The Integration of Immigrants from the Former Soviet Union in the Israeli Labor Market*

Zvi Eckstein† and Yoram Weiss‡

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Abstract

This paper analyzes the recent mass immigration from the USSR to Israel. We examine three interrelated features of the assimilation process; the rise in the productive capacity of immigrants as they gradually adapt to the Israeli labor market, the rising rewards that immigrants receive for their imported skills and the role of the family in facilitating the acquisition of local skills. We estimate wage regression to capture the growth in wages with time spent in Israel, for immigrants with different skills. We use these estimates for quality adjustment of aggregate labor and show that the aggregate capital labor ratio remained almost constant during the period of mass immigration. This explains the stable average wage of native Israelis combined with rising wages of immigrants. We find a large marriage premium for immigrants, in contrast to the small and insignificant marriage premium among native Israelis. We interpret this difference as evidence for stronger within family coordination of work activities among immigrants.

1. Introduction

The mass immigration of Jews from the former Soviet Union to Israel which started towards the end of 1989 amounted to a total of about 711 thousand immigrants between 1990 and the end of 1997 (see Table 11.1). The Israeli population at the end of 1989 was 4.56 million and the pre-migration population growth rate during the 1980s was between 1.4% and 1.8% per annum. The 1990-91 wave of immigration increased the population almost instantly by 7.6%. The flow from 1992 to 1995 stabilized at about 64-68 thousand, and declined to about 55 thousands in 1997, contributing almost one percent to the annual rate of growth of the population. The accumulated flow of the immigrants from the former Soviet Union, during the period 1990-1997, constitutes about 16 percent of the labor force of the pre-migration population of Israel.

An important characteristic of this wave of immigration is their exceptionally high level of education and their prior experience in academic jobs (see Table 11.1). Those who arrived before the end of 1993 possessed an average of 14.5 years of schooling, and half of them had held academic and managerial positions before immigrating. Of those, 57,400 defined themselves as engineers and 12,200 as medical doctors, compared with 30,200 engineers and 15,600 doctors in Israel in 1989. The large entry rates of highly skilled immigrants generated a gradual adjustment process, whereby immigrants first work at low skill occupations and

then climb up the occupational ladder as they become more familiar with the Israeli labor market and find jobs that match their skills.

We have chosen to focus our analysis on the time patterns of aggregate and individual wages and examine three interrelated features of the assimilation process; the rise in the productive capacity of immigrants as they gradually adapt to the Israeli labor market, the rising rewards that immigrants receive for their imported skills and the role of the family in facilitating the acquisition of local skills. Our purpose is to provide an integrative view of the of wage dynamics, putting aside other important features which have been discussed elsewhere.[1]

Section 2 provides a summary of the aggregate time series evidence on the link between immigration, economic growth, employment and wages. These aggregate patterns are linked with the micro economic analysis that follows. It is shown that the estimated individual wage profiles can be used to create a quality adjusted labor aggregate, that maintains a fixed aggregate capital labor ratio, during the period of mass immigration. This allows us to reconcile the stable average wage of Israelis and the rising wages of immigrants during the period 1990-1995, which was characterized by a large inflow of labor and a corresponding, but delayed, increase in capital.

Section 3 that is based on Eckstein and Weiss (1998) analyzes individual wage growth for immigrants of different skills. The general pattern is an initial low wage, compared with Israelis of similar skills, followed by a sharp increase with

time spent in Israel. For instance, the average hourly wage of a highly skilled immigrant who arrived in the cohort 1990-91 at the age of 30 is predicted to be 60 percent of the wage of an equivalent Israeli. The estimated equation predicts that this immigrant will reach at age of 55 a wage that is about 84% of that equivalent Israeli. On the average, wages of immigrants grow at a rate of 6.4% a year, during the five years following the arrival. Rising prices for imported skills, mainly schooling and work experience, account for one half of this rise. As the price of imported skills rise, immigrants become more differentiated and their wage become less equal.

Section 4 compares the impact of marital status on the wages and labor force participation of immigrants and native Israelis. For immigrants, we find a large initial marriage premium of 8.1% for males and 11.5% for females. This gap between married and singles rises during the first 15 years in Israel and then narrows down. In contrast, among native Israelis we find a small and insignificant marriage premium. We interpret this difference in differences as evidence for stronger within family coordination of work activities among immigrants. This coordination allows married immigrants to enjoy a higher wage level and a higher wage growth than single immigrants.

2. Aggregate Aspects

Ben-Porath (1986) provides a detailed description of the growth of population and output in Israel from 1922 to 1982 and notes the positive correlation between

immigration and growth. Table 11.2 updates his Table 1 up to 1997 and reveals that this pattern continued in the 1990's, despite the lower growth rates in later years. In particular, consumption per capita rises during periods of mass immigration. This was made possible through investments that were triggered by the immigration shocks. As seen in Table 11.2, the capital stock keeps up with the increase in employment, after some delay. This is true for both productive capital and residential capital. There is also some evidence that the rate of capital utilization has increased at the initial period after the mass immigration started.[2]

Razin and Sadka (1993) and Sussman (1998) use a simple aggregate model with Cobb-Douglas production function to describe the co-movements of population, GDP, employment, wages and capital. An implication of this technology is that, under competitive conditions, the wage rate is proportional to the output per worker and, therefore, the continued rise in GNP per capita, is an indication that the mass immigration was accompanied by a corresponding increase in other inputs and in productivity, without a substantial negative impact on the wages and employment opportunities of the native Israelis.

Figure 11.1 shows the movements in real wages in the public and the business sectors from 1980 to 1997. Following the beginning of the mass immigration in 1990, there is an initial small decrease in average wages, followed by a subsequent increase. The temporary reduction in wages occurred mainly in the business sector, while public sector wages continued to grow. The different patterns of

adjustment by sector reflect the importance of collective bargaining in the public sector (see Sussman and Zakai, 1998). The outbreak of a large and unexpected immigration wave, and the increase by 11.6 percent in the working population, aged 15+ during 1990-1992, caused no discernible break in the average wage.

Separate time patterns in the real hourly wages for natives and immigrant during 1991-1997 (see Eckstein and Weiss (1999)) show that the wage of *both* groups tend to *rise* during the period, with higher proportional wage growth among immigrants. In particular, the wage of natives with 16+ years of schooling remained flat during 1991-1994 and then started to rise slightly. The average wage of such workers has declined as more immigrants joined the 16+ group, because their wage is about half the wage of natives. Thus, the decline in average wages mainly reflects the entry of immigrants into low paying jobs, and does not imply that natives suffered a wage loss. Freidberg (1996) provides additional evidence showing a small impact of the mass immigrants on the wages of native Israelis. This accumulated evidence is consistent with the literature on the impact of immigrants on wages of native workers (see Altonji and Card, 1991, Lalonde and Topel, 1991). We note that the US studies examined the impact of immigration on wages of natives in *local* labor markets. Local wages can be unaffected because native workers move out as immigrants enter (see Freidberg and Hunt, 1995). In contrast, we report the absence of countrywide wage affects, where labor mobility

is not operative. Instead, capital inflow and its effect on the aggregate capital labor ratio maintain wage stability.[3]

The aggregate employment data misrepresents the time changes in the aggregate labor input and, consequently, in the aggregate capital labor ratio, because immigrants are treated as perfect substitutes to natives. In fact, as we show in detail, immigrants adapt *gradually* to the Israeli labor market and become closer substitutes to comparable Israeli workers, with similar schooling and work experience, as they spend more time in Israel. This process is reflected in the initially low wages of immigrants, about half of the wages of comparable natives, followed by a sharp increase in wages with time spent in Israel.

Following Jorgenson and Griliches (1967), we propose a simple method for quality adjustment based on the relative wages of immigrants and natives (a detailed description of these adjustments appears in the Appendix). The implied adjustments in the capital labor ratio are shown in Figure 11.2. As seen, the adjustments imply that the aggregate capital labor ratio remained roughly constant during the period of mass immigration. Under constant returns to scale technology and competitive conditions, this implies that the growth in inputs has no effect on wages. The only sources for growth in average wages are quality changes, reflecting shifts in composition of the labor force towards more productive workers, and growth in total factor productivity. Among immigrants, there is a 20 percent increase in quality during 1990-1995, compared with only 2 percent

among Israelis. In this respect, the aggregate data, properly interpreted, is consistent with a stable average wage for native workers and rising average wages for immigrants.

3. Analysis of the Convergence of Immigrant Wages

3.1 A Framework for Analysis

An immigrant brings with him a fixed set of marketable skills such as schooling, occupation and work experience acquired abroad. As time passes, these skills are gradually adapted to the Israeli market and their quality and market value rises. The immigrant may also augment his skills or acquire new skills in Israel. The acquisition of new skills requires some sacrifice of current earning. Thus, each immigrant is faced with an investment problem in which he compares the benefits from investment in terms of higher future earnings to the costs in terms of forgone current earnings. The investment decisions interact with the changes in the market value of the immigrant's skills and together determine his earning growth. An Israeli worker faces a similar investment problem, except that he does not have skills that were acquired abroad.

We distinguish three sources of wage growth for immigrants: (i) the rise of the return to imported human capital; (ii) the impact of accumulated experience and investments on the job in the host country; and, (iii) the mobility up the

occupational ladder in the host country.[4] We provide a simple framework, based on human capital theory, to explain the connections between rising prices of skills and investment in human capital and describe the conditions under which the earnings of immigrants will convergence to the earnings of comparable natives. We use two basic results from human capital theory: investment declines as the individual becomes older and approaches the end of his working career, and current investment is higher if the individual expects an increase in the price of skills. The first result follows from the fact that value of human capital depends on the expected period of utilization. The second result follows from the observation that investment in human capital involves a sacrifice of current earning capacity in favor of increased future earning capacity. Based on this framework, we formulate a non-linear model, which is estimated using repeated cross section data that includes immigrants with different duration of time in Israel, observed in the years 1991 to 1995. The estimation is done in two steps: First, a wage equation is estimated for Israelis and the estimated coefficients are used to predict earnings for immigrants. Then, imported skills and their interaction with time spent in Israel explain the difference between actual and predicted earnings for immigrants.

3.2 Data on Wages

Hourly wages are constructed from data on earnings and hours, reported in the CBS Income Surveys for the years 1991 to 1995, which are random annual surveys of the whole Israeli population. Using these data we construct two

subsamples: a sample of native born Israelis and a sample of immigrants from the former USSR who were older than 13 upon arrival. The two subsamples include only Jewish men of ages 26 to 65 who worked more than two weeks during the last month and more than 25 hours per week. We also exclude all individuals with no information on age, no information on the number of years of schooling and with more than 31 years of schooling. For immigrants, we can separate the number of years of schooling and experience of work between those acquired in the former Soviet Union and those accumulated in Israel.

From the summary statistics for the two sub-samples from the Income Survey we learn that on the average, immigrants earn about 64 percent of the monthly wage of Israelis (and 66 percent of their hourly wage). Immigrants are about 3 years older than Israelis and have one year more of education. The occupational distribution of working immigrants is quite similar to the occupational distribution of working Israelis. The immigration flows from the former USSR were concentrated in two time periods; about 20 percent of the immigrants, observed in 1991-1995 arrived in the early wave of 1970-79 and 62 percent arrived in the later wave of 1989-1992. Seventy five percent the immigrants in the sample are newly arrived and had been in Israel for less than 6 years.

3.3 Implementation

We follow a simple two-stage estimation procedure. We first use a sample of Israeli natives to estimate a wage equation for Israeli workers. We use these

estimates to predict what each immigrant would earn in Israel if he could sell his observed skills for the same prices as native Israelis. We then form the differences between actual and predicted earning for immigrants and estimate a second regression equation, with the objective of identifying the effect of changing prices of skills, as a function of time spent in Israel.[5] We allow for cohort effects and for the possibility that immigrants who are "trapped" in low skill occupations, receive a lower return for schooling acquired abroad.

The observed imported skills in this analysis are schooling and experience acquired abroad. Schooling is measured simply by the total time spent in school. However, experience is not simply the accumulated time spent at work, but rather the amount of human capital or skills accumulated in work. This quantity is given by the expression $[b\exp - \frac{c\exp^2}{2}]$, where *exp* denotes experience, defined in the usual way (age-schooling-6-military service). We normalize by setting the price (in terms of log earnings) which is paid to Israelis for their "true" experience to unity. We shall *define* the "true" work experience that immigrant import as $[b\exp_0 - \frac{c\exp_0^2}{2}]$, using the values for *b* and *c* as for Israelis.[6] We then estimate the time pattern of the price which immigrants receive for this quantity. The prices of unobserved skills are represented by the time patterns of the occupational specific constants.

3.4 Regression Results for Israelis

Table 11.3 presents the estimation results of the wage equation for Israelis. The yearly dummies represent the difference from the wage in 1995. We find that, despite the mass immigration, the wage per hour for Israelis is *increasing* during the period. Controlling for schooling, occupation and experience, the hourly wage in 1991 is about six percent lower than in 1995 (1992 is an exception where wage per hour is almost as that of 1995). The wages in occupation 1 and occupation 2 are, respectively, about 27 and 22 percent higher than in occupation 3. There is a 4.5 percent increase of the hourly wage with the first year of experience and about 7 percent increase of the hourly wage with a year of education.[7]

We use this equation as the benchmark for studying the convergence of the wages of immigrants to native Israelis, as described in the model above.

3.5 Regression Results for Immigrants

To estimate the convergence parameters, we use as dependent variable the difference between the observed log wage of each immigrant and his predicted log wage, using the estimated parameters in Table 11.3. The explanatory variables are schooling acquired abroad (interacted with occupation), experience acquired abroad and occupation in Israel. The effect of each of these variables (including the constant) is allowed to interact with time since arrival to Israel. To isolate the impact of mass immigration in 1990-1991, we distinguish three cohorts: immigrants who arrived before 1990, during 1990-1991 and during 1992-1995,

and allow them to affect the constant. Specifically, we estimate the nonlinear regression

$$\begin{aligned} D_i = {} & b + b_{<90}c_{<90} + b_{92-95}c_{92-95} + de^{-\lambda(t-t_{0i})} \\ & + \left[b_{occ1} + d_{occ1}e^{-\lambda(t-t_{0i})}\right]\cdot occ1 + \left[b_{occ2} + d_{occ2}e^{-\lambda(t-t_{0i})}\right]\cdot occ2 \\ & + \left[b_{exp} + d_{exp}e^{-\lambda(t-t_{0i})}\right]\cdot\left[(.045 - .0007exp_{0i})\cdot exp_{0i}\right] \\ & + \left[b_{s\_occ1\&2}(occ1 + occ2) + b_{s\_occ3}occ3 + d_s e^{-\lambda(t-t_{0i})}\right]\cdot s_{0i} + \varepsilon_i, \end{aligned} \tag{1}$$

where D_i is the residual from the first stage, $t - t_{0i}$ is potential experience in Israel, exp_{0i} is potential experience in former USSR, s_{0i} is the number of years of schooling in the USSR, $occ1_i$ and $occ2_i$ are dummies that take the value 1 if the immigrant works in occupations 1 or 2, respectively, (occupation 3 is the reference group) and $c_{<90}$ and $c_{92\text{-}95}$ are dummy variables that take the value 1 if the immigrant entered Israel, before 1990 and between 1992 and 1995, respectively. The value of $\left[(.045 - .0007exp_{0i})\cdot exp_{0i}\right]$ is the accumulated human capital associated with the market labor experience that the immigrant imported, using the estimated coefficients for experience and experience squared for Israelis in Table 11.3. We restrict the speed of convergence of the coefficients of the human capital indicators, λ, to be the same for all the parameters.

The effects of occupation schooling and experience interact with time spent in Israel, where each effect has the form $b + de^{-\lambda(t-t_{0i})}$. The first part, denoted by *b*, describes the *long run* difference in the effect between Israelis and immigrants. The second term, denoted by $de^{-\lambda(t-t_{0i})}$, describes the adjustment process and *d*+*b*

is the *immediate* impact. The estimated parameters, for this non-linear regression are presented in Table 11.4.

The estimated speed of adjustment, λ, is .0953 per year, implying that within a period of ten years each price is adjusted by 62 percent of the initial distance from it's long run value. However, convergence also depends on the long-term difference between the prices that Israelis and immigrants obtain for their skills. We shall, therefore, discuss each of the prices, for schooling, experience and unobserved skills, separately.

The initial difference, upon arrival, in the price (rate of return) of schooling between immigrants and Israelis is $b_{s\_occ1\&2} + d_s$ = –.0290 – .0359 = –.0649 in occupations 1 and 2 and $b_{s\_occ1\&2} + d_s$ = –.0455 – .0359 = –.0814 in occupation 3. Given the estimated rate of return of .0728 for native Israelis, the initial reward for schooling is slightly positive for an immigrant working in occupation 1 or 2 and slightly negative (but not significantly different from zero) for an immigrant working in occupation 3. The long run difference in the rate of return for schooling in occupations 1 and 2 is $b_{s\_occ1\&2}$ = –.0290 and b_{s_occ3} = –.0455 in occupation 3. Hence, the rate of return that immigrants can expect in the long run is only .0728 – .0290 = .0438 in occupations 1 and 2 and .0728 – .0455 = .0273 in occupation 3. This substantial gap between natives and immigrants suggests that schooling acquired in the former USSR is not fully transferable to Israel, either because

differences in quality or informational frictions which cause immigrants to "give up" in their search for better jobs (see Weiss et al, 1999).

The initial difference, upon arrival, in the value of experience acquired abroad is $b_{exp} + d_{exp}$ = –.233 – 1.014 = –1.247. Since the price of accumulated experience that Israelis obtain is normalized to one, this means that the initial return for accumulated experience is 1–1.247= –.247. This means that, initially, experience accumulated in the former USSR has negative value in the Israeli labor market. With time, however, the price rises to $1 - b_{exp}$ = 1 – .233 = .767, which, given the high standard error on b_{exp}, is not significantly different from 1. Thus, we cannot reject the hypothesis that, in the long run, immigrants obtain the same rate of return for experience as native Israelis.

The occupational dummies show that immigrants who work in the high skill occupations 1, and in occupation 2, obtain higher premia (relative to occupation 3) than comparable Israeli workers. Using the specification without a schooling-occupation interaction, these premia are, in the short run, .272+(.368 – .242) = .398 and .215 + (.212 – .155) = .272, in occupations 1 and 2, respectively. In the long run, these premia are even higher: .272+.368 = .640 and .215 + .212 = .427. However, a large part of these occupational effects is a consequence of the lower rate of return for schooling in occupation 3. When a schooling-occupation interaction is added, it is seen that the occupational effects are reduced to .127 and

.021, in the short run and to .378 and .194 in the long run. The remaining occupational effects suggest that, in the long run, workers who were lucky to find jobs in the high skill occupations, or had some unobserved characteristic which made them more suitable for employment there, fare substantially better than those immigrants who remain in the low skill occupation.

We now turn to the discussion of the constant terms that summarize the *average* impact of unmeasured characteristics of immigrants. As seen in Table 11.4, for both specifications, the coefficients *b* and *d* are positive and large, indicating that, in the short run, there is not much to distinguish between immigrants with different human capital indicators. However, with time, the constant term declines and more weight is shifted to observable characteristics, since their prices rise.

The cohort dummies indicate a reduction in the unmeasured quality of immigrants. Holding measured characteristics constant, immigrants who came before 1990 earn 6.2 percent more than immigrants who came in 1990-1991 (the omitted group), who earn 5.7 percent more than immigrants who came in 1992-1995. This pattern is consistent with the observed reduction in measured quality in terms of schooling and academic occupation (see Table 11.1).

3.6 The (non) Convergence of Wages within Occupations

The estimated regressions allow us to compare the simulated life cycle wages for immigrants and natives. Figures 11.3a to 11.3c show the predicted wage-age profiles for an immigrant with 16 years of schooling who arrived to Israel, during

the period 1990-1991 at the age of 30, and for an equivalent native Israeli. We consider three such comparisons, one for each occupational category.

As seen in these figures, the immigrant's wage-age profile is generally below those of the native Israeli. In occupations 1, convergence is predicted for the *average* immigrant, but not for members of the recent immigration wave. In occupations 2 and 3 wages of immigrants with 16 years of schooling do not converge to those of a comparable Israeli, but rather to the wages of an Israeli with the average level of schooling in these occupations, 14 and 12 years, respectively.[8] The predicted wage gaps between immigrants and Israelis with 16 years schooling at age 55, for the 1990-1991 cohort, are 8%, 20% and 34% in occupations 1,2, and 3, respectively.

3.7 The (non) Convergence of Average Wages

As we have seen, the occupation at which an immigrant is employed has a strong impact on his wages. Therefore, the rate at which immigrants find jobs in the high skill occupations is an important determinant of wage growth. Because of market frictions and lack of information, immigrants do not immediately find jobs that suit their qualifications and skills. Instead, they start at the bottom of the occupational ladder and gradually climb up. Weiss and Eckstein (1998) and Weiss et al. (1999) provide a detailed description of this process. We shall provide here only a brief description of occupational transitions.

Table 11.5 shows the occupational distribution of immigrants, by years in Israel, for two age groups; those who arrived at age 26-40 and those who arrived at age 41-55. These figures show a sharp increase in the proportion employed in academic jobs, especially among immigrants who arrived at a young age. Among those with more than 16 years of schooling, only 20 percent are employed in academic jobs upon arrival. After 4 years in Israel, this percentage rises to 36% and 28% among the young and old, respectively. Among those who had been in Israel for 5 to 15 years, the corresponding figures are 54% and 37%. By way of comparison, the percentage of Israelis with 16+ years of schooling who work in occupation 1 is 63%. Using simple Logit estimation, it is expected that the occupational gap between recent immigrants and comparable Israelis will narrow substantially with time spent in Israel.[9]

We now bring together our results on wage dynamics and the dynamics of occupational transitions by immigrants, and examine the convergence of the average wage, unconditioned on occupation. Figure 11.4 presents wage-age profiles, averaged over occupations, for an immigrant with 16 years of schooling, who arrived to Israel at age 30 and a comparable Israeli. Figure 11.4 shows that the wage differential between immigrants and comparable native Israelis narrows substantially with time spent in Israel. An immigrant who arrives at age 30 with 16+ years of schooling earns, on the average, only 52 percent of the wage of a comparable Israeli. After 5 years in Israel, the same immigrant earns a wage that is

62 percent of the wage of a comparable Israeli and after 20 years this proportion rises to 80 percent. The growth in early years is mainly due to the rise in the returns for imported skills. The growth in later years is mainly due to occupational switches, reflected in the narrowing of the occupational differences between immigrants and native Israelis. However, convergence is slow and full convergence is not attained, because of incomplete convergence in the occupational structure and the lack of convergence within occupations.[10]

4. Family Effects

Immigrants arrive to Israel as single or married, with small or large families. Family structure has a marked effect on the labor market integration and the wages of immigrants. Wages of married immigrants tend to be higher and grow at a faster rate. These patterns reflect the coordination of work activities between immigrating spouses. In this section we outline the main features and consequences of this coordination.

4.1 Data on the Family

The data source that we use to assess the impact of family structure on wages is the 1995 Israeli Census of Population. We extracted from the 1995 Census all the available data on immigrants from the former USSR. For purpose of comparison, we have also drawn a random sample of the similar size of native Israelis from the 1995 Census. Immigrants from the former USSR include only those who entered Israel at ages between 26 to 55 and who are 65 or younger in 1995. Native Israelis

are included only if their age falls in the range 26 to 65.[11] These restrictions give us samples of 14384 male and 17737 female native Israelis and on 14719 male and 18223 female immigrants from the former USSR. The sample means are reported in Eckstein and Weiss (1999).

We focus on the wage of "full time" workers who had worked more than 10 hours in the Census week and positive hours a week before. Workers with less than 11 hours per week are counted as unemployed. The "hourly wage" is available only for workers who reported monthly gross salary (in September 1995) and weekly hours of work.[12] Many sampled individuals have no wage data, despite being of working age, because they had no work or failed to report wages and hours. We use the term participation to indicate the availability of wage data on the individual and that the individual worked more than 10 hours a week.

There are some important differences in family structure between native Israelis and immigrants. The immigrants are older by about 5 years, on the average and have fewer and older children (.07 aged 1 to 5 and .55 aged 6 to 14 vs. .60 and .80, respectively, among Israelis). There are more singles, especially single women among the immigrants. Only 12% of the males immigrants are single vis-a-vis 25% of the female immigrants. The corresponding figures for native Israelis are 9% and 13%, respectively. Participation rates among married Israelis and immigrants are almost the same. Single immigrants have a lower labor participation rate. Immigrants have higher unemployment rate and their hourly

wages are much lower than those of Israelis, despite their higher average schooling. Male immigrants earn an hourly wage of 18.5 IS, compared with 32.8 IS for male Israelis, and female immigrants earn an hourly wage of 15.5 IS, compared with 27.2 IS for female Israelis. The lower average wage and the higher unemployment rate of immigrants reflect the short duration in Israel for most immigrants in the sample, about 5 years on the average.

The average wages per hour are the same among married and single immigrants, but male Israelis who are married earn an hourly wage which is 16 percent higher than singles. Although the raw means seem to indicate that there is no marriage premium among immigrants, as we shall now show, there is in fact a large premium when we compare married and single immigrants with the same characteristics, using a wage regression corrected for selection.

4.2 Wage Regressions with Family Effects

We allow marital status to affect both earning function (as an indicator of the individual quality) and the participation function (through of division of labor between spouses).[13] As we have seen in section 3, wages of immigrants tend to be lower than those of comparable natives, but grow at a faster rate. We, therefore, introduce interactions of marital status with experience and time in Israel, allowing marital status to affect both the level and growth in participation and wages. We use children as instruments that affect participation but not wages.

In Table 11.6, we report the results of estimating the wage regressions for male and female immigrants with and without Heckman's correction for employment selectivity bias. In Table 11.7 we report the corresponding results for Israelis. There is a clear pattern of *positive* interaction between the schooling level of the two spouses. Among married immigrant men, an increase of the wife's schooling raises the husband's wage by 1.8 percent. Among married immigrant women, an increase in husband's schooling by a year raises her wage by 2.5 percent. We find the same patterns with almost the same estimates (1.9% and 2.2%) for Israelis in Table 11.7. These strong positive interactions reflect the matching process in the "marriage market" and are consistent with positive assortative mating based on schooling (the correlation in schooling among spouses is generally high, about .5, see Weiss and Willis, 1997). Although each person can only market his own characteristics, the high education of the spouse indicates that the person has unobserved marketable characteristics that make him attractive to potential mates and employers.[14]

Recent studies (Baker and Benjamin, 1997 and Duleep et al., 1999) have addressed the question whether wives support investment activities by their husbands via increased participation at reduced wages, at the early stage after migration. The data on immigrants from the USSR to Israel is consistent with a more symmetric view. Marital status helps *both* husbands and wives. This is reflected in the higher participation rates and the higher wage level and wage

growth for married immigrants of both sexes during the early years in Israel, relative to comparable singles.

As seen in Figure 11.5, the initial growth rate in wages for single male immigrants is 8.1 percent a year, while married male immigrants enjoy an initial growth of 10.7 percent. There is a positive and significant initial marriage premium of 8.1% for males and 11.5% for females. This gap between married and singles rises during the first 15 years in Israel and than narrows down. For female immigrants, the difference in the initial growth rate between married and single is also positive (15.5 vs. 13 percent, respectively) and the pattern over time is very similar to that of man.

In contrast to the positive marriage gap among immigrants, the marriage premium among Israeli men is very small, controlling for measured attributes and accounting for the differences in participation. Comparing immigrants who have been in Israel for 10 years with Israelis who had 10 years of market experience, we see that married immigrant males obtain a large (15 to 20 percent) marriage premium for both males and females, while for Israelis the corresponding premia are essentially zero. This large “difference in differences” provides strong evidence for the presence of complementarities in the development of wages of married immigrants. It seems that being married provides a substantial advantage for married couples in the absorption into the Israeli labor market.

The higher participation and wage growth among married immigrants can be either an outcome of different behavior, e.g. coordination of work activities, or different attributes of married couples. It is very difficult to separate these effects from a single cross section. Let us note, however, that the husband-wife interactions in schooling and age follow the same pattern as among married Israelis, suggesting that selection by attributes operates in a similar way for the two groups and the difference in wage growth between married and single is probably due to coordination. One indication for coordination is that the wage differences between married and single immigrants tend to vanish after a long stay in Israel. Among Israelis, we do not see any change in the differences between married and singles, suggesting that the differences mainly reflect assortative mating. Another indication for coordination is the fact that among immigrants females, the married participate (and work) more than the single, while among Israeli females the single work more (see Figure 11.6 and Figure 10 in Eckstein and Weiss (1999)).

For both Israelis and immigrants, one can observe a clear *positive* correlation between the husband's and wife's participation in the labor market. That is, one is more likely to participate if the spouse is participating. This pattern survives after one controls for personal attributes, such as age and schooling, and for the number of children (see Figures 11.6 and Figure 11 in Eckstein and Weiss (1999)). This somewhat surprising pattern has been noted in other studies (Davis et al. (1992)

and Gianelli and Micklewright (1995)) and is usually attributed to unobserved common factors which influence the labor supply of both husband and wife and incentives created by the welfare system. Comparing these differences across groups, we see that immigrating husbands are influenced by the participation of their wife to a lesser degree than comparable Israeli husbands, while immigrating wives are more influenced by the participation of their husband than comparable Israeli wives. In addition, there is a smaller difference between the participation rate of husbands and wives among immigrants than among Israelis.

Three are two possible explanations for these findings. First, among immigrants, an important common factor for married partners is their joint time of arrival to Israel. Second, because of their low initial income, immigrants, are entitled to welfare transfers in the form of "income augmentation", based on *family* income. Since husbands have higher wages, the family strategy is for the husband to work and for the wife to adjust to his employment status. If he does not work, the family is eligible. Therefore, she does not work and the family collects benefits. If he works, she is inclined to work too, because the family is no more eligible. Among natives, who have higher family income, the welfare transfers are more in the form of unemployment benefits, which are based on *individual* income and employment status. Therefore, coordination is less important, and the positive correlation reflects mainly sorting.

Appendix.

This appendix describes a simple procedure for adjusting the quality of employed natives and immigrants, based on the wage regressions reported in this paper.

Consider a constant returns to scale production function $Y_t = A_t F\left(K_t, L_t^*\right)$, where Y_t is GNP, K_t is aggregate capital and L_t^* is the aggregate *quality adjusted* supply of labor, and A_t is an index of total factor productivity. Let there be *J* types of labor where L_{jt} is the quantity of each type and w_{jt} is the wage of each type in year *t*. Then $L_t = \sum L_{jt}$ is the unadjusted aggregate and $w_t = \sum w_{jt} L_{jt} / L_t$ the average wage in year *t*. We define the quality adjusted index as $L_t^* = \sum_{j=1}^{J} \gamma_j L_{jt}$, where γ_j is a *fixed* positive weight of labor of type *j*. These weights are defined as the wage of type of labor *j* relative to the average wage in some base year, *t* = 0, that is $\gamma_j = w_{j0} / w_0$. By construction, with this choice of weights the unadjusted and adjusted indices coincide in the base year, that is $L_0^* = L_0$. Recall that under constant returns to scale, the marginal product of labor $A_t F_L\left(K_t, L_t^*\right)$ depends only on the adjusted capital labor ratio K_t / L_t^*. Under competitive conditions, the linear aggregation rule implies $w_{jt} = \gamma_j A_t F_L\left(K_t, L_t^*\right)$ and $w_t = A_t F_L\left(K_t, L_t^*\right)\frac{L_t^*}{L_t}$. Setting,

$A_0 = 1$, the average wage equals the marginal product of labor in year 0. Notice that if labor quality rises, because of shift towards more productive workers, average wage may grow even if the adjusted capital labor ratio is constant and no technical change occurs.

Into this simple framework we now introduce immigrants. We divide the population between immigrants and natives and each of the two groups is cross classified by 4 levels of schooling: 0-8, 9-12, 13-15, 16+; there are three occupational groups: academic, white collar and blue collar; and 6 levels of experience: 0-4, 5-10, 11-20, 21-30, 31-40, 40+, a total of 72 cells. Within each cell, immigrants are further classified by year since migration, 1, 2,…, 6 , and by cohort 1990-91 or 1992-1995.

We assume that immigrants that came before 1990 can be treated as Israelis. Immigrants in each occupation, *j*, are distinguished by their cohort, *c*, and time in Israel, τ . For *t* = 1990,1991,…,1995, let $N_{jt}^{o}(\tau, c)$ be the number of working immigrants with τ years since migration and of cohort *c* in year *t*, and let $w_{jt}^{o}(\tau, c)$ be their wage. We transform immigrants into equivalent Israelis in the cell by using *relative wages* as weights. Thus, the adjusted number of working immigrants in each year, N_{jt}^{o*}, is

$$N_{jt}^{o*} = \frac{\sum_{c=0}^{2}\sum_{\tau=0}^{5} w_{jt}^{o}(\tau, c) N_{jt}^{o}(\tau, c)}{w_{jt}^{n}},$$

where w_{jt}^{n} is the wage of native Israelis in cell *j* in year *t*. The total number of "Israeli equivalent" workers in each cell is $L_{jt} = N_{jt}^{n} + N_{jt}^{o*}$, where N_{jt}^{n} is the number of Israelis working as type *j* at year *t*. We define the weights for each type of labor, *j*, based on the relative wages of *Israelis* in 1991, that is, $\gamma_j = w_{j0}^{n} / w_0^{n}$, where w_{j0}^{n} and w_0^{n} are the wage of natives of type *j* and the average wage of natives in 1991, respectively.

A restrictive assumption behind this procedure is that the *relative* wages of Israeli workers of different types do not change over the period under analysis. We allow, however, the weights for immigrants relative to Israelis to change over time, because immigrants of different skills may adapt at different rates. An alternative log-linear specification $L_t^{*} = \exp\left(\sum_{j=1}^{J} \gamma_j \ln\left(L_{jt}\right) \right)$, where γ_j are labor shares at the base year, can be used to allow for changes in relative wages (see Young, 1995).

The wages w_j^{n} and $w_{jt}^{o}(\tau, c)$ are calculated using the predicted wages from the regressions reported in the text, based on the Income Surveys for 1991-1995. We use the mid- point in the cell for the conditioning variables. For example, for the schooling cell of 13 to 15 years of schooling we used the year 14. The average wages, $w_{average}^{n}$ and $w_{t,average}^{n}$ are the average predicted wage of native Israelis, using the regression reported in Table 11.4. The number of workers for each cell

of natives and immigrants is taken from the Labor Force surveys for the years 1990-1995.

We assume that the labor force survey is a representative sample of all cells in the population. Within each survey we estimate the ratio L_t^*/L_t separately for immigrants and natives for the years 1990-1995. We then use aggregate data on employed immigrants and natives, as reported by the CBS annual reports, multiply it by the corresponding adjustment factors, and add over the natives and immigrants to get the total adjusted labor force. The results are given in Table 3 of Eckstein and Weiss (1999).

Because we have estimated regressions only for male workers, *relative* wage differentials between male natives and male immigrants were imputed to females. We ignored the within group gender differences in wages. Based on cross section data from the 1995 Census, female workers earn about 20 percent less than males, adjusting for observed characteristics, and among immigrants this difference is almost 40 percent. Because the proportion of employed females is larger among immigrants, we underestimate the quality adjustment required for immigrants. Our procedure can be extended to include further adjustment for male and female workers, but this would require more work than we could complete for this study.

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† Tel Aviv University, Boston University and CEPR (eckstein@econ.tau.ac.il).

‡ Tel Aviv University (weiss@post.tau.ac.il).

[1] Sikron and Leshem (1998) provide a comprehensive collection of papers that describe many other aspects of the recent immigration wave from the former USSR to Israel. Papers that discuss wage and occupational dynamics include Eckstien and Weiss (1998), Weiss et al. (1999) and Friedberg (1996) and (1999).

[2] We do not have good aggregate measure of capital utilization, however, we know that some production plants initially moved to more shifts and that the number of households and individuals per apartment increased significantly.

[3] Another potential mechanism, which would operate even if relative factor endowment change, is factor price equalization through trade. A recent paper by Gendal et al. (1999) show that substantial growth in exports, high-tech products in particular, have absorbed much of the impact of increased supply of high-skilled and moderately-skilled workers. See also Beenstock and Fisher (1997).

[4] We use three occupations as follows: Occupation 1 includes engineers, physicians, professors, other professionals with an academic degree and managers; Occupation 2 includes teachers, technicians, nurses, artists and other professionals; Occupation 3 includes blue collar and unskilled occupations.

[5] The two stage procedures allows us to incorporate in a simple way the identifying restriction that the time effects, reflecting a common rental rate for human capital which may vary over time, are the same for immigrants and natives.

[6] If both the parameters *b* and *c* differ between Israelis and immigrants, one cannot separate "quantity" from "price". It is possible, however, for one parameter, to differ across these groups. We have estimated the model, allowing the coefficient *c* to differ. We found that this coefficient was -.00061 for immigrants and -.00066 for Israelis. The difference between the two estimates is statistically insignificant.

[7]These estimates and the fit ($R^2 = 0.32$) of the model are similar to those obtained in other application of Mincer's wage function The only non standard feature is that we allow occupation to have separate effect on wages, beyond schooling. This is mainly done to allow comparability with immigrants, for whom occupational transitions play an important role.

[8] The widening gap in occupation 3 between immigrants and Israelis with 16 years schooling suggests that immigrants who stay in occupation 3 for a long time are of increasingly lower quality, compared with the Israelis who stay.

[9]The data source for occupational transitions of immigrants is the CBS Labor Force Survey, from which the Income Survey is drawn (both surveys report occupation, but only the Income Survey has wage data). This is a relatively large sample with almost 10,000 observations. The Logits estimated for natives control for schooling and age. The logits for immigrants control for schooling, age at arrival, cohort and time in Israel.

[10] In contrast, Friedberg (1999) reports that the wages of immigrants from the USSR who arrived to Israel before 1983, do converge to those of native Israelis. Earlier immigration from the USSR was of a much smaller scale.

11 We also exclude observations with: age difference between husband and wife of more than 30 years in absolute value; years of schooling difference between husband and wife of more than 16 years in absolute value; wage per hour of less than 5 or more than 99 IS; no information on hours or wages; no information of the labor market activity; employed workers who did not work a full month.

[12] Because the wage is constructed, we treat as unknown hourly wages which appear too low (less than 4 Shekels) or too high (more than 100 Shekels).

[13] We use the term participation to include individuals that are working more than 10 hours a week. Non-workers include both unemployed and non-participants individuals. Workers with no information on hours or wages are dropped from the regression analysis.

[14] Weaker interactions can be noted in the age of the two spouses. An increase in the wife's age by one year raises the husband's wage by 0.3 percent. The effect of the husband's age on his wife's wage is negative, small and insignificant.

Table 11.1. Total Immigrants and Immigrants from Former USSR by Year of Immigration and Occupation Abroad (Total Immigrants in Parentheses)

	1990		1991		1992		1993		1994		1995		1996		1997		Total 90-97	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total Arrivals	185,227 (199,516)		147,839 (176,456)		65,093 (77,057)		66,145 (76,805)		68,079 (79,844)		64,847 (76,361)		59,049 (70,919)		54,591 (66,000)		710,870 (822,958)	
Aged 15+	142,944 (153,395)		117,395 (133,987)		52,037 (60,451)		52,569 (60,607)		54,706 (63,615)		52,382 (61,031)		47,960 (56,852)		44,536 (53,124)		564,529 (643,062)	
Worked Abroad	(100,720)	(100.0)	79,743 (84,694)	100.0 (100.0)	33,696 (36,948)	100.0 (100.0)	33,141 (36,128)	100.0 (100.0)	35,145 (39,232)	100.0 (100.0)	36,338 (41,230)	100.0 (100.0)	32,009 (36,943)	100.0 (100.0)	31,026 (35,877)	100.0 (100.0)	281,098* (411,772)	100.0 (100.0)
*Occupation.*** *Abroad*																		
1	(43,315)	(43.0)	31,693 (33,078)	39.7 (39.1)	12,242 (13,179)	36.3 (35.7)	10,214 (11,219)	30.8 (31.1)	11,563 (13,086)	32.9 (33.4)	11,089 (12,514)	30.5 (30.4)	10,771 (12,277)	33.6 (33.2)	9,926 (11,589)	32.0 (32.3)	97,498* (150,257)	34.7 (36.5)
2	(34,443)	(34.2)	26,021 (27,321)	32.6 (32.3)	10,872 (11,631)	32.3 (31.5)	10,736 (11,658)	32.4 (32.3)	11,748 (13,179)	33.4 (33.6)	11,272 (12,593)	31.0 (30.5)	10,220 (11,680)	31.9 (31.6)	9,856 (11,181)	31.8 (31.2)	90,725* (133,687)	32.4 (32.7)
3	(22,962)	(22.8)	22,029 (24,294)	27.6 (28.7)	10,582 (12,138)	31.4 (32.9)	12,191 (13,251)	36.8 (36.7)	11,834 (12,967)	33.7 (33.1)	13,977 (16,123)	38.5 (39.1)	11,018 (12,986)	34.4 (35.2)	11,244 (13,107)	36.2 (36.5)	92,875* (127,828)	33.0 (31.0)

** Occupation 1: Academic professionals and managers. Occupation 2: Associate professionals and technicians. Occupation 3: other skilled and unskilled workers.
Source: Israeli Central Bureau of Statistics, *Statistical Abstracts*, 1990-1995; Israeli Central Bureau of Statistics, *Annual Statistics*, 1997-1998.

Table 11.2. Annual Growth Rates of Population, Production and Capital, 1922 – 1997

Years	*Population*	*GNP*	*GNP per capita*	*Capital Stock*	*Housing Stock*	*Consumption per capita*	*Immigration Rate*
1922-1932	8.0%	17.6%	7.8%	13.7%			8.2%
1932-1947	8.4%	11.2%	3.0%	9.8%			6.4%
1947-1950	31.9%	11.2%	3.0%	9.8%			19.8%
1950-1951	20.0%	29.7%	10.0%				13.2%
1951-1964	4.0%	9.1%	4.9%	12.3%	11.6%	12.8%	2.2%
1964-1972	3.0%	8.9%	5.5%	8.4%	7.7%	8.7%	1.3%
1972-1982	2.1%	3.2%	0.8%	6.7%	7.7%	6.1%	0.9%
1982-1989	1.4%	3.4%	1.7%	3.3%	1.6%	2.6%	0.4%
1982-1986	1.5%	3.0%	1.2%	3.5%	-3.2%	2.4%	0.4%
1986-1989	1.3%	4.0%	2.3%	3.0%	8.4%	2.8%	0.4%
1989-1997	2.9%	5.3%	2.0%	5.4%	9.2%	3.4%	2.3%
1989-1993	3.8%	5.8%	1.9%	3.7%	10.1%	3.0%	2.8%
1993-1997	2.1%	4.9%	2.2%	7.2%	8.2%	3.7%	1.7%

Source: Israeli Central Bureau of Statistics, *Statistical Abstracts*, 1960-1997 and Ben-Porath (1986).

Table 11.3. Wage Regression for Israeli Men, Aged 25-65, Years 1991-1995

Variable	*Coefficient*	***St. Dev.***
Constant	1.2726	0.0360
1991	-0.0614	0.0160
1992	-0.0083	0.0162
1993	-0.0437	0.0167
1994	-0.0223	0.0162
Occupation 1	0.2718	0.0165
Occupation 2	0.2150	0.0170
Experience	0.0451	0.0018
Experience ^{2}	-0.0007	0.00004
Schooling	0.0728	0.0022
R^2	0.3215	
No. of obs.	8,186	

Table 11.4. Nonlinear Regression on Residuals for Male Immigrants, Age at Arrival > 25, Years 1991 – 1995

Dependent Variable: Residuals from Wage Regression in Table 11.3.

	Without occupation-schooling interaction		*With occupation-schooling interaction*	
Coefficient	*Estimate*	*St. Dev.*	*Estimate*	*St. Dev.*
b_{cons}	0.3917	0.2114	0.4233	0.2103
$b_{cohort\ <90}$	0.0625	0.0468	0.0621	0.0467
$b_{cohort\ 92-95}$	-0.0562	0.0274	-0.0574	0.0274
d_{cons}	0.5743	0.2582	0.5766	0.2565
λ	0.0941	0.0344	0.0953	0.0348
$b_{con\ \ occ\,1}$	0.3679	0.0851	0.1062	0.1595
$d_{con\ \ occ\,1}$	-0.2426	0.1151	-0.2513	0.1146
$b_{con\ \ occ\,2}$	0.2116	0.0980	-0.0209	0.1550
$d_{con\ \ occ\,2}$	-0.1553	0.1359	-0.1734	0.1357
b_{exp}	-0.2372	0.2618	-0.2333	0.2605
d_{exp}	-1.0013	0.2879	-1.0142	0.2858
b_{school}	-0.0423	0.0119	–	–
$b_{school\ \ occ\ \ 1\&occ2}$	–	–	-0.0290	0.0136
$b_{school\ \ occ\ \ 3}$	–	–	-0.0455	0.0119
d_{school}	-0.0371	0.0141	-0.0359	0.0139
Mean Dependent Var.	-0.6106	0.4822	-0.6106	0.4822
Sum of Sq. Residuals	234.307		233.799	
Log-Likelihood	-724.262		-722.369	
R^2	0.7780		0.7767	
No. of obs.	1,744		1,744	

Table 11.5. Occupational Distribution of Male Immigrants (percent)

Occupation	After 1 Year		After 2 Year		After 3 Year		After 4 Year		After 5-15 Years		After 15+ Years	
	All	*Sch 16+*	*All*	*Sch 16+*	*All*	*Sch 16+*	*All*	*Sch 16+*	*All*	*Sch 16+*	*All*	*Sch 16+*
Age at Arrival 26-40												
1	6.94	20.77	12.05	24.79	16.35	34.65	17.06	36.50	21.05	54.26	23.79	58.40
2	6.20	10.38	8.18	8.97	9.31	10.09	11.57	13.50	11.18	13.45	11.37	12.18
3	65.93	45.36	67.73	51.71	67.30	45.61	65.58	46.00	63.29	28.70	58.30	26.05
Not Working	20.93	23.50	12.05	14.53	7.04	9.65	5.79	4.00	4.47	3.59	6.54	3.36
Num. of Obs.	951	183	880	234	795	228	674	200	760	223	765	238
Age at Arrival 41-55												
1	6.82	19.16	9.41	18.91	11.03	21.46	14.00	28.22	18.81	37.42	25.75	75.00
2	3.48	3.27	5.26	6.30	6.21	8.68	8.32	10.40	8.26	6.75	7.78	2.50
3	66.48	47.20	68.74	54.20	72.76	58.90	69.78	50.99	67.20	49.69	60.48	12.50
Not Working	23.23	30.37	16.59	20.59	10.00	10.96	7.91	10.40	5.73	6.13	5.99	10.00
Num. of Obs.	719	214	627	238	580	219	439	202	436	163	167	40

Source: CBS Labour Force Surveys, 1991-1995.

Table 11.6. Hourly Wage and Participation Regressions for Immigrants

Variables	*Heckman*				*Log-Linear*			
	Men		*Women*		*Men*		*Women*	
	Coef.	*Std. Err.*	*Coef.*	*Std. Err.*	*Coef.*	*Std. Err.*	*Coef.*	*Std. Err.*
Wage Regression								
age at migration	0.0307	0.0063	0.0734	0.0078	0.0157	0.0058	0.0110	0.0069
age at migration^2	-0.0005	0.0001	-0.0012	0.0001	-0.0003	0.0001	-0.0002	0.0001
years of schooling	0.0568	0.0018	0.0786	0.0021	0.0490	0.0016	0.0603	0.0019
Husb-wife school. diff.	-0.0179	0.0020	0.0252	0.0023	-0.0127	0.0019	0.0202	0.0020
husb-wife age diff.	-0.0027	0.0014	-0.0051	0.0016	-0.0033	0.0013	-0.0035	0.0014
years since migr.	0.0804	0.0098	0.1299	0.0094	0.0643	0.0094	0.0602	0.0088
years since migr.^{2}	-0.0026	0.0004	-0.0042	0.0004	-0.0015	0.0004	-0.0009	0.0004
married	0.0816	0.0364	0.1155	0.0364	-0.0131	0.0350	-0.0523	0.0344
married*ysm	0.0256	0.0105	0.0243	0.0106	0.0155	0.0100	0.0318	0.0099
married*ysm^2	-0.0008	0.0004	-0.0010	0.0005	-0.0005	0.0004	-0.0012	0.0004
constant	1.0951	0.1304	-0.4929	0.1579	1.7125	0.1189	1.3471	0.1379
	Coef.	*Std. Err.*	*Coef.*	*Std. Err.*				
Probit Regression								
age at migration	0.0705	0.0161	0.1438	0.0132				
age at migration^2	-0.0012	0.0002	-0.0023	0.0002				
years of schooling	0.0654	0.0042	0.0893	0.0035				
husb-wife school. diff.	-0.0333	0.0050	0.0253	0.0040				
husb-wife age diff.	0.0025	0.0034	-0.0078	0.0027				
single's ch. <6	-0.1310	0.1836	-0.4492	0.0776				
single's ch. 6-14	0.1434	0.0754	0.0994	0.0277				
married's ch. <6	-0.0342	0.0423	-0.1543	0.0351				
married's ch. 6-14	0.0044	0.0186	-0.0374	0.0143				
years since migr.	0.0872	0.0198	0.2334	0.0146				
years since migr.^{2}	-0.0044	0.0008	-0.0097	0.0006				
married	0.4057	0.0762	0.4624	0.0598				
married*ysm	0.0723	0.0217	-0.0116	0.0169				
married*ysm^2	-0.0031	0.0009	-0.0002	0.0007				
constant	-1.7556	0.3275	-3.8687	0.2704				
rho	0.7937		0.9181					
Sigma	0.5017		0.6227					
Lambda	0.3982	0.0102	0.5717	0.0079				
Number of Obs.	12873		16333		9840		9163	
R-squared					0.2184		0.2442	
Log Likelihood	-12003.7353		-15149.6682					

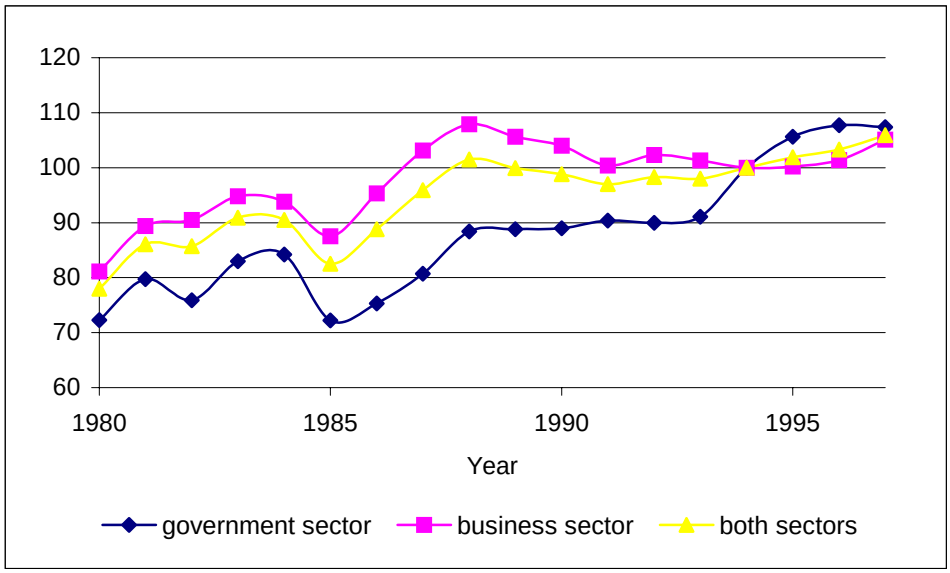
Source: 25% sample from the 1995 Census.
Note: dependent variable – log hourly wage in 1991 IS.

Table 11.7. Hourly Wage and Participation Regressions for Israelis

Variables	*Heckman*				*Log-Linear*			
	Men		*Women*		*Men*		*Women*	
	Coef.	*Std. Err.*	*Coef.*	*Std. Err.*	*Coef.*	*Std. Err.*	*Coef.*	*Std. Err.*
Wage Regression								
years of schooling	0.0955	0.0022	0.1208	0.0030	0.1080	0.0020	0.1144	0.0019
husb-wife school. diff.	-0.0188	0.0024	0.0223	0.0020	-0.0245	0.0022	0.0208	0.0019
husb-wife age diff.	-0.0116	0.0017	-0.0011	0.0016	-0.0126	0.0016	-0.0006	0.0016
experience	0.0287	0.0061	0.0324	0.0043	0.0308	0.0058	0.0310	0.0042
experience^2	-0.0003	0.0002	-0.0004	0.0001	-0.0004	0.0001	-0.0004	0.0001
married	0.0283	0.0522	0.1442	0.0446	0.0331	0.0487	0.1547	0.0442
married*experience	0.0023	0.0065	-0.0073	0.0047	0.0105	0.0061	-0.0082	0.0047
married*experience^2	0.0000	0.0002	0.0001	0.0001	-0.0001	0.0002	0.0001	0.0001
constant	1.7984	0.0601	1.0259	0.0725	1.4153	0.0543	1.1670	0.0507
	Coef.	*Std. Err.*	*Coef.*	*Std. Err.*				
Probit Regression								
years of schooling	0.0740	0.0053	0.1301	0.0045				
husb-wife school. diff.	-0.0326	0.0056	0.0273	0.0043				
husb-wife age diff.	-0.0047	0.0040	-0.0108	0.0032				
single's ch. <6	0.0419	0.0880	-0.4013	0.0640				
single's ch. 6-14	0.3742	0.0848	-0.0651	0.0403				
married's ch. <6	-0.0607	0.0174	-0.2875	0.0163				
married's ch. 6-14	-0.0278	0.0142	-0.0967	0.0122				
experience	-0.0113	0.0122	0.0264	0.0101				
experience^2	0.0001	0.0003	-0.0008	0.0002				
married	-0.0356	0.1143	0.0884	0.1173				
married*experience	0.0637	0.0133	0.0117	0.0112				
married*experience^2	-0.0013	0.0003	-0.0005	0.0002				
constant	-0.4158	0.1303	-1.2963	0.1268				
rho	-0.7558		0.1870					
sigma	0.5541		0.4680					
lambda	-0.4188	0.0146	0.0875	0.0319				
Number of Obs.	12542		15933		9873		9675	
R-squared					0.2789		0.2772	
Log Likelihood	-13022.2910		-15916.4530					

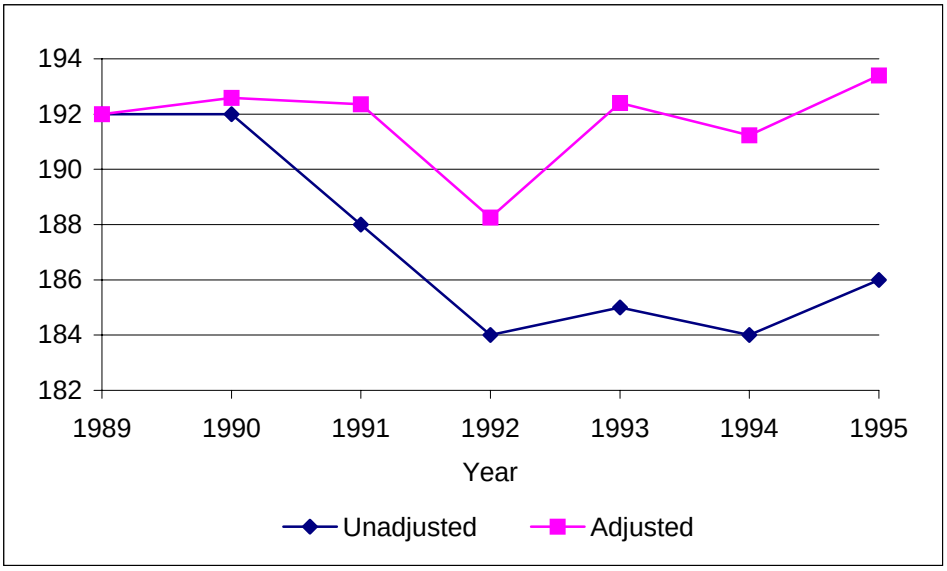
Source: 25% sample from the 1995 Census.
Note: dependent variable - log hourly wage in 1991 IS.

Figure 11.1. Indices of the Real Wage in the Government and Business Sectors, 1980 - 1997
(1994=100)



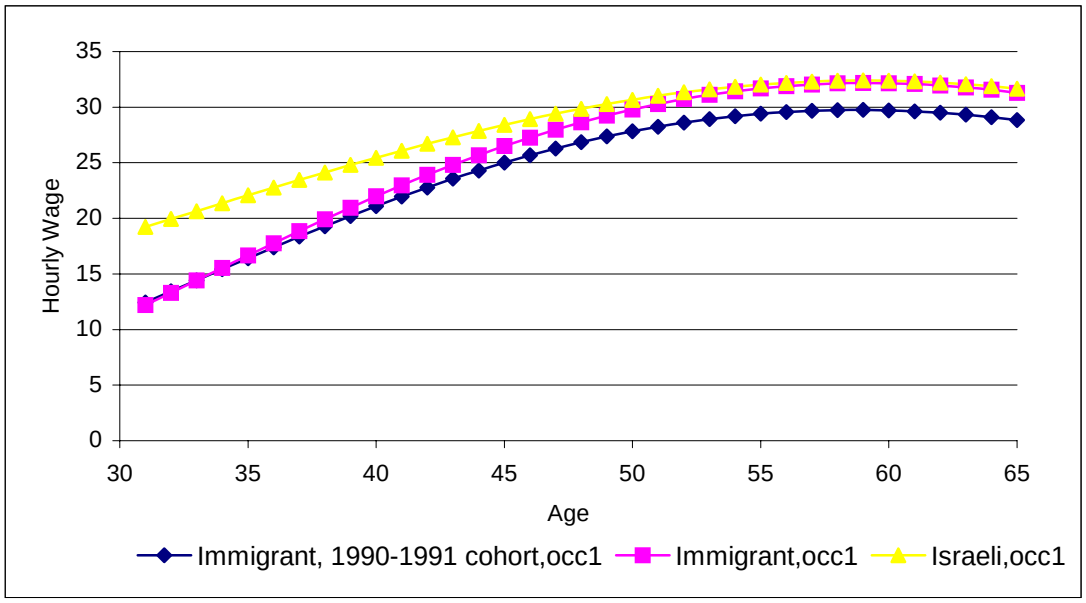
Bank of Israel Report, 1998.

Figure 11.2. Adjusted and Unadjusted Capital - Labor Ratio[1]



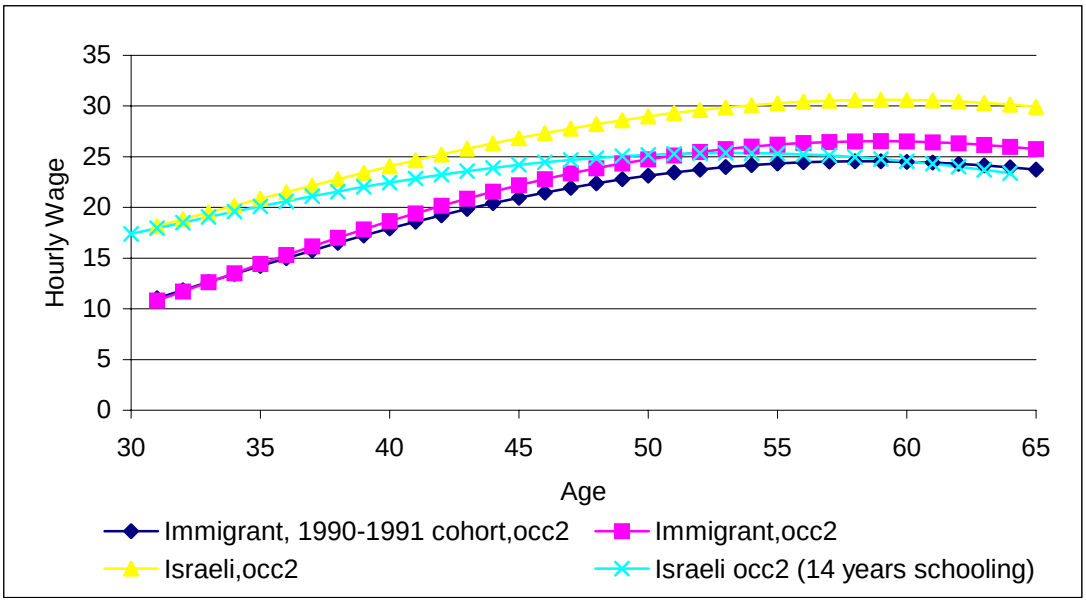
[1]The unadjusted capital labor ratio is from Bank of Israel Report, 1998.
The adjusted capital labor ratio is obtained using the adjustment factor from Table 3 in Eckstein and Weiss (1999).

Figure 11.3a. Simulated Wage-Age Profiles in Occupation 1 for an Israeli and an Immigrant, with and without Cohort Effects, Schooling=16, Age at Migration=30*



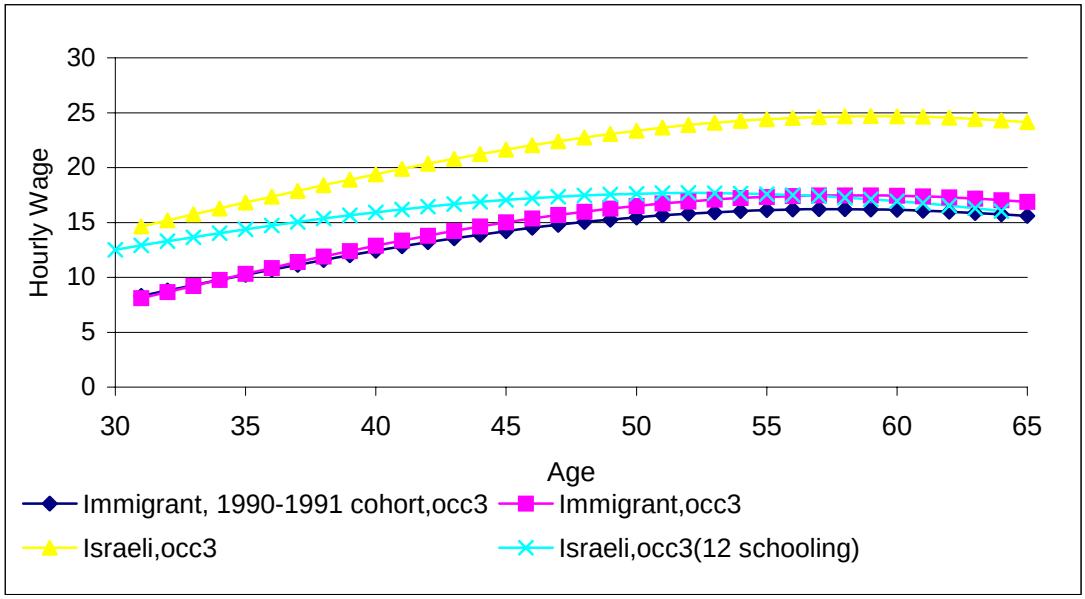
*Wage per hour in 1991 NIS. Based on the regressions in Tables 11.3 and 11.4

Figure 11.3b. Simulated Wage-Age Profiles in Occupation 2 for an Israeli and an Immigrant, with and without Cohort Effects, Schooling=16, Age at Migration=30*



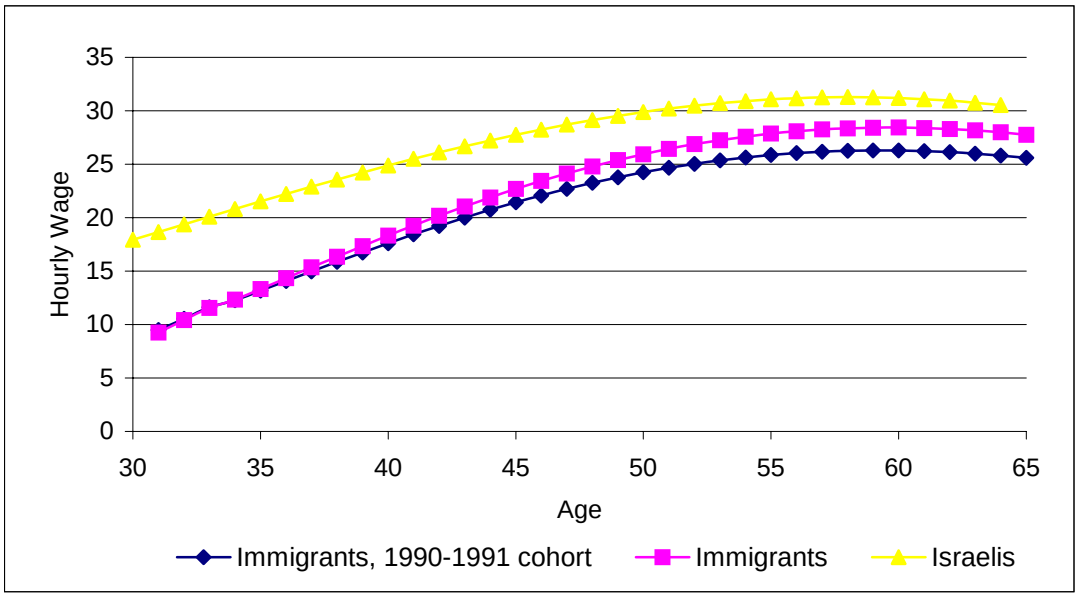
*Wage per hour in 1991 NIS. Based on the regressions in Tables 11.3 and 11.4

Figure 11.3c. Simulated Wage-Age Profiles in Occupation 3 for an Israeli and an Immigrant, with and without Cohort Effects, Schooling=16, Age at Migration=30*



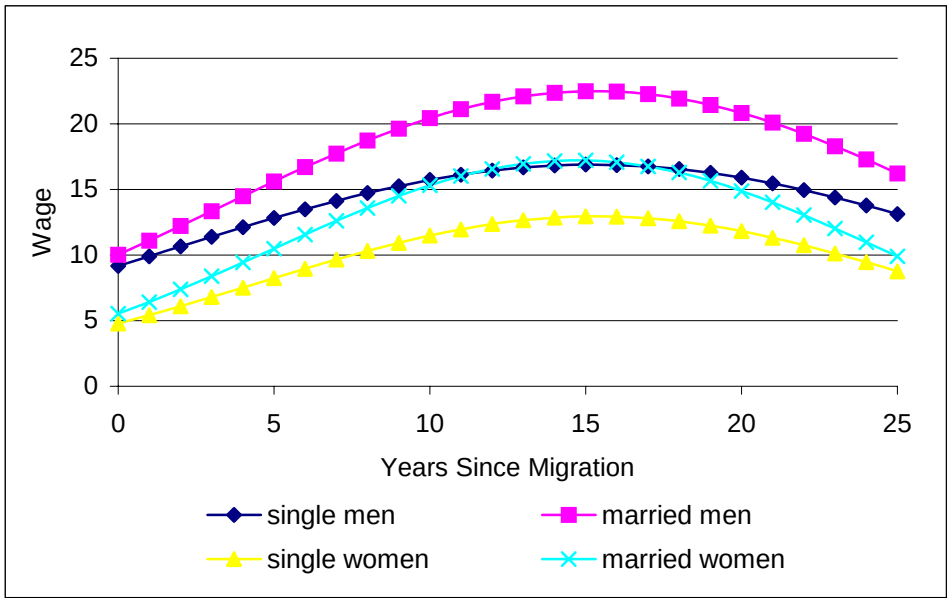
*Wage per hour in 1991 NIS. Based on the regressions in Tables 11.3 and 11.4

Figure 11.4. Simulated Wage-Age Profiles Averaged over Occupations, for an Israeli Worker and Immigrant, with and without Cohort Effects, Schooling=16, Age at Migration=30*



*Wage per hour in 1991 NIS. Based on the regressions in Tables 3 and 4

Figure 11.5. Simulated Wage and Participation of Immigrants



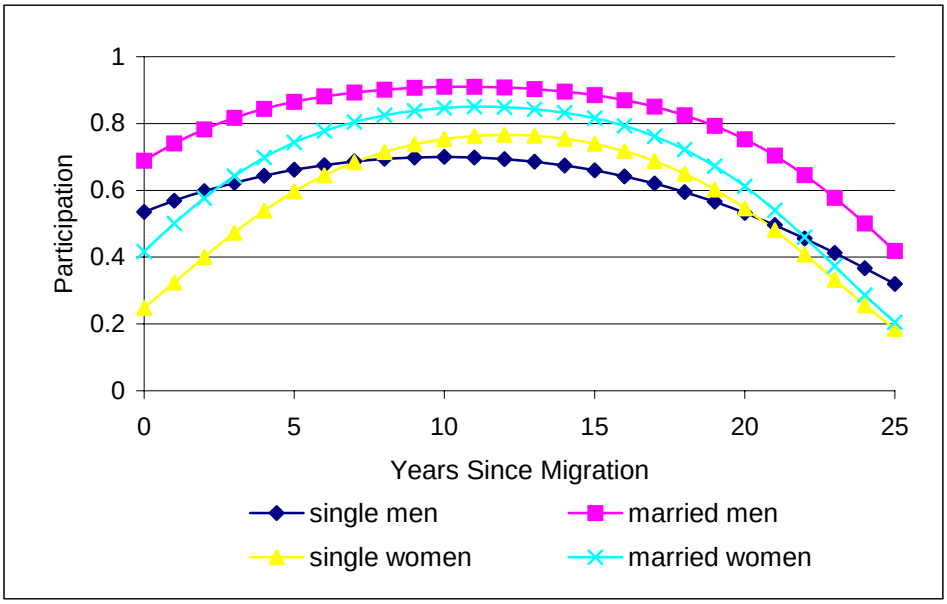
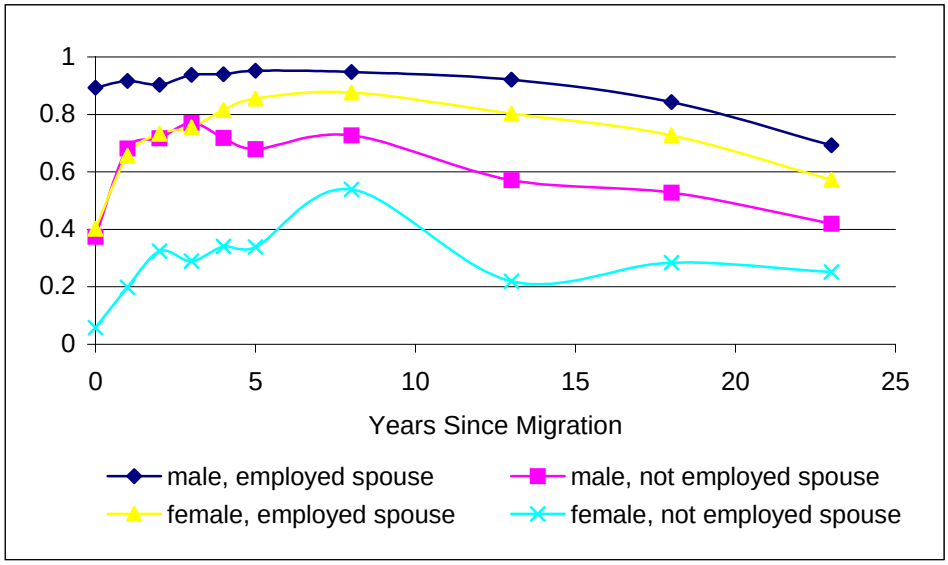


Figure 11.6. Participation Rates of Immigrants by Spouse Employment States

Data



Probit Prediction