

THE PARTICIPATION OF FEMALE IMMIGRANTS FROM THE FORMER SOVIET UNION IN VOCATIONAL TRAINING COURSES IN ISRAEL

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This paper deals with the occupational absorption of female immigrants from the former Soviet Union (now the CIS) into Israel's labor market, and their participation in subsidized vocational training courses. About 43 percent of these immigrants had participated in such a course during their first five years in Israel.

A calibration of a dynamic choice model in which immigrants' decision regarding their occupation in Israel is made simultaneously with the decision whether to undergo training shows that the model successfully generates the path of immigrants' occupational absorption during the first five years after their arrival in the country. Assuming that training courses are freely available and that participation in a course is the immigrants' own decision and not the result of selection of participants by the course administrators, the model successfully predicts the rate of participation in such courses during immigrants' first two years in Israel.

1. INTRODUCTION

This paper deals with the labor-market absorption of female immigrants into Israel from the former Soviet Union, and their participation in government-subsidized vocational training courses.¹ As part of the 'absorption package' for new immigrants, Israel provides intensive courses for learning Hebrew (Ulpanot) and tries to reduce the adverse effects on immigrants' human capital by offering subsidized vocational training courses. The purpose of these courses is either to adapt immigrants' vocational expertise in the occupations they pursued in the Soviet Union to the requirements of the market in Israel, or to train them in another field in cases where there is no demand in Israel for their original occupations.²

Since the early stages of the large-scale immigration towards the end of 1989 from the CIS (then the Soviet Union), the absorption of the immigrants has provided a rich source of material for research. Sikron and Leshem (1998) provide a comprehensive survey of the various aspects

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The authors thank the Pinchas Sapir Center for Development, Tel Aviv University, for its support of this research.

¹ For the sake of brevity, henceforth the term 'immigrants' will refer only to female immigrants, unless otherwise indicated.

² This paper does not discuss training programs intended to provide immigrants with professional qualifications or licenses to practice certain professions such as law or medicine in Israel.

of the absorption of immigrants who arrived in 1990–95. Studies which deal with the occupational absorption of this immigration support the claim that in the short term the human capital of immigrants (male and female) is not fully utilized for two reasons:³ first, the difficulty in adapting the human capital they had accumulated prior to their immigration to the requirements of Israel's labor market, mainly in professions requiring higher education, and second, Israel's economic structure, which prevents the absorption of all those who engaged in certain professions in the Soviet Union into similar occupations in Israel.

Despite the great similarity between the human capital acquired in the Soviet Union by male and female immigrants to Israel, their occupational absorption in Israel in the short term is strikingly different. In particular, the rate of unemployment and the rate of participation in training courses are higher among female immigrants than male immigrants in the same age groups. The absorption paths show that women encounter greater difficulties in the labor market in Israel than do their male counterparts, so that it is to be expected that training courses are more meaningful for them.

The data in this study derives from the employment survey carried out in 1992 by the Brookdale Institute of Gerontology and Human Development among men and women who had immigrated to Israel from the Soviet Union in the years from 1989 to 1992, and from the follow-up survey it performed in 1994–95. The current paper focuses on women in the 25–55 age group at the time of their immigration. They had an average of 14.5 years of education, and about 75 percent worked in white-collar occupations in their countries of origin. About 43 percent of the women in the sample participated in a subsidized vocational training course during their first five years in Israel, most of them in their first year in the country. The data of the Brookdale surveys are shown in Section 2.

In the current study we estimate a Cox Proportional Hazard model for the immigrants' participation in training courses. The model corrects for the fact that some of the immigrants did not participate in such courses during the sample period (right censoring), and allows for differences in the rates of entry to the courses between the different age groups. We found that a higher level of education significantly shortened the period to training, whereas the number of children, marital status, and previous work in white-collar occupations in the CIS did not affect it significantly. When the work experience accumulated by the immigrants in Israel in white-collar and blue-collar jobs was added to the model, it was found that the total experience gained in each field of employment raised the time to training significantly. Since the immigrants' choice of job and hence the cumulative work experience in the different occupational fields is endogenous, it is reasonable to assume that the estimates relating to both the decision regarding participation and its timing are biased.

A dynamic choice model which corrects for self-selection for training courses and for the various employment situations is shown in Section 3. Underlying the model is the assumption that each immigrant, from her arrival in Israel till her retirement, sequentially chooses between work in white-collar professions, work in blue-collar occupations, participation in vocational training courses, and unemployment,⁴ so as to maximize the expected current value of her utility under the budgetary limitations and the limitations on the transition probabilities. The

³ Most studies focus on the absorption of men, not women.

⁴ It is not possible to derive information from the data in the Brookdale survey about female immigrants' decision to join the labor market in Israel. This study therefore focuses on those who were part of Israel's labor force and actively looked for work from the time of their arrival in the country.

model enables us to understand the immigrant's conduct and choices regarding profession and participation in training as part of her effort to raise her wage-earning potential in Israel and to move up from a blue-collar to a white-collar job. The investment in the human capital specific to Israel is endogenous to the model and takes two forms: the first is the accumulation of work experience in white-collar or blue-collar professions by active participation in Israel's labor market; the second is participation in government-subsidized vocational training programs, during which the immigrant cannot work.

A calibration of the model based on the data from the Brookdale survey shows that it provides a good fit for the immigrants' employment path and their participation in vocational training courses during their first five years in Israel.

2. DATA ON THE EMPLOYMENT OF FEMALE IMMIGRANTS AND THEIR PARTICIPATION IN TRAINING

The data herein derives from a survey conducted in 1992 by the Brookdale Institute of Gerontology and Human Development among men and women who had immigrated in 1989–92 from the CIS, and from a follow-up survey the Institute undertook in 1994–95. The first survey provides a representative sample of the geographical distribution and the demographic characteristics of the immigrants who arrived in the designated years, and covered about 1,100 immigrants in some 30 localities in Israel. The follow-up covered about 900 of the immigrants. The surveys included information on their age, level of education in the CIS, country of origin, occupation in their country of origin, knowledge of Hebrew before immigrating to Israel, whether they studied in an Ulpan (intensive Hebrew course), marital status, and size of family, etc. The two surveys enable a retrospective occupational profile of immigrants to be constructed from the time of arrival in Israel until the date of the second survey, i.e., a period of up to five years. For each of the jobs in which immigrants worked in Israel, information is available on wages,⁵ the weekly number of hours worked, and starting and ending dates of job. The surveys also provided information on immigrants' participation in training courses of one month or more, such as the length of the course, the occupation studied, the number of hours, and the reason for joining the course. The original monthly data were converted into quarterly data.⁶

The current study focuses on 502 women aged between 25 and 55 years when they arrived in Israel who actively looked for work at some stage since their arrival. Ninety-seven percent had participated in the labor market in the CIS, of whom 53 percent were employed in occupations requiring higher education or in managerial positions, 25 percent in the 'free' professions (e.g., lawyers), and 22 percent in blue-collar occupations. About 43 percent participated in subsidized training courses during the sample period.

The averages of the different variables related to the entire sample and to those immigrants who did and did not participate in training courses are shown in Table 1. The average age at time of arrival in Israel was 37.2 years, the average number of years of education was 14.5, and the average time in Israel at the time of the survey was 43.2 months. Some 16 percent of

⁵ In the first survey only the wage in the most recent job was reported.

⁶ The conversion was on the basis of the majority share, e.g., if the immigrant did not work for two out of the three months in the quarter, she would be classified as unemployed.

the immigrants knew Hebrew before they immigrated. Almost 77 percent were married, with an average of 1.05 children. Those who participated in training courses were on average younger at the time of their arrival in Israel than the non-participants, and were more highly educated. Seven percent of the women who had taken a training course had not found work since they immigrated, compared with 21 percent of those who had not taken a course in the sample period.

Table 1
Summary Statistics

Variables*	(averages)		
	Entire sample	Participated in training course	Non-participants in training course
Number of observations	502	218	284
Age on arrival in Israel (years)	37.2 (8.5)	35.0 (7.4)	38.9 (8.9)
Education (years)	14.5 (2.4)	15.2 (2.0)	13.9 (2.5)
Employed in white-collar job in CIS before migrating (%)	75.7	83.9	69.3
Knew Hebrew before migrating (%)	15.7	20.6	12.0
Number of children	1.05 (0.8)	1.1 (0.8)	1.01 (0.9)
Married (%)	76.5	75.7	77.1
Time in Israel at latest survey (months)	43.2 (14.0)	46.7 (10.9)	40.5 (15.6)
Number of jobs in Israel since arrival	1.8 (0.97)	2.0 (1.0)	1.6 (0.9)
Unemployed throughout entire sample period (%)	15.1	7.3	21.1
Time from arrival to first job (months)	13.9 (10.6)	16.3 (10.4)	11.8 (10.3)
Time from arrival to start of training course (months) (based on following number of observations)	–	15.8 (10.4)	–
Observations	426	202	224

* Figures in parentheses are standard deviations.

This section presents the various indicators of the process of the immigrants settling into the labor market in Israel and their participation in training courses during their first five years in the country. The occupations in which they were employed in the CIS and in which they could be integrated in Israel can be divided into two groups: (1) those requiring higher education, management positions, and the 'free' professions (e.g. law or medicine), henceforth referred to as white-collar, wc, or Type I jobs, and (2) technical and similar jobs, and other occupations, henceforth blue-collar, bc, or Type II jobs.⁷

⁷ Type I includes items 0–299 in the 1972 classification of professions, and Type II includes the rest.

Absorption in employment

Eighty-five percent of the immigrants had worked in at least one job in the sample period since arriving in Israel, and 15 percent had not worked despite being actively engaged in job searching. Of those who had worked, 47 percent had held one job, 33 percent had changed jobs once (i.e., had held two jobs), 13 percent had worked in three jobs, and 7 percent in more than three. The average time taken to find the first job was about 14 months (Table 1).

Table 2 shows the distribution of immigrants between employment in white- and blue-collar occupations, unemployment and participation in training courses. The table shows that in the second quarter after their arrival in Israel, 17.5 percent were employed, 81 percent were not employed, and 1.5 percent were taking training courses. As their time in Israel lengthened, the share of immigrants who were employed increased, reaching 82 percent after four years in the country; concurrently, the share of unemployed declined to 16 percent. The greatest increase in the share of the employed occurred in their first year in Israel; after a year (four quarters) in Israel 37 percent were employed (= 6.9 + 29.9). In their second year in Israel this rose by 22 percentage points to 59 percent, and by a further 14 percentage points and 8 percentage points in the third and fourth years respectively. The share participating in training courses peaks in their fourth quarter in Israel, with about 17 percent taking such vocational training courses. The figure declined thereafter, until after four years the participation rate is zero.

Table 2
Distribution of Immigrants by Labor Market Activity

Number of quarters since arrival	White-collar job	Blue-collar job	Participated in training course	Unemployed	Number of observations
1	0.010	0.064	0.002	0.924	502
2	0.026	0.149	0.016	0.809	502
3	0.044	0.263	0.121	0.572	495
4	0.069	0.299	0.169	0.463	479
5	0.082	0.333	0.150	0.436	466
6	0.103	0.372	0.116	0.409	457
7	0.132	0.399	0.085	0.383	446
8	0.147	0.449	0.072	0.333	430
9	0.168	0.472	0.059	0.301	422
10	0.194	0.496	0.046	0.264	417
11	0.194	0.517	0.032	0.257	412
12	0.213	0.525	0.020	0.243	408
13	0.233	0.536	0.013	0.218	386
14	0.251	0.537	0.025	0.186	354
15	0.252	0.533	0.034	0.181	321
16	0.256	0.562	0.021	0.160	281
17	0.295	0.541	0.005	0.159	207
18	0.323	0.528	0.008	0.142	127
19	0.397	0.444	0.000	0.159	63
20	0.433	0.400	0.000	0.167	30
Total					7,205

Participation in vocational training courses

About 43 percent of the immigrants in the sample participated in a subsidized vocational training course at some time. Most of the courses were provided by the Ministry of Labor and Social Affairs in cooperation with the Ministry of Immigrant Absorption, and were held in training centers around the country. While taking part in training courses, immigrants were entitled to unemployment benefit or income support payments determined according to various criteria. The average period from immigration to starting a course was 16 months (Table 1). The length of courses varied from one quarter to three quarters, with an average of 25 hours per week. The drop-out rate from courses was minimal, despite the fact that the average length of courses was six months. By comparison, drop-out rates from some training courses in the US are as high as 40 percent, although their average length is three months.⁸

Table 3 shows the connection between immigrants' field of employment in their countries of origin and their participation in training courses and the type of course taken. About 48 percent of the immigrants who were employed in white-collar jobs in the CIS participated in vocational training courses, compared to 24 percent of those who were in blue-collar jobs. Sixty-five percent (142/218) of the immigrants who underwent training participated in courses in white-collar occupations, and 35 percent (76/218) in blue-collar.

Table 3
Participation in Training Course, and Distribution of
Training Courses by Type of Occupation in the CIS*

Type of occupation in CIS	Type of course		Did not participate in training course	Total
	White-collar	Blue-collar		
White-collar	119 (31.32)	64 (16.84)	197 (51.84)	380 (100)
Blue-collar	16 (15.09)	9 (8.49)	81 (76.42)	106 (100)
Did not work in CIS	7 (43.75)	3 (18.75)	6 (37.50)	16 (100)

*Figures in parentheses are percent of the total in the row.

Table 4 shows various longitudinal cross-sectional distributions of the length of courses. Twenty-eight percent of the participants undertook courses of one quarter's duration, 41 percent took courses lasting two quarters, and 30 percent, three quarters. The table shows that the number of hours per week was not related to the length of the course. As was seen from Table 3, the immigrants' participation rates differed significantly between those who worked in different types of jobs prior to their immigration. There is also marked variation in participation rates according to the number of years of education: 54 percent of those with 16 or more years of education undertook training courses, compared with 22 percent with up to (and including) 12 years of schooling. Despite the wide variation in the participation rates of immigrants with different levels of education and with different types of work experience in their countries of origin (white-collar vis-à-vis blue-collar), those factors do not have a significant effect on the length of course taken. In other words, immigrants previously employed in white-collar jobs

⁸ Heckman, Lalonde and Smith, 1999, Section 5.3.3.

in the CIS or with a higher level of education did not take longer courses. Surprisingly, the length of course is not affected by the type of occupation taught in the course (white-/blue-collar) either.

Table 4
Distribution of Duration of Training Courses by Various Cross-Sections

	Duration of course (quarters)			Total
	1	2	3	
Number of observations	62	90	66	218
Percent of total in the row	(28.4)	(41.3)	(30.3)	(100.00)
Hours per week	24.3	26.8	25.3	25.6
Standard deviation	(13.7)	(11.2)	(12.6)	(12.4)
Type of occupation in CIS				
White-collar	28.24	41.53	30.05	100.00
Blue-collar	28.00	40.00	32.00	100.00
Years of education				
0–12	33.33	37.50	29.17	100.00
13–15	28.97	40.19	30.84	100.00
16+	26.44	43.68	29.89	100.00
Type of course				
White-collar	28.17	40.85	30.98	100.00
Blue-collar	28.95	42.10	28.95	100.00

The decision whether to undergo training

To examine the variables that affect an immigrant's decision to participate in a training program, the authors estimated two specifications of a Logit model. Note that this model ignores the dynamic aspect of participation (i.e., the decision regarding *when* to participate), and concentrates on the static decision whether or not to participate. The results of the regressions are shown in Table 5.

The probability that an immigrant will participate in a training course rises with her level of education, and the chances of someone who had worked in a white-collar job in the CIS participating in a training course are significantly higher than those of someone who had worked in a blue-collar job or who had not worked in the CIS. These results suggest that women immigrants who had a high level of human capital in the CIS tended to invest more in Israeli human capital via the vocational training mechanism. Being married and having children reduced the probability of participation in a training course, but were not statistically significant.

As expected, there is a significant inverse relation between age at time of immigration and participation in training. The decision to join a course is an investment decision, so that the lower the age of the immigrant and the longer her expected life in Israel's labor force, the more worthwhile the investment. Immigrants' age plays a major role in the participation in training, due to self-selection and selection by the administrators of the training programs who prefer to train younger immigrants.

In addition to the human capital and demographic variables, the second specification included, also an indicator as to whether the immigrant arrived in Israel in 1989–90. This gave

Table 5
Participation in Training: Logit Regression Estimates^a

Variable	(averages)	
	Estimate (1)	Estimate (2)
Constant	-1.370 (0.811)	-1.663 (0.831)
Education (years)	0.250 (0.049)	0.249 (0.050)
White-collar occupation in CIS ^b	0.520 (0.266)	0.494 (0.267)
Marital status (married=1)	-0.095 (0.236)	-0.146 (0.240)
Number of children aged up to 18 (incl.)	-0.061 (0.131)	-0.053 (0.132)
Years of immigration 1989–1990		0.376 (0.203)
Number of observations	502	502
Log likelihood	-305.76	-304.05
Pseudo R ²	0.1101	0.1151

^a Figures in parentheses are standard deviation.

^b The reference group consists of women who had not worked in the CIS or who had worked in blue-collar occupations.

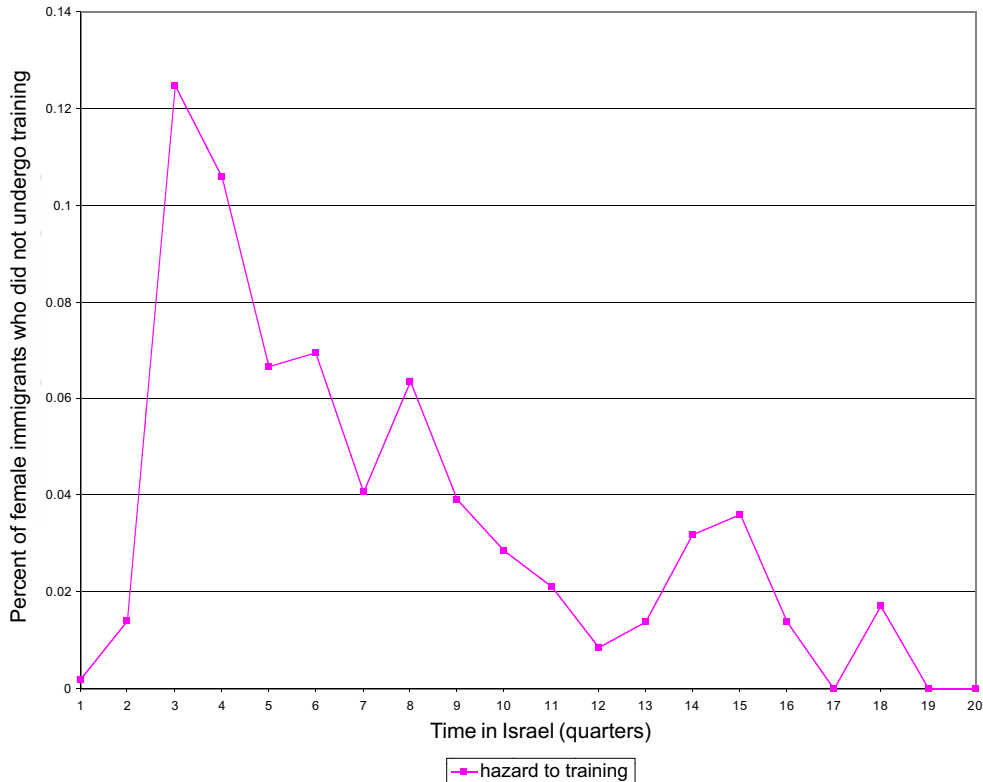
rise to the result that those who came at the start of the large-scale immigration were more likely to participate in training courses. This may reflect not only the self-selection of these early arrivals but also changes in the supply of training programs in accordance with the reduction in the numbers of immigrants arriving and budgetary considerations.

The timing of participation in training

About 60 percent of the immigrants who undertook training did so before they had worked in Israel. This finding is consistent with the theory of investment in human capital. Alternatively, it may reflect the fact that it is difficult for them to find employment without the appropriate training.

The actual change in the participation rate in training courses (known as the hazard rate) as a function of the length of time immigrants have been in the country is shown in Figure 1. During the first year in Israel, the rate rises steeply, mainly in the second half of the year. It is worth stating the obvious, that participation in a training course is conditional on a knowledge of Hebrew. Ninety-four percent of the women in the sample studied Hebrew in an Ulpan for 4–6 months, so that the hazard rate in the first two quarters of their first year in Israel was minimal. It spurted and reached a peak in the third quarter from their arrival, when 12.5 percent of those who had not previously participated in a course did so. Among immigrants who had been in Israel for about a year the hazard rate declined somewhat. This reduction reflects the rise in the number of the immigrants who found work without training and waived their right to a course, and also the decrease in the supply of courses as the number of new immigrants arriving in the next few years fell. The path of the hazard rate shows that most of

Figure 1
Participation in Training



the immigrants chose to participate in training courses shortly after their arrival in order to benefit from the return on the course over a longer period. The graph also shows, however, that the hazard rate rose again to some extent after the women had been in Israel for three years. The explanation might be that those who were not satisfactorily absorbed in the labor market chose to avail themselves of the option to participate in training courses relatively late.

To examine the variables that affect the timing of participation in training courses, a Cox Proportional Hazard model was run in the participation period. The model was of the type

$$H(t) = H_0(t)\exp(\beta'x),$$

where $H(t)$ is the hazard rate, t is time since immigration (in quarters), $H_0(t)$ is the baseline hazard that can vary between different groups of immigrants, x is a vector of the independent variables and β is a vector of the parameters. The model corrects for the fact that some of the immigrants did not participate in training courses during the sample period (right censoring).

As stated above, age was an important variable in relation to the decision to participate in a course. It seems that age is also important regarding the timing of participation. The average age of those who started training within their first two years in Israel was 34.8 years, whereas the average age of those who trained after a longer period from their arrival date was 38.2.

Table 6
COX Proportional Hazard^a

Variable	(averages)	
	Estimate (1)	Estimate (2)
Marital status (married=1)	0.9389 (0.1595)	0.9563 (0.1612)
Number of children aged up to 18 (incl.)	0.9248 (0.0919)	0.9225 (0.0906)
Age on arrival in Israel	0.9559 ^a (0.1350)	0.9389 ^a (0.1595)
White-collar occupation in CIS	1.3067 (0.2628)	1.2917 (0.2685)
Education	1.1818 ^b (0.0358)	1.1734 ^b (0.0387)
Cumulative white-collar experience in Israel		0.8671 ^b (0.0497)
Cumulative blue-collar experience in Israel		0.8727 ^b (0.0276)
Log likelihood	1116.8	-1107.1

^a Figures in parentheses are robust standard errors clustered on individuals. A coefficient greater than 1 means that the variable reduces the period prior to participation in a training course, and vice versa.

^b Significant at 5% level.

The baseline hazard, was allowed to vary between those who were aged 40 or more at the time of their immigration, and those aged 25–39 (with the same β for both categories). Table 6 shows the estimates obtained from the two specifications of the model. The first column gives the estimates from the model in which the vector of independent variables, x , includes, in addition to the demographic variable, the variables of human capital accumulated by the immigrant in the CIS, i.e., education and type of employment. It can be seen from this specification that despite the variation allowed between the two age groups defined above in the baseline hazard, the time to participation in a training course increased with the age of the immigrants on arrival in Israel (within each age group). The higher the level of education, the (significantly) shorter the time to participation, while the number of children, marital status and employment in a white-collar job in the country of origin did not significantly affect the time to participation. The second column shows the estimates from the regression in which x includes in addition to the variables of human capital accumulated in the CIS also the immigrants' cumulative work experience in white- and blue-collar employment in Israel. This shows that the cumulation of work experience in white- and blue-collar employment in Israel significantly extend the period to training. The effect of work experience on the length of time to participation in training reflects two elements: the longer the period in which the immigrant has worked in Israel (and hence the more experience she has gained), the longer the time to participation in training courses, as work and training are mutually exclusive. However, the result may indicate that the immigrants who gained work experience in Israel had less incentive to undergo training. The direction in which the other variables included in the second regression affected the time to participation in training did not change.⁹ Note that as long as the immigrants'

employment decisions, i.e., the decision to participate and the timing of the participation, and hence their cumulative work experience in Israel in the different types of employment (Type I and Type II) are endogenous, the estimates in column 2 are biased. Section 2 presents a dynamic model in which employment decisions are made at the same time as the decision to participate.

Absorption in employment after training

Table 7 shows the transition between the type of employment prior to training and that in the first job after training. Of the immigrants who worked in Israel before undergoing training, 19.5 percent (17/87) were in Type 1 (white-collar) jobs in their latest pre-course employment. In the first jobs after the training courses, the share in white-collar jobs rose to 30 percent (66/218), 58 percent were employed in blue-collar jobs, and 12 percent were unemployed after training. The share of immigrants who had not worked in Israel before training and who found white-collar jobs thereafter was higher than the share who worked in blue-collar jobs prior to training. More than 70 percent of those who worked in blue-collar jobs prior to undertaking the training courses did not manage to improve the type of employment after the course, and 9 percent did not find employment at all.

Table 7
Distribution of Type of Occupation in Last Job Prior to Training
and in First Job After Training^a

	Type of occupation in			Total
	first-job after training		Unemployed	
	White-collar	Blue-collar	after training	
Type of occupation in				
next job prior to training				
1	13 (76.47)	2 (11.76)	2 (11.76)	17
2	14 (20.00)	50 (71.43)	6 (8.57)	70
Unemployed before training	39 (29.77)	76 (58.02)	16 (12.21)	131
Total	66	128	24	218

^a Actual numbers. Figures in parentheses are percent of the total in the row.

Changes in the wage

The 1992 survey included data on the wage in the most recent jobs reported by the immigrants, while the second survey in 1994–95 covered the last wage in each of the jobs reported by the immigrant. The total population consists of 649 wage observations throughout the sample period. The average wage in white-collar jobs rose with the length of time in Israel, whereas in blue-collar jobs the wage remained more or less unchanged. The variance of wages in

⁹ In other specifications examined, the effect of the year of immigration on the length of time to participation in courses was found to be not significant.

white-collar jobs is higher than that in blue-collar jobs. The average wage in white-collar jobs during immigrants' first year in Israel was NIS 12.5 per hour, and in blue-collar jobs, NIS 11.6; in the fourth year the figures were NIS 22.1 and NIS 10.8 respectively (all in terms of July 1995 prices).

Various regressions on wages estimated by OLS are shown in Table 8. The dependent variable is the natural log of the hourly wage. The regressions do not correct the various types of selection bias deriving from the immigrants' decision to participate in training courses and the choice of type of job (white- or blue-collar). The training indicator is equal to 1 if the wage was reported after the course, and zero otherwise. Columns (1) and (2) give the estimates from the pooled regressions on wages in the two types of job. Regression (1) is based on the assumption that wages are the same in both types of occupation, although the return on work

Table 8
OLS Wage Regression^a

Variables	All wage observations	All wage observations	Wage in white-collar occupations	Wage in blue-collar occupations
Constant	2.099 (0.119)	2.065 (0.117)	2.003 (0.413)	2.133 (0.124)
Education	0.009 (0.007)	0.008 (0.007)	0.023 (0.021)	0.008 (0.008)
Cumulative white-collar experience	0.111 (0.020)	0.031 (0.027)	0.032 (0.037)	0.084 (0.118)
Square of cumulative white-collar experience	-0.004 (0.002)	0.0004 (0.0019)	0.0004 (0.002)	-0.007 (0.015)
Cumulative blue-collar experience	-0.034 (0.014)	-0.013 (0.014)	0.038 (0.052)	-0.021 (0.016)
Square of cumulative blue-collar experience	0.002 (0.0008)	0.001 (0.0008)	-0.004 (0.005)	0.002 (0.0009)
Training	0.086 (0.040)	0.062 (0.040)	0.156 (0.095)	0.022 (0.043)
Age on arrival in Israel	0.002 (0.002)	0.001 (0.002)	0.005 (0.006)	0.0003 (0.002)
Employed in white-collar occupation		0.368 (0.104)		
Number of observations	649	649	148	481
R ²	0.27	0.29	0.09	0.02

^a Figures in parentheses are standard errors.

experience is specific to each type. The return on training in this specification was 8.5 percent, and was significant at the 5% level. Regression (2) includes an indicator of work in a Type I job, and allows differences between the unconditional average wage in the two types of employment. The premium on work in Type I occupations in this specification is 37 percent, and was significant at the 5% level. The return on training was 6.2 percent, and was not statistically significant. This result shows that the return on training in regression (1) covers the differences between wages in the two types of job, at least partially, when the indicator of job type is dropped. Columns (3) and (4) show the estimates of separate regressions for the different types of job. The return on training in white-collar jobs (column 3) is high, 15.6 percent, and is significant at the 10 percent level, while the return on blue-collar jobs shown in column (4) was low and not significant.

3. THE MODEL

A dynamic model of labor supply and participation in training courses

This section presents a dynamic choice model of an immigrant's choice between undertaking a training course or supplying labor. The model is based on the dynamic programming principle used in various studies regarding decisions of work and education (e.g., Keane and Wolpin, 1997). The innovation introduced herein is that it incorporates the decision whether to participate in a vocational training program and the decision regarding the timing of participation in a dynamic model of employment seeking. This combination enables an analysis of how the initial absorption of an immigrant in Israel's labor market affects her decision to participate in a vocational training course, and of how the participation in a course affects her integration into the labor market thereafter.

The theoretical foundation of the model is based on the assumption that each immigrant, from her arrival in Israel until retirement, chooses from a finite number of mutually exclusive alternatives those that will maximize her expected present value of her utility. Due to the finite horizon of the model, the immigrant's decisions were not stationary but depended on the number of periods until her retirement. For example, if participation in a course were only an investment, the immigrant would have no incentive to undertake a training course in her last period prior to retirement, as she would not receive any return on her investment. On the other hand, an immigrant may have the incentive to invest in a course on arrival in Israel in order to benefit from the return in the future periods. The younger the immigrants on arrival in Israel, the greater the incentive, as she would reap the benefits over a longer period.

The model broadens the debate in the literature on the effectiveness of vocational training courses to cover additional aspects:

- a. It enables participation in training to be viewed not only as an investment in human capital but as a mechanism for seeking employment, as it increases the probability that the immigrant will receive job offers in different occupations.

- b. It enables training (and also unemployment) to be considered as an option that affects an immigrant's decisions, even if she decides not to participate in a course.

The maximization problem

In this section we formulate an estimable finite-horizon dynamic discrete choice model for the integrated labor supply and human capital investment decisions of female immigrants. The model follows the dynamic programming models of labor supply and schooling for example, Keane and Wolpin (1997) and Eckstein and Wolpin (1999), where an individual sequentially chooses among a finite set of mutually exclusive alternatives over a finite horizon, in order to maximize the discounted expected utility. The model incorporates observed heterogeneity regarding such variables as marital status, number of children, schooling, age on arrival and occupation prior to migration. It can also be easily modified to incorporate unobserved heterogeneity.

Each immigrant has a finite decision horizon, starting on arrival in Israel and ending with retirement. At each period t the immigrant chooses an element a among her choice set A which contains at most four alternatives: employment in a white-collar occupation (hereafter WC or occupation 1) ($a = 1$), employment in a blue-collar occupation (hereafter BC or occupation 2) ($a = 2$), participation in training ($a = 3$) and unemployment ($a = 4$). Let the choice variable d_{at} equal 1 if the a element was chosen in period t and equal zero otherwise.¹⁰ The four alternatives are mutually exclusive, such that $\sum_{a=1}^4 d_{at} = 1$ for all $t = 1, \dots, T$.

The constraints of the optimization problem lie in the transition probabilities, i.e., in the probabilities of switching from one alternative to another, as both the availability of jobs in WC and BC occupations and the availability of training programs are random and depend on the immigrant's characteristics, as well as on her current and past decisions.

The objective of the immigrant is, thus, to maximize

$$(1) \quad E \sum_{t=1}^T \beta^t U_t(d_{at}) | S(1)$$

by choosing a sequence of the control variables for all $t = 1, \dots, T$, where t is time since arrival, T is the retirement period and β is the discount factor, U_t is the stochastic periodic utility at time t and $S(t)$ is the individual's state space at time t which contains all the variables known to the immigrant at time t that affect either her current or her future utility.

The household's budget constraint in each period t , $t = 1 \dots T$, is

$$(2) \quad d_{1t}w_{1t} + d_{2t}w_{2t} + d_{3t}TW + d_{4t}UB + AI_t = C_t + g_1N(d_{1t} + d_{2t}) + g_2Nd_{3t} + g_3Nd_{4t}$$

where w_{at} is the immigrant's wage in WC occupation ($a=1$) or BC occupation ($a=2$) TW is the subsidy the immigrant receives while attending CT and UB is the unemployment benefit. AI_t represents the household's additional sources of income such as the husband's earnings that do not depend on the immigrant's choice, C is the consumption of a composite good in period t and N indicates the number of children. The cost of children, may differ if the immigrant works ($a = 1,2$), participates in training ($a = 3$) or is unemployed ($a = 3$) at time t .

¹⁰ For simplicity of notation, we omit the individual index in this section.

The wage function and the accumulation of local human capital

The stochastic offered wage in occupation j , w_{jt} ($j = 1, 2$) follows a standard quadratic Mincer wage function,

$$(3) \quad w_{jt} = \exp(\alpha_{0j} + \alpha_{1j}SC + \alpha_{2j}k_{1,t-1} + \alpha_{3j}k_{1,t-1}^2 + \alpha_{4j}k_{2,t-1} + \alpha_{5j}k_{2,t-1}^2 + \alpha_{6j}dt_t + \alpha_{7j}AGE + \varepsilon_{jt}).$$

SC denotes the immigrant's imported years of schooling. The endowment of schooling is assumed to be exogenous as migration to Israel was not a feasible option when the schooling decision was made.

Let $k_{j,t-1}$ denote the actual work experience that the immigrant has accumulated in occupation j since her arrival until period t and dt_t is an indicator that equals one if the immigrant has completed a training program before period t . The immigrant's age on arrival is denoted by AGE. The literature on training evaluations has focused on the parameter α_{6j} which is known as the mean return on training; ε_{jt} is an occupation-specific shock which varies with time and which is assumed to be serially uncorrelated. Under the last assumption, time dependence in wages is related to the immigrant's decisions via work-experience accumulation and participation in CT and not to randomness.

The occupation-specific work experience stocks evolve according to

$$(4) \quad \begin{aligned} k_{1t} &= k_{1,t-1} + d_{1t} \\ k_{2t} &= k_{2,t-1} + d_{2t} \end{aligned}$$

The initial values of the endogenous human capital variables are given by the level of these variables at the time of the immigrants' arrival in Israel, implying $k_{1,0} = k_{2,0} = dt_0 = 0$ immigrants choices take into account the fact that future job opportunity and wage offers depend on endogenously accumulated occupation-specific work experience and training status.

The utility function

The periodic utility is assumed to be linear and additive in consumption and leisure:

$$(5) \quad \begin{aligned} U_t &= (\gamma_{1m}M + \gamma_{1c}N)(d_{1t} + d_{2t}) + \\ &(\gamma_{2m}M + \gamma_{2c}N + \gamma_{3l} + \varepsilon_{3t})d_{3t} + \\ &(\gamma_{3m}M + \gamma_{3c}N + \gamma_{4l} + \varepsilon_{4t})d_{4t} + C_t \end{aligned}$$

where M equals 1 if the immigrant is married and N is the number of children. We assume that both the marital status and number of children are exogenous and fixed over the immigrant's life cycle in the Israeli labor market. According to Equation 5, the utility from children and marriage is independent of the immigrant's occupation, but can change if the immigrant is unemployed or participates in training. Replacing the budget constraint in the utility function, the periodic utility in each of the four states can be written as

$$\begin{aligned}
U_{1t} &= w_{1t} - g_1N + \gamma_{1m}M + \gamma_{1c}N \\
U_{2t} &= w_{2t} - g_1N + \gamma_{1m}M + \gamma_{1c}N \\
U_{3t} &= TW - g_2N + \gamma_{2m}M + \gamma_{2c}N + \gamma_{3l} + \varepsilon_{3t} \\
U_{4t} &= UB - g_3N + \gamma_{3m}M + \gamma_{3c}N + \gamma_{4l} + \varepsilon_{4t} .
\end{aligned}
\tag{6}$$

Transition probabilities

The transition probabilities from one state to the next are restricted by the following constraints:

- 1) The immigrant can always receive an offer to participate in training, as long as she has not done it before. During the first two quarters in Israel, only immigrants who had prior knowledge of Hebrew can participate in the training programs. The length of the training program varies from one quarter to three quarters. The probability to be assigned to a one-quarter program is 0.33, to a two-quarter program is 0.42 and to a program with a duration of three quarters 0.25 (these probabilities represent the actual distribution of the length of training in our sample).
- 2) In each period, the immigrant can receive job offers in occupation 1 and 2, independently. The probability of receiving a job offer in occupation $j, j = 1, 2$, at time t , depends on the labor-market activity the immigrant engaged in during the previous period d_{at-1} , as well as on her years of schooling, age on arrival, participation in training, occupation in the CIS (denoted by UOC) and accumulated work experience in occupation j . We adopt the logistic form for the job offers, implying

$$\lambda_{jt} = \frac{\exp[b_{10j}(d_{3t-1} + d_{4t-1}) + b_{11j}d_{-jt-1} + b_{2j}SC + b_{3j}AGE + b_{4j}dt_t + b_{5j}UOC + b_{6j}k_{jt-1}]}{1 + \exp[b_{10j}(d_{3t-1} + d_{4t-1}) + b_{11j}d_{-jt-1} + b_{2j}SC + b_{3j}AGE + b_{4j}dt_t + b_{5j}UOC + b_{6j}k_{jt-1}]}
\tag{7}$$

where $d_{-jt-1} = 1$ if the immigrant was employed in occupation other than j at $t-1$.

- 3) In each period there is an exogenous probability of an employed immigrant being separated from her job in occupation $j, j = 1, 2$.

The dynamic programming problem

The optimization problem can be represented by a set of alternative-specific value functions, each of which obeys the following Bellman equation (Bellman, 1957). where future decisions are assumed to be made optimally for any current choice a . In each period the immigrant chooses one element from her choice set, A , for which the value function is maximized. That is,

$$\begin{aligned}
V_a[S(t), t] &= U_{at} + \beta E\{Max_{x \in A} [V_x[S(t+1), t+1]] | S(t), d_{at} = 1\}, \quad t < T \\
V_a[S(t), t] &= U_{at}, \quad t = T
\end{aligned}
\tag{8}$$

The decision rules in a finite horizon model are not stationary and depend, *inter alia*, on the number of periods until retirement. The model is solved recursively from the last period back to the first. In general, the value functions in period t should be computed for any possible point in the state space of period $t+1$, $S(t+1)$ that can arise given $S(t)$ and d_{at} . The solution method is described in Appendix 1.

4. CALIBRATION RESULTS

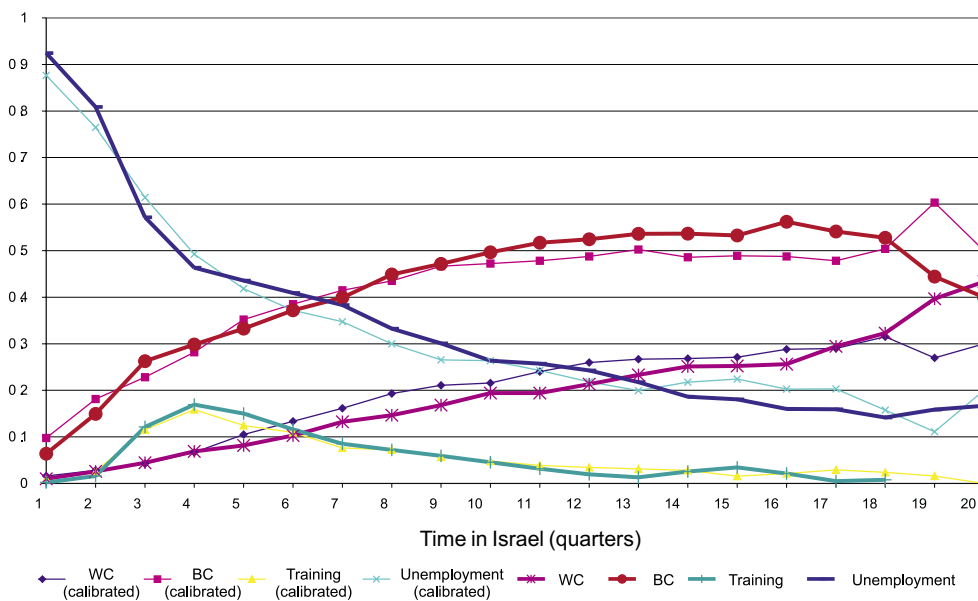
In this section we present results from calibration of the model under the following simplifying assumptions:

- 1) The wage parameters in the above wage equation are the OLS estimates reported in columns 3 and 4 in Table 8.
- 2) Marital status and number of children do not affect decisions.
- 3) To be consistent with most of the literature on training, we assume $b_{4j} = 0, j = 1, 2$.
That is, participation in training does not affect the job offer probabilities.
- 4) The variance-covariance matrix of the shocks is diagonal.

The values of the other parameters are presented in Appendix 2.

The restricted model is simulated using the Brookdale data. For each of the 502 immigrants in our sample, we calculate the value functions in 3,080 points in the state space that may arise during the twenty-period planning horizon (which means 3,080 combinations of the endogenous variables $k_1 0, k_2 0, dt_0$. In each of these 3,080 points we use 150 Monte-Carlo draws as described in Keane and Wolpin (1994).

Figure 2
Actual and Calibrated Distribution



The calibrated and actual labor market choices are presented in Figure 2. The bold lines are the actual data. As the figure shows, the restricted model can generate the employment and participation in training patterns we observe in the data. The simulations generate a peak in the participation in training during the third and fourth quarter after arrival, and a moderate decline in the participation rate after one year of residency in Israel. Note that under the first assumption on the transition probabilities, the simulated participation pattern is governed only by the self-selection of the immigrants into the programs and not by the selection of the administrators.

Table 9
Actual and Predicted Quarterly Transitions between White-collar and Blue-collar Employment, Training and Unemployment

From	(number of immigrants)							
	WC		BC		Training		Unemployment	
	Actual	Predicted	Actual	Predicted	Actual	Predicted	Actual	Predicted
WC	918	877	7	1	12	2	23	41
BC	14	1	2,414	2,412	51	10	120	151
Training	33	10	71	10	222	154	105	125
Unemployment	101	146	330	319	154	119	2,128	2,325
	1,066		2,822		439		2,376	

Table 9 shows the actual and predicted transitions between the two employment situations (WC and BC), training and unemployment. The terms on the diagonal are the most prominent, particularly in the two employment possibilities. Of the immigrants working in a white-collar (blue-collar) job in any month, 95.6 percent (92.9 percent) would be in the same type of job in the following month. Unemployment also showed a high degree of persistence, with 78.4 percent of the immigrants who were unemployed in a quarter continuing to be unemployed in the following quarter. The model is successful in replicating the persistence in the two employment situations, but overstates that in unemployment. Although in practice there are considerable direct transitions into the two employment situations, the model predicts low transitions from training into employment. This prediction may be affected by the assumption that training does not change the probability of receiving offers of employment in white- or blue-collar jobs.

5. SUMMARY AND CONCLUSIONS

This paper deals with the occupational absorption of female immigrants from the former Soviet Union into Israel's labor market, and their participation in subsidized vocational training courses. About 43 percent of these immigrants had participated in such a course during their first five years in Israel.

The paper presents a calibration of a dynamic choice model in which immigrants' decision regarding their occupation in Israel is made simultaneously with the decision whether to undergo training. The calibration successfully generates the path of immigrants' occupational absorption during the first five years after their arrival in Israel. Assuming that training courses are freely available and that participation in a course is the immigrants' own decision and not the result of selection of participants by the course administrators, the model successfully predicts the rate of participation in such courses during immigrants' first two years in Israel.

Appendix 1: Solution of the model

Full numerical computation of the value functions requires high-dimensional integrations. Following Keane and Wolpin (1994), Monte Carlo integration is used to as numerical approximation for the *EMAX* in the Bellman equation above (Equation 8). That is, *D* draws from the multivariate normal distribution of the shocks are taken and for each draw, the maximum of the value functions is calculated. The maximum values are averaged.

In addition, we split the horizon to two sub-periods. During the first twenty quarters, the model is solved explicitly, as described above. The value functions in the twenty-first quarter are assumed to be a parameterized function of the immigrant's state space at the 20th quarter. The terminal value is thus

$$V_a[S(21)] = \delta_1 k_{1\ 20} + \delta_2 k_{2\ 20} + \delta_3 AGE + \delta_4 dt_{20} + \delta_5 + \delta_6 d_{1\ 20} + \delta_7 d_{2\ 20} = \delta_8 SC + \delta_9 N + \delta_{10} M + \delta_{11} UOC$$

Appendix 2: Parameter values

$\beta=0.99$

Job offer parameters	WC job offer (j=1)	BC job offer (j=2)
b	-4.8	-2.5
b^{10j}	-9.23	-4.33
b^{11j}	0.1	0.029
b^{2j}	0.001	0.011
b^{3j}	0.0	0.0
b^{4j}	0.54	-0.46
b^{5j}	0.08	0.05
b^{6j}		
Separation rate	0.032	0.052

Utility and Terminal Value Parameters

Utility Parameters	
TW	-1.0
UB	1.0

Terminal Value Parameters	
δ_1	25.0
δ_2	25.0
δ_3	2.0
δ_4	25.0
δ_5	1,420.0
δ_6	500.0
δ_7	0.0
δ_8	150.0
δ_9	0.0
δ_{10}	0.0
δ_{11}	100.0

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