Brain Drain and Adverse Selection: The Case of the Israeli Kibbutz*

RAN ABRAMITZKY

NORTHWESTERN UNIVERSITY

JOB MARKET PAPER 2

R-ABRAMITZKY@NORTHWESTERN.EDU

NOVEMBER 2004

The Israeli Kibbutz is a voluntary cooperative based on equality, mutual assistance and partnership. I analyze a unique longitudinal dataset of individuals linked across the 1983 and 1995 Israeli population censuses and evaluate the role economic forces play in the decision by individuals to live in the Kibbutz. I find that Kibbutz-to-city migrants are favorably selected from the Kibbutz population, and that entrants to the Kibbutz are adversely selected compared to non-entrants. The nature of the environment and dataset allows me to test more precisely than the previous literature the presence of adverse selection and the "favorable selection hypothesis" of migrants.

I. INTRODUCTION

The Israeli Kibbutz is a voluntary cooperative based on equality, mutual assistance, communal life and partnership. It is an important socialist experiment that persisted successfully for most of the twentieth century, despite the adverse selection and moral hazard expected by economists to undermine such an egalitarian commune. In the last twenty years, the Kibbutz has experienced a debt crisis and a large wave of net emigration, and it is now introducing substantial reforms designed to reward ability and effort. The shift of the Kibbutz away from full equality marks the end of voluntary egalitarianism, making the Kibbutz important for social scientists in general and for economists in particular.

I analyze a longitudinal dataset of individuals linked across the 1983 and 1995 population censuses to evaluate the role of economic forces in the decision by individuals to live in the Kibbutz. I find that members who left are favorably selected from the Kibbutz population in terms of both observable (education, occupation) and unobservable (ability, motivation) characteristics, suggesting that a brain drain occurred. Entrants to the Kibbutz earn, ceteris paribus, lower wages than non-entrants and have lower pre-entry wealth that is privately known to them, suggesting that adverse selection is present.

* Northwestern University. I am indebted to Joel Mokyr for guidance and encouragement. I am grateful to Fabio Braggion, Adeline Delavande, Zvi Eckstein, Joe Ferrie, Avner Greif, Reuben Gronau, Timothy Guinnane, Nisan Langberg, Charles Manski, Jacob Metzer, Chiaki Moriguchi, Rob Porter, William Rogerson, Kathy Spier and Luis Vasconcelos for helpful discussions and comments. Special thanks to the members of the Kibbutz Department of Absorption for granting me access to the application forms and for sharing their ideas with me. Financial support from Northwestern Dissertation Dean Fellowship and the Economic History Association Dissertation Award is gratefully acknowledged.

The contribution of this paper is threefold. First, despite the widely accepted view that the success of the Kibbutz depends on its ability to keep productive members and to attract new ones, few studies have investigated this topic.[1] Many scholars and observers have insisted that solidarity and ideology are more important than economic forces in the Kibbutz environment. My findings emphasize the role of economic forces in the decision by individuals to live in the Kibbutz. Second, I shed light on the recent shift of the Kibbutz away from equality, a tendency that can be viewed as a rational response to the brain drain and adverse selection.[2]

The second contribution is that I test for the presence of adverse selection more directly than does the current literature. Despite the theoretical importance of adverse selection, relatively little empirical work tests for its presence. The empirical literature typically only has access to the data available to the less-informed party and, in order to test for the presence of asymmetric information, uses either indirect evidence on prices (e.g., Greenwald and Glasspiegel [1983], Genesove [1993]) or the correlation between unobservables in the contract choice and ex-post behavior (Chiappori and Salanie [2000a, 2000b], Cardon and Hendel [2001]).[3] In the Kibbutz, individuals who seek to enter may have private information regarding their productivity. For example, the applicants' pre-entry wealth is either unobserved (apartment size, ownership of some durable goods) or overlooked (wages) by Kibbutz officials. The census data, on the other hand, contain accurate information on the individuals' wealth prior to their entry into the Kibbutz. Therefore, I posses certain information available only to the more informed party. I conduct two tests and find that, after controlling for information that is observable by the Kibbutz, entrants are adversely selected.

The third contribution of the paper is to the migration literature. I test a well-known and much-disputed hypothesis, according to which a positive self-selection of migrants is expected when the origin has a more equal income distribution than the destination, while a negative one is expected when the origin has a more unequal income distribution (Borjas [1987, 1991, 1994]). According to Borjas, positive (negative) selection occurs when the best (worst) people leave the country of origin and outperform

(underperform) the natives in the country of destination. The basic idea is that a country with a low level of income inequality "insures" low-skilled individuals and "taxes" high-skilled individuals.

However, Borjas' methodology and findings have been widely criticized (Chiswick [1999, 2000], Chiqiuar and Hanson [2002], Liebig and Sousa-Poza [2003]). First, migrants are only observed at the destination. This may bias the analysis both because the destination may have policies favoring migrants with certain skills and because the migrants' self-selection should be compared to that of non-migrants.[4] Second, Borjas' measure of income inequality "may be poorly related to relative skill differentials" (Chiswick [1999, p. 184]). Third, almost no study has found evidence for the negative selection of migrants, regardless of whether they come from origins with high or low income inequality.

The longitudinal micro-level data of individuals entering and exiting the Kibbutz allow me to test Borjas' hypothesis directly while avoiding the above-mentioned critiques. First, unlike international migrants, Kibbutz members can freely emigrate to the city without restriction.[5] The Kibbutz imposes restrictions on new applicants, but these restrictions are incorporated in the analysis. Second, I compare migrants to both non-migrants and to the population of the destination. That is, I test whether Kibbutz-to-city migrants are positively selected with respect to stayers and whether they outperform individuals outside the Kibbutz. Third, the Kibbutz is, by definition, more egalitarian than the rest of Israel, thus serving as a good environment to test migration from an origin with low (high) income inequality to a destination with high (low) income inequality.

The findings of this paper provide the first empirical support, at the individual level, to Borjas' hypothesis. Individuals who leave the Kibbutz are favorably selected compared to stayers, and entrants into the Kibbutz are adversely selected compared to non-entrants. Nevertheless, the analysis reveals that a positive selection with respect to the population of origin does not necessary imply a positive selection with respect to the population of destination. More specifically, Kibbutz-to-city migrants are generally not favorably selected compared to individuals in the city. While former Kibbutz members of low-skill occupations outperform individuals with similar characteristics, high-skilled former Kibbutz members underperform individuals with similar characteristics.

II. Brief Background

Though the first Kibbutz (*Degania*) was established in 1910 primarily as a communal farm, today most Kibbutzim have factories and an industrial base alongside agriculture. The standard of living of Kibbutzim, although not measured rigorously, was considered to be higher than for the rest of the Jewish population.[6] The Kibbutz movement in 1995 consisted of 120,000 members in 268 Kibbutzim, located all over Israel, and it accounts for 2.6% of the Jewish population in Israel.

A. Demographic Patterns

Kibbutzim vary in size from fewer than a hundred to over a thousand members, but most Kibbutzim consist of between 200 and 650 individuals. The Kibbutz population has increased dramatically over the last century. The first Kibbutz was established in 1910 south of the sea of Galilee by fewer than two dozen young individuals from Russia. By 1920, there were 12 Kibbutzim consisting of 805 people. Table I and Figure I present the development over time of the total number of Kibbutzim and the Kibbutz population. They suggest that the Kibbutz population grew continuously throughout the century until the mid-1980s, but then shrank substantially. Before the 1950s, a main source of population growth had been net migration to the Kibbutz through youth movements from Israel and abroad. Since then, however, the main source of population growth has been internal (i.e., Kibbutz-born individuals who have decided to stay in their Kibbutz), rather than net migration to the Kibbutz.[7] Figure II presents exit and entry rates for the period 1966-2002. The graph suggests that exit rates from the Kibbutz increased substantially since the late 1980s.

B. Debt Crisis

In the mid-1980s the Kibbutz movements were struck by an unexpected debt crisis.[8] From the late 1970s, the major Kibbutz movements (the Takam movement and the Kibbutz Artzi movement) borrowed large sums of money, which had been easier to repay in the presence of high inflation in the early 1980s. In 1984, inflation reached 400% and the Israeli government intervened. The Shekel was devalued, wages and prices were frozen while interest rates remained high. The Kibbutz movements found themselves with a huge debt of more than five billion dollars. Another reason for the crisis was a decline in the

profitability of agriculture, which has always been a major source of income for the Kibbutz.[9] A complicating factor was the system of mutual guarantees. All the Kibbutzim were members of their movement funds, such that each Kibbutz was liable for the total debt of the movement in addition to its private one. By 1989 the crisis involved most Kibbutzim. The government, the banks and the Kibbutzim established an independent Kibbutz Arrangement Board, consisting of economists and lawyers. The board first dealt with the problem of mutual guarantee and let each Kibbutz deal with its own economic problems. Agreements between the government, the banks and the Kibbutzim were signed in 1989, 1996 and 1999 and brought the debt crisis under control.[10] Nevertheless, many Kibbutzim were forced to reduce the facilities offered to members.[11]

C. Differential Reforms

At the outset, the founders of the Kibbutz laid out strict rules of behavior including a separate society of children residing outside their parents' homes, strict consumption sharing, communal dining, direct distribution of goods and an economy based on no cash and on hard physical labor. Nevertheless, the Kibbutz reformed many of its rules to adjust to members' needs and to the modern world. Children moved to live with their parents as early as the late 1970s, cash was introduced and members started receiving a general monthly allowance to be used for personal consumption. Together with the rest of Israel, the Kibbutz went through a process of industrialization in the 1960s and 1970s. Increasingly, members have started to work outside their Kibbutz and individuals from outside the Kibbutz movement have been accepted to work in the Kibbutz movement.[12] These reforms have all taken place despite the fact they were against the "Kibbutz values" of the founders, that crystallized over a long period of time. Nevertheless, income equality remained untouched before the 1990s.

In the late-1990s, many Kibbutzim started to implement reforms. The "new Kibbutz" presents differentiated wages and related material incentives to reward ability.[13] In 2003, every Kibbutz officially self-sorted itself in one of five different categories, ranging from a "cooperative Kibbutz" (Kibbutz *Shitufi*) still based on full equality to a "communal village" (*Yeshuv Kehilati*) that is essentially not egalitarian at all. Out of 268 Kibbutzim, 39 remain completely egalitarian and only 3 abandoned equality

altogether. The majority of Kibbutzim have chosen a middle way, with 110 Kibbutzim choosing a model closer to the "communal village" and 64 closer to the "cooperative Kibbutz" model.[14]

III. The Data

The data sets used here were generated from a list of over 100,000 individuals linked from the 1983 Israeli Census of Population to the 1995 census who answered the "extensive questionnaire." The "extensive questionnaire" was given at each of the censuses to 20% of the households in a way that adequately represents the entire population, so that the matched records account for 4% of the population. The data identify individuals who live in "a cooperative rural settlement, in which production, marketing and consumption are organized in a cooperative manner", which uniquely defines Kibbutz members.

This data set allows me to observe the same individuals at two points in time, in 1983 and in 1995, a period in which the Kibbutz was still egalitarian and before major reforms were implemented. I test the following hypotheses: 1. Kibbutz-to-city migrants are favorably self-selected compared to non-migrants. (Section IV) 2. Once in the city, Kibbutz-to-city migrants outperform the Israeli labor force. (Section V) 3. Entrants to the Kibbutz are negatively self-selected from the Israeli labor market in terms of observable and unobservable characteristics. (Section VI)

IV. Favorable Selection of Movers vs. stayers

The Kibbutz is more egalitarian than the rest of Israel. Thus, the Kibbutz "insures" low-skilled individuals and "taxes" high-skilled individuals. Borjas [1987, 1991, 1994] hypothesized that in such environment, migrants will be positively selected both compared to non-migrants and compared to the population in the destination. This section compares migrants from the Kibbutz to non-migrants. Section V compares migrants from the Kibbutz to the Israeli labor force outside the Kibbutz.

A. Kibbutz Literature and Aggregate Data

The current (mainly sociological) literature has not found convincing evidence that the most productive members tend to leave, nor that less ideological members are more likely to leave.

Over 30 years ago, Bruno Bettelheim [1969] raised the idea that the Kibbutz educates to mediocrity and that the best and worst members would tend to leave. Nevertheless, very little evidence for this hypothesis has been found. Nathan, Shenbal and Paskin [1982] followed an entire high school class for seven years. Before graduating, the minors were asked to fill in a CPI questionnaire (personality questionnaire) combined with a "talent test." Seven years later, the researchers found no differences between movers and stayers in either the "talent test" or in their education and their job positions. Similarly, Helman [1982] found no such evidence in movers' and stayers' "talent level" as evaluated by their former high-school teachers. Leviathan and Orchan [1982] based their research on members under 35 years old from 10 Kibbutzim and found no difference in a self-assigned "talent level" between movers and stayers. Leviathan [1993] considers the increase in the percentage of movers who are older than 30 as evidence for the exodus of "good" members, as these people are generally more experienced and more educated due to their age. He also found a 4% exit rate of members who held major positions in their Kibbutz over a period of five years and viewed this as evidence that the best members tend to leave.

Moreover, no evidence has shown that the less ideological were the first to leave in the face of the crisis. Leviathan [1996] evaluates the relative role "materialism" and ideology play in members' migration decisions. He found no evidence that members who are less ideological are more inclined to leave, or that members are more inclined to leave Kibbutzim that are viewed by him as more materialistic and less ideological.[15]

The aggregate data collected by Kibbutz officials reveal that members who studied a "useful occupation" are more likely to leave. Table II provides evidence that the percentage of those who leave the Kibbutz without a diploma has decreased dramatically. Whereas on the eve of the crisis, almost 90% of those who left did not have a diploma, in 1999 this percentage decreased to about 60%. The number of educated members leaving the Kibbutz has increased continuously over the last fifteen years. Table III presents the field of study of those who left the Kibbutz in the last fifteen years. It suggests that since the 1980s, increasingly educated members leave the Kibbutz and that as time goes by, more economists, engineers and teachers leave and fewer members who studied humanities and education. Nevertheless,

these results may simply be due to the fact that more people in Israel have acquired a higher level of education and that there is more demand for fields such as economics and engineering. Moreover, it is possible that members who stayed in the Kibbutz also become more educated so that there is no brain drain taking place. A formal test for brain drain requires longitudinal micro-level data that allow us to observe both individuals' migration decision and their characteristics. The next two sections provide such an analysis for the period 1983-1995.

B. Are Kibbutz-to-City Migrants Favorably Selected From the Kibbutz Population?

The data set used here allows more than an assessment of the magnitude of migration and a description of movers' characteristics. It allows me to explore, at the individual level, the determinants of Kibbutz-to-city migration and to capture the dependence between the migration decision and the economic outcome.

Since I compare movers to stayers, I consider only the 3768 individuals who were inside the Kibbutz in 1983 and ended up either inside the Kibbutz or outside the Kibbutz by 1995. A total of 986 members left the Kibbutz in this period, more than 20%. I concentrate on individuals who lived in a Kibbutz in 1983, who were between the age of 15-54 and for whom I have information on education and profession and on movers' wages outside the Kibbutz. This leaves me with a sample of 1655 individuals, of whom 397 left the Kibbutz between 1983 and 1995. "High-Skill" occupations are defined as academic and managerial occupations. "Low-Skill" occupations are unskilled industrial professions and service workers. A third group contains all other occupations.

Summary statistics of the variables and their relationship to the migration decision are shown in Table IV. As expected, individuals who left the Kibbutz are on average more educated than stayers (54% of migrants have at least a high school diploma compared to 48% of stayers), and they are less likely to have a low-skilled occupation (13% compared to 23%). Individuals with bigger families tend to stay, in part because a Kibbutz member does not fully internalize the cost of having a big family as this cost is spread over the entire Kibbutz population. Foreign-born individuals seem to stay in the Kibbutz, but this

may simply be a result of the fact that many movers are young and many of the young were born in Israel. A regression analysis can disentangle these effects.

To formally test the "favorable selection" hypothesis, I employ a switching regression model (a Type 5 Tobit Model) and adjust it for the Kibbutz case. This model allows for two regimes (in my case "stay in the Kibbutz" or "move to city"), a criterion function (a "migration rule" that determines whether or not an individual will leave the Kibbutz) and two regression equations describing income determination in the Kibbutz and in the city. This framework has been used to study migration (see, for example, Robinson and Tomes [1982] and Ferrie [1997]), returns to schooling (Willis and Rosen [1979]) and the impact of union membership on wages [Lee (1978]). One interesting difference between the Kibbutz-case and the above examples stems from a defining feature of the Kibbutz, namely that the income earned by a member is not a function of his personal characteristics.

Assume that an individual chooses whether or not to migrate taking into consideration her income gain $\ln(I_{ic}^{95}) - \ln(I_{ik}^{95})$ as well as other individual and location characteristics Z_i. The individual migrates if an unobservable criterion function D_i^* is positive:

(1) $$D_i^* = \delta_1 Z_i + \delta_2 \left[\ln(I_{ic}^{95}) - \ln(I_{ik}^{95})\right] + u_i$$

(2) $$\left\{\begin{array}{l} \ln(I_{ik}^{95}) = K \\ \ln(I_{ic}^{95}) = \beta_c' X_i + \varepsilon_i \end{array}\right\}$$

where $E(u_i) = 0$ and $\text{var}(u_i)$ is normalized to 1 without loss of generality. $E(\varepsilon_i) = 0$, $\text{var}(\varepsilon_i) = \sigma_c^2$. The census data do not have information about the income of Kibbutz members. Since the Kibbutz in this period was still based on equality in the distribution of income, I assume that income is taken by an individual member as a constant and does not depend on his personal characteristics, i.e. $\ln(I_{ik}^{95}) = K$. This, however, involves two assumptions. First, K may be a function the characteristics of the *average* Kibbutz member and thus an indirect function of a member's characteristics X_i. Note that even if K is a function of individuals' characteristics such that an individual's income in the city is positively correlated with her income in the Kibbutz, then δ_2 underestimates the effect of income differences on migration and

provides a lower bound for the true parameter. In this sense, my finding that members leave the Kibbutz to seek higher income is underestimated. Second, different Kibbutzim provide members with different levels of income. Unfortunately, the dataset does not allow me to identify the specific Kibbutz in which individuals live. The assumption that income is constant across Kibbutzim may over or underestimate the effect of income differences on migration.[16] D_i^* is unobservable, but

(3) $$D = 1 \text{ if } \quad D_i^* = \delta_1 Z_i + \delta_2 \left[\ln(I_{ic}^{95}) - \ln(I_{ik}^{95})\right] + u_i \geq 0$$

$$D = 0 \text{ if } \quad D_i^* = \delta_1 Z_i + \delta_2 \left[\ln(I_{ic}^{95}) - \ln(I_{ik}^{95})\right] + u_i \leq 0$$

or,

(4) $$D = 0 \text{ if } \quad D_i^* = \gamma' W_i + \mu_i \geq 0$$

$$D = 1 \text{ if } \quad D_i^* = \gamma' W_i + \mu_i \leq 0$$

where W_i contains all the elements of X and Z. One of the hypotheses that will be tested is that members who left the Kibbutz were also more likely to succeed outside, in the sense that the characteristics (observable and unobservable) that affected their decision to leave also affected their income outside the Kibbutz. Ignoring this dependence will make it impossible to test whether Kibbutz members were positively selected and might result in overestimation of the returns to observable characteristics outside the Kibbutz. To capture the dependence between individuals' migration decisions and their subsequent income, I assume that (μ_i, ε_i) are i.i.d and distributed Bivariate Normal with $corr(\mu_i, \varepsilon_i) = \rho_c$.[17] It follows that[18]:

(5) $$\ln(I_{ic}^{95}) = \beta_c' X_{ic} + \rho_c \sigma_c \frac{\phi(\gamma' W_i)}{\Phi(\gamma' W)} + \varepsilon_i$$

Where $\frac{\phi(\gamma' W_i)}{\Phi(\gamma' W)}$ is the Inverse Mill Ratio.

The vector X includes 1983 individual characteristics thought to influence the income of Kibbutz members who left to cities: age and age squared, occupation (high-skill or low-skill), education level (high school diploma or higher) and gender. The elements of Z include age and age squared, family size,

whether the Kibbutz of origin is located in the far north or south of Israel, education level, foreign birth and gender. The parameters δ_1, δ_2 γ and β_c are identified under the restrictions imposed by the model. To identify δ_1 and δ_2, there must be at least one variable in X not in Z and vice versa. Both conditions are satisfied: Z includes variables not included in X (family size, whether the Kibbutz of origin is located in the far north or south of Israel and foreign birth), and X includes variables not in Z (the occupation variables), which are assumed to affect the migration decision only through their effect on income.[19]

The structural parameters of the model were estimated via a three-step procedure.[20] First, the reduced form equation (4) is estimated by Probit maximum likelihood to find $\hat{\gamma}$. Then, using $\hat{\gamma}$, we obtain the Inverse Mill Ratio for each observation: $\frac{\phi(\gamma' W_i)}{\Phi(\gamma' W)}$. Second, equation (5) is estimated by OLS. That is, I run an OLS regression of $\ln(I_{ic}^{95})$ on X_{ic} and $\frac{\phi(\gamma' W_i)}{\Phi(\gamma' W)}$ and get β_c and $\ln(\hat{I}_{ic}^{95}) = \hat{\beta}_c' X_{ic}$. Estimates of the standard errors of the coefficients are corrected using White's method to account for both the heteroscedasticity introduced by the Inverse Mill ratio and the fact that γ is computed rather than known. Note that by assumption $\ln(I_{ik}^{95}) = K$ is known for each individual, which means that the counterfactual for a mover is known and does not have to be estimated. Third, equipped with $\ln(\hat{I}_{ic}^{95})$ and $\ln(I_{ik}^{95})$, I estimate the structural decision equation (1) to find the determinants of migration.[21]

Table V presents the estimation results. The first column displays the variable means. The second column presents the reduced-form Probit equation (equation 3) and the third column presents the structural Probit equation (equation 1). The fourth column presents the OLS regression of the determinants of income in the city (equation 2). The marginal effects $\frac{\partial \Pr(move)}{\partial X}$ are evaluated at the mean of X for continuous variables and are $\Pr(D=1|X=1) - \Pr(D=1|X=0)$ for discrete variables (and calculated at the means of the other Xs).

The results provide strong evidence for brain drain from the Kibbutz in the period 1983-1995. The most productive members were much more likely to leave the Kibbutz during this period.

First, Kibbutz-to-city migrants have "better" observable characteristics than stayers. The reduced-form Probit regression (column 2) suggests that the more educated members are more likely to leave and that having at least a high school education increases the exit rate by a third (from 20% in average to 30%). Members with high-skill occupations are nine percentage points more likely to leave the Kibbutz and low-skill members are nine percentage points less likely to leave. Moreover, the large positive coefficient on $\ln(\hat{I}_{ic}^{95})$ indicates that individuals anticipating higher income outside the Kibbutz were much more likely to leave. An anticipated increase of 2500 NIS (about $600) increases the probability to leave by thirty percentage points, making a member more than twice more likely to leave. The coefficient on "High school diploma or more" is only positive and significant in the reduced form equation. This implies that education level does not directly influence the decision to leave the Kibbutz, but only affects the decision through its impact on income.

Second, Kibbutz-to-city migrants have "better" unobservable characteristics than stayers. The model predicts how members who stayed in their Kibbutz would have fared had they left the Kibbutz instead. The positive and large coefficient on the Mill ratio shown in Table V (fourth column) reveals that members who left the Kibbutz were positively selected in the sense that their unobservable personal characteristics were associated with a higher income. That is, migrants did better than those who remained in the Kibbutz would have done had they left instead of staying in the Kibbutz.[22]

The words of a secretary of Kibbutz Givat Brenner in 2001 summarize the process that has taken place in the last two decades[23]:

“I don't want to shout it out loud, but there is a negative selection process at work here. We have lost some of the best and brightest of our young adults....We do not have enough members in the twenty-five to forty age group, and frankly, those who have stayed are not the best”.

Other factors affect the decision to stay in the Kibbutz (column 3). Young members are more likely to leave. As discussed, members with bigger families prefer to stay in the Kibbutz and let other

members subsidize them, rather than leave and finance their big family outside the Kibbutz. An additional family member decreases the exit probability by two percentage points (from 20% on average, to 18%). Overseas immigrants are four percentage points more likely to leave the Kibbutz than Israeli-born individuals, although this parameter is not measured precisely. Members from Kibbutzim in the far north and south of Israel were five percentage points more likely to leave their Kibbutz. It is also interesting to note differences by gender in the migration decision. Summary statistics and the reduced form equation do not reveal differences in behavior between men and women and even suggest that more men than women have left the Kibbutz in the late 1980s and early 1990s. On the other hand, the structural equation suggests that men tend to earn more than women outside the Kibbutz, which is why we see more men leaving. When controlling for this income effect, it turns out that men are 20% less likely to leave the Kibbutz than are women. This may be a result of more women marrying out of the Kibbutz than men, but this issue requires further investigation.

Wages of former Kibbutz members outside depends on a number of factors (column 4). As expected, more educated individuals fare better and so do individuals with academic and managerial occupations. Unskilled workers in industry and service workers who left the Kibbutz could expect to earn less outside the Kibbutz than do other industry and service workers. Income is larger for older individuals, but the rate of increase decreases with age. Men earn higher incomes than women outside the Kibbutz.

V. Relative Performance of Former Members Outside the Kibbutz

The previous section provided evidence of positive selection of Kibbutz-to-city migrants compared to members who stayed in the Kibbutz. This section tests whether Kibbutz-to-city migrants are positively selected compared to the Israeli labor force outside the Kibbutz. That is, I evaluate how former Kibbutz members, who left the Kibbutz between 1983 and 1995, perform outside the Kibbutz in 1995 relative to individuals already in the city. Unlike in the previous section, whether a member left her Kibbutz can be treated as exogenous and thus there is no need to use sample selection. I estimate the following regression model[24]:

(6) $$\ln(I_i) = \alpha + \beta' X_i + \delta_1 EXIT_i + \delta_2 \left(EXIT * Skilled\right)_i + \delta_3 \left(EXIT * Unskilled\right)_i + \varepsilon_i$$

where I_i is the monthly income earned outside the Kibbutz in 1995, X_i is a vector of characteristics that are believed to affect monthly income and includes age, age squared, gender, a dummy for Israeli born, education and occupation. $EXIT_i$ is a dummy variable indicating a former Kibbutz member who left the Kibbutz between 1983 and 1995. $\left(EXIT * Skilled\right)_i$ indicates whether the individual left the Kibbutz and is working in a high-skilled occupation and $\left(EXIT * Unskilled\right)_i$ indicates whether the individual left the Kibbutz and is working in a low-skilled occupation. All variables are 1995 characteristics.

The data consist of 27,249 Jewish individuals who lived outside the Kibbutz in 1995, out of whom 26,820 lived outside the Kibbutz in both 1983 and 1995, and 429 emigrated from the Kibbutz between 1983-1995. The latter are the same Kibbutz-to-city migrants who were analyzed in the previous section, but here they are compared to the Jewish population outside the Kibbutz rather than to the Kibbutz population. The results are presented in Table VI. The first column presents the mean characteristics of the whole sample. The second column displays the mean characteristics of the 429 former Kibbutz members and the third column presents the mean characteristics of individuals who lived outside the Kibbutz in both periods. The last column shows the determinants of wages outside the Kibbutz in 1995.

The average former Kibbutz member is younger (36 years old) than the average Israeli Jew (42 years old), more educated (78% have at least a high school diploma compared to 55% in the Jewish population outside the Kibbutz), is more likely to be working in a high-skill occupation (33% as compared with 22%), and is less likely to work in a low-skill occupation (25% as compared with 39%). Nevertheless, there are no differences in wage between the average former Kibbutz member and the Jewish average.

The regression results reveal that whereas former Kibbutz members as a whole do not get higher wages relative to the general Jewish population, they do get a substantial wage premium if they work in low-skill occupations. A “blue-collar” worker who left the Kibbutz earned a wage premium (over an

average blue-collar) of 15.4%. A “white-collar” worker who left the Kibbutz, on the other hand, earned an average wage that is 16.7% lower than an average white-collar worker. These results suggest that positive selection with respect to the population of origin does not necessarily imply a positive selection with respect to the population of destination. Although Kibbutz members who left are positively selected compared to members who stayed, migrants only outperform in the city when they work in low-skilled occupations.

High-skill workers earn more than low-skill workers both among former Kibbutz members and in the general population, but due to the above-mentioned positive and negative premiums, the difference between the wage of the high-skilled and low-unskilled is smaller for former Kibbutz members than for the general population. This is illustrated in Table VII.

There are a few possible explanations for this result. The Kibbutz population may simply be more homogeneous in skills than the rest of the population, making former members' wages more similar once in the city. A second possible explanation is that the skills of “white collar” members are not well-adapted to the city, forcing some high-skilled members to work in low-skilled occupations. Third, this result may be due to selection. Low-skilled workers who were willing to leave the Kibbutz and forgo sharing their income with managers, lawyers and academics, are expected to be much more talented than average low-skilled workers. The mere fact that a low-skilled worker left the Kibbutz could serve as a signal to potential employers that they are talented. Following the same logic, high-skilled workers who leave the Kibbutz are not expected to earn in the city more than average high-skilled workers.[25]

VI. Adverse Selection in Entering the Kibbutz

In this section, I test the hypothesis that Kibbutz-to-city migrants are negatively self-selected compared to non-entrants, which contributes to two strands of literature. First, an important and much-disputed hypothesis in the migration literature is that migrants tend to come from the "lower tail of the home country's income distribution" (Borjas [1987, p. 534]) if the origin has a more unequal income

distribution than the destination. Nevertheless, almost no evidence has been found in the literature for such negative selection.[26]

Second, even if Kibbutz officials are well-aware of this tendency, adverse selection may still take place if individuals who seek to enter have private information regarding their productivity. As discussed below, the census data contain information on an individual's wealth that is unobserved by the Kibbutz. Having the data of the informed party allows me, unlike most other work, to test directly for adverse selection.

I offer two complementary tests for adverse selection. The first evaluates whether in 1983 prospective migrants to the Kibbutz earned, ceteris paribus, a lower wage than Jewish Israelis who did not migrate to the Kibbutz. The second test is a Probit analysis of entry to the Kibbutz in 1983-1995, in which I evaluate whether entrants tend to be less productive in terms of both characteristics that are observable to the Kibbutz (such as education and occupation) and ones that are unobservable-to-Kibbutz (such as wealth). Evidence for the latter is interpreted as adverse selection as it results from asymmetric information between the migrant and the Kibbutz. Both tests suggest that adverse selection is present in the decision to enter the Kibbutz. The tests are presented in sections B and C, after the application process to the Kibbutz is briefly described in section A.

A. The Application Process[27]

In the early 1980s, the leaders of the Kibbutz wanted to restore the central place of the Kibbutz in Israeli society and decided to engage in a massive absorption. 30,000 people entered the Kibbutz in the period 1980-1985, increasing the Kibbutz population by more than 30%. Since then, however, the Kibbutz has put more effort into the screening process and decided to concentrate on quality rather than quantity.

A central body, the Kibbutz's Department of Absorption and Demographic Growth, is in charge of the screening process of most individual applicants to the Kibbutz. The Kibbutz has strict rules of entry. Applicants must be between twenty and fifty years old, after having completed their army service. They must have at least twelve years of education. They must be married with no more than three

children and both the husband and wife must have an occupation that is demanded by the Kibbutz and that will allow them to "find a job within the Kibbutz or its area immediately." Moreover, applicants have to go through a lengthy interview, to fill out forms about their physical and mental health and those of their children, to give an elaborate statement about their education level, occupation and army experience and to write a Curriculum Vita, which is tested by a graphologist. They also have to answer a long questionnaire meant to check whether the individual is personally suited to live in a Kibbutz. A week after the interview, successful applicants are informed about the Kibbutz's decision and the Department of Demographic Growth will then actively look for a Kibbutz for the applicants.

Only about one third of the Kibbutzim are engaged in absorbing new members from outside the Kibbutz. These Kibbutzim are typically in good but not excellent economic condition and they are more likely than not located in the far south and far north of Israel.[28] Some Kibbutzim require an entry fee, but this can often be recovered in part upon leaving.

B. First Test for Adverse Selection in Entering the Kibbutz

The favorable selection hypothesis has it that migrants are "more able and more highly motivated" than natives (Chiswick [1978, p. 900]). If motivation and ability are positively correlated with both propensity to migrate and labor market outcome, one expects to observe that potential migrants earn, ceteris paribus, more than individuals who do not migrate. This observation forms the bases of the work by Gabriel and Schmitz [1995], who study internal migration in the US and found that migrants were positively selected.

On the other hand, if adverse selection is present and entrants to the Kibbutz are less able than non-entrants, than one expects potential entrants to the Kibbutz to earn, ceteris paribus, less than individuals who do not enter.

I conduct the following regression analysis based on Mellow [1981], Mincer [1983] and Gabriel and Schmitz [1995]:

$$\ln(W_{83}) = \alpha + \beta' X_{83} + \delta ENTER + \varepsilon \tag{7}$$

where W_{83} is the wage earned outside the Kibbutz in 1983, X is a vector of characteristics that are believed to affect wages and includes age, age squared, gender, a dummy for Israeli born, education and occupation. ENTER is a dummy indicating whether the individual entered a Kibbutz between 1983 and 1995. A positive δ will indicate a favorable selection of city-to-Kibbutz migration and a negative δ will indicate an unfavorable selection of city-to-Kibbutz migration.

In order to better target the population who considers entering a Kibbutz, I concentrate on Jewish individuals who were between 19-49 years old in 1983, who were born in Israel and for whom I have information on education, occupation, and wage. There are 11,010 such individuals, out of whom 67 entered a Kibbutz in this period. Table VIII presents the regression results.

The results suggest strong evidence of adverse selection. The coefficient on the variable $ENTER$ is negative, big and significant, suggesting that prospective (ex-ante) migrants have lower wages than nonmigrants. That is, those who subsequently entered a Kibbutz earned, ceteris paribus, a lower wage than non-entrants. Since the regression controls for other determinants of income such as age, education and occupation, this means that the lower wages for entrants to the Kibbutz is due to unobservable factors such as lower ability or lower motivation.

C. Second Test for Adverse Selection in Entering the Kibbutz

My data set contains information indicating the wealth (apartment size, ownership of durable goods, wage) and hours worked of individuals prior to their entry to the Kibbutz (in 1983), which are not observable (apartment size, ownership of some durable goods, hours worked) or overlooked (wage) by Kibbutz officials.

Applicants are not asked about the size of their apartment, whether they own goods such as a television and a dishwasher and how many hours they worked per week. Even if they were asked such questions, this information would not be easily verifiable. Moreover, although applicants are asked to fill out their wages and whether they own an apartment, these are not used as criteria in the application process (and Kibbutz officials do not verify them). As discussed in section A, the Kibbutz is far more

concerned with an applicant's age, family size and ability to find a job in the Kibbutz or its surroundings than with his wealth prior to entry.[29]

Using census information to follow individuals between 1983 and 1995, I test whether (after controlling for publicly observable characteristics) there is adverse selection in entering the Kibbutz. More specifically, I test the hypothesis that entrants to the Kibbutz are adversely selected in terms of their pre-entry wealth, which is a proxy for their privately held information regarding their productivity and ability.[30] I consider a few measures of wealth in my regression. The first (column 3 in Table IX) is an individual's wage prior to entry. The second measure (column 4) is an individual's number of rooms if they own an apartment (the measure equals zero if the individual does not own an apartment). A third measure (column 5) uses both wages and the number of rooms (if they own an apartment) as regressors. To account for the possible endogeneity of apartment ownership, I instrument the number of rooms in the individual's own apartment with television ownership and wage (column 6). The characteristics that are public information (i.e. observable to both the individual and the Kibbutz) are age, gender, family size, education and occupation prior to entry.

The Probit analysis (Table IX) is conducted on Jewish individuals who were between 19-49 years old in 1983, who were born in Israel and for whom I have information on education, occupation and the relevant measure of wealth described above. Since the census has more missing observations on wages than on apartment size and television ownership, the number of observations is different for each measure of wealth and is reported in Table IX for each specification. The results are the same when I restrict attention to the smaller sample that contains information on *all* three measures of wealth.

X_i is defined as the vector of publicly observed characteristics that affect individuals' decision of whether to join a Kibbutz. As discussed above, these include age, gender, family size, education and occupation prior to entry. Y_i is the privately observed characteristics (various measures of wealth) that affect this decision. Let D_i^* denote the (unobservable) reduced form outcome generated by both the individual's decision and the Kibbutz's decision whether to accept the individual:

(8) $$D_i^* = \beta_1' X_i + \beta_2' Y_i + \varepsilon_i .$$

Denote D_i the observable decision:

(9) $$D_i = 1 \text{ if } D_i^* \geq 0$$

$$D_i = 0 \text{ Otherwise.}$$

From the last two equations we get that:

(10) $$\Pr(D_i = 1) = \Pr(\varepsilon_i \geq -\beta_1' X_i - \beta_2' Y) = 1 - F(-\beta_1' X_i - \beta_2' Y)$$

where F is the cdf of ε_i. Assuming $\varepsilon_i \sim N(0,1)$, the likelihood function is[31]:

(11) $$L = \prod_{D_i=0} \Phi(-\beta_1' X_i - \beta_2' Y) \prod_{D_i=1} [1 - \Phi(-\beta_1' X_i - \beta_2' Y)]$$

Then, maximizing the likelihood function we find an estimator for $\beta' = (\beta_1', \beta_2')$. I am interested in finding two marginal probabilities:

1. $\frac{\partial \Phi(\beta_1' X_i + \beta_2' Y)}{\partial X_{ik}} = \Phi(\beta_1' X_i + \beta_2' Y)\beta_{1k}$. That is, how does the probability of entering a Kibbutz change as individual characteristics that are observable by the Kibbutz change? In particular, do less educated individuals enter? Do individuals with less-skilled occupations enter? If so, this would indicate negative selection that is either due to self-selection or due to policy restrictions imposed by the Kibbutz

2. $\frac{\partial \Phi(\beta_1' X_i + \beta_2' Y)}{\partial Y_{ik}} = \Phi(\beta_1' X_i + \beta_2' Y)\beta_{2k}$. That is, how does the probability of entering a Kibbutz change as individual characteristics that are not observable by the Kibbutz change? In particular, given X, do individuals with lower wealth enter a Kibbutz? If so, this would indicate adverse selection.

Table IX presents the mean characteristics of both individuals who entered the Kibbutz between 1983 and 1995 (column 1) and those who were outside the Kibbutz in both periods (column 2) as well as the regression results (columns 3-6).

The average individual who enters a Kibbutz is younger than the general population (28 vs. 31 years old) and has a smaller family (3.18 vs. 3.81 members in the household). An entrant is more educated than the general Jewish population (75% posses at least a high-school diploma vs. 53% in the general population). He is equally as likely to work in a high-skill occupation as the average worker, and is also equally likely to work in an low-skilled occupation. However, his wage is substantially lower than that of the general Jewish population (20735 Shekels vs. 24921 Shekels) and his apartment is smaller (2.07 rooms vs. 2.81).

The Probit regression (Table IX columns 3-6) provides no evidence of negative selection over publicly observable characteristics (probably due to policy), but strong evidence of adverse selection. That is, whereas younger and more educated individuals are more likely to enter, entrants to the Kibbutz are much less wealthy than non-entrants (in all measures of wealth).

VII. Conclusion

Employing and analyzing a unique longitudinal data set of individuals linked across the Israeli 1983 and 1995 censuses, I show that Kibbutz-to-city migrants are favorably selected compared to those who stayed in their Kibbutz and that entrants to the Kibbutz are adversely selected from the Jewish population of Israel.

The recent institutional change of the Kibbutz can be viewed as a rational response to the brain drain and adverse selection it faces.[32] The reforms allow high ability individuals to receive a premium for their ability and thus reduce the incentives of skilled individuals to leave the Kibbutz and of unskilled individuals to enter a Kibbutz.

Besides shedding light on the Kibbutz and its recent institutional change, the contribution of this paper is twofold. First, the results provide the first empirical support, at the individual level, for Borjas' hypothesis that the type of selection (positive or negative) depends on the relative inequality in income distribution of the origin and destination. Nevertheless, the results also reveal the limitations of his hypothesis. More specifically, I find that positive selection with respect to non-migrants does not necessarily mean a positive selection of migrants with respect to the population of the destination.

Whereas low-skilled former Kibbutz members outperform individuals with similar characteristics, high-skilled former Kibbutz members under perform individuals with similar characteristics.

Second, unlike most empirical literature that tests indirectly for adverse selection, I provide two direct tests for adverse selection. In the first, I show that entrants to the Kibbutz earned prior to entry lower wages than non-entrants, ceteris paribus. In the second test, I show that, controlling for publicly observable information, entrants to the Kibbutz are adversely selected in terms of their privately observed pre-entry wealth.

REFERENCES

Abel, P. "The Viability of Industrial Producer Cooperation" in Crouch, C. and F. Heller (Eds.). International yearbook of Organizational Democracy, vol. 1, pp. 73-103. John Wiley & Sons (1983).

Abramitzky Ran. "Risk-Sharing, Limited Commitment and Institutional Change: the Case of the Israeli Kibbutz". Northwestern University mimeo (2002).

Abramitzky, Ran. "Endogenous Social Insurance in the Israeli Kibbutz". Northwestern University mimeo (2003).

Amemiya, T. Advanced Econometrics. Cambridge: Harvard University Press (1985).

Barkai, Haim. Growth Patterns of the Kibbutz Economy. Amsterdam, New York and Oxford (1977).

Ben-Ner, Avner. "On the Stability of the Cooperative Type of Organization". Journal of Comparative Economics (1984).

Ben-Ner, Avner. "preferences in a Communal Economic System". Economica (1987).

Borjas, George J. "Self-Selection and the Earnings of Immigrants". The American Economic Review (1987).

Borjas, George J. "Immigration and Self-Selection". in John Abowd and Richard Freeman eds. Immigration, Trade and the Labor Market (1991).

Borjas, George J. "The Economics of Immigration". Journal of Economic Literature (1994).

Chiappori, Pierre-Andre and Bernard Salanie. "Testing for Asymmetric Information in Insurance Markets", Journal of Political Economy (2000).

Burda, M., W. Hardle, M. Muller and A Werwatz. Semiparametric Analysis of German East-West Migration Intentions: Facts and Theory". Journal of Applied Econometrics (1998).

Cardon, James and Igal Hendel. "Asymmetric Information in Health Insurance Markets". Rand Journal of Economics (2001)

Carliner, Geoffrey. "Wages, Earnings, and the Hours of First, Second and Third Generation American Males". Economic Inquiry (1980).

Chiappori, Pierre-Andre and Bernard Salanie."Testing Contract Theory: a Survey of Some Recent Work". Prepared for the World Congress of the Econometric Society Seattle (2000).

Chiquiar, D., and G. Hanson. "International Migration, Self-Selection, And the Distribution of Wages: Evidence from Mexico and the United States". NBER Working Paper (2002).

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

Chiswick, Barry. "Are Immigrants Favorably Self-Selected?". The American Economic Review (1999).

Don, Yehuda. "Altruism and Cooperative Survival" in Jones P.C Svenjar (Eds.). Advances in the Economic analysis of Participatory and Labor Managed Firms. vol. 5 pp. 185-204 (1995).

Ferrie, Joseph P. "How Ya Gonna Keep 'Em Down on the Farm [When They've Seen Schenectady]? Rural to Urban Migration in the US, 1850-70". Prepared for the Cliometrics Conference (1999).

Ferrie, Joseph P. Yankeys Now: Immigrants in the Antebellum United States, 1840-1860. New York: Oxford University Press (1999).

Finckelstein, Amy and Kathleen McGarry. "Private Information and its Effect on Market Equilibrium: New Information from Long-Term Care Insurance". NBER (2003).

Gabriel, P., and S. Schmitz. "Favorable Self-Selection and the Internal Migration of Young White Males in the United States". Journal of Human Resources (1995).

Gavron, Daniel. The Kibbutz: Awaking from Utopia. Lanham, Boulder, New York and Boston (2000).

Gaynor, Martin and Paul Gertler. "Moral Hazard and Risk Spreading in Partnerships". Rand Journal of Economics (1995).

Getz, Shlomo. Surveys of Changes in Kibbutzim. The Institute for Study and Research of the Kibbutz. University of Haifa. (1990-2000).

Genesove, David. "Adverse Selection in the Wholesale Used Car Market". Journal of Political Economy (1993).

Greenwald, Bruce C. and Robert R. Glasspiegel. "Adverse Selection in the Market for Slaves: New Orleans, 1830-1860". Quarterly Journal of Economics (1983).

Heckman, James. "Varieties of Selection Bias". American Economic Review (1990).

Helman, Amir. "The Israeli Kibbutz as a Socialist Model". Journal of Institutional and Theoretical Economics. vol. 148, no. 1 pp. 168-181 (1990).

Helman, Amir. "Privatization, Efficiency and the Kibbutz System". Economic Quart. (1993) [Hebrew].

Lang, Kevin and Peter-John Gordon. "Partnerships as insurance devices: Theory and Evidence". Rand Journal of Economics (1995).

Lee, L. F. "Unionism and Wage Rates: a Simultaneous Equation Model with Qualitative and Limited Dependent Variables". International Economic Review (1978).

Leviatan, Uriel and Elliet Orchan. "Kibbutz Born Ex-Members and Their Adjustment to New Life Outside the Kibbutz". Interchange pp. 16-28 (1982).

Leviatan, Uriel. "Negative Selection Among Youngsters in the Kibbutz" [Hebrew].The Institute for Study and Research of the Kibbutz. University of Haifa (1996).

Liebig, Thomas and Alfonso Sousa-Poza. "How Does Income Inequality Influence International Migration?" Working Paper (2003).

Lieblich, Amiya. Kibbutz Makom. Jerusalem: Shocken (1981).

Maddala, G. S. Limited-Dependent and Qualitative Variables in Econometrics. Cambridge: Cambridge University Press (1983).

Manski, Charles. "Nonparametric Bounds on Treatment Effects". American Economic Review (1990).

Mellow, Wesley. "Unionism and Wage Rates: A Longitudial Analysis". Review of Economics and Statistics (1981).

Mincer, Jacob. "Family Migration Decisions". Journal of Political Economy (1978).

Near, Henry. The Kibbutz Movement: A History vol. 1. Oxford: Oxford University Press (1992).

Near, Henry. The Kibbutz Movement: A History vol. 2. Oxford: Oxford University Press (1992).

Newey, Whitney, James Powell and James R. Walker. "Semiparametric Estimation of Selection Models: Some Empirical Results". American Economic Review (1990).

Olson, Mancur. The Logic of Collective Action. Harvard University Press (1971).

Palgi, Michal and Shlomo Sharir. "Surveys of Public Opinion in the Kibbutzim". The Institute for Study and Research of the Kibbutz. University of Haifa. No. 83 (1990-2001).

Pavin, Avraham. The Kibbutz Movement: Facts and Figures. Yad Tabenkin (2001).

Robinson, C., and N. Tomes. " Self-Selection and Interprovincial Migration in Canada." Canadian Journal of Economics (1982)

Rosner, Menachem and A.S Tannenbaum. "Ownership and Alienation in Kibbutz Factories". Work and Occupations. Vol. 14(2) pp. 165-196 (1987).

Rosner, Menachem and Shlomo Getz. The Kibbutz in the Era of Changes. Haifa: Ha'kibbutz Ha'meuchad (1996).

Rosolio, Daniel. System and Crisis: Crisis, Adjustments and Changes in the Kibbutz Movement. Tel Aviv: Am Oved (1999).

Roy, A. "Some Thoughts on the Redistribution of earnings". Oxford Economic Papers (1951).

Satt, Ehud. "Relative Deprivation in the Kibbutz Economy: An Exploration of the Concepts of Equality and Equity". Economica (1996).

Shimoni, Uzi, Hana Goldberg, Jacob Glik and Menachem Rosner. "The Kibbutz Industry motivation". The Institute for Study and Research of the Kibbutz. University of Haifa (1994).

State of Israel. Qibbutzim and Their Population. Central Bureau of Statistics (2000).

State of Israel. Statistical Abstracts of Israel. Central Bureau of Statistics.

Willis, R., and S. Rosen. "Education and self-selection". Journal of Political Economy (1979).

NOTES

[1] The existing research is mainly sociological, and only observes a small number of individuals and Kibbutzim. This research is mainly based on "talent tests" that are given to movers and stayers (Nathan, Shenbal and Paskin [1982] and Orchan [1982]), or on former teachers' evaluations of the "talent level" of movers and stayers (Helman [1982]). Leviathan [1993] examines exit rates of members who held major positions in their Kibbutz. No convincing evidence of a brain drain was found.

[2] See Abramitzky [2003] for a theoretical and empirical analysis of the Kibbutz as an economic institution that provides members with optimal insurance contracts.

[3] An exception is the paper by Finckelstein and McGarry [2003] that tests directly for adverse selection.

[4] See Chiswick [1978], Carliner [1980], Borjas [1987], Chiquiar and Hanson [2002] and the surveys by Borjas [1994] and Chiswick [2002]. Burda et al. [1998] and Liebig and Sousa-Poza [2003] overcome these limitations by employing data on the intention to migrate.

[5] Gabriel and Schmitz [1995] also study internal migration and, thus, do not face policy restrictions. Their study, however, only observes individuals at one point in time.

[6] Barkai [1977] suggests that in the period 1936-1965, both disposable income and consumption per capita were above the country's average.

[7] Barkai [1977] for the period before 1970 and my data set for the period after.

[8] There are three major Kibbutz movements that are coordinating the activities of individual Kibbutzim.

[9] First, world prices of agriculture deteriorated, and second, Israeli agriculture is capital intensive, which played against it in the presence of high interest rates to borrow and invest in capital equipment.

[10] Part of the debt was canceled and other parts rescheduled.

[11] The causes of the crisis are still debated. Some claim that Kibbutzim were victims of the government's recovery plan to fight inflation and others claim that the Kibbutzim are to blame for the huge loans they took and for unprofessional accounting.

[12] See Abramitzky [2002] for evidence based on the analysis of Israeli censuses conducted in 1961, 1972, 1983 and 1995.

[13] See Abramitzky [2002] for a detailed discussion of the reforms.

[14] About 40 Kibbutzim are still debating their status.

[15] The "materialistic level" of a Kibbutz is proxied by the level of a member's satisfaction from the material level in their Kibbutz. "Ideological Kibbutz" is proxied by the level of a member's satisfaction from the level of "Kibbutz values" provided by the Kibbutz. These measures are obviously very problematic.

[16] On the one hand, members from less wealthy Kibbutzim are more likely to leave, resulting in an overestimation of δ_2 under my assumption. On the other hand, members from less wealthy Kibbutzim are expected to leave even when offered a lower income in the city, resulting in underestimation of δ_2 under my assumption.

[17] Although the distributional assumptions used in the analysis are standard, they are strong and might have substantial effects on the estimation (Heckman [1990], Manski [1990], Newey, Powell and Walker [1990]).

[18] See Greene [1997], Theorem 20.4 (p. 975).

[19] The exclusion restrictions were also tested using an F test and t tests, which rejected the hypothesis that they are omitted variables. That is, there is no evidence of Z_i terms not in X_i mattering apart from their effect through the Mill ratio, and no evidence of X_i terms not in Z_i mattering apart from their effect through $\ln(I_{ic}^{95})$.

[20] See Maddala [1983] pp. 223-228 and Amemiya [1985] pp. 399-402.

[21] Standard errors were corrected by bootstrapping through data resampling with 1000 repetitions to account for the fact that $\ln(I_{ic}^{95})$ is estimated rather than observed.

[22] By the assumptions of the model, those who left the Kibbutz would have earned the same (as those who stayed) had they decided to stay instead of leaving the Kibbutz.

[23] Gavron [2001, p. 68].

[24] A similar regression model was analyzed in the seminal work of Chiswick [1978] and Carliner [1980].

[25] The fact that they earn less than average high-skilled workers may be a result of their relatively young age (income increases with age before 49 and slowly decreases thereafter) or due to a lack of experience suited to the city.

[26] Borjas [1987] found, using US data, some evidence for negative selection of immigrants to the US from countries with a higher level of income inequality. His findings and methodology was criticized by Chiswick [1999] and others.

[27] This section draws on the application forms and interviews with all members of the Kibbutz's Department of Absorption and Demographic Growth. I am grateful to them for sharing the data and ideas with me.

[28] Poor Kibbutzim often cannot absorb individuals from the outside, as they hardly have the resources to build new apartments for children who decide to stay - still the main source of population growth. Poor Kibbutzim also face unemployment, which prevent them from absorbing new individuals from the outside. The very rich Kibbutzim often also do not accept new members from outside the Kibbutz, as they face demand for apartments from their own children. Kibbutzim in the center of Israel and those close to the sea are crowded with members and often do not have room for new housing.

[29] A main reason is that an applicant's city-wage and wealth are harder to verify compared to age, family size, profession and education. Whereas the latter are naturally revealed in the process of moving to a Kibbutz and finding a new job once there, the former can not be observed once the applicant moves to a Kibbutz.

[30] "Hours worked" is a more problematic measure of ability and is thus excluded from the analysis that follows. Nevertheless, including it only strengthens my claim: I find that individuals who worked more hours prior to entry are less likely to enter the Kibbutz (and all the other results presented below remain the same).

[31] Since the proportion of entrants to the Kibbutz is small, the assumption of a normal distribution might be strong. To check for robustness, I tried two other specifications: a Logit regression (with a logistic distribution) and a linear probability model. Results are qualitatively the same in all specifications.

[32] See Abramitzky [2003] for a theoretical and empirical study of the Kibbutz as a self-enforcing institution that balances insurance and incentives.

TABLES

TABLE I

Kibbutz Population, 1910-1999

Year	Number of Kibbutzim	Population
1910	1	
1920	12	805
1930	29	3877
1940	82	26554
1950	214	66708
1960	229	77955
1970	229	85100
1980	255	111200
1987	268	127000
1990	270	125100
1999	267	117400

Source: Pavin, The Kibbutz Movement: Facts and Figures (2001).

TABLE II

Education of Movers (% of movers)

year	no diploma	technicians	practical engineers	teachers	other diploma	BA	MA	PhD
1985	87.5	0.1		0.5	0.5	5.4	0.4	0.2
1986	84.8	0.2	0.3	0.8	0.3	5.6	0.8	0.3
1987	77.9	0.2	0.6	1	11.9	6.2	0.7	0.2
1988	73.3	0.2	1	2.2	14.3	8.2	0.8	0.1
1989	70.5	0.2	1.2	2.6	15.5	8.9	0.9	0.3
1990	70.8	0.2	1.1	2.4	15.3	8.6	0.8	0.7
1991	73	0.3	1.8	2.5	13.2	8.1	0.8	0.3
1992	70.2	0.3	1.5	2.7	14.1	8.9	1	0.8
1993	65	0.9	1.6	2.5	12.7	13.6	1.9	0.4
1994	59.6	0.3	2.8	3.6	14.7	15.2	1.6	0.7
1995	63.5	0.6	2.5	3.1	14.6	13.2	1.4	0.5
1996	62.4	0.4	2.8	3	12.8	16.5	1.2	0.4
1997	61.8	0.3	2.9	2.5	13.9	15.9	1.6	0.6
1998	60.4	0.3	2.6	2.8	15.2	16.4	1.2	0.7
1999	61.4	0.5	2.4	2.9	13.5	17.2	1.1	0.5
100	70	0.3	1.6	2.3	12.2	10.2	1	0.4
Total	17338	79	394	564	3016	2673	257	107

Source: Pavin, The Kibbutz Movement: Facts and Figures (2001).

TABLE III

Field of Study of Educated Movers (% of educated movers)

year	nature sciences	engineering	exact sciences	social sciences	economics and management	medicine	art	humanities	education
1985	5.9	10.9	4.2	14.3	8.4	10.9	7.6	16.8	21
1986	8.8	12.2	3.4	10.2	10.2	12.9	4.1	15.6	23.1
1987	9.5	14	4.1	4.5	8.1	12.7	7.2	12.7	20.8
1988	8.6	12.4	4.9	9	9	8.6	8.2	12.7	22.1
1989	8.9	15.4	3.8	9.6	9.6	10.6	7.2	9.6	21.5
1990	7.9	16.2	4.1	12.8	12.8	11.4	5.5	10	18.6
1991	8.5	18.1	2.6	11.1	11.1	8.1	7	12.6	19.6
1992	10.1	15.2	4.1	12.2	12.2	12.2	8.8	8.8	18.9
1993	9.9	21.3	3.5	10.8	10.8	9.6	11	7	15.2
1994	9.4	19	3.6	10.2	10.2	10.4	12	7.8	17.4
1995	9.2	20.4	4	11.5	11.5	10.6	6.6	7.8	18.4
1996	10.1	18.5	2	12.4	12.4	8.7	10	7.6	16.3
1997	6.8	20.6	3.1	13.2	13.2	9	9.3	8.7	14.1
1998	7.4	17.5	3	11.8	11.8	11.5	12	7.4	15.9
1999	7.5	21.7	3.1	11.1	11.1	9.2	9.5	7.5	13.6

Source: Pavin, The Kibbutz Movement: Facts and Figures (2001).

TABLE IV

Summary Statistics of Movers vs. Stayers, 1983-1995

	Stayed in Kibbutz		Left the Kibbutz	
Variable	Observations	Mean	Observations	Mean
Age	1258	34.94***	397	27.23***
Male	1258	0.5	397	0.54
Family Size	1258	3.57***	397	2.88***
At Least High School Diploma	1258	0.48**	397	0.54**
High-Skilled	1258	0.08	397	0.09
Low-Skilled	1258	0.23***	397	0.13***
Born in Israel	1258	0.68***	397	0.78***
Israel's North Region	1258	0.53	397	0.54
Israel's South Region	1258	0.19*	397	0.23*

t-test for difference in means significant at ***1% **5% *10%

TABLE V

Mover/ Stayer Analysis of Kibbutz Members, 1983-1995

Variable	Mean (1)	$\frac{\partial \Pr ob(Move)}{\partial X}$ (2)	$\frac{\partial \Pr ob(Move)}{\partial X}$ (3)	$\frac{\partial \ln (I_{ic}^{95})}{\partial X}$ (4)
Specification:		Reduced	Structural	OLS
Personal characteristics:				
Age	33.09	-0.025***	-0.051***	0.082***
Age squared		0.001	0.0007***	-0.002***
Male	0.51	0.009	-0.200***	0.681***
Family size	3.41	-0.018***	0.018***	
At Least High School Diploma	0.49	0.100***	-0.03	0.413***
High-Skilled	0.08	0.090**		0.357***
Low-Skilled	0.21	-0.093***		-0.249***
Born in Israel	0.71	-0.039	-0.039	
$\ln(\hat{I}_{ic}^{95})$	7.35		0.312***	
Kibbutz characteristics:				
Israel's North Region	0.53	0.044*	0.044*	
Israel's South Region	0.2	0.053*	0.055*	
Selection parameter:				
Mills Ratio				0.778***
Predicted Probability			0.203	0.203
Observations		1655	1655	397
R^2				0.326
Adjusted R^2				0.314
F				26.92***
LR ^{2}		255.49***	254.30***	

Coefficient significant at ***1% **5% *10%.

Notes: "High-Skilled" are individuals working in either academic or managerial occupations. “Low-Skilled” are individuals working in either unskilled occupation in industry or as service workers. A third group contains all other occupations. "Israel's North region” includes the following districts: Sefad, Kinneret,Yizrael, Akko and Golan. "Israel's South region" includes Ashkelon and Beer-Sheva districts.

TABLE VI

Movers' Wage Premiums (OLS), 1995

Variable	Mean (1)	Mean Mover (2)	Mean City (3)	$\frac{\partial \ln(Wage)}{\partial X}$ (4)
Age	42	36***	42***	0.585***
Age squared				-0.026***
Male	0.561	0.531	0.561	0.637***
Born in Israel	0.612	0.781***	0.610***	0.088***
At Least High School Diploma	0.558	0.781***	0.555***	0.258***
High-Skilled	0.218	0.329***	0.217***	0.321***
Low-Skilled	0.383	0.247***	0.385***	-0.247***
EXIT	0.016			-0.046
EXIT*Skilled	0.005			-0.167**
EXIT*Unskilled	0.004			0.154**
Constant				4.766***
Monthly Income (NIS)		6175	6203	
Observations		429	26,820	27,249
R^2				0.2994
Adjusted R^2				0.2992
F				1164.1***

Column (2) and (3): t-test for difference in means significant at *** 1% ** 5% * 10%

Column (4): coefficient significant at *** 1% ** 5% * 10%

Notes: "High-Skilled" are (~10%) individuals working in either academic or managerial occupations. "Low-Skilled" are (~10%) individuals working in industry or construction, or as service and sales workers. "EXIT" is an individual who lived in a Kibbutz in 1983 and outside the Kibbutz in 1995. "EXIT*Skilled" is an individual who left the Kibbutz and is working in a high-skilled occupation. "EXIT*Unskilled" is an individual who left the Kibbutz and is working in a low-skilled occupation. Notice that the "Low-Skilled" variable is not defined exactly the same as in the previous section due to the different ways occupations were grouped in the 1983 and 1995 censuses.

TABLE VII

Wage (NIS) of Movers vs. the Rest of the Jewish Population, 1995

	All occupations	High-Skilled	Low-Skilled
Movers	6175	7812***	5666***
Rest of Jewish Population	6203	9789***	5113***

t-test of difference in means significant at ***1% **5% *10%

TABLE VIII

Entrants' (Negative) Wage Premiums (OLS), 1983

Variable:	$\frac{\partial \ln(W_{83})}{\partial X}$	
Age	0.52***	
Age Squared	-0.026***	
Male	0.353***	
At Least High School Diploma	0.111***	
High-Skilled	0.114***	
Low-Skilled	-0.091***	
ENTER	-0.129**	
Observation:		
Entrants	67	
Non-Entrants	10943	
R^2		0.26
Adjusted R^2		0.26
F	552.14***	

Coefficient significant at *** 1% ** 5% * 10%

"High-Skilled" are individuals working in either academic or managerial occupations. "Low-Skilled" are individuals working in either unskilled occupation in industry or as service workers or in craft. "ENTER" indicates an individuals who joined a Kibbutz between 1983 and 1995.

TABLE IX

Probit Analysis of Entry to the Kibbutz, 1983-1995

$\frac{\partial \Pr ob(enter)}{\partial X}$

			measure of wealth used:			
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	Mean entrants	Mean non-entrants	wage	apartment size	(3) and (4)	IV for (4)
Observables:						
Age	28***	31***	-0.0011**	-0.0027***	-0.0008	-0.0011**
Male	0.57	0.51	0.0031**	0.0029**	0.0032**	0.0026*
Family size	3.18***	3.85***	-0.0013***	-0.0007	-0.0007	-0.0009*
At Least High School Diploma	0.75***	0.53***	0.0052***	0.0053***	0.0058***	0.0053***
High-Skilled	0.08	0.15	-0.0014	-0.0044*	-0.0026	-0.0028
Low-Skilled	0.22	0.18	0.0011	-0.0014	0.0016	0.0016
Unobservables:						
Wage (Old Shekels)	20735**	24921**	-0.0006**		-0.0007**	
Apartment Size (if own)	2.07***	2.81***		-0.0008**	-0.0007*	
IV for apartment size	2.7***	2.88***				-0.0047***
Observations:						
Entrants	51	8479	67	125	51	51
non-Entrants			10943	13856	8530	8479
Predicted Probability			0.0043	0.0066	0.004	0.0042
LR ^{2}			48.81***	69.56***	43.81***	41.83***

Notes: columns (1), (2): t-test of difference in means significant at ***1% **5% *10%

Column (3): coefficient significant at *** 1% ** 5% * 10%
"High-Skilled" are individuals working in either academic or managerial occupations. "Low-Skilled" are individuals working in either unskilled occupation in industry or as service workers or in craft. "Apartment Size" is the number of rooms in own apartment (equals 0 if the individual does not own apartment). The instrumental variable (IV) is a predicted value of the regression of apartment size on television ownership and wage. Summary statistics shown for smallest sample. Regression run on the smallest sample are very similar and the main result holds. All explanatory variables are 1983 characteristics.

FIGURE I: Kibbutz Population, 1966-2002

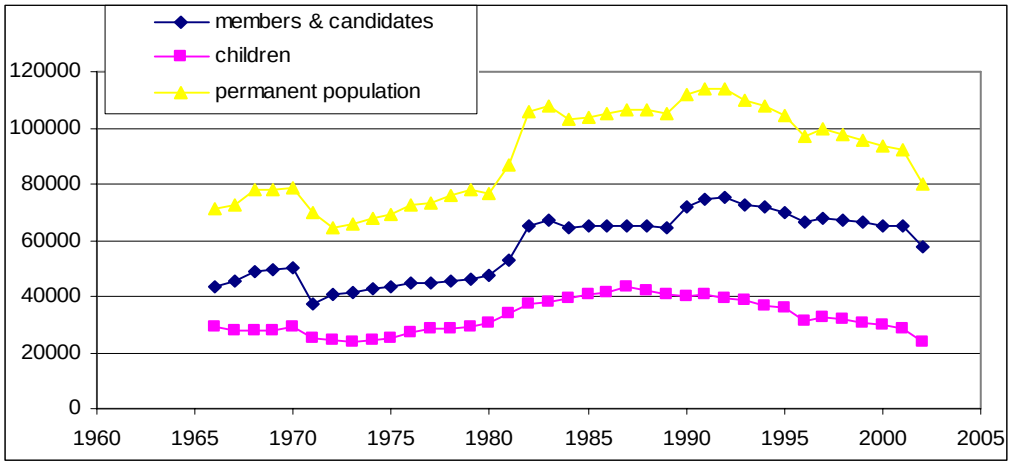

FIGURE II: Exit from the Kibbutz, 1966-2002