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# You Can't Take It with You? Immigrant Assimilation and the Portability of Human Capital

Rachel M. Friedberg, *Brown University and National  
Bureau of Economic Research*

The national origin of an individual's human capital is a crucial determinant of its value. Education and labor market experience acquired abroad are significantly less valued than human capital obtained domestically. This difference can fully explain the earnings disadvantage of immigrants relative to comparable natives in Israel. Variation in the return to foreign schooling across origin countries may reflect differences in its quality and compatibility with the host labor market. The return to foreign experience is generally insignificant. Acquiring additional education following immigration appears to confer a compound benefit by raising the return to education acquired abroad.

## I. Introduction

In recent years, much attention has been devoted in the labor literature to the issue of immigrant labor market assimilation. Upon arrival in their host country, immigrants usually command lower wages than native-born workers with comparable measured characteristics. The literature

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has focused on quantifying the size of this initial earnings differential and the rate at which it diminishes with time since migration (see Chiswick 1978*a*; Borjas 1985, 1995; Friedberg 1992; LaLonde and Topel 1992; Baker and Benjamin 1994; Schoeni 1997). At issue is whether immigrants ever attain earnings parity with natives and, if so, how long this process takes. A related question is how the earnings gap differs for immigrants from different countries and different arrival cohorts (see Chiswick 1986; Jasso and Rosenzweig 1988, 1990; Borjas 1992; Funkhouser and Trejo 1995; Butcher and DiNardo 1996; Duleep and Regets 1996).<sup>1</sup>

The innovation of this article is to introduce to this analysis a distinction between human capital acquired abroad and human capital acquired domestically. Foreign and domestic human capital may not be very close substitutes, and considering them as a homogeneous factor may be misleading. Many immigrants complete their schooling in their countries of origin. Many, however, immigrate at young ages and obtain virtually all their human capital after immigration. A sizable number possess a combination of foreign and domestic human capital. Thus, although previous work on immigrant and native earnings has allowed the return to human capital to differ for immigrants and natives, doing so is not equivalent to distinguishing between domestic- and foreign-source human capital in the analysis of earnings determination.<sup>2</sup>

This study demonstrates that the most important factor determining the gap in the standard human-capital-corrected earnings of immigrants and natives is the source of their human capital. Foreign human capital often—although not always—earns a lower return than domestic human capital, and this fact alone is sufficient to fully explain the residual earnings disadvantage of immigrants.<sup>3</sup>

The data most commonly used to study immigrants in the United States are the series of public-use microdata samples of the U.S. Census of Population. These data do not contain adequate information to reliably determine the source of an immigrant's education. There is no direct measure of where schooling was obtained, and the information on an immigrant's year of arrival, which could be used to impute it, is reported in bracketed form. It is therefore not feasible to analyze the importance of

<sup>1</sup> For a comprehensive study, see Smith and Edmonston (1997). For reviews of the literature, see LaLonde and Topel (1996) and Borjas (1999).

<sup>2</sup> Chiswick (1978*a*) and Fishelson, Weiss, and Mark (1980) consider the difference in the return to foreign and domestic schooling, but they do not bring this directly to the question of immigrant assimilation.

<sup>3</sup> Eckstein and Weiss (1998) study recent immigrants to Israel from the former Soviet Union and find that the initial return to imported skills is negligible, but that it rises with time in Israel.

human capital source using the U.S. Census.<sup>4</sup> The Census of Population in Israel lends itself more readily to this kind of study. It is possible in this data to precisely date the timing of immigration. In addition, the lack of a systematic change in the unobserved quality of successive immigrant cohorts to Israel makes it possible to use a single cross section of data to analyze assimilation rates. The Israeli case provides a large, richly varied pool of immigrants to observe. These immigrants have come from a wide range of countries and have vastly different educational and occupational backgrounds.

This article first establishes that the national origin of an individual's human capital is a crucial determinant of its return. It shows that the gap in the residual earnings of immigrant and native workers is eliminated or even reversed once this factor is taken into account. It then goes on to show when the difference in returns is most marked and what factors mitigate it. Section II of the article presents the econometric model and highlights important restrictions implicit in the standard specification used in the immigration literature. The third section provides basic facts about immigration to Israel and describes the data used. Section IV presents the empirical results in three steps. First, it examines the effects of immigrant status and length of residence on earnings, comparing the returns to human capital obtained in the country of origin and in Israel. Second, it analyzes whether human capital acquired subsequent to immigration may raise the return to human capital obtained abroad. This is followed by an analysis of the extent to which the portability of education depends on its level or configuration, in terms of type and source. The final section of the article summarizes and discusses implications for the immigration literature and for immigration policy.

## II. Immigrants' Earnings and the Returns to Human Capital

When immigrants first arrive in a new country, they are at a disadvantage in the labor market relative to natives with comparable demographic characteristics and measured skill levels. One reason is that natives have country-specific skills and information that immigrants lack. As immigrants spend time in the host country and gradually acquire this country-specific knowledge, their labor market performance may improve relative to that of their native counterparts. The rate at which the earnings gap between immigrants and natives narrows with years since migration is referred to as the assimilation rate. The standard earnings function used in the immigration literature (due to Chiswick 1978*a*) is

<sup>4</sup> The 1976 Survey of Income and Education (SIE) is a U.S. data set containing direct information on country of schooling, but the sample of immigrants is small. See Borjas (1982) and Friedberg (1993) for examples of papers that use the SIE.

$$y = \alpha_0 + \alpha_1 ED + \alpha_2 EXP + \alpha_3 EXP^2 + \alpha_4 M + \alpha_5 YSM + \alpha_6 YSM^2 + \varepsilon, \quad (1)$$

where  $y$  is log earnings,  $ED$  is years of schooling completed,  $EXP$  is years of potential labor market experience,  $M$  is a dummy variable for immigrant status, and  $YSM$  is the number of years elapsed since an immigrant's arrival in the host country. Since years since migration is held constant in this regression, the coefficient on the immigrant status dummy measures the initial earnings disadvantage of a newly arrived immigrant relative to an otherwise comparable native. In the absence of systematic changes in the unobserved earnings potential ( $\varepsilon$ ) of successive immigrant arrival cohorts, the coefficients on  $YSM$  capture the rate at which the immigrant-native earnings gap narrows as immigrants assimilate into the labor market.

There are some important restrictions implicit in estimating equation (1). To see this, consider recasting the model purely in terms of education and experience. Let  $ED_i$  and  $EXP_i$  denote years of schooling and potential labor market experience obtained in country  $i$ , where  $i = 1$  for the country of origin and  $i = 2$  for the destination country.<sup>5</sup> Thus,

$$ED = ED_1 + ED_2 \quad (2)$$

and

$$EXP = EXP_1 + EXP_2. \quad (3)$$

By definition,  $YSM = 0$  for natives, while for immigrants,

$$YSM = EXP_2 + ED_2 + k, \quad (4)$$

where  $k = \max(0, 6 - \text{age} + YSM)$ .<sup>6</sup> Ignoring quadratic terms, equation (1) can, therefore, be rewritten as

$$y = \alpha_0 + \alpha_1(ED_1 + ED_2) + \alpha_2(EXP_1 + EXP_2) + \alpha_4 M + \alpha_5[(ED_2 + EXP_2 + k) \times M] + \varepsilon, \quad (5)$$

<sup>5</sup> By construction,  $ED_1 = 0$  and  $EXP_1 = 0$  for natives. While some native-born Israelis may have attended school or worked abroad, there is no information available on this in the census data. The return to  $ED_1$  and  $EXP_1$  will therefore measure the return to foreign schooling and experience for immigrants only.

<sup>6</sup> In the data used here,  $k$  equals 0 for the 81% of immigrants who migrated to Israel after the age of 6, and  $k$  equals between 1 and 6 for the others.

or, collecting terms, as

$$y = \alpha_0 + (\alpha_4 + \alpha_5 \times k)M + \alpha_1ED_1 + \alpha_1ED_2 + \alpha_5(ED_2 \times M) + \alpha_2EXP_1 + \alpha_2EXP_2 + \alpha_5(EXP_2 \times M) + \varepsilon. \quad (6)$$

There are eight coefficients but only five underlying parameters in this model. Equation (1) is thus equivalent to a restricted version of a human capital earnings function that allows the return to human capital to vary according to its source ( $i = 1, 2$ ) and the worker's nativity ( $M = 0, 1$ ). Relabeling the coefficients, that is,

$$y = \beta_0 + \beta_1M + \beta_2ED_1 + \beta_3ED_2 + \beta_4(ED_2 \times M) + \beta_5EXP_1 + \beta_6EXP_2 + \beta_7(EXP_2 \times M) + \varepsilon, \quad (7)$$

we see that equation (1) imposes the following three restrictions: (1)  $\beta_2 = \beta_3$ , (2)  $\beta_5 = \beta_6$ , and (3)  $\beta_4 = \beta_7$ . The first restriction imposes equal returns to immigrants' foreign schooling and natives' domestic schooling. The second restriction imposes equal returns to immigrants' foreign labor market experience and natives' domestic labor market experience. Because of the first two restrictions, the third restriction has two interpretations. It constrains the relative return to immigrants' foreign and domestic human capital to be the same for both education and experience. It also constrains the immigrant-native differential in the return to domestic human capital to be the same for both education and experience.

Although equation (1) is the standard specification used in the literature, as will be seen in the empirical estimates below, the data strongly reject these restrictions. This is not surprising, considering the many reasons why the return to human capital might differ, depending on whether the schooling or experience was acquired abroad or domestically and on whether the worker is an immigrant or a native.

The degree to which the human capital that immigrants acquired in their countries of origin is transferable into earnings potential in their destination country—the “portability” of their human capital—is measured by  $\beta_2$  and  $\beta_5$ . Differences across origin groups in the value placed on foreign human capital may stem from two factors. First, school quality varies considerably across countries. Immigrants from developed countries, for example, might receive a higher return to their foreign education than immigrants from developing countries because schooling is generally of lower quality in the latter. A second important factor is the compatibility of the human capital received abroad with the skill requirements of the host-country labor market. The more similar the origin and destination countries are in terms of their levels of economic development, industrial and occupational structures, institutional settings, and so forth,

the more likely it is that education and work experience received in the origin country will be highly valued in the destination labor market. Even within country of origin, the type of education is likely to be important for its portability. For example, elementary school education might transfer well for many origin groups, while law and other professional schooling might not.

The return to domestic human capital for immigrants may differ from the return received by natives, that is,  $\beta_4$  and  $\beta_7$  may not equal zero. On the one hand, natives have an advantage in language and other country-specific knowledge, which may enable them to gain more productivity-enhancing skills from a given year of formal instruction or work experience. On the other hand, time spent at school or work in the host country has compound benefits for immigrants since in addition to acquiring the human capital usually associated with schooling and experience, immigrants gain language skills, learn about domestic institutions and norms, and so forth. The marginal return to a year of investment in domestic human capital could, therefore, be lower or higher for immigrants than for natives.

In addition to the direct effects of foreign and domestic human capital on immigrants' labor market success, there may well be important interactions between them. The earnings of more- and less-skilled immigrants may be compressed upon their arrival in the host country, with both groups constrained to work in low-skill jobs that require little language proficiency or other country-specific human capital. Over time, as they gain exposure to the new labor market, immigrants become better able to maximize the return to their origin-country skills through several types of learning. These include learning by doing on the job, accumulating more information about the host labor market, and engaging in search to find better earnings opportunities and job matches. As a result, immigrants may gradually sort themselves into more differentiated occupations, resulting in a rise in skill differentials ( $\beta_2$  and  $\beta_5$ ) among immigrants with labor market experience in the host country.<sup>7</sup> A rise with time since migration in the return to schooling obtained abroad is definitionally equivalent to a faster assimilation rate for better-educated immigrants. We also might expect earnings growth to be greater for more educated immigrants because the gap between their initial and potential occupational standing is greater.

An even more effective way for immigrants to gain the skills necessary to adapt their previously acquired training to their new country may be

<sup>7</sup> For empirical evidence documenting occupational downgrading upon arrival and subsequent upgrading with duration of residence, see Chiswick (1978*b*) and Jasso and Rosenzweig (1988) for the United States, and Sabatello (1979) and Flug, Kasir, and Ofer (1992) for Israel.

by obtaining further formal education after arrival. Attending school in the host country may aid in the transferability of an immigrant's human capital by giving him the language proficiency needed to literally translate his skills. It may also provide him with other country-specific human capital that will enable him better to apply his previously acquired skills in the new labor market setting.<sup>8</sup> Especially for immigrants who arrive with education or training that is not very well matched to the host country, attending school there may be invaluable in teaching them to use that human capital in ways rewarded in the host labor market. Such knowledge might be very difficult to obtain without further formal instruction. A higher return to an immigrant's foreign schooling when it has been followed by schooling in the host country is consistent with the hypothesis that domestic schooling raises the return to schooling obtained abroad. It could, however, also reflect positive self-selection on the part of individuals who choose to get further schooling after immigration. Immigrants differ in both their incentives and their capacity to acquire domestic human capital. More educated immigrants might have a higher net benefit from acquiring domestic skills than less educated immigrants, and if prior education is correlated with unobserved ability, the estimated return to domestic human capital will be higher for the more educated. Unfortunately, it is impossible to distinguish between treatment and selection effects using the available data.

To measure the importance of interaction effects, equation (7) is modified by the addition of three variables interacting foreign and domestic human capital:<sup>9</sup>

$$\begin{aligned}
 y = & \beta_0 + \beta_1 M + \beta_2 ED_1 + \beta_3 ED_2 + \beta_4 (ED_2 \times M) + \beta_5 EXP_1 \\
 & + \beta_6 EXP_2 + \beta_7 (EXP_2 \times M) + \beta_8 (ED_1 \times ED_2) \\
 & + \beta_9 (ED_1 \times EXP_2) + \beta_{10} (EXP_1 \times EXP_2) + \epsilon.
 \end{aligned} \tag{8}$$

### III. Immigration to Israel and the Census of Population Data

Like the United States, Israel is a country of immigrants. Israel continues to receive very large inflows, relative to its population. Most

<sup>8</sup> One example is that in Israel, as in many countries, immigrant lawyers and physicians must pass a series of licensing exams in order to practice. In the case of law, there is a "conversion" exam covering general legal principles, which is followed by the bar exam. For physicians, there is a licensing exam for general competence, which is followed by specialization exams. For all of these exams, immigrants commonly attend 6-month-long preparatory courses (often offered in their native languages). There are also required internship periods for both law and medicine, which typically last over a year.

<sup>9</sup> Note that if  $EXP_1 > 0$ , then by construction  $ED_2 = 0$ , so there is no interaction term for  $EXP_1$  and  $ED_2$ .



current immigrants are from the former Soviet Union. Earlier immigrants originated in diverse parts of the world, with the largest concentrations coming from Eastern Europe and North Africa.

The data used in this study are the public-use microdata samples of the two most recent available Israeli Censuses of Population and Housing, conducted in 1972 and 1983 (Israel Central Bureau of Statistics 1974, 1985). As stated earlier, these data have the advantage that year of migration is recorded as a continuous variable, rather than in the bracketed form available in the U.S. Census. Appendix B uses both Israeli censuses to show that, in the Israeli case, one cross section is sufficient to identify the parameters of interest. This is because the coefficient on years since migration in the single 1983 cross section is found indeed to reflect assimilation rather than a decline in cohort quality over time. The analysis can therefore be conducted on the 1983 data alone.<sup>10</sup> This is another strength, relative to the U.S. case, in which the issue of changing cohort quality necessitates the use of multiple cross sections. All Israeli citizens—Jews, Arabs, and others—are included in the census. This covers virtually all residents of Israel proper, as well as citizens living in the West Bank and the Gaza Strip, who constitute 2% of the Israeli population. The census microdata are a one-in-five sample of the population.

In order to facilitate comparisons with results from the literature on immigration to the United States, which focuses primarily on male immigrants, the sample is restricted to men ages 25–65.<sup>11</sup> In addition, so as not to confound the present analysis with the issue of Arab-Jewish differences in the labor market, Arabs are not included in the sample. Kibbutz and collective members, students, and the self-employed are also excluded. Finally, only full-time, salaried, nonagricultural workers reporting earnings of between 5,000 and 500,000 Israeli shekels per month are retained.<sup>12</sup> After these adjustments, 54,103 individuals remain in the 1983 sample.

Only one-third of these men are native-born Israelis. The foreign-born

<sup>10</sup> Although most of the literature on immigrant assimilation uses cross-sectional data, this is primarily due to the unavailability of panel data. Panel data would be superior since one could directly track individual developments over time rather than infer them.

<sup>11</sup> For military security reasons, men between the ages of 18 and 24 are coded as age 21 in the public-use files of the census microdata. Such censoring generates difficulties in calculating many key variables used in the analysis, such as years since migration. Men under the age of 25 are therefore excluded from the sample. Given Israel's compulsory 3-year military service, many men in this age range would not be employed in the civilian labor market in any event.

<sup>12</sup> This is equal to approximately \$90–\$9,000 in 1983 U.S. dollars. About 10% of the sample had zero income. Another 3% had income below 5,000 shekels, and 0.1% had income over 500,000 shekels.

**Table 1**  
**Area of Origin of Immigrants to Israel**

|  |       |
|--|-------|
| Percentage of immigrants by continent group:       |       |
| Western Hemisphere and Western Europe              | 9.01  |
| Eastern Europe                                     | 29.26 |
| USSR   | 12.88 |
| Asia and Africa                                    | 48.85 |
| Percentage of immigrants by most common countries: |       |
| Morocco  | 14.65 |
| Romania  | 14.29 |
| Soviet Union                                       | 12.88 |
| Iraq   | 8.79  |
| Poland   | 8.72  |
| Iran   | 3.72  |
| Yemen  | 3.63  |
| Turkey   | 3.59  |
| Egypt and the Sudan                                | 2.81  |
| Tunisia  | 2.34  |
| Bulgaria   | 2.28  |
| Germany  | 2.26  |
| Libya  | 1.85  |
| India and Pakistan                                 | 1.59  |
| Argentina  | 1.36  |
| Hungary  | 1.31  |
| Czechoslovakia                                     | 1.23  |
| United States                                      | 1.04  |

SOURCE.—Author's tabulation of the 1983 Israeli Census of Population microdata.

are classified into four area-of-origin groups: Western (primarily from Western Europe and the Americas), Eastern European, Soviet, and those from Asia and Africa. The countries included under each of these headings are listed in appendix A. Table 1 shows the breakdown of immigrants into these four groups, as well as the major countries of origin. Roughly half of the immigrants are of African or Asian descent, and half are of European, American, or Soviet origin. Forty-two percent are from Morocco, Romania, or the Soviet Union, with the remainder distributed over a wide range of countries.

The mean characteristics of the 1983 sample are presented in table 2. The average age of immigrants is 45.6; this is 11 years older than the typical native. The mean immigrant came to Israel in 1956, at age 19, but at the time of the survey, 14.7% of Soviet immigrants had been in Israel for only 5 years or less. Mean monthly earnings for the native sample are 44,796 Israeli shekels, or about \$750 in 1983 U.S. dollars. Information is available in the census on hours worked per week. However, many people appear to have reported hours per month instead. Since creating an hourly wage variable might introduce more noise than signal to the data, the monthly earnings measure is used in all of the analysis below.

Table 3 contains detailed information on schooling for the five broad origin groups. The average years of completed schooling among native Israelis is 12.4 years. Educational attainment is highest for Western im-

**Table 2**  
**Summary Statistics**

|  | Natives            | All Immigrants     | Immigrants from the West | Immigrants from Eastern Europe | Immigrants from the USSR | Immigrants from Asia or Africa |
|--|--------------------|--------------------|--------------------------|--------------------------------|--------------------------|--------------------------------|
| Gross monthly income (1983 Israeli shekels)      | 44,796<br>(32,056) | 41,505<br>(29,754) | 55,593<br>(37,737)       | 48,270<br>(33,000)             | 41,294<br>(29,014)       | 34,910<br>(23,833)             |
| Hours worked per week                            | 48.9<br>(6.5)      | 47.9<br>(5.8)      | 48.4<br>(6.5)            | 48.1<br>(6.0)                  | 47.5<br>(5.5)            | 47.8<br>(5.6)                  |
| Weeks worked per year                            | 50.5<br>(8.1)      | 51.0<br>(7.3)      | 50.2<br>(7.3)            | 51.3<br>(6.3)                  | 51.2<br>(7.0)            | 50.9<br>(7.8)                  |
| Year of migration                                | ...                | 1956<br>(11.0)     | 1958<br>(14.6)           | 1953<br>(9.9)                  | 1968<br>(12.2)           | 1955<br>(8.0)                  |
| Percentage with 5 or fewer years since migration | ...                | 3.7                | 9.1                      | 1.1                            | 14.7                     | 1.2                            |
| Age at migration                                 | ...                | 18.7<br>(12.6)     | 18.9<br>(13.6)           | 19.8<br>(11.7)                 | 29.1<br>(14.0)           | 15.2<br>(10.7)                 |
| Age  | 34.8<br>(8.6)      | 45.6<br>(10.9)     | 44.2<br>(10.8)           | 49.8<br>(10.6)                 | 44.3<br>(11.5)           | 43.7<br>(10.1)                 |
| Years of experience (total)                      | 16.4<br>(8.9)      | 28.7<br>(12.4)     | 24.1<br>(12.1)           | 32.3<br>(12.3)                 | 26.2<br>(12.7)           | 28.2<br>(11.8)                 |
| Years of experience abroad                       | ...                | 6.2<br>(9.2)       | 4.7<br>(7.9)             | 6.4<br>(8.6)                   | 13.0<br>(12.5)           | 4.7<br>(7.9)                   |
| Years of experience in Israel                    | 16.4<br>(8.9)      | 22.5<br>(10.5)     | 19.3<br>(12.1)           | 25.9<br>(10.3)                 | 13.2<br>(9.8)            | 23.5<br>(8.7)                  |
| <i>N</i>   | 18,488             | 35,615             | 3,209                    | 10,422                         | 4,587                    | 17,397                         |

NOTE.—Figures are means for the sample of full-time, salaried, nonagricultural male workers ages 25–65 in the 1983 Israeli Census of Population. Standard deviations are in parentheses.

**Table 3**  
**Schooling Characteristics**

|  | Natives       | All Immigrants | Immigrants from the West | Immigrants from Eastern Europe | Immigrants from the USSR | Immigrants from Asia or Africa |
|--|---------------|----------------|--------------------------|--------------------------------|--------------------------|--------------------------------|
| Years of schooling:                    |               |                |                          |                                |                          |                                |
| Total                                  | 12.4<br>(3.3) | 10.8<br>(4.2)  | 14.1<br>(3.9)            | 11.5<br>(3.9)                  | 12.0<br>(4.0)            | 9.4<br>(3.9)                   |
| Abroad                                 | ...           | 7.0<br>(5.4)   | 9.2<br>(6.9)             | 7.9<br>(5.0)                   | 10.3<br>(5.0)            | 5.2<br>(4.6)                   |
| In Israel                              | 12.4<br>(3.3) | 3.7<br>(5.1)   | 4.8<br>(6.1)             | 3.6<br>(5.3)                   | 1.7<br>(4.0)             | 4.1<br>(4.8)                   |
| Terminated education in Israel (%)     | ...           | 46.3           | 51.6                     | 42.7                           | 21.3                     | 54.1                           |
| Highest level attained (%):            |               |                |                          |                                |                          |                                |
| Elementary                             | 12.8          | 27.4           | 7.7                      | 24.8                           | 18.7                     | 34.9                           |
| Secondary                              | 51.0          | 41.4           | 34.4                     | 40.8                           | 35.9                     | 44.6                           |
| Postsecondary                          | 35.9          | 27.3           | 57.3                     | 33.4                           | 43.7                     | 13.8                           |
| Whether level attained and source (%): |               |                |                          |                                |                          |                                |
| Elementary = F                         | ...           | 67.9           | 69.2                     | 76.7                           | 88.0                     | 57.1                           |
| Elementary = I                         | 99.7          | 28.4           | 30.3                     | 22.4                           | 10.3                     | 36.3                           |
| Secondary = F                          | ...           | 35.2           | 52.6                     | 40.1                           | 63.8                     | 21.5                           |
| Secondary = I                          | 86.9          | 33.6           | 39.1                     | 34.1                           | 15.8                     | 36.8                           |
| Postsecondary = F                      | ...           | 13.3           | 31.7                     | 14.1                           | 33.5                     | 4.1                            |
| Postsecondary = I                      | 35.9          | 14.0           | 25.6                     | 19.3                           | 10.2                     | 9.6                            |
| Undergraduate = F                      | ...           | 14.5           | 34.9                     | 15.4                           | 34.6                     | 4.9                            |
| Undergraduate = I                      | 35.9          | 12.9           | 22.5                     | 18.1                           | 9.2                      | 9.0                            |
| Graduate = F                           | ...           | 4.4            | 16.8                     | 4.6                            | 9.2                      | .9                             |
| Graduate = I                           | 11.1          | 4.3            | 11.2                     | 6.5                            | 3.0                      | 2.2                            |

NOTE.—“Elementary = I” is a dummy variable, indicating that elementary schooling was completed in Israel; “Elementary = F” indicates that elementary schooling was completed abroad. Standard errors are in parentheses.

migrants (14.1 years) and lowest for Asian/African immigrants (9.4 years). More than one-third of Asian/African immigrants have only attended elementary school, while over one-third of native Israelis and 57.3% of Western immigrants have had some postsecondary education.

The measure of education used here is the number of completed years of schooling.<sup>13</sup> To construct measures of the years of schooling completed in the country of origin and in Israel, it is assumed that children start school at the age of seven and attend continuously until completing their total years of schooling. Since the age at which an immigrant arrived in Israel is known, one can calculate the years of schooling that would have been completed before and after his move to Israel.<sup>14</sup> The resulting mean years of schooling in Israel and abroad are shown in the second and third rows of table 3. Just under half of all immigrants have attended school in Israel, with 19% of them having received all their schooling domestically and 27.5% having attended school both before and after immigrating. The average fraction of schooling acquired abroad is 65%. This fraction is lowest for Asian/African immigrants (55%) and highest for Soviet immigrants (86%), only one-fifth of whom have attended school in Israel at all.

#### IV. Empirical Results

##### A. The Return to Foreign versus Domestic Human Capital for Immigrants and Natives

The first column of table 4 presents estimates of equation (5), the standard specification that constrains the returns to schooling and experience to be invariant to the worker's nativity and to where the human

<sup>13</sup> Observations for which the last type of schooling was postsecondary yeshiva (religious academy) are excluded from the sample. This is because religious Jews often continue to study at such institutions throughout their lives. Attending a postsecondary yeshiva is better classified as a religious activity than as a program of human capital accumulation applicable in the labor market. Thus, including in the sample individuals who count years spent at a yeshiva in their total years of schooling would bias the coefficient on schooling downward. Also excluded are the small number of other people in the sample who report over 27 years of schooling.

<sup>14</sup> For an individual with a discontinuous schooling history who temporarily suspended his education while still in his country of origin, this method will overstate the number of years acquired abroad. The bias will be greater the longer an individual was out of school between schooling spells abroad or—if he did not return to school abroad at all following the interruption—the longer he was out of school before migrating. This will lead to an underestimate of  $\beta_2$  and an overestimate of  $\beta_3$ . To test the accuracy of this imputation technique, I applied it to data from the U.S. Survey of Income and Education, a dataset which also contains direct information on years of schooling completed abroad. The correlation between the true and imputed measures of origin-country schooling was 0.78.

**Table 4**  
**The Return to Human Capital**

|                                  | (1)              | (2)              | (3)               |
|----------------------------------|------------------|------------------|-------------------|
| Immigrant                        | -.253<br>(.008)  | .040<br>(.006)   | .374<br>(.233)    |
| Education                        | .081<br>(.006)   | ...              | ...               |
| Education abroad                 | ...              | .076<br>(.001)   | .071<br>(.001)    |
| Education in Israel              | ...              | .088<br>(.001)   | .100<br>(.001)    |
| Experience                       | .0068<br>(.0002) | ...              | ...               |
| Experience abroad                | ...              | .0032<br>(.0003) | .0010<br>(.0003)  |
| Experience in Israel             | ...              | .014<br>(.0002)  | .017<br>(.0004)   |
| Years since migration            | .0081<br>(.0003) | ...              | ...               |
| Education in Israel × immigrant  | ...              | ...              | -.020<br>(.002)   |
| Experience in Israel × immigrant | ...              | ...              | -.0057<br>(.0005) |
| $R^2$                            | .254             | .266             | .269              |
| $N$                              | 54,103           | 54,103           | 54,103            |

NOTE.—Dependent variable is log monthly earnings. Standard errors are in parentheses.

capital was obtained. The estimated returns to schooling and experience are 8% and 0.7%, respectively. Immigrants are found to earn approximately 25% less than natives upon arrival, with their relative earnings rising by 0.8% per year following migration.

The restrictions implicit in equation (5) are easily rejected. The second column of table 4 shows that human capital obtained abroad is of significantly less value in the Israeli labor market than human capital obtained in Israel. The return to domestic schooling is 8.8%, while the return to foreign schooling is only 7.6%.<sup>15</sup> The return to domestic experience is 1.4%, while the return to foreign experience is just 0.3%. *F*-tests of the equality of the coefficients on foreign and domestic human capital yield *p*-values of zero to the fourth decimal place.

Estimates of equation (7), the fully unrestricted form of equation (5), are presented in the third column. All three of the restrictions listed following equation (7) are rejected. The return to domestic human capital

<sup>15</sup> Using the 1970 U.S. Census, Chiswick (1978a) finds that the return to schooling obtained abroad is 1 percentage point higher than the return to U.S. schooling. These results may be affected by the difficulty of imputing accurate measures of premigration and postmigration schooling in this data, in which years since migration are reported in 5- and 10-year bracketed intervals.

is higher than the return to foreign human capital, and it is higher for natives than for immigrants. The native-immigrant gap is 2 percentage points for schooling and 0.6 percentage points for experience. The fact that natives receive a higher return lends support to the argument that their country-specific skills, including their superior Hebrew fluency, enable them to extract more productive potential from a year of schooling or experience than can immigrants. There is a 10.0% return to domestic schooling for natives, an 8.0% return to domestic schooling for immigrants, and a 7.1% return to foreign schooling for immigrants. The results for experience show a similar pattern: native earnings rise by 1.7% for each year of domestic experience, while immigrants gain 1.1% for each year of domestic experience and just 0.1% for years of foreign experience. *F*-tests of the equality of the native and immigrant coefficients yield *p*-values of zero to the fourth decimal place.

At first glance, the results of equations (5) and (7) might seem to contradict each other. By definition in equation (4),  $ED_2 \times M$  and  $EXP_2 \times M$  roughly sum to years since migration. The negative estimated coefficients  $\beta_4$  and  $\beta_7$  on the former variables in equation (7) might therefore seem inconsistent with the positive coefficient on the latter found in equation (5),  $\alpha_5$ . The key to reconciling these results lies in understanding the difference in the implicit benchmark in the two specifications. The coefficients  $\beta_4$  and  $\beta_7$  measure the return to immigrants' domestic human capital relative to the return to natives' domestic human capital. The coefficient  $\alpha_5$  measures the return to immigrants' domestic human capital relative to a weighted average of the returns to natives' domestic and immigrants' foreign human capital, which are constrained in equation (5) to be equal. The estimates from the two specifications are, therefore, not inconsistent: the return to immigrants' domestic human capital is lower than the return to natives' domestic human capital, but it is higher than the return to immigrants' foreign human capital.<sup>16</sup>

The earnings gap between immigrants and natives can be fully explained by the lower value placed on the immigrants' human capital. In equation (5), immigrants were found to earn about one-quarter less than natives upon arrival. In equation (7), once the return to human capital is allowed to differ for immigrants and natives and for foreign and domestic human capital, newly arrived immigrants no longer earn less than natives.

<sup>16</sup> These two specifications highlight a problem with the standard interpretation of  $\alpha_5$  as a measure of the assimilation rate. Recall that the assimilation rate is the rate at which immigrants' earnings grow more quickly than natives' over time as both groups accumulate domestic labor market experience. In fact, the coefficient  $\alpha_5$  actually measures the rise in immigrants' earnings, holding total education and experience constant, as the source mix of their human capital shifts from foreign to domestic.

**Table 5**  
**The Return to Human Capital (by Area of Origin)**

|                         | Natives         | All<br>Immigrants | Immigrants<br>from the<br>West | Immigrants<br>from<br>Eastern<br>Europe | Immigrants<br>from the<br>USSR | Immigrants<br>from Asia<br>or Africa |
|-------------------------|-----------------|-------------------|--------------------------------|---|--------------------------------|--------------------------------------|
| Education<br>abroad     |                 | .071<br>(.001)    | .071<br>(.003)                 | .067<br>(.002)                          | .064<br>(.002)                 | .057<br>(.001)                       |
| Education in<br>Israel  | .100<br>(.001)  | .079<br>(.001)    | .081<br>(.003)                 | .072<br>(.002)                          | .077<br>(.003)                 | .065<br>(.001)                       |
| Experience<br>abroad    |                 | .001<br>(.0004)   | .001<br>(.002)                 | -.005<br>(.001)                         | -.0002<br>(.0007)              | -.0002<br>(.0006)                    |
| Experience in<br>Israel | .017<br>(.0004) | .012<br>(.0003)   | .014<br>(.001)                 | .008<br>(.001)                          | .014<br>(.001)                 | .009<br>(.001)                       |
| Constant                | 9.01<br>(.018)  | 9.39<br>(.015)    | 9.40<br>(.055)                 | 9.65<br>(.034)                          | 9.49<br>(.035)                 | 9.52<br>(.022)                       |
| $R^2$                   | .297            | .250              | .205                           | .223                                    | .292                           | .176                                 |
| $N$                     | 18,488          | 35,615            | 3,209                          | 10,422                                  | 4,587                          | 17,397                               |

NOTE.—Dependent variable is log monthly earnings. Standard errors are in parentheses.

In fact, taking into consideration that their human capital is all foreign and that foreign human capital is less valued than natives' human capital, immigrants earn roughly 37.4% more than natives. This is seen in the change in the value of the estimated coefficient on the immigrant dummy variable across the two specifications.

The results when immigrants are split into four area-of-origin groups are shown in table 5. Foreign human capital always earns a lower return than domestic human capital. The highest return to schooling obtained abroad is found among immigrants from the West (7.1%), while immigrants from Asia and Africa earn the lowest return (5.7%). While this pattern supports the idea that Western school quality is higher and better matched to the Israeli labor market than Asian/African schooling, these results could also reflect less discrimination between Western and Asian/African immigrant workers at lower levels of education than at higher levels. With respect to experience accumulated abroad, the return is actually negative for Eastern Europeans (-0.5%) and is insignificantly different from zero for Westerners, Soviets, and Asians/Africans.<sup>17</sup>

Comparing the return to Israeli schooling across groups, Westerners again receive the highest return (8.1%) and Asian/African immigrants the lowest (6.5%). With respect to Israeli labor market experience, Soviet and

<sup>17</sup> A negative coefficient on  $EXP_1$  could reflect the negative effect on earnings of immigrating at an older age (see Friedberg 1992).



Western immigrants earn the highest return (1.4%, as compared to 1.7% for natives), with the other immigrant groups earning substantially less.

### B. Raising the Return to Foreign Human Capital

Having established that the lower value placed on immigrants' human capital fully explains their earnings disadvantage relative to natives with the same observable characteristics, a natural question is whether this difference is fixed or whether there exist factors that can reduce or eliminate it. This section studies whether acquiring domestic labor market experience or education might raise the return to foreign human capital. Estimates of equation (8) are reported in table 6.<sup>18</sup>

One way immigrants may learn to adapt their previously acquired training to Israel could be by obtaining further formal education after arrival. The interaction of foreign and Israeli schooling enters positively and significantly in the regression for immigrants taken as a whole, meaning that immigrants who attend school in Israel earn a higher return on their country-of-origin human capital than immigrants who completed their education abroad. For the average immigrant, who has completed 3.7 years of schooling in Israel, this interaction raises the average return to origin-source education to 7.6%, eliminating half of the gap between the returns to foreign and Israeli schooling. For Asian/African immigrants, there is a large rise in the return to foreign schooling resulting from acquiring further education in Israel. Just 3 years of schooling in Israel completely eliminate the difference in the return to foreign schooling and the return to Israeli schooling. It is not surprising that the indirect effect of domestic schooling would be largest for immigrants from Asia and Africa since, among immigrant groups, their country-of-origin education is initially least valued in the Israeli economy. East European immigrants also experience an increase in the return to their source-country education following schooling in Israel, but the effect for this group is smaller. For Western immigrants, there is a puzzling negative effect of having attended school in Israel on the return to education acquired abroad. It is unclear what lies behind this anomaly, though it could be negative selection: the results overall are consistent with a model in which acquiring further education raises the return to schooling obtained abroad. But as pointed out above, they could also reflect self-

<sup>18</sup> In results not reported here (see Friedberg 1996), immigrants who do not speak Hebrew are found to earn 14% less than other immigrants. This effect is larger for more educated immigrants. The rise in the return to foreign schooling associated with some knowledge of Hebrew is 2.2 percentage points per year of schooling. Hebrew language ability thus considerably raises the return to schooling obtained abroad, but it cannot eliminate the gap between the returns to foreign and domestic education.

**Table 6**  
**Postimmigration Human Capital Accumulation**

|   | All<br>Immigrants  | Immigrants from<br>the West | Immigrants from<br>Eastern Europe | Immigrants from<br>the USSR | Immigrants from<br>Asia or Africa |
|---|--------------------|-----------------------------|-----------------------------------|-----------------------------|-----------------------------------|
| Education abroad                                | .072<br>(.001)     | .068<br>(.004)              | .071<br>(.003)                    | .057<br>(.003)              | .057<br>(.003)                    |
| Education in Israel                             | .078<br>(.001)     | .085<br>(.003)              | .070<br>(.002)                    | .081<br>(.003)              | .063<br>(.002)                    |
| Experience abroad                               | .0009<br>(.001)    | -.0009<br>(.002)            | -.005<br>(.002)                   | -.002<br>(.001)             | -.001<br>(.001)                   |
| Experience in Israel                            | .012<br>(.001)     | .012<br>(.002)              | .010<br>(.001)                    | .008<br>(.002)              | .010<br>(.001)                    |
| Education abroad $\times$ education in Israel   | .0010<br>(.0002)   | -.0018<br>(.0005)           | .0008<br>(.0003)                  | .0001<br>(.0006)            | .0023<br>(.0003)                  |
| Education abroad $\times$ experience in Israel  | -.00003<br>(.0001) | .0004<br>(.0002)            | -.0002<br>(.0001)                 | .0006<br>(.0002)            | -.0001<br>(.0001)                 |
| Experience abroad $\times$ experience in Israel | .00003<br>(.00003) | .0001<br>(.0002)            | -.00004<br>(.0001)                | .0002<br>(.0001)            | .0001<br>(.0001)                  |
| Constant  | 9.38<br>(.017)     | 9.43<br>(.061)              | 9.61<br>(.039)                    | 9.56<br>(.038)              | 9.51<br>(.028)                    |
| $R^2$   | .251               | .210                        | .224                              | .296                        | .180                              |
| $N$   | 35,615             | 3,209                       | 10,422                            | 4,587                       | 17,397                            |

NOTE.—Dependent variable is log monthly earnings. Standard errors are in parentheses.

selection on the part of individuals who choose to get further schooling after immigration.

As argued earlier, accumulating labor market experience in Israel may also enable an immigrant to translate the human capital he brought with him into terms valued in the Israeli labor market. For immigrants taken as a whole, the interaction between foreign education and domestic experience is insignificant. This is because the effect exists only for certain area-of-origin groups. The return to foreign schooling rises with experience in Israel for Western and Soviet immigrants, but it is unaffected by domestic experience or even reduced for others. Even for the former groups, the effect is small, resulting only in a roughly 0.5 percentage point rise for every 10 years of experience. Finally, the interaction between foreign and domestic labor market experience is largely insignificantly different from zero, with marginally significant positive effects for Soviet and Asian/African immigrants.

### C. Simulated Earnings Profiles

The empirical results thus far can usefully be summarized using simulated earnings profiles. Figures 1–3 use parameter estimates from equation (8), augmented by quadratic terms in experience, to trace out earnings profiles for hypothetical native and immigrant workers. Since the return to foreign work experience was found to be generally insignificantly different from zero in table 6, the simulations focus on new labor market entrants (i.e., immigrants with  $EXP_1 = 0$ ).

Figure 1 charts the earnings paths of five high school graduates. One is a native, and the others are new immigrants from the four major origin groups. The figure shows how monthly earnings rise with domestic labor market experience, or, equivalently for the immigrants, with years since migration. Earnings are at similar levels and increase at roughly the same rate for natives and Ashkenazi immigrants (those from the West, Eastern Europe, and the Soviet Union), with immigrants from Asia and Africa lagging far behind. The earnings of immigrants from Asia and Africa would be even lower if their lower average years of schooling were taken into account.

Figure 2 traces out earnings profiles for another set of high school graduates, this time focusing on differences in the source of schooling. There are one native and three immigrants: one who was educated abroad ( $ED_1 = 12$ ,  $ED_2 = 0$ ), one who was educated in Israel ( $ED_1 = 0$ ,  $ED_2 = 12$ ), and one who has a mix of foreign and domestic education ( $ED_1 = 6$ ,  $ED_2 = 6$ ). The graph shows that earnings are generally higher for natives than for immigrants, and higher, the greater the fraction of schooling obtained in Israel rather than abroad.

Finally, figure 3 displays the earnings paths of four new immigrants. Two arrive as high school dropouts ( $ED_1 = 8$ ), with one entering the

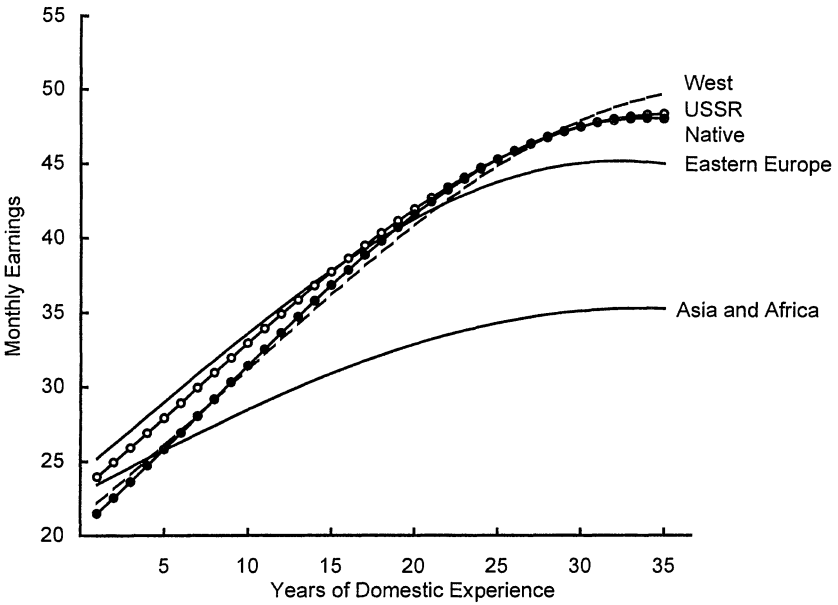


FIG. 1.—Earnings by area of origin. Figure plots simulated wage profiles using estimated parameters from equation (8), augmented by quadratic terms in experience, and assuming  $EXP_1 = 0$  and  $ED_1 = 12$  for immigrants and  $ED_2 = 12$  for natives.

labor force immediately, while the other attends school in Israel prior to entering the labor force ( $ED_2 = 4$ ). The other two immigrants arrive as college graduates ( $ED_1 = 16$ ), again with one entering the labor force immediately and the other attending school in Israel prior to entering the labor force. The figure highlights that the benefit to attending school in Israel is higher for more educated immigrants, that is,  $\beta_8 > 0$ . Graphically, the upward shift in the earnings profile associated with attending school in Israel is proportionately higher for college graduates than for high school dropouts.

#### D. Variation in the Return to Schooling by Level and Source

Some of the results found in the preceding sections, such as the lower return to domestic education for immigrants compared to natives, could simply be artifacts of the assumption of linearity in the return to schooling. Since immigrants' foreign education precedes their Israeli education, their education in Israel takes place at a higher level of total years of schooling than does the natives', on average. If there are decreasing returns to schooling, the estimated return to domestic schooling for immigrants, following the methodology in the previous analysis, will be downward biased. In this section, the return to schooling is allowed to

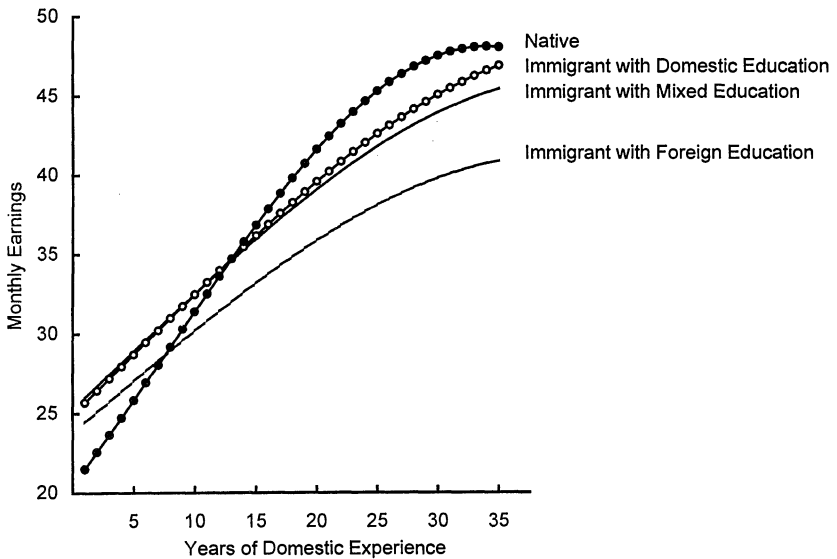


FIG. 2.—Earnings by source of schooling. Figure plots simulated wage profiles using estimated parameters from equation (8), augmented by quadratic terms in experience, and assuming  $EXP_1 = 0$  and  $ED = 12$ . For immigrants, “foreign education” denotes  $ED_1 = 12$  and  $ED_2 = 0$ , “domestic education” denotes  $ED_1 = 0$  and  $ED_2 = 12$ , and “mixed education” denotes  $ED_1 = 6$  and  $ED_2 = 6$ .

vary with its level. This will also show whether the transferability of education depends on its level. For example, higher levels of education may be more country-specific than the basic skills learned in elementary school.

To analyze this question, years of education are divided into categories: elementary school (years 1–8), secondary school (years 9–12), and post-secondary school (years 13+), which is subdivided into undergraduate (years 13–16) and graduate (years 17+) schooling.<sup>19</sup> The return to education is then estimated as a piecewise linear function. Equation (9) modifies equation (7) by replacing the uniform years of schooling variables,  $ED_b$ , with years of schooling in each of the four categories,  $ED_{ij}$ , where  $j = e, s, u, g$  indicate elementary, secondary, undergraduate, and graduate, respectively.

$$y = \gamma_0 + \gamma_1 EXP_1 + \gamma_2 EXP_2 + \gamma_3 ED_e + \gamma_4 ED_s + \gamma_5 ED_u + \gamma_6 ED_g + \gamma_7 ED_{1e} + \gamma_8 ED_{1s} + \gamma_9 ED_{1u} + \gamma_{10} ED_{1g} + \varepsilon. \quad (9)$$

<sup>19</sup> Although the undergraduate degree is ostensibly a 3-year program in Israel, the modal years of schooling for a bachelor’s degree recipient is in fact 4 years.

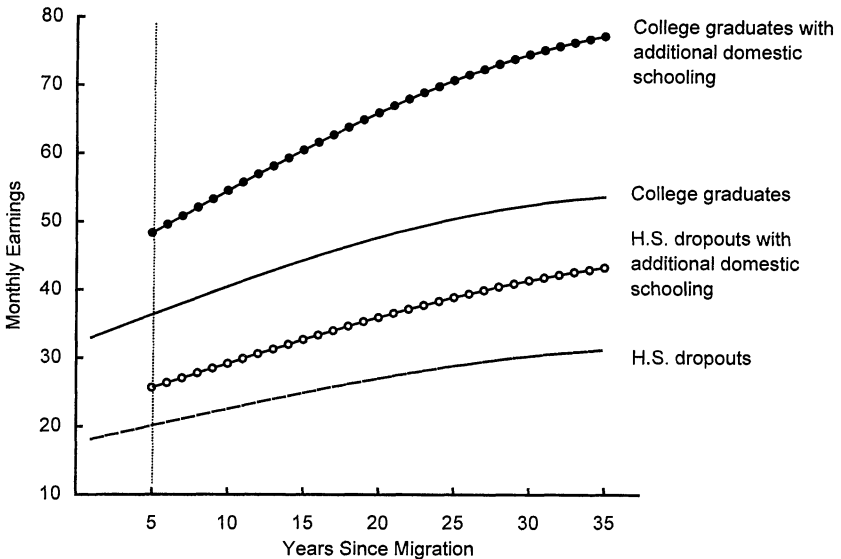


FIG. 3.—The effect of acquiring domestic human capital. Figure plots simulated wage profiles using estimated parameters from equation (8), augmented by quadratic terms in experience, and assuming  $EXP_1 = 0$ . “H.S. Dropouts” denotes  $ED_1 = 8$ , “College Graduates” denotes  $ED_1 = 16$ , and  $ED_2 = 0$  or 4.

Estimates of equation (9) can be found in table 7. The results in the first column, for natives, reveal that the return to schooling is indeed strongly nonlinear. Secondary and undergraduate education both have high returns (12.2% and 11.5%), while elementary school and graduate school have much lower returns (6.5% and a mere 3.7%). Consistent with the results in Section IVA, immigrants receive a lower return than natives to Israeli schooling, but the ordering of coefficients across schooling levels is similar: elementary, 3.2%; secondary, 10.9%; undergraduate, 10.7%; and graduate, 2.9%.

Turning to the difference in the returns to schooling acquired abroad and in Israel by immigrants, some interesting patterns emerge. For immigrants taken as a whole, the point estimates generally show the return to foreign schooling to be lower than the return to Israeli schooling. However, because of heterogeneity across origin groups, the coefficients are mostly insignificant.

Elementary school is equally valued, regardless of whether it was acquired in Israel or abroad. This is seen in the marginally significant coefficients on the variable “elementary abroad.” The one exception is the somewhat higher return for Westerners to attending elementary school in Israel. In general, the skills embodied in elementary schooling seem to be quite portable across national boundaries.

**Table 7**  
**The Return to Schooling by Level and Source**

|                      | Natives          | All Immigrants    | Immigrants from the West | Immigrants from Eastern Europe | Immigrants from the USSR | Immigrants from Asia or Africa |
|----------------------|------------------|-------------------|--------------------------|--------------------------------|--------------------------|--------------------------------|
| Experience abroad    | ...              | -.0008<br>(.0004) | .0015<br>(.0015)         | -.0053<br>(.0008)              | -.0008<br>(.0007)        | -.0042<br>(.0006)              |
| Experience in Israel | .0180<br>(.0004) | .0119<br>(.0003)  | .0162<br>(.0010)         | .0089<br>(.0007)               | .0142<br>(.0008)         | .0089<br>(.0005)               |
| Total elementary     | .065<br>(.007)   | .032<br>(.002)    | .047<br>(.017)           | .022<br>(.006)                 | .023<br>(.008)           | .024<br>(.003)                 |
| Total secondary      | .122<br>(.003)   | .109<br>(.003)    | .138<br>(.011)           | .107<br>(.006)                 | .128<br>(.011)           | .086<br>(.003)                 |
| Total undergraduate  | .115<br>(.003)   | .107<br>(.003)    | .082<br>(.010)           | .089<br>(.006)                 | .058<br>(.011)           | .109<br>(.005)                 |
| Total graduate       | .037<br>(.004)   | .029<br>(.005)    | .028<br>(.010)           | .025<br>(.008)                 | .066<br>(.015)           | .014<br>(.010)                 |
| Elementary abroad    | ...              | -.0008<br>(.0012) | -.0114<br>(.0048)        | .0043<br>(.0026)               | .0023<br>(.0050)         | -.0020<br>(.0015)              |
| Secondary abroad     | ...              | -.0264<br>(.0031) | -.0318<br>(.0118)        | -.0297<br>(.0060)              | -.0691<br>(.0107)        | -.0085<br>(.0043)              |
| Undergraduate abroad | ...              | .0015<br>(.0045)  | .0365<br>(.0123)         | .0065<br>(.0079)               | .0430<br>(.0120)         | -.0138<br>(.0091)              |
| Graduate abroad      | ...              | -.0022<br>(.0070) | -.0108<br>(.0131)        | -.0001<br>(.0134)              | -.0362<br>(.0183)        | -.0020<br>(.0187)              |
| Constant             | 9.21<br>(.055)   | 9.64<br>(.018)    | 9.48<br>(.132)           | 9.88<br>(.048)                 | 9.75<br>(.055)           | 9.76<br>(.025)                 |
| $R^2$                | .308             | .269              | .229                     | .235                           | .306                     | .200                           |
| $N$                  | 18,488           | 35,615            | 3,209                    | 10,422                         | 4,587                    | 17,397                         |

NOTE.—Dependent variable is log monthly earnings. Elementary, secondary, undergraduate, and graduate indicate years of schooling completed at that level. Standard errors are in parentheses.

The results at the secondary school level are quite different. The Israeli labor market places a large premium on acquiring high school training in Israel rather than abroad. This is true for all areas of origin, with an average difference of 2.6 percentage points in the rates of return per year.

Finally, the differential associated with attending postsecondary school abroad rather than in Israel is smaller than that differential at the high school level. This is somewhat surprising given that postsecondary education is generally considered to be more specialized than secondary education, suggesting that it would be less internationally portable. Foreign graduate study receives a lower return than Israeli training, but Western and Soviet undergraduate training actually receive higher returns.

A final issue concerns the possibility that the return to schooling depends on the particular configuration of schooling obtained. For example, a year of university study in Israel may yield a different return depending on whether the high school education that preceded it was acquired in Israel or abroad. A set of indicator variables is constructed for different combinations of schooling levels and sources. For each individual, it is determined whether he attended elementary school, secondary school, and postsecondary school, and if so, whether the given school level was acquired abroad or in Israel.<sup>20</sup> This yields six dummy variables: (1) attended elementary school abroad, (2) attended elementary school in Israel, (3) attended secondary school abroad, (4) attended secondary school in Israel, (5) attended postsecondary school abroad, and (6) attended postsecondary school in Israel. The sample means for these attainment variables are presented in the second to bottom panel of table 3. These variables then enter into the calculation of the nine indicator variables used in the regressions below. The three letters in the variable name denote elementary school, high school, and postsecondary school, respectively. An "I" signifies that this schooling took place in Israel, an "F" signifies that it took place abroad, and "O" means that this level was not attained. The nine dummy variables are

- III = elementary, secondary, and postsecondary all acquired in Israel;
- IIO = elementary and secondary in Israel, no postsecondary;
- IOO = elementary in Israel, no secondary or postsecondary;
- FFF = elementary, secondary, and postsecondary all obtained abroad;

<sup>20</sup> For people who completed part of a schooling level in each country, three alternative methods of assigning that schooling to a country were used: according to where the majority of schooling at that level took place, as foreign if any of it took place abroad, or as Israeli if any of it took place in Israel. The results using these different measures being quite similar, results are presented only for the first method.



FFO = elementary and secondary abroad, no postsecondary;  
 FOO = elementary abroad, no secondary or postsecondary;  
 FFI = elementary and secondary abroad, postsecondary in Israel;  
 FII = elementary abroad, secondary and postsecondary in Israel; and  
 FIO = elementary abroad, secondary in Israel, no postsecondary.

Replacing the continuous years of schooling measures used in equation (9) with these nine schooling configuration dummies, we have

$$y = \gamma_0 + \gamma_1 \text{EXP}_1 + \gamma_2 \text{EXP}_2 + \gamma_3 \text{III} + \gamma_4 \text{IIO} + \gamma_5 \text{IOO} + \gamma_6 \text{FFF} \\ + \gamma_7 \text{FFO} + \gamma_8 \text{FOO} + \gamma_9 \text{FFI} + \gamma_{10} \text{FII} + \gamma_{11} \text{FIO} + \varepsilon. \quad (10)$$

Since the constant term and the returns to experience vary somewhat across groups, direct comparisons cannot be made between the returns to a given configuration for two area-of-origin groups merely by comparing their corresponding coefficients. Direct comparisons can be made, however, for the difference between two groups in the difference between two schooling configurations (i.e., comparing the difference between III and FFF for Western immigrants vs. that difference for Soviets).

These differences in differences are presented in table 8. It is instructive to focus on three comparisons: (1) the return to attending school in Israel for natives versus immigrants when both groups acquired their previous education in Israel; (2) the return to attending school in Israel for natives versus immigrants when the immigrants acquired their previous education abroad; and (3) the return to Israeli versus foreign schooling for immigrants.

The return to attending school in Israel for natives versus immigrants when both groups obtained their previous education in Israel can be seen in first two lines of table 8. The college–high school differential (III–IIO) is slightly smaller for the four immigrant groups than it is for natives. The high school–elementary school differential (IIO–IOO) varies considerably by group, with Western and Soviet immigrants gaining much more than natives and Asian/African immigrants gaining much less. Among immigrants who received no schooling abroad (i.e., those who immigrated too young), the return to college is only slightly lower than the return for natives, while for high school, some immigrant groups actually earn a higher return.

The second set of comparisons is of the return to attending school in Israel for immigrants versus natives when the immigrants obtained their previous education abroad. One case is the difference in the return to postsecondary school in Israel for a high school educated native (III–IIO) and the return for an immigrant who attended high school abroad (FFI–

**Table 8**  
**Differences in the Returns to Different Configurations of Schooling**

|         | Natives          | All<br>Immigrants | Immigrants<br>from the<br>West | Immigrants<br>from<br>Eastern<br>Europe | Immigrants<br>from the<br>USSR | Immigrants<br>from Asia<br>or Africa |
|---------|------------------|-------------------|--------------------------------|---|--------------------------------|--------------------------------------|
| III-IIO | .5140<br>(.0080) | .4944<br>(.0120)  | .4453<br>(.0367)               | .4486<br>(.0229)                        | .3946<br>(.0470)               | .4102<br>(.0176)                     |
| IIO-IOO | .3696<br>(.0117) | .3446<br>(.0126)  | .4482<br>(.0701)               | .3459<br>(.0378)                        | .5243<br>(.0728)               | .2753<br>(.0139)                     |
| FFF-FFO | ...              | .4305<br>(.0098)  | .4661<br>(.0318)               | .3487<br>(.0181)                        | .3746<br>(.0184)               | .3692<br>(.0199)                     |
| FFO-FOO | ...              | .2725<br>(.0079)  | .7423<br>(.0480)               | .2293<br>(.0157)                        | .1880<br>(.0231)               | .2414<br>(.0119)                     |
| III-FFF | ...              | .1286<br>(.0129)  | .0514<br>(.0324)               | .1597<br>(.0241)                        | .2002<br>(.0373)               | .0943<br>(.0247)                     |
| III-FFI | ...              | .0916<br>(.0193)  | .1207<br>(.0482)               | .1318<br>(.0332)                        | .1864<br>(.0560)               | -.0240<br>(.0325)                    |
| III-FII | ...              | .0501<br>(.0166)  | .1351<br>(.0498)               | .0685<br>(.0264)                        | .0424<br>(.0518)               | -.0061<br>(.0271)                    |
| FFI-FFF | ...              | .0370<br>(.0183)  | -.0692<br>(.0462)              | .0279<br>(.0320)                        | .0138<br>(.0475)               | .1183<br>(.0337)                     |
| FII-FFF | ...              | .0785<br>(.0157)  | -.0836<br>(.0480)              | .0912<br>(.2259)                        | .1579<br>(.0427)               | .1004<br>(.0288)                     |
| IIO-FFO | ...              | .0647<br>(.0119)  | .0723<br>(.0397)               | .0598<br>(.0218)                        | .1802<br>(.0374)               | .0533<br>(.0142)                     |
| IOO-FOO | ...              | -.0074<br>(.0130) | -.0998<br>(.0790)              | -.0568<br>(.0014)                       | -.1561<br>(.0702)              | .0194<br>(.0147)                     |
| FIO-FFO | ...              | .0606<br>(.0118)  | .1047<br>(.0486)               | .0640<br>(.0221)                        | .0972<br>(.0417)               | .0388<br>(.0159)                     |
| FIO-FOO | ...              | .3331<br>(.0123)  | .3808<br>(.0607)               | .2929<br>(.0242)                        | .3264<br>(.0450)               | .2798<br>(.0156)                     |
| IIO-FIO | ...              | .0041<br>(.0120)  | -.0324<br>(.0487)              | -.0042<br>(.0243)                       | .0831<br>(.0503)               | .0146<br>(.0147)                     |
| FFI-FFO | ...              | .4676<br>(.0182)  | .3969<br>(.0509)               | .3766<br>(.0312)                        | .3884<br>(.0480)               | .4874<br>(.0303)                     |

NOTE.—Measures are the difference in log monthly earnings for people with the specified configurations of schooling. The three-letter combinations (FIO, etc.) are dummy variables that are interpreted as follows: the first letter indicates the location of elementary school, the second the location of secondary school, and the third the location of postsecondary school. F indicates foreign, I indicates Israel, and O indicates none. OOO is the omitted category. Standard errors on the differences are in parentheses.

FFO). The difference for natives is 0.5140, or 67.2%.<sup>21</sup> As shown in the bottom line of the table, this increment is much lower for immigrants (0.4676 or 59.6%). The same comparison at the high school level (IIO-IOO vs. FIO-FOO) yields a similar result (44.7% and 39.5%). In both cases, immigrants receive a much lower return than do natives. Contrasting this with the previous set of comparisons suggests that one of the main reasons immigrants earn a lower return to Israeli schooling than do natives is that they are building on a base of foreign schooling, rather than

<sup>21</sup>  $\ln(\text{III}) - \ln(\text{IIO}) = 0.5140$ , so  $\text{III}/\text{IIO} = e^{0.5140} = 1.672$ .

one of Israeli schooling. It is, however, not the only reason, as immigrants earn a lower return to domestic schooling than do natives, even when they have no prior foreign schooling.

The third set of comparisons is of the return to Israeli versus origin country schooling for immigrants. The difference in earnings for someone who attended school through the postsecondary level in Israel versus abroad is (III–FFF). This difference is positive for all immigrant groups (approximately 12.9% on average). The difference for individuals who terminated their education at the high school level (IIO–FFO) is also positive in all cases (6.5% on average). Examining immigrants with foreign schooling who completed their education in Israel versus those who completed it abroad yields a similar pattern. For example, the value of attending postsecondary school in Israel versus abroad (FFI–FFF) is positive for almost all immigrant groups (3.7% on average). The exception is Westerners, whose postsecondary schooling is more highly valued. Looking at this comparison at the high school level (FIO–FFO) also shows positive values for all groups, ranging from 3.9% for African and Asian immigrants to 10.5% for Westerners, whose origin-source education is always highly valued.

## V. Conclusion

This article studies the labor market assimilation of immigrants, focusing on the source of the immigrants' human capital. The national origin of an individual's education and labor market experience is found to be a crucial determinant of their value in the labor market. Human capital is imperfectly portable across countries. Estimation of standard earnings determination and immigrant assimilation equations yields patterns similar to those found in the literature on the United States, suggesting that the evidence from Israel may be used to shed light on this set of questions more generally.

Upon arrival, immigrants to Israel earn approximately one-quarter less than their native counterparts of comparable measured skill levels. This gap can be fully attributed to the significantly lower value placed on the immigrants' human capital. With few exceptions, human capital acquired abroad receives a lower return in the host labor market than human capital acquired domestically. The return to education obtained abroad is higher for immigrants from Europe and the Western Hemisphere than for immigrants from Asia and Africa. These patterns may reflect differences in school quality across continents of origin, as well as the compatibility of the education obtained abroad with the requirements of the host labor market. They may also reflect a lesser degree of discrimination against immigrant workers from Asia or Africa at low levels of education than at high levels. The return to labor market experience acquired abroad is generally insignificant.

The direct return to a year of schooling or experience obtained in the host country is also found to be higher for natives than for immigrants. One explanation for this result is that natives' superior language proficiency and other country-specific knowledge enable them to learn and train more productively than immigrants. The portability of education is found to vary significantly with its level. Elementary school education is equally valued, almost regardless of where it was acquired. The source of a high school education, however, is an important determinant of its value, with domestic high school earning the highest return. The return to postsecondary schooling obtained abroad varies greatly with area of origin.

Finally, acquiring further human capital following immigration is associated with a rise in the return to education obtained abroad. Education obtained in the destination country appears to significantly raise the return to schooling acquired abroad for Asian and African immigrants, with weaker effects for European and American immigrants. For Western and Soviet immigrants, the return to origin-country schooling also rises with the accumulation of host-country work experience. Equivalently, the more highly educated immigrants in these groups experience more earnings growth over time than do their less educated counterparts. The faster assimilation rate of the more educated immigrants somewhat offsets their larger initial earnings deficit relative to comparably educated natives. These findings are consistent with a model in which destination-country human capital enables immigrants to translate the skills they accumulated in their countries of origin into terms rewarded in the host labor market. This suggests a compound benefit to immigrants of receiving further training following immigration.

## Appendix A

### Area of Origin Groups

#### I. West

Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Cuba, Denmark, Ecuador, Finland, France, Germany, Holland, Ireland, Italy, Luxembourg, Mexico, New Zealand, Norway, Panama, Peru, Portugal, South Africa, Spain, Sweden, Switzerland, United Kingdom, United States, Uruguay, Venezuela, Zimbabwe (Rhodesia), unspecified Central America, unspecified South America, unspecified Europe, and unspecified Oceania.

#### II. Eastern Europe

Albania, Bulgaria, Czechoslovakia, Greece, Hungary, Poland, Romania, and Yugoslavia.

### III. Soviet Union

Soviet Union.

### IV. Asia and Africa

Afghanistan, Algeria, Burma, China, Cyprus, Egypt, Ethiopia, Eritrea, India, Indonesia, Iran, Iraq, Japan, Jordan, Korea, Lebanon, Libya, Mongolia, Morocco, Pakistan, Philippines, Saudi Arabia, Somalia, South Yemen, Sudan, Syria, Tangier, Tunisia, Turkey, Yemen, unspecified Africa, and unspecified Asia.

## Appendix B

### Assimilation versus Cohort Quality

The issue of potential "cohort quality" effects has received much attention in the literature on immigration.<sup>22</sup> In a single cross section of data, it is not possible to separately identify aging and cohort effects. A positive estimated effect of years since migration (YSM) on earnings in equation (1) could therefore be due either to a rise in immigrants' relative earnings with time since arrival or to earlier immigrant arrival cohorts having permanently higher earnings potential than more recent ones. In order to test the extent to which the cross-sectional return to YSM reflects assimilation versus cohort effects, two cross sections of data are needed. Equation (1) can then be estimated on the pooled data, with arrival-cohort dummies added to the equation. If the return to YSM is invariant to the addition of the cohort dummies, then it is legitimate to interpret that coefficient as a measure of assimilation in cross-sectional analysis.

Table B1 pools data from the 1972 and 1983 Israeli Censuses of Population.<sup>23</sup> The first column of the table presents estimates of equation (1), allowing the coefficients  $\alpha_0$ ,  $\alpha_1$ ,  $\alpha_2$ , and  $\alpha_3$  to be different in the two years.<sup>24</sup> Note that even with two cross sections of data, in order to test for the presence of cohort effects, it is necessary to constrain the returns to immigrant status, years since migration, and arrival cohort to be the same in both years.

In the second column of table B1, a set of arrival-cohort dummy variables is added to the regression. There are 14 dummies, covering the years 1917–83 in 5-year intervals. The coefficients on YSM and its square are quite close in columns (1) and (2). If the same equations are run with

<sup>22</sup> The issue was first raised by Borjas (1985), who concludes that most of the return to years since arrival in the United States is due to a systematic decline in the quality of successive immigrant cohorts, rather than to assimilation. See Friedberg (1992) and LaLonde and Topel (1992), among others, for reexaminations of this finding.

<sup>23</sup> The rules used in constructing the 1972 sample are the same as those used for the 1983 sample.

<sup>24</sup> An  $F$ -test of the equality of these coefficients across the two years rejects at the 1% level that they are the same.

**Table B1**  
**Assimilation versus Cohort Quality**

|                                     | (1)               | (2)               | (3)               | (4)               |
|-------------------------------------|-------------------|-------------------|-------------------|-------------------|
| 1983                                | -2.56<br>(.015)   | -2.58<br>(.015)   | -2.61<br>(.015)   | -2.61<br>(.015)   |
| Education (1972)                    | .050<br>(.001)    | .049<br>(.005)    | .043<br>(.001)    | .043<br>(.001)    |
| Education (1983)                    | .080<br>(.001)    | .079<br>(.006)    | .075<br>(.001)    | .075<br>(.001)    |
| Experience (1972)                   | .021<br>(.001)    | .020<br>(.001)    | .019<br>(.001)    | .020<br>(.001)    |
| Experience (1983)                   | .027<br>(.001)    | .027<br>(.001)    | .028<br>(.001)    | .028<br>(.001)    |
| Experience <sup>2</sup> /100 (1972) | -.034<br>(.001)   | -.034<br>(.001)   | -.035<br>(.001)   | -.036<br>(.001)   |
| Experience <sup>2</sup> /100 (1983) | -.036<br>(.001)   | -.036<br>(.001)   | -.039<br>(.001)   | -.039<br>(.001)   |
| All immigrants                      | -.317<br>(.007)   | -.447<br>(.028)   | ...               | ...               |
| Immigrants from the West            | ...               | ...               | -.234<br>(.008)   | -.377<br>(.028)   |
| Immigrants from Eastern Europe      | ...               | ...               | -.296<br>(.007)   | -.443<br>(.028)   |
| Immigrants from the USSR            | ...               | ...               | -.292<br>(.007)   | -.426<br>(.028)   |
| Immigrants from Asia or Africa      | ...               | ...               | -.419<br>(.007)   | -.566<br>(.028)   |
| Years since migration (YSM)         | .0133<br>(.0005)  | .0147<br>(.0009)  | .0167<br>(.0005)  | .0160<br>(.0009)  |
| YSM <sup>2</sup> /100               | -.0108<br>(.0010) | -.0133<br>(.0016) | -.0176<br>(.0011) | -.0157<br>(.0016) |
| Constant                            | 11.8<br>(.011)    | 11.8<br>(.011)    | 11.9<br>(.011)    | 11.9<br>(.011)    |
| Arrival-cohort dummies              | No                | Yes               | No                | Yes               |
| R <sup>2</sup>                      | .847              | .847              | .849              | .849              |
| N                                   | 110,285           | 110,285           | 110,285           | 110,285           |

NOTE.—This table shows pooled data from the 1972 and 1983 Censuses of Population. Dependent variable is log monthly earnings in 1983 Israeli shekels. The arrival-cohort dummies cover the years 1917–83 in 5-year intervals. The omitted dummy is the most recent one. The  $R^2$  falls by 0.35 if the dependent variable is adjusted to have the same mean in the 2 years. Standard errors are in parentheses.

YSM entering linearly, the coefficient is 0.00836 ( $t$ -statistic of 54.4) when the arrival-cohort dummies are omitted and 0.00828 ( $t$ -statistic of 14.5) when they are included. Correcting for area of origin in columns (3) and (4) also shows the effect of YSM to be largely invariant to the inclusion of arrival-cohort effects. The linear version here yields a return to YSM of 0.00845 ( $t$ -statistic of 53.9) without cohort effects and 0.00849 ( $t$ -statistic of 14.9) with them.

These results indicate that the coefficient on YSM estimated in a single cross section of data is correctly interpreted here as a measure of immigrant earnings growth over time since arrival and does not reflect a decline in the earnings potential of more recent arrival cohorts. An  $F$ -test of the joint significance of the arrival-cohort dummies rejects the null that they do not differ from zero, although with a standard deviation of 0.04, they

are rather small in size. In any case, the magnitude of the cohort effects is unimportant for the purpose of obtaining unbiased estimates of assimilation rates. All that matters is that they do not follow a systematic pattern over time. As these cohort effects do not, their omission does not bias the return to YSM. This is not surprising since, in contrast to the United States, there was no change in Israeli immigration policy analogous to the 1965 amendments to the U.S. Immigration and Nationality Act that would lead us to expect a systematic change in unobserved cohort quality over time. The analysis can therefore proceed, using the data from the 1983 Census alone to estimate the parameters of interest.

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