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ABSTRACT

Labor Mobility of Immigrants: Training, Experience, Language and Opportunities*

This paper analyzes the labor mobility and human capital accumulation of male immigrants who moved from the former Soviet Union to Israel. We formulate an estimable dynamic choice model for employment and training in blue and white-collar occupations, where the labor market randomly offered opportunities are affected by past choices. The estimated model well fits the observed patterns of the fast decrease in unemployment as immigrants first find blue-collar jobs and attend training, followed by a gradual movement to white-collar occupations. The estimated rates of return to local training, local experience and local language are very high, but imported skills have zero (conditional) return. Furthermore, the welfare gain from the impact of training on job offer probabilities is larger than it's effect on wages. Due to low job offer rates, the realized rate of return from white-collar training is relatively low and takes time. As a result, the annual aggregate wage growth, due to the availability of training programs, increases with time in Israel to 1.4 percent in the fifth year.

JEL Classification: J31, J68

Keywords: immigration, occupation, training, unemployment, transitions, welfare

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1 Introduction

The transition pattern of immigrants to a new labor market is characterized by high wage growth, fast decrease in unemployment as immigrants first find blue-collar jobs, followed by a gradual movement to white-collar occupations. A central aspect of this process is the acquisition of local human capital in the form of the local language, local experience and the participation in vocational training programs provided by the government.[1] In this paper we quantify the impact of local accumulation of human capital and imported skills on labor mobility and wages (Weiss, Sauer and Gotlibovski (2002)), with special emphasis on the role of the local training classes. In particular, we study the effect of training in white and blue-collar occupations on wages, job offer probabilities and individual utility. In addition, we estimate the predicted aggregate wage growth of male immigrants and the individual welfare gain from the availability of training.[2]

To study these issues we formulate a dynamic choice model, in which immigrants at each period can be in one of the following states: employed in blue-collar occupations, employed in white-collar occupations, attend training related to either of these occupations and non-employed. Wages and job offers are random and are affected by the immigrant's endogenously accumulated experience and participation in training as well as by his language knowledge and imported skills.[3] We estimate our model using quarterly panel data of a sample of male immigrants who moved from the former Soviet Union to Israel during the period of 1990 to 1992. Our data covers the labor market

[1] Borjas (1994, 1999) and LaLonde and Topel (1994) provide comprehensive surveys on the economics of immigrants in the labor market. The focus of the literature is on the wage growth of immigrants, the convergence of wages to those of equivalent natives and the impact of immigrants on natives employment and wages.

[2] Heckman, LaLonde and Smith (1999) provide a comprehensive survey of the methods and empirical findings regarding the gains from vocational training programs provided by the government. The survey includes the analysis of endogenous participation in training and labor supply in the framework of a dynamic search model. However, the econometric models are static and they focus on the estimation of the training impact on potential earnings.

[3] The model is similar to that of Keane and Wolpin (1997) and Eckstein and Wolpin (1999). Card and Sullivan(1988), Ham and LaLond(1996) and Heckman and Smith(1999) empirically analyzed the interactions between training participation and (un)employment before and after the program.

experience of immigrants during their first 20 quarters since their arrival in Israel.[4]

The existing labor economic literature on immigration focuses on immigrants' earning growth and their impact on natives' employment and wages (see, e.g., LaLond and Topel (1994) and Borjas (1999) for recent surveys). This vast empirical literature has documented a high wage growth for immigrants during their first decade in the new country where the main questions are the effects of time since arrival and the year of arrival on wages.[5] Our detailed unique data on a cohort of immigrants includes information on experience, language skills, occupational training participation and pre-migration skills. This data enables us to further investigate alternative human capital and market opportunities channels that determine the wage growth and labor mobility of immigrants within a dynamic stochastic choice model.

The estimated model fits well the main patterns of labor market mobility for immigrants: the fast reduction in unemployment and the sharp increase in their share in blue-collar jobs, followed by a gradual transition to white-collar occupations (see figure 1). The main reason for this slow transition is the very low offer probability of white-collar jobs. The predicted pattern of participation in training is consistent with the observed peak in training at the end of the first year in the new country, and the decrease in participation over the following two years.[6] The model also predicts the observed sharp decline in the share of employed in blue-collar jobs and the increase in the share of employed in white-collar jobs during the 5'th year in Israel. This surpris-

[4]The mass migration from the Former Soviet-Union to Israel started towards the end of 1989. For a more detailed description of this immigration wave see Eckstein and Weiss (2002). See table $A1$ for a sample of this study and the key fact is their high level of education. Several studies suggest that the return to various human capital variables depends on the national origin of these stocks. Eckstein and Weiss (2001) find that upon arrival, immigrant males receive no return for their imported skills. Friedberg (2000) finds variation in the return to foreign schooling across origin countries and an insignificant return to foreign experience.

[5]Eckstein and Weiss (2001) extended this work using repeated cross-section samples for the same immigration wave that is investigated here. Their main finding is that the large wage growth during the first five years in the new country is characterized by a zero return to the imported education in the first year of arrival. However, the return to education is increasing with time in the new country. Weiss, Sauer and Gotlibovski (1999) is an exception in the literature. They use a dynamic model framework in order to analyze the compatibility between the immigrant's work and his imported level of schooling and its effect on immigrants' wage and welfare.

[6]The formal goodness of fit test implies that a maximum likelihood estimated model does not fit well the aggregate proportions of individuals in each labor market state.

ing result is due to three factors: (i) the decline in transitions from unemployment to blue-collar jobs; (ii) the low permanent transition of immigrants from blue-collar jobs to white-collar jobs; and (iii) the stability of white-collar jobs that are always preferred by immigrants.[7]

The estimated rate of return to white-collar related training and blue-collar related training are 19% and 13%, respectively, for 78% of the population and zero for rest of the immigrants population.[8] However, the predicted mean accepted wages are only 6% higher for participants in white-collar related training and 11.9% higher for participants in blue-collar related training**.** The difference between the estimated rate of return to training and the effect of training on mean accepted wages is due to the occupation specific employment probability. The endogenous offer arrival rates and choices (selection) of jobs by occupation dominates the estimated coefficients of the rate of return that is realized for the participation in training. There is a large return to the knowledge of Hebrew in both occupations and to the knowledge of English in white-collar jobs only. Accumulated experience in the new country has about a 2% return per quarter, but imported schooling and experience (age) have zero (conditional) return in the new country. It seems, therefore, that the imported skills do not contribute to wage growth directly but only through their effect on the accumulation of local skills.[9] In addition, we find that imported human capital has a significant positive effect on white-collar job offer probability.

In addition to the high wage return for white-collar related training, this type of training doubles the white-collar job offer rates.[10] This effect is the main channel through which training affects labor mobility of immigrants. However, the high return to local experience, the estimated negative utility from attending training and the low

[7] Figure 1 shows this fact clearly. It should be noted that the model allows for alternative explanations, such as accumulated human capital and cohort effects.

[8] We allow for two unobsreved types of immigrants in the population (Heckman and Singer (1984)). Our OLS estiamtes of the effect of training are large but insignificant, which is the common result in the literature (Lalonde(1995)). Our estimated model indicates that the OLS return to training are biased downwards.

[9] Imported schooling affects the choice and the potential return to training. In this paper we did not model this interesting interaction between imported skills and local accumulation of human capital.

[10] Card and Sullivan (1988) and Ham and LaLond (1996) found that the participation in training has a significant positive effect on the post training employment probabilities.

availability of white-collar training are the main explanations for the predicted low participation rates in training.[11] Furthermore, the individual welfare gain at arrival from the existence of training programs, as provided by the government, is estimated to be between one percent to one and half percent. The direct wage effect of this gain is small, despite the estimated high return for training in wages. The finding that the wage gain from training constitutes only a small fraction of the total gain supports the lesson from previous evaluation studies that training affects not only wages, but also other variables and, therefore, one should model a multiplicity of outcomes of training (Heckman, LaLonde and Smith (1999)). The existing empirical literature evaluates the impact of training using the "treatment effect" econometric model. In this model it is assumed that the wage in the first job following the training captures the future potential return to the "treatment". The results in this paper show that it is likely that the occupation in the first job after training is unrelated to the specific training program. Hence, the standard model might underestimate the effect of training.

In this paper we jointly estimate the impact of training on employment and wages. Therefore, we can calculate the predicted aggregate wage growth that is due to the availability of the government vocational training programs. This estimated aggregate wage growth due to the availability of training programs increases in time since arrival. It is about one percent in the third year since migration and 1.4% in the fifth year. The large difference between the effect of training on the individual wage equations and on the predicted wage growth is due to the dynamic realized opportunities and selection decisions made by workers. As a result, the effect of training on observed employment and wages is a dynamic phenomenon that takes many years to be realized.

The rest of the paper is organized as follows. Section 2 presents the quarterly panel data on the sample of male immigrants. Section 3 develops the discrete choice human capital investment model. Section 4 summarizes the estimation results and the model fit and in section 5 we present policy implications of our results. Section 6 concludes the paper.

[11] The negative utility from participation in training can be interpreted as a result of liquidity constraint on immigrants' investment in human capital.

2 Data

The data for this study is based on a panel from two surveys of the same sample.[12] The first survey was conducted during the summer of 1992 on a random sample of 1,200 immigrants from the former USSR who entered Israel between October 1989 and January 1992. The second survey was done in 1995 and only 901 of these immigrants were re-sampled. The original sample consists of immigrants between working-ages (25-65) residing in 31 different locations in Israel at the time of the first survey. Both surveys contain monthly history of the jobs and wages from the date of arrival in Israel until the interview. The surveys also provide detailed information on participation in government-sponsored training programs, the knowledge of Hebrew on arrival, participation in Hebrew classes and Hebrew knowledge at the date of the surveys. In addition, the surveys contain information on demographic characteristics before and after migration. For this study, we converted the monthly labor market data to a quarterly (three months) data set.

We consider 419 male immigrants who were 23 to 58 years old at time of arrival, where 316 of these immigrants were interviewed in the second survey. We restrict the sample to immigrants who did not return to be full time students and were actively looking for a job in Israel.

The immigrants' high level of imported skills is reflected in their average 14.6 years of schooling and the high proportion of immigrants who worked in white collar jobs (68%) in the former USSR (see Table A1). White collar jobs are related to work that requires more than 12 years of schooling such as researchers, managers, computer analysts, teachers, nurses, engineers, artists and other high skilled professionals. The blue-collar occupations consists of all other jobs which require mainly basic skills.[13].

The knowledge of language is measured by four questions on ability to understand, to speak, to read and to write the language. The immigrants were asked these questions

[12] The surveys were conducted by the JDC - Brookdale Institute of Gerontology and Human Development, Jerusalem- Israel.

[13] White-collar jobs correspond to codes 000-299 in the 1972 occupation classification of the Israeli Central Bureau of Statistics (CBS).

both in Hebrew and in English. We use an index that gives equal weights for all questions and has a lowest value of one for those who have no knowledge and the value four for those knowing the language fluently. Few immigrants had knowledge of English prior to migration. Therefore, the average English index is only 1.76.[14]

The knowledge of Hebrew was measured at the two interviews. 12 percent of the immigrants were able to hold a simple conversation in Hebrew prior to their arrival. On arrival, all immigrants are assigned to a government-provided two quarters Hebrew Course, which is called "Ulpan"[15]. 92% of the immigrants attended Ulpan with 79% completing it. The knowledge of Hebrew increased, on average, by 10% between the two surveys.

Each immigrant to Israel is eligible for participating in one government-sponsored vocational training program. These training programs are classified by white-collar and blue-collar occupations. Training in white-collar related occupations includes courses in computers, accounting, adjusting engineering skills to local market requirements, etc.. Training in blue-collar related occupations includes courses in sales, cosmetics, diamond cutting, construction related occupations, etc..[16] These training programs are open both to unemployed and displaced native Israelis as well as to immigrants. A mandatory requirement for participation in training is passing a test in the Hebrew language. Some of the programs can be considered as retraining as they aim at allowing the participant to adjust his skills to the Israeli labor market. For example, many immigrants worked in different fields of engineering prior to migration. Since some of these fields are not in demand in the Israeli labor market, various training programs were designed to adjust their knowledge.[17]

[14] We assume that this level of English is constant over the life cycle. The interview was in Russian or/and Hebrew.

[15] It should be mentioned that each household of immigrants receives an absorption package of benefits during their first year in Israel. This package contains special allowances for rental and mortgage for housing which can be partially extended for a longer period. Ulpan and training are part of the benefits as well.

[16] While many government-sponsored training programs in the US are offered to economically disadvantaged individuals whose level of skills is low, Israeli classroom vocational training programs are designated mainly for high school graduates and collage graduates.

[17] In some occupations such as law and medicine, immigrants had to participate in special programs in order to get a license to practice this occupation in Israel. Since participation in these special

In the data we classified the labor market status of individuals in such a way to fit the classification used in our theoretic model. In each quarter the immigrant can be in one of five labor market states: unemployed (UE), working in a white-collar job (WC), working in a blue-collar job (BC), attending a training course in a white collar occupation (WT) or attending a training course in a blue collar occupation (BT). Figures 1a and 1b describe the actual proportions of individuals in each state for the first 20 quarters since arrival in Israel. Immigrants who attend Ulpan during the first two quarters are considered to be unemployed. The unemployment rate reaches 23% after a year and stabilizes at about 10% after 13 quarters in Israel. A substantial number of immigrants work in blue-collar jobs during the first two years in Israel. The proportion of these individuals reaches more than 60 percent after two and a half years in Israel and stays at this level for almost two additional years. This pattern of slow dynamic transition is similar to what is believed to be typical immigrant behavior (Chiswick, (1992), Eckstein and Weiss (2001)).[18]

What might seem as a substantial occupational downgrading during the first 4 years in the new country, gets a significant turn later on. During the fifth year in Israel, the share of immigrants who work in BC jobs is reduced by almost 20% and the share of employed in white-collar jobs increases by almost the same magnitude. Hence, the movement between occupations is a long dynamic process.[19] Does this change in trends represent an occupational upgrading during the fifth year since migration, or is this change a result of the characteristics of the 1990 immigrants relative to the 1991/2 immigrants? The answer to this question requires a structural model that can distinguish between the two hypotheses.

The transitions between the five labor market states (Table A2) show high (80% to 97%) and increasing persistence in the WC and BC jobs. The transitions from WC

programs is mandatory, our study does not include immigrants who participated in these programs.The length of the training programs varies between one to three quarters. Based on discussions with public administrators we learn that the duration of the courses depends on administrative conditions and does not reflect differences in quantity or quality of the learning material.

[18]Note that this pattern is similar to the transition to work of high school graduates, as described by Keane and Wolpin (1997).

[19]It should be noted that the number of observations in the fifth year is low.

(BC) jobs to BC (WC) jobs are low and decreasing over time. The rate of transition from work to unemployment, after more than two and a half years in Israel, is about 5%, which is substantially lower than the transition to unemployment from any other state.

Table 1 shows that 84% of the immigrants who attended training had worked in white-collar jobs in the former USSR. Hence, immigrants who arrived with more skills are more likely to invest in training. Yet, a significant number of these immigrants are willing to downgrade their occupation, since 37% of the immigrants who had white-collar jobs attended training in blue-collar related occupations. This observation may reflect the way that the immigrants perceived their labor market opportunities in Israel. However, as can be seen in Table 2, it does not mean that they will necessarily end up working in blue-collar jobs.

Table 1. Transitions from Occupation in Former USSR to Training by Occupation in Israel*.

Occupation in Former USSR	*Training in White − Collar*	*Training in Blue − Collar*	Proportions	Observations
White − Collar	54.03	30.65	84.68	105
Blue − Collar	4.84	10.48	15.32	19
Proportions	58.87	41.13	100.00	–
Observations	73	51	–	124

*(In percentage, Observations in numbers.)

Table 2 shows that the occupation in the first job after training is not necessarily the same as the occupation in the training program, and there is more downgrading than upgrading. However, the theory in the next section shows that one cannot infer from the transition from training to the first job, the long term impact of training on the immigrant's occupational choice.

Table 2. First Job After Training in Israel by Occupation.

First Job After Training	*Training in White − Collar*	*Training in Blue − Collar*	Proportions	Observations
White − Collar	34.26	9.26	43.52	47
Blue − Collar	25.93	30.56	56.48	61
Proportions	60.19	39.81	100.00	–
Observations	65	43	–	108

*16 immigrants hadn't found a job after training (out of 124 who participated in training programs)

Multinomial logit regression for employment states

In order to describe the role of training by occupation we estimate a pooled multinomial logit regression for the immigrants' employment choices in different periods (Table 3). The dependent variable indicates whether the immigrant was working in WC, BC or was unemployed at time t.[20] The variable WT (BT) equals 1 if the immigrant has completed training in WC (BC) before time t and equals zero otherwise. Training in white-collar occupations increases the probability of working in a white-collar job and being unemployed, while training in blue-collar only affects positively the probability of being unemployed. The knowledge of Hebrew and English, age on arrival and work in a white collar occupation in the former USSR increase the probability of both working in a white-collar job and being unemployed relative to working in blue-collar jobs. Education (years of schooling) has no significant effect on these probabilities. Accumulated work experience in Israel reduces the probability of being unemployed. It is interesting to note that all the variables that are related to the level of human capital, increase the probability of working in white-collar jobs as well as being unemployed. That is, skilled immigrants invest both in the accumulation of human capital and in job search.

[20]Note that each immigrant appears in this regression several times and there is no individual fixed effect. Moreover, the regression does not control for endogeneity of training and only provides a way to measure conditional transitions in the data. Error terms are clustered by individuals.

Table 3: Multinomial-logit on Employment by Occupation and Unemployment

Variable	White-collar	Unemployed
Constant	−4.4424 (0.5034)	−0.4753 (0.4804)
Hebrew	0.9612 (0.0761)	0.1342 (0.0701)
English	0.6563 (0.0428)	0.1529 (0.0497)
Age on arrival	0.0135 (0.0055)	0.0205 (0.0052)
Years of schooling	0.0331 (0.0212)	0.0332 (0.0190)
Training in WC	0.9421 (0.1153)	0.8183 (0.1658)
Training in BC	−0.2101 (0.1594)	0.9586 (0.1815)
Experience	−0.0046 (0.0100)	−0.6807 (0.0233)
Occup. in USSR WC	1.4837 (0.1417)	0.2156 (0.1137)
No. of Obs.	5536	
Log likelihood	-3558.40	

* The comparison group is employment in blue-collar jobs.

Wages

The quarterly wage growth estimated by a simple regression of the mean wage on time since arrival is 2.2-3% per quarter. This growth rate is about 9% annually, which is 2.6% higher than the rate we find in a larger sample given by the cross section income surveys of the CBS (See Eckstein and Weiss (2001)).

Simple pooled log wage OLS regressions for each occupation separately are given in Table 4. Clearly, we do not correct for the selection bias implied by the choices of the individual so that the regression provides benchmark correlations. Training enters as a dummy only for wages reported after the graduation of the training program. Training in white-collar occupations has a positive large (11.6%) estimated effect on accepted wages in white-collar jobs and zero effect on accepted wages in blue-collar jobs. Training in blue-collar occupations is estimated to have a 5.6% effect on wages

in BC and zero effect on wages in WC. The estimated coefficients have large standard errors. These results are similar to results obtained in many studies that attempt to find the impact of training on wages (see Heckman, LaLonde and Smith (1999)).[21]

The estimated effects of the knowledge of Hebrew and English on wages are substantial.[22] The highest level of the Hebrew index is four which implies a impact of 16% above that of the average Hebrew knowledge, which is the level of 2.7. The effect of English on wages in WC jobs is even larger. The impact of the knowledge of Hebrew on the wages in blue-collar jobs is smaller than in white-collar jobs, but is still positive and significant, while the effect of English in BC jobs is negative and insignificant.[23] The correlation coefficients for imported human capital in the form of experience (age on arrival) and education are zero in the BC wage equation. In white-collar jobs the least square estimators for the return to imported education is 2 percent, but insignificant, while there is over a 1 percent return to a year of experience abroad (age on arrival). It is important to note that the estimated correlation for an additional quarter of general experience in Israel has a 1.7 percent wage return in white-collar jobs and a 2.4 percent wage return in blue-collar jobs.[24]

[21] The correlations reported by the regressions indicate that the division of training and jobs by the two occupational categories is meaningful.

[22] The level of Hebrew in each quarter is the predicted index from the regression of index of Hebrew knowledge at the time of the first and second survey on time since arrival, time square, length of ulpan and the indicator for Hebrew knowledge prior to migration:

$$\widehat{Heb} = \underset{(0.169)}{1.695} + \underset{(0.015)}{0.092} \times Ulpan\_length + \underset{(0.089)}{0.657} \times Hebrew\ before\ migration + \underset{(0.031)}{0.071} \times time - \underset{(0.0013)}{0.0014} \times time^2.$$

[23] Berman, Lang and Siniver (2000) find similar results with respect to the knowledge of Hebrew using a different data set on immigrants to Israel. Chiswick and Miller (1999) find that the earnings return for English proficiency for legalized aliens for the US is between 8 to 17 percent. Dustmann and van Soret (2001) estimate a model that control for the endogeneity of language fluency. They find that the earning gain from language fluency is positive but sensitive to the specification of the model.

[24] Since we observe wages only during the first 5 years in Israel, we did not include a quadratic element for experience.

Table 4: OLS Wage Regression

Dependent Variable	ln hourly wage white-collar occupation	ln hourly wage blue-collar occupation
Cons.	1.091 (0.407)	2.122 (0.120)
Hebrew	0.129 (0.061)	0.050 (0.027)
English	0.132 (0.036)	−0.011 (0.022)
Age on arrival	0.013 (0.005)	−0.003 (0.002)
Years of schooling	0.021 (0.022)	0.008 (0.006)
Training in WC	0.116 (0.079)	−0.009 (0.062)
Training in BC	−0.045 (0.129)	0.056 (0.055)
Experience in Israel	0.017 (0.009)	0.024 (0.003)
No. of Obs.	132	442
R^2	0.230	0.153

Based on the above observations, we formulate a model that is consistent with the facts from the data and can provide consistent estimates for the parameters of the wage function.

3 The Model

The model follows the dynamic programing approach of labor supply and schooling (for example, Eckstein and Wolpin (1999) and Keane and Wolpin (1997)), where in each period an individual chooses amongst a finite set of mutually exclusive alternatives over a finite horizon. Immigrants randomly receive job offers and training program offers in two occupations and choose one activity in each period.

Formally, an immigrant i who arrives in Israel at age τ_i and is expected to live L periods, is facing a finite horizon planning period of duration $T_i = L - \tau_i$ quarters. In each period since arrival, t, $t = 1, 2...T_i$, he can choose one of five labor market alternatives $j = 0, 1, 2.., J$, $J = 4$. Let d_{it}^j equal one if individual i chooses alternative

j at time t, and zero otherwise. The index $j = 1$ corresponds to work in a white-collar occupation (WC) and the index $j = 2$ corresponds to work in a blue-collar occupation (BC). When $d_{it}^j = 1$, and $j = 3, 4$, the individual acquires training relevant to occupation $j - 2$. When $d_{it}^0 = 1$, the immigrant searches for work while being unemployed. We denote by d_{it} the row vector $\{d_{it}^j, j = 0, .., J\}$.

Consider an immigrant i who chose alternative r in period $t-1$. At the end of this period he will randomly receive offers to work in WC, BC or to participate in a training program that is related to white-collar occupation (WT). The conditional probability that this offer will be from alternative $j, j = 1, 2, 3$, is given by,

$$P_{it}^{rj} = P^{rj}(x_{it}, d_{it-1}, t). \tag{1}$$

The matrix $\{P_{it}^{rj} : r = 0, 1, 2.., 4;\ j = 1, 2, 3\}$ is the periodic conditional offer probability matrix. The vector x_{it} represents individual characteristics, such as occupation in the country of origin, knowledge of Hebrew, knowledge of English, age on arrival, whether the individual has completed a training program in a certain occupation and general work experience. Note that for alternative j, $j = 1, 2, 3$, the immigrant either can or cannot have the option to choose this alternative, while unemployment ($j = 0$) and training in a blue-collar occupation (BT), $j = 4$, are always available. However, we imposed the institutional rules that both training programs are available only from the third quarter of residency in Israel for those immigrants who had no prior knowledge of Hebrew.[25] The immigrant can be admitted to training program if he had not been in training before and he is allowed to be adimtted to only one training program during his lifetime.

The offered wage in occupation j, $j = 1, 2$ at period t is a standard log linear function of the immigrant's occupation-specific human capital, K_{it}^j and a random $i.i.d$ shock, z_{it}^j. That is,

$$\ln w_{it}^j = K_{it}^j + z_{it}^j \ . \tag{2}$$

The accumulation of human capital for each j, $j = 1, 2$, is determined by the

[25] Eligibility to participate in a training typically expires after 18 quarters.

following equation:

$$K_{it}^{j} = \alpha_{0j} + \alpha_{ej} EX_{it} + \alpha_{cj} C_{it}^{j} + \alpha_{Hj} L_{it}^{H} + \alpha_{Fj} L_{i}^{F} + \alpha_{Aj} \tau_i + \alpha_{Sj} ed_i, \tag{3}$$

where EX_{it} is the general accumulated experience in the Israeli labor market, such that $EX_{i1} = 0$ and $EX_{it} = EX_{it-1} + d_{it-1}^{j}$, $j = 1, 2$.[26] C_{it}^{j} is an indicator that equals one if the worker has completed a training course in occupation j, $j = 1, 2$ prior to period t. L_{it}^{H} indicates the level of Hebrew of individual i at time t in Israel, which we assume to be exogenous. The imported human capital is represented by the immigrant's education level (ed_i), age on arrival (τ_i) and the knowledge of English on arrival, L_i^F.

The current utility from labor market state j for individual i at time t in Israel is denoted by U_{it}^{j} and is given by,

$$\begin{aligned} U_{it}^{0} &= ue + \varepsilon_{it}^{o} \\ U_{it}^{j} &= w_{it}^{j}, \quad for \;\; j = 1, 2 \\ U_{it}^{j} &= tr^{j} + \varepsilon_{it}^{j}, \quad for \;\; j = 3, 4, \end{aligned} \tag{4}$$

where the random vector $\varepsilon_{it} = [\varepsilon_{it}^{0}, z_{it}^{1}, z_{it}^{2}, \varepsilon_{it}^{3}, \varepsilon_{it}^{4}]$ is normally distributed by $N(o, \Omega)$ and Ω is not restricted. The immigrant's utility in (4) is measured in monetary values due to the linearity of utility in wage in the two employment states, $(j = 1, 2)$. The monetary value of the utility associated with a training program is denoted by tr^j, $j = 3, 4$, and with unemployment, $(j = 0)$, is ue. The monetary units are set by the wage definition which is the hourly wage rate in NIS.

The immigrant is assumed to maximize the expected present value of his lifetime utility

$$E\left[\sum_{t=1}^{T_i} \beta^{t-1} \sum_{j \in J+1} U_{it}^{j} d_{it}^{j} \mid S_{i1}\right] \tag{5}$$

[26] Note that experience in one occupation affects the human capital stock differently in other occupations.

by the choice of d_{it}^{j} for all $t = 1, ..., T_i$, and where S_{i1} is the vector of all the relevant state variables at arrival. E denotes the expectation taking over the joint distribution of ε_{it} and the transition probabilities, P_{it}^{rj}, and β is the discount factor, $0 < \beta < 1$.[27] The state vector at time t in Israel is given by $S_{it} = [EX_{it}, C_{it}^{j}, L_{it}^{H}, L_{i}^{F}, \tau_i, ed_i, pwc_i, d_{it-1}^{j}, \varepsilon_{it}; for\ j = 0, 1, 2, 3, 4]$, where pwc_i is an indicator for holding a WC job prior to migration and ε_{it} is the realized value of the vector of shocks.

Let $V_i^r(S_{it}, t)$ be the maximum expected lifetime utility of immigrant i given by equation (5) such that $d_t^r = 1$. This value is defined recursively, for $t = 1, ..., T_i$ using the Bellman equation,

$$V_i^r(S_{it}, t) = U_{it}^r + \beta E \max\{V_i^j(S_{it+1}, t+1), for\ j = 0, .., 4 \mid S_{it}, t, d_{it}^r = 1\}. \quad (6)$$

To simplify the model we assume that the optimization problem is divided into two sub-periods. During the first 20 quarters the model is solved explicitly. At the 21'st quarter the immigrant utility is given by $V_i^j(S_{i21}, t = 21)$, which is assumed to be a given linear function of S_{21}, for $j = 0, 1, ...4$ (see Eckstein and Wolpin(1999)). Furthermore, perfect foresight is assumed concerning the future behavior of the exogenous values of L_{it}^{H}, $t = 1, .., 21$. Given this simplification, we solve the model by backwards induction from period $t = 21$.

Solution Method

The model does not admit an analytical solution. Using the end conditions, and assuming a known distribution of ε_{it} and a functional form for the job offer probability functions, it is possible to solve numerically for the set of optimal decisions, using backwards induction for any given values of the parameters. We solve the problem at each point of the state space. To be specific, we first separate between the expectation operator taken in (6) on the transition probabilities defined by (1) and on the joint distribution of ε_{it}. Let $g_{it+1}^{a}(S_{it+1}, t+1 \mid S_{it}, t, d_{it}^{j} = 1)$ be a vector that indicates the feasibility of each of the 5 possible choices where one indicates a feasible alternative and zero otherwise. This vector is defined for individual i at time t for a potential outcome

[27] The optimization problem (5) is in the same format as in Eckstien and Wolpin(1999).

a at time $t+1$ given $(S_{it}, t, d_{it}^j = 1)$. Let $\tilde{V}{}_{it+1}^{a}(S_{it+1}, t+1 \mid S_{it}, t, d_{it}^j = 1)$ be the corresponding vector of the values of the feasible alternatives for individual i at time t for an outcome a at time $t+1$ given $(S_{it}, t, d_{it}^j = 1)$.At each zero in g_{it+1}^a the corresponding $V_i^j(S_{it+1}, t+1)$ is eliminated from $\tilde{V}{}_{it+1}^{a}$, and at each one in g_{it+1}^a the value in $\tilde{V}{}_{it+1}^{a}$is equal to (6). The index of potential outcomes a has $A_{it+1}^j = A(S_{it+1}, t+1 \mid S_{it}, t, d_{it}^j = 1)$ total number of $t+1$ feasible choice sets. For example, an unemployed immigrant with no restrictions on training participation can be unemployed or participate in BT, but the other three states are random. In this case one potential outcome, say $a = 1$, is $g_{it+1}^1 = [1, 0, 0, 0, 1]'$ where 1(0) at a given row indicates whether this choice is feasible (not feasible). For this case the vector $\tilde{V}{}_{it+1}^{1}$is given by,

$$\tilde{V}{}_{it+1}^{1}(S_{it+1}, t+1 \mid S_{it}, t, d_{it}^0 = 1) = [V_{it+1}^1(S_{it+1}, t+1 \mid S_{it}, t, d_{it}^0 = 1), V_{it+1}^4(S_{it+1}, t+1 \mid S_{it}, t, d_{it}^0 = 1)]'.$$

For this example, there are eight potential outcomes that we denote by $A_{it+1}^0 = 8$. Let $P(g_{it+1}^s(S_{it+1}, t+1 \mid S_{it}, t, d_{it}^j = 1))$ be the conditional probability of $g_{it+1}^a(S_{it+1}, t+1 \mid S_{it}, t, d_{it}^j = 1)$. Now we can rewrite (6) as follows,

$$V_i^j(S_{it}, t) = U_{it}^j + \beta \sum_{a=1}^{A_{it+1}^j} P(g_{it+1}^a(S_{it+1}, t+1 \mid S_{it}, t, d_{it}^j = 1)) E(\max\{\tilde{V}{}_{it+1}^{a}(S_{it+1}, t+1 \mid S_{it}, t, d_{it}^j = 1)\}). \tag{7}$$

where E is the expectation operator taken only on the joint distribution of ε_{it}. The numerical complexity arises because the value function requires high-dimensional integrations for the computation of the "Emax function" which is denoted by the last term on the right hand side of (7) . We follow the procedure in Keane and Wolpin (1994), using Monte Carlo integrations to evaluate the integrals that appear in (7).[28]

Implications

The model has several predictions regarding the dynamic pattern of the proportion of immigrants in each labor market state (see Figure 1). Participation in training

[28] To compute the Emax function we simulate 150 draws at each point of the state space.

related to a certain occupation is an investment in skills that are rewarded in that occupation by a higher wage as well as increasing the job offer probability in that occupation. The standard human capital theory emphasized the impact of human capital (schooling) on earnings (Ben-Porat, 1967). Both the wage return and the job-offer reward to training investment are for the entire future, and therefore, the implication from the model is that training should be taken next on arrival in Israel. Yet, in our model, training can also be viewed as an alternative for unemployment, hence, participation in training could be expected in later periods. Moreover, the availability of WT is random and, therefore, it is possible to observe participation in WT in later periods.

The accumulation of work experience and participation in a training program affects future wages faced by the individual as well as work possibilities, which, in turn, affect future participation and wages in the labor market. Assuming that the availability of blue-collar jobs is higher than that of white-collar jobs (more blue-collar positions are available in the Israeli market), the model predicts that initially the workers who arrive with high potential human capital (high schooling) will initially invest by working in blue-collar jobs and attain training, and later would find a job in a white-collar occupation. These important predicted patterns of participation in training and occupational choice are achieved by simulating the model and are consistent with the observed pattern (see Figures 1a-1b).

Maximum Likelihood Estimation

Conditional on values for the parameters and the observed state space of a given individual, the dynamic Bellman equation (6) looks like a standard indirect utility function in a multinomial choice model for panel data. The main complications here, compared to the multinomial probit (logit) case, stem from the theory that does not permit additivity and independence of the errors and, hence, the choices for each individual are correlated at each t. Furthermore, we allow for measurement error in observed wages. Specifically, we assume that the log of the observed wage of individual i at time t in occupation j , $\ln w_{it}^{jo}$, is of the form: $\ln w_{it}^{jo} = \ln w_{it}^{j} + \eta_{it}^{j}$, where $\eta_{it}^{j} \sim N(0, \sigma_{\eta}^{2})$ is the multiplicative measurement error.

The model is estimated using simulated maximum likelihood (SML) (McFadden(1989) and Keane and Wolpin (1997)). Let I be the number of individuals in the sample and denote by t_i the number of periods individual i is observed in the sample ($t_i \leq 20$). The vector of observed outcomes for individual i at date t, $t \leq t_i$, is given by $[d_{it}^j, w_{it}^{jo}]$. Note that the vector of parameters of the model enters the likelihood through its effect on the choice probabilities and the wages. Furthermore, the wage is observed only while working and for each individual the sample is truncated at time t_i.

Given the assumption of joint serial independence of the vector of errors, the simulated likelihood function is computed as a product of within period conditional joint probabilities of the choices and the wage for each individual. The joint probabilities for each individual are computed using F ($F = 25$) simulations of the solution of the dynamic programming model for each observed outcome $[d_{it}^j, w_{it}^{jo}]$ conditional on the observed state S_{it-1}. That is, we use the simulated outcomes to compute the $Pr(d_{it}^j, w_{it}^{jo} \mid S_{it-1}) = \Pr(d_{it}^j \mid w_{it}^{jo}, S_{it-1})\phi(w_{it}^{jo})$, where ϕ is the density of the observed wage.

To calculate the simulated value for $\Pr(d_{it}^j \mid w_{it}^{jo}, S_{it-1})$ consider, for example, the case that $j = 1$, that is, we have to calculate $\Pr(d_{it}^1 = 1 \mid w_{it}^{jo}, S_{it-1})$.[29] As noted above there are different unobserved potential alternatives at time t, and, therefore, we have to integrate them out to calculate the probability of the observed choice. The probabilities of the unobserved alternative choices given that $d_{it}^1 = 1$ and S_{it-1}, are computed using (1). The conditional probability of $d_{it}^1 = 1$ for each of these unobserved alternatives is computed using smooth simulated probabilities in the way suggested by Keane and Wolpin(1997).[30]

[29] For the states where the wage is not observed we compute the conditional probability using the simulated wage. In the same way we compute the conditional probability for the states where no wage outcome exists (e.g., unemployment).

[30] For example, for the probability that $d_{it}^1 = 1$, we use the Kernel smoothing function: $\exp(\frac{(V_i^1(S_{it},t) - \max(V_i^f(S_{it},t))}{\tau}) / \sum_{k=0}^{4} \exp(\frac{(V_i^k(S_{it},t) - \max(V_i^f(S_{it},t))}{\tau})$, where f is the simulation index and we use ($F =$) 25 simulations for calculating the smoothed probabilities. $V_i^f(S_{it}, t)$ is the vector of all potential values for the particular case of potential alternative choice that is used for the calculation of the probability. τ is the Kernel smothing parameter that we set to 500. The probability is calculated by the average over the F draws.

So far the heterogeneity in the model is captured by the imported skills of the immigrants, the knowledge of Hebrew and the arrival period. It is possible that the individual's gains from working in certain occupations, the gain from training and the utility while being unemployed is valued differently among immigrants. To capture the possible heterogeneity that is unobserved (by us), we allow for M types of individuals, each comprising π_m fraction of the population (Heckman and Singer (1984)). We allow for this heterogeneity to enter the wage, the utility and the job offer probabilities. As such, the model is solved for each type independently and the likelihood function is a weighted average of the likelihood of each type, that is,

$$L(\theta) = \prod_{i=1}^{I} \sum_{m=1}^{M} \Pr(d^j_{i1m}, w^{jo}_{i1m}, d^j_{i2m}, w^{jo}_{i2m}, ..., d^j_{it_im}, w^{jo}_{it_im} \mid S_{im0}, type = m) \times \pi_m, \quad (8)$$

where θ is the vector of parameters to be estimated.

Specific Parameterization

Here, we provide the explicit functional forms that we use in the estimation of the model. The wage offer in occupation j , $j = 1, 2$, is as we specify in (3), allowing for unobserved heterogeneity in the constant term, α_{0jm}, and in the return to training, α_{cjm}.

The probabilities to receive job offers in WC and BC have the following logistic form:

$$P^{rj}_{it} = \frac{\exp\{Q_{ijt}\}}{1 + \exp\{Q_{ijt}\}}, (j = 1, 2) \quad (9)$$

where the specification of Q_{ijt} depends on j. During the first two quarters in Israel, immigrants who had no knowledge of Hebrew on arrival cannot receive a job offer in a WC occupation. From the third quarter ($t \geq 3$), P^{r1}_{it} is given by (9), such that

$$
\begin{aligned}
Q_{i1t} &= b_{01jm} d^{1}_{t-1,i} + b_{02jm} d^{2}_{t-1,i} + b_{03jm}(d^{0}_{t-1,i} + d^{4}_{t-1,i} + d^{3}_{t-1,i}) + \\
&\quad b_{11j} I(1 \leq EX_{it} \leq 4) + b_{12j} I(EX_{it} > 4) + b_{2j} C^{1}_{it} + \\
&\quad + b_{3j} \tau_i + b_{4j} L^{H}_{it} + b_{5} L^{F}_{i} + + b_{6} pwc_i
\end{aligned} \tag{10}
$$

where $I(1 \leq EX_{it} \leq 4)$ is an indicator that equals one if individual i has accumulated between $1-4$ quarters of work-experience in Israel by time t, and where $I(EX_{it} > 4)$ is an indicator that equals one if individual i has accumulated more than 4 quarters of work-experience in Israel by time t. As such, the probability to receive a job offer in a white-collar occupation ($j = 1$) depends on the labor market state of the individual in the previous period (r), the unobserved type of the individual (indexed by m), the accumulated experience in Israel, participation in a white-collar training course, age on arrival, knowledge of Hebrew, the knowledge of English and an indicator for a WC job in the USSR.

The probability that an individual i receives a job offer in a blue-collar occupation ($j = 2$), P^{r2}_{it} is given by (9), such that Q_{i2t} depends on which activity the individual engaged in the previous period (r), the unobserved type of the individual, accumulated experience in Israel, participation a blue collar training course, age on arrival and knowledge of Hebrew. Specifically:

$$
\begin{aligned}
Q_{i2t} &= b_{01jm} d^{1}_{t-1,i} + b_{02jm} d^{2}_{t-1,i} + b_{03jm}(d^{0}_{t-1,i} + d^{4}_{t-1,i} + d^{5}_{t-1,i}) + \\
&\quad b_{11j} I(1 \leq EX_{it} \leq 4) + b_{12j} I(EX_{it} > 4) + b_{2j} C^{2}_{it} + \\
&\quad b_{3j} \tau_i + b_{4j} L^{H}_{it} + b_{7} I(t < 2)
\end{aligned} \tag{11}
$$

where $I(t < 2)$ is an indicator equalling one during the first quarter in Israel.

The probabilities of receiving an offer to participate in a training program related to a white or blue-collar occupation are zero during the first two quarters, unless the immigrant had prior knowledge of Hebrew. For $t > 2$, the probability of receiving a

BT offer is 1 and the probability of receiving a WT offer is constant and less than 1. Both training offer probabilities are independent of the job offers. An immigrant who has already participated in WC or BC training since his arrival, does not get another training offer. Once the training program is available, the immigrant is randomly assigned to a one, two or three quarter training program. This allocation assignment is determined by a random draw from a simple three points discrete probability distribution where the proportions are set to be equal to the actual observed proportion in each program. That is, 33% are allocated to a one quarter training program, 42% for a 2 quarters program and the rest, 25%, are assigned to a 3 quarters training program. The decision to participate in training (either WT or BT) is based on the expected present value of this choice conditional on these three alternative durations of each training course assuming the actual probabilities.[31]

We further allow for the utility from being unemployed and utility while participating in a training program $(ue, tr^j,\ j = 1, 2)$ to differ across the unobserved M types.

As explained above, we simplify the solution of the dynamic model by assuming a parameterized analytical format for the value function in the 21st quarter after migration. In particular, the present value of utility of the individual i at the 21st quarter has the following linear function of the state variables at that period, that is,

$$\begin{aligned} V_{im}^{j}\left(S_{i21}, t=21\right) &= \delta_{1m} + \delta_2 EX_{i21} + \delta_{3m} C_{i21}^{1} + \delta_4 ed_i + \delta_5 \tau_i + \\ &\quad \delta_6 L_{i21}^{H} + \delta_7 L_i^{F} + \delta_8 d_{i20}^{1} + \delta_9 d_{i20}^{0} + \delta_{10m} C_{i21}^{2}, \end{aligned} \tag{12}$$

where m indicates the unobserved type of the individual.

[31] The calculations of the probabilities that enter the likelihood function are corrected according to this additional randomness to the model.

4 Results

The model was estimated using maximum likelihood (equation (8)), based on the full solution of the dynamic model and the particular functional form specifications explained above.[32] In this section we discuss the fit of the model to the aggregate labor states, the transitions between these states and wages, as well as the estimated parameters and their economic interpretation.

4.1 Model fit

Labor market states

Given the estimated parameters of the model, we calculate the predicted proportion of immigrants in each of the five labor market states (see figures 1a and 1b).[33] The predicted proportion of immigrants fit the main dynamic patterns of the aggregate outcomes of unemployment, employment and training very well. Specifically, the model well predicts the rapid decrease in unemployment during the first year of residency in Israel and it well fits unemployment during the last two years. However, it underpredicts unemployment during the second and the third years. Most of the under prediction of unemployment corresponds to the over prediction of employment in BC jobs.

The predicted rise in the share of immigrants who are employed in WC well fits the data, though it is too high during the second and third years, compared to the actual

[32] The program is written in FORTRAN90 code and it iterates between the solution of the Dynamic Programming (DP) and the calculation of the likelihood function. For each of the 419 immigrants in our sample, we calculate the *Emax* in 2,070 points in the state space that may arise during the 20 period planning horizon (which means 2,070 combinations of EX, C^1 and C^2). At each of these points, we use 150 simulated draws of the vector ε to calculate the $E\max$. The state space increases linearly with the number of unobserved types. In this version of the model we assume only two unobserved types, implying that for each person we calculate the value functions in 4,140 points in the state space. Since the solution of the DP problem and the calculation of the likelihood function is done for each observation independently, we take advantage of the parallel processing features of super-computers. The program runs simultaneously on 8 or 16 or 32 processors on IBM and Silicon Graphics (Origin2000) super computer at Tel-Aviv University and on a Silicon Graphics super-computer at Boston University.

[33] This predictions are based on 50 one-step ahead simulations of the choices of each of the 419 individuals in our sample aggregated over the estimated types.

proportion in the data. The predicted pattern of participation in training is roughly consistent with the data. The estimated model predicts a peak in participation in WT (BT) in the fourth (sixth) quarter (4.4% in WT and 2.6% in BT), whereas the actual peak in WT (6.4%) occurs in the fourth quarter and the actual peak in BT (4.3%) occurs in the fifth quarter.

Based on a simple χ^2 Newman-Pearson fit test for the first 20 quarters and the five labor market states, we reject the hypothesis that there is no difference between the actual and predicted proportions in unemployment, WC, WT and BT, separately. We do not reject this hypothesis with respect to work in BC. The fit test for the model as a whole shows a rejection at the 1% level. In addition, we find a significant difference between the predicted and actual choice distribution for all the choices during the first eleven periods and during the 16'th quarter. The formal goodness of fit test implies that the maximum likelihood estimated model does not fit well the aggregate proportions of individuals in each labor market state.[34]

The model follows well the observed 20 % decline in the share of employed in BC and the increase in the share of employed WC at the 5'th year in Israel (see Figure 1a).[35] This is a surprising and important result which enables us to further investigate through the model. The question is whether this turn in occupational choices is a result of one of the three main sources: (i) the endogenous accumulated human capital in the form of experience, training and the knowledge of Hebrew, that affect job offer probabilities and wages; (ii), the dynamic change in the stocks (proportions) of immigrates in each labor market state; (iii) the differences between the exogenous characteristics of the cohort of 1989-90 and the cohort of 1991-92 ("cohort effects").

Unconditional prediction of the estimated model for the sample eliminates the particular random outcomes that affect future realizations. Using unconditional prediction

[34] We also estimated the model by minimizing the square differences between the actual and the predicted aggregated labor market choices which are presented in Figure 1a and 1b. Obviously, the fit of the estimated model using this procedure, was better. Yet, this estimation did not provide a good fit to the individual's choices. That is, the model succeeded to fit well the aggregate choices, but the predicted individual's choices were much different than their actual choices.

[35] Note that the one period ahead prediction for the sample adjusts every period the state (S_{it}) for each individual in the sample according to the outcome in the data. Unconditional prediction is based on simulations where the state for each individual (S_{it}) is based on the predicted outcome.

for the entire 20 quarters in Israel, the model predicts higher BC and many less immigrants in training compared to the data and to the one step ahead prediction. In this case, the reduction in the proportion of BC starts as UE reaches the bottom at the end of the third year in Israel, and during the fourth and the fifth year, BC proportion is predicted to decrease by 10%. Simulations that are based on a sample of identical immigrants, with the same schooling level and age at arrival as that of the 1989-90 cohort, also predict about 10% reduction in BC in the fifth year in Israel. As a result, we conclude that the cohort explanation (point (iii)) accounts for at most one half of the movement from BC to WC in the fifth year since migration. The additional 10% increase in WC employment and, the corresponding, reduction in BC, is due to the transition of about 2.5% (Table 9) of males from BC to WC per quarter, at the same time there being zero net movement to UE.

The simulated mean wages and reservation values always show a substantial gain in accepting a WC job. Hence, the only reason for the low increase in the proportion of immigrants working in WC is due to the relatively low WC offer rates conditional on not working in a WC job previously. The offer rates do not increase at the fifth year (see discussion below). Hence, the main cause for the additional 10% reduction in BC proportion and the increase in immigrants in WC jobs is due to the substantial reduction in the stock of UE. That is, there are always transitions in and out of BC jobs, unlike WC jobs, which are very stable. Moreover, there are significant transitions from BC to WC. As the stock of UE becomes very low (less than 2%) the flow of immigrants from unemployment to BC is much lower than the flow from BC jobs to WC jobs.[36]

Transitions

Table 5 presents the predicted mean transitions based on the same simulations that generated the choice distribution in Figures 1a and 1b. The model well predicts the persistence in WC jobs, BT and in WT. However, it produces too little persistence in unemployment and correspondingly too much persistence in BC jobs, as shown by the

[36] This result is partially consistent with Borjas's(1985) claim regarding the effect of the cohort on the estimated earnings function of immigrants to the US.

figures. The predicted transitions from training to the two employment states and to unemployment match fairly well the observed transitions. However, there are almost no predicted transitions from the two employment states to training and the main transition to training is from unemployment (Heckman and Smith (1999)).

Table 5: Actual and Predicted Transitions*

$\frac{TO}{FROM}$	Unemployment		WC		BC		WT		BT		Obs.
	Actual	Model	Actual	Model	Actual	Model	Actual	Model	Actual	Model	
UE	66.85	60.30	7.08	8.68	21.86	28.99	2.70	1.77	1.51	0.26	1258
WC	1.53	0.96	95.51	98.57	1.43	0.29	1.15	0.29	0.38	0.09	1046
BC	3.89	0.00	0.64	1.32	93.56	98.41	0.92	0.13	0.99	0.14	2828
WT	18.38	23.70	17.65	9.66	12.50	9.87	51.47	56.77	0.00	0.00	136
BT	23.08	25.19	4.40	3.68	20.88	13.62	0.00	0.00	51.65	57.52	91
Total											5359

*(In percentage of row)

Accepted Wages

Table 6 shows that the estimated model well fits the trend and the level of the mean accepted wages in both occupations.[37] The average compounded predicted wage growth of 6% for BC and 7% for WC during the first five years in the host country are consistent with the observed wage growth in the data. This fact is also consistent with the average wage growth observed in cross-sectional data and the estimation results reported by Eckstein and Weiss (2001). The data shows 11.4% higher wages for WC occupation related trainees and 5.7% higher wages for participants in BC occupation related training. The model, however, predicts that mean accepted wages are higher by 6% for WT participants and by 11.9% for BT participants.[38]

[37]Note that the bad fit of the first to the fourth quarter WC wage is a result of the 4 observations and one large outlier.

[38]Given the estimated wage parameters, reported below, this result indicates that the selection process to employment by occupation dominates the estimated predicted return to training.

Table 6: Actual and Simulated Accepted Wages by Tenure and Training*

	WC occupation			BC occupation		
	Actual	Model	Obs.	Actual	Model	Obs.
By quarters in Israel						
1-4	21.766	14.215	4	10.475	10.968	64
5-8	15.062	15.563	46	10.968	11.687	139
9-12	18.864	17.376	29	11.868	12.658	73
13-16	20.449	18.738	25	12.497	13.717	97
17-20	21.521	20.037	28	15.232	14.775	69
By training						
no training	17.932	16.840	96	11.985	12.211	402
after training	19.981	17.846	36	12.660	13.666	40
∗Wage per hour in July 1995 prices (NIS).						

4.2 Estimated Parameters

Wage Parameters

The two types of immigrants face a substantially different estimated rates of return to training in the two occupations (see Table 7). The rate of return to WT in WC jobs is 19% and significant at 5% level for type 1 individual, who is estimated as 78.2% of the population, and it is zero for type 2. The predicted weighted return across types is 14.8% which is higher than the OLS estimate of 11.6%**.** Similarly, the rate of return for BT in BC jobs is 12.7% and significant (6% significance level) for type 1, while it is zero for type 2.[39] Hence, most of the immigrants (type 1) gain substantially from any training program. The unobserved heterogeneity in the estimated return to training that we find here, explains the large variance of the estimated training coefficients that are found in the literature (Heckman, LaLonde and Smith (1999)). The dynamic programming model provides a complicated control for the selection of

[39]In the estimation we imposed that the return to BT (WT) in WC (BC) jobs is set to zero. This restriction followed the OLS results (Table 4) and the estimation results that we observed as we worked on the estimation of the structural model.

individuals to training and work by occupation, and it implies a higher estimate for the impact of training on wages than the standard OLS estimator. These estimated returns for training are large relative to the findings in the existing literature.

A Wald test for the null hypothesis that training does not affect wages (four zero restrictions) is rejected at a marginal probability level of 10 percent.[40]

Accumulated experience in Israel has a positive and significant impact on wages. An additional quarter of experience increases the wage in WC by 2% and in BC by 1.9%. These coefficients show that the actual experience effect is similar across occupations and is very close to the estimated coefficient from the OLS regression. Knowledge of Hebrew has a significant positive impact on wages in both occupations and knowledge of English has a positive effect on wages in WC jobs, but a negative effect on wages in BC jobs.[41] The Hebrew coefficient implies that the wage rate of return to average knowledge of Hebrew (compared to no knowledge of Hebrew) is between 15% to 19%, which is close to the OLS (see Table 3).

The estimated parameters of the wage equation imply that the value of imported human capital in the form of schooling and experience abroad (age on arrival), conditional on local accumulated human capital, is zero. Our estimates suggest that the return to local Israeli human capital comes from accumulating local experience, knowledge of the Hebrew language and training. The results with respect to the imported human capital are roughly the same as the OLS estimates, but might arise from the short period since arrival. Eckstein and Weiss (2001), who used cross-sectional data that included Russian immigrants from earlier waves, find that the return to imported human capital is zero on arrival but significantly increases with time since migration. However, the cross-sectional data does not include data on actual experience, knowledge of Hebrew and English and training. In this paper we use actual data on the accumulated human capital in the host country and, therefore, we can better measure

[40] We also tested for three additional zero effects of training on: (i) wages and job offer probabilities (6 restrictions); (ii) wages, job offer probabilities and terminal value (10 restrictions); and, (iii) wages, job offer probabilities, terminal value and utility values of training equal to utility in unemployment (14 restrictions). All of these tests are rejected at a marginal probability value of less than one percent.

[41] Note that the knowledge of English and Hebrew indeces vary between 1 to 4 . Hence, a person with no language skills has an index of 1. The mean index is 1.76 for English and 2.7 for Hebrew.

the sources for the wage growth in the host country.[42] In the case that locally accumulated human capital depends on imported skills, our specification ignores this indirect value of imported human capital.[43]

Table 7: Estimated Wage Function Parameters

Wage parameters	BC	WC
$\alpha_{\text{cons, } type1}$	1.8799^{*} 0.0250	1.6276^{*} 0.0758
$\alpha_{\text{cons, deviation of } type2 \text{ from type 1}}$	0.1930^{*} 0.0500	-0.1443 0.3001
α_{Hebrew}	0.1100^{*} 0.0200	0.0964^{*} 0.0439
α_{English}	-0.0418^{*} 0.0190	0.1386^{*} 0.0315
$\alpha_{\text{age at arrival}}$	-0.00008 0.0015	0.0050 0.0050
$\alpha_{\text{years of schooling}}$	0.0090 0.0059	0.0126 0.0164
$\alpha_{\text{accumulated experience}}$	0.0187^{*} 0.0003	0.0205^{*} 0.0087
$\alpha_{\text{trained in wc}}, type1$		0.1908^{*} 0.0860
$\alpha_{\text{trained in wc}}, type2$		0.0004 0.3168
$\alpha_{\text{trained in bc}}, type1$	0.1275 0.0771	
$\alpha_{\text{trained in bc}}, type2$	0.00008 2.3136	
Proportion of type 1	0.7817^{*} 0.0329	

Job Offer Parameters

The estimated parameters of the logistic job offer probabilities (equations (10) and (11)) are presented in Table 8, and the implied offer probabilities conditional on previous choice and weighted by types are reported in Table 9. These probabilities are based on the average exogenous attributes in our sample and on different levels of the endogenous human capital variables.[44]

[42] The result in Eckstein and Weiss (2001) is based on a non-linear interaction between schooling, age on arrival and time in the host country.

[43] To estimate the indirect effect of imported human capital on local accumulated human capital the model should include additional interaction parameters. This is beyond the scope of this paper.

[44] The average attributes are: age on arrival is 38, the English skill index is 1.76 and the Hebrew skill index is 2.7. For the WC job offer calculation we consider an immigrant who worked in WC job in the USSR.

Table 8: Estimated Job Offer Parameters

	WC Offer Probability	**BC Offer Probability**
	$j = 1$	$j = 2$
b_{01j1} − worked in WC at t-1 type 1	15.9966* (0.1069)	−2.4980* (0.6655)
b_{01j2} − worked in WC at t-1 deviation of type 2 from type 1	−0.0053 (1.1211)	1.7338 (1.0221)
b_{02j1} − worked in BC at t-1 type 1	−2.9737* (0.4461)	14.0431* (0.1194)
b_{02j2} − worked in BC at t-1 deviation of type 2 from type 1	−1.1589 (1.1799)	0.0082 (1.1903)
b_{03j1} − didn't work at t-1 type 1	−1.7604* (0.7486)	−0.4116 (3.6136)
b_{03j2} − didn't work at t-1 deviation of type 2 from type 1	0.6392 (2.6457)	1.3162 (1.1946)
b_{11j}−Work experience in Israel 1-4	−0.2761 (0.2175)	0.2421* (0.1196)
b_{12j}−Work experience in Israel > 5	−0.8935* (0.2769)	−0.2707* (0.133)
b_{2j}−Training in occupation j	0.9424* (0.2317)	0.2196 (0.117)
b_{3j}−Age on arrival	−0.0286* (0.0067)	−0.0071* (0.0025)
b_{4j}−Hebrew	−0.0938 (0.096)	−0.1744* (0.0415)
b_5−English	0.2095* (0.0876)	—
b_6−WC=1 in Soviet Union	0.5554* (0.2547)	—
b_7−first period dummy		−0.4881* (0.1598)

The large and significant coefficients of working in the previous period in the same occupation for both types and in both occupations, imply that the individual always retains his job regardless of his other characteristics ($P^{11} = 1$ and $P^{22} = 1$). Hence, the transition away from the existing occupation (job) to any other labor market state is very low.

Immigrants who did not work in the previous quarter, either because they were unemployed or participated in one of the training programs, face a *higher* probability of receiving a job offer than immigrants who worked in the other occupation. The factor difference is about four times. For example, the offer rate from unemployment

to WC is between 10 to 20 percent per quarter at the first year (see Table 9) and from BC to WC, the job offer rate is between 2.5 to 6 percent, respectively. Hence, job arrival rates from the other occupation are lower for working individuals, for both types at a quantitatively significant rate.[45]

Accumulated general work experience in Israel has a negative effect on the probability of receiving job offers in WC jobs and an ambiguous impact on the probability of receiving job offers in BC jobs. That is, immigrants who did not accumulate any work experience in Israel face a substantially higher (almost twice as large) probability of receiving a job offer in the WC occupation, compared to immigrants who have 5 or more quarters of experience in Israel. However, the impact of having 1-4 quarters of experience on the WC job offer probability is insignificant. With respect to the BC job offer probability, having less than a year of experience (1-4 quarters) increases this probability, while having at least 5 quarters of experience lowers this probability. To understand these results one has to keep in mind that these marginal effects are conditional on the last period's state and accumulated experience. Conditional on the fact that the immigrant is working, the job offer rate for the same occupation is one independently of the level of experience (see Table 9). However, an unemployed immigrant with local experience has a lower job offer rate. That is, the chance of an unemployed immigrant, who most likely has experience in a BC job, in receiving a job offer in a WC job decreases fast with experience in the host country. The result also indicates that the likelihood of job offer opportunities are very sensitive to the individual job specific history, which is intuitively very reasonable.

Participation in training related to a given occupation has a large and significant positive effect on job offers in that occupation. Table 9 demonstrates that training more than doubles the WC job offer probability. In particular, if the average immigrant has no experience in Israel, he would receive a WC job offer each quarter with probability 0.12 and participation in WT would increase this offer probability by 110% to 0.25. The same immigrant with no training but with five or more quarters of work experience

[45] This result is consistent with the stadard assumed rates of arrival of offers in search models, where on-the-job search is allowed (Burdett (1978)).

in Israel, would receive a WC job offer with a probability of 0.05. Participation in WC related training (WT) would increase this probability to 0.12. Participation in BT increases the BC job offer from unemployment by .05 probability, while the actual probability for BC job is much larger. The same result holds for the offer probability while the individual is working in a BC job.

Knowledge of Hebrew has a negative and insignificant effect on the WC job offer probability, but a negative and significant effect on the BC job offer probability. This is a surprising result assuming that the offer rate is determined by demand, conditional on observed knowledge of Hebrew, or that individuals with better language skills put in more search efforts. On the other hand, it might well be that individuals who spend more time learning the language have a longer unemployment duration, explained here by the lower estimated offer probabilities.

Both the WC in the USSR and the English skills (imported human capital) have a significant positive effect on the rate of WC job offers. Yet, the fact that the individual worked in a WC occupation has a much lower impact on job offer probabilities than the impact of training.

We assume that WC job offers are not available in the first quarter for immigrants who attend Ulpan and have no prior knowledge of Hebrew. In addition, we find that the BC job offer probability in the first quarter is significantly lower than in later periods. This effect may rise from the inability of immigrants to communicate in Hebrew or from the low search efforts of immigrants during the first quarter when they are supposed to be at Ulpan. We also assume that BT is always available, but find that the quarterly probability to receive a WT offer equals 0.037.

Table 9: Training and Job offer Probabilities (weighted by types)*

$\frac{TO}{FROM}$		WC			BC			WT		
experience		0	1-4	5+	0	1-4	5+	0	1-4	5+
WC	after training	1.0	1.0	1.0	0.084	0.103	0.066	0.000	0.000	0.000
	no training	1.0	1.0	1.0	0.069	0.085	0.054	0.037	0.037	0.037
BC	after training	0.068	0.052	0.029	1.000	1.000	1.000	0.000	0.000	0.000
	no training	0.028	0.021	0.012	1.000	1.000	1.000	0.037	0.037	0.037
UE	after training	0.254	0.206	0.124	0.350	0.403	0.295	0.000	0.000	0.000
	no training	0.118	0.093	0.052	0.305	0.355	0.255	0.037	0.037	0.037

*The probability to take BT is assumed to be one if the state is in "no training".

Net Utility from Unemployment and Training

The utility while being unemployed and in training is negative (see Table A3). Type 1 prefers unemployment to both WT and BT, while type 2 prefers WT to UE and the UE to BT. Since the utility of type 2, while attending WT, is higher than the utility of being unemployed, participation in WT might be motivated by the current utility gain rather than by expected future returns.

The government provided income is the same for UE and training. Hence, the estimated lower value of utility in training indicates that there is additional disutility from training relative to UE. The very low utility in both UE and training may be influenced by the fact that immigrants have no access to formal and informal loans and, therefore, their consumption while not working is very low. Note that the negative utility in training is an important reason for the observed low participation in training, and, therefore, the interpretation of the parameters has interesting policy implications.

Terminal value

This is the most ad hoc part of the model. Yet, Table A3 shows that all the estimated parameters have the expected a-priori sign. All the human capital variables have positive coefficients. Age and being unemployed in the previous period reduce the terminal value of the immigrant's utility after 21 quarters in Israel. Since utility is measured in terms of per hour wage in NIS the parameters can be interpreted accord-

ingly. For example, every unit of work experience increases the discounted terminal value by 233 NIS per hour. Training in WC increments the terminal value by around 2156 NIS for type 1 and about 1398 NIS for type 2 whereas training in BC increments the terminal value by around 528 and 222 NIS for the two types, respectively. A unit of Hebrew skill or English skill increases the terminal value by 60 NIS each. Immigrants who worked in WC in the last quarter can expect an increase of 116 NIS in the terminal value whereas an immigrant who was unemployed in the last quarter faces a decrease of 649 NIS in his terminal value.[46]

The Interpretation of Types

The estimated proportion of type 1 in the population is 78.2% and the two types differ in several aspects of their labor market characteristics and preferences. From the estimated wage function (Table 7) it is clear that type 1 receives a high wage return to training in both occupations, while type's 2 wage return is zero. From Table 10 we learn that type 2 job offer probabilities from unemployment are between 80 to 120 percent higher than those for type 1. On the other hand, the two types' job offer probabilities, conditional on working, are very similar. An exception is that type 2's conditional probability to move from WC to BC job is higher than that of type 1 (Table 8).

In order to understand the role of unobserved heterogeneity in the decision making of the immigrants of the two types, we estimate the mean predicted quarter to quarter transitions between the five alternative labor market states for all immigrants conditional on the unobserved type (Table 11).[47] The main result is that type 2 is less persistent in unemployment than type 1, since type 2 transition rates from all states to the two employment states, and particularly to BC jobs, are much larger than those of type 1. Also note that type 2 has more direct transitions from the two training states to the two employment states. As a result, few of type 2 choose to participate in training.

[46] The consistency of the estimated terminal value is a complicated problem that has not been studied here.

[47] The transitions here are based on the same simulations we used to form the weighted transitions in Table 5.

Table 10: Estimated WC and BC Job Offer Probabilities from Unemployment by Types*

	WC job-offer probability				BC job-offer probability			
experience	no training		after training		no training		after training	
	type 1	type 2	type 1	type 2	type 1	type 2	type 1	type 2
0 first period	–	–	–	–	0.1622	0.4193	0.1946	0.4735
0 other periods	0.1019	0.1797	0.2255	0.3555	0.2398	0.5405	0.2821	0.5944
$1-4$	0.0793	0.1403	0.1809	0.2951	0.2867	0.5998	0.3336	0.6512
5+	0.0444	0.0809	0.1065	0.1842	0.1940	0.4730	0.2306	0.5278

*The average attributes are: age on arrival is 38, the English skill index is 1.76 and Hebrew skill index is 2.7, and For WC job offer calculation we consider an immigrant who worked in a WC job in the USSR.

Table 11: Predicted Transitions by Type*

To / *From*	UE		WC		BC		WT		BT		Total
Type	1	2	1	2	1	2	1	2	1	2	
UE	66.14	37.32	7.55	12.72	23.54	48.53	1.94	1.16	0.26	0.026	1258
WC	1.00	0.80	98.57	98.58	0.05	0.25	0.29	0.29	0.09	0.09	1046
BC	0.00	0.00	1.55	0.49	98.17	99.27	0.14	0.09	0.14	0.14	2828
WT	26.40	14.06	8.52	13.78	8.32	15.40	56.77	56.76	0.00	0.00	136
BT	27.98	15.21	3.19	5.43	11.32	21.85	0.00	0.00	57.52	57.52	91
Total											5359

*In percentage of row

To summarize, we find that the population of Russian immigrants is divided among immigrants who are good in training (type 1) and immigrants who are good in search (type 2). Alternatively, we can identify type 2 as immigrants who have certain unobserved characteristics that help them fit well into the Israeli labor market, so they can easily receive job offers and have no wage benefits from formal training. However, most of the immigrants belong to the type that needs a comprehensive adjustment in

order to fit to the Israeli labor market demanded skills (type 1). That is, conditional on observed human capital, 78% of the immigrants face very low job offer rates, but they gain substantially if they choose to invest in the government provided training programs. These training programs are costly in time but they provide a large wage compensation in later periods. On the other hand, 22% of the immigrants better fit the market demand and their job offer rates are higher and they do not substantially gain from the vocational training programs.

5 Policy Implications

Training programs are the main government instrument for intervention in the labor market. We analyze the impact of policy experiments that change the availability of training programs relative to the existing policy. To do that, we compare the outcomes from the simulation of the estimated model (existing policy) to the outcomes from the simulation of the following four alternative training policies:

Case 1: No training is available.

Case 2: Only training related to blue-collar occupations (BT) is available.

Case 3: Only training related to white-collar occupations (WT) is available.

Case 4: Double the probability of participating in WT.[48]

The simulation outcomes are presented in three formats. First, we measure the effect of the policy experiments on wages and unemployment of an average immigrant (Table 12). Second, we measure the aggregate predicted wage growth that is due to the policy experiments (Table 13) and, third, we measure the effect of the policies on the immigrant's welfare.

Wages and Unemployment in the Fourth and Fifth Years

To measure the effect of the policy experiments on wages and unemployment of an average immigrant we use the estimated model as a benchmark. Table 12 reports the predicted differences in mean accepted wages and mean unemployment rate during the fourth and the fifth years in the new country between the benchmark and the

[48] The probability of BT is assumed to be one in the model.

simulated alternative policy. We find that the policy experiments do not change the predicted long term unemployment rate of immigrants. The unemployment rate after three years is predicted to be close to zero and it stays close to this rate (changes are at the level of less than half a percentage point). Earnings are affected in the predicted direction, such that mean earnings decrease due to the non-availability of any training programs and wages increase as the availability of WT increases from the estimated 0.04 probability to 0.08 probability.

Table 12: Predicted Policy Effects on Mean Accepted Wages and Unemployment*

Policy Change	No Training is Available			Double WT Offer Rate		
Immigrant	Accepted wage (%Δ)		(Change)	Accepted wage (%Δ)		(Change)
	WC	BC	UE	WC	BC	UE
BC in USSR, schooling=12	-1.1	-0.1	0.0	3.5	2.5	0.0
WC in USSR, schooling=15	-0.8	-0.1	0.0	3.4	2.6	0.0

*Percent change for wages and change in unemployment relative to the estimated model during the 13 to 20 quarters since arrival. Average immigrant with age at arrival 30.

The interesting result is that the increasing availability of WT (case 4) has a large impact on accepted wages and it affects both the predicted mean accepted wages in white-collar and blue-collar at about the same rate. The increase in BC mean accepted wage is a result of the selection of type 1 immigrants into the WT and, subsequently, to WC jobs. Type 1 has a lower mean BC wage and its exit from BC employment increases the average observed wage for BC workers. The increase in WC mean accepted wage is the result of the higher availability of WT and higher mean wage of type 1 in WC employment.

We do not report here the results of cases 2 and 3 since the availability of BT has zero impact on mean accepted wages and unemployment. Hence, cases 1 and 3 have the same predicted effects. The main result is that the individual gain only from

the white-collar related training programs. The availability of these training programs have a very large impact on participation and predicted wage growth but no impact on unemployment.

Aggregate Wage Growth due to Training

The estimated structural model enables us to estimate the predicted increase in the mean accepted wages due to the availability of the government provided vocational training programs. One can view this predicted change in wages as the gross economy rate of return to training.[49] In Table 13 we report the predicted annual (years since arrival) effect of training availability on the mean accepted wages as a percent change relative to an economy without training (case 1). We use the sample of 419 males as a representative sample of male immigrants for calculating the effect of the policy on all male immigrants in the economy. The calculation of the aggregate rate of wage growth here is different from the estimated coefficient of training in the wage equations since it includes dynamic selection made by workers, in addition to the impact of training on wages and the random opportunities.

The most important result is that the total rate of return is increasing overtime. In the first year the effect is almost zero since very few immigrants are predicted as having participating in training. Most of the participation in training occurs between the end of the first to the third year after arrival in Israel. Therefore, it is not surprising to observe that the return to training is increases in the fourth year after arrival. The large increase in the return in the fifth year is due to the large shift of workers from BC to WC as discussed above. The main gain from training is accumulated by type 1 immigrants who find WC jobs. The increase in the wage of BC when training is available is mainly due to the increase of the proportion type 2 immigrants in blue-collar jobs.

The predicted average aggregate wage growth due to training over the first five years after arrival is about .85 percent. Participation in training starts at the end

[49] The implicit assumption is that the mean wage measures the mean productivity. The net economy return should account for the social and private costs and benefits of the programs which are not reflected by the change in wages. These rates are used by the government decision process in comparing the outcome of the training program to other public investments.

of the first year, hence, the wage growth in the first two years is not relevant to the wage gain from training. Since the predicted 0.96 to 1.4 percent wage growth occurs at the third to the fifth year after arrival, it is safe to conclude that the present value increase in wages, due to training is at least one percent. We should also report that a policy that doubles the availability of WT has an estimated social gross rate of return of about 3 percent (see Table 12).

Table 13: The Predicted Annual Effect of Training Availability on Mean Accepted Wages: Percent Change Relative to an Economy without Training.

	Total	White-collar	Blue-collar
Year 1	0.07	0.146	0.035
Year 2	0.60	1.172	0.239
Year 3	0.96	1.559	0.318
Year 4	1.22	1.883	0.396
Year 5	1.40	2.029	0.492
All Years	0.85	1.605	0.261

Immigrant's Welfare Return from Training

We consider the impact of each of the four experiments on the hourly present value (PV) of four representative immigrants that differ by their imported human capital: age on arrival, years of schooling and occupation in the USSR. The knowledge of Hebrew and English are set at their sample means. The results of the experiments are presented in Table 14 in the form of PV for each case and percentage difference from the estimated model.

If no training is available then the utility of a male immigrant is reduced by one to one and a half percentage points and if the availability of WT is doubled the PV utility increases by about the same rates. These are very reasonable estimates of the overall individual welfare gains from the availability of training and they reflect all costs and benefits that are associated with participating in training programs. An interesting result is that the gain of older and lower skilled immigrants from the existence of

WT is higher than the gain of younger and more educated immigrants. However, BT has no impact at all on immigrant's welfare. This implies that training in high skill occupations is an important investment for less skilled and older immigrants.

Table 14: Predicted Policy Effect on the Hourly Present Value (PV)
(In parenthesis , percent of change compared to PV in first row.

Experiment	BC in USSR, schooling=12		WC in USSR, schooling=15	
	age on arrival 30	age on arrival 45	age on arrival 30	age on arrival 45
Upon Arrival*	3,371.87	3,117.30	3,458.92	3,203.37
No Training	3,334.58 (−1.11)	3,071.45 (−1.47)	3,425.98 (−0.95)	3,160.24 (−1.35)
No WT	3,334.85 (−1.11)	3,071.45 (−1.47)	3,425.98 (−0.95)	3,160.24 (−1.35)
No BT	3,371.87 (0.00)	3,117.30 (0.00)	3,458.92 (0.00)	3,203.37 (0.00)
Double WT offer	3,404.10 (0.96)	3,155.98 (1.24)	3,487.97 (0.84)	3,240.43 (1.16)

*Per Hour NIS in July 1995 prices.

To investigate further the welfare gains from training, we partition (Table 14) the total gain from the existence of training in both occupations by restricting the potential sources of the gain. Specifically, we use as a benchmark the PV of the estimated model under the "no training" (case 1) policy. Then, we allow for training to exist with the estimated probability for WT of .04 and BT with probability one. The gains from training are allowed to change in a certain sequential order. First, we set all sources of gains from training to zero and allow only the random error in the utility from training to affect the PV ("no return in all sources"). The result is that the random shock to preferences in training has zero impact on the PV welfare from training. If the gain from training is only due to the utility from the participation in training, then the PV gain is 1.6% of the total percentage gain reported in Table 15.

Most of the gain (68 to 71 percent) is derived from the terminal value. The estimated terminal value component of the gain from training approximates all the future returns from training which include: the job offer rates and wage returns. Hence, it is not surprising that this component captures most of the individual gain. The effect

of training on job offer probabilities accounts for about 25 to 29 percent of the gain. Hence, the wage return during the first five years accounts for about 2 percent of the immigrant's PV utility gain from training. This result is due to the fact that the high return for training in wages is reduced by the low offer probability of WT, the loss in utility and the loss of potential experience while attending training.[50]

Table 15: Partition of the Gain from Training by Sources*

(% of total gain)

Experiment	BC in USSR, schooling=12		WC in USSR, schooling=15	
	Age = 30	Age = 45	Age = 30	Age = 45
No Training	(3, 334.58)	(3, 071.45)	(3, 425.98)	(3, 160.24)
No return - all sources	0.00 (3,334.57)	0.00 (3,071.43)	0.00 (3,425.97)	0.00 (3,160.23)
Return in utility only	1.6 (3,335.17)	1.7 (3,072.23)	1.6 (3,426.49)	1.6 (3,160.94)
Return in utility and terminal	72.3 (3,361.53)	73.6 (3,105.20)	69.6 (3,448.90)	69.1 (3,190.00)
Return in utility, terminal, job offer	98.2 (3,371.20)	98.6 (3,116.63)	97.5 (3,458.10)	98.0 (3,202.49)

*(In parenthesis the PV utility in per hour June 1995 NIS. Age means the age on arrival).

6 Conclusions

In this paper we estimated a dynamic choice model of immigrants for employment in blue and white-collar occupations and training, where the labor market randomly offered opportunities affected by the past choices. Participation in training programs affects the mean wage offers, the job offer probabilities by occupation, and provides direct utility. Furthermore, the knowledge of the new country language is changing

[50] To check for the robustness of the calculations we changed the order of the return components in Table 14. The results are very close to those in Table 14 with a somewhat higher proportion of the gain that is due to the terminal value.

and the imported human capital affects both the mean wage offers and the job offer probabilities by occupation.

The estimated model well fits the pattern of the observed labor market choices of immigrants during their first five years since arrival. The estimated coefficients of the wage function show that the conditional estimated rates of return to white-collar related training and blue-collar related training are very high for 78% of the immigrants and zero for the rest. The return to knowledge of Hebrew in both occupations is high, while the knowledge of English affects only wages in white-collar jobs. Accumulated experience in the new country has about 2% return per quarter but the imported schooling and experience (age) have zero return conditional on the local accumulated human capital. The high return to local experience, the estimated large disutility from training and the low offer probability of training white-collar related occupations are the main reasons for the observation that only few male immigrants participate in training. As a result, the total individual ex-ante welfare gain from the existence of training programs is estimated to be between one to one and half percentage points. Furthermore, the increase in wages during the first five years that is due to the availability of the government provided vocational training programs is estimated to be about .85 percent over the five years after arrival. Yet the wage growth due to training is increasing and is 1.4% at the fifth year after arrival to the new country.

Several implications emerge from the findings. First, the individual and the economy return from training in white-collar occupations is much higher than training in blue-collar occupations. Second, the realized return to training may take long a time due to job offers. Hence, the first wage after training does not necessarily reflect the potential gain from the training. Third, a subsidy for "on the job training" would likely to have a higher social and individual return than vocational government provided training. The similarity between immigrants and displaced workers suggests that the above model can be used to evaluate the effect of alternative active labor market policies that are aimed at enhancing the transition from unemployment to work.

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Table A1. Summary Statistics

	Observations	Percent	Mean	SD
Schooling	419	–	14.58	2.74
Age on arrival	419	–	38.05	9.15
White collar USSR	284	67.78	–	–
Blue collar USSR	127	30.31	–	–
Did not work in USSR	8	1.91		
Married	363	86.63	–	–
English	419	–	1.76	0.94
Hebrew before migration	50	11.9	–	–
Ulpan Attendance	386	92.3	–	–
Ulpan Completion	332	79.2	–	–
Ulpan Length (months)	387	–	4.6	1.34
Hebrew1 (first survey)	419	–	2.71	0.82
Hebrew2 (second survey)	316	–	2.98	0.83

Table A2: Transitions among the Labor Market States

	Quarters 8 and 9					
Quarters 3 and 4	*WC*	*BC*	*WT*	*BT*	*UE*	Obs.
WC	79.57	10.76	3.22	2.15	4.30	93
BC	2.57	80.86	1.72	2.85	12.00	350
WT	51.28	28.20	0.00	0.00	20.51	39
BT	25.00	50.00	0.00	0.00	25.00	20
UE	18.94	47.93	6.51	1.77	24.85	169
	Quarters 14 and 15					
Quarters 8 and 9	*WC*	*BC*	*WT*	*BT*	*UE*	Obs.
WC	90.52	6.90	0.00	0.86	1.72	116
BC	4.57	91.87	0.035	0.007	3.51	285
WT	41.20	41.20	0.00	0.00	17.60	17
BT	25.00	66.66	0.00	0.00	8.34	12
UE	23.86	44.33	0.00	0.00	31.81	88
	Quarters 18 and 19					
Quarters 14 and 15	*WC*	*BC*	*WT*	*BT*	*UE*	Obs.
WC	96.72	3.27	0.00	–	0.00	61
BC	2.47	90.12	2.47	–	4.94	81
WT	–	–	–	–	–	–
BT	0.00	100.00	0.00	–	0.00	1
UE	30.00	20.00	0.00	–	50.00	10

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[51] *The upper right box in the first matrix was created by calculating the number of people who worked in occupation "white collar" in the 3rd(4th) quarter and worked in the same occupation in the 8th(9th) quarter and averaging the two numbers by numbers of observations working in "white collar" in the 3rd and 4th quarter.

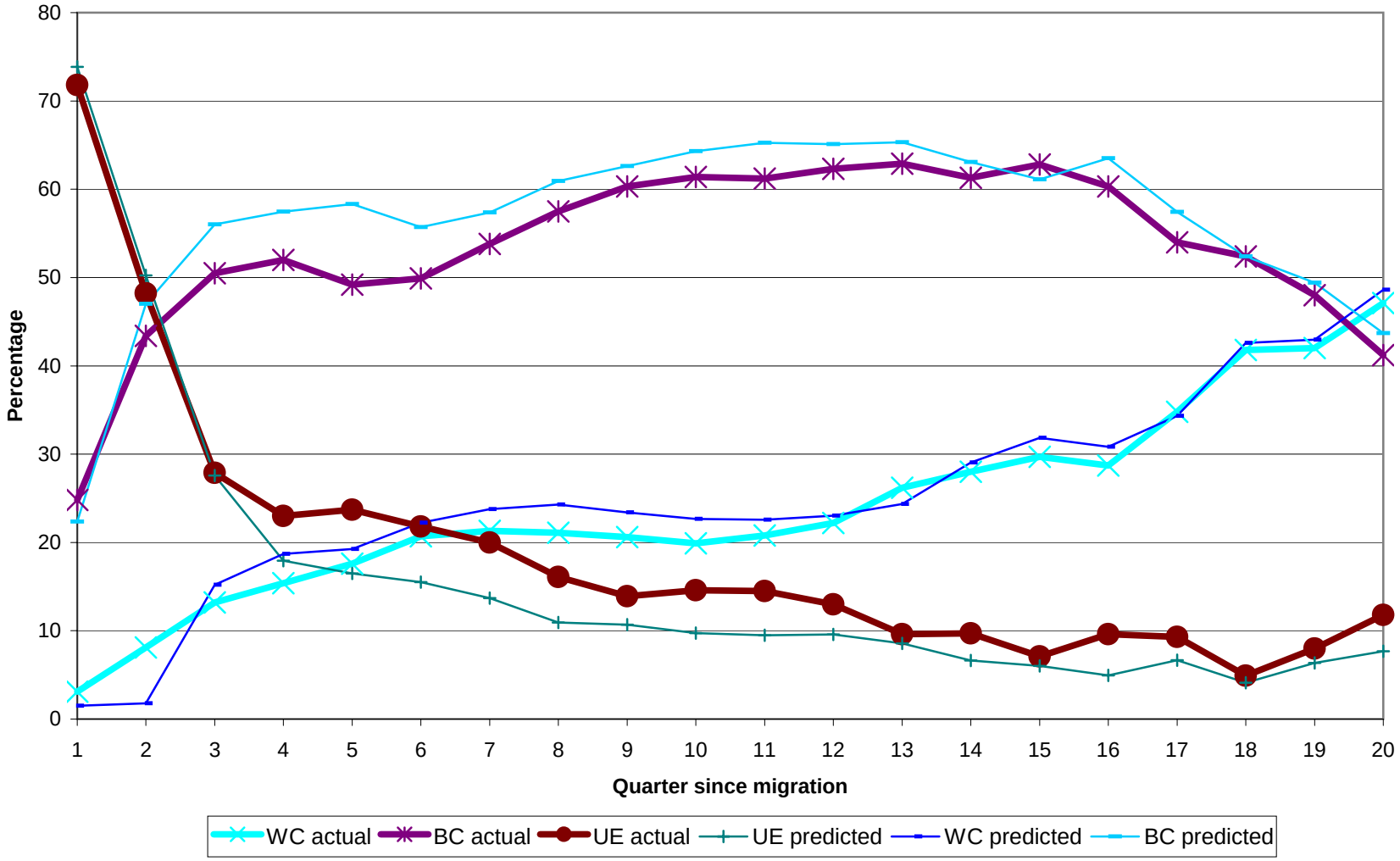
Table A3: ML Estimated Parameters: Training Offer Probabilities, Utility Parameters and Terminal Value

Offer Probability in WC Training		0.0371* 0.0044
Offer Probability in BC Training		1.0000
Utility Parameters		
unemployment benefit	type 1	−217.213* 0.0049
unemployment benefit	deviation of type 2 from type 1	−1249.69* 0.0010
WT benefit	type 1	−588.245* 0.0024
WT benefit	deviation of type 2 from type 1	208.424* 0.0077
BT benefit	type 1	−1143.55* 0.0011
BT benefit	deviation of type 2 from type 1	−722.14* 0.0017
Terminal value parameters		
δ_{11} – Constant	type 1	1000.0275* 0.0014
δ_{12} – Constant	deviation of type 2 from type 1	−0.00011 9.6900
δ_{2} – Experience		208.4056* 0.0065
δ_{31} – WC Training	type 1	2156.473* 0.0007
δ_{32} – WC Training	deviation of type 2 from type 1	−758.473* 0.0018
δ_{4} – Schooling		10.27555* 0.1383
δ_{5} – Age on arrival		−8.7038* 0.1545
δ_{6} – Hebrew knowledge		60.0745* 0.0180
δ_{7} – English knowledge		60.0203* 0.0220
δ_{7} – worked in WC last period		116.0128* 0.0094
δ_{8} – unemployed last period		−649.153* 0.0019
δ_{101} – BC Training	type 1	528.6876* 0.0024
δ_{102} – BC Training	deviation of type 2 from type 1	−306.581* 0.0040
Proportion of Type 1		0.7817* 0.0329

Table A3:(cont.) Covariance Matirx Parameters

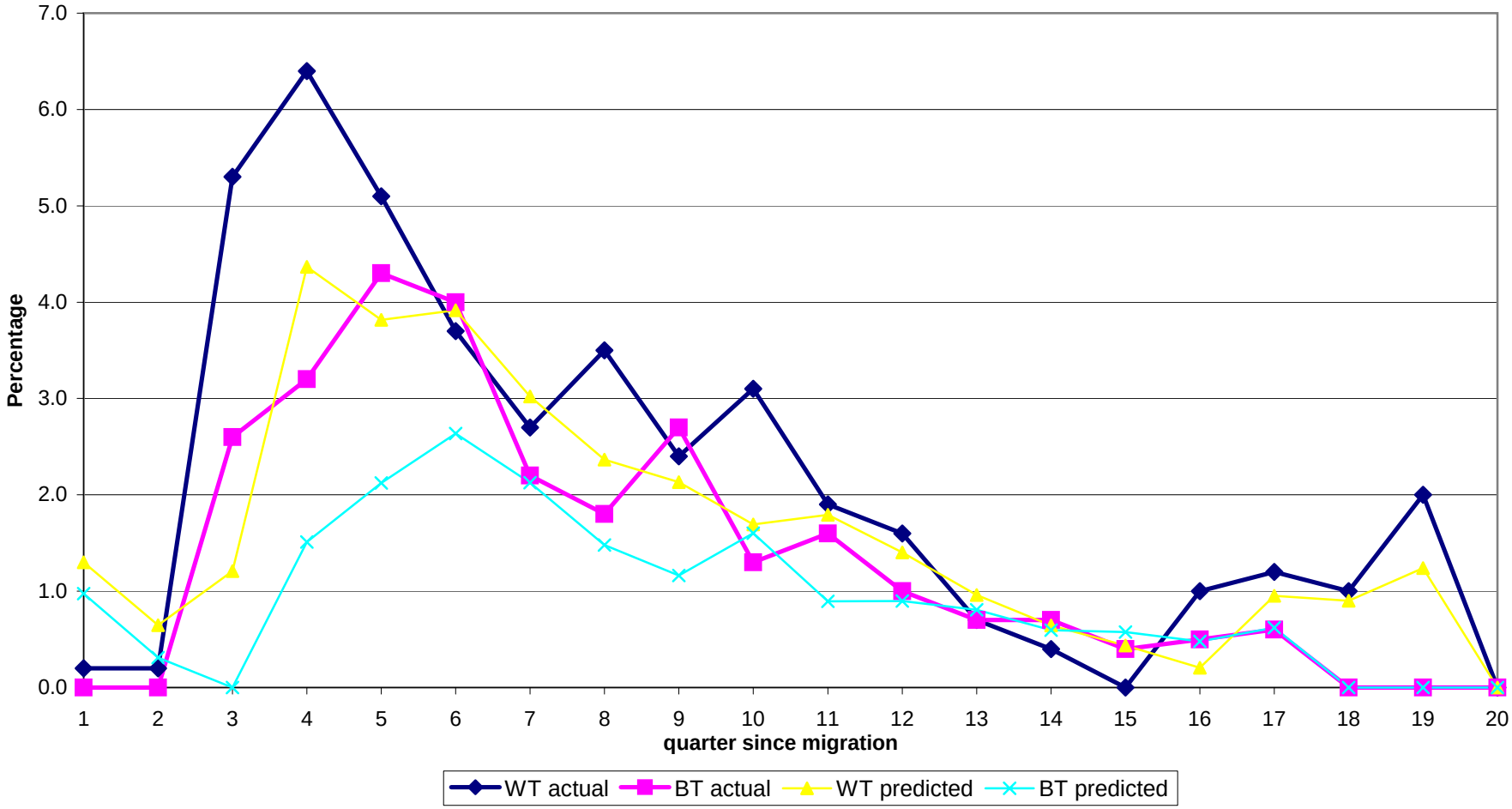
ε^0-variance of error-UE	11.434
z^1-variance of error-WC	0.163
z^2-variance of error-BC	0.106
ε^1-variance of error-WT	1.727
ε^2-variance of error-BT	9.449
covariance (BC,WC)	-0.057
covariance (UE,WT)	-0.781
covariance (UE,BT)	-1.083

Figure 1a: Actual and Predicted Proportions in Unemployment, Blue-Collar and White-Collar Jobs*



* WC:white-collar jobs, BC: blue-collar jobs

Figure 1b: Actual and Predicted Proportions in Training*



*WT- white-collar related training, BT- blue-collar related training

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