

*Migration and Human Capital Development, AFD*

**The Global Migration of Skill**

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## Issues and questions

1. How large are the gains to immigration for persons around the world and how do they vary by country and schooling level?
2. How do we measure the gains?
3. What are the magnitudes of the net migration of skilled immigrants by country?
4. What determines the variation in the *net* outflow of skills across countries inclusive of persons acquiring human capital abroad (foreign students)?
5. How do the educational policies in receiving countries and sending countries affect the international flows of skill?
6. What are implications for educational policies as development policies?

## The Measurement of “Brain Drain”

Two alternative definitions (there are others):

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

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

$$\text{Brain drain (BD}_i\text{) for country } i = \frac{\sum \text{FB}_{ij}}{S_i + \sum \text{FB}_{ij}}$$

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

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

2. The number or proportion of already highly-educated persons who left low-income countries for high-income countries (“net brain drain”); i.e.,

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

$$\text{NBD}_i = (\sum \text{FBH}_{ij}) / (S_i + \sum \text{FBH}_{ij} - \sum \text{SFB}_{ij})$$

where  $\text{FBH}_{ij}$  = Foreign-born residents educated in  $i$  living in  $j$

$\text{SFB}_{ij}$  = Home-country residents in  $i$  educated in  $j$

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

B. However, this NBD measure still ignores the fact that some S “stayers” also received their schooling in the destination country and then returned. These returning “foreign” students should be subtracted from the NDB denominator.

Relatively little attention to the training of students from low-income countries in high-income countries

But there is a great deal of foreign, outsourced education

UNESCO:

A. Over 2 million foreign students enrolled in tertiary schools in 2005

B. Five host countries dominate (80%) in attracting foreign students:

the United States, the United Kingdom, Australia, Japan,  
Germany

C. Large variation in proportions of foreign students by country, many from low-income countries

**Figure 1. Annual Number of Foreign Student Visas Issued, by Receiving Country**

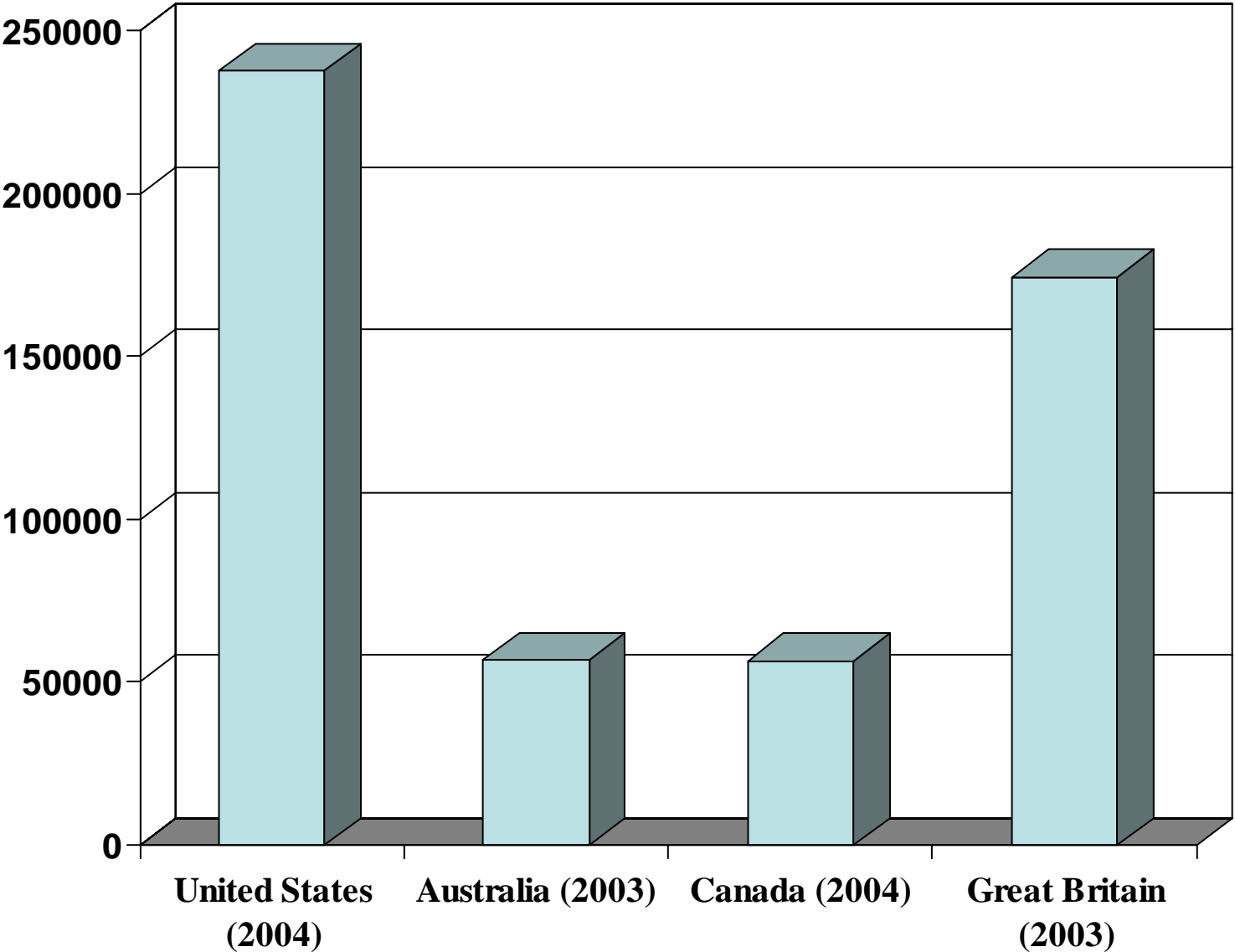


Table 1  
Top Ten Sending Countries of US Foreign Students, by Measure

Student Visas Issued, 2003 (State Department) <sup>a</sup>		Number of Foreign Students, 2006 (SEVIS)	
Country	Number	Country	Number
Korea	34,697	Korea	86,626
Japan	25,962	India	77,220
India	20,230	China	59,343
China	19,251	Japan	54,816
Taiwan	12,071	Taiwan	36,091
Mexico	9,077	Canada	32,153
Brazil	7,625	Mexico	14,863
Turkey	5,592	Turkey	12,795
Germany	5,376	Thailand	10,940
UK	5,076	Indonesia	8,610

a. Canadian citizens who become US students are not required to obtain a US visa.

To understand the net flow of skill from low- to high-income countries, we need thus to know:

- a. Where permanent immigrants in receiving countries are schooled.
- b. What determines the gross outflows of those already skilled.
- c. Where “stayers” in sending countries are schooled - how many were formerly foreign students ?
- d. What determines the outflow of students studying abroad -  
low school quality?      Job prospects abroad?
- e. How permanent are the foreign-born skilled and foreign students.
- f. What determines the return of those acquiring their skills abroad (foreign students) and those who left with already-acquired skills (“permanent immigrants”)

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

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

USCIS 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.*

## 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 or Mexico 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:

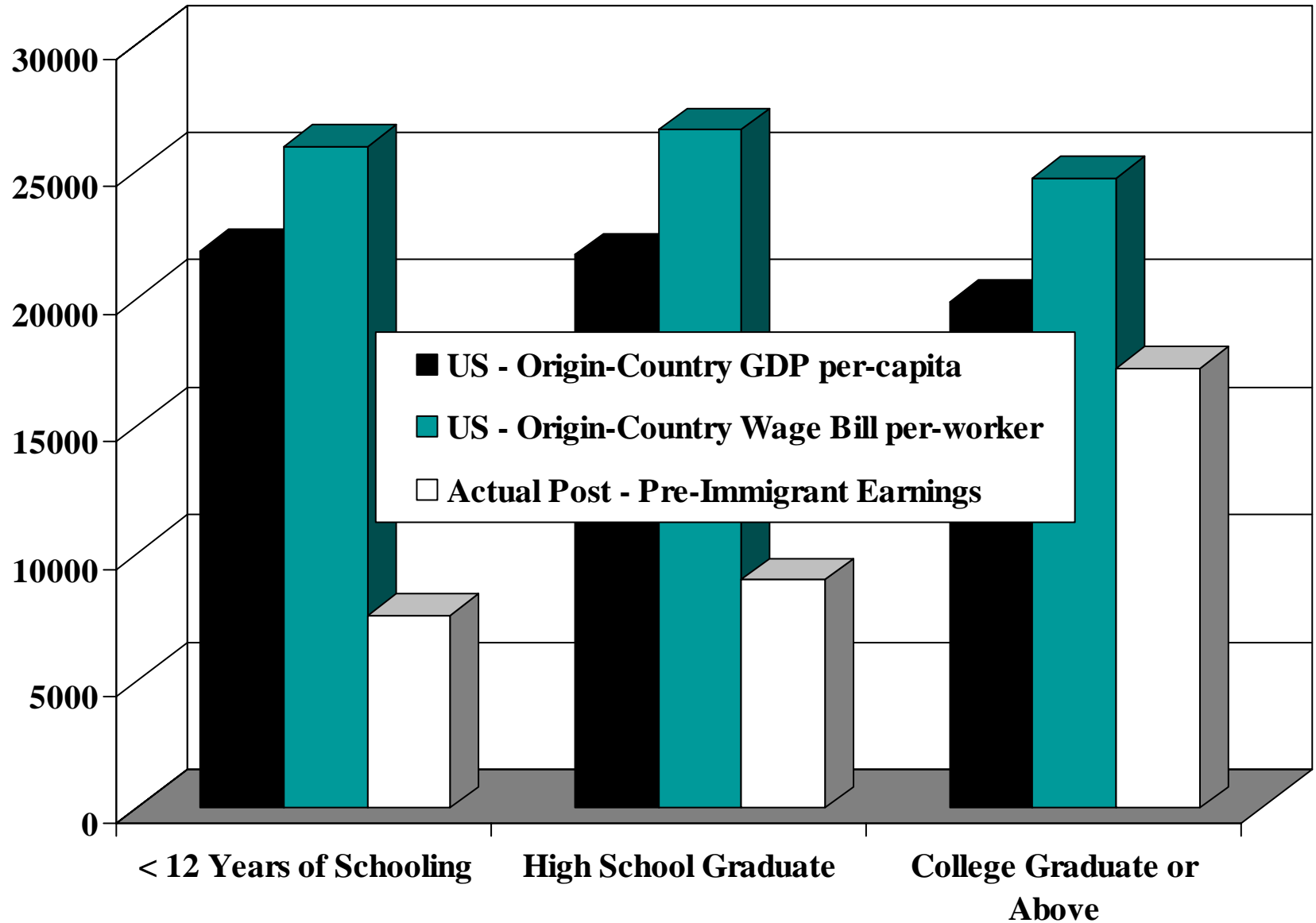
But, cross-country variation is due to differences in the proportion of the population in the labor force and in skill levels, not just rewards to skills

Per-worker GDP also not adequate

Workers vary substantially in skill across countries

Does it matter for measuring migration gains?                      Yes

**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)**



## What determines the quantity and quality of Migrants? The Skill Price Model

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

$$(1) \quad W_{ij} = \dot{u}_j x_i,$$

where

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

$\dot{u}_j$  = 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  $\dot{u}_j$ .

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

$$(2) \quad W_{iu} = \hat{u}_u x_i,$$

where  $\hat{u}_u$  = the destination-country skill price

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

$$(3) \quad G_{ij} = x_i [p \hat{u}_{ui} - \hat{u}_j (1 + \check{\delta}_j)] - C_j.$$

where  $C_j$  = direct costs of migrating

$\check{\delta}_j W_{ij}$  = time costs of migrating

The utility of residing in destination-country  $u$  for a worker born in  $j$  is

$$(4) \quad V^u = \hat{a}_1 \tilde{A}_{iu} + \hat{a}_2 (W_{iu} - W_{ij} \check{\theta}_j - C_{iu}) + \hat{a}_i^u,$$

where  $\tilde{A}_{iu}$  are amenities from living in  $u$  such as a spouse born in  $u$  or disamenities associated with a foreign culture and  $\hat{a}_i^u$  is a country- and worker-specific error term.

The utility of the worker staying in  $j$  is

$$(5) \quad V^j = \hat{a}_1 \tilde{A}_{ij} + \hat{a}_2 W_{ij} + \hat{a}_i^j.$$

The decision rule: migrate iff  $V^u > V^j$

The model delivers the result that a rise in the home-country skill price reduces the gain from immigration and thus the probability of migration: fewer migrants from low skill price countries.

What about migration selectivity?

1. What is the effect of a rise in the sending-country skill price on the average skill of immigrants?

Example: the marginal distributions of skills in each country are normal (or log normal), the joint stochastic or unmeasured parts of the utility functions (containing the  $\tilde{a}^j$ ) are independently and identically Gumbel distributed, and skills and the  $\tilde{a}^j$  are

$$(6) \quad \frac{\partial E(x_i | V^u > V^j)}{\partial \tilde{u}_j} = \frac{\partial E(x_i | -\hat{a}_2 W_{iu} - \hat{a}_1 (\tilde{A}_{ij} - \tilde{A}_{iu}) + \tilde{a}^u - \tilde{a}^j > -\hat{a}_2 (W_{ij} - C_{ij}) / \partial \tilde{u}_j}{= \hat{a}_2 \sigma^2(x_i) A > 0,$$

where  $A = \ddot{e}^2 + \hat{a}_2 W_{ij} \ddot{e}$ ,  $\ddot{e} = \ddot{\phi}[H(P)] / \dot{\phi}[H(P)]$  (the Mills ratio), and  $H(\cdot)$  is the inverse standard normal cumulative density function evaluated at the probability  $P$  that the worker chooses to migrate.

*More skilled workers will come from higher skill-price countries*

2. What is the effect of a rise in moving costs on the average skill of immigrants?

$$(7) \quad \partial E(x_i | V^u > V^j) / \partial C_j = (\hat{u}_{x_i}^{\alpha_i-1} - \hat{u}_i) \sigma^2(\hat{u}_i) [\hat{e}^2 + \hat{a}_2 C_{ij} \hat{e}] > 0.$$

*More skilled workers will come from more distant countries, if distance and migration costs are positively correlated*

Distance is not the only cost of migration, and the cost of migration may be related to many things:

- A. Ability to finance migration: credit availability, wealth
- B. Search costs: having community members in the receiving country may lower migration costs (networking)

Thus, more networked workers may be less positively selected

Education may be correlated with migration costs

## What determines the acquisition of schooling abroad?

The skill production model facilitates modeling the decision to where to acquire schooling, as it incorporates the quality of schooling directly

Consider now the choice of schooling location for a student  $i$  residing in country  $j$ .

Schooling taken abroad has two potential benefits:

- A. Foreign schooling may enhance the prospects for receiving a job abroad (at a higher skill price).
- B. Schools abroad may be of higher quality, so that the foreign-trained student will earn more at home for the same schooling cost than if she acquires the schooling domestically.

Let  $p^A$  = the probability of getting a job in the destination country  $u$  where schooling is taken

$\hat{a}$  = the quality of schools abroad,

Then, the expected wage if one unit of schooling is taken abroad is given by

$$E(W_{ij})^A = p^A \hat{u}_u e^{\hat{a}} + (1 - p^A) \hat{u}_j e^{\tilde{a}\hat{a}},$$

where  $\tilde{a}$  ( $0 < \tilde{a} < 1$ ) measures the extent to which schooling acquired abroad is of less value in the home country than in the destination country.

The expected gain from schooling abroad  $G^A$  is then

$$G_{ij}^A = p^A \hat{u}_u e^{\hat{a}} + \hat{u}_j [(1 - p^A) e^{\tilde{a}\hat{a}} - e^{\hat{a}}] - C_{ij}^A,$$

where  $C^A$  = direct cost of acquiring schooling outside the country; e.g., travel costs, foreign language training, and the extra tuition.

Note that (4) assumes that the probability of obtaining a permanent job abroad if schooling is acquired domestically is nil, while the probability of obtaining a job abroad is not insignificant (of, course, just need a non-trivial inequality).

What is  $p^A$ ?

We show below = 20%

What is the probability of getting a job, say, in the US without US schooling for a typical person residing outside the United States??

Probability of having a relative abroad?

Infinitesimal

Probability of winning the diversity lottery =

$\frac{1}{2}$  of 1% (0 for China, India, Pakistan, the Philippines, South Korea, Vietnam)

The student model delivers the same implication of the model describing the migration choice of those with given skills:

inter-country skill price differences attract students

Assume that

- A. Students will acquire schooling abroad if  $G_{ij}^A > 0$
- B. Choose host country with highest  $G_{ij}^A$ .

Implications - skill price gaps:

1. The lower the domestic price of skill, the higher the gain from acquiring schooling abroad, if  $P^A$  is high and schooling returns not too different:

$$\partial G^A / \partial \tilde{u}_j = (1 - p^A) e^{\tilde{a}^A} - e^{\hat{a}} = -p^A e^{\hat{a}} < 0 \quad \text{if } \tilde{a}^A \approx \hat{a}$$

2. The higher the foreign price of skill, the higher the gain from acquiring schooling abroad:

$$\partial G^A / \partial \tilde{u}_u = p^A e^{\hat{a}} > 0.$$

School quality difference matter also:

1. The higher the quality of domestic schools, the lower the gain from foreign schooling:

$$\partial G^A / \partial \hat{a} = - \hat{u}_j e^{\hat{a}} < 0.$$

2. The higher the quality of foreign schools, the higher the gain from foreign schooling:

$$\partial G^A / \partial \hat{a} = p^A \hat{u}_u e^{\hat{a}} + \tilde{u}_j (1 - p^A) e^{\tilde{a}} > 0.$$

3. The higher the direct costs of acquiring schooling abroad, the lower the gain:

$$\partial G^A / \partial C_{ij}^A = -1.$$

Then, if there is a domestic distribution of individual costs of acquiring schooling abroad or abilities to finance the costs, then the higher the average gain, the higher the proportion of students who will acquire schooling abroad

## Identifying Skill Prices

How do we know what skill prices are around the world?

Given absence of comparable data on country-specific wages, almost all studies use per-capita GDP as the principal determinant of migration

Seen GDP differences do not measure migration gains, by skill, well

But, the framework suggests that 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.

## 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, other human capital variables and an unobservable skill endowment; for example:

$$(8) \quad x_{ij} = \hat{\iota}_{ij} \exp(\hat{\alpha}_j S_{ij} + \mathbf{I}_{ijk} \tilde{\mathbf{a}}_k),$$

where  $S_{ij}$  = schooling,  $\hat{\alpha}_j$  = country-specific schooling “return”,  
 $\hat{\iota}_{ij}$  = skill endowment

$\mathbf{I}_{ijk}$  = vector of other human capital variables for worker  $i$  in country  $j$

$\tilde{\mathbf{a}}_k$  = a vector of coefficients

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

$$(9) \quad \ln(W_{ij}) = \ln \hat{\iota}_j + \hat{\alpha}_j S_{ij} + \mathbf{I}_{ijk} \tilde{\mathbf{a}}_k + \ln \hat{\iota}_{ij}.$$

The intercepts in (9), which are allowed to differ across countries, provide the log of the skill price for each country represented in the data.

## Data for Estimating World Skill Prices

What are the micro data that can be used to estimate wages, by schooling, for countries of the world?

Requires comparable information on the earnings of workers of the same skill across all countries of the world to assess migration and wage-determination models

There are three sources:

- A. The New Immigrant Survey Pilot (1996)
- B. Occupational Wages Around the World (2000)
- C. The New Immigrant Survey (2003)

**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 4000 workers for 140 countries

Disadvantages:

1. Still incomplete and selective sample of countries: only those with sufficient number of immigrants in US
2. Selective sample of workers: those workers who chose to emigrate (model implies immigrants positively selected on unobservables)

Table 2  
 Characteristics of Global Earnings Data Sets

Data set/variable	NIS-P Home-Country Workers	OWW, 1995	NIS Home-Country Workers
Mean annualized earnings of respondents (US\$)	14719 <sup>a</sup> (2602)	10208 <sup>b</sup> (13289)	17803 <sup>a</sup> (29410)
Mean age of respondents	34.6 (8.53)	-	39.7 (11.5)
Mean years of schooling of respondents	14.4 (4.5)	-	13.8 (3.82)
Number of industries	-	49	-
Number of occupations	-	161	-
Number of countries	54	67	140
Number of workers	332	4924	4455

a. PPP-adjusted

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

## Estimation strategy for identifying skill prices and their effects on migration

Estimate wage equation (9) for all workers in the NIS-P or NIS, based on earnings in last job before coming to the United States - home country wages.

Allow  $\hat{a}$  to vary across countries:

a. Non-parametrically: individual dummy interactions

$$\hat{a}_j = \sum \ddot{a}_j S_{ij}, \quad \text{where the } \ddot{a}_j \text{ are country dummy variables}$$

b. As a function of measures of quality  $Q_j$  of schooling:

$$\hat{a}_j = \hat{a}_0 + Q_j \hat{\mathbf{E}}, \text{ for primary, secondary and tertiary schools}$$

b is a test of the Mincer model:  $H_0: \hat{\mathbf{E}} = 0$

Table 3  
Personal and Country Characteristics for NIS Immigrants

Variable	Mean	Standard Deviation
GDP per adult equivalent in 2000 (PPP \$)	19,961	19,865
Average years of schooling, adults	6.12	2.89
Any universities ranked in the top 200 world universities	.172	.379
Average rank of universities if any ranked	118.1	35.7
Students per teacher, primary schools	34.0	11.7
Students per teacher, secondary schools	19.7	6.8
Primary school spending per student (PPP \$)	1,204	1,578
Secondary school spending per student (PPP \$)	2,040	2,256
Annual teacher salary, primary (PPP \$)	13,947	11,256
Annual teacher salary, secondary (PPP \$)	32,650	17,473
Labor force size ( $\times 10^{-3}$ )	16,776	67,768

Note: school quality information from Bartik (2008).

## Estimates of Skill Prices Using the NIS

1. Skill prices or  $W(0)_j$  differ significantly across countries

2. Rejection of Mincer-Smith equilibrium:

A. Quality matters (not spurious) B. Non-proportional wage differences

Figure displays the estimated (PPP-adjusted) skill prices for 19 Asian countries, based on the NIS-P and OWW data sources (correlation = .66)

See differences in skill prices are enormous, however estimated:

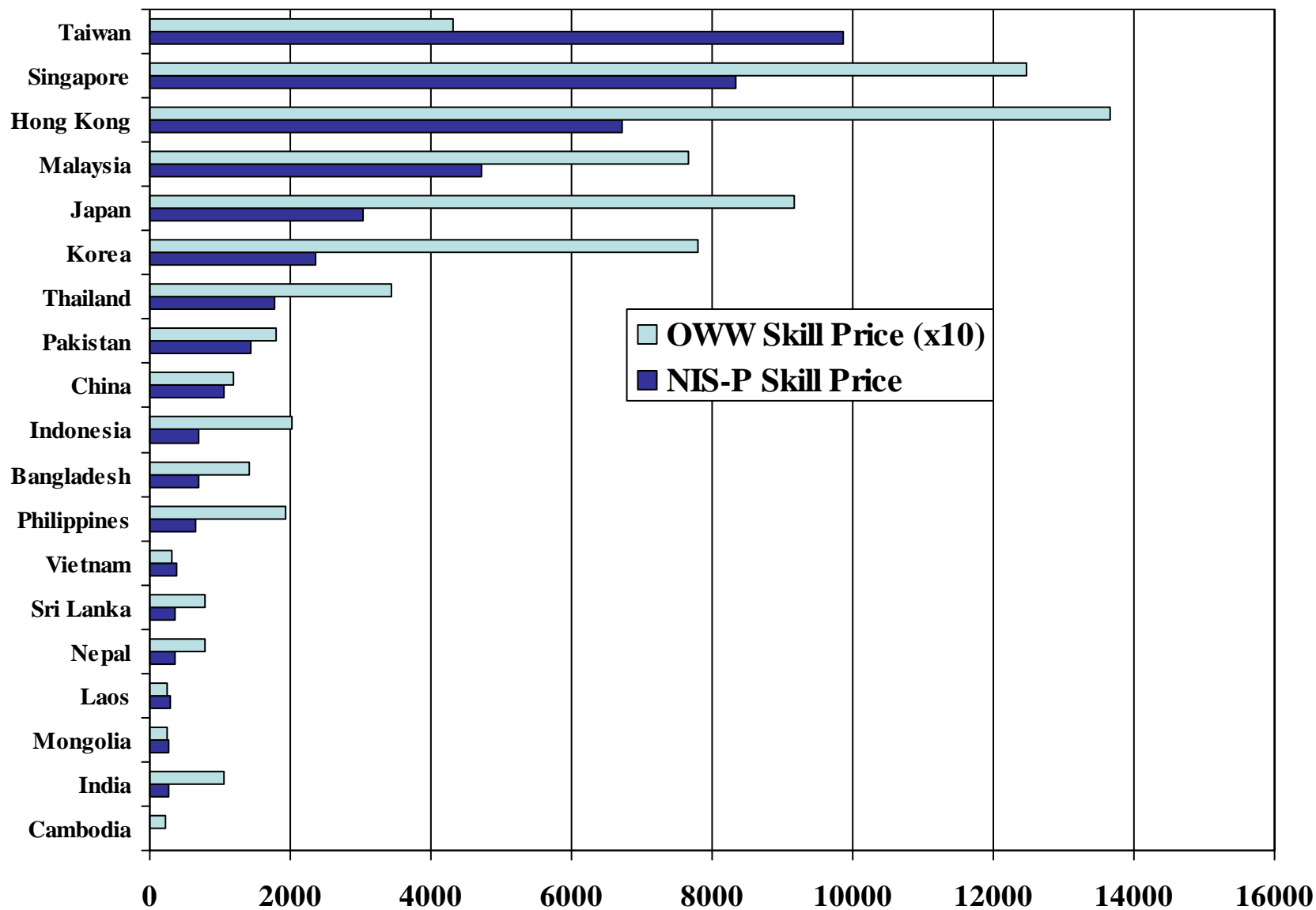
Skill price in S. Korea is 3.5 to 5.5 times that in Bangladesh

How do skill prices relate to earnings by educational level across countries?

Compute for selected countries earnings for high-school and college graduates using skill price estimates

Assume rate of return to schooling is .07 ( $\hat{\alpha}$ ) for all countries.

## Estimated PPP \$ (1995) Skill Prices for 19 Asian Countries, by NIS-P and OWW Sources



**Estimated (Purchasing-Power Adjusted 1996) Earnings of High School and College Graduates,  
Across Selected Countries Around the World (r=.07)**

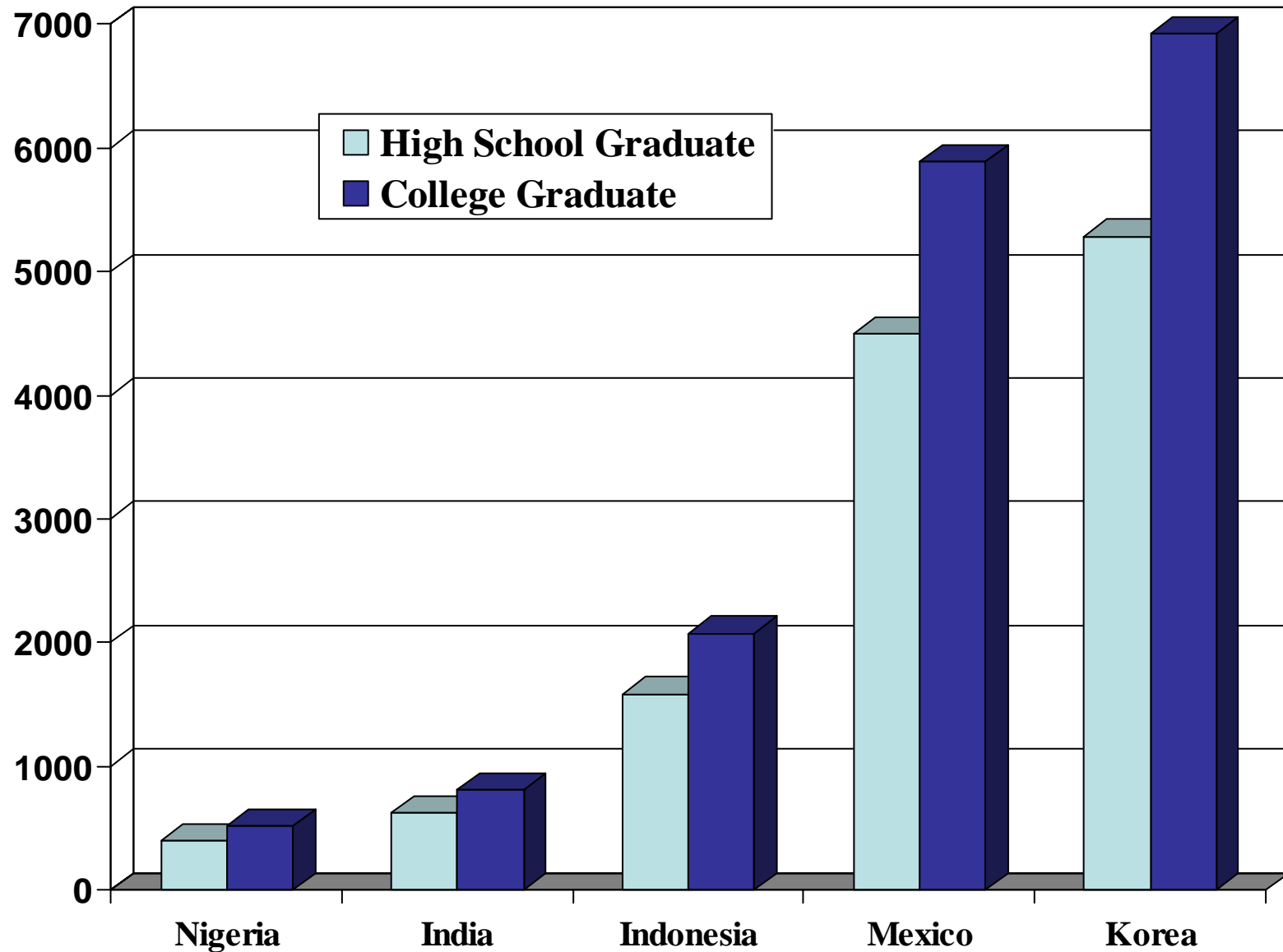


Figure shows estimated (PPP-adjusted) earnings by schooling level for six countries

Two important features:

A. Gains from moving across countries always greater for those with more skill

B. Equalizing schooling levels across countries (say, making everyone a college graduate) would change global earnings inequality very little

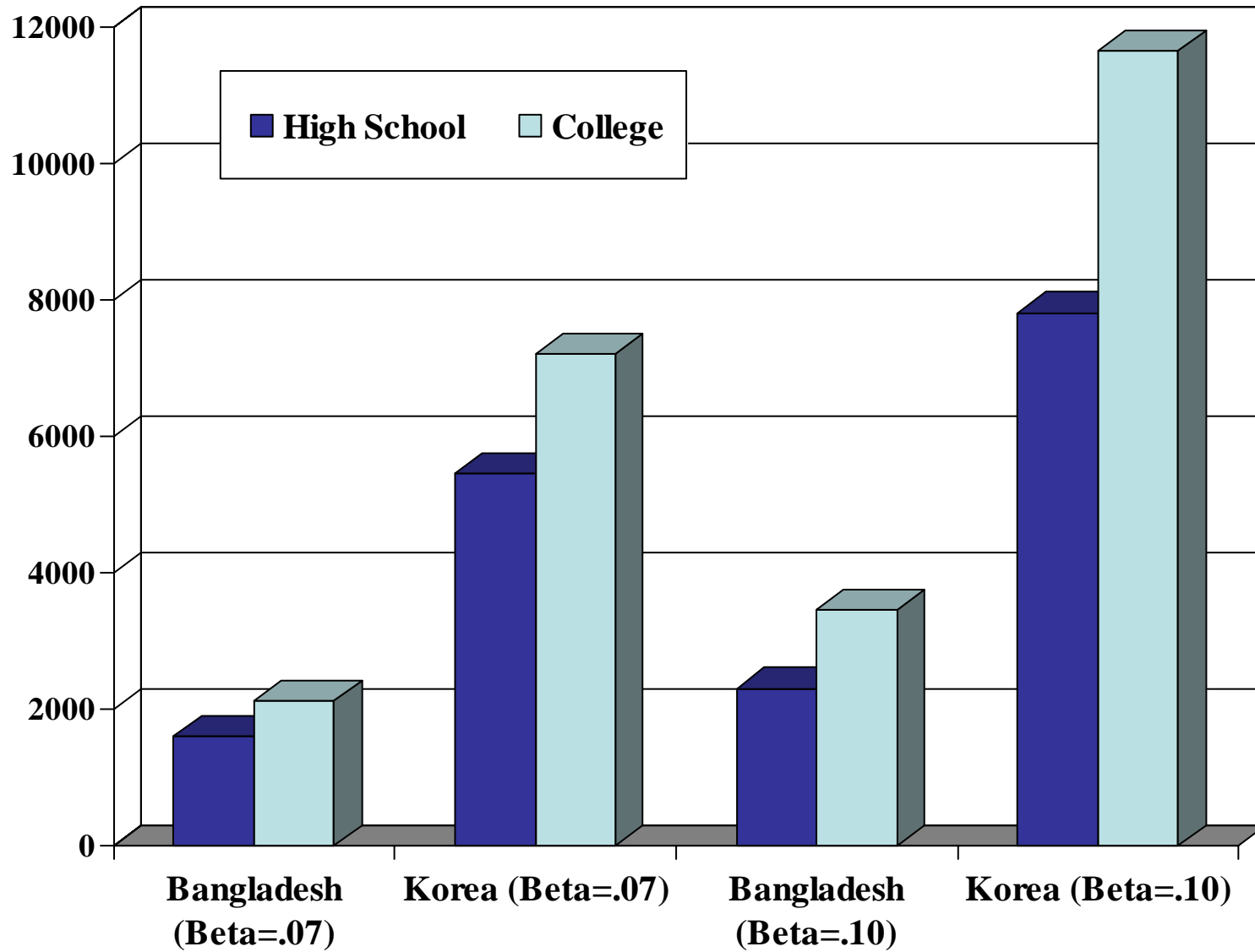
Inequality across countries dominated by difference in rewards to skills across countries

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

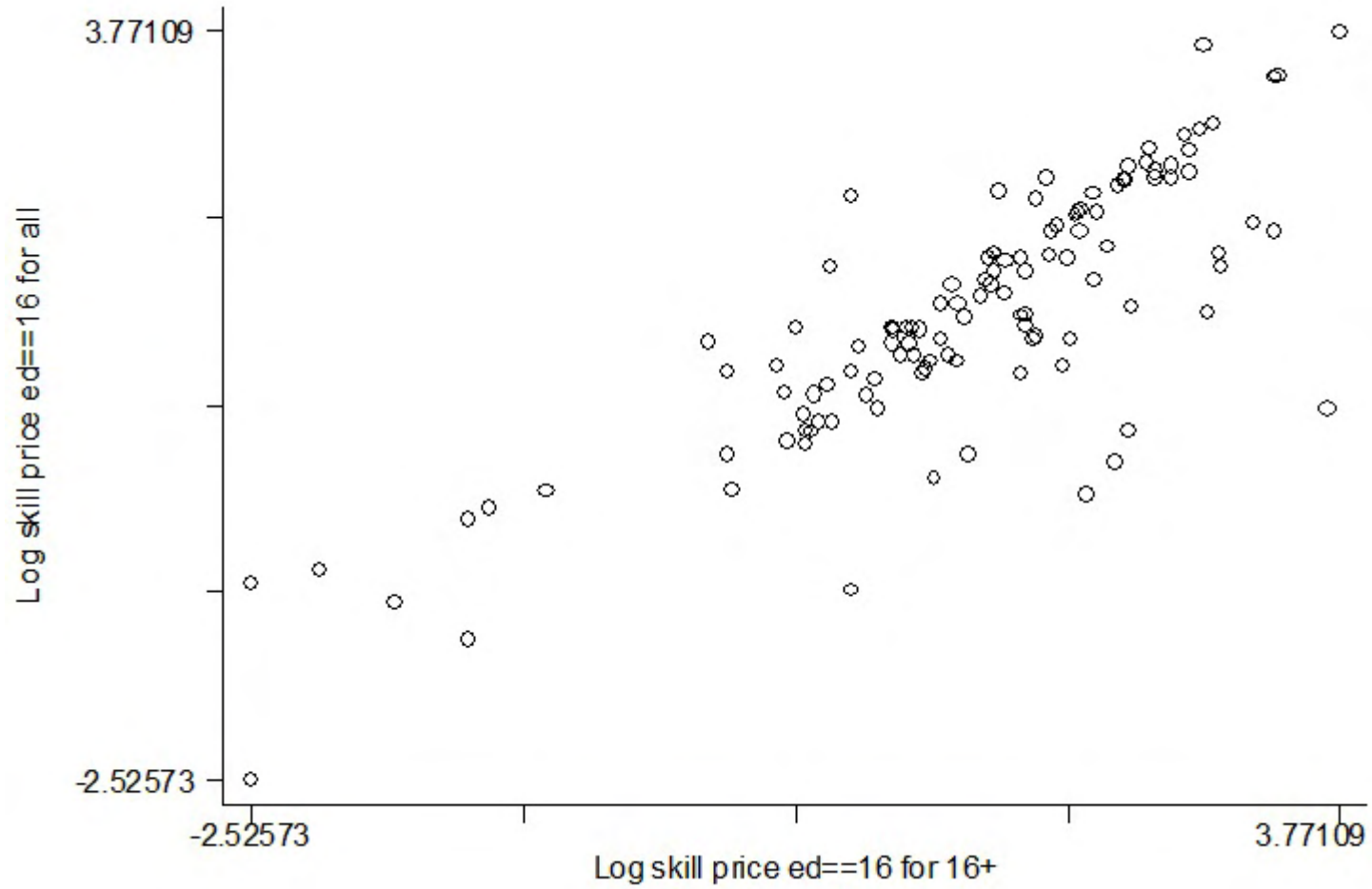
In the one-skill or Mincer model, higher inequality due to higher “return” to schooling  $\hat{a}$  or  $r$

How does a rise in  $\hat{a}$  or  $r$  in the sending country affect the differential gain of, say, high school and college graduates?

# PPP-Adjusted 1996 Estimated Annual Earnings (NIS-P Skill Prices) in Bangladesh and Korea, By Schooling Level and Schooling Return



Relationship Between Log Skill Price (One Skill) and Log College+ Skill Price



## **How do skill prices and migration costs affect the amount and average skill of immigrants?**

Obtain MI estimates of determinants of number of US “permanent” immigrants (from the labor force): across 168 countries, for two types

A. All immigrants

B. Employment visa principals

Findings:

1. Less immigrants from higher skill price countries
2. Per-capita GDP, given the skill price, has a positive effect on out-migration

Suggests importance of credit constraints

3. Proximity to the United States matters, given income and wage gains: fewer immigrants from countries located farther away

MI estimates of determinants of average schooling of immigrants

A. Employment visa principals    B. EVP +spouses    C. All immigrants

Findings mirror image of quantity estimates, as expected, but only for A and B:

Higher skill prices increase average quality of those who leave

Higher per-capita GDP or proximity lowers *average* quality

Do lower skill price countries send out more or less *total* human capital?

What is the elasticity of N\*average S with respect to skill price?

$$-.827 + .499 = -.328$$

But development effects are complex, total elasticity of per-capita GDP is

$$.346 - .108 = .238$$

## **Determinants of Student Outflows: Where do US Foreign Students Come from?**

- A. As seen, the United States is the major host country in the world for students

Why? [jobs and number of universities]

- B. Exploit unique information on students and immigrants permitting estimation of return rates

Additional source of data:

Counts of students by country in 2005: US SEVIS

Essentially same specification as for immigrants, except add the number of universities by country in addition to the quality measures

## Estimates for Numbers of US Foreign Students

1. Skill price coefficients are consistent with the hypothesis that student study abroad is motivated by gains from permanent migration

More students per-capita from lower skill price countries

Doubling of skill price (ex: India to Philippines): reduces stock of students by 26%-73%

2. Costs of schooling matter

For given skill price, higher per-capita income leads to more foreign schooling (82% of undergraduate schooling self-financed by foreign students; 43% for graduate students)

Doubling both a country's skill price *and* income increases study abroad

Greater distance to the United States reduces foreign student flows

### 3. Effects of Domestic Investments in tertiary education:

Increasing the average quality of tertiary education *decreases* student outflows

Increasing the number of universities *increases* student outflows (grad. Ed)

## **How Many Foreign Students (do not) Return? Determinants of the Return Rates of US Foreign Students**

The number of foreign students  $R_j$  who return to their home country  $j$ :

$$R_j = (1 - r_j)m_j,$$

where  $r_j$  = the fraction of students from  $j$  who remain in the host country

$m_j$  = the stock of students from  $j$  in the host country

How do we compute  $r_j$ ?

Need to know the number of permanent immigrants who were once foreign students

The NIS provides complete history of “visits” to the US, and all prior visas held

Student stayers = New permanent immigrants who once held a student visas

6% of all new immigrants

Who are they?

- A. Highly educated, particularly those from Asia, compared with other new immigrants
- B. Scientists, engineers, particularly from Asia, compared with other immigrants

Highly trained, technical elite are being lost - but what fraction return?

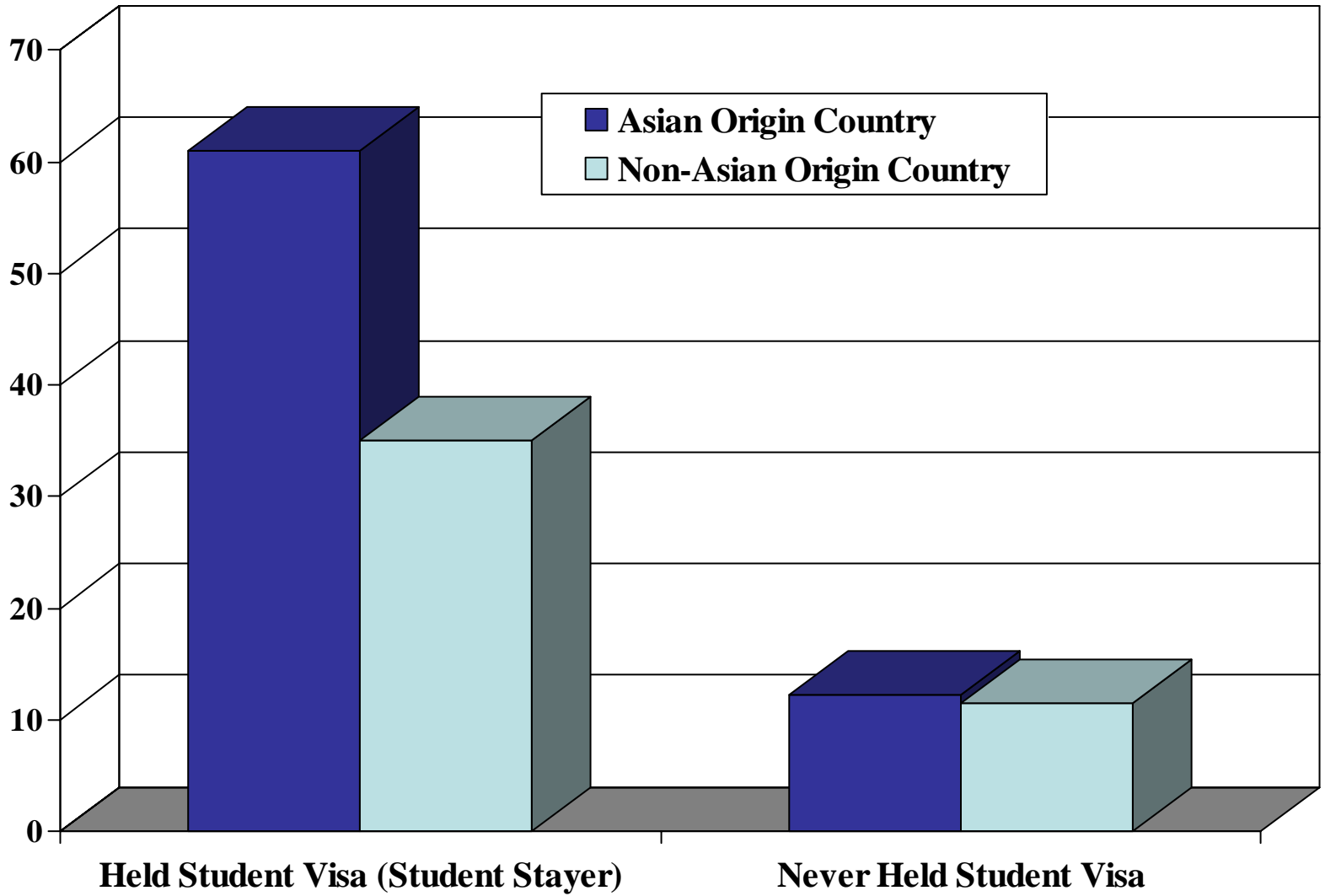
Compute for each sending country  $j$  the stay or depreciation rate  $r_j =$

Number of student stayers from  $j$  / Stock of students from  $j$

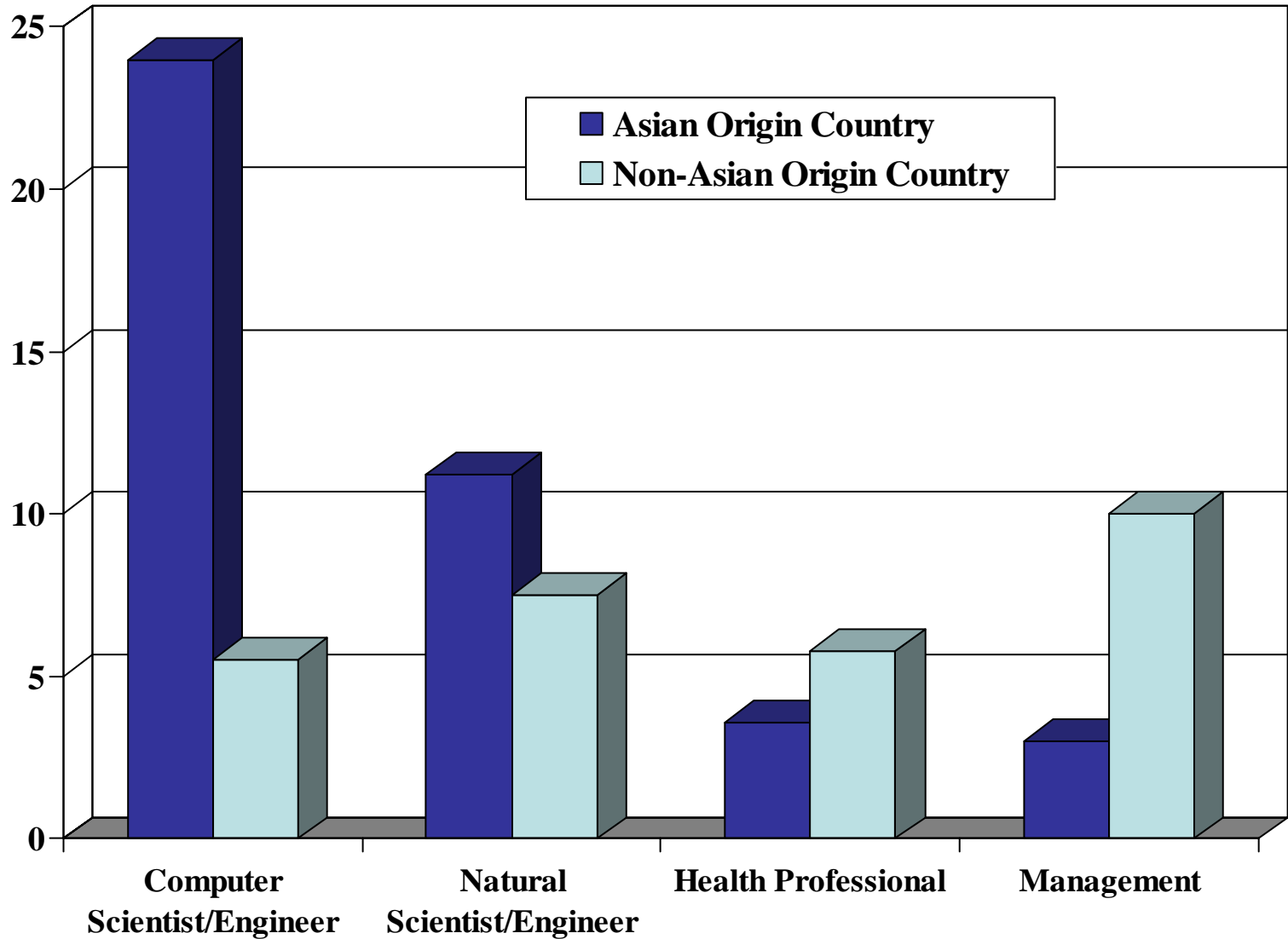
Average stay or depreciation rate of the stock = 4.7% (2.7% for Asia-origin)

If about 5 cohorts in the stock, that is a flow return rate of about 20%

**Percentage of New US Permanent Immigrants in 2003 with Post-Graduate Training, Student Stayers and All Other Immigrants, by Origin Region**



**Occupational Distribution of Student Stayers:  
New US Permanent Immigrants in 2003 Who Had Held a Student Visa, by Origin Region**



The estimated stay rates  $r_j$  vary widely across Asian countries

Figure displays the rates for 19 Asian countries

Stay rates are highest for Cambodia, Burma the Philippines

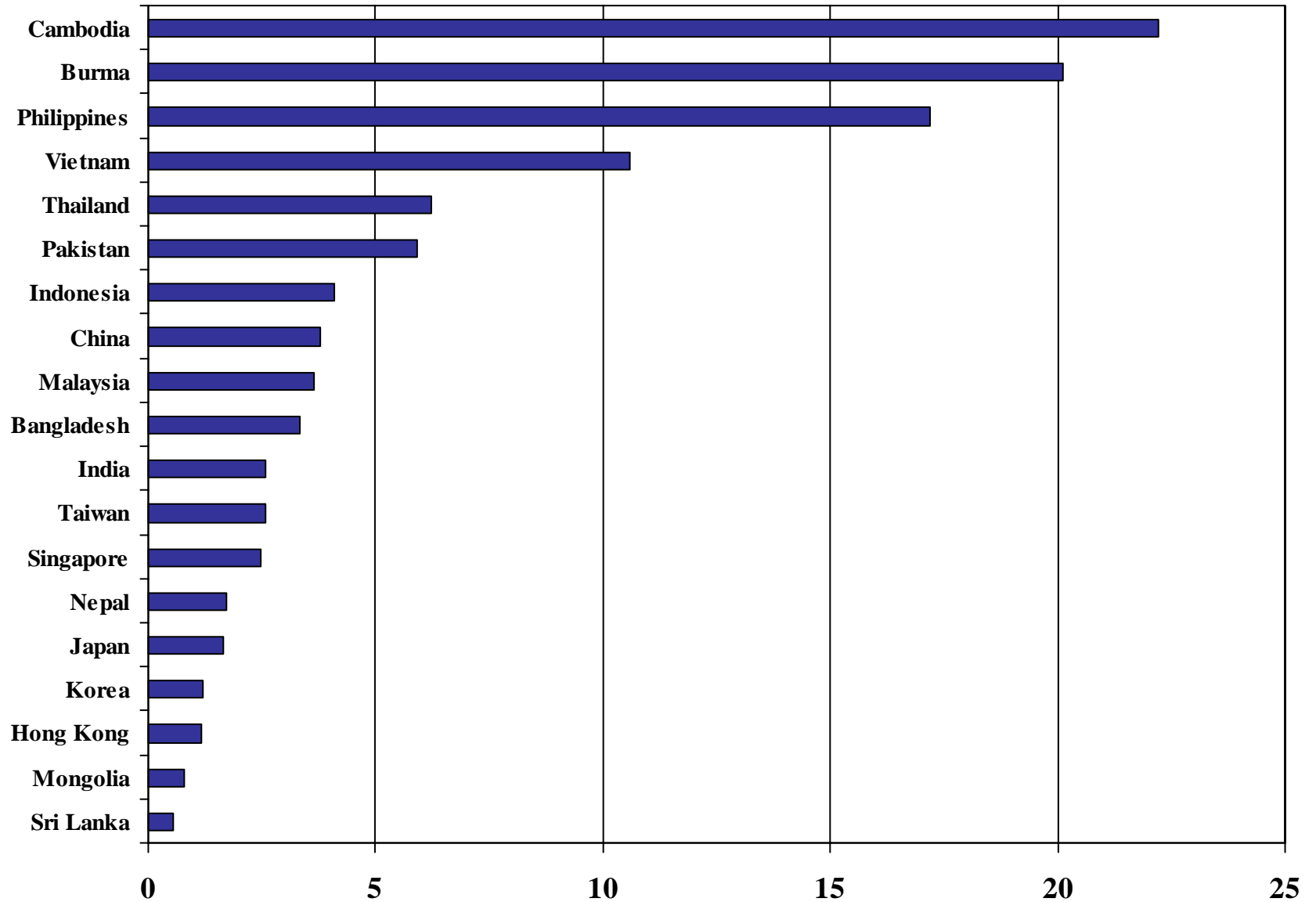
But what determines variation?

Table presents estimates of how country-of-origin characteristics affect the return rates across all countries

Hypothesis: higher return rates to countries with higher skill prices

Confirmed

## Estimated Annual Student “Depreciation” Rates for 19 Asian Countries



Now, we know:

1. How skill prices at home affect the numbers of students who go abroad
2. How skill prices at home affect the rates at which students return

How do skill prices on net affect the number of returned foreign-trained students:

$$d\log R_j / d\log \hat{u}_j = \zeta_m + \zeta_{(1-r)},$$

where  $\zeta_m$  = the estimated skill price coefficient in Table 2 for the country's stock of students obtaining training in the United States

$\zeta_{(1-r)}$  = the estimate of the effect of log skill price on the log return rate

The combined estimates are -.24 (NIS-P) and -.71(OWW)

Thus, lower skill price countries have larger stocks of foreign-trained students

But that it is not quite the end of the story:

Not all “permanent” immigrants stay forever

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?

Few estimates for “permanent” immigrants

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:

Overall proportion who left = 30%

As high as 50% in some countries

NIS question to new (“permanent”) immigrants, entitled to remain in the US the rest of their lives, soon after obtaining their visas:

“Do you intend to live in the United States for the rest of your life?”

Figure reports the fractions reporting “No” or “Not sure” for

A. Students stayers

B. Employment immigrants

Fractions not inconsistent with prior estimates

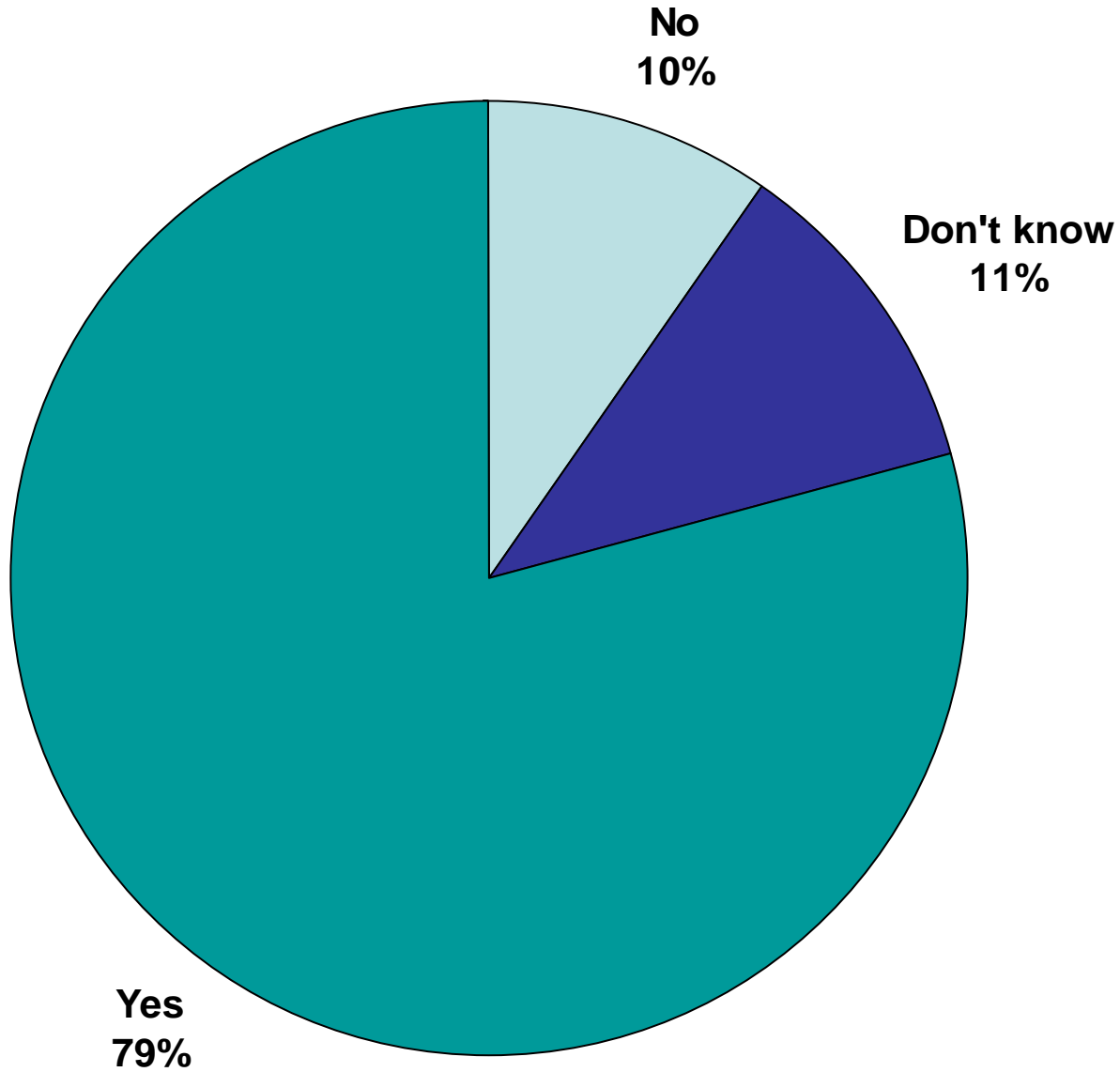
Final questions:

What are the determinants of “intentions” to return?

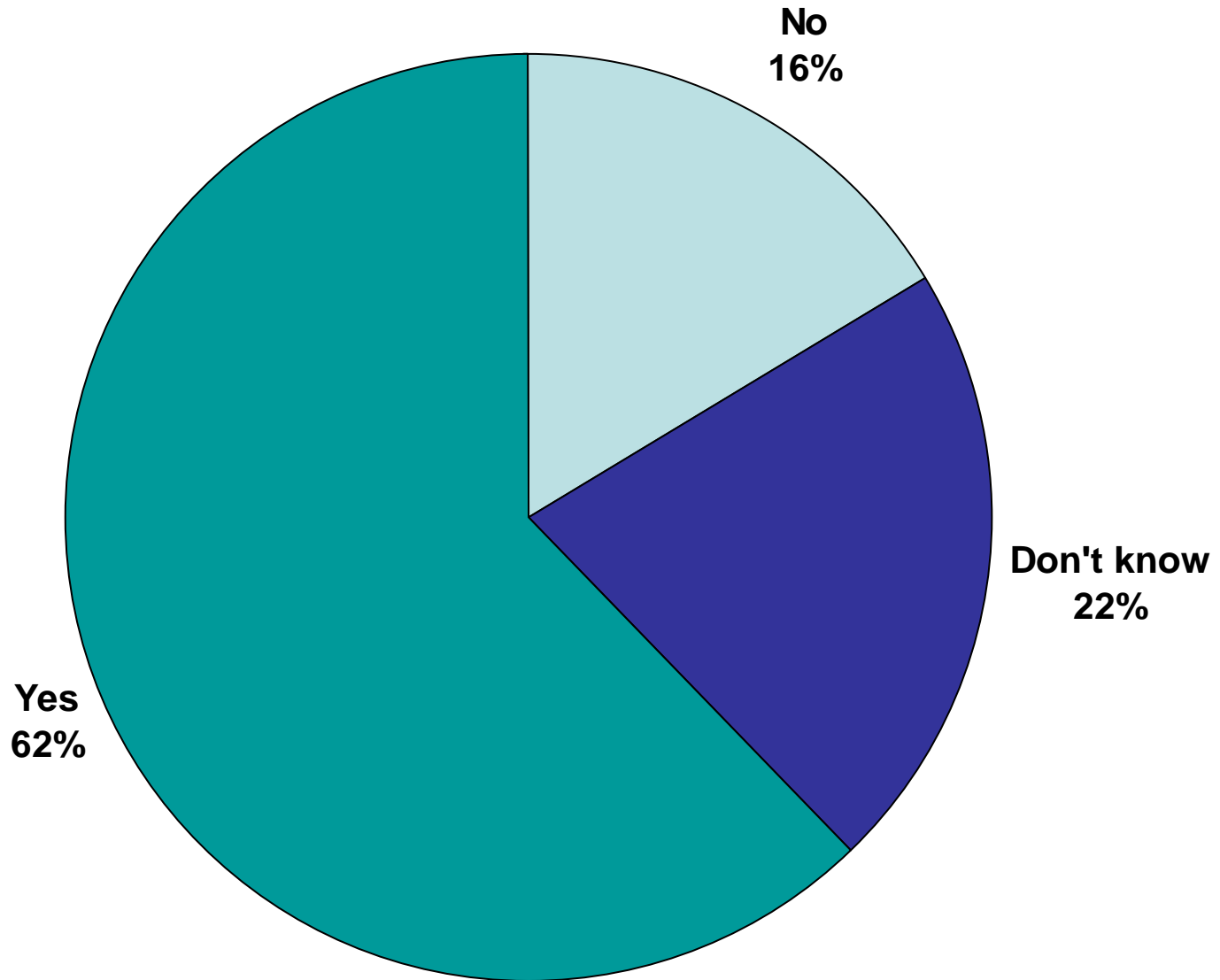
Is the return selective by schooling?

What are the determinants of selectivity?

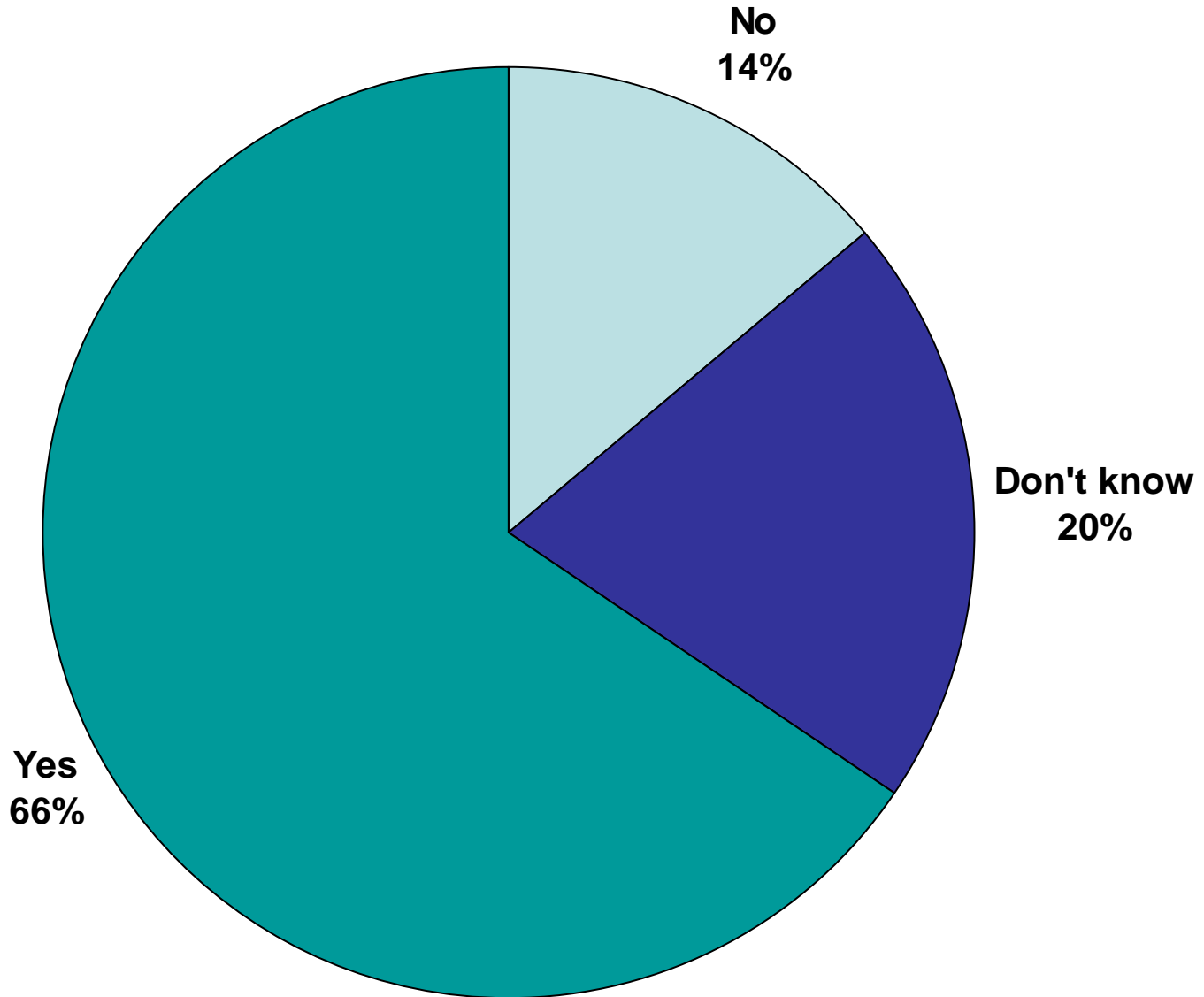
**All Visa Holders' Answers:  
"Do You Intend to Stay in the United States the Rest of Your Life?"**



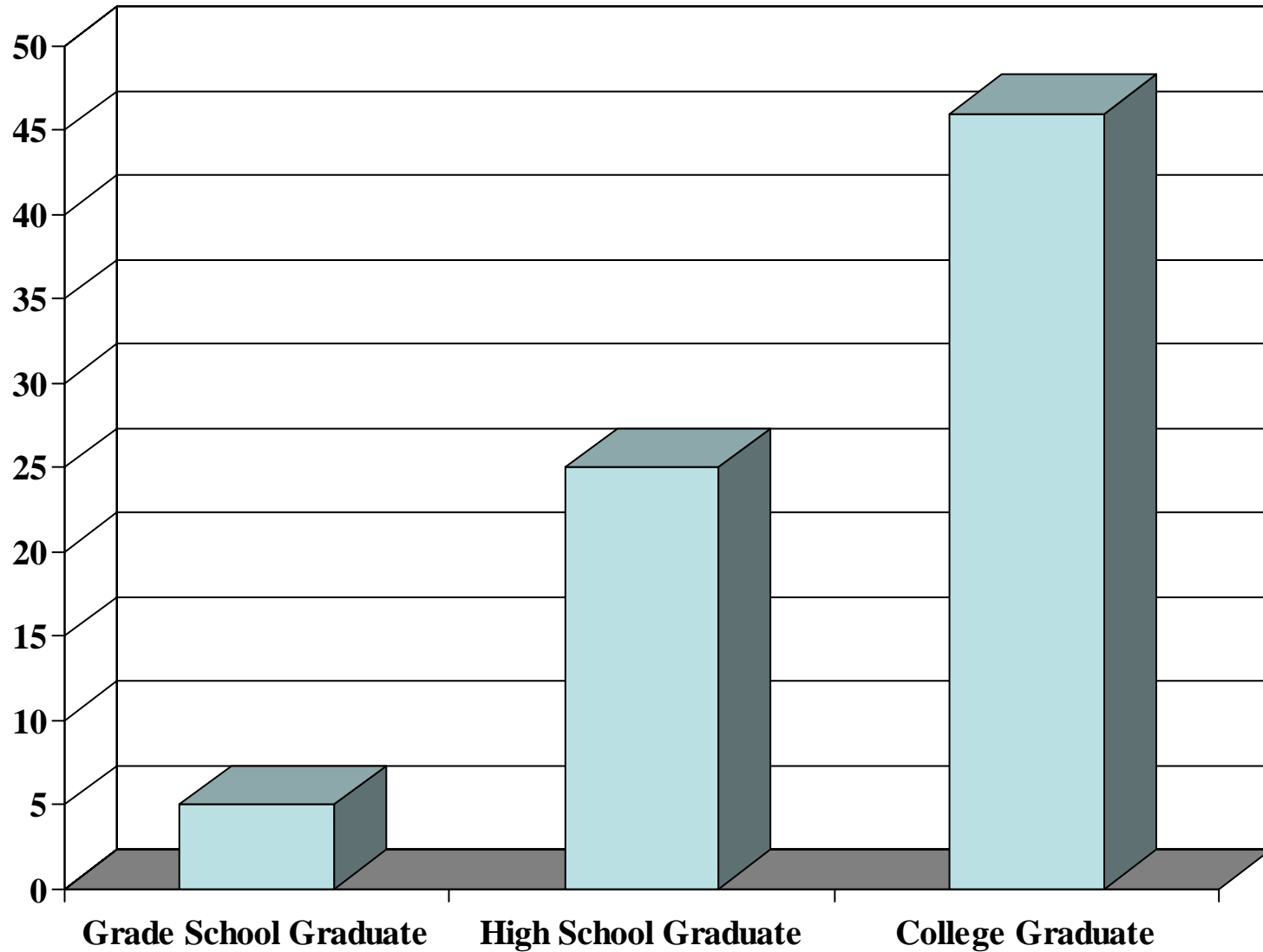
**Former Student Visa Holders' Answers:  
"Do You Intend to Stay in the United States the Rest of Your Life?"**



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



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



## **Educational policy implications**

1. In the absence of fundamental change (institutions, etc.), merely increasing schooling in low skill-price countries does little to close the gaps in incomes and may increase the net outflow of skill.

2. Domestic investments in higher education in low-income countries must be attentive to the foreign alternative:

Increasing the quantity and quality of domestic colleges and universities have significant, and opposite, effects on student outflows

Outsourcing of tertiary education is a viable alternative, given high return rates, especially in low skill-price countries

3. On average, the quality of tertiary education is higher in high income countries

Expanding tertiary schooling availability in receiving countries will increase foreign-schooled in low-income counties

4. The main social cost to student sending countries is the *average* loss of 20% or so of the “best and brightest,” at least for some time, to high-income countries

Still, poorest countries gain most and on average 80% of students return and can have a large impact:

56% of leaders of 115 countries in 1990 (Splilimbergo) received their tertiary education abroad (24% from the United States)

5. Average private costs of schooling abroad significantly higher than domestic schooling costs

Wealthier families most likely to take advantage of foreign schooling:  
82% of foreign students to the US are self-financed

6. For poor countries outsourcing higher education may be cost-effective; if embrace outsourcing, to improve efficiency: merit scholarship program