The Earnings of U.S. Immigrants: World Skill Prices, Skill Transferability and Selectivity

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A major issue in U.S. immigration research is the determination of the skill level, or quality, of immigrants, as measured by their earnings in the United States. The U.S. earnings of immigrants is determined both by (i) the extent to which the skills brought by immigrants are transferable to the U.S. labor market and (ii) the selectivity of the immigration process, a function of differences in U.S. and origin-country earnings opportunities, migration costs and opportunities to immigrate. Empirical research on skill transferability, or assimilation, has examined the difference in the earnings of immigrant cohorts, defined by arrival dates, in the same time period (Chiswick,1978) or of the same immigration cohort in two different two time periods (Borjas,1987).[1] Research on the selectivity of immigrants (Borjas,1987; Jasso and Rosenzweig,1990) has focused on how the characteristics of sending countries, which measure the costs and gains from immigration, are reflected in the earnings of recently-arrived immigrants in the United States.

There are a number of shortcomings to this research due in large measure to the limitations of the Census data that have been the principal data source for research on U.S. immigration. First, because the earnings of new immigrants are only measured in the United States, observed earnings confound both skill selectivity and initial skill transferability. To the extent that transferability is a transient state and related to origin-country attributes, the relationships between the initial U.S. earnings of immigrants and their home-country characteristics cannot be used to unambiguously infer skill selection (Lalonde and Topel, 1992).[2] Second, U.S. immigrants are selected under many different criteria, including their kin relationship to U.S. citizens; some immigration, that of asylees and refugees, may not reflect choice

[1]Eckstein and Weiss (1997) use panel data on immigrants to Israel from the former Soviet Union to quantify assimilation. The data they use also do not provide information on the earnings of the immigrants in their home country, so that initial cross-border skill transferability cannot be assessed.

[2]The U.S. decennial census questionnaire asks no direct question about how immigrants fared in labor markets at home. Similarly, the cross-sectional workhorse survey of American labor economists - the Current Population Surveys (CPS) - asks not one single question about pre-immigrant labor market experience.

based on economic gain at all; the flows to the United States of some immigrants are subject to the binding constraints of numerical country ceilings, and immigrants' participation in the U.S. labor market is subject to different constraints depending on visa status (e.g., legal versus illegal immigrants, temporary versus permanent). Census data do not distinguish the routes by which immigrants enter the United States or their visas status, again making it difficult to draw inferences about skill selectivity based on choice-theoretic migration models. Third, because of the selective emigration of U.S. immigrants, even comparison of an aggregate immigrant cohort in two time periods confounds the skill transferability of an individual immigrant over time and changes in the skill composition of immigrants due to selective emigration. Moreover, as emphasized by Dustmann (2000), temporary migrants will exhibit different investment behavior in the recipient country than "permanent" immigrants, and Census data do not distinguish between temporary (by contract) and permanent immigrants.

The limitations of data describing the countries of the world has also limited understanding of the processes and selectivity of U.S. immigration. Borjas' (1987) major study of immigration selectivity based on the Roy model (1951) highlights the differences in opportunities for exploiting skills across sending countries and the United States. Such data, however, are not readily available for many countries. Indeed, Borjas uses country-specific information on the distributions of income in his empirical implementation of the Roy framework, but such measures reflect both the distribution of worker skills as well as rewards to skills that are the objects of the model, as he recognizes (see also Chiswick, 2000). This approach has thus not been fully implemented.[3]

In this paper, we set out an empirically implementable model of migration choice. Rather than concentrating on descriptive parameters such as income inequality, we highlight the more basic parameters of the economic structure of an economy, namely worker skills and country-specific skill

[3]The correlation between earnings dispersion and inequality in earnings opportunities or skill rewards is unclear, and the estimated relationship between within-country inequality gross of skill dispersion and the initial earnings of the U.S. foreign-born was not statistically significant.

prices, along with direct migration costs. The model is used to examine (1) the determinants of the skill heterogeneity of legal U.S. immigrants and (2) the initial transferability of their home skills to the U.S. labor market. The analysis exploits new survey data on U.S. legal immigrants - permanent resident aliens - providing information on both their initial U.S. earnings and their earnings in the last job in the origin country. These data are combined with internationally-comparable country-specific data on worker skills and per-worker output in sending countries, enabling the measurement of initial skill transferability, tests of inter-country skill price equalization and immigration selectivity and estimates of the determinants of transferability and selectivity. We focus on two groups of U.S. immigrants, those that qualify for a U.S. visa by marriage to a U.S. citizen or a permanent resident alien and immigrants who enter by obtaining an employment visa. We focus on these two groups because the large majority of these immigrants have not been constrained by numerical country ceilings in recent years. Thus, their selection conforms most closely to choice-theoretic migration models that have been used to guide most immigration research.[4] These groups, moreover, constitute over 55% of all non-refugee/asylee U.S. immigrants.

In section 1, we show that with information on both the initial U.S. earnings of immigrants and their home country earnings it is possible to test for skill price equalization across countries, to identify the average degree of initial skill transferability, and to estimate how skill transferability varies with exposure to the U.S. labor market for any degree of skill selectivity. We also show that two characteristics of origin countries will be important determinants of the extent of and selectivity of immigration - GDP per worker and the average schooling of home-country workers - country characteristics that are available for most countries of the world. Section 2 describes the data and presents earnings-function estimates based on U.S. earnings that are comparable to those obtained from

[4]In contrast to immigrants who qualify for a U.S. visa because they have a sibling, parent or child who is a U.S. citizen. Research on U.S. immigration based on census data cannot distinguish among immigrants who enter via nepotism or who mainly enter via marriage and job markets or between contractually temporary and migrants entitled to reside in the United States without restriction.

earlier studies of U.S. immigrants based on Census data. In section 3 we present estimates of skill transferability using earnings specifications that combine the home-country and U.S. earnings of the immigrants. The estimates indicate rejection of the hypothesis that skill prices are equalized across countries and suggest that on average 34% of the skills of immigrants are initially transferred in the U.S. labor market, but that skill transferability varies by gender, age and residence in the United States.

The finding of imperfect skill transferability and its variability across immigrants suggests that skill selectivity cannot be assessed based solely on the initial U.S. earnings of immigrants. Our estimates, based on the *home-country* earnings of immigrants, made comparable using the PPP indices from the International Comparisons Project (Summers and Heston, 1991), indicate rejection of the hypothesis that the spouse and employment immigrants are not positively selected and provide direct evidence that inferences about the effects of U.S. experience on assimilation based on the relationship between U.S. earnings and years in the United States are subject to selectivity bias. In accordance with the model, the estimates also suggest that among these immigrants, those that are higher-skilled, within schooling and visa groups, originate from high per-worker-GDP countries in which native workers have on average lower schooling levels. Consistent with this finding, emigration rates are also lower in countries characterized by high levels of GDP per worker and lower-quality workers. Section 4 contains a summary of the findings and some of their implications.

1. Theoretical Framework

a. Immigrant decisions, home country characteristics and immigrant selectivity

In this section we set out a simple model aimed at capturing the most important factors affecting the observed earnings differentials among immigrants and that can exploit available data. We assume a world economy in which there is a continuum of skills, workers have different levels of skills, rewards to skills (skill prices) differ across countries due to imperfect factor mobility, and skill is initially imperfectly transferable across countries. The number of efficiency or skill units x_i supplied by a worker i has two components - an observed component, such as schooling, and an unobserved component - and is

given by

(1) $x_i = \mu_i \exp(\beta S_i)$,

where S_i is worker i's schooling in years and μ_i is the worker's endowed skill, which is unobserved by the researcher. The assessment of the 'selectivity' of immigrants usually refers to the variation in the unobserved skill component among immigrants of given observed skills.

The worker's wage in home country j is thus

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

where ω_j is the skill price in country j. Thus, variation in the average wages of workers across countries is due to inter-country differences in average schooling levels, differences in the skill prices, and differences, if any, in average endowed skills (which may include pre-school human capital investments).

The initial earnings that worker i could earn in destination country u is given by

(3) $W_{iu} = \omega_u x_i^{\delta iu}$,

where ω_u is the destination-country skill price and δ_{iu}, $0 \leq \delta_{iu} \leq 1$, reflects the initial degree of transferability of a worker i's skills to the destination country's labor market. A worker of given skill earns a different wage in her origin country and initially in the destination country for two reasons: the skill price differs across the two countries and the worker's own skill may not be fully transferable. A worker's skills may be incompletely transferable upon arrival in the destination country due to lack of job contacts, lack of familiarity with the job market or work practices, or poor English skills. With full transferability ($\delta_{iu}=1$), the migrant can initially make use of all of his skill in the destination country; if her skill is initially completely non-transferable across the origin and destination countries ($\delta_{iu}=0$),the migrant enters the destination labor market as if she had the lowest skill level (x=1).

Given direct costs C_j and time costs $(1+\pi_j)W_{ij}$ of migrating from j to u, the economic gain from migrating from j to u, G_{ij}, for worker i is

(4) $G_{ij} = \mu_i \exp(\beta S_i)[\omega_u x_i^{\delta i\, u-1} - \omega_j(1+\pi_j)] - C_j$.

Expression (4) shows that for any level of direct migration costs C_j the gains from immigrating, given a

positive destination-origin skill price differential net of migration time costs ($\omega_u > \omega_j(1+\pi_j)$), are always higher for more skilled workers and for workers for whom skill transferability is high.[5]

As Borjas (1987) points out, costs (and benefits) of migration are also psychic and must be important given the apparently large disparities in skill prices across countries. Workers are assumed to migrate from country j to country u if the utility of residing and working in u exceeds that from residing and working in j net of moving costs. The utility of residing in destination-country u for a worker born in j is

$$V^u = \beta_1 \Gamma_{iu} + \beta_2 (W_{iu} - W_{ij}\pi_j - C_{iu}) + \epsilon^u_i, \tag{5}$$

where Γ_{iu} are amenities from living in u such as a spouse born in u or disamenities associated with a foreign culture and ϵ^u is a country- and worker-specific error term. The utility of the worker staying in j is

$$V^j = \beta_1 \Gamma_{ij} + \beta_2 W_{ij} + \epsilon^j_i. \tag{6}$$

Given the decision rule, migrate iff $V^u > V^j$, and expressions (1) through (6) we can see how the endowed or unmeasured skills of immigrant workers in u differ across their countries of origin characterized by different skill prices and moving costs. To fix ideas, we assume that the marginal distributions of the μ in each country are normal, the joint stochastic or unmeasured parts of the utility functions (containing the ϵ^j) are independently and identically Gumbel distributed, and μ and the ϵ^j are orthogonal.[6] The average endowed skill level of immigrant workers varies with their *home-country* skill prices according to

$$\partial E(\mu_i | V^u > V^j)/\partial \omega_j = \tag{7}$$

$$\partial E(\mu_i | -\beta_2 W_{iu} - \beta_1(\Gamma_{ij} - \Gamma_{iu}) + \epsilon^u - \epsilon^j > -\beta_2(W_{ij} - C_{ij})/\partial \omega_j$$

[5]Chiswick (2000) shows that if higher skill also lowers direct migration costs immigration will be more skill-intensive.

[6]The implications of the model do not depend on these specific distributional assumptions. Such assumptions do permit an empirically tractable analysis of multiple potential destinations, but we have simplified the framework to incorporate one potential destination, given the domination of the United States as an immigrant receiving country.

$$= \beta_2 \omega_u \exp(\beta S_i) \sigma^2(\mu_i) A > 0,$$

where $A = \lambda^2 + \beta_2 W_{ij} \lambda$, $\lambda = \phi[H(P)]/\Phi[H(P)]$, and H() is the inverse standard normal cumulative density function evaluated at the probability P that the worker chooses to migrate.

Expression (7) indicates that as long as there is heterogeneity in endowed skill among observationally identical (same schooling levels) workers, immigrant workers in u from sending countries with high skill prices will have higher endowed or unmeasured skill levels compared with immigrant workers from low skill-price countries of origin. The intuition is that, from (5), for given fixed monetary and psychic costs of migrating, at low skill price differentials (when ω_j is high) only the most skilled obtain a net gain from migrating while when the differential is wide even the least-skilled experience a net gain.

Implicit in the model is a relationship between inter-country differences in skill prices and the variation in income inequality across countries. In particular, controlling for the distribution of skills, increases in the skill price of a country increases its wage inequality (and average wages). However, it is important to note that our results are not inconsistent with the claim that increased inequality for given mean income in a country can induce more lower-skilled workers to leave (Borjas (1987)). The relationship between the change in a country's income inequality and the skill-selectivity of its migrants will depend on the source of the inequality change. An increase in the origin-country skill price increases incomes for all skill levels of workers but does so proportionally more for the higher-skilled. The gains from migration thus fall for all workers, leading to reduced immigration, but less so for the most skilled. However, while it is not the emphasis in our approach, it is also true that an increase in income inequality brought about, say, by reduced income support for the less-skilled but that also holds median income constant would encourage additional migration of less-skilled workers in our approach.

The model also delivers the result that immigrant skills will also be positively associated with direct, psychic or monetary, moving costs:

(8) $$\partial E(\mu \mid V^u > V^j)/\partial C_j = \exp(\beta S_i)(\omega_u x_i^{\delta iu-1} - \omega_{ij})\sigma^2(\mu_i)[\lambda^2 + \beta_2 C_{ij}\lambda] > 0.$$

Again, among those immigrants who incur higher costs of migrating only those with higher skills will obtain a net positive immigration gain, ceteris paribus. Thus, for example if distance and migration costs are positively associated, among immigrants from countries with the same skill prices, those from countries located farther away will tend to be more skilled and have higher earnings in the destination country.

Finally, immigrants who have high amenities in u or value them more will tend to have lower skills:

$$(9) \qquad \partial E(\mu \mid V^u > V^j)/ \partial \Gamma_{iu} = \exp(\beta S_i)(\omega_u x_i^{\delta iu-1} - \omega_{ij})\sigma^2(\mu_i)[\lambda^2 + \beta_1 \Gamma_{iu}\lambda] < 0.$$

Otherwise identical immigrants from the same origin country who derive non-pecuniary benefits from migrating - such as a desired spouse - will have lower skill on average compared with immigrants whose gains from immigrating are purely pecuniary.

b. Skill transferability and factor price equalization

The preceding framework makes clear that there are two barriers to inferences about immigration selectivity. First, country-specific skill prices are not directly observed, and cannot be inferred from information on country-specific earnings inequality without concomitant information on the distribution of skills. Second, observations on the earnings of immigrants in the destination country reflect both immigration selectivity and skill transferability. If worker skills are perfectly transferable ($\delta_{iu}=1$) across countries or skill transferability to destination u is identical for all workers ($\delta_{iu}=\delta_u$) , then selectivity operates identically in j and in u. That is, the relationships between earnings, moving costs, and home-country skill prices for immigrants to u will be identical whether earnings are observed in the home country j or in destination-country u. Immigrant selectivity can thus be identified based on earnings in either the destination or origin countries. If skills are not perfectly transferable at least initially and such transferability varies by worker characteristics, however, then selectivity can only be inferred with respect to origin-country wages. Information on initial-entry destination-country wages alone would not

be sufficient to separate the distinct influences of imperfect transferability and selectivity.[7]

With information on origin-country and destination-country earnings for the same immigrant worker, however, it is possible to test (i) whether there is skill-price equalization across countries, which would preclude any selectivity based on earnings gains, and (ii) whether foreign worker skills are completely transferable to the destination country, to identify δ_{iu}, without any information on skill prices or on their determination. This is because the difference between the log of earnings for the same worker in her origin country and in the destination country is only due to differences in the skill prices across the countries and to imperfect transferability. In particular, given (2) and (3):

(10) $\quad Ln(W_{iu}) = Ln(\omega_u) - \delta_{iu}Ln(\omega_j) + \delta_{iu}Ln(W_{ij})$.

If initial skill transferability was the same across all immigrants, the relevant regression equation derived from (10) run on data describing workers from different origin countries but in the same destination country would be:

(11) $\quad Ln(W_{iu}) = \lambda_0 - \delta_u\Sigma\lambda_j + \delta_u Ln(W_{ij}) + \epsilon_{ij}$,

where $\lambda_0=Ln(\omega_u)$, the λ_j are origin-country-specific dummy variables that impound the origin-country log skill prices, and ϵ_{ij} is an error term. The test of world factor price equalization is that the set of origin-country dummy variables are non-identical in (11); i.e., the null hypothesis of factor price equalization is that $\lambda_j=\lambda_0$, all j. A coefficient of one on the origin-country wage would, moreover, indicate full skill transferability. At the other extreme, if origin-country skills are fully non-transferrable ($\delta_u=0$), then there would be no relationship between the origin-country log wage and destination-country earnings, and all foreign workers would initially earn the same wage regardless of skill or country of origin. In that case it would not be possible to test for factor price equalization. As long as $\delta_u>0$, however, the log skill prices are identified and factor equalization can be tested.

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[7]Use of information on the wages of immigrants many years after entry would minimize the influence of heterogeneity in initial transferability on inferences about skill selectivity, but such selectivity would reflect both the decision to enter the United States and to remain (emigration selectivity). Estimates suggest that approximately 30% of permanent resident aliens do not remain in the United States, and emigration rates vary significantly by origin country.

If skill transferability varies across workers, however, (11) cannot be used to test for factor price equalization because in that case, as seen in (10), destination-country wages would vary by country-of-origin for workers with the same origin-country wage (skill) even if skill prices were actually identical across sending countries. To take into account heterogeneity in δ_{iu}, we can express δ_{iu} as a function of worker characteristics Z_{ik}:

(12) $\delta_{iu} = \delta_{u0} + \Sigma\delta_{uk}Z_{ik}$,

so that (11) becomes the non-linear equation

(13) $Ln(W_{iu}) = \lambda_1 + (\delta_{u0} + \Sigma\delta_{uk}Z_{ik})(Ln(W_{ij}) - \Sigma\lambda_j) + \epsilon_{ij}$.

The set of coefficients associated with the interaction of worker characteristics with the log of the worker's home country wage provides the contribution of each characteristic to the transferability of immigrant skills. These transferability determinants are identified from the variation in origin-country wages across workers within each country.[8] The log factor prices, embedded in the coefficients associated with the interactions between the country dummy variables and the transferability determinants Z_{ik}, are thus identified as well, as long as at least some of the skill transferability determinants δ_{iuk} are non-zero.

By estimating (13) using non-linear least squares it is thus possible to test to what extent transferability is a permanent or temporary trait by including among the Z's a variable indicating the number of years the worker has been residing in the United States. Note that because the worker's skill is captured by the worker's home-country wage net of the skill price, years of exposure to the U.S. cannot in (13) reflect differences in cohort "quality" or skill selectivity, unlike for standard cross-sectional relationships between year of arrival and earnings. The relevant parameter describes the transferability of a worker's given skill over time. Presumably, if transferability is not permanent, the coefficient on years in the U.S. in (13) should be positive net of the destination-origin skill price differential.

[8]Theoretical identification does not depend on the assumption that the transferability determinants coefficients do not differ across countries of origin. Allowing for such variation would, however, increase the number of parameters by multiples of the number of countries of origin.

One difficulty in estimating (13) as a basis for testing for factor-price equalization and measuring skill transferability and its determinants is that the home-country wage measures skill with error, given both that earnings are stochastic and corrections based on purchasing power across countries, needed to make wages across countries comparable, are imperfect. Such measurement error, if random, would bias δ_u to zero in (11), and bias all of the δ_{iuk}'s in (13) as well. Multiple observations on W_{ij} or instruments that affect W_{ij} but not U.S. earnings net of skill are thus needed as well to identify skill transferability.

c. The determination and measurement of country-specific skill prices

To make inferences about immigrant selectivity, in the absence of direct information on country-specific skill prices, additional information and some additional structure is required. In particular, we now show that with information on the home-country earnings and the schooling of immigrants and country-specific data on aggregate output, numbers of workers, and their average schooling levels in the immigrant sending countries it is possible to obtain tests of immigrant selectivity without information on the world distribution of skill prices or country-specific measures of income inequality even when skill transferability is also imperfect.

We assume that aggregate output Y_j in country j is produced according to Cobb-Douglas technology

(14) $Y_j = AL_j^{\alpha}K_j^{\gamma}$,

where K_j is country j's capital stock and L_j, the country's aggregate stock of labor in efficiency units, is given by

(15) $L_j = N_j(a(x_{ij}))$,

where N_j is the total number of workers in j and a() is an function yielding the average efficiency units per worker in country j.

The skill price ω_j is the marginal product of an efficiency unit of labor, given by

(16) $\omega_j = \alpha Y_j/N_j(a(x_{ij}))$,

The log of worker i's wage in country j, from (2), can thus be written as

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

Equation (17) indicates that the log wage for worker i in country j is equal to a constant, the log of the labor output coefficient (in efficiency units), plus the log of output per worker in country j, with a coefficient of 1.0, minus the log of country j's average efficiency or skill per worker, plus the coefficient on schooling (the schooling return) in (1) times worker i's own schooling. Of course, if equation (17) is estimated on a sample of immigrant workers from different countries, the estimates will be subject to selectivity bias. In particular, it is easy to show that because the model indicates that the higher the country-specific skill price the greater the average endowed skill of the migrant from that country, the estimated coefficient on the log of per-worker aggregate output (which is positively associated with the skill price) in (17) obtained from a sample of workers who chose to migrate will be upwardly biased and thus greater than one.

In sum, the basic migration model with worker skill heterogeneity and country skill price differentials implies that high skill-price countries (which will have relatively higher earnings inequality for given skill inequality) will send fewer but more skilled immigrants. In terms of the observable correlates of skill prices, among workers residing in countries with the same output per worker, those workers residing in countries where workers have higher average skill levels receive lower skill prices, while among workers in countries with the same average worker skill levels, those in countries with higher output per worker will receive higher (lower) skill prices. Given immigrant skill heterogeneity and selectivity due to home-country skill price variation, these results imply that immigrants from countries with high (low) output per worker and with low (high) average levels of schooling will have the highest (lowest) skill levels among immigrants with identical schooling levels.

2. The Data

To assess the skill transferability of immigrants, the extent of factor price equalization and immigrant selectivity we use data from the New Immigrant Survey Pilot (NIS-P), which provides both the U.S. earnings and home-country earnings for a sample of new U.S. legal immigrants, combined with

information on the characteristics of immigration sending countries. The sampling frame for the NIS-P consists of the 148,987 persons who were admitted to legal permanent residence during the months of July and August of 1996. The sample of immigrants was drawn from the administrative records of the Immigration and Naturalization Service (INS), which provided information on the immigrants' age, type of visa, and country of origin as well as the address provided by each immigrant to which his or her "green card", evidence of legal immigration status, was to be sent. The stratified random sample drawn from the records over sampled migrants with employment visas and under sampled children, and numbers 1,984 persons, of whom 1,839 were adult immigrants.

Attempts were made to interview by telephone all of the sampled immigrants based on the address information provided. The sampled adult respondents successfully contacted, 62% of all sampled immigrants, were administered a questionnaire ascertaining information on their earnings in their last job in their origin country and in their current job in the United States as well as information on their schooling, abroad and in the United States, and their migration histories. The availability of information from the administrative record for all sampled immigrants regardless of interview status enables an assessment of the representativeness of the surveyed sample. In the Appendix we examine the issue of whether the interviewed immigrants that make up the sample that we analyze are representative of the sampled immigrants. Jasso, Massey, Rosenzweig and Smith (2000) also examine whether the July-August immigrants are representative of a full-year cohort and provide more detail about the sample. These analyses suggest that the interviewed sample is representative of the annual flow of U.S. immigrants in the recent period.

One additional advantage of the administrative-record based sample is that there is precise information on the visa status of the immigrant. Because immigrants are selected by different criteria, it is important in carrying out economic analyses of immigration selectivity to focus on immigrants who most conform to economic models of choice. Prior empirical analyses of the characteristics and behavior of the foreign-born in the United States has principally relied on Census data , which provides no

information on visa status. Such analyses thus lump together immigrants matched in the job and marriage markets and immigrants subject to binding numerical ceilings, immigrants fleeing for their lives, immigrants who are in illegal status, and immigrants able to immigrate by dint of having U.S. kin, and thus who faced heterogeneous prior constraints on immigration and/or constraints on work opportunities in the United States.

To carry out the analyses motivated by the theoretical framework, we focus on the earnings of the 659 adult immigrants aged 21 through 64 who obtained visas as "employment" immigrants or as spouses of U.S. citizens or U.S. permanent resident aliens. We chose these categories principally because such immigrants are able to immigrate without having a blood relative in the United States. This non-nepotistic immigration is thus an option for all individuals born and residing outside the United States, subject only to job or marital screening/matching, and thus conforms most closely to choice-theoretic models of migration. Moreover, spouses of U.S. citizens are not subject to numerical limitation and employment immigrant visas at the time of the survey were available for almost all immigrants who qualified.[9] In contrast, the left-out group is very heterogeneous, including refugees, parents, adult unmarried children and siblings of U.S. citizens, immigrants from a subset of countries selected by lottery, and some very small miscellaneous categories, and includes significant numbers of immigrants subject to numerical limitations. The marriage and employment groups are an important component of the total legal immigrant flow, which will also likely continue as U.S. immigration admission categories in the foreseeable future - employment and marital immigrants constitute over 55% of all 21 and over non-refugee immigrants in the 1996 (July and August) immigrant population and, because of the over sampling of employment immigrants, 67% of all adult immigrants in the sample.

As noted, one of the unique and important features of the NIS-P is that it provides information on the earnings of the immigrants in their last job before coming to the United States. Over 77% of the

[9]Among Third- and Fourth-preference employment immigrants, those from the Philippines had to wait for a visa for one to two years. Those immigrants receiving an "unskilled" visa had waiting times of 5-9 years. Both groups together represent less than 10% of all employment immigrants in our sample.

immigrants had worked in a foreign country in the ten years prior to the survey. We converted the earnings in the last job abroad, provided by the immigrants in native currency units, to dollar amounts based on estimates of the country-specific purchasing power of the currencies from the Penn International Comparisons Project, described in Summers and Heston (1991). These conversion factors are explicitly designed to take into account differences in the "cost of living" across countries and to avoid the distortions associated with exchange rate regimes in order to facilitate cross-country comparisons. The purchasing power parity (PPP) estimates thus permit comparisons of origin-country earnings across U.S. immigrants who have worked in many different countries and are comparable with their U.S. earnings, all denominated in dollars of purchasing power. Based on information on work time and pay periods, to adjust for labor supply differences across workers we converted all pay data to full-time earnings.

We appended to each record information on the characteristics of the immigrant's origin country using information on the last country of residence. To measure skill prices in accordance with the model, we used the real (PPP-converted) GDP *per worker* estimates from the Penn World Table, Mark 5.6 supplemented with updated 1995 estimates from the ICP, and estimates of the average schooling levels of the population aged 25 and over in origin countries from Barro and Lee (1993). Average schooling estimates are available for a large but not complete subset of countries for which there are PPP GDP estimates. For those countries for which there is no schooling stock estimates we constructed a variable indicating that schooling was missing and set the schooling variable to zero.

We also appended to the micro data country-specific information related to the costs of immigration. Two variables measure origin-country proximity. The first variable is the distance of the origin country's capital to the closest major entry city in the United States. The second is an indicator variable taking on the value of one if the country was a host to a U.S. military base in the five years preceding the survey. Military bases are enclaves of U.S. citizens abroad, many of whom are young and single. The selection framework suggests that countries with such bases, border countries (Mexico and

Canada), and countries generally not located at great distances from the United States thus have lower U.S. immigration barriers or costs and should, given skill prices, be disproportionately sending countries for low-skill immigrants and send more immigrants in total. Finally, as country-specific determinants of information costs, from Jasso and Rosenzweig (1990a and b), we also obtained information on whether English was an official language for each sending country.

Most but not all of the new legal immigrants in the subsample are in fact new migrants. The data indicate that one-third of the sample immigrants had resided in the United States prior to becoming a green card holder, although less than twenty-five percent had been in the United States for more than 2 years in total. Of the immigrants with at least some prior U.S. experience, the average number of years in the United States was slightly less than 5.5 years. The information on the number of years each immigrant had been in the United States prior to obtaining permanent residence status is likely more accurate than that found in most surveys and the U.S. Census, as it is based on questions posed to the immigrant on date of first entry to the United States, on number of trips to the United States since first entry, and on total number of years spent in the United States since the first entry. This information contrasts with that from the U.S. Census, for example, in which duration of stay in the United States is based on one question that requires the migrant to provide the time-period when he or she first "came to stay.". We use the information on the number of prior years in the United States to estimate, based on (13), to what extent the transferability of the skills brought by an individual immigrant increases with residence in the destination country.

Table 1 provides descriptive statistics for the three overlapping subsamples of immigrants that we will use - the sample of immigrants who worked in the home country, numbering 342; the sample of immigrants who worked in the United States, numbering 414; and the sample of immigrants who worked both in the United States and in their home country, numbering 230. All sample sizes reflect the unavailability of PPP-based GDP figures for all countries, the major omissions of which are all countries of the Former Soviet Union, eastern European countries that undertook major economic reforms, and

Vietnam.[10] Nevertheless, there are 132 countries with sufficient country-level information, of which there are 58, 70 and 54 countries represented, respectively, in the three subsamples of employment/spouse immigrants.

The figures in Table 1 indicate that the characteristics of the immigrants do not differ substantially by employment location, the one exception being that women are somewhat under represented in the sample of immigrants working both prior to and after immigrating. All three samples suggest that immigrants are positively selected with respect to their origin country populations in terms of observable human capital indicators. For example, among the immigrants who either worked in their home country or in the United States, the average number of years of schooling of the labor-force age population in their home countries is below 7.5 years, while their own average schooling is above 14 years (higher than the U.S. average). Similarly, while average GDP per worker in the home countries of the immigrants who worked in their home country is $13,194, the average earnings of the immigrants in their last job prior to immigrating was $19,879. Most striking is the fact that for the sample of immigrants for whom we have pay information in both the home country and in the United States, the average initial gain in earnings is almost $21,000 - such immigrants earned on average $17,080 in the last job in their home country and $37,989 in their first job as immigrants in the United States soon after entry.[11] The large positive average gap in full-time-equivalent earnings for the same workers at origin and in the United States indicates that on average the skill price in the United States exceeds the average of skill prices among the sending countries. The relatively high U.S. skill price evidently has evidently attracted higher-skill immigrants from among the sending countries, as measured by their home-country earnings

[10]The set of 132 countries, which we use to estimate the determinants of emigration, is not an immigration-choice-based sample and the average numbers of July/August immigrants per country includes zeros for the countries not represented in the cohort. The number of countries represented in Table 1 is less than the number represented in the NIS-P sample of immigrants by 41. Among all adult immigrants in the visa categories in the entire 1996 July/August immigrant cohort 128 countries are represented.

[11]Such immigrants on average could not have worked more than 1.9 years in the United States, if all years spent in the United States prior to becoming an immigrant were spent in the labor force.

and schooling. This average gap, of course, overstates the average skill price differential to the extent that skill is not immediately fully transferable.[12]

Table 2 reports the characteristics for the complete set of 132 potential sending countries for which there is PPP GDP information available. Comparison of the characteristics of the sending counties of the employment and spouse immigrants in Table 1 with those for all countries in Table 2 indicates that U.S. employment/spouse immigrants are also positively selective with respect to country characteristics - the average schooling level of adults of working age in all countries outside of the United States, at 6.3 years, is below that in the actual sending counties of employment/spouse immigrants, as is average real GDP per worker, at $11,268. Clearly, the legal immigrants in the three visa categories, whose schooling and home country earnings exceed their own country means, are highly, and positively, selected on average with respect to the earnings and schooling of the world population residing outside of the United States.[13]

The first column of Table 3 reports estimates of the determinants of the log of initial U.S. earnings for the sample of U.S. earners among the immigrants. The specification includes only the personal characteristics of the worker that are available in Census-type data sets, including schooling, age, age squared and years in the United States and its square. The estimates are also similar to those obtained in studies of the foreign born based on Census data - schooling has a positive "return", of over 7%, and earnings rise at diminishing rates with residence in the United States and with age. The women immigrants also earn a little over 60% of what men earn in their first post-immigration jobs. In the second column, estimates are reported for the same sample with visa information included in the specification. The visa coefficients indicate that, relative to immigrants chosen on the basis of a job offer, immigrants wh enter as spouses of U.S. citizens, or as spouses of U.S. permanent resident aliens, or as

[12]24% of the immigrants earned less in their first U.S. job than in their last home-country job.

[13]This is true a fortiori if the country data are weighted by population. The population-weighted average PPP GDP per worker is $8,095 for the 132 countries and average schooling is 6.0 years (99 countries).

spouses of the employment immigrants earn less (net of gender). Clearly immigrants selected on the basis of skills are more skilled, given observable characteristics, than are the spouse immigrants, whose gains from immigration are in part non-pecuniary, and for the "tied mover" spouses of employment migrants.

The estimates from a specification that adds the country characteristics of the immigrants to the specification reported in the second column are reported in column three. These estimates confirm, as in prior studies of the foreign-born from the U.S. Censuses, that net of observable characteristics, the initial U.S. earnings of foreign-born workers are significantly correlated with the characteristics of the countries immigrants migrate from. In particular, the estimates indicate that immigrants from countries proximate to the United States geographically (Mexico and Canada) or because of the presence of a U.S. military base have lower initial U.S. earnings than the other immigrants, given visa category, while immigrants from higher GDP countries have higher U.S. earnings. Finally, estimates from the same specification but obtained from the sample of immigrants with both U.S. and home-country earnings are reported in column four. These estimates are very similar to those for the sample of U.S. earners, suggesting that the smaller sample that conditions on work abroad and in the United States, is not especially selective.

3. Identifying Skill Transferability and Selectivity: Estimates

a. Initial Skill Transferability and Inter-country Skill-Price Equalization

As discussed, the relationship between country-of-origin characteristics and the initial U.S. earnings of the immigrants reflects both the forces of selectivity and variation in initial cross-border skill transferability. It is thus not possible to infer the roles of migration costs and skill prices in determining immigration selectivity from estimates based on U.S. earnings alone. We first assess to what extent imperfect skill transferability plays a role in the variation in the initial U.S. earnings of immigrants and test the significance of skill-price differentials, net of the influence of imperfect skill transferability, by estimating U.S. earnings equations (11) and (13), which condition of the (log) home-country earnings of the immigrants and thus net out skill selectivity.

Table 1 reports in the first column the OLS estimates of the transferability equation (11), which

assumes that skill transferability is the same across all immigrants. The estimates are obtained from the sample of 230 immigrants reporting earnings from both their current U.S. job held after admission to permanent residence and their last job in their home-country.[14] The estimate of δ_u indicates that the hypotheses that skills are perfectly not transferable in the first year and that skills are perfectly transferable are both rejected. Indeed, the transferability coefficient is quite low, suggesting that immigrants on average initially transfer less than 17% of their skill. However, as noted, because PPP-adjusted home country earnings net of the skill price is an imperfect measure of skill, the skill transferability coefficient may be biased to zero. In the second column of the table we report two-stage least squares estimates in which the log of the home-country wage is predicted using as instruments the schooling attainment, in years, of the immigrant's mother and father.[15] The estimate of skill transferability more than doubles using these instruments, suggesting that on average immigrants initially transfer over a third of their skill.[16]

The estimates in both the first and second columns also indicate that the set of country dummy variables differ significantly, rejecting resoundingly cross-country skill price equalization at least for the 54 major sending countries represented in the sample. The existence of skill price differentials across countries suggests that immigration selectivity with respect to skill will indeed differ across counties of

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[14]The sample excludes immigrants whose last job in their home country was held prior to leaving school.

[15] As pointed out in Dustmann and Soest (forthcoming), parental schooling attainment, conditional on respondent skill, is less likely to directly affect earnings through networks, for example, if the parents of immigrants do not reside in the United States. This is almost completely the case for our sample of employment and marriage immigrants. Indeed, one immigrant category that we exclude from the analysis includes individuals who are the adult children of U.S. citizens.

[16]Human capital investment theory, as emphasized in Eckstein and Weiss (1997), suggests that the estimate of δ is a lower-bound estimate of initial skill transferability. The theory implies that equally-skilled immigrants with lower initial earnings due to lower transferability will initially invest more than those immigrants with higher transferability coefficients because they have a (presumably) temporary lower opportunity cost of investment. This will lower their initial earnings further. These considerations, however, do not alter the correspondence between the ordering of true skill transferability across different immigrant groups, although differences in the estimated δ across immigrants will be overstated due to the reinforcing influence on earnings of human capital investments.

origin. However, as discussed, if skill transferability also varies by immigrant, the country-specific dummy coefficients will pick up these differences to the extent that individual skill transferability determinants are correlated with country of origin. In columns three and four, we report non-linear, two-stage least squares estimates of equation (13) in which skill transferability is allowed to vary with the number of years the immigrant spent in the United States and its square, immigrant age and immigrant gender. The instruments used to predict home-country earnings and its interaction with the determinants of skill transferability additionally include the schooling of the mother and father of the immigrant interacted with the set of transferability determinants.[17]

The estimates in columns three and four indicate that skill transferability differs significantly by immigrant personal characteristics. In particular, net of U.S. exposure, initial skill transferability is lower for older immigrants Moreover, on average women's skill are 10% less transferable at entry than are men's skills. The test-statistic indicates that the gender and age variables are jointly significant at the .068 level ($F(2,170)=2.72$). Moreover, net of age and gender, skill transferability varies with exposure to the United States, with the linear and quadratic experience variables jointly statistically significant at the .016 level ($F(2,170)=4.25$). The point estimates suggest that (i) skill transferability increases with U.S. residence, increasing transferability by approximately 6% after the first year, but (ii) the effects on transferability of residence in the United States diminish over time, completely dissipating by the sixth year of residence.[18] These estimates also reject inter-country skill price equalization at the .0001 level, net of the inter-immigrant variability in skill-transferability related to age, gender and U.S. experience. These results thus imply that inferences based on the initial earnings of new immigrants may provide a misleading picture of the extent of skill selectivity potentially caused by imperfect factor price

[17]Table B in the Appendix reports test statistics for the set of instruments used in the first-stage equations for each of the variables appearing in the second stage.

[18]It is important to note that the measure of exposure to the U.S. reflects exposure prior to becoming a permanent resident alien and may underestimate the extent to which skill transferability changes over time after immigration as a permanent resident. For example, migrants may make less investments in U.S. skills before they obtain a permanent residence visa due to uncertainty about obtaining the visa.

equalization because (i) initial skill transferability varies by worker characteristics and (ii) transferability is in part a temporary state.

b. Home Country Earnings and Skill Price Variation

To avoid the contaminating effects of immigrant characteristics on the initial U.S. earnings of recent immigrants due to imperfect skill transferability that is indicated in Table 4, we assess immigration skill selectivity implied by the existence of inter-country skill-price differentials by looking at the relationship between the most recent *home-country* earnings of the immigrants and the characteristics of their home countries, as in equation (17). In the first column of Table 5 we report GLS estimates that take into account the existence of common error components within countries of origin but from a specification that ignores country-of-origin attributes. The results, although they are in terms of home-country earnings, are again conventional - a 6% "return" to schooling, quadratic age effects, and lower earnings for women net of schooling and age.

In column 2 we report GLS estimates of equation (17) that includes the country-specific skill price determinants - the log of real GDP per worker and the log of the average schooling of workers - and the individual worker's individual observable skill attributes. This specification also includes the visa category variables, the geographic proximity variables and years of U.S. residence as determinants of home country earnings. We include the latter variables to assess how selectivity can obscure interpretations of the determinants of the U.S. earnings of immigrants. Because the geographic location of a country relative to the United States, the U.S. visa status of an immigrant and his or her U.S. experience are unlikely to have direct effects on home-country earnings, the coefficients on these variables mainly reflect selectivity, measured in terms of home-country earnings. Thus, for example, the interpretation of the positive coefficient on U.S. experience is not that increased time in the United States increases home-country earnings, because home-country earnings are measured prior to coming to the United States in almost all cases. Rather, these results imply that immigrants, of given age, who came to the U.S. earlier tend to be of higher skill. Similarly, the results indicate that those U.S. immigrants from

either Canada or Mexico with the same schooling tend to have lower skill. The set of "selectivity" coefficients is statistically significant (F(12, 58)=2.92). These results thus imply that the findings in Table 3 that the U.S. earnings of the immigrants are higher for those with more U.S. experience are due in part to skill selectivity and not just to the influence of U.S. experience on skill transferability. The estimates in Table 4, however, which control for home-country skill, pick up pure transferability effects.[19]

The estimates in column two also show that country-specific skill prices account for a statistically significant proportion of the variation in the home-country earnings of worker-immigrants net of the workers' own schooling. In conformity to the model, the coefficient on the log of per-worker country output is positive and, given positive selectivity with respect to skill price, greater than one, by 32%. The F-statistic indicates rejection of the hypothesis that the coefficient is equal to one at the .049 level (F(1,57)=4.05). In addition, as implied by the model the sign of the coefficient on the measure of average worker skill in the country is negative and also statistically significant. The point estimates suggest that among countries with the same average skill level of workers and among immigrants with the same individual schooling, those immigrants from countries with a 10% higher output per worker have home-country earnings that are 13% higher than those immigrants from countries with average skill prices. Similarly, among immigrants with the same level of individual schooling and emigrating from countries with the same output per worker, those who emigrate from countries in which workers' average schooling is 10% higher have home-country earnings that are 8.6% below average.

One possible alternative interpretation of the negative average worker schooling effect, for given output per worker, on immigrant home-country earnings is that it reflects not lower skill prices but lower

[19]Another coefficient that requires care in interpretation because of selection is that for gender. The finding in Table 3 that net of the other variables female immigrants did not earn less than male immigrants in their home country should not necessarily be interpreted as the absence of gender discrimination outside of the United States labor market. In fact, the model suggests that if the skill price differential between the United States and the home country is lower for women than men, because, say, the U.S. labor market values men more than women compared with sending countries, then female immigrants will be more skilled than male immigrants.

schooling quality. The third column of Table 5 reports estimates from the a specification that adds two measures of schooling quality, from Barro and Lee (1997), the log of teachers per pupil in primary and secondary schools. These variables are barely jointly significant, but their inclusion actually increases in absolute value the magnitude of the average schooling coefficient and increases its significance. It is also possible that the specifications in columns two and three omit important country variables that affect worker earnings and that average worker skill in a country is imperfectly measured by the average schooling of the worker-age population. The specification used to obtain the estimates in the fourth column of Table 5 replaces all of the country-specific variables characterizing skill prices and migration costs by country dummy variables. If there were important country-level variables correlated with individual worker characteristics omitted in the column-two specification, then we would expect that the estimates of the individual worker characteristics effects on earnings would change significantly when all potential country variables are absorbed in a country fixed effect. However, as can be seen, the estimates of worker variable coefficients are little changed when country fixed-effects are used, although the schooling return coefficient falls by 18%, a difference that is not statistically significant, and the age coefficients become individually statistically insignificant.[20]

c. Emigration Rates

The evidence in Tables 5 suggests that an increase in home-country skill prices, as reflected in the coefficients on real GDP per worker and average schooling attainment among the worker-age population, increases the average skill of immigrants, in conformity to the model in which decreases in the destination-origin skill price differential increases the skill level of immigrants. Does the cross-country variation in these measures of the two components of skill prices also affect the inter-country variation in the number of immigrants coming to the United States consistent with a skill-price interpretation of these variables? The first two columns of Table 6 report results from regressions of the

[20]The change in the age coefficient may suggest that we may have imperfectly controlled for the average age of the country's labor force, which is a determinant of worker skill.

per-capita total number of non-refugee immigrants and the per-capita number of employment and spouse immigrants, respectively, in the 1996 July/August immigration cohort on the country characteristics for the 132 countries for which we have PPP GDP data.

The set of six variables measuring country-specific skill prices and costs of immigrating explains over 38% and over 46%, respectively, of the total variation across the 132 countries in total and employment/spouse U.S. immigration flows per-capita. The greater explanatory power for the latter subset of immigrants is consistent with the fact that a much greater proportion of these immigrants have not been subject to numerical country ceilings, *de facto* and *de jure*. Moreover, the signs of the skill price variable coefficients - real GDP per worker and average schooling - conform to the predictions of the migration choice-framework and are statistically significant determinants of the size of both total, non-refugee and employment/spouse migration flows to the United States. The point estimates in the first column for total immigrant flows suggest that a 10% increase in real output per worker for a country with an average population size, for a fixed average schooling among workers, would reduce the number of non-refugee U.S. immigrants from that country by 7%. An increase in a potential sending-country's skill price, given the results in Table 5, thus leads to fewer but higher-skill immigrants emigrating to the United States from that country. However, for given per-worker output, those countries with higher-skilled workers on average, and thus with lower skill prices, send more, and lower-skill, immigrants; with a 10% increase in average schooling levels being associated with 7% additional immigrants.

The estimates also suggest that a country's proximity to the United States, based on distances to borders and proximity by proxy, as represented by the presence of a military base in a potential sending country, appears to increase significantly the size of immigrant flows for all immigrants and those in the employment and spouse categories. Whether or not English is an official language of a country also appears to increase the number of immigrants from that country, suggesting that lack of English language skill is a barrier to U.S. immigration.

Finally, to assess whether the estimated effects of the determinants of country-specific skill

prices on the flows of non-refugee immigrants reflect migration choice and are not merely spurious, we also estimate the same specification for immigrants who are classified as refugee/asylees. The relationships between these immigrant flows, geographic proximity and determinants of skill prices presumably should not conform well to those implied by economic-selection models of migration. And, as seen in the last column of Table 6, none of the skill price or proximity variables individually or as a set are statistically significant determinants of the number of these migrants to the United States.

4. Conclusion

Attempts to understand the labor market status of immigrants have been an important component of labor economics in recent decades. In spite of some significant contributions in that literature, some of the more basic labor market questions about immigration have received little attention. These issues include isolating the economic factors determining the differential skills and selectivity of immigrants, the magnitude and determinants of immigrants' economic gains from immigration, and the transferability of skills across national borders. In this paper we address these questions using a new survey of recent immigrants to the United States that has information on pre-and post- immigrant labor market experiences.

Our empirical findings from the new data, based on an empirically implementable theoretical framework incorporating worker skill heterogeneity, inter-country differences in skill rewards and direct migration costs, suggest that labor market skills are imperfectly transferable across the U.S. border. The estimates indicate, moreover, that skill transferability varies by immigrant characteristics such as age, gender and exposure to the U.S., so that prior estimates of immigrant selectivity based solely on the U.S. earnings of immigrants confound transferability and selectivity. The estimates also indicate that skill prices differ significantly across countries and support the hypotheses that the differential size of immigrant flows from sending countries, the economic heterogeneity among U.S. immigrants, and the amount that they benefit from immigration are strongly related to inter-country differences in skill prices, the costs of moving between countries, and the set of legal and administrative rules the United States has

in place that govern immigration. In particular, consistent with the theoretical framework countries less proximate to the United States, with high output per worker but with workers of low average skill tend to send the fewest immigrants but immigrants with the highest skills. The evidence suggests that U.S. immigrants are on average more skilled than the world population, and as a consequence of the positive selectivity of migration with respect to home-country skill prices, the inequality in the earnings of U.S. immigrants is more compact than the world inequality in skill prices. The results also imply that, absent any changes in U.S. immigration laws, development and aid polices of the United States can have important effects on U.S. immigration flows. In particular, a decline in the U.S./world relative skill price, brought about, say, by the importation and development of new technology outside of the United States, would lead to both a decline in the demand for U.S. visas and an increase in the average skill level of new U.S. immigrants.

Finally, it is important to note that our findings pertain only to U.S. marital and employment immigrants. As we have stressed, the forces of selectivity may be quite different for other types of immigrants who make up a large, but quite heterogeneous, part of U.S. immigration flows. Moreover, because the data that we use describe newly-admitted immigrants, our estimates do not characterize the ultimate skill composition of immigrants measured in terms of U.S. earnings after U.S. earnings potential associated with transferability barriers has been fully realized. This will depend on the post-immigration behavior of immigrants and in particular on their post-immigration investments in U.S.-specific job skills and ultimately decisions to remain in the United States. Without an understanding, however, of the mechanisms that select the immigrants who come and impediments to skill transferability, an understanding of the factors accounting for the heterogeneity of the earnings of immigrants residing in the United States for different periods of time would be seriously incomplete.

Appendix: Sample Selection and Representativeness

The sampling frame for the NIS-P consists of all persons who were admitted to legal permanent residence during the months of July and August of 1996. The total number of immigrants admitted during this period was 148,987. A stratified random sample was drawn, under sampling children and over sampling the employment-based. The strata were defined as follows: (i) all children (defined as being under age 18) went into one stratum, with a probability of selection equal to .003715; (ii) all adults (defined as age 18 or over) with employment-category visas (including the spouses of employment-based principal immigrants) went into the second stratum, and were assigned the highest probability of selection (.047201); and (iii) all other immigrants went into the third and last stratum, assigned a probability of selection of .013486. Accordingly, employment-based immigrants were exactly 3.5 times as likely to be drawn as immigrants in the residual category. The sample thus drawn numbers 1,984 persons.

In this paper we describe only adult immigrants aged 21 and over in three visa categories - those admitted as employment immigrants and those admitted by marrying a U.S. citizen or permanent resident alien. These immigrants numbered 1,048 in the total sample drawn from administrative records, of whom 659 were successfully located and interviewed by telephone (a response rate of 63%). The most important factor in reducing the sample response rate was the inability to obtain phone numbers for all of the sampled immigrants, as the response rate among those cases in which the immigrant was contacted by telephone was 85%. The principal constraint on successful telephone contact was a high rate of unlisted and unpublished numbers. Unlisted and unpublished numbers are a growing trend in the United States and there are particularly high rates in those geographic areas in which immigrants concentrate. For example, unpublished and unlisted phone numbers run as high as 69% in some urban areas which coincide with high immigrant concentration such as Los Angeles. These problems, which exist for all populations, were compounded by the prevalence of common last names for some ethnic groups (e.g., Koreans). Finally, immigrant women typically do not have phone numbers listed in their names (in some

origin-country groups wives differ from their husbands in surnames). To reduce the consequences of these problems, field tracking was carried out in areas where the sampled immigrants were most concentrated. In particular, a staff of field trackers were sent out to locate respondents and obtain phone numbers in the following areas: Los Angeles area, Northern California, and parts of the following states -- New York, New Jersey, Connecticut, Florida, Texas, Washington, Michigan, Virginia, Maryland, Massachusetts -- as well as Washington, DC.

Although the NIS-P response rate is reasonably high, it is possible that the interviewed sample is selective and not representative of the entire sample. The unique records-based design of the survey, however, facilitates the assessment of sample representativeness because the records provide information on both the interviewed immigrants as well as those immigrants not interviewed. That is, unlike for most surveys, we have information on the characteristics of all sampled individuals regardless of interview status. In particular, the administrative records provide information on the immigrant's visa, age, sex, marital status, place of birth, and initial (intended) place of residence. Based on the these characteristics, the interviewed sample appears to be similar to the non-interviewed sample and thus to be representative of the sampled immigrants.

Table A reports the immigrant record characteristics for the sample stratified by interview status as well as probit coefficients obtained by estimating a probit equation determining whether or not a sampled immigrant was interviewed as a function of the characteristics on the immigrant's administrative record.. As seen in the table, the two groups are remarkably similar in almost all measured characteristics. Those interviewed and those not interviewed resemble each other in demographic characteristics -- age, sex, and marital status, and, for those immigrants adjusting from a visiting status in the United States, the year of entry. There is a slight tendency for visa adjusters (those formerly in the Unites States with a non-immigrant visa) to be under represented (21.4% of those interviewed versus 26.2% of those not interviewed).

With respect to visa type, the proportions in the two principal visa categories -- spouse of U.S.

citizen and employment-based immigrants -- are similar across the two groups. The place- of-birth distributions indicate that the two groups are, again, remarkably similar, with difficulties in locating and interviewing immigrants largely confined to two continents, Asia (reflecting in part the surname problem) -- which accounts for 39.6% of the noninterviewed but 35.5% of the interviewed -- and Africa -- which accounts for 7.2% of the noninterviewed but 5.0% of the interviewed.

Information on the initial state of residence in the United States indicates that the interviewed and noninterviewed immigrants do not differ appreciably by geographic residence, with one exception - California, with California accounting for 26.2% of the interviewed versus only 16.5% of the noninterviewed. This reflects the fact that California has a high proportion of unlisted telephone numbers as well as a high presence of Asia-born immigrants.[21] The test statistics based on the probit coefficients confirm what is evident by comparing the individual characteristics of the interviewed and non-interviewed samples - the set of coefficients reflecting the differences in characteristics by interview status for all characteristics is statistically significant, but the set excluding California is not statistically significant at even the 20% level.

[21]California is the principal state of residence of immigrants born in Korea and India, and in both cases the proportions located and interviewed appear to be smaller in California than in other states. For example, while 60% of the India-born residing in California were interviewed, 100% percent of those residing in New Jersey (the second largest contingent) were interviewed; similarly, while 38.5% percent of the Korea-born residing in California were interviewed, 50% of those residing in New York (the second largest group) were interviewed.

References

Barro, Robert and Jong Wha Lee, "International Comparisons of Educational Attainment," Journal of Monetary Economics 32, December 1993, 363-94.

Borjas, George J., "Assimilation, Changes in Cohort Quality and the Earnings of Immigrants," Journal of Labor Economics 3, 1985, 463-489.

Borjas, George J., "Self-Selection and the Earnings of Immigrants," American Economic Review 77, September 1987, 531-553.

Chiswick, Barry, "The Effect of Americanization on the Earnings of Foreign-Born Men," Journal of Political Economy 86, 1978, 897-921.

Chiswick, Barry, "Are Immigrants Favorably Self-Selected? An Economic Analysis," Institute for the Study of Labor, Discussion Paper No. 131, March 2000.

Duleep, Harriet O. and Mark C. Regets, "The Decline in Immigrant Entry earnings: Less Transferable Skills or Lower Ability?" Quarterly Review of Economics and Finance 37 (Special Issue on Immigration), 1997, 89-108.

Dustmann, Christian, "Temporary Migration and Economic Assimilation," Swedish Economic Policy Review 7, 2000, 213-244.

Dustmann, Christian and Arthur van Soest, "Language Fluency and Earnings: Estimation with Misclassified Language Indicators," Review of Economics and Statistics, forthcoming.

Eckstein, Zvi and Yoram Weiss, "The Absorption of High Skill Immigrants: Israel 1990-1995," mimeo, 1997.

Jasso, Guillermina, Massey, Doug, Rosenzweig, Mark and James Smith, "The New Immigrant Survey Pilot: Overview and New Findings About Legal Immigrants at Admission," Demography, February 2000.

Jasso, Guillermina and Mark Rosenzweig, The New Chosen People: Immigrants in the United States, New York: Russell Sage Foundation (Census Monograph Series), 1990a.

Jasso, Guillermina and Mark Rosenzweig, "Self Selection and the Earnings of Immigrants: Comment," American Economic Review, March 1990b.

Lalonde, Robert J. and Robert H. Topel, "The Assimilation of Immigrants in the U.S. Labor Market," in George J. Borjas and Richard Freeman, eds., Immigration and the Work Force: Economic Consequences for the United States and Source Areas, Chicago: University of Chicago Press, 1992, 67-92.

Lalonde, Robert J. and Robert H. Topel, "Economic Impact of International Migration and the Economic Performance of Migrants," in Rosenzweig, Mark R. and Oded Stark, eds., Handbook of Population and Family Economics, Amsterdam: North Holland, 1997, 799-850.

Lee, Jong-Wha and Robert J. Barro, "Schooling Quality in a Cross Section of Countries," National Bureau of Economic Research Working Paper: 6198. September 1997.

Summers, Robert and Alan Heston, "The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950-1988," Quarterly Journal of Economics 106, May 1991, 327-368.

Table 1
Characteristics of Employment and Spouse Immigrants, by Country of Employment

Variable	Worked in Home Country	Worked in the United States	Worked in the U.S. & Home Country
Home country characteristic			
GDP(PPP$)/Worker	13,194 (10,406)[a]	12,569 (9,774)	12,634 (10,346)
Average years of schooling of labor-force age population	7.36 (2.57)	7.12 (2.51)	7.40 (2.56)
Distance to closest U.S. port of entry (miles)	4510 (3626)	4344 (3511)	4599 (3598)
Border country	.178	.174	.158
U.S. military base	.232	.229	.254
English an official language	.345	.316	.366
Characteristic of worker			
Home-country full-time annual earnings (PPP$))	19,879 (32,403)	-	17,080 (30,142)
U.S. full-time annual earnings ($)	-	35,641 (40,037)	37,989 (46,680)
Schooling years	14.3 (4.45)	14.7 (4.88)	14.6 (4.54)
Age	35.0 (8.59)	34.1 (8.39)	35.3 (8.29)
Years in the U.S. prior to immigrating	1.72 (3.04)	2.18 (3.46)	1.85 (3.09)
Year last worked in home country	91.4 (4.16)	-	91.7 (3.69)
Female	.511	.531	.358
Visa			
Spouse of U.S. citizen	.359	.367	.346
Spouse of U.S. permanent resident alien	.0819	.0797	.0542
Spouse of employment immigrant	.234	.157	.183
Number of immigrants	342	414	230
Number of countries	58	70	54

[a]Standard deviation in parentheses.

Table 2
Characteristics of Potential Sending Countries

Origin-Country Characteristic	Mean	SD
Total number of U.S. non-refugee/asylee immigrants aged 25-59 per capita, July-August 1996 ($x10^3$)	.0967	.232
Number of U.S. employment and spouse immigrants aged 25-59 per capita, July-August 1996 ($x10^3$)	.0401	.0897
Number of U.S. refugee/asylees per capita, July-August 1996 ($x10^3$)	.00232	.00725
Real GDP(PPP$)/worker	11,268	10,061
Average years of schooling of labor-force age population	6.17	3.07
Distance to nearest port of entry (miles$x10^{-6}$)	5154	2392
U.S. military base	.143	.352
English an official language	.129	.336
Number of countries	132	

Table 3
GLS Estimates of the Determinants of the Log of Immigrants' Full-Time Earnings in the United States After Immigrating

Variable/Sample	U.S. Earners			U.S. and Home-Country Earners
Home country characteristic				
Ln(Real GDP/Worker)	-	-	.267 (3.99)	.316 (3.74)
Ln(Average schooling in years)	-	-	-.0184 (0.28)	-.0598 (0.62)
Distance (miles$\times 10^{-4}$)	-	-	.0378 (0.26)	.181 (1.05)
Border country	-	-	-.235 (2.57)	-.329 (2.77)
U.S. military base	-	-	-.157 (1.68)	-.130 (1.47)
English an official language	-	-	.192 (2.50)	.171 (2.30)
Schooling missing	-	-	.219 (2.07)	.324 (1.79)
Characteristic of worker				
Schooling (years)	.0723 (9.17)[a]	.0538 (5.26)	.0490 (4.73)	.0448 (3.83)
Years in the U.S.	.0645 (2.10)	.0472 (1.84)	.0515 (2.08)	.0755 (2.73)
Years in the U.S. squared	-.00542 (1.90)	-.00434 (1.83)	-.00469 (1.97)	-.00683 (2.17)
Age	.0772 (3.49)	.0716 (2.99)	.0704 (2.81)	.0526 (1.62)
Age squared	-.00101 (3.46)	-.000977 (3.12)	-.000968 (2.98)	-.000779 (1.83)
Female	-.383 (5.21)	-.255 (3.98)	-.257 (4.25)	-.259 (2.55)
Visa				
Spouse of U.S. citizen	-	-.477 (4.89)	-.413 (4.64)	-.523 (4.41)
Spouse of U.S. permanent resident alien	-	-.724 (6.21)	-.631 (5.55)	-.657 (4.53)
Spouse of employment immigrant	-	-.292 (2.19)	-.262 (1.77)	-.382 (2.08)
Constant	8.19 (20.4)	8.82 (19.3)	6.37 (8.63)	6.23 (6.63)
Number of immigrants	414	414	414	230
Number of countries	70	70	70	54
R^2	.329	.411	.466	.490

[a]Absolute value of t-ratio in parentheses adjusted for country cluster effects.

Table 4
Estimates of Skill Transferability:
Dep. Variable = the Log of Immigrant's Full-Time Earnings in the United States at Entry[a]

Variable	OLS	2SLS	Non-linear 2SLS	Non-linear 2SLS
Log of f.t. earnings in home country (δ)	.167 (4.32)[b]	.341 (3.34)	.241 (3.25)	.272 (3.56)
x years in the U.S.	-	-	.0157 (2.83)	.0159 (2.92)
x years in the U.S. squared	-	-	-.00132 (2.59)	-.00135 (2.67)
x age	-	-	-..00115 (1.33)	-.00134 (1.56)
x sex	-	-	-	-.0280 (1.93)
F-statistic (d.f.,d.f.), country dummies	29.4 (54,174)	16.7 (54,174)	3.85 (54,171)	3.60 (54,170)
Number of countries	54	54	54	54
Number of immigrants	230	230	230	230

[a]All specifications include 55 dummy variables for origin countries.
[b]Absolute value of t-ratio in parentheses.

Table 5
Determinants of the Log of Immigrants' Full-Time Earnings in the Home Country Prior to Immigrating

Sample	Home-Country Earners				U.S. and Home-Country Earners
Variable/Estimation Procedure	GLS	GLS	GLS	FE-country	GLS
Home country characteristic					
Ln(Real GDP/Worker)	-	1.32 (8.27)[a]	1.25 (6.29)[a]	-	1.35 (6.49)[a]
Ln(Average schooling in years)	-	-.863 (2.71)	-1.01 (2.66)	-	-1.07 (1.99)
Distance to closest U.S. port of entry (milesx10^{-4})	-	.324 (0.91)	342 (0.93)	-	.237 (0.61)
Border country	-	-.232 (1.06)	-.0532 (0.21)	-	-.255 (1.19)
U.S. military base	-	-.108 (0.46)	-.139 (0.57)	-	-.0105 (0.03)
English an official language	-	.676 (3.65)	.535 (2.72)	-	.797 (3.43)
Schooling missing	-	-.969 (2.07)	-.978 (1.64)	-	-1.44 (1.89)
Log(Teachers per pupil - primary)	-	-	-.601 (1.41)	-	-
Log(Teachers per pupil - secondary)	-	-	.379 (1.02)	-	-
Characteristic of worker					
Schooling (years)	.0603 (2.14)[a]	.0428 (2.76)	.0438 (2.81)	.0387 (2.13)[b]	.0441 (2.24)
Years in the U.S.	-	.128 (1.48)	.133 (1.55)	.121 (1.98)	.0818 (1.10)
Years in the U.S. squared	-	-.0185 (1.88)	-.0187 (1.95)	-.0175 (2.81)	-.0108 (1.37)
Age	.108 (2.47)	.0822 (2.37)	.0991 (2.57)	.0291 (0.59)	.118 (1.99)
Age squared	-.000907 (1.76)	-.000675 (1.69)	-.000804 (1.82)	-.000014 (0.02)	-.00113 (1.42)
Year last worked in home country	.0758 (2.45)	.0471 (2.46)	.0437 (2.37)	.0421 (2.13)	.0407 (1.15)
Female	-.198 (1.68)	-.118 (0.92)	-.121 (0.96)	-.0381 (0.26)	-.250 (1.65)
Visa					
Spouse of U.S. citizen	-	-.552 (3.01)	-.520 (2.96)	-.594 (2.95)	-.619 (2.79)

Spouse of U.S. permanent resident alien	-	-.305 (1.02)	-.224 (0.67)	-.227 (0.74)	-.256 (0.64)
Spouse of employment immigrant	-	-.393 (2.25)	-.393 (2.36)	-.367 (1.86)	-.419 (2.06)
Constant	-1.54 (0.45)	-8.69 (3.70)	-6.90 (2.17)	-	-8.51 (2.09)
Number of immigrants	342	342	342	342	230
Number of countries	58	58	58	58	54
Adjusted R^2	.113	.424	.437	.481	.460

[a]Absolute value of t-ratio adjusted for country cluster effects in parentheses in column.
[b]Absolute value of t-ratio in parentheses in column.

Table 6
Determinants of the Total Number of Non-Refugee/Asylee, Employment and Spouse, and Refugee/Asylee U.S. Migrants Aged 25-59 per-Capita ($x10^3$) in July and August 1996

Origin-Country Characteristic	Total Non-Refugee/Asylee Immigrants	Employment and Spouse Immigrants	Refugee/Asylees
Ln(Real GDP/Worker)	-.0212	-.00789	-.000489
	(2.36)[a]	(2.19)	(0.49)
Ln(Average Schooling)	.0167	.00652	.00121
	(2.57)	(2.40)	(1.28)
Distance (milesx10^{-6})	-2.15	-.977	-.0464
	(3.41)	(3.65)	(0.78)
Border country	.0784	.0336	-.00375
	(1.83)	(2.28)	(1.51)
U.S. military base	.0231	.0143	-.000824
	(1.38)	(1.82)	(0.61)
English an official language	.0254	.0119	-.000579
	(2.11)	(2.29)	(0.56)
Constant	.288	.116	.00670
	(3.01)	(3.00)	(0.63)
Number of countries	132	132	132
R^2	.385	.461	.113

[a]Absolute value of robust t-ratio in parentheses. All regressions weighted by country populations.

Table A
Immigrant Record Characteristics of Sampled NIS-P Spouse and Employment Immigrants 21+

Characteristic	Interviewed	Not Interviewed	Probit Coefficient (t-ratio)
Demographic Characteristics			
Mean age (years)	34.3	35.2	-.0070 (1.45)
Percent female	53.1	56.0	-.0783 (0.86)
Percent married	88.2	90.7	-.216 (1.46)
Visa Adjustment			
Percent adjusted	21.4	26.2	.0600(0.31)
Year of entry if adjusted	92.3	92.1	.0021(1.20)
Visa Type (%)			
Spouse of U.S. citizen	36.3	36.0	-.0162 (0.15)
Employment principal	32.6	31.9	-.112 (0.90)
Place of Birth (%)			
Africa	5.0	7.2	-.925 (1.46)
North and Central America	32.0	32.1	-.577 (0.93)
South America	8.2	6.7	-.540 (0.86)
Asia	35.5	39.6	-.685 (1.12)
Europe	18.7	14.1	-.475 (0.77)
Mexico	13.7	16.7	-.224 (1.45)
U.S. State of Residence (%)			
California	16.5	26.2	-.313 (2.77)
New Jersey	9.7	10.5	-.150 (1.06)
New York	19.1	15.9	.0267 (0.23)
Texas	11.4	8.0	.265 (1.73)
Constant	-	-	1.41 (1.87)
N	659	389	1048
$\chi^2(18)$	-	-	35.3[a]

[a]Test statistic for all coefficients but California = 0, $\chi^2(17)=21.1$, p=.22.

Table B
F-Statistics and Significance Levels for the Set of Identifying Instruments Used to Obtain Skill Transferability Estimates in Table 4, by Variable

Variable	Ln Home-Country Earnings (LHCE)	LHCExFemale	LHCExYears in the United States	LHCEx(Years in the United States)^2	LHCExAge
F(10,165)	4.15	27.9	72.5	76.3	41.2
P	.000	.000	.000	.000	.000

Instruments are: mother's years of schooling, father's years of schooling, and these variables interacted, respectively, with female, speaks English well, years in the U.S., years in the U.S. squared, and age.