universities, and the number of ranked universities

Table 3  
 Determinants of Employment-Visa Immigration Rates by Receiving Country:  
 Sample Immigrants per Country Population (x10<sup>6</sup>)

Variable/Country	Australia	United States
Country skill price (NIS-P)	-20.9 (1.92)	-17.3 (2.15)
GDP per adult-equivalent	3.03 (1.99)	.290 (2.93)
Distance	-8.55 (1.38)	-1.22 (1.50)
Population	-.0475 (1.43)	-.00178 (0.58)
Constant	75930 (1.41)	11659 (2.26)
Number of countries	132	132
R <sup>2</sup>	.11	.07

Absolute values of robust t-statistics in parentheses.

Sources for immigrant characteristics: New Immigrant Survey and Longitudinal Survey of Immigrants to Australia 2, Wave 1 (Jasso and Rosenzweig, 2005).

Table 4

*Selectivity: Determinants of the Log Educational Attainment of Employment-Visa Immigrants in Australia and the United States (Combined)*

Variable/Specification	
Log Country skill price	.0266 (2.45)
Log GDP per adult-equivalent	-.0169 (1.71)
Log Distance	.0172 (4.51)
Log Population ( $\times 10^{-3}$ )	21.2 (5.06)
Receiving country is the United States	-.0250 (1.99)
Constant	2.43 (21.4)
Number of observations	148
R <sup>2</sup>	.34

Absolute values of robust t-statistics in parentheses. Sources for immigrant characteristics: New Immigrant Survey and Longitudinal Survey of Immigrants to Australia 2, Wave 1 (Jasso and Rosenzweig, 2005).

Table 5  
Determinants of the Demand for (Log)US Student Visas, 2003/4

Country characteristics	NIS-P Skill Price		OWW Skill Price	
Log of country skill price	-.361 (2.42)	-.234 (1.32)	-.947 (2.41)	-.883 (2.23)
Log of GDP per adult-equivalent	.682 (2.95)	.692 (3.00)	1.35 (2.95)	1.35 (2.96)
Log of number of universities	.218 (1.90)	.768 (2.28)	.266 (2.26)	.435 (1.60)
Log of number of universities x log of country skill price	-	-.0796 (1.86)	-	-.0328 (0.67)
Any ranked universities (top 200)	.467 (1.72)	.630 (2.20)	.312 (1.10)	.381 (1.36)
Log of students per teacher, primary schools	-.377 (1.17)	-.418 (1.31)	-.240 (0.77)	-.246 (0.79)
Log of students per teacher, secondary schools	.783 (2.09)	.770 (2.03)	.659 (1.86)	.628 (1.75)
Log of population	.476 (3.57)	.492 (3.60)	.487 (3.47)	.491 (3.44)
Log of distance to nearest US city of entry (miles)	-.293 (1.98)	-.289 (1.92)	-.313 (1.95)	-.315 (1.94)
Constant	-.801 (0.30)	-1.73 (0.66)	-4.04 (1.30)	-4.19 (1.34)
Number of countries	124	124	124	124
R <sup>2</sup>	.733	.741	.729	.730

Absolute values of robust t-ratios in parentheses. Source: Rosenzweig(2006)

## What about Inequality and Immigration?

George Borjas has popularized the idea using the “Roy model” that inequality, and differences in the returns to schooling across countries, is an important determinant of immigration

However, the Roy model assumes that wages are the same across countries!

1. In the skill price model, inequality has two sources:

1. inequality in skills      and    2.the level of the return to schooling  $\beta$

The higher is  $\beta$ , the greater the earnings difference between high- and low-schooled persons in the country.

2. Differences in returns to schooling (and inequality) across countries will only have second-order effects compared to differences in skill prices in determining the amount and selectivity of migration.

What is the effect of home-country relative “inequality” on the skill selectivity of immigration?

In the one-skill model, higher inequality due to higher “return” to schooling  $\beta$

How does a rise in  $\beta$  in the sending country affect the differential gain of, say, high school and college graduates?

Differential gain, high-school and college graduates:

$$\text{Gain for college graduate} = e^{\beta_{US}SC}(\omega_{US}) - e^{\beta_M SC}(\omega_M)$$

$$\text{Gain for high-school graduate} = e^{\beta_{US}SHS}(\omega_{US}) - e^{\beta_M SHS}(\omega_M)$$

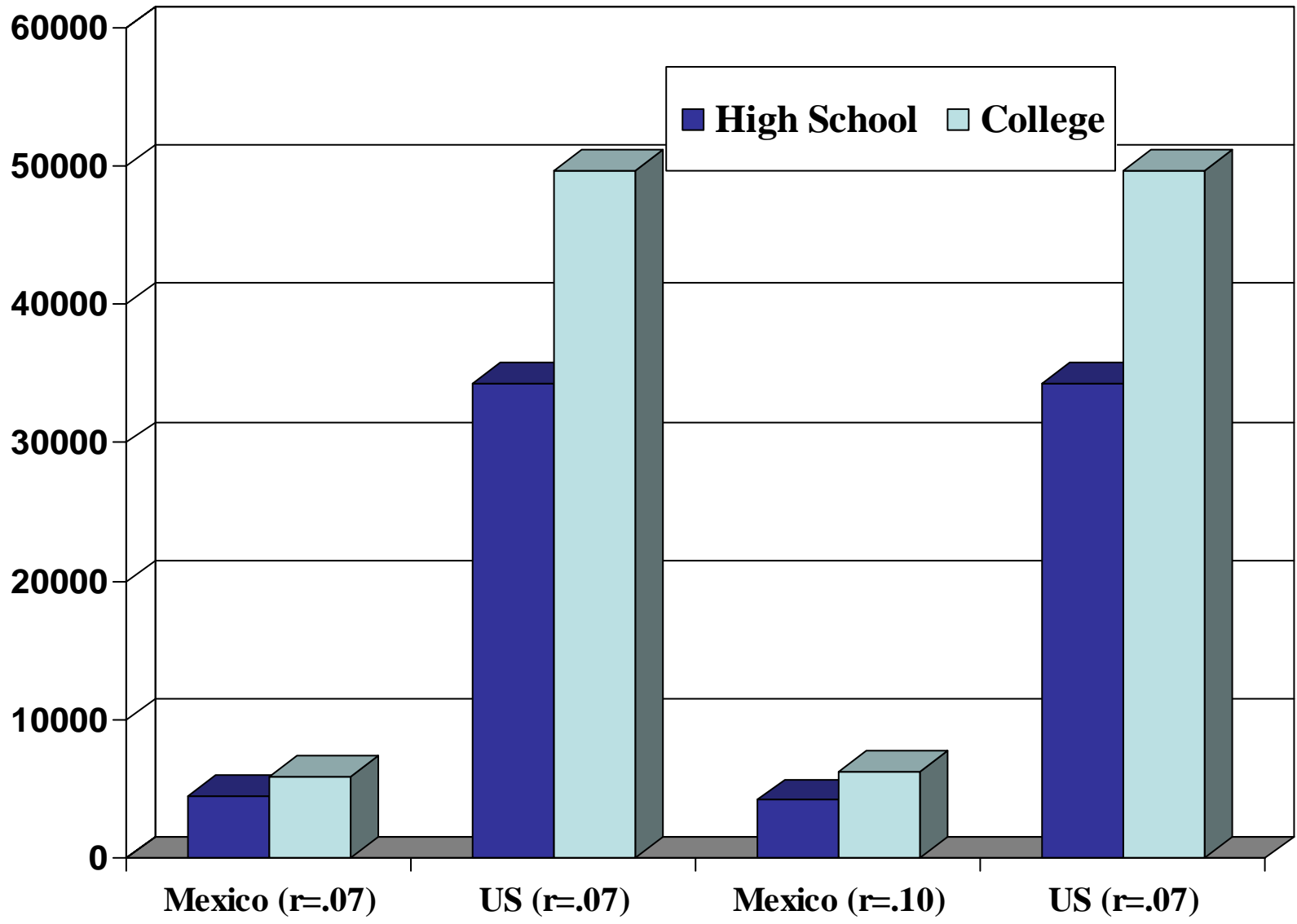
Compute gains for  $\beta=.07$  in US and Mexico, then increase  $\beta$  to .10 in Mexico (more inequality) using skill price estimates, but keep average wages the same

Annual migration gain for high-school graduates increases by \$269 (.09%)

Annual migration gain for college graduates decreases by \$329 (.08%)

Trivially less selective compared with skill price differential: inequality is second-order

# PPP-Adjusted 1996 Estimated Annual Earnings in Mexico and the United States, By Schooling Level and Schooling Return



## Direct Effects of Out-migration on wages (skill prices) in sending countries

### 1. *Short-run effects:*

A. General-equilibrium effect: aggregate skill quantity decreases, skill prices (wages) rise

Increase in sending-country wage (computable world general-equilibrium models show this)

B. Compositional effect: if migrants are higher (lower) than average in skill, then average skill decreases (increases)

Skilled out-migration has ambiguous effect on sending country wages (raises skill price by a lot but reduces average skill by a lot)

Some analysts confuse these two effects: George Borjas in discussing the effects of creating greater opportunities in the United States for skilled migrants

*“Such a drain of human capital would further widen the income gap between the United States and the rest of the world, creating more incentives for migration to this country...”*

## 2. Long-run effects

A. General-equilibrium effect: Changes in skill price induced by loss of skill raises returns to skill investments: skills are not fixed but can respond to changes

Because the higher the level of the skill of the out-migrants the greater the rise in the skill price, more skilled out-migration will have a bigger effect on skill upgrading than less skilled out-migration.

This long-run effect on incentives to invest in skills is ignored in the general-equilibrium models computing the consequences of migration.

Evidence of responsiveness of school investments to change in returns in low-income countries? See the development economics literature

B. Migration prospect effect: Opening up possibility of migration directly raises *expected* returns to skill investments

Assume that residents of a country face an exogenous probability  $p$  of being able to migrate to a higher skill price country. Then residents respond to changes in the expected skill price:  $(1 - p)\omega_j + p\omega_k$

How large is the effect of increasing out-migration on the “return” to domestic schooling?

The Case of Mexico, using NIS-P skill prices

Expected annual wage difference, college vs. high school, with no migration:

$$A. E(W_C - W_{HS})_M = e^{\beta\Delta S}(\omega_M) = \$1392$$

where  $\Delta S = \text{College} - \text{High School}$  (4 years)

Expected annual wage difference, college vs. high school, with out-migration probability  $p = .015$ :

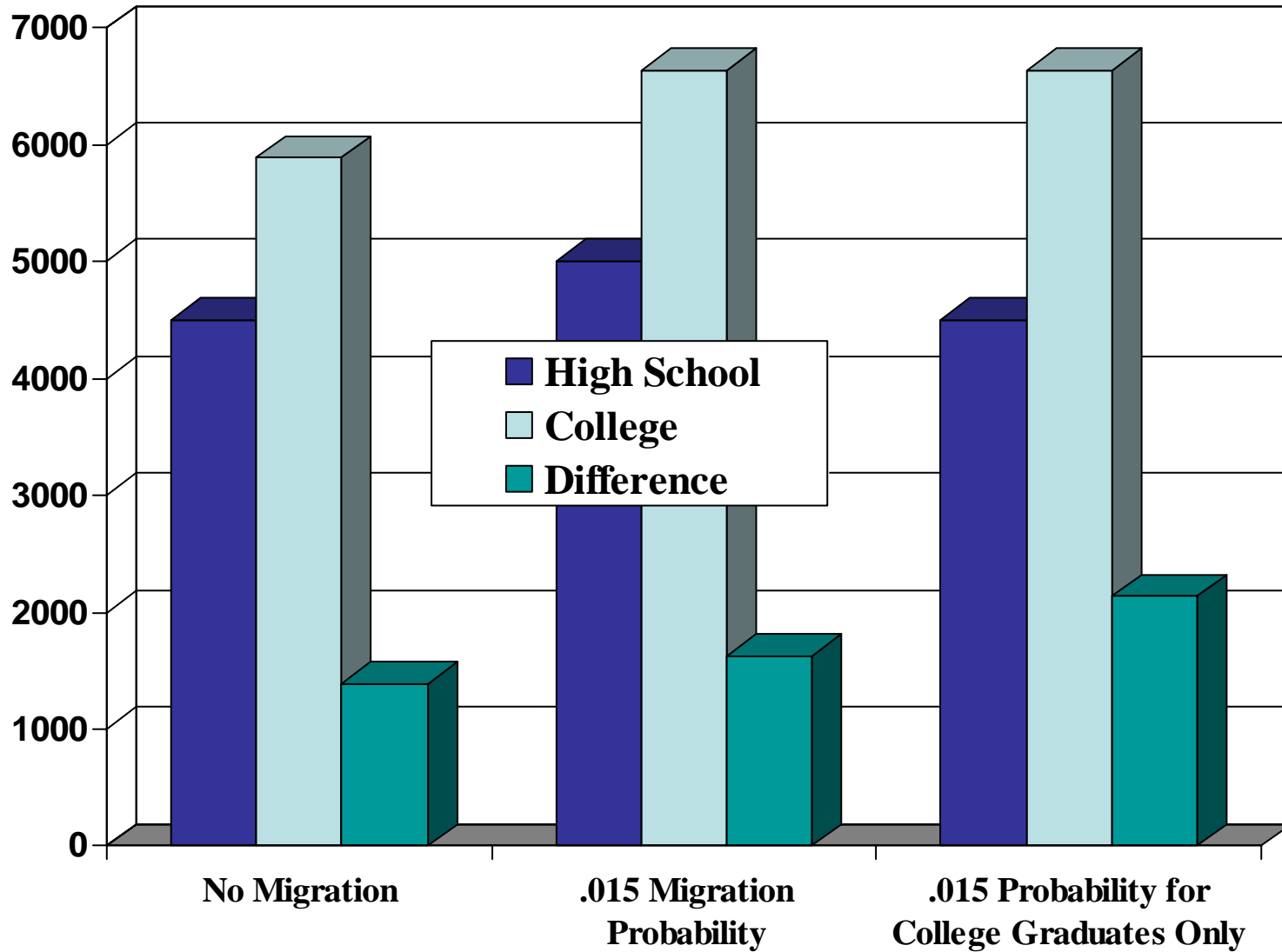
$$B. E(W_C - W_{HS})_M = e^{\beta\Delta S}((1-p)\omega_M + p\omega_{US}) = \$1623$$

Expected annual wage difference, with out-migration probability  $p = .015$  for college-educated only:

$$C. E(W_C - W_{HS})_M = e^{\beta\Delta S} [((1-p)\omega_M) + (p\omega_{US})] - e^{\beta\Delta S}(\omega_M) = \$2137$$

Total annual gain in college vs. high school wage differential (A - C) \$745

# Expected PPP-Adjusted 1996 Annual Earnings in Mexico, By Schooling Level and Migration Regime



C.The return of skilled immigrants: Returning immigrants may bring back to the home country increased skills and knowledge that could only be picked up abroad but are transferable to the home environment

And compared with low-skill migrants who work temporarily in low-skill jobs for a short period of time, high-skill individuals working in dynamic sectors of the economy are more likely to contribute, upon return, to the institutional development of the home country.

What are the magnitudes of return migration by skilled immigrants who have acquired significant skills in the receiving country and who were not required to return home?

1. Jasso and Rosenzweig (1982) combined INS administrative records at entry for the FY 1971 cohort of legal permanent immigrants with their subsequent naturalization and address report records to estimate 10-year emigration rates: 30%, as high as 50% in some countries.

2. NIS: New 2003 (“permanent”) immigrants asked “intend to spend rest of life in US?”

D. The training of students in developed countries and their return: Many individuals come to developed countries for the purpose of acquiring schooling.

George Borjas' "criticism" of the US student visa program (Borjas (2002): "The program is best viewed as yet another redistribution program, taking wealth away from native workers and taxpayers and redistributing it to universities *and foreigners* [italics mine]."

To the extent that schooling is publicly subsidized in receiving countries and foreign students do not remain in the receiving country, there is an important subsidy from receiving-country taxpayers going to immigrant sending countries.

Now turn to two final questions:

1. How large is the brain drain and return migration?
2. What are the principal determinants of return migration, by foreign students and by "permanent" immigrants?

## How Do We Measure “Brain Drain”?

Two alternative definitions (there are others):

1. The proportion of highly-educated persons born in a country living outside the country.

Recent estimates of this definition of “brain drain” based on Census-type data, supported by the World Bank (Docquier and Marfouk, 2004) [D-M],

Brain drain ( $BD_i$ ) for country  $i$  =

$$\frac{\sum FB_{ij}}{(S_i + \sum FB_{ij})}$$

where  $FB_{ij}$  = tertiary-educated persons aged 25+ born in country  $i$  residing in destination country  $j$

$S_i$  = tertiary-educated persons residing in origin-country  $i$

Examples: 82% of tertiary-educated Jamaicans reside outside Jamaica

43% of tertiary-educated Ghanaians reside outside Ghana

2. The number or proportion of highly-educated persons who leave low-income countries for high-income countries; i.e.,

the emigration only of *those educated in the sending countries*:

$$NBD_i = (\sum FBH_{ij}) / (S_i + \sum FBH_{ij} - \sum SFB_{ij})$$

where  $FBH_{ij}$  = Foreign-born residents educated in i living in j

$SFB_{ij}$  = Home-country residents in i educated in j

Thus, two problems with the BD estimates:

A. Many FB in destination countries received their schooling there, not in their home country. Thus the numerator is biased upward

B. Some S “stayers” also received their schooling in the destination country and then returned. These should be subtracted from the denominator

How off are these estimates?

We need to know

- a. Where permanent immigrants in receiving countries are schooled.
- b. Where “stayers” in sending countries are schooled - how many were formerly foreign students ?

A. Where are the highly-educated foreign-born schooled?

1. Some emigrants left permanently as children - received all their higher schooling in destination country

BCIS data (FY 2003): 20% of permanent resident aliens in US came before age 18

For Jamaica:           38% came before age 20

For the Gambia:       only 10% came before age 20

Thus, BD overstates the migration of the already skilled, and the bias in the estimates varies by country

Recently, Beine, Docquier and Rapoport (BDR, 2006) re-computed their country-specific “brain drain” estimates to take into account those foreign-born who arrived before age 22 (and could not possibly have completed their tertiary schooling at home)

*On average their corrected estimates of the “brain drain” are 68% of the ones published initially, with some as low as 51% those reported in the earlier work.*

*Caveat:* Can the Census data be used to correct the bias - remove those who came as children using information on date of arrival?

For the US (the major receiving country by far), date of entry is based on answers to the ambiguous question: “When did you first come to stay?”

Contains a subjective element - might answer when they got a permanent visa (not student visa), or when they first came at all (and some intend not to stay who have “permanent” visas)

The BDR estimates still do not take into account the training and experience received abroad by those in the home country; they neglect

## B. The Reverse Brain Drain:

### 1. Foreign student return rates:

Construct return rate for each country using the NIS data:

Number of permanent immigrants in 2003 (NIS) who had ever held a student visa (stayers)/Total stock of foreign students in 2003 (SEVIS)

Estimates indicate about 6% of the stock convert to LPR status

How do skill prices in the home country affect the proportion who stay as legal permanent immigrants?

### 2. Return rates of the highly skilled permanent immigrants:

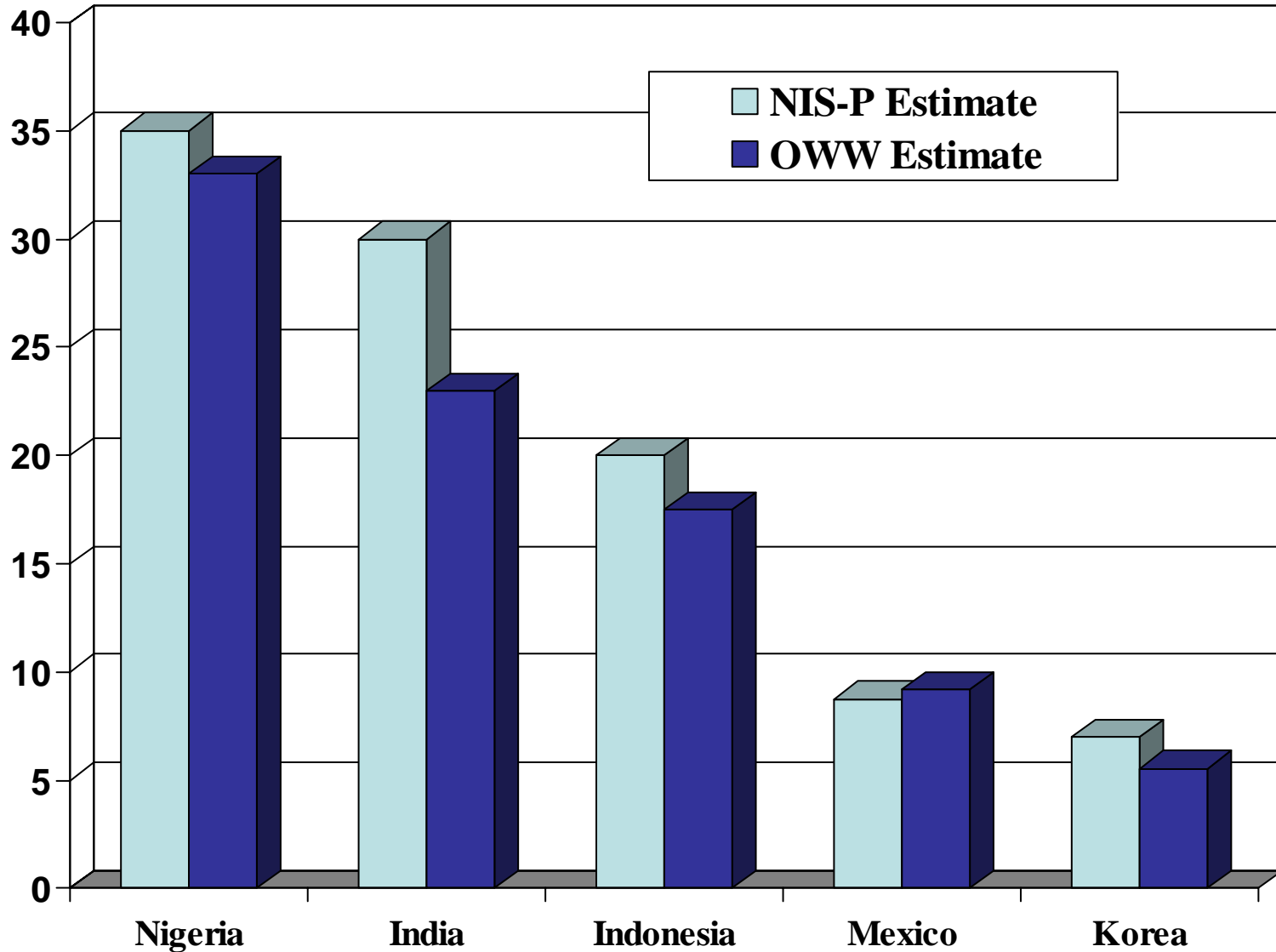
Look at how skill prices in home country affect the proportion of immigrants who say they will not stay, from NIS question

Table 6  
Determinants of the Return Rate of US Students ( $\times 10^{-2}$ ), 2003

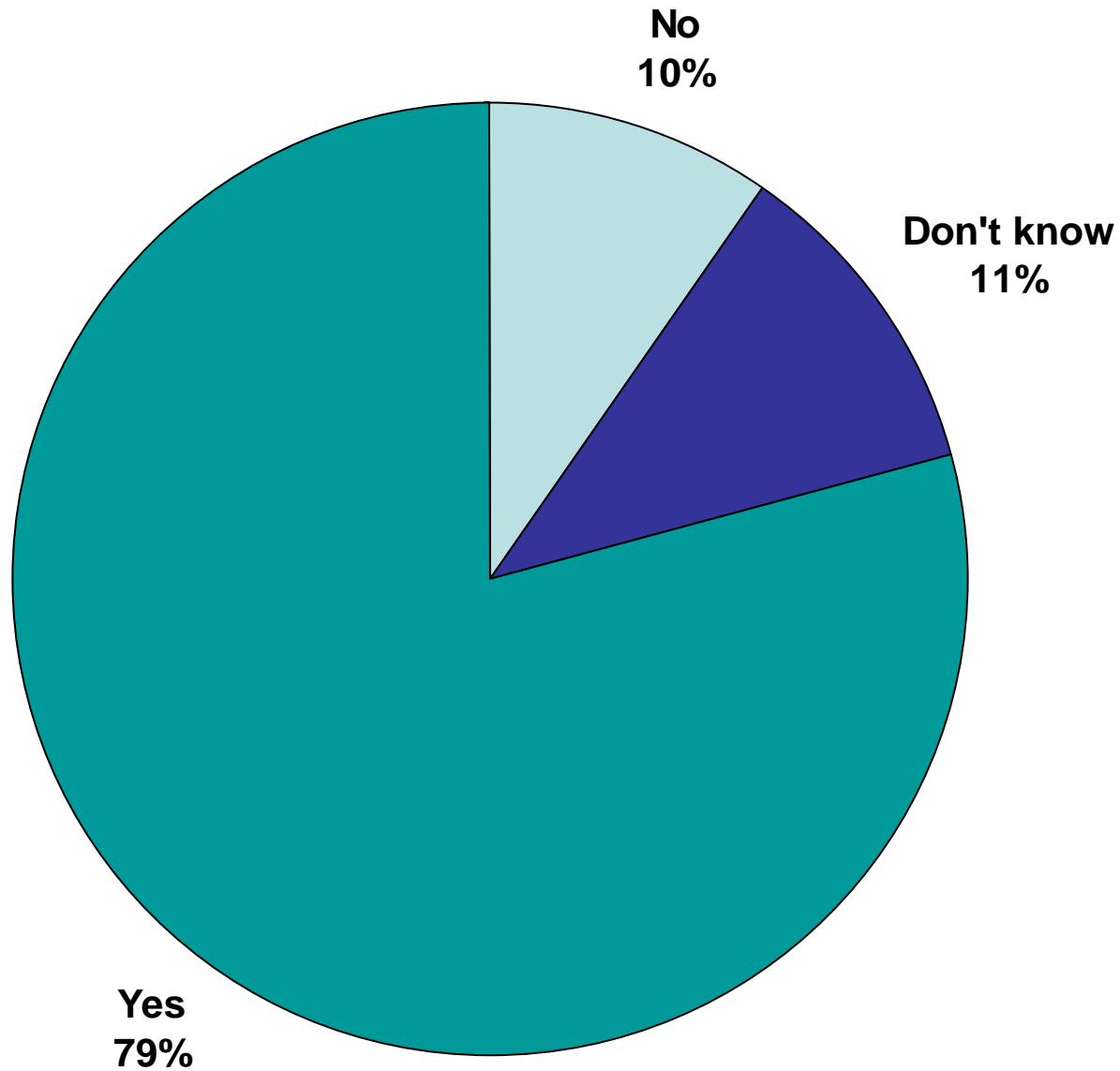
Country characteristics	NIS Skill Price	OWW Skill Price
Log of country skill price	.805 (2.45)	.453 (2.04)
Log of number of universities	.332 (1.63)	.0532 (0.31)
Any ranked universities (top 200)	.818 (0.82)	1.26 (1.36)
Log of distance to nearest US city of entry (miles)	-.0925 (1.09)	-.0839 (0.65)
Number of countries	100	154
R <sup>2</sup>	.13	.10

Absolute values of robust t-ratios in parentheses. Other variables included: log of students per teacher, primary and secondary. Weighted by stock of students (SEVIS).

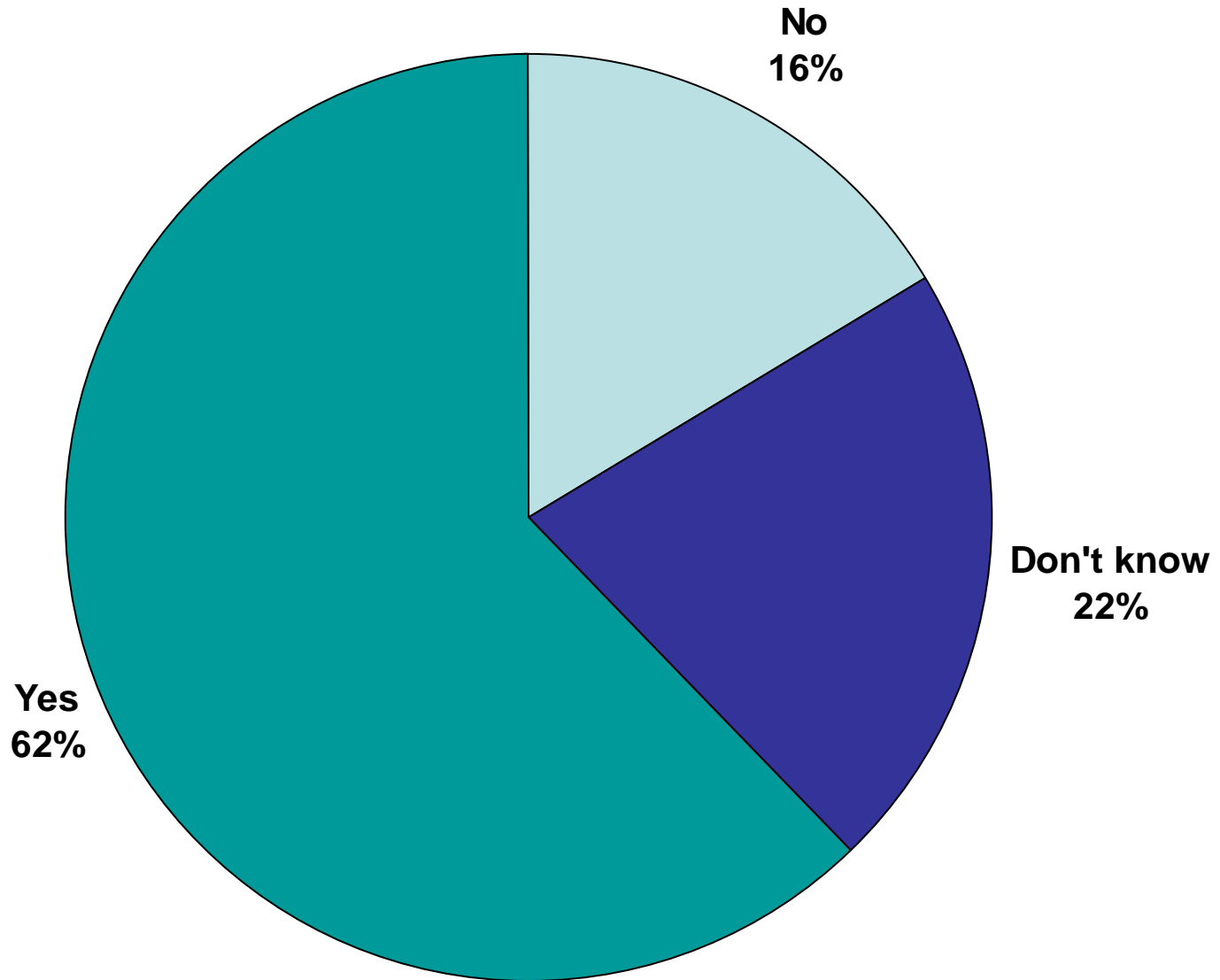
# Estimated Percentage *Increase* in the Number of US Students from Doubling the Number of Home Universities, by Selected Countries



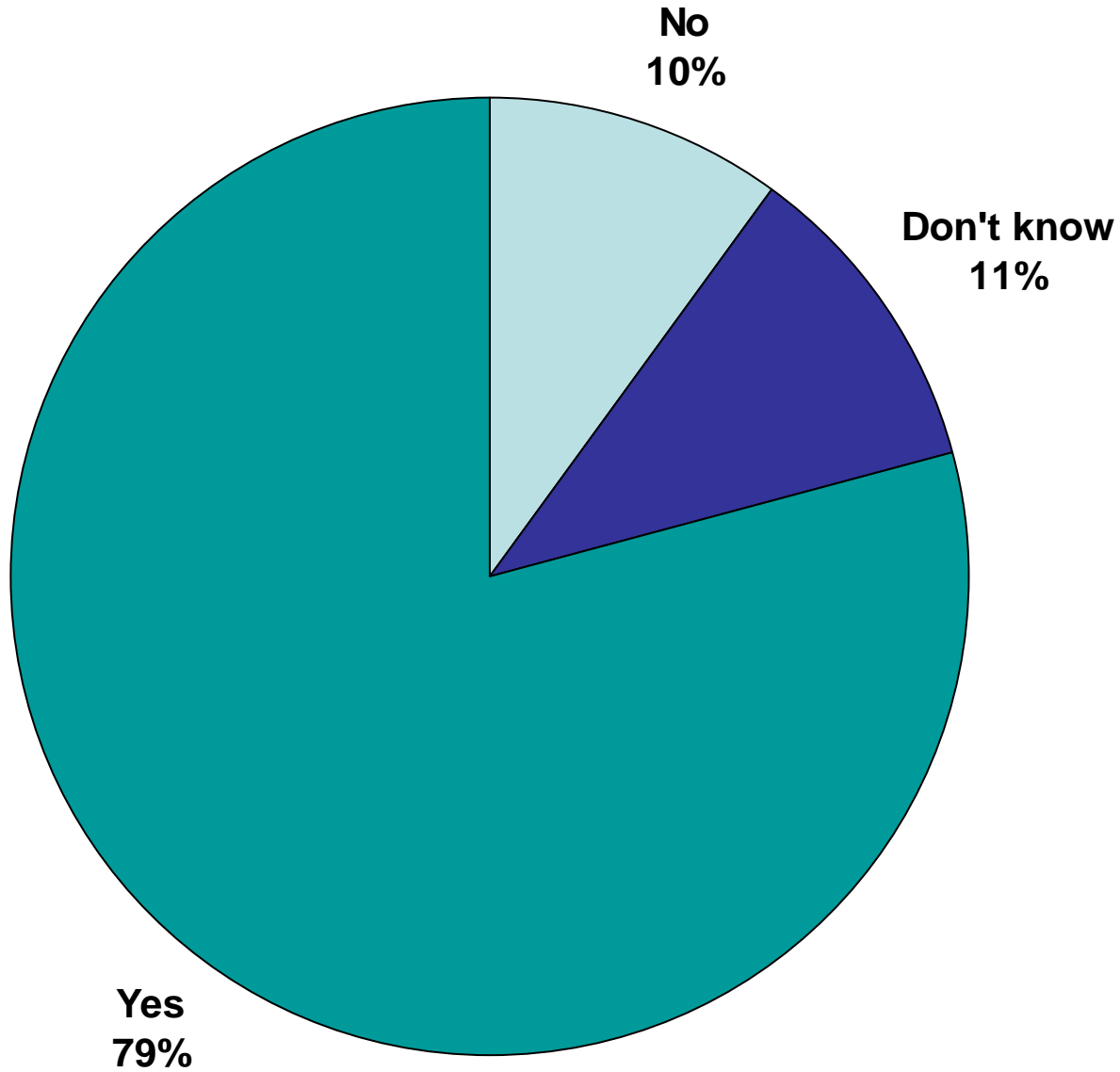
**Figure A. Visa Holders' Answers Who Were not F-1's:  
"Do You Intend to Stay in the United States the Rest of Your Life?"**



**Figure B. Former Student Visa Holders' Answers:  
"Do You Intend to Stay in the United States the Rest of Your Life?"**



**Figure A. Non-Employment Principal Visa Holders' Answers:  
"Do You Intend to Stay in the United States the Rest of Your Life?"**



**Figure B. Employment Principal Visa Holders' Answers:  
"Do You Intend to Stay in the United States the Rest of Your Life?"**

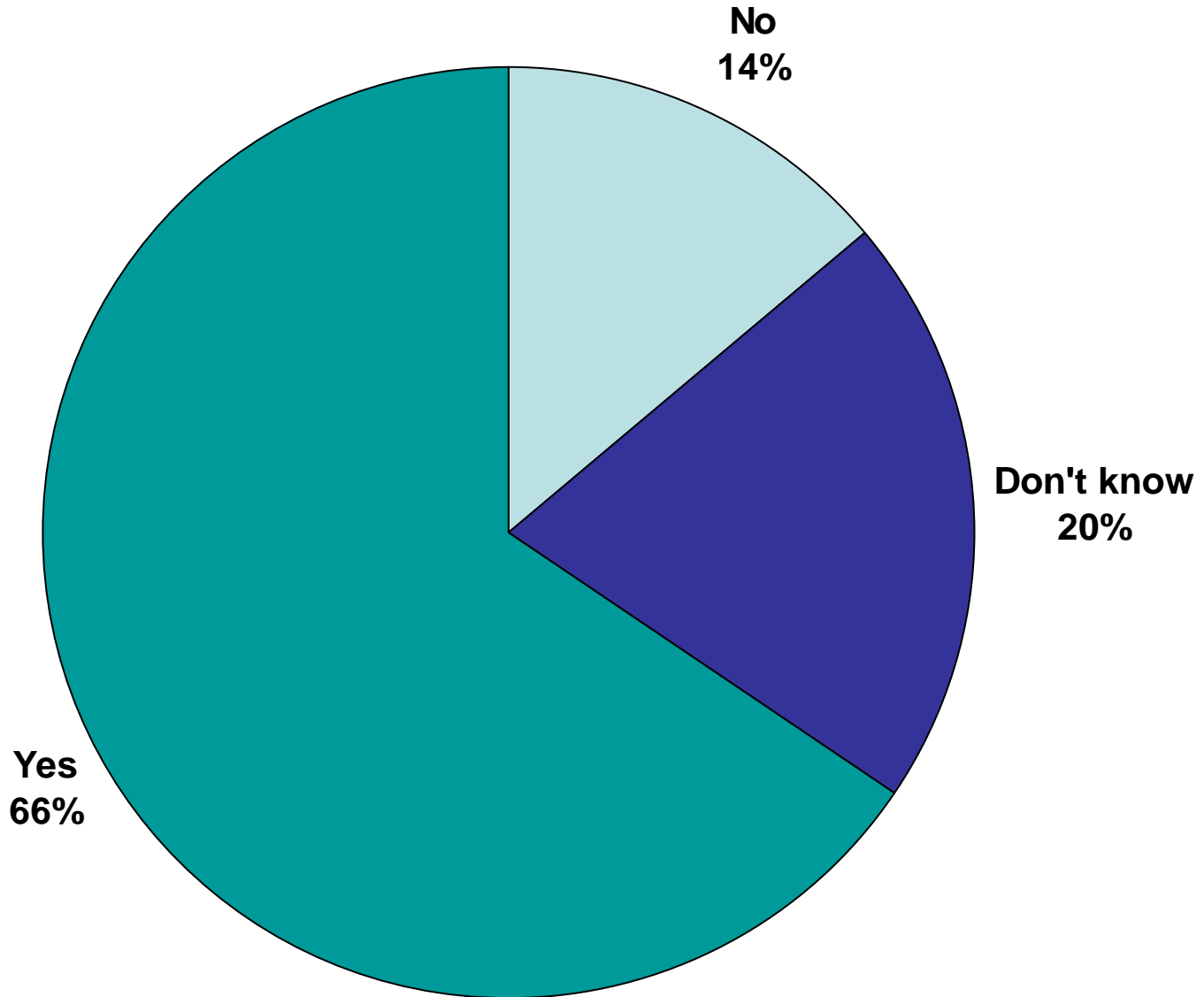


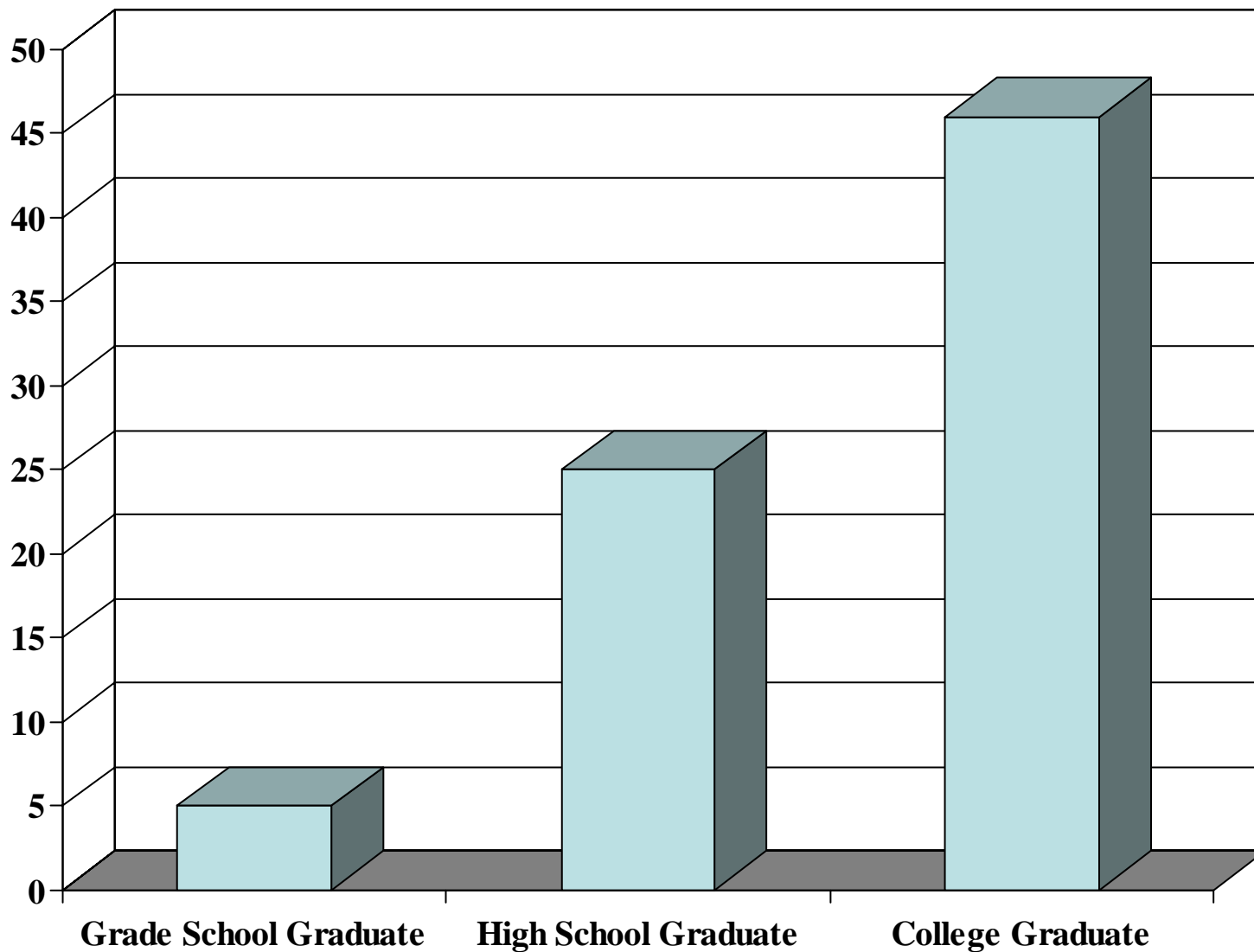
Table 7

## Determinants and Selectivity of the Proportion of New “Permanent” Intending to Leave, 2003

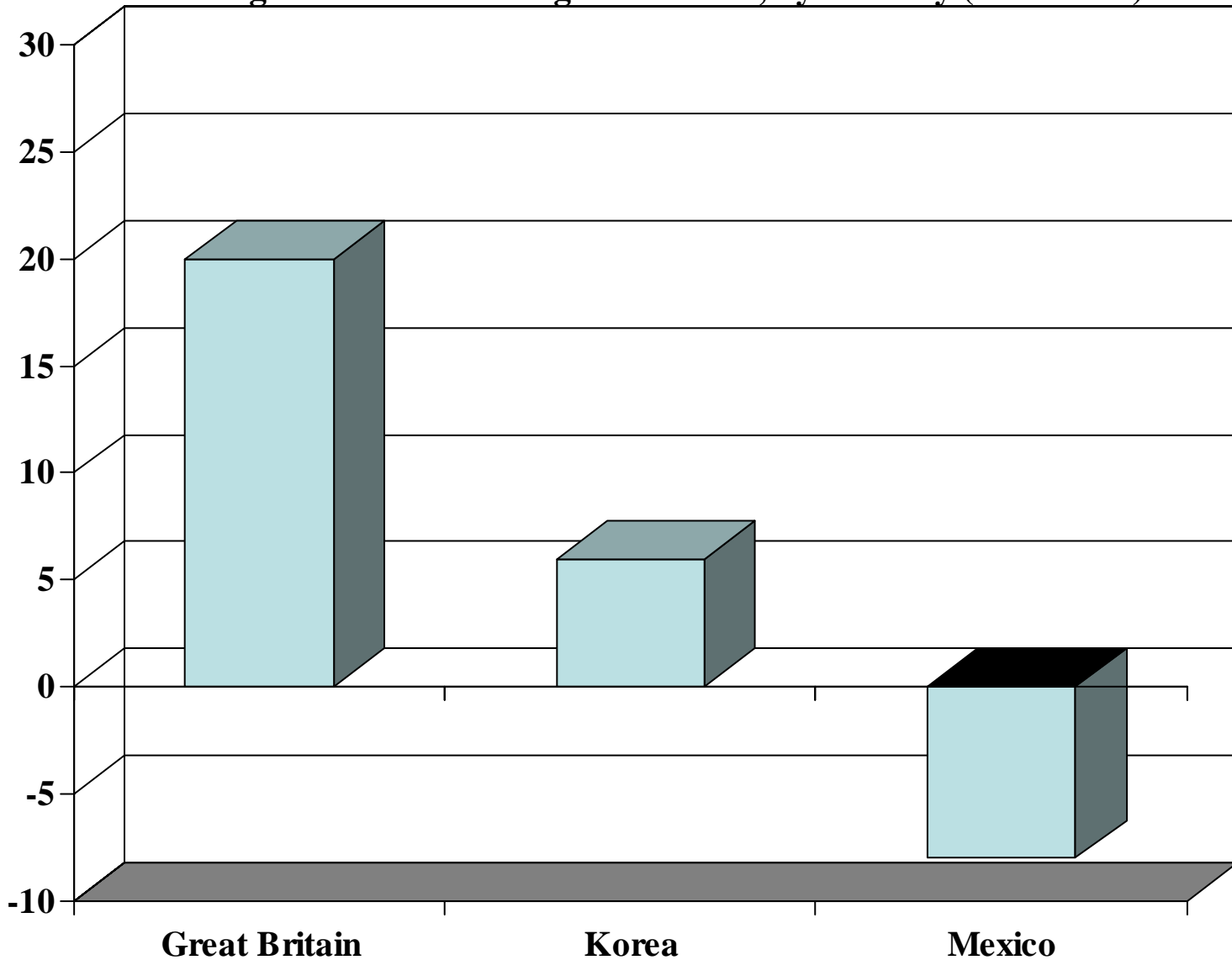
Country characteristics/ Immigrant Type	Former US Student		All
Log of country skill price (NIS estimate)	.0250 (3.26)	.0812 (2.39)	-.0355 (2.49)
Log of country skill price x Years of schooling	-	-	.00509 (4.01)
Years of schooling	.0004 (0.25)	.0115 (1.12)	.00854 (3.09)
Number of countries	59	121	121
Number of immigrants	212	3879	3879
R <sup>2</sup>	.12	.03	.03

Absolute values of robust t-ratios in parentheses. Other variables included: log of students per teacher, primary and secondary; age; age squared; gender; entry visa (employment principal, spouse of citizen); log of distance; any ranked universities; number of universities.

**Percentage Increase in the Proportion of “Permanent” Immigrants Intending to Return  
From Doubling the Home-Country Skill Price, by Schooling level**



**Percentage Difference in the Proportion of “Permanent” Immigrants Intending to Return Between High School and College Graduates, by Country (Skill Price)**



## Conclusions

The good news and hopes:

1. The greatest impact of the flow of skilled immigrants may lie in the return of persons experiencing good institutions - working markets, high-quality educational organizations - in the destination country who then may have both the models and the means to effect institutional change in their home country. These will be returning students and skilled immigrants (example: Zedillo?).
2. The number of foreign-born skilled residing in developed countries substantially overstates the number of people educated in low-income countries who emigrated and especially overstates the net brain drain.
3. A large number of persons born in low-income countries receive their expensive, higher education in high-income countries, and the vast majority of them return to their home country despite the fact that the main motivation appears to be wage improvements via migration.
4. A large fraction of “permanent” immigrants return to their home country; this rate is especially high among those immigrants chosen on the basis of their skill.

The bad news:

1. The gaps between low skill-price and high-skill price countries, and thus the private gains from migration, are enormous, especially for the high-skilled.
2. Although high skill out-migration is more prevalent in high-skill price countries, both high *and* low skill immigrants leave low skill-price countries.
3. Efforts to increase the number of skilled persons through improving schools will be less effective in a low skill-price country compared to a high skill-price country because of out-migration.
4. Return migration rates of the schooled-abroad and immigrants are significantly (a) lower and (b) less skilled on average for low- than for high-skill price countries.

The first-order issue is addressing why rewards to skills are low in low-income countries, for which high out-migration and low return-migration are important symptoms.

The training of people in high-income, high-quality institutions may be the best assistance high-income countries provide.