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## Testing Self-Selection in Migration: Evidence from the Israeli Kibbutz

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### **Abstract**

This paper tests the incentive theory's prediction that pay that is less sensitive to performance attracts lower quality workers. I use a longitudinal dataset of individuals entering and exiting Israeli Kibbutzim to test whether and to what extent equal-sharing discourages participation of productive individuals. The findings provide evidence for negative selection in entry to the equal-sharing communities and positive selection in exit. Entrants were negatively selected in their pre-entry earnings compared to non-entrants. Individuals who left the equal-sharing communities were positively selected in their education and skills compared to stayers, and they earned higher wages upon exit. At the broader level, these findings provide the first micro-level empirical support for Borjas' hypothesis that migrants' self-selection depends on the difference in earnings inequality between the origin and the destination.

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# 1 Introduction

Two main predictions of incentive theory are that equal-sharing, or team-based pay: 1) encourages free-riding (the incentive effect) and 2) discourages participation of high-ability individuals (the selection effect).<sup>1</sup> Yet, there is little empirical work on the selection effect, mainly because of data limitation.<sup>2</sup> This paper contributes to the literature by empirically addressing the question of whether, and to what extent, equal-sharing discourages participation of high-ability individuals. Specifically, I ask: are individuals who leave equal-sharing arrangements positively selected in their ability? And, are entrants to equal-sharing arrangements negatively selected?

I analyze a unique panel data set of individuals exiting and entering equal-sharing arrangements. These data on individuals linked across population censuses allow me to test for selection in both exit from and entry to Kibbutzim (plural of Kibbutz), which are communities that offered their members equal-sharing, i.e. team-based pay that is not sensitive to performance.

I test the hypothesis that Kibbutz-to-city migrants are positively selected and city-to-Kibbutz migrants are negatively selected. My empirical analysis supports the selection hypothesis. Specifically, movers are more educated and skilled than stayers and they earn higher wages upon exit than observably similar individuals. In contrast, entrants earn lower wages than individuals who did not enter. Moreover, following the approach developed in Finkelstein and McGarry (2006) and Finkelstein and Poterba (2006), I rely on observable characteristics that are not used by the Kibbutz in the application process, such as wealth and hours worked. I then document the presence of adverse selection attributable

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<sup>1</sup>A classic reference to the incentive effect of equal-sharing is Holmstrom (1982). Lazear (1986, 2000a, 2000b) highlighted the selection effect of pay schemes.

<sup>2</sup>The (scant) evidence provides a mixed answer to this question. Weiss (1987) finds that, in the context of workers in a pharmaceutical company, both high-ability and low-ability workers are more likely to leave than medium-ability workers. Lazear (2000a) finds that the average quality of workers in an auto glass company increased after the introduction of piece-rate pay. See also Prendergast (1999) for a survey of the literature on the provision of incentives in firms.

to asymmetric information between the applicant and the Kibbutz.

Moreover, I show that selection patterns vary across education levels. Whereas less educated Kibbutz-to-city movers earned higher wages upon exit than the average less-educated worker, the more educated movers did not. In contrast, more educated entrants earned lower wages prior to entry than observably similar non-entrants, but the less educated entrants did not. Finally, I show that positive and negative selection in exit and entry are driven by men. Women who exit and enter earn similar wages to those who do not.

I rule out alternative hypotheses that may explain the skill bias in exit from and entry to the kibbutz. I evaluate the hypothesis that the skill-bias in migration reflects the preferences of more skilled individuals to live in urban places (e.g. skilled individuals like the opera), rather than a selection away from equal-sharing arrangements. In particular, I test whether the selection effect of equal-sharing holds in exit from and entry to other rural areas. I find positive selection in exit from Kibbutzim to rural communities that do not practice equal-sharing, and negative selection in entry from such communities. These findings suggest that equal-sharing, rather than the rural environment, discourages the participation of high ability individuals. I also examine exit and entry from cities to Kibbutzim with exit and entry from cities to rural communities that do not practice equal-sharing. I find that while Kibbutz-to-city migrants earn higher wages upon exit than city natives, other rural-to-city migrants do not. Similarly, while city-to-Kibbutz migrants earn lower wages than individuals who did not migrate, city-to-other-rural area migrants do not. I then evaluate the hypothesis that individuals who plan to exit are not more able, but simply invest more in their human capital. In particular, I examine older movers who arguably made their investment in human capital years ago. I find positive selection of movers in all age groups.

Apart from empirically testing the selection effect of compensation schemes, this paper contributes directly to the migration literature by addressing some of its main questions. Are migrants positively or negatively selected from their source country? How do migrants

perform in terms of their earnings as compared to the native population? These questions have generated a great deal of attention and dispute over the last few decades (prominent contributions include Chiswick (1978), Borjas (1987) and Chiquiar and Hanson (2005)). This paper is among the first to test a well-known and much-disputed hypothesis, according to which positive self-selection of migrants is expected when the place of origin has a more equal earnings distribution than the destination, while a negative self-selection is expected when the place of origin has a more unequal earnings distribution (Borjas (1987, 1991, 1994)).

According to Borjas, positive (negative) selection occurs when individuals with high (low) skill levels leave the country of origin and outperform (underperform) the natives in the country of destination in terms of earnings. The basic idea is that a country with a low level of earnings inequality “insures” low-skilled individuals and “taxes” high-skilled individuals. However, the empirical relevance of this conjecture has been questioned (Chiswick (1999), Chiswick (2000) Liebig and Sousa-Poza (2003) Chiquiar and Hanson (2005)). First, migrants are observed only at the destination, but self-selection of migrants should be compared to that of non-migrants.<sup>3</sup> Second, Borjas’ measure of income inequality “may be poorly related to relative skill differentials” (Chiswick 1999, p. 184). Third, few studies have found evidence of the negative selection of migrants, regardless of whether the migrants come from origins with high or low income inequality.

The longitudinal data for individuals linked across the 1983 and 1995 Israeli population censuses allow me to test Borjas’ hypothesis directly while avoiding the above-mentioned critiques. First, I observe migrants in both the origin and the destination and, thus, can compare them both to non-migrants and to the population of the destination.<sup>4</sup> Second, in the period of study (1983-1995), Kibbutzim offered equal-sharing and, as such, they offered

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<sup>3</sup>Chiswick (1978), Carliner (1980), Borjas (1987), Chiquiar and Hanson (2005), and the surveys by Borjas (1994), Chiswick (1999), Burda, Härdle, Müller, and Werwatz (1998) and Liebig and Sousa-Poza (2003) overcome these limitations by employing data on the intention to migrate.

<sup>4</sup>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.

lower skill premia than do Israeli cities. Thus, Kibbutz-to-city migrants are moving from an origin with low earnings inequality to a destination with high earnings inequality, and city-to Kibbutz migrants are moving from high-inequality origin to low-inequality destination.

This paper provides empirical support, at the individual level, for Borjas' hypothesis. Yet, the analysis reveals that the type of selection is not necessarily the same for all migrants and it may vary with education-level and gender.

This paper also contributes to an understanding of organizations that are subject to self-selection. These include professional partnerships, cooperatives, and labor managed firms, which often are based on revenue-sharing.<sup>5</sup> For example, in professional partnerships such as law firms, just as in Kibbutzim, high-ability partners may exit to earn a wage premium for their ability outside of the partnership.<sup>6</sup> The paper will investigate explicitly the relative quality of partners in exit and entry.

Finally, the literature on Kibbutzim emphasizes the importance of sociological factors.<sup>7</sup> In contrast, the findings of this paper reveal the importance of economic incentives in such communities.<sup>8</sup> Elsewhere, I show that a recent shift of Kibbutzim away from equal-sharing was a rational economic response to the negative selection documented in this paper.<sup>9</sup>

Section 2 provides a brief theoretical framework based on Borjas' selection hypothesis for migrants. The environment and data sources used in the analysis are described in Section 3. Section 4 tests the hypothesis that Kibbutz-to-city migrants are positively selected compared to non-migrants and evaluates the hypothesis that equal-sharing en-

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<sup>5</sup>Theoretical contributions include Ward (1958), Farrell and Scotchmer (1988), Kandel and Lazear (1992), Kremer (1997), and Levin and Tadelis (2005). The studies by Craig and Pencavel (1992), and Gaynor and Gertler (1995) focus on the effect of revenue sharing on productivity; Craig (1994) focuses on a cooperative's response to shocks compared to conventional firms; Lamoreaux (1995) studies the choice between partnerships and other forms of organization in early 19th century American business; Garicano and Hubbard (2005) study law firms' field boundaries.

<sup>6</sup>See Levin and Tadelis (2005)

<sup>7</sup>See, for example, Talmon (1972), ?, Don (1995), Rosner and Getz (1996), Rosolio (1999), and Leviatan and Rosner (2000).

<sup>8</sup>Berman (2000) studies the role of economic incentives in Jewish Ultra Orthodox communities.

<sup>9</sup>See Abramitzky (2005) for a theoretical and empirical analysis of Kibbutzim as insurance devices subject to participation constraints by their members.

courages productive individuals to exit (against alternative hypotheses). Section 5 further investigates positive selection in exit by testing whether, upon exit, Kibbutz-to-city migrants earn higher wages than city natives. I show that this positive selection effect does not hold in general for rural-to-city migration. This section also examine differences in selection patterns across genders and education levels. Section 6 tests the hypothesis that entrants to the Kibbutz are negatively selected compared to non-entrants in terms of their pre-entry earnings. I show that this negative selection varies with education-level and does not hold in general for city-to-rural migration. Section 7 concludes.

Appendix A conducts a two-step estimation to account for possible selection over unobservables of Kibbutz movers vs. stayers (as opposed to Section 5, which examines selection over unobservables of Kibbutz movers vs. native individuals of the city). Appendix B tests whether the negative selection in entry is driven by asymmetric information between applicants and the Kibbutz. I find evidence for adverse selection over characteristics such as wealth and hours worked that are unobservable-to-Kibbutz. Appendices C through G conduct various robustness tests of the results.

## **2 Theoretical Framework**

Although understudied empirically, the theoretical prediction that equal-sharing discourages participation of high-ability individuals is straight forward. High-ability workers are more likely to be attracted to pay-for-performance schemes and low-ability workers are more likely to be attracted to team-based pay (equal-sharing). This is a straight forward prediction of standard incentive theory.

The simple theoretical framework in this section is intended to illustrate how the migration literature uses this insight in the context of selection of migrants to and from origins where sharing is more equal.

Borjas (1987) and Chiquiar and Hanson (2005) show that migrants' selection depends on the differences in earnings inequality between the origin and the destination. Migrants

from origins with low earnings inequality are expected to be positively selected (i.e. they have higher-than-average skill); migrants from origins with high returns to skill and earning inequality are negatively selected (they have lower-than-average skill). To illustrate, assume that individuals from the Kibbutz (indexed by 0) choose whether to migrate to an Israeli city (indexed by 1). The Kibbutz involves full earning equality:

$$\ln(w_0) = \mu_0 \tag{1}$$

where  $w_0$  is the wage in the Kibbutz and  $\mu_0$  is the base wage in the Kibbutz. If the population of Kibbutz members were to migrate to the city, they would earn

$$\ln(w_1) = \mu_1 + \delta_1 s \tag{2}$$

where  $w_1$  is the wage for Kibbutz migrants in the city,  $\mu_1$  is the base wage in the city,  $s$  is the level of skill, and  $\delta_1$  is the return to skill. Like Chiquiar and Hanson (2005), I focus mainly on migrants' selection over observable skills, that is education and occupation, but I also account for selection in unobservable skills, that is, migrants' unobservable (to the researcher) characteristics that are associated with a higher (or lower) level of earnings.

Kibbutz members migrate to the city if

$$I = \ln(w_1) - \ln(w_0 + C) \approx \mu_1 + \delta_1 s - \mu_0 - c > 0 \tag{3}$$

where  $C$  represents migration costs and  $c = \frac{C}{w_0}$  represents the “time equivalent” measure of the cost of migrating from the Kibbutz to the city. The cost of migrating from the Kibbutz include both direct costs and indirect costs attributable to the fact that migrants cannot take with them their physical assets (e.g., their house and their share of the public goods and plants). Equation 3 defines a cutoff skill level above which Kibbutz members would migrate to the city. That is, we expect Kibbutz-to-city migrants to be positively selected from the Kibbutz population. This is illustrated in Figure 1, which shows that individuals with a skill level below  $s^*$  remain in the Kibbutz, and individuals with a skill level above

$s^*$  migrate to the city. This result does not change even if migration costs decrease with the level of skill,  $s$ . Because the wage in the Kibbutz is not a function of skills,  $\mu_1 + \delta_1 s - c$  and  $\mu_0$  will only cross once, regardless of whether  $c$  is constant or decreasing in the level of skill,  $s$ . This result only holds for a constant  $\ln(w_0)$ . It is a special case of Chiquiar and Hanson who show that the type of selection might change when migration costs vary with skill.

The city-to-Kibbutz migration can be described similarly. Because the Kibbutz offers lower returns to skill and higher earning equality, we expect city-to-Kibbutz migrants to be negatively selected from the city population. The main difference here is that the Kibbutz is well-aware of the tendency of low-skilled individuals to attempt to enter and does not admit applicants with (observed) skill levels below  $s^*$ . However, individuals may have private information on their skills (unobserved by the Kibbutz) and enter if their privately observed skills are low (adverse selection). The census data used in this study contain information on pre-entry wealth and earnings that were unobserved or overlooked by Kibbutz officials. Hence, I have information available only to the more informed party, which enables me to test for adverse selection in entering the Kibbutz. The centralized screening agency of Kibbutzim is described in Appendix B.

### 3 Data

In the period of study, Kibbutzim are communities based on full income-sharing across members. Between 80% and 95% of Kibbutz members worked inside their Kibbutz in the period of study (1983–1995).<sup>10</sup> Each member was paid an equal wage, regardless of the contribution to the collective. Kibbutz members who worked outside their Kibbutz would bring their salary in, and it would be split equally across members.

Each Kibbutz member can leave the Kibbutz and earn a premium for ability and effort outside the Kibbutz, but the movers cannot take with them their share of the Kibbutz

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<sup>10</sup>See the Central Bureau of Statistics (2000)

assets (house, plants, public goods). This makes moving costly. Kibbutz-born individuals are entitled to stay in their Kibbutz.<sup>11</sup> Individuals from outside the Kibbutz can apply for membership, which requires the approval of the Kibbutz.

The first Kibbutz (Degania) was established in 1910 primarily as a communal farm aimed at full equal-sharing as reflected in the Marxist idea “from each according to his ability to each according to his needs”. Today, however, most Kibbutzim have factories and an industrial base alongside agriculture. In 1995, the Kibbutz movement consisted of 120,000 members in 268 Kibbutzim, located all over Israel, and it accounts for 2.6% of the Jewish population in Israel. It always had been perceived that the standard of living of Kibbutzim was at least as high as that of the rest of the Jewish population of Israel (Barkai 1977, Klinov and Palgi 2006). Table 1 shows the development over time of the total number of Kibbutzim and their population. As will be shown later, about 20% of members between the age of 21 and 54 left their Kibbutz between 1983 and 1995.

The data set used here is a random representative sample of individuals linked between the 1983 and the 1995 Israeli Censuses of Population (the link was done by the Israeli Central Bureau of Statistics). The data include all Israeli citizens who answered the “extensive questionnaire” in both years: it was given at each census to 20% of the households in a way that adequately represented the entire population. Thus, the matched sample accounts for a representative 4% of the Israeli population (including a representative 4% of Kibbutz members). The data identify individuals who live in “a cooperative rural settlement, in which production, marketing, and consumption are organized in a cooperative manner.” This uniquely defines Kibbutz members. For this study, I employ three main sub-samples:

(1) 1983 Kibbutz members also observed in 1995. This sample allows me to compare Kibbutz-to-city migrants with Kibbutz members who stayed in the Kibbutz.

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<sup>11</sup>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 stayed in their Kibbutz. This implies that a Kibbutz’s ability to retain its members has been critical to its stability and population growth.

(2) Outside-of-Kibbutz residents observed in 1995 (including individuals who migrated from the Kibbutz between 1983 and 1995). This sample allows me to analyze the earnings of Kibbutz-to-city migrants in the city labor market compared to earnings of city natives.

(3) Outside-of-Kibbutz residents observed in 1983 (including individuals who would later migrate to the Kibbutz between 1983 and 1995). This sample allows me to compare city-to-Kibbutz migrants with individuals who stayed in the city.

To make these comparisons meaningful, I concentrate on Jewish individuals who were between the ages of 21 and 54 in 1983 (and thus between the ages of 27 and 66 in 1995). A total of 343 out of the 1577 individuals in the sample left the Kibbutz between 1983 and 1995, over 20%. A total of 77 out of 15948 individuals entered a Kibbutz in this period, less than 0.5%. Entry is low in part because Kibbutzim are well-aware of the tendency of low-ability individuals to apply; they engage in centralized screening to mitigate adverse selection.<sup>12</sup> Note that this makes it more difficult to document negative selection in entry, and my results probably provide a lower bound for the negative selection in entry.

The dataset has a couple of important shortcomings. First, because of confidentiality concerns of the Israeli Central Bureau of Statistics, the data do not provide information on the specific Kibbutz of individuals. For both 1983 and 1995, I can only identify whether individuals live inside a Kibbutz (any Kibbutz), but cannot tell which Kibbutz (I can only control for the location of the Kibbutz). This can create a bias in the analysis of exit, because the selection may be different across Kibbutzim. Since exit rates are higher in the poorer Kibbutzim (see Abramitzky (2005)), considering only an average Kibbutz might make it more difficult to document positive selection in exit. Further, wages inside the Kibbutz are not recorded in the population censuses. Thus, when examining Kibbutz-to-city migrants, I must compare movers to stayers in their education and skills rather than

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<sup>12</sup>A central body, the Kibbutz's Department of Absorption and Demographic Growth, is in charge of the screening process for individual applicants to the Kibbutz and imposes strict rules on entry.

Only about one-third of the Kibbutzim absorb new members from outside the Kibbutz. These Kibbutzim are typically "average" (neither rich nor poor) and are more likely to be located in Israel's far south and far north.

in their wages.

## 4 Movers From Kibbutzim Are Positively Selected Compared to Stayers

To test for selection in exit, I run a Probit regression that takes the value 1 when an individual left the Kibbutz between 1983 and 1995. This is a reduced form of individuals' decision of whether to stay or leave. Specifically, assume that an individual chooses whether or not to migrate ( $D_i^*$ ) based on her individual and location characteristics ( $W_i$ ). The individual migrates if an unobservable criterion function is positive:

$$D_i^* = \delta_1 W_i + u_i \quad (4)$$

where  $E(u_i) = 0$  and  $var(u_i)$  is normalized to 1 without loss of generality. Because we do not observe  $D_i^*$ , we do observe whether the individual moved or stayed (denote as  $D_i$ ) It follows that,

$$D_i = 1 \text{ if } D_i^* > 0 \quad (5)$$

$$D_i = 0 \text{ otherwise}$$

Table 2 suggests that Kibbutz-to-city migrants are more educated and more skilled than stayers. Column 1 shows the mean characteristics of individuals who stayed in their Kibbutz between 1983 and 1995, and Column 2 shows the mean characteristics of individuals who left their kibbutz during this period. The third column presents the results from the Probit regression.

The regression analysis suggests that having at least a high school education increases the exit rate by 9.8 percentage points. Members with high-skill occupations are over 8 percentage points more likely to leave the Kibbutz and low-skill members are over 9 percentage points less likely to exit.

One potential concern with tests of the effect of skills on migration is that the skill-bias could be attributed either to selection or to “selective” investment in human capital. The application studied in this paper allow me to alleviate this problem. The period of study is one of increased migration (25% of Kibbutz members in the sample left between 1983 and 1995) following an exogenous crisis that hit the Kibbutz (for more details on the crisis, see Abramitzky (2005)). Under these circumstances, the skill-bias of movers (compared to stayers) more likely reflects the effect of skill on migration (the selection hypothesis) rather than differential investment in human capital of migrants compared to non-migrants.

As a robustness check, I conduct the same analysis on subsamples of individuals who were over 30, 35, and 40 years of age in 1983. Older individuals had already invested in their human capital years before the period studied here (probably with the intention of staying, otherwise they would have left much earlier) and their decisions are less likely represent selective investment in human capital. That last fact is even more true in the Kibbutz, where one cannot save privately and cannot take her share of the Kibbutz (e.g. her house, her share in the Kibbutz plants, public goods) with her upon exiting, making the move more costly at an older age.

The results of the Probit regression (1 if left the Kibbutz) of subsamples of individuals at different ages are reported in Table 3. The first column considers all individuals over age 21 in 1983. The second column considers only individuals who are at least 30 in 1983. The third column considers individuals over 35 and the fourth column considers individuals over 40. The regression results suggest that (under all specifications), the more educated and higher-skill workers are more likely to exit, and the low-skill workers are less likely to exit. That is, the effect of education and skill on the probability of migrating is economically large and statistically significant, even when older individuals who probably only migrated as a result of the crisis are considered.

This result of positive selection of movers vs. stayers is robust to various measures of ability. More specifically, Table C1 presented in Appendix C shows that individuals with

at least a Bachelors' degree are over 10 percentage points more likely to exit (Table C1, column 2). Table C1 also suggests (columns 3-5) that the coefficient on education and skill is higher when the regression uses either education or skill (but not both).

The exit of the educated and skilled is robust to considering men and women separately and when I introduce occupation dummies. These results are presented in Appendix D (Table D1). Column 2 of Table D1 presents the regression results for men, and column 3 presents the results for women. Column 4 of Table D1 presents the results from a regression that breaks the "High-skilled" and "Low-skilled" dummies into the eight occupation categories provided by the census. The regression shows that Kibbutz members with academic occupations are the most likely to exit and that unskilled industrial workers are the least likely to exit.

The educated and skilled are more likely to exit, either to cities and or to rural locations where earnings are not based on equal-sharing. These findings, shown in Table 4, imply that equal sharing, rather than preferences of productive individuals to live in the city, discourages Kibbutz participation among productive individuals. Table 4 presents the results of separate Probit regressions of Kibbutz-to-city and Kibbutz-to-rural migration. The first three columns show the 1983 (pre-exit) mean characteristics of members who stayed in their Kibbutz, of Kibbutz members who left for a rural location, and of Kibbutz members who left for a city, respectively. Column 4 shows the results of the Probit regression for Kibbutz-to-rural migration, and column 5 shows the results of the Probit regression for Kibbutz-to-city migration.

The next section tests whether movers away from equal-sharing have unobservable characteristics associated with higher wages relative to observably similar individuals working under pay-for-performance. In contrast, the current section accounts for the possibility of unobservable characteristics of movers compared to *stayers*. I use a 2-step Heckman regression. The first step is a selection Probit regression of exit. The second step is an OLS regression of post-exit (in 1995) earnings of movers on pre-exit (1983) characteristics,

accounting for potential selection in the migration decision. The exclusion restriction assumption is that whether an individual is married, and the size of his family, affect his migration decision but not his earnings. This specification is described in more detail in Appendix A. The results are presented in Table E1 of Appendix E. The first step (Probit regression of exit) is presented in column 2 of Table E1. The second step (OLS regression) is presented in column 3 of Table E1. Regressions using alternative exclusion restriction assumptions are presented in Table E2. Columns 1 and 2 again present the first and second steps using the exclusion restrictions just described. Columns 3 and 4 present the first and second steps using whether a Kibbutz member is divorced as the exclusion restriction (instead of whether he is married). Columns 5 and 6 assume that whether a Kibbutz member is divorced in 1983 and whether he lived in the Kibbutz in 1978 affect his migration decision, but not his 1995 earnings. The results are similar under these specifications and there does not appear to be additional selection over unobservable characteristics. That is, the coefficient on the Mill-ratio in all regressions is not statistically different from zero.

The results of positive selection corroborate the observation made by a secretary of Kibbutz Givat Brenner in 2001. He summarizes the process that has taken place in his Kibbutz during the last two decades:<sup>13</sup>

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 (Table 2, column 3. See also Tables 3 and C1 for alternative specifications discussed above). Young Kibbutz members are more likely to leave. Married members are less likely to exit. Israeli-born Kibbutz members are less likely to leave their Kibbutz than overseas migrants. Members from

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<sup>13</sup>Gavron (2000, p. 68)

Kibbutzim in the far north and south of Israel were 5 percentage points more likely to leave their Kibbutz.

## 5 Movers Earn Higher Wages Than City Natives Upon Exit

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.<sup>14</sup>

To test how Kibbutz-to-city migrants perform in the city labor market, I run the following OLS regression of 1995 earnings on 1983 characteristics and dummy variables for whether the individual exits from a Kibbutz, and whether he exits with a high-level of education:

$$\ln(Wage_i^{95}) = \alpha + \beta' X_i^{83} + \delta_1 EXIT_i + \delta_2 (EXIT * Educated^{83})_i + \varepsilon_i \quad (6)$$

where  $Wage_i^{95}$  is the 1995 wage of individual  $i$  in the city;  $X_i^{83}$  is individual  $i$ 's 1983 characteristics expected to affect her wage;  $EXIT_i$  is a dummy variable that equals 1 if individual  $i$  left her Kibbutz between 1983 and 1995; and  $(EXIT * Educated^{83})_i$  is a dummy variable that equals 1 if individual  $i$  left the Kibbutz with at least a high school diploma in 1983. The coefficients of interest are  $\delta_1$  and  $\delta_2$ , which test whether Kibbutz-to-city migrants have unobservable (to the researcher) characteristics that are associated with higher wages once in the city.

I consider three different subsamples of 1995 locations: city (to consider Kibbutz-to-city migration), rural (to consider Kibbutz-to-rural migration), and either rural or city (to consider Kibbutz-to-outside-of-Kibbutz). Table 5 presents the results. The first three columns

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<sup>14</sup>A similar regression model was analyzed in the work of Chiswick (1978) and Carliner (1980).

presents the mean characteristics of the entire sample, Kibbutz-to-outside-of-Kibbutz migrants, and native individuals outside the Kibbutz, respectively. Column 4 presents the OLS regression results of 1995 earnings of outside-of-Kibbutz individuals on 1983 characteristics. Column 5 presents the OLS regression results of 1995 earnings of individuals in cities on 1983 characteristics. Column 6 presents the OLS regression of 1995 earnings of individuals in rural locations on 1983 characteristics.

The first three columns of Table 5 show that the average Kibbutz mover in 1983 (before migration) is younger (29.5 years old) than the average Israeli Jew (33 years old) and more educated (61.8% have at least a high school diploma compared to 51% in the Jewish population outside the Kibbutz), but is less likely to have a high-skill occupation (9.9% as compared with 14%), and more likely to work in a low-skill occupation (13.4% as compared with 8.4%). The Table shows that, on average (and without controlling for individuals' characteristics), Kibbutz movers earn higher wages than the Jewish average wage (5178NIS compared with 4939NIS).

The regressions presented in columns 4-6 of Table 5 suggest that Kibbutz movers earn higher wages than both city natives and rural natives, indicating that Kibbutz-to-city migrants have unobservable characteristics that are associated with higher wages in the Israeli labor market. In cities, this effect is driven by less educated migrants. That is, whereas less educated Kibbutz-to-city migrants earn more than natives with similar education level (i.e.  $\delta_2$  is negative and significant), more educated Kibbutz-to-city migrants earn similar wages to those of educated workers in the Israeli labor market (i.e.  $\delta_2$  is negative and significant and similar in magnitude to  $\delta_1$ ).

These results are consistent with the selection hypothesis because less-educated workers who were willing to leave the Kibbutz and forgo sharing their income with more-educated workers are expected to be more talented than average less-educated workers. Following the same logic, more-educated workers who leave the Kibbutz are not expected to earn more than average higher-skilled workers. These results also suggest that, unlike the typical

assumption in the migration literature, the type of selection with respect to the population of the destination might differ across individuals with different observable characteristics (such as educational level).

One concern is that rural-to-city migrants are always positively selected and that positive selection occurs regardless of the equal-sharing in the Kibbutz. To evaluate this claim, I compare the selection of Kibbutz-to-city migrants with other rural-to-urban migrants. I run the following regression:

$$\left\{ \begin{array}{l} \ln(Wage_i^{95}) = \alpha + \beta' X_i^{83} + \delta_1 (KibbutzMover)_i + \delta_2 (EducatedKibbutzMover)_i \\ \quad + \delta_3 (RuralMover)_i + \delta_4 (EducatedRuralMover)_i + \varepsilon_i \end{array} \right\} \quad (7)$$

where  $Wage_i^{95}$  is the 1995 wage of individual  $i$  in the city;  $X_i^{83}$  is individual  $i$ 's 1983 characteristics expected to affect her wage;  $(KibbutzMover)_i$  is a dummy variable that equals 1 if individual  $i$  left her Kibbutz between 1983 and 1995 (this variable was called *EXIT* in regression 6);  $(EducatedKibbutzMover)_i$  is a dummy variable that equals 1 if individual  $i$  left the Kibbutz with at least a high school diploma in 1983 (this variable was called *EXIT \* Educated*<sup>83</sup> in regression 6);  $(RuralMover)_i$  is a dummy variable that equals 1 if individual  $i$  left a rural location not based on equal-sharing between 1983 and 1995; and  $(EducatedRuralMover)_i$  is a dummy variable that equals 1 if individual  $i$  left a rural location not based on equal-sharing with at least a high school diploma in 1983.

The coefficients of interest again are  $\delta_1$  and  $\delta_2$ , which indicate whether Kibbutz-to-city migrants have unobservable (to the researcher) characteristics that are associated with higher wages once in the city. Coefficients  $\delta_3$  and  $\delta_4$  indicate whether rural-to-city migrants have unobservable (to the researcher) characteristics that are associated with higher wages in the city.

The results are shown in Table 6. The first four columns present the mean characteristics of the entire sample, Kibbutz-to-city movers, other rural-to-city movers, and city natives, respectively. Column 5 presents the OLS regression results. The regression shows that

while Kibbutz-to-city migrants earn higher wages than city natives, other rural-to-urban migrants do not. As already mentioned, this positive selection result is driven by the less educated Kibbutz-to-city migrants who earn higher wages than similar city natives.

Another concern is that the education system in the Kibbutz is different from that of the rest of Israel. To address this concern, I consider individuals with at least a Bachelors' degree (instead of a high school diploma), which only can be achieved outside the Kibbutz. The results are all similar under this specification. The results of regression 6 using "at least Bachelors' degree" are presented in Table F1, columns 1 (for outside of Kibbutz), 2 (city), and 3 (rural). Interestingly, Kibbutz-to-rural migrants earn more than similar rural natives, but Kibbutz-to-rural migrants with at least a Bachelors' degree earn lower wages than similar rural natives. The results of regression 7 are presented in Table F2, column 3.

The results also are robust to considering men and women separately. Columns 1-3 of Table F3 present the results of regression 6 for men and columns 4-6 present the results for women; columns 1 and 2 of Table F2 present the results of regression 7 for men and women, respectively, and for including occupation dummies instead of dummy variables for high-skill and low-skill occupations (Table F1, columns 4-6 for regression 6 and Table F2, column 4 for regression 7). Interestingly, the regressions show different selection patterns for men and women. In particular, female Kibbutz-to-city migrants earn similar wages to city natives. Less educated men who move from the Kibbutz to the city earn higher wages than similar city natives, but more educated men who move to cities earn lower wages than similar city natives.

## **6 Entrants to Kibbutzim Are Negatively Selected compared to Non-Entrants**

To test for selection in entry, I run an OLS regression of 1983 earnings on 1983 characteristics and dummy variables for whether the individual subsequently entered a Kibbutz (between 1983 and 1995) and whether she entered with a high-level of education. Specifi-

cally, I use three alternative specifications and conduct the following regression analyses:

$$\ln(Wage_i^{83}) = \alpha + \beta' X_i^{83} + \delta_1 (ENTER)_i + \varepsilon_i \quad (8)$$

$$\ln(Wage_i^{83}) = \alpha + \beta' X_i^{83} + \delta_1 (ENTER)_i + \delta_2 (ENTER * Educated^{83})_i + \varepsilon_i \quad (9)$$

$$\left\{ \begin{array}{l} \ln(Wage_i^{83}) = \alpha + \beta' X_i^{83} + \delta_1 (ENTER)_i + \delta_2 (ENTER * Educated^{83})_i \\ \quad + \delta_3 (EnterRural)_i + \delta_4 (EnterRural * Educated^{83})_i + \varepsilon_i \end{array} \right\} \quad (10)$$

where  $Wage_i^{83}$  is the individual's wage earned outside the Kibbutz in 1983;  $X_i^{83}$  is a vector of characteristics believed to affect wages and including age, age squared, gender, a dummy for Israeli born, education, and occupation;  $(ENTER)_i$  is a dummy indicating whether the individual entered a Kibbutz between 1983 and 1995;  $(ENTER * Educated^{83})_i$  is a dummy that equals 1 if individual  $i$  entered a Kibbutz between 1983 and 1995 with at least a high school diploma (in 1983);  $(EnterRural)_i$  is a dummy indicating whether the individual entered a rural location not based on equal-sharing between 1983 and 1995;  $(EnterRural * Educated^{83})_i$  is a dummy that equals 1 if individual  $i$  entered a rural location not based on equal-sharing with at least a high school diploma in 1983. If equal-sharing discourages participation of high earners, then I expect  $\delta_1$  and/or  $\delta_2$  to be negative. If rural environment is a driving force behind this negative selection, then  $\delta_3$  and/or  $\delta_4$  are expected to be negative.

Table 7 presents the mean characteristics in 1983 of the entire sample (column 1), city-to-Kibbutz migrants (column 2), and native workers of the city (column 3). The average individual who entered a Kibbutz is younger than the average Israeli (28.9 vs. 34.4 years old) and is more educated than non-entrants (68.8% possess at least a high-school diploma vs. 51.3% in the general population). He or she is just as likely to work in a high-skill occupation as the average worker, and is just as likely to work in a low-skilled occupation. However, the Kibbutz entrants' wage is substantially lower than that of non-entrants (19453 old Israeli shekels vs. 25514 Shekels).

Table 8 presents the main results of selection in entry to the Kibbutz. The three columns of the table show the results of the three OLS regressions, respectively. The regression

results suggest that city-to-Kibbutz migrants are negatively selected. The coefficient on the entry variable in regression 8 ( $\delta_1$ ) is negative, large and significant, suggesting that entrants to the Kibbutz earn lower wages prior to entry than non-entrants. The results from regression 9 reveal that the negative selection is coming from the more educated entrants ( $\delta_1$  is zero and  $\delta_2$  is negative and large) In particular, individuals who entered a Kibbutz with at least a high school diploma earn lower wages prior to entry than similar non-entrants. The results from regression 10 suggest that other city-to-rural migrants earn *higher* wages prior to migration than city natives who did not move (this effect is driven by less educated city-to-rural migrants).

Tables G1 and G2 of Appendix G estimate these three regressions separately for men and women. Interestingly, the estimation results suggest that while men who entered a Kibbutz are negatively selected (as described above), women are not. In particular, women who entered a Kibbutz earned similar wages to those who did not enter.<sup>15</sup> One reason for the difference in the patterns of selection across genders could be that men's wages are higher fraction of household income and thus are more important in the migration decision.

Clearly I only observe individuals who actually entered, rather than all applicants. However, this should make it more difficult to document negative selection, implying that the results here provide a lower bound for negative selection. While Kibbutz-born individuals can stay regardless of their ability, the Kibbutzim can avoid accepting low-ability individuals from the outside. Indeed, Kibbutzim are well aware of the tendency of low-ability individuals to apply and they have designed a central body that imposes strict rules of entry in order to avoid adverse selection.

Appendix B elaborates on the application process and suggests a test for adverse selection caused by asymmetric information between the applicant and the Kibbutz. What allows me to test for adverse selection is the fact that the census data contain information

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<sup>15</sup>Educated women who moved to a rural location not based on equal-sharing, on the other hand, earned lower wages prior to entry.

on individuals' pre-entry wealth and hours worked, which are not observable (apartment size, hours worked) or are difficult to verify (wage) by Kibbutz officials. I conduct a Probit regression analysis of entry to Kibbutzim accounting for both the characteristics that are observable-to-Kibbutz and the ones that are unobservable-to-Kibbutz. The regression results, presented in Table 9, suggest that while entrants are not negatively selected over characteristics that are observable to the Kibbutz, they are adversely selected over unobservable characteristics. In particular, individuals who work fewer hours at jobs are more likely to enter a Kibbutz, as are individuals with lower wages and smaller apartments

The negative selection result supports Borjas' hypothesis. According to Borjas, migrants tend to come from the "lower tail of the home country's income distribution" (Borjas 1987, p. 534) if the place of origin has a more unequal income distribution than the destination. If negative selection is present, and indeed entrants to the Kibbutz are less able than non-entrants, then, *ceteris paribus*, one expects potential entrants to the Kibbutz to earn less than individuals who do not enter. Nevertheless, supporting this conjecture has not been successful so far.<sup>16</sup>

On the contrary, much of the literature postulates that migrants always will be positively selected regardless of income distribution of origin and destination. The positive 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, then one expects to observe that potential migrants *ceteris paribus* earn more than individuals who do not migrate.

## 7 Conclusion

This paper tests the selection effect of equal-sharing, which is one of the key predictions of incentive theory. I use a unique data set of individuals entering and exiting communities

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<sup>16</sup>Borjas (1987) found, using U.S. data, some evidence for negative selection of immigrants to the US from countries with a higher level of income inequality. His findings and methodology were criticized by Chiswick (1999) and others.

that are based on equal-sharing. My findings provide support for positive selection in exit and negative selection in entry. Individuals who move from equal-sharing to a pay-for-performance environment are positively selected in terms of both their observable and unobservable characteristics. In particular, movers are more educated and skilled than stayers and they earn higher wages (compared to similar individuals) under the pay-for-performance scheme. Entrants to the equal-sharing communities earned lower wages prior to entry in the pay-for-performance environment and they worked shorter hours.

The selection effect also forms the basis for Borjas' hypothesis that selection (either positive or negative) depends on the relative earnings inequality of the origin and destination. This paper provides one of the first empirical foundations for the selection hypothesis.

At the same time, the results reveal the limitations of looking for a uniform pattern of selection. This is particularly important in the migration literature that often looks at aggregate distribution of earnings. I find, first, that selection over unobservables varies across education levels. In moving from an equal-sharing to a pay-for-performance environment, the less educated movers earned higher wages (upon exit) than the average less educated individual. The more educated movers, on the other hand, did not earn a wage premium upon exit. In moving from pay-for-performance to equal-sharing scheme, the more educated entrants had earned lower wages prior to entry than the average more educated individual. On the other hand, less educated individuals earned a similar wage to non-entrants. Further, selection patterns vary across genders. Specifically, men are positively selected in exit and negatively selected in entry, but women are not.

Recently (after the period analyzed in this paper), many Kibbutzim have introduced substantial reforms and shifted away from full equality. The "new Kibbutz" presents differentiated wages and related material incentives to reward ability. In light of the papers' findings, this recent institutional change can be viewed as a rational response to the problem of brain drain and adverse selection.<sup>17</sup> The reforms allow high ability individuals to

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<sup>17</sup>See Abramitzky (2005) for a discussion of the reforms and for a theoretical and empirical study of the

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.

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Kibbutz as a self-enforcing institution that balances insurance and incentives.

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TABLE 1  
Kibbutz Population, 1910-1999.

Year	Number of Kibbutz 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 2

Summary Statistics and Probit of Exit from the Kibbutz, 1983-1995.

Variable	(1)	(2)	(3)
	Stayed in Kibbutz Mean	Left the Kibbutz Mean	Probit of Exit Decision Marginal Coefficients
At Least High School Diploma	0.500*** (0.500)	0.618*** (0.487)	0.098*** (0.021)
High-skilled	0.084 (0.278)	0.099 (0.299)	0.084** (0.043)
Low-skilled	0.226*** (0.418)	0.134*** (0.341)	-0.092*** (0.023)
Age	36.295*** (8.719)	29.609*** (7.750)	-0.038*** (0.011)
Age squared	1393 (649)	937 (519)	0.0003** (0.0002)
Male	0.494* (0.500)	0.548* (0.498)	0.022 (0.022)
Born in Israel	0.669** (0.471)	0.729** (0.445)	-0.045* (0.025)
Married	0.796*** (0.403)	0.566*** (0.496)	-0.064* (0.038)
Family Size	3.570*** (1.627)	2.708*** (1.694)	-0.0006 (0.01)
Israel's North region	0.524 (0.450)	0.522 (0.500)	0.050** (0.024)
Israel's South region	0.199** (0.400)	0.257** (0.437)	0.055* (0.033)
<i>Observations</i>	1234	343	1577
Predicted Probability			0.182
LR <sup>2</sup>			237.70

Notes: The dependent variable in column (3) equals 1 if exit from Kibbutz and 0 otherwise.

Entries in column (1) represent the mean characteristics of individuals who stayed in their Kibbutz between 1983-1995. Entries in column (2) represents the mean characteristics of individuals who left their Kibbutz between 1983-1995.

"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 omitted 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. A third omitted group contains all other regions.

Standard errors in parentheses.

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

All explanatory variables are measured in 1983 (before exit).

TABLE 3

Probit of exit from the Kibbutz between 1983-1995, by age

Variable	(1)	(2)	(3)	(4)
	Probit of Exit Decision Marginal Probabilities			
Specification	Benchmark: age>=21	age>=30	age>=35	age>=40
At Least High School Diploma	0.098*** (0.021)	0.059*** (0.019)	0.071*** (0.022)	0.055** (0.024)
High-skilled	0.084** (0.043)	0.080** (0.037)	0.088** (0.043)	0.128*** (0.053)
Low-skilled	-0.092*** (0.023)	-0.072*** (0.021)	-0.061** (0.024)	-0.025 (0.029)
Age	-0.038*** (0.011)	0.034 (0.023)	-0.051 (0.044)	-0.160 (0.093)
Age squared	0.0003** (0.0002)	-0.0005* (0.0003)	0.0005 (0.0005)	0.002 (0.001)
Male	0.022 (0.022)	0.022 (0.020)	0.011 (0.022)	0.022 (0.024)
Born in Israel	-0.045* (0.025)	-0.056*** (0.021)	-0.040* (0.022)	-0.009 (0.023)
Married	-0.064* (0.038)	-0.005 (0.040)	-0.026 (0.050)	-0.002 (0.045)
Family Size	-0.0006 (0.01)	-0.006 (0.009)	-0.004 (0.010)	-0.014 (0.011)
Israel's North region	0.050** (0.024)	0.034 (0.023)	0.026 (0.025)	-0.002 (0.026)
Israel's South region	0.055* (0.033)	0.021 (0.032)	-0.017 (0.031)	-0.007 (0.032)
<i>Observations</i>	1577	1085	773	457
Predicted Probability	0.182	0.109	0.098	0.061
LR <sup>2</sup>	237.70	61.63	53.57	33.63

Notes: Dependent variable is equal to 1 if the person left the Kibbutz.

All explanatory variables are measured in 1983. The coefficients reported are marginal probabilities.

"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 omitted 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. A third omitted group contains all other regions.

Standard errors in parentheses.

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

All explanatory variables are measured in 1983 (before exit).

TABLE 4  
 Probit of Kibbutz-to-rural and Kibbutz-to-city Migration, 1983-1995

Variable	(1) Stayed in Kibbutz Mean	(2) Kibbutz-to-rural migrants Mean	(3) Kibbutz-to-city migrants Mean	(4) Probit of Kibbutz-to-rural exit Marginal Coefficients	(5) Probit of Kibbutz-to-city exit Marginal Coefficients
At Least High School Diploma	0.500 (0.500)	0.630 (0.486)	0.615 (0.488)	0.021** (0.011)	0.086*** (0.019)
High-skilled	0.084 (0.278)	0.099 (0.300)	0.099 (0.300)	0.016 (0.022)	0.075** (0.041)
Low-skilled	0.226 (0.418)	0.086 (0.283)	0.149 (0.357)	-0.041*** (0.009)	-0.058** (0.021)
Age	36.295 (8.719)	29.963 (7.280)	29.5 (7.900)	-0.013** (0.006)	-0.032*** (0.010)
Age squared	1393 (649)	950 (478)	932 (532)	0.0001 (0.00008)	0.0003** (0.0001)
Male	0.494 (0.500)	0.543 (0.501)	0.550 (0.498)	0.003 (0.011)	0.020 (0.020)
Born in Israel	0.669 (0.471)	0.654 (0.479)	0.752 (0.433)	-0.029** (0.014)	-0.022 (0.022)
Married	0.796 (0.403)	0.704 (0.459)	0.523 (0.500)	0.008 (0.016)	-0.077** (0.037)
Family Size	3.570 (1.627)	3.136 (1.730)	2.576 (1.663)	0.004 (0.005)	-0.003 (0.010)
Israel's North region	0.524 (0.450)	0.568 (0.498)	0.508 (0.501)	0.024* (0.013)	0.033 (0.022)
Israel's South region	0.199 (0.400)	0.359 (0.441)	0.256 (0.437)	0.026 (0.020)	0.042 (0.030)
<i>Observations</i>	1234	81	262	1315	1496
Predicted Probability				0.039	0.175
LR <sup>2</sup>				78.03	199.12

Notes: The dependent variables in column (4) and (5) equal 1 if exit from Kibbutz and 0 otherwise. Entries in column (1) represent the mean characteristics of individuals who stayed in their Kibbutz between 1983-1995. Entries in column (2) represent the mean characteristics of individuals who left their Kibbutz between 1983-1995 to a rural-location.

Entries in column (3) represent the mean characteristics of individuals who left their Kibbutz between 1983-1995 to a city.

"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 omitted 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. A third omitted group contains all other regions.

Standard errors in parentheses.

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

All explanatory variables are measured in 1983 (before exit).

TABLE 5

Earnings of Kibbutz migrants outside the Kibbutz (OLS regression), 1995

Variable (1983)	(1)	(2)	(3)	1995 Earnings outside Kibbutz (OLS)		
	Mean	Mean movers	Mean "natives"	city+rural	city	rural
At Least High school diploma	0.512 (0.500)	0.618 (0.487)	0.510 (0.500)	0.356*** (0.010)	0.359*** (0.010)	0.332*** (0.039)
High-skilled	0.140 (0.347)	0.099 (0.299)	0.140 (0.347)	0.364*** (0.014)	0.362*** (0.015)	0.369*** (0.055)
Low-skilled	0.084 (0.278)	0.134 (0.341)	0.084 (0.277)	-0.225*** (0.017)	-0.226*** (0.017)	-0.218*** (0.067)
Age	33.154 (8.671)	29.609 (7.750)	33.208 (8.673)	0.087*** (0.004)	0.087*** (0.004)	0.090*** (0.017)
Age squared	1174 (613)	936 (519)	1178 (613)	-0.001*** (0.00006)	-0.001*** (0.00006)	-0.001*** (0.0002)
Male	0.576 (0.494)	0.548 (0.498)	0.577 (0.494)	0.599*** (0.009)	0.600*** (0.010)	0.592*** (0.037)
Born in Israel	0.555 (0.496)	0.729 (0.445)	0.553 (0.497)	0.105*** (0.010)	0.113*** (0.010)	0.064 (0.041)
Israel's North region	0.093 (0.290)	0.522 (0.500)	0.086 (0.281)	-0.099*** (0.016)	-0.094*** (0.018)	-0.083* (0.044)
Israel's South region	0.126 (0.332)	0.257 (0.437)	0.124 (0.330)	-0.039*** (0.014)	-0.028* (0.015)	-0.120** (0.049)
<b>EXIT</b>	<b>0.015</b> <b>(0.121)</b>			<b>0.222***</b> <b>(0.060)</b>	<b>0.182***</b> <b>(0.068)</b>	<b>0.372***</b> <b>(0.139)</b>
<b>EXIT*At Least High School Diploma</b>	<b>0.009</b> <b>(0.096)</b>			<b>-0.192***</b> <b>(0.076)</b>	<b>-0.184***</b> <b>(0.086)</b>	<b>-0.207</b> <b>(0.174)</b>
Constant				6.436*** (0.072)	6.429*** (0.074)	6.411*** (0.286)
1995 Monthly earnings (NIS)	4942	5178	4939			
Observations	22948	343	22605	22948	21150	1798
R <sup>2</sup>				0.26	0.26	0.22
Adjusted R <sup>2</sup>				0.26	0.26	0.22
F				733.18	689.23	46.39

Notes: Entries in column (1) represent the mean 1983 characteristics of individuals who lived outside a Kibbutz in 1995. Entries in column (2) represent the mean 1983 characteristics of individuals who exit a Kibbutz between 1983-1995. Entries in column (3) represents the mean characteristics of individuals who lived outside a Kibbutzin both 1983 and 1995. The dependent variable in column (4) is the natural log of earnings outside the Kibbutz in 1995.

"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 omitted 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. A third omitted group includes all other regions.

"EXIT" is an individual who lived in a Kibbutz in 1983 and outside the Kibbutz in 1995.

"EXIT\*At Least High-School Diploma" is an individual who left the Kibbutz with at least a high school diploma between 1983-1995.

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

Standard errors in parentheses.

All explanatory variables are measured in 1983 (before exit).

TABLE 6  
Earnings of Kibbutz-to-City vs. Other Rural-to-City Migrants (OLS regression), 1995

Variable (1983)	(1)	(2)	(3)	(4)	(5)
	Mean	Mean Kibbutz-to-city movers	Mean other rural-to-city movers	Mean city "natives"	1995 Earnings OLS coefficients Specification 1
At Least High school diploma	0.507 (0.500)	0.615 (0.048)	0.577 (0.495)	0.505 (0.500)	0.361*** (0.010)
High-skilled	0.140 (0.347)	0.099 (0.300)	0.117 (0.322)	0.141 (0.348)	0.362*** (0.015)
Low-skilled	0.085 (0.279)	0.149 (0.357)	0.112 (0.316)	0.084 (0.277)	-0.226*** (0.017)
Age	33.263 (8.711)	29.5 (7.900)	29.089 (7.865)	33.389 (8.706)	0.087*** (0.004)
Age squared	1182 (617)	932 (532)	908 (521)	1191 (618)	-0.001*** (0.00006)
Male	0.576 (0.494)	0.550 (0.498)	0.577 (0.495)	0.577 (0.494)	0.601*** (0.010)
Born in Israel	0.544 (0.498)	0.752 (0.433)	0.744 (0.437)	0.537 (0.494)	0.113*** (0.010)
Israel's North region	0.081 (0.273)	0.508 (0.501)	0.235 (0.425)	0.072 (0.260)	-0.093*** (0.018)
Israel's South region	0.122 (0.328)	0.256 (0.437)	0.240 (0.428)	0.118 (0.323)	-0.025* (0.015)
<b>Kibbutz-to-city migrant</b>	<b>0.012</b> <b>(0.111)</b>				<b>0.181***</b> <b>(0.068)</b>
<b>Kibbutz-to-city migrant*At Least High School Diploma</b>	<b>0.008</b> <b>(0.087)</b>				<b>-0.186*</b> <b>(0.086)</b>
<b>Other-rural-to-city migrant</b>	<b>0.018</b> <b>(0.133)</b>				<b>0.011</b> <b>(0.054)</b>
<b>Other-rural-to-city migrant*At Least High School Diploma</b>	<b>0.010</b> <b>(0.102)</b>				<b>-0.073</b> <b>(0.071)</b>
Constant					<b>6.428</b> <b>(0.075)</b>
Monthly earnings (NIS)	4955	5026	4725	4958	
Observations	21132	262	383	20487	21132
R <sup>2</sup>					0.26
Adjusted R <sup>2</sup>					0.26
F					585.05

Notes: Entries in column (1) represent the mean 1983 characteristics of individuals who lived outside a Kibbutz in 1995. Entries in column (2) represent the mean 1983 characteristics of Kibbutz-to-city migrants between 1983-1995. Entries in column (3) represents the mean characteristics of other rural-to-urban migrants between 1983 and 1995.

Entries in column (4) represents the mean characteristics of individuals who lived in a city in both 1983 and 1995. The dependent variable in column (5)

is the natural log of earnings outside the Kibbutz in 1995. "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 omitted 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. A third omitted group includes

all other regions. "Kibbutz-to-city migrant" is an individual who lived in a Kibbutz in 1983 and in the city in 1995.

"Kibbutz-to-city migrant\*At Least High-School Diploma" is an individual who left the Kibbutz to a city between 1983-1995 with at least a high school diploma (in 1983)

"Other rural-to-city migrant" is an individual who lived in a rural location not based on equal-sharing in 1983 and in a city in 1995.

"Other rural-to-city migrant\*At Least High-School Diploma" is an individual who left a rural location to a city between 1983-1995 with at least a high school diploma (in 1983)

Coefficient significant at \*\*\*1% \*\*5% \*10%. Standard errors in parentheses. All explanatory variables are measured in 1983 (before exit).

TABLE 7

## Pre-Entry Earnings of City-to-Kibbutz and City-to-Other-Rural Migrants (Summary Statistics), 1983

	(1)	(2)	(3)
Variable	Mean non-entrants	Mean city-to-Kibbutz entrants	Mean other-city-to-rural migrants
At Least High school diploma	0.513 (0.500)	0.688 (0.466)	0.706 (0.456)
High-skilled	0.162 (0.368)	0.117 (0.323)	0.190 (0.393)
Low-skilled	0.093 (0.291)	0.104 (0.307)	0.072 (0.259)
Age	34.41 (8.277)	28.883 (5.851)	29.783 (6.596)
Age squared	1253 (600)	868 (356)	930 (437)
Male	0.560 (0.496)	0.519 (0.503)	0.542 (0.499)
Born in Israel	0.511 (0.500)	0.792 (0.408)	0.696 (0.460)
Israel's North region	0.076 (0.264)	0.013 (0.114)	0.106 (0.308)
Israel's South region	0.117 (0.321)	0.195 (0.399)	0.101 (0.302)
Monthly earnings (NIS)	25514	19453	24179
Observations	15456	77	415
R <sup>2</sup>			
Adjusted R <sup>2</sup>			
F			

Notes: Entries in column (1) represent the mean 1983 characteristics of individuals who lived in a city in both 1983 and 1995.

Entries in column (2) represent the mean 1983 characteristics of individuals who entered from a city to a Kibbutz between 1983-1995.

Entries in column (3) represents the mean 1983 characteristics of individuals who lived in a city in 1983 and moved to a rural location not based on equal-sharing between 1983-1995.

"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 omitted 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. A third omitted group includes all other regions.

Coefficient significant at \*\*\*1% \*\*5% \*10%. Standard errors are in parenthesis. All explanatory variables are measured in 1983 (before exit).

TABLE 8  
Pre-Entry Earnings of City-to-Kibbutz and City-to-Other-Rural Migrants (OLS regression), 1983

Variable	(1)	(2)	(3)
	1983 Earnings OLS coefficients Specification 1	1983 Earnings OLS coefficients Specification 2	1983 Earnings OLS coefficients Specification 3
At Least High school diploma	0.206*** (0.011)	0.208*** (0.011)	0.214*** (0.011)
High-skilled	0.277*** (0.015)	0.277*** (0.015)	0.277*** (0.015)
Low-skilled	-0.266*** (0.018)	-0.266*** (0.018)	-0.265*** (0.018)
Age	0.112*** (0.005)	0.112*** (0.005)	0.112*** (0.005)
Age squared	-0.001*** (0.00007)	-0.001*** (0.00007)	-0.001*** (0.00007)
Male	0.539*** (0.010)	0.538*** (0.010)	0.539*** (0.010)
Born in Israel	0.068*** (0.011)	0.068*** (0.011)	0.069*** (0.011)
Israel's North region	-0.026 (0.019)	-0.026 (0.019)	-0.026 (0.019)
Israel's South region	-0.0004 (0.016)	-0.001 (0.016)	-0.0006 (0.016)
<b>ENTERED KIBBUTZ</b>	<b>-0.164** (0.073)</b>	<b>0.028 (0.130)</b>	<b>0.031 (0.130)</b>
<b>ENTERED KIBBUTZ*At Least High School Diploma</b>		<b>-0.279* (0.156)</b>	<b>-0.286* (0.156)</b>
<b>ENTERED RURAL</b>			<b>0.195*** (0.058)</b>
<b>ENTER RURAL*At Least High School Diploma</b>			<b>-0.282*** (0.069)</b>
Constant	7.434*** (0.088)	7.433*** (0.088)	7.427*** (0.088)
Monthly earnings (NIS)			
Observations	15948	15948	15948
R <sup>2</sup>	0.28	0.28	0.28
Adjusted R <sup>2</sup>	0.28	0.28	0.28
F	616.38	560.72	476.18

Notes: The dependent variable in columns (1), (2) and (3) is the natural log of 1983 earnings.

"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 omitted 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. A third omitted group includes all other regions.

"ENTERED KIBBUTZ" is a dummy variable equals to 1 if the individual moved from a city to a Kibbutz between 1983-1995.

"ENTERED KIBBUTZ\*At Least High-School Diploma" is a dummy variable equals to 1 if the individual moved from a city to a Kibbutz between 1983-1995 and had at least a high school diploma in 1983.

"ENTERED RURAL" is a dummy variable equals to 1 if the individual moved from a city to a rural location not based on equal-sharing between 1983-1995.

"ENTERED RURAL\*At Least High-School Diploma" is a dummy variable equals to 1 if the individual moved from a city to a rural location not based on equal-sharing between 1983-1995 and had at least a high-school diploma in 1983.

Coefficient significant at \*\*\*1% \*\*5% \*10%. Standard errors are in parenthesis. All explanatory variables are measured in 1983 (before exit).

TABLE 9  
Adverse Selection in Entry to the Kibbutz (Probit), 1983-1995.

Variable	$\frac{\partial \text{Pr ob(enter)}}{\partial X}$		
	(1) ln wage	(2) hours worked	(3) apartment size
<b>Observables:</b>			
At Least High-School Diploma	0.0024*** (0.0008)	0.0020*** (0.0008)	0.0020*** (0.0008)
High-skilled	-0.001 (0.0008)	-0.001 (0.0008)	-0.002** (0.0006)
Low-skilled	0.0007 (0.001)	0.0008 (0.001)	-0.0008 (0.0008)
Age	0.0008* (0.0004)	0.0008* (0.0004)	0.0005* (0.0003)
Age squared	-0.0001** (0.00006)	-0.0001** (0.00006)	-0.00008 (0.00005)
Born in Israel	0.003*** (0.0009)	0.003*** (0.0009)	0.002*** (0.0008)
Israel's North region	0.0006 (0.001)	0.0007 (0.001)	-0.0001 (0.0009)
Israel's South region	0.004*** (0.002)	0.004*** (0.002)	0.004*** (0.002)
Family Size	-0.0008*** (0.0002)	-0.0008*** (0.0002)	-0.0004* (0.0002)
Married	-0.004*** (0.001)	-0.004*** (0.001)	-0.004*** (0.002)
Rural location	0.005*** (0.003)	0.005*** (0.003)	0.009*** (0.004)
Unemployed	0.007** (0.006)	0.001 (0.003)	0.004* (0.004)
<b>Unobservables:</b>			
In wage (Old Shekels)	-0.0009** (0.0005)		
Hours worked		-0.0003** (0.0001)	
apartment size			-0.0004** (0.0002)
<b>Observations:</b>			
Entrants	90	90	65
non-Entrants	16699	16699	12734
Predicted Probability	0.0027	0.0027	0.0018
LR <sup>2</sup>	113.44	113.83	118.72

Notes: Dependent variable is equal to 1 if the person left the Kibbutz.

All explanatory variables are measured in 1983. The coefficients reported are marginal probabilities.

"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 omitted group contains all other occupations.

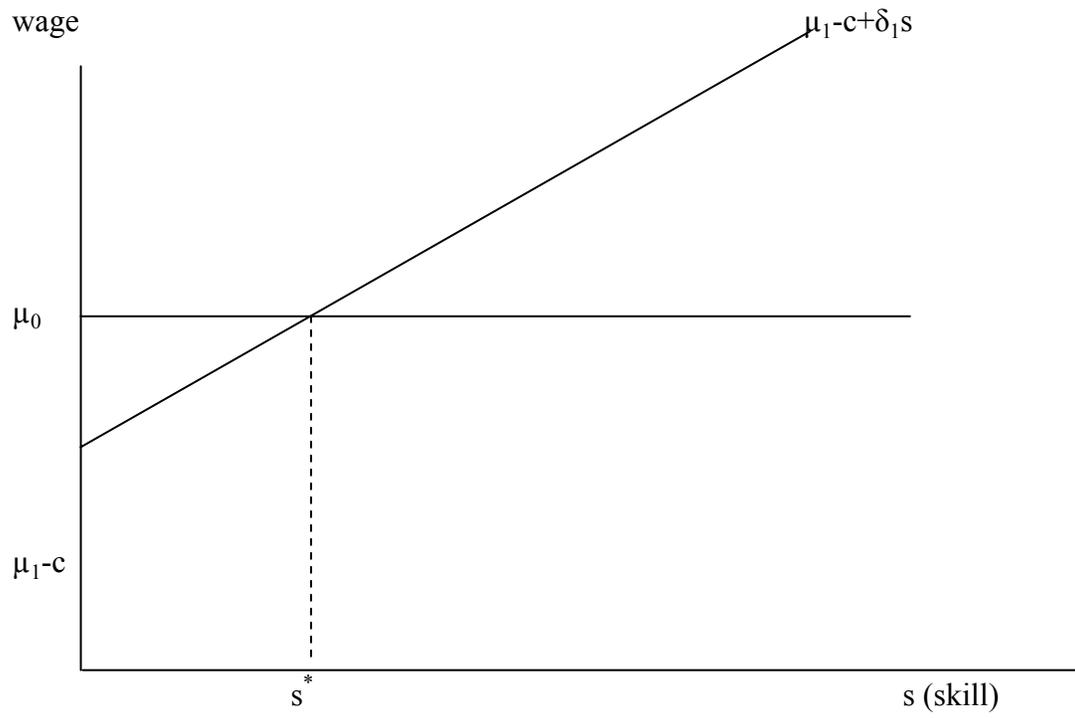
"Israel's North region" includes the following districts: Sefad, Kinneret, Yizrael, Akko and Golan. "Israel's South region" includes Ashkelon and Beer-Sheva districts. A third omitted group contains all other regions.

Standard errors in parentheses.

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

All explanatory variables are measured in 1983 (before exit).

FIGURE 1



# APPENDICES FOR REFEREES NOT NECESSARILY FOR PUBLICATION

## Appendix A: Accounting for Unobservables in Exit of Kibbutz Movers vs. Stayers

In the text, I account for selection over observables when comparing movers from the Kibbutz to stayers. I also account for selection over unobservables when comparing the earnings of Kibbutz movers with that of city natives. Here, I account for selection over unobservables of Kibbutz movers vs. stayers.

I employ a standard two-step procedure, which is based on Heckman's (1979) two step selection model. This model allows for a criterion function (a "migration rule" that determines whether or not an individual will leave the Kibbutz) and a regression equation describing earning determination in the city.

Assume that an individual chooses whether or not to migrate ( $D_i^*$ ) based on her individual and location characteristics ( $W_i$ ). The individual migrates if an unobservable criterion function is positive:

$$D_i^* = \delta_1 W_i + u_i \tag{11}$$

where  $E(u_i) = 0$  and  $var(u_i)$  is normalized to 1 without loss of generality. For every Kibbutz-to-city migrant, we observe the 1995 income level  $\ln(I_{iC}^{95})$  in the city. The city earnings can be written as a function of personal characteristics  $X_i$  reflecting expected productivity, which are observable for both movers and stayers. I assume that

$$\{ \ln(I_{iC}^{95}) = \beta_C' X_i + \varepsilon_i \} \tag{12}$$

where  $E(\varepsilon_i) = 0$  and  $var(\varepsilon_i) = \sigma_C^2$ . It follows that,

$$D_i = 1 \text{ if } D_i^* > 0 \tag{13}$$

$$D_i = 0 \text{ otherwise}$$

To capture the dependence between individuals' migration decisions and their subsequent income, I assume that  $(u_i, \varepsilon_i)$  are i.i.d and distributed Bivariate Normal with  $corr(u_i, \varepsilon_i) =$

$\rho_c$  and covariance  $\sigma_{12}$ .<sup>18</sup> It follows that:

$$E(\ln(I_{iC}^{95})) = \beta'_C X_{iC} + \sigma_{12} \frac{\phi(\gamma'W_i)}{\Phi(\gamma'W_i)_i} \quad (14)$$

where  $\phi$  is the normal pdf,  $\Phi(\gamma'W_i)$  represents the normal cdf and  $\frac{\phi(\gamma'W_i)}{\Phi(\gamma'W_i)}$  is the Inverse Mill Ratio. The  $\sigma_{12}$  indicates the direction of selection over characteristics that are unobservable to the researcher. A positive (negative)  $\sigma_{12}$  suggests that a migrant's unobservable characteristics are associated with a higher (lower) level of income outside the Kibbutz.

The vector  $X$  includes 1983 individual characteristics thought to influence the earnings of Kibbutz members who left to cities: age and age squared, occupation (high-skill or low-skill), education level (high school diploma or higher), gender and whether they came from the far north or far south of Israel. The elements of  $Z$  include all the elements of  $X$  and also family size and whether or not the individual is married. The exclusion restriction assumption is that family size and marital status are in  $Z$  but not in  $X$ . That is, they affect the migration decision but not the earnings upon exit. I use alternative exclusion restrictions such as whether the individual is divorced and whether she lived in the Kibbutz in 1978. Results are robust to all the alternative specifications.

The parameters of the model were estimated via a two-step procedure. First, the reduced form equation  $\gamma'W_i + \mu_i$  is estimated by Probit maximum likelihood to find  $\hat{\gamma}$ . Then, using  $\hat{\gamma}$ , we obtain the Inverse Mill Ratio for each observation:  $\frac{\phi(\hat{\gamma}W_i)}{\Phi(\hat{\gamma}W_i)}$ . Second, equation 14 is estimated by OLS. That is, I run an OLS regression of  $\ln(I_{iC}^{95})$  on  $X_{iC}$  and  $\frac{\phi(\hat{\gamma}W_i)}{\Phi(\hat{\gamma}W_i)}$  and get  $\hat{\beta}'_C$  and  $\widehat{\ln(I_{iC}^{95})} = \hat{\beta}'_C X_{iC}$ . 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  $\gamma$  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.

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<sup>18</sup>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).

Tables E1 and E2 present the estimation results. The first column of Table E1 presents the variable means. The second column presents the Probit equation and the third column presents the OLS regression of the determinants of earnings in the city (equation 12). The marginal effects  $\frac{\partial Prob(move)}{\partial X}$  are evaluated at the mean of  $X$  for continuous variables and are  $Prob(D = 1/X = 1) - Prob(D = 1/X = 0)$  for discrete variables (and calculated at the means of the other  $X$ s).

The second-stage OLS regression results suggest that there is no additional selection of Kibbutz movers vs. stayers over unobservable characteristics. That is, the coefficient on the Mills-ratio, although positive, is not statistically different than zero. This result is robust to alternative exclusion restriction assumptions, which are presented in Table E2.

The OLS regression results also suggest that wages of former Kibbutz members outside depends on a number of factors (column 3, Table E1 and columns 2, 4 and 6, Table E2). 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.

## Appendix B: Adverse Selection in Entry due to Asymmetric Information Between Applicants and Kibbutz

Even if Kibbutz officials are well-aware of this tendency, adverse selection might still transpire as individuals who seek to enter may have private information regarding their productivity. The census data contain information on individuals' pre-entry wealth and hours worked, which are not observable (apartment size, ownership of some durable goods, hours worked) or difficult to verify (wage) by Kibbutz officials. Having relevant information about the informed party allows me to test for adverse selection.

A central body, the Kibbutz's Department of Absorption and Demographic Growth, is in charge of the screening process of individual applicants to the Kibbutz and imposes strict rules on entry.<sup>19</sup> Applicants must be between twenty and fifty years old, having served in the army, and have at least twelve years of education.<sup>20</sup> They must be married with no more than three children and both the husband and wife must have an occupation 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 and their children's physical and mental health, to give a 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.

Only about one third of the Kibbutzim absorbs new members from outside the Kibbutz. These Kibbutzim are typically "average" Kibbutzim (neither the rich Kibbutzim nor the poor ones) and they are more likely to be located in Israel's far south and far north.<sup>21</sup>

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<sup>19</sup>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.

<sup>20</sup>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. Since then, however, the Kibbutz has put more effort into the screening process and decided to concentrate on quality rather than quantity.

<sup>21</sup>Poor Kibbutzim often cannot absorb outsiders, as they lack 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. Rich Kibbutzim

Some Kibbutzim require an entry fee, but this can often be recovered in part upon leaving. Applicants can list their preferences to join particular Kibbutzim, but the decision takes into account both applicants' preferences and Kibbutzim' needs, so one can be assigned to any Kibbutz.

I do not have census data on applicants to the Kibbutz, but only on individuals who actually entered. This makes it harder to document adverse selection since it only includes applicants who were accepted by the Kibbutz and exclude those who were rejected (the application process is described below). Hence, my results provide a lower bound for the actual adverse selection.

I conduct 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. 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.<sup>22</sup>

I consider a few measures of wealth in my regression. The first (column 1 in Table 9) is individuals' natural log of wage prior to entry. The second measure (column 2) is individuals' hours of work. A third measure (column 3) is number of rooms. The characteristics that are public information (i.e. observable to both the individual and the Kibbutz) and used by the Kibbutz in the application process are age, gender, family size, education, occupation, employment status, marital status, previous residence (rural/urban, south/north).

$X_i$  is defined as the vector of publicly observed characteristics that affect individu-

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often also do not accept outsiders, as they face high 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.

<sup>22</sup>I also find that individuals who worked more hours prior to entry are less likely to enter the Kibbutz.

als' decision of whether to join a Kibbutz.  $Y_i$  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:

$$D_i^* = \beta'_1 X_i + \beta'_2 Y_i + \varepsilon_i \quad (15)$$

Denote  $D_i$  the observable decision:

$$D_i = 1 \text{ if } D_i^* > 0 \quad (16)$$

$$D_i = 0 \text{ otherwise}$$

These two equations imply that:

$$\text{prob}(D_i = 1) = \text{prob}(\varepsilon_i > -\beta'_1 X_i - \beta'_2 Y_i) = 1 - F(-\beta'_1 X_i - \beta'_2 Y_i) \quad (17)$$

where  $F$  is the cdf of  $\varepsilon_i$ . Assuming  $\varepsilon_i \sim N(0, 1)$ , the Likelihood function is:<sup>23</sup>

$$L = \prod_{D_i=0} \Phi(-\beta'_1 X_i - \beta'_2 Y_i) \prod_{D_i=1} [1 - \Phi(-\beta'_1 X_i - \beta'_2 Y_i)] \quad (18)$$

Then, maximizing the Likelihood function we find an estimator for  $\beta' = (\beta'_1, \beta'_2)$ . We need to find:

1.  $\frac{\partial \Phi(\beta'_1 X_i + \beta'_2 Y_i)}{\partial X_{ik}} = \Phi(\beta'_1 X_i + \beta'_2 Y_i) \beta_{1k}$ . 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

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<sup>23</sup>The proportion of entrants to the Kibbutz is small, implying that 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.

2.  $\frac{\partial \Phi(\beta_1' X_i + \beta_2' Y_i)}{\partial Y_{ik}} = \Phi(\beta_1' X_i + \beta_2' Y_i) \beta_{2k}$ . 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 9 presents the regression results. The Probit regression provides no evidence of negative selection over observable-to-Kibbutz characteristics, but strong evidence of adverse selection. That is, whereas more educated individuals were more likely to enter, entrants to the Kibbutz were, *ceteris paribus*, much less wealthy than non-entrants, they had smaller apartments and they worked less hours.

## Appendix C: Robustness of Probit of Exit to measures of ability

TABLE C1

Robustness (to measure of ability) of Probit of Exit from the Kibbutz, 1983-1995.

Variable	(1)	(2)	(3)	(4)	(5)
	Benchmark				
<i>ability measure:</i>					
At Least High School Diploma	0.098*** (0.021)		0.117*** (0.02)		
At Least Bachelors' Degree		0.104*** (0.04)		0.143*** (0.039)	
High-skilled	0.084** (0.043)	0.075* (0.044)			0.122*** (0.044)
Low-skilled	-0.092*** (0.023)	-0.102*** (0.022)			-0.105*** (0.022)
<i>Controls:</i>					
Age	-0.038*** (0.011)	-0.038*** (0.011)	-0.037*** (0.011)	-0.036*** (0.011)	-0.036*** (0.011)
Age squared	0.0003** (0.0002)	0.0003** (0.0002)	0.0003** (0.0002)	0.0003** (0.0002)	0.0003** (0.0002)
Male	0.022 (0.022)	0.003 (0.021)	0.054*** (0.021)	0.035* (0.02)	0.002 (0.021)
Born in Israel	-0.045* (0.025)	-0.043* (0.025)	-0.039* (0.024)	-0.035 (0.025)	-0.049** (0.025)
Married	-0.064* (0.038)	-0.054 (0.037)	-0.064* (0.038)	-0.054 (0.038)	-0.049 (0.037)
Family Size	-0.0006 (0.01)	-0.0021 (0.01)	-0.001 (0.01)	-0.003 (0.01)	-0.002 (0.01)
Israel's North region	0.050** (0.024)	0.050** (0.024)	0.053** (0.025)	0.054** (0.025)	0.046* (0.025)
Israel's South region	0.055* (0.033)	0.057* (0.033)	0.061* (0.033)	0.065* (0.033)	0.056* (0.033)
<i>Observations</i>	1577	1577	1577	1577	1577
Predicted Probability	0.182	0.183	0.186	0.217	0.217
LR <sup>2</sup>	237.70	224.22	218.89	202.81	216.17

Notes: Dependent variable is equal to 1 if the person left the Kibbutz.

All explanatory variables are measured in 1983. The coefficients reported are marginal probabilities.

"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 omitted 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. A third omitted group contains all other regions.

Standard errors in parentheses.

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

All explanatory variables are measured in 1983 (before exit).

## Appendix D: Robustness of Probit of Exit: Males, Females and Occupations

TABLE D1

Robustness (to males, females, occupation dummies) of Probit Estimates of Exit from Kibbutz, 1983-1995.

Specification:	(1)	(2)	(3)	(4)
	Benchmark	Males only	Females only	Occupation dummies
At Least High School Diploma	0.098*** (0.021)	0.088*** (0.031)	0.106*** (0.028)	0.088*** (0.022)
High-skilled	0.084** (0.043)	0.106** (0.036)	0.047 (0.069)	
Low-skilled	-0.092*** (0.023)	-0.057 (0.051)	-0.096*** (0.027)	
Academics				0.105** (0.06)
Managers				0.048 (0.066)
Free professionals				0.040 (0.036)
Service workers				-0.076** (0.029)
Unskilled in industry				-0.136** (0.036)
Skilled in industry				-0.016 (0.035)
Farmers				-0.037 (0.031)
Age	-0.038*** (0.011)	-0.044*** (0.016)	-0.034** (0.016)	-0.038*** (0.011)
Age squared	0.0003** (0.0002)	0.0004* (0.0002)	0.0003 (0.0002)	0.0003** (0.0002)
Male	0.022 (0.022)			0.050** (0.025)
Born in Israel	-0.045* (0.025)	-0.071** (0.037)	-0.021 (0.032)	-0.045* (0.025)
Married	-0.064* (0.038)	-0.026 (0.054)	-0.102** (0.055)	-0.063* (0.038)
Family Size	-0.0006 (0.01)	-0.005 (0.016)	0.0037 (0.015)	-0.0018 (0.01)
Israel's North region	0.050** (0.024)	0.031 (0.036)	0.065** (0.032)	0.050** (0.024)
Israel's South region	0.055* (0.033)	0.048 (0.046)	0.06 (0.046)	0.057* (0.033)
<i>Observations</i>	1577	798	779	1577
Predicted Probability	0.182	0.206	0.157	0.181
LR <sup>2</sup>	237.70	110.63	128.63	243.70

Notes: Dependent variable is equal to 1 if the person left the Kibbutz.

All explanatory variables are measured in 1983. The coefficients reported are marginal probabilities.

"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 omitted group contains all other occupations.

The "Occupation dummies" specification omits the following occupation groups: "clerks" and sales workers, agents, etc..

"Israel's North region" includes the following districts: Sefad, Kinneret, Yizrael, Akko and Golan. "Israel's South region" includes Ashkelon and Beer-Sheva districts. A third omitted group contains all other regions.

Standard errors in parentheses.

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

All explanatory variables are measured in 1983 (before exit).

## Appendix E: Heckman two-step selection analysis of exit

TABLE E1  
Heckman Two-Step Selection Analysis of Exit, 1983-1995.

Variable	(1)	(2)	(3)
	Mean	Selection equation Probit Coefficients	Earnings equation for movers 2nd-step OLS coefficients
At Least High School Diploma	0.526 (0.499)	0.375*** (0.082)	0.295* (0.156)
High-skilled	0.088 (0.283)	0.288** (0.134)	0.476*** (0.175)
Low-skilled	0.206 (0.405)	-0.388*** (0.110)	-0.328* (0.185)
Age	34.841 (8.951)	-0.145*** (0.042)	0.107 (0.076)
Age squared	1294 (650.6)	0.001** (0.0006)	-0.002** (0.001)
Male	0.506 (0.500)	0.084 (0.082)	0.577*** (0.086)
Born in Israel	0.682 (0.466)	-0.165* (0.088)	0.099 (0.107)
Family size	3.382 (1.679)	-0.002 (0.040)	
Married	0.746 (0.436)	-0.231* (0.131)	
Israel's North region	0.523 (0.500)	0.190 (0.093)	-0.054 (0.115)
Israel's South region	0.212 (0.409)	0.198 (0.112)	0.014 (0.125)
<i>Selection parameter:</i>			
Mills ratio			0.484 (0.525)
Observations	1577	1577	343

Notes: The dependent variable in columns (2) is equal to 1 if person moved from the Kibbutz.

The dependent variable in column (3) is the natural log of movers' earnings in 1995.

"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 omitted 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. A third omitted group includes all other regions.

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

Standard errors in parentheses.

All explanatory variables are measured in 1983 (before exit).

TABLE E2

Robustness (to various exclusion restrictions) of Heckman Two-Step Analysis, 1983-1995.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
	Selection Equation	2nd step	Selection Equation	2nd step	Selection Equation	2nd step
	Probit coefficients	OLS coefficient	Probit coefficients	OLS coefficient	Probit coefficients	OLS coefficient
At Least High School Diploma	0.375*** (0.082)	0.295* (0.156)	0.373*** (0.081)	0.304** (0.149)	0.347*** (0.082)	0.101 (0.115)
High-skilled	0.288** (0.134)	0.476*** (0.175)	0.273** (0.134)	0.482*** (0.170)	0.276** (0.135)	0.311** (0.147)
Low-skilled	-0.388*** (0.110)	-0.328* (0.185)	-0.384*** (0.110)	-0.340* (0.180)	-0.394*** (0.110)	-0.111 (0.144)
Age	-0.145*** (0.042)	0.107 (0.076)	-0.167*** (0.043)	0.102 (0.073)	-0.180*** (0.035)	0.205*** (0.055)
Age squared	0.001** (0.0006)	-0.002** (0.001)	0.001** (0.0006)	-0.002** (0.008)	0.002** (0.0005)	-0.003*** (0.006)
Male	0.084 (0.082)	0.577*** (0.086)	0.106 (0.083)	0.581*** (0.086)	0.116 (0.082)	0.525*** (0.079)
Born in Israel	-0.165* (0.088)	0.099 (0.107)	-0.155* (0.088)	0.097 (0.104)	-0.124 (0.089)	0.191** (0.092)
Family size	-0.002 (0.040)		-0.032 (0.032)			
Married	-0.231* (0.131)					
Divorced			0.391* (0.204)		0.391* (0.204)	
Lived in Kibbutz in 1978					-0.245** (0.198)	
Israel's North region	0.190 (0.093)	-0.054 (0.115)	0.204** (0.094)	-0.054 (0.110)	0.196** (0.094)	-0.151 (0.098)
Israel's South region	0.198 (0.112)	0.014 (0.125)	0.205* (0.112)	0.015 (0.122)	0.180 (0.113)	-0.084 (0.111)
<i>Selection parameter:</i>						
Mills ratio		0.484 (0.525)		0.518 (0.488)		-0.275 (0.336)
Observations	1577	343	1577	343	1577	343

Notes: The dependent variable in columns (2) is equal to 1 if person moved from the Kibbutz. The dependent variable in column (3) is the natural log of movers' earnings in 1995. "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 omitted 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. A third omitted group includes all other regions.

Coefficient significant at \*\*\*1% \*\*5% \*10%. Standard errors in parentheses. All explanatory variables are measured in 1983 (before exit).

## Appendix F: Robustness of post-exit earnings to education-level, occupation dummies, males and females

TABLE F1

Earnings of Kibbutz migrants outside the Kibbutz (OLS regression), 1995

Robustness to education-level and to occupation dummies

	At least Bachelors' degree			Occupation dummies		
	(1) city+rural	(2) city	(3) rural	(4) city+rural	(5) city	(6) rural
At Least High School Diploma				0.302*** (0.011)	0.305*** (0.011)	0.268*** (0.041)
At Least Bachelors' degree	0.395*** (0.015)	0.400*** (0.016)	0.348*** (0.056)			
High-skilled	0.310*** (0.016)	0.306*** (0.016)	0.327*** (0.060)			
Low-skilled	-0.285*** (0.017)	-0.285*** (0.017)	-0.279*** (0.067)			
Academics				0.386*** (0.018)	0.390*** (0.019)	0.342*** (0.073)
Managers				0.324*** (0.022)	0.328*** (0.023)	0.266*** (0.087)
Free professionals				0.105*** (0.014)	0.108*** (0.014)	0.091 (0.055)
Service workers				-0.216*** (0.019)	-0.212*** (0.020)	-0.244*** (0.075)
Unskilled in industry				-0.390*** (0.034)	-0.382*** (0.035)	-0.531*** (0.168)
Skilled in industry				-0.127*** (0.014)	-0.125*** (0.014)	-0.155*** (0.064)
Farmers				-0.257*** (0.032)	-0.224*** (0.049)	-0.278*** (0.057)
Age	0.074*** (0.004)	0.074*** (0.004)	0.081*** (0.017)	0.086*** (0.004)	0.086*** (0.004)	0.096*** (0.017)
Age squared	-0.001*** (0.00006)	-0.001*** (0.00006)	-0.001*** (0.0002)	-0.001*** (0.00006)	-0.001*** (0.00006)	-0.001*** (0.0002)
Male	0.550*** (0.009)	0.552*** (0.010)	0.529*** (0.036)	0.650*** (0.010)	0.647*** (0.010)	0.676*** (0.040)
Born in Israel	0.109*** (0.010)	0.115*** (0.010)	0.075* (0.041)	0.101*** (0.010)	0.106*** (0.010)	0.064 (0.041)
Israel's North region	-0.109*** (0.016)	-0.107*** (0.018)	-0.096** (0.044)	-0.092*** (0.016)	-0.092*** (0.018)	-0.079* (0.043)
Israel's South region	-0.060*** (0.014)	-0.047*** (0.015)	-0.153*** (0.049)	-0.034** (0.014)	-0.027** (0.015)	-0.091* (0.049)
<b>EXIT</b>				<b>0.257***</b> <b>(0.060)</b>	<b>0.210***</b> <b>(0.069)</b>	<b>0.385***</b> <b>(0.137)</b>
<b>EXIT*At Least High School Diploma</b>				<b>-0.195***</b> <b>(0.076)</b>	<b>-0.184**</b> <b>(0.086)</b>	<b>-0.199</b> <b>(0.173)</b>
<b>EXIT</b>	<b>0.178***</b> <b>(0.041)</b>	<b>0.129***</b> <b>(0.047)</b>	<b>0.340***</b> <b>(0.090)</b>	6.460*** (0.073)	6.497*** (0.076)	6.327*** (0.291)
<b>EXIT*At Least Bachelors' degree</b>	<b>-0.259**</b> <b>(0.108)</b>	<b>-0.180</b> <b>(0.116)</b>	<b>-0.603*</b> <b>(0.321)</b>			
Constant	6.853*** (0.073)	6.853*** (0.075)	6.766*** (0.29)			
<i>Observations</i>						
Predicted Probability						
R <sup>2</sup>	22948	21150	1798	22948	21150	1798
Adjusted R <sup>2</sup>	0.24	0.24	0.21	0.27	0.27	0.24
F	0.24	0.24	0.20	0.27	0.27	0.23
	657.03	616.30	42.74	525.99	491.68	34.92

Notes: Entries in column (1) represent the mean 1983 characteristics of individuals who lived outside

a Kibbutz in 1995. Entries in column (2) represent the mean 1983 characteristics of individuals who

lived in a city between 1983-1995. Entries in column (3) represents the mean characteristics of

individuals who lived in rural locations in 1995. The dependent variable in columns (4), (5) and (6)

is the natural log of earnings outside the Kibbutz in 1995.

"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 omitted group contains all other occupations.

The "Occupation dummies" specification omits the following occupation groups: "clerks" and sales workers, agents, etc. "Israel's North region" includes the following districts: Sefad, Kinneret, Yizrael, Akko and Golan.

"Israel's South region" includes Ashkelon and Beer-Sheva districts. A third omitted group includes

all other regions. "EXIT" is an individual who lived in a Kibbutz in 1983 and outside the Kibbutz in 1995.

"EXIT\*At Least High-School Diploma" is an individual who left the Kibbutz with at least a high school diploma between 1983-1995. "EXIT\*At Least BA Degree" is an individual who left the Kibbutz with at least a BA degree

Coefficient significant at \*\*\*1% \*\*5% \*10%. Standard errors in parentheses.

All explanatory variables are measured in 1983 (before exit).

TABLE F2

Earnings of Kibbutz-to-City vs. Other Rural-to-City Migrants (OLS regression), 1995  
 Robustness to education-level, occupation dummies and male and female subsamples

Variable (1983)	(1)	(2)	(3)	(4)
	1995 Earnings OLS coefficients			
	Males	Females	At least Bachelors' degree	Occupation dummies
At Least High school diploma	0.371*** (0.014)	0.342*** (0.015)		0.307*** (0.010)
At Least Bachelors' degree			0.402*** (0.016)	
High-skilled	0.358*** (0.019)	0.374*** (0.024)	0.306*** (0.016)	0.362*** (0.015)
Low-skilled	-0.144*** (0.024)	-0.328*** (0.025)	-0.286*** (0.017)	-0.226*** (0.017)
Academics				0.390*** (0.019)
Managers				0.327*** (0.023)
Free professionals				0.107*** (0.015)
Service workers				-0.212*** (0.020)
Unskilled in industry				-0.382*** (0.035)
Skilled in industry				-0.125*** (0.014)
Farmers				-0.222*** (0.049)
Age	0.079*** (0.006)	0.098*** (0.007)	0.074*** (0.004)	0.086*** (0.004)
Age squared	-0.001*** (0.00008)	-0.001*** (0.0001)	-0.001*** (0.00006)	-0.001*** (0.00006)
Male			0.552*** (0.010)	0.648*** (0.010)
Born in Israel	0.155*** (0.014)	0.055*** (0.015)	0.115*** (0.010)	0.106*** (0.010)
Israel's North region	-0.093*** (0.023)	-0.083*** (0.028)	-0.106*** (0.018)	-0.091*** (0.018)
Israel's South region	0.002 (0.019)	-0.069*** (0.022)	-0.047*** (0.015)	-0.026* (0.015)
<b>Kibbutz-to-city migrant</b>	<b>0.222***</b> <b>(0.084)</b>	<b>0.098</b> <b>(0.137)</b>	<b>0.129***</b> <b>(0.047)</b>	<b>0.210***</b> <b>(0.069)</b>
<b>Kibbutz-to-city migrant*At Least High School Diploma</b>	<b>-0.317***</b> <b>(0.115)</b>	<b>-0.001</b> <b>(0.137)</b>		<b>-0.186**</b> <b>(0.086)</b>
<b>Kibbutz-to-city migrant*At Least Bachelors' degree</b>			<b>-0.182</b> <b>(0.116)</b>	
<b>Other-rural-to-city migrant</b>	<b>0.049</b> <b>(0.067)</b>	<b>-0.087</b> <b>(0.091)</b>	<b>-0.006</b> <b>(0.039)</b>	<b>0.009</b> <b>(0.054)</b>
<b>Other-rural-to-city migrant*At Least High School Diploma</b>	<b>-0.270***</b> <b>(0.093)</b>	<b>0.198*</b> <b>(0.112)</b>		<b>-0.058</b> <b>(0.070)</b>
<b>Other-rural-to-city migrant*At Least Bachelors' degree</b>			<b>-0.066</b> <b>(0.097)</b>	
Constant	<b>7.118***</b> <b>(0.098)</b>	<b>6.305***</b> <b>(0.116)</b>	<b>6.853***</b> <b>(0.076)</b>	<b>6.469***</b> <b>(0.076)</b>
Monthly earnings (NIS)				
Observations	12188	8953	21132	21132
R <sup>2</sup>	0.16	0.17	0.24	0.27
Adjusted R <sup>2</sup>	0.16	0.17	0.24	0.27
F	199.91	150.17	521.48	437.25

Notes: Entries in column (1) represent the mean 1983 characteristics of individuals who lived outside a Kibbutz in 1995. Entries in column (2) represent the mean 1983 characteristics of Kibbutz-to-city migrants between 1983-1995. Entries in column (3) represents the mean characteristics of other rural-to-urban migrants between 1983 and 1995. Entries in column (4) represents the mean characteristics of individuals who lived in a city in both 1983 and 1995. The dependent variable in column (5) is the natural log of earnings outside the Kibbutz in 1995. "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 omitted 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.

A third omitted group includes all other regions. "Kibbutz-to-city migrant" is an individual who lived in a Kibbutz in 1983 and in the city in 1995.

"Kibbutz-to-city migrant\*At Least High-School Diploma" is an individual who left the Kibbutz to a city between 1983-1995 with at least a high school diploma (in 1983)

"Other rural-to-city migrant" is an individual who lived in a rural location not based on equal-sharing in 1983 and in a city in 1995.

"Other rural-to-city migrant\*At Least High-School Diploma" is an individual who left a rural location to a city between 1983-1995 with at least a high school diploma (in 1983)

Coefficient significant at \*\*\*1% \*\*5% \*10%. Standard errors in parentheses. All explanatory variables are measured in 1983 (before exit).

TABLE F3

Earnings of Kibbutz migrants outside the Kibbutz (OLS regression), 1995  
Robustness to Male and Female

Specification:	Males only			Females only		
	(1)	(2)	(3)	(4)	(5)	(6)
	urban+rural	urban	rural	urban+rural	urban	rural
At Least High School Diploma	0.360*** (0.013)	0.365*** (0.014)	0.326*** (0.042)	0.343*** (0.015)	0.345*** (0.015)	0.350*** (0.061)
High-skilled	0.365*** (0.018)	0.359*** (0.019)	0.398*** (0.072)	0.368*** (0.023)	0.373*** (0.024)	0.198*** (0.088)
Low-skilled	-0.148*** (0.023)	-0.144*** (0.024)	-0.213** (0.100)	-0.321*** (0.024)	-0.327*** (0.025)	-0.235*** (0.090)
Age	0.078*** (0.005)	0.079*** (0.006)	0.071*** (0.023)	0.100*** (0.007)	0.098*** (0.007)	0.116*** (0.026)
Age squared	-0.001*** (0.00007)	-0.001*** (0.00008)	-0.001*** (0.0003)	-0.001*** (0.0009)	-0.001*** (0.001)	-0.002*** (0.004)
Born in Israel	0.145*** (0.013)	0.154*** (0.014)	0.093* (0.057)	0.051* (0.015)	0.056*** (0.015)	0.012 (0.059)
Israel's North region	-0.110*** (0.021)	-0.096*** (0.023)	-0.143** (0.060)	-0.075*** (0.025)	-0.082*** (0.027)	-0.02 (0.064)
Israel's South region	-0.019 (0.018)	-0.002 (0.019)	-0.163** (0.067)	-0.067*** (0.021)	-0.065*** (0.022)	-0.050 (0.071)
<b>EXIT</b>	<b>0.253***</b> <b>(0.075)</b>	<b>0.224***</b> <b>(0.084)</b>	<b>0.377**</b> <b>(0.179)</b>	<b>0.164</b> <b>(0.103)</b>	<b>0.097</b> <b>(0.118)</b>	<b>0.395*</b> <b>(0.223)</b>
<b>EXIT*At Least High School Diploma</b>	<b>-0.320***</b> <b>(0.102)</b>	<b>-0.311***</b> <b>(0.115)</b>	<b>-0.337</b> <b>(0.240)</b>	<b>-0.031</b> <b>(0.120)</b>	<b>-0.005</b> <b>(0.137)</b>	<b>-0.128</b> <b>(0.261)</b>
Constant	7.155*** (0.095)	7.122*** (0.098)	7.334*** (0.393)	6.280*** (0.111)	6.301*** (0.116)	5.967*** (0.426)
<i>Observations</i>	13229	12190	1039	9719	8960	759
R <sup>2</sup>	0.16	0.16	0.13	0.16	0.17	0.15
Adjusted R <sup>2</sup>	0.16	0.17	0.13	0.16	0.17	0.13
F	252.40	238.34	16.09	190.90	179.91	12.58

Notes: Entries in column (1) represent the mean 1983 characteristics of individuals who lived outside a Kibbutz in 1995. Entries in column (2) represent the mean 1983 characteristics of individuals who exit a Kibbutz between 1983-1995. Entries in column (3) represents the mean characteristics of individuals who lived outside a Kibbutz in both 1983 and 1995. The dependent variable in column (4) is the natural log of earnings outside the Kibbutz in 1995.

"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 omitted 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. A third omitted group includes all other regions.

"EXIT" is an individual who lived in a Kibbutz in 1983 and outside the Kibbutz in 1995.

"EXIT\*At Least High-School Diploma" is an individual who left the Kibbutz with at least a high school diploma between 1983-1995.

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

Standard errors in parentheses.

All explanatory variables are measured in 1983 (before exit).

# Appendix G: Robustness of pre-entry earnings: males and females

TABLE G1

Pre-Entry Earnings of City-to-Kibbutz and City-to-Other-Rural Migrants (OLS regression), 1983  
Robustness to subsample of Males only

Variable	(1)	(2)	(3)
	1983 Earnings OLS coefficients Specification 1	1983 Earnings OLS coefficients Specification 2	1983 Earnings OLS coefficients Specification 3
At Least High-School Diploma	0.186*** (0.014)	0.188*** (0.014)	0.193*** (0.014)
High-skilled	0.280*** (0.018)	0.279*** (0.018)	0.278*** (0.018)
Low-skilled	-0.152*** (0.023)	-0.153*** (0.023)	-0.153*** (0.023)
Age	0.155*** (0.006)	0.155*** (0.006)	0.155*** (0.006)
Age squared	-0.002*** (0.00008)	-0.002*** (0.00008)	-0.002*** (0.00008)
Born in Israel	0.092*** (0.014)	0.092*** (0.014)	0.092*** (0.014)
Israel's North region	-0.037 (0.014)	-0.036 (0.024)	-0.038 (0.024)
Israel's South region	0.013 (0.020)	-0.012 (0.020)	0.012 (0.020)
<b>ENTERED KIBBUTZ</b>	<b>-0.262*** (0.097)</b>	<b>0.073 (0.152)</b>	<b>0.078 (0.152)</b>
<b>ENTERED KIBBUTZ*At Least High-School Diploma</b>		<b>-0.560*** (0.197)</b>	<b>-0.565*** (0.197)</b>
<b>ENTERED RURAL</b>			<b>0.244*** (0.069)</b>
<b>ENTER RURAL *At Least High-School Diploma</b>			<b>-0.271*** (0.086)</b>
Constant	7.121*** (0.114)	6.896*** (0.114)	7.106*** (0.114)
Observations	8922	8922	15948
R <sup>2</sup>	0.22	0.22	0.22
Adjusted R <sup>2</sup>	0.22	0.22	0.22
F	277.86	251.08	210.56

Notes: The dependent variable in columns (1), (2) and (3) is the natural log of 1983 earnings.

"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 omitted 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. A third omitted group includes all other regions.

"ENTERED KIBBUTZ" is a dummy variable equals to 1 if the individual moved from a city to a Kibbutz between 1983-1995.

"ENTERED KIBBUTZ\*At Least High-School Diploma" is a dummy variable equals to 1 if the individual moved from a city to a Kibbutz between 1983-1995 and had at least a high school diploma in 1983

"ENTERED RURAL" is a dummy variable equals to 1 if the individual moved from a city to a rural location not based on equal-sharing between 1983-1995.

"ENTERED RURAL\*At Least High-School Diploma" is a dummy variable equals to 1 if the individual moved from a city to a rural location not based on equal-sharing between 1983-1995 and had at least a high-school diploma in 1983.

Coefficient significant at \*\*\*1% \*\*5% \*10%. Standard errors are in parenthesis. All explanatory variables are measured in 1983 (before exit).

TABLE G2

Pre-Entry Earnings of City-to-Kibbutz and City-to-Other-Rural Migrants (OLS regression), 1983  
Robustness to subsample of Females only

Variable	(4)	(5)	(6)
	1983 Earnings OLS coefficients Specification 1	1983 Earnings OLS coefficients Specification 2	1983 Earnings OLS coefficients Specification 3
At Least High-School Diploma	0.220*** (0.017)	0.219*** (0.017)	0.227*** (0.017)
High-skilled	0.269*** (0.025)	0.269*** (0.025)	0.270*** (0.025)
Low-skilled	-0.371*** (0.027)	-0.371*** (0.027)	-0.369*** (0.027)
Age	0.073*** (0.008)	0.073*** (0.008)	0.072*** (0.008)
Age squared	-0.0008*** (0.0001)	-0.008*** (0.0001)	-0.0008*** (0.0001)
Born in Israel	0.043*** (0.017)	0.043*** (0.017)	0.045*** (0.017)
Israel's North region	-0.004 (0.031)	-0.004 (0.031)	-0.003 (0.031)
Israel's South region	0.020 (0.025)	-0.020 (0.025)	-0.021 (0.025)
<b>ENTERED KIBBUTZ</b>	<b>-0.056</b> <b>(0.108)</b>	<b>-0.046</b> <b>(0.232)</b>	<b>-0.046</b> <b>(0.232)</b>
<b>ENTERED KIBBUTZ*At Least High-School Diploma</b>		<b>-0.013</b> <b>(0.263)</b>	<b>-0.020</b> <b>(0.263)</b>
<b>ENTERED RURAL</b>			<b>0.108</b> <b>(0.101)</b>
<b>ENTER RURAL*At Least High-School Diploma</b>			<b>-0.265**</b> <b>(0.115)</b>
Constant	7.121*** (0.114)	8.232*** (0.139)	8.239*** (0.139)
Observations	8922	7026	7026
R <sup>2</sup>	0.22	0.13	0.13
Adjusted R <sup>2</sup>	0.22	0.13	0.13
F	277.86	103.23	86.88

Notes: The dependent variable in columns (1), (2) and (3) is the natural log of 1983 earnings.

"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 omitted 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. A third omitted group includes all other regions.

"ENTERED KIBBUTZ" is a dummy variable equals to 1 if the individual moved from a city to a Kibbutz between 1983-1995.

"ENTERED KIBBUTZ\*At Least High-School Diploma" is a dummy variable equals to 1 if the individual moved from a city to a Kibbutz between 1983-1995 and had at least a high school diploma in 1983.

"ENTERED RURAL" is a dummy variable equals to 1 if the individual moved from a city to a rural location not based on equal-sharing between 1983-1995. "ENTERED RURAL\*At Least High-School Diploma" is a dummy variable equals to 1 if the individual moved from a city to a rural location not based on equal-sharing between 1983-1995 and had at least a high-school diploma in 1983.

Coefficient significant at \*\*\*1% \*\*5% \*10%. Standard errors are in parenthesis.

All explanatory variables are measured in 1983 (before exit).