

The Limits of Equality: Insights From the Israeli Kibbutz

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Abstract

The Israeli Kibbutzes, which are voluntary communities based on income equality, are puzzling since they might unravel due to moral hazard and adverse selection. Yet Kibbutzes persisted for most of the 20th century. How did voluntary communities based on income equality persist within a capitalist environment? What level of equality can they sustain? This paper employs unique data sets at both the Kibbutz-level and the individual-level to analyze Kibbutzes' choices of their level of income equality, their organizational form and their members' decisions of whether to leave the Kibbutz. A wealth shock that hit Kibbutzes differentially provides the "natural experiment" that allows me to identify the determinants of the level of equality and the exit rates in each Kibbutz. The main findings are that the most productive members are more likely to leave, that common wealth is a lock-in device that makes exit costly, and that wealthier Kibbutzes are more likely to choose a higher level of income equality. All the patterns in the data are consistent with a simple model of optimal insurance under limited commitment of members to stay in their Kibbutz once their type is realized. This stands in contrast to the view of Kibbutzes as primarily ideological entities. At a broader level, the study of Kibbutzes reveals how potential moral hazard and negative selection determine contractual relationships in organizations such as partnerships and cooperatives.

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1 Introduction

The Israeli Kibbutz presents a puzzle for economists. Throughout history non-market institutions have engaged in redistribution, but few are as explicitly based on income equality across members as the Kibbutz.¹ Such communities might unravel since equal distribution encourages shirking (moral hazard) and discourages the participation of productive individuals (adverse selection). Yet, the Kibbutz has persisted successfully for most of the 20th century and formed one of the largest communal movements in history, consisting today of 120,000 members living in 268 Kibbutzes (plural of Kibbutz).

The Kibbutz allows us to deal with a fundamental question in economics of how potential moral hazard and negative selection shape contractual relationships. More specifically, what are the factors that allow the voluntary egalitarian Kibbutz to coexist within a capitalist environment? What level of income equality can it sustain? These are the main questions this paper aims to answer.

The study of Kibbutzes also contributes to our understanding of organizations such as partnerships, cooperatives, and labor managed firms, which are often based on revenue-sharing and are, thus, subject to similar problems. Despite a large theoretical literature, only few empirical studies have investigated these forms of organization.² Moreover, current empirical work takes the level of equality within the partnership (i.e. the sharing rule) as given and abstracts from possible exit of partners.³ Two main goals of this paper are to study the determinants of the level of income equality within each Kibbutz and to examine the relative quality of movers compared to stayers.

Two facts make the environment and data especially suited for these purposes. First, the unique data

¹Example of institutions that engage redistribution include group lending institutions such as the Grameen Bank in Bangladesh (Stiglitz 1990, Varian 1990 and Besley and Coate 1995); rotating savings institutions (see Besley, Coate and Loury 1993 and Calomiris and Rajaraman 1993); risk-sharing arrangements in village economies in India (Rosenzweig 1988, Ligon 1993, Townsend 1995), Thailand (Townsend 1995), and Nigeria (Udry 1994); risk-sharing institutions in medieval English villages (McCloskey 1976, 1991) under the open field system, and Richardson 2003 for Fraternities and the customary poor law as a risk-sharing institution); sharecropping in late medieval Italy (Akerberg and Botticini 2000) and in early modern France (Hoffman 1984); credit cooperatives operated in Germany in the nineteenth and early twentieth centuries (Banerjee, Besley, and Guinnane 1994); nineteenth century American communes such as Amana and the Shakers (Murray 1995, Cosgel and Murray 1998); Soviet Kolkhozes; Orthodox Jews in Israel (Berman 2000); and professional partnerships of lawyers (Lang and Gordon 1995) and physicians (Gaynor and Gertler 1995). The welfare state is another example.

²Theoretical contributions include Ward 1958, Farrell and Scotchmer 1988, Kendel and Lazear 1992, Kremer 1997, and Levin and Tadelis 2005.

³The studies by Craig and Pencavel 1992, Lang and Gordon 1995, Gaynor and Gertler 1995 focus on the effect of revenue sharing on productivity; Craig and Pencavel 1994 focus 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 is a study of law firms' field boundaries.

I have assembled contain information that is not usually available to researchers of organizations, such as the self-reported level of income equality of each Kibbutz and census information on movers and stayers. Second, a financial wealth shock that hit Kibbutzes differentially in the mid-1980s provides the “natural experiment” that allows me to identify the role of economic forces in members’ migration decisions and in Kibbutzes’ decisions on their level of income equality. Since the shock, Kibbutzes have gone through major changes. For over half a century, exit rates were low and virtually all of the Kibbutzes were based on full income equality across members. Recently, however, Kibbutzes experienced high exit rates and shifted away from full income equality.

I provide a simple model of optimal insurance under limited commitment of members to stay in their Kibbutz that accounts for these changes and provides testable predictions.⁴ The Kibbutz would like to split output equally to insure members against idiosyncratic income shocks but, in doing so, might lose high ability members who find it optimal to leave the commune. The common wealth of a Kibbutz (and the fact that members cannot take their share upon leaving) partially locks-in members and allows income equality. A main prediction of the model, which is tested using an individual-level data set, is that movers from the Kibbutz are positively selected compared to members who stay. A main comparative statics, which is tested using a Kibbutz-level data set, is that wealthier Kibbutzes will choose a higher level of equality and will experience less exit.

The main empirical findings of the paper are consistent with the model and can be summarized as follows. First, the wealth shock that hit Kibbutzes was followed by massive exit; the larger the shock that hit a Kibbutz, the more exit the Kibbutz experienced. Second, movers from Kibbutzes were positively selected compared to stayers in terms of their education and occupation. Third, post-crisis wealth had a large positive impact on the subsequent level of equality chosen by a Kibbutz (this result is shown to be robust for various measures of a Kibbutz’s wealth). On the other hand, a Kibbutz’s level of ideology, as measured by its affiliation to movements with different ideological commitment to equality, did not affect its level of equality. Indeed, Kibbutzes that shifted away from full equality are shown to experience a decline in exit.

⁴Hendel and Lizzeri 2003 provide a similar model in the context of life insurance.

Finally, the paper discusses the relevance of the model's main ingredients and assumptions, such as insurance, the use of lock-in devices, and the shirking problem. I claim that insurance has always been a major consideration of Kibbutz members, albeit this aspect of Kibbutzes was neglected by scholars. The founders of Kibbutzes came to a land filled with uncertainty and wanted insurance against their type and other idiosyncratic income shocks.⁵ They were young, had similar background and training and can be considered to a large extent as homogenous (Talmon, 1972). They set up communities based on full income equality but must have realized that members who turn out to have high abilities might leave the Kibbutz and earn a premium for their ability outside. To alleviate the tendency of the best members to leave, they created (ex ante) lock-in devices that would make ex-post exit costly, such as collective ownership of all property, high provision of public goods and disallowing members to recover their share upon leaving their Kibbutz. The wealth shock of the mid-1980s weakened the lock-in and resulted in massive exit and a subsequent shift away from full equality to reduce exit. Mutual monitoring and peer pressure allow the Kibbutzes to insure members while mitigating the shirking problem. Interestingly, membership size does not affect a Kibbutz's level of equality, suggesting that the shirking problem is not a driving force in Kibbutzes' choices of their level of equality, otherwise larger Kibbutzes, where monitoring might be more difficult, would tend to choose a lower level of equality.

I conclude that an economic approach to Kibbutzes - which are often claimed to be driven by ideology - is consistent with the creation of Kibbutzes, their key principles, their demographic patterns, their recent shift away from full income equality and the substantial heterogeneity in their behaviors.

The next section provides a brief description of the key principles of the Kibbutz, the mid-1980s wealth shock, as well as major demographic, economic and social developments in the Kibbutzes over the last century. Section 3 provides a simple model that treats Kibbutzes as partnerships that would like to provide insurance to partners who cannot commit to stay in their partnership once their ability is realized. After describing the data in section 4 section 5, by looking at the relationship between wealth and exit, confirms the role of a Kibbutz's common wealth as a lock in device that makes exit costly. The model's prediction that the most productive members are more likely to leave is tested in section 6 using a longitudinal data

⁵Insurance market against shocks to human capital does not exist, besides life insurance and disability insurance.

set of individuals linked across Israeli 1983 and 1995 censuses of population. The prediction that wealthier Kibbutzes are more likely to maintain a higher level of income equality is tested in section 7 using a Kibbutz-level data set. Section 8 discusses the relevance of insurance and lock-in devices in the Kibbutz, and suggests that the shirking problem has been mitigated by peer pressure and mutual monitoring. Section 9 provides an economic re-interpretation of the Kibbutz history and section 10 concludes.

2 The Kibbutz: Brief Background, Crisis and Reforms

Kibbutzes were founded on three main principles. First, there would be full equality in the distribution of income across members regardless of their ability. Second, members would have no private property and all their property would belong to the Kibbutz. Third, Kibbutzes would be voluntary communities, so that each member could leave the Kibbutz and move to an Israeli city.

The first Kibbutz (Degania) was established in 1910, but the majority of Kibbutzes were established in the 1930s and 1940s just before the creation of the State of Israel. Kibbutzes were established mainly by young immigrants with socialist ideology from eastern Europe who wanted to create a new voluntary egalitarian way of life in Palestine. At the outset, Kibbutzes were primarily communal farms, but today they have factories and an industrial base alongside agriculture. The Kibbutz movement in 1995 consisted of 120,000 members in 268 Kibbutzim, located all over Israel, and it accounts for 2.6% of the Jewish population in Israel. Kibbutzes vary in size from less than a hundred to over a thousand, but most Kibbutzes have between 400 and 600 members, with an average of 441 members. FIGURE 1 shows the distribution of membership size in Kibbutzes.

A main source of membership growth before the 1950s had been entry to the Kibbutz through youth movements from Israel and abroad. Since then, however, the main source of membership growth has been internal (i.e., Kibbutz-born individuals who have stayed in their Kibbutz).⁶

For over half a century, exit rates from Kibbutzes were low, their standards of living were higher than the country's average (Barkai 1977), and virtually all of the Kibbutzes were based on full income equality. Since the late-1980s, however, exit rates increased sharply. As will be shown later, over 20% of members

⁶Barkai 1977 for the period before 1970 and my data set for the period after.

left their Kibbutz between 1983 and 1995.

A few years later and for the first time in their history, many Kibbutzes shifted away from full income equality. Certain Kibbutzes remained traditional communities based on full income equality, while others introduced various degrees of differential reforms, ranging from small deviations from the full income sharing model to substantial reforms that essentially transformed those Kibbutzes into capitalist neighborhoods. The massive exit and the shift away from full equality followed a financial crisis in the mid-1980s.

The unexpected crisis in the mid-1980s, that later became known as “the Kibbutz crisis”, hit the common wealth of some Kibbutzes more severely than others. After the government fixed interest rates on an excessively high levels as part of its stabilization program to stop the escalating inflation, Kibbutzes suddenly found themselves in various levels of debts and had to reduce their living standards to various degrees.

There were a few reasons for the crisis. First, several Kibbutzes faced losses when the shares of the major banks crashed. Second, an investment adviser, who was hired to guarantee the money of some Kibbutzes against inflation, went bankrupt and could not pay the Kibbutzes back. Third, in the decade prior to the crisis, Kibbutzes had been borrowing on a large scale to enlarge members’ apartments to facilitate the move of their children home (children used to live in separate residences) and to improve the dining halls, swimming pools, theaters, etc. At first, loans were unlinked to the cost-of-living index and they were easy to repay in the presence of escalating inflation, but many Kibbutzes continued to borrow even as loans were linked. The artificially high interest rates announced by the government in 1985 left many Kibbutzes in huge debts (many other businesses went bankrupt and the cooperative Moshav villages were also hit severely). Fifth, many Kibbutzes “had overexpanded their industries with the help of borrowed capital, and acquired a huge burden of debt, vastly exacerbated by the high real rates of interest.” (Near 1997, p. 346). Another contributing factor to the crisis was the decline in world prices of agriculture, which has always been a major source of income for Kibbutzes.

A complicating factor was the system of mutual guarantees across Kibbutzes that goes back to the 1920s. All Kibbutzes were members of their movement funds, such that each Kibbutz was liable for the total debt in addition to its private one. In 1989, the government, the banks and the Kibbutzes established

an independent Kibbutz Arrangement Board, which dissolved the mutual guarantees across Kibbutzes and forced each Kibbutz to deal with its own economic circumstances.

3 A Model of Kibbutz

This section provides an economic framework that highlights an insurance motive for the creation of the Kibbutz and illustrates how the common wealth of the Kibbutz serves as a lock-in device that allows the Kibbutz to implement equality while keeping high ability members inside. The level of equality in the Kibbutz is determined endogenously and limited by the Kibbutz's common wealth and members' outside option.

The economy is a planned endowment economy with a single consumption good. Agents' utility $u(c)$ is strictly increasing and strictly concave function of consumption c .

The timing of events is as follow. There are two dates $t = 0, 1$ and there is a continuum of ex ante identical agents with a unit mass. At $t = 0$, the Kibbutz offers a contract (c_L, c_H) to be given for a low income level θ_L or a high income level θ_H , respectively. Kibbutz members contribute their private property to the Kibbutz, which builds common wealth (local public goods) worth K units for each member.⁷ At $t = 1$, individuals receive a signal $p \in [0, 1]$, which is a probability to earn a high income level θ_H (as opposed to a low income level θ_L).⁸ Individuals then decide whether to stay in the Kibbutz and enjoy $pu(c_H + K) + (1 - p)u(c_L + K)$, or leave, in which case they forgo the Kibbutz's common wealth K and enjoy $pu(\theta_H) + (1 - p)u(\theta_L)$.

The Kibbutz is subject to a budget constraint (BC), $\int_{p \in P} [pc_H + (1 - p)c_L] dF(p) \leq \int_{p \in P} [p\theta_H + (1 - p)\theta_L] dF(p)$, i.e. it cannot provide members with more than the sum of their production, where P is the set of individuals who remain in the Kibbutz and $F(p)$ is the distribution of signals of those who stay. The Kibbutz is also subject to an ex-post participation constraint (PC), $pu(c_H + K) + (1 - p)u(c_L + K) \geq pu(\theta_H) + (1 - p)u(\theta_L)$ iff $p \in P$.

The social planner problem is, thus, to choose a contract (c_L, c_H) that maximizes the sum of members

⁷The model is very similar in the private good case, as long as members cannot take it upon leaving. In the private good case, $\frac{K}{F(p)}$ replaces K , when $F(p)$ is the fraction of members who stay in the Kibbutz. In the case of a private good, the central planner has an additional incentive to let members leave, since those who stay have more private goods for themselves.

⁸For simplicity, income levels θ_L and θ_H are assumed to be equal inside and outside the Kibbutz.

expected utilities, subject to a budget constraint and an participation constraint. The set of members that stays in the Kibbutz (P) is determined by the contract (c_L, c_H) . Formally, the Kibbutz solves:

$$\underset{c_L, c_H, P}{Max} \int_{p \in P} [pu(c_H + K) + (1 - p)u(c_L + K)] dF(p) + \int_{p \notin P} [pu(\theta_H) + (1 - p)u(\theta_L)] dF(p) \quad (1)$$

s.t

$$BC : \int_{p \in P} [pc_H + (1 - p)c_L] dF(p) \leq \int_{p \in P} [p\theta_H + (1 - p)\theta_L] dF(p)$$

$$PC : pu(c_H + K) + (1 - p)u(c_L + K) \geq pu(\theta_H) + (1 - p)u(\theta_L) \text{ iff } p \in P$$

The assumption of ex ante identical agents is natural for the founders of the Kibbutz, who are described in the literature as young individuals, unattached from their families and homogenous in their ideology and training.⁹ In later generations, the model is meant to describe the exit decision by Kibbutz-born individuals rather than the entry decision from outside, since the latter has been a marginal factor in the last five decades (more on this later). Kibbutz-born individuals in young age (who are entitled to become members regardless of their ability) can also be thought of as ex ante the same. As they get signals about their types and as long as they still have a long time horizon to rebuild their wealth outside, they decide whether to stay in their Kibbutz. In fact, the data suggest that members who leave their Kibbutz are typically in the age range of 20-40 and very few members leave the Kibbutz after the age of 45 (see FIGURE 2).

Claim 1 *The budget constraint (BC) binds.*

Proof. Suppose BC is not binding and that (c_H^*, c_L^*) is the equilibrium contract. Then, the Kibbutz can increase c_H and c_L and still satisfy BC and PC , which increases the objective function. Such an increase implies that (c_H^*, c_L^*) is not optimal, which is a contradiction. ■

The first-best contract is the contract a social planner would choose if he could force people to stay once their type is realized. Such a contract would provide full insurance and all members would stay. Formally,

Claim 2 *The first best contract provides full insurance $c_L^{FB} = c_H^{FB} = E[\theta]$ and all members stay in the Kibbutz.*

⁹Talmon (1972), p.2.

Proof. In the first best contract, the social planner needs not satisfy the participation constraint PC . Thus, it follows that all members $p \in [0, 1]$ stay in the Kibbutz, regardless of (c_L, c_H) . Since the objective function is concave, the first best contract satisfies $c_L^{FB} = c_H^{FB} = E[E[\theta/p]] = E[\theta]$ ■

Outside the first-best world, the Kibbutz faces a trade-off, since keeping a high level of income equality improves the insurance but might result in adverse selection, as members who realize they are high types might forgo the insurance and leave, leaving the Kibbutz with only low types. Thus, the Kibbutz has to find optimal levels of income equality, which might involve adverse selection. This is illustrated in Claims 3 and 4.¹⁰

The model illustrates a fundamental feature of the Kibbutz, namely that the optimal Kibbutz contract is more egalitarian than in the capitalist city:

Claim 3 *The optimal contract satisfies $\theta_L \leq c_L^* \leq c_H^* \leq \theta_H$.*

Proof. Assume in contradiction that $c_L^* < \theta_L$. Then, since (BC) binds, we have that $c_H^* > \theta_H$. Since the objective function of the Kibbutz is concave, the Kibbutz can increase the set P and the objective function by offering $c_L = \theta_L$ and $c_H = \theta_H$. This contradicts the optimality of (c_H^*, c_L^*) . Assume in contradiction that $c_L^* > c_H^*$. Since the objective function is concave, the Kibbutz can increase P and the objective function by offering $c_L = c_H$, contradicting the optimality of (c_H^*, c_L^*) . ■

The model reveals a tendency of adverse selection from the Kibbutz, i.e. higher types are more likely to leave. Formally,

Claim 4 *If $p \in P$, then $p' < p$ implies that $p' \in P$.*

Proof. I need to prove that if the (PC) is satisfied for a certain p , it is satisfied for every $p' < p$. In other words, I need to prove that $pu(c_H) + (1-p)u(c_L) - pu(\theta_H) - (1-p)u(\theta_L)$ is non-increasing in p , i.e. that $\frac{\partial(pu(c_H) + (1-p)u(c_L) - pu(\theta_H) - (1-p)u(\theta_L))}{\partial p} = u(c_H) - u(c_L) - u(\theta_H) + u(\theta_L) \leq 0$. This follows from Claim 2 and the concavity of u . ■

¹⁰There are two reasons that the social planner wants people to belong to the Kibbutz. First, there is insurance. Second, there is the public good generation, as staying leads to a public good consumption of K .

Claim 4 suggests that there is a threshold $p' \in [0, 1]$ below which a member stays in the Kibbutz and above which she leaves. Therefore, given an optimal level of (c_H^*, c_L^*) , the *PC* uniquely defines p' .¹¹

The model highlights an important trade-off faced by the Kibbutz. The Kibbutz can “increase the pie” either by increasing total consumption or by smoothing consumption across individuals. High types increase total consumption, but at the same time they force the Kibbutz to reduce the level of insurance for other members. Given a wealth level, a Kibbutz has to choose between a contract with a high level of equality but lower membership (since high types are excluded), and a contract with a lower level of equality but a higher membership (when high types are included). The challenge of this trade-off has been faced in recent years in many Kibbutzes, who struggle to find the optimal level of equality that will provide insurance on the one hand, and keep enough high types on the other hand.

Proposition 1 suggests that the optimal level of insurance is (at least gradually) increasing in the Kibbutz’s common wealth, K .¹² The underlying reason is that for a high enough K , full equality can be implemented without losing high ability members, and as K increases the level of equality gradually approaches to full income equality. Formally,

Proposition 1 *For any k' in which the level of insurance is partial (i.e. $c_H - c_L > 0$), there exists $\underline{K} > k'$ (that depends on k') above which the level of insurance is higher (i.e. $c_H - c_L$ is smaller) than in k' . Moreover, there exist $\overline{\overline{K}} \geq \overline{K} \geq \underline{K}$ such that for all $k \in (\underline{K}, \overline{K})$ the contract provides partial insurance (i.e. $c_H - c_L > 0$) and for all $k \geq \overline{\overline{K}}$ the contract provides full insurance (i.e. $c_H - c_L = 0$).*

Proof. Define $c_H^*(k)$ and $c_L^*(k)$ as the optimal level of insurance for a fixed $k \geq 0$. Also, let $\Delta(k) = c_H^*(k) - c_L^*(k)$. Finally, let $\overline{K} = \inf \{k \geq 0 : c_H^*(k) - c_L^*(k) = 0\}$, and $\underline{K} = \sup \{k \geq 0 : c_H^*(k) - c_L^*(k) \geq \Delta(k')\}$. It can be shown that $c_H = c_L$ is the solution for a large enough k . More specifically, when $k \geq \overline{\overline{K}} = \theta_H$,

¹¹The Kibbutz problem can, thus, be simplified and rewritten as follows:

$$\begin{aligned} \text{Max}_{c_L, c_H} \int_{p=0}^{p'} [pu(c_H + K) + (1-p)u(c_L + K)] dF(p) + \int_{p=p'}^1 [pu(\theta_H) + (1-p)u(\theta_L)] dF(p) \quad (2) \\ \text{s.t.} \\ BC : \int_{p=0}^{p'} [pc_H + (1-p)c_L] dF(p) = \int_{p=0}^{p'} [p\theta_H + (1-p)\theta_L] dF(p) \\ PC : pu(c_H + K) + (1-p)u(c_L + K) \geq pu(\theta_H) + (1-p)u(\theta_L) \text{ iff } p \leq p' \end{aligned}$$

¹²Depending on the functional forms of $u(c)$ and $F(p)$, a Kibbutz whose post-crisis value of K is low, should either reduce the level of equality, or reduce its membership, or both.

then the first best contract in which $c_H = c_L$ can be implemented. Since k' attains partial insurance, i.e. $\Delta(k') > 0$ and the solution is continuous in k , the interval $(\underline{K}, \overline{K})$ is not empty and \overline{K} exists. ■

4 Data Description

A data-collection effort over several years has resulted in two large and unique micro-level data sets of individuals and Kibbutzes. The first is a data set generated from the Israeli censuses of population that contains 4% representative sample of the Israeli population. The sample is linked across the 1983 and 1995 Israeli censuses of population. The data set allows me to observe in both years whether an individual lives inside or outside *a* Kibbutz, but does not allow to identify particular Kibbutzes (for reasons of confidentiality). During this period, all Kibbutzes were still based on full income equality and major reforms were not yet implemented. This data set contain, among other things, information on the education and occupation of both individual who stayed and those who left the Kibbutz, as well as information on movers' income outside the Kibbutz in 1995.

The second data set contains 184 Kibbutzes (70% of all Kibbutzes) and was assembled from various archives and institutions in Israel. Kibbutzes that were excluded either have not yet decided on their level of income equality (about 40 Kibbutzes), or they are religious Kibbutzes (16 Kibbutzes), which are both different in their nature and offer less quantitative information. Note that the religious Kibbutzes did not suffer in general from the financial crisis and, as predicted, many of them maintain full income equality. Excluding them, thus, works against the hypothesis that I am testing.

The data contain annual demographic information on each Kibbutz such as the number of members, exit and entry, and average household size; information on the degree to which the Kibbutz's wealth was hit by the crisis as reported to the government in 1994 by a committee led by a large accounting firm; information on the Kibbutz's post-crisis wealth as reflected in the 1995 and 2000 credit rating they were assigned by Dunn and Bradstreet, as well as in their 2000 balance sheets; self-reported information on the Kibbutzes' level of equality as chosen by them in 2003; information on Kibbutzes' ideology level (as measured by their movement's affiliation). Variables used in the Kibbutz-level regression analysis are described in sections 7.

5 The Effect of Wealth and the Level of Equality on Membership

To confirm the role of wealth as a lock-in device, I look at the relationships between wealth and exit.¹³ Although the model predicts that the Kibbutz should reduce its level of income equality after a wealth shock, in reality such fundamental reforms did not happen instantaneously. Membership responded to the wealth shock faster than Kibbutzes' decisions to shift away from full equality, and many Kibbutz members exited their Kibbutz in the post-crisis, pre-reform period. It took Kibbutzes over a decade to "digest" the wealth shock and to shift away from full equality.

At the aggregate level, TABLE 1 shows that the number of Kibbutzes and their membership grew continuously throughout the century until the mid-1980s, but shrank since then. The next section shows that, as predicted, members who left were positively selected from the Kibbutz population in terms of their education and occupation.

At the Kibbutz-level, FIGURE 3 and FIGURE 4 show that whereas membership in all Kibbutzes increased continuously before the crisis, membership in Kibbutzes that were hit by the wealth-shock shrank substantially since then, while membership continued to increase in Kibbutzes that were not hit.

Next, I show that exit decreased as a result of the shift away from full income equality. Since most Kibbutzes have shifted away from full equality only recently, it is still early to test whether and to what extent exit responded to the reforms. Nevertheless, I look at the few Kibbutzes had started to discuss reforms in the mid-1990s. FIGURE 5 shows membership over time in an average such Kibbutz. The figure suggests that membership increased continuously before the shock, then decreased dramatically and in 1993 reached its 1967 level. The Kibbutzes then shifted away from full equality and since then membership has not suffered a further decline and remained constant.

Anecdotal evidence and reports of Kibbutz officials suggest that the shift away from equality seems to be successful in keeping members inside. David Koren, a former member of the Knesset (Israeli parliament) and a member of Kibbutz *Gesher Haziv*, commented that: "*Since we started with the privatization, no one*

¹³I show here the effect of wealth and the level of equality on membership, rather than on exit, since I do not have consistent data on exit before the 1980s. Note that changes in membership size reflects mostly exit, since entry is a much smaller phenomenon. The available data on exit suggest similar patterns, as exit rates were similar for all Kibbutzes before the crisis and only increased in Kibbutzes with low post-crisis wealth.

has left (the Kibbutz)".¹⁴

6 Selection in Exit: Individual-Level Analysis

Despite the fact that a member cannot take his share of the Kibbutz's assets upon leaving, some members have always left their Kibbutz. Kibbutz observers and scholars have always suspected that the "best" members are the first to leave (Bettelheim 1969, Talmon 1970, Helman 1982, Leviathan 1993), as predicted by the model. The secretary of Kibbutz Givat Brenner in 2001 commented that¹⁵:

"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."

To formally examine whether the "best" members are more likely to leave, I employ the census individual level data.¹⁶ For the purposes of this paper, I consider only the 1655 individuals between the age of 15-54 who were inside a Kibbutz in 1983 and ended up either inside the Kibbutz or outside a Kibbutz by 1995. Notice that this is the post-crisis but pre-reforms period, i.e. all Kibbutzes were still based on full income equalit. A total of 397 members left a Kibbutz to the city in this period, more than 20%.

Summary statistics for both movers and stayers are presented in Table 2, and reveal that the more educated and skilled members were more likely to leave. "High-Skill" occupations are defined as academic and managerial occupations. "Low-Skill" occupations are unskilled industrial professions and service workers. A third control group contains all other occupations such as clerks, sales persons and workers in agriculture. I find that individuals who left the Kibbutz are on average more educated than stayers (54% of migrants have at least a high school diploma compared to 48% of stayers), and they are less likely to have a low-skilled occupation (13% compared to 23%).

A Probit regression that assigns 1 to movers and 0 to stayers is presented in Table 3. The more educated members were more likely to leave, such that having at least a high school education increases the exit rate

¹⁴Source: the Israeli newspaper Yedioth Aharonot of 5/22/02.

¹⁵Gavron [2001, p. 68].

¹⁶In Abramitzky (2004), I employ the individual-level data set to test Borjas' selection hypothesis by examining exit from and entry to the Kibbutz. I find strong evidence that Kibbutz members who left their Kibbutz are positively selected from the Kibbutz population, and (the few) individuals who enter the Kibbutz are adversely selected from the city population.

by a third (from 20% in average to 30%). Members with high-skill occupations are nine percentage points more likely to leave the Kibbutz and low-skill members are nine percentage points less likely to leave.

7 The Determinants of Equality: Kibbutz-Level Analysis

By 2003, and for the first time, many Kibbutzes have shifted away from equality and are introducing various degrees of reforms, ranging from adjustments “in the margin” to substantial reductions of income equality.

In this section, I study the determinants of the level of income equality within a Kibbutz. I test the prediction that a Kibbutz would maintain a higher level of equality when its common wealth (K) is higher. More specifically, I perform an Ordered Probit regression analysis:

$$Equality_i = \alpha + \beta' X_i + \delta_1 K_i + \varepsilon_i$$

where $Equality_i$ is Kibbutz i 's choice of the level of income equality it implements, K_i is the post-crisis wealth of Kibbutz i , X_i are control variables that may affect a Kibbutz's level of equality such as its level of ideological commitment to equality, its membership size and its exit and entry rates.

The Kibbutz specific wealth-shock and the variation across Kibbutzes in the shift away from equality allow identification. Notice that since before the wealth shock all the Kibbutzes were based on full income equality, the post-shock *level* of equality chosen by Kibbutzes also represent the *change* in the level of equality.

Furthermore, besides the wealth-shock, a Kibbutz's own post-crisis wealth can also be used as a predictor of the Kibbutz's choice of the level of equality. Kibbutzes in the pre-crisis period were relatively similar in their living standards. Even if there were differences between Kibbutzes, the mutual guarantee across Kibbutzes (that was dissolved after the crisis) tended to cancel those differences. After the crisis and for the first time, a Kibbutz's own wealth, as opposed to the total wealth of all Kibbutzes, became the relevant indication for a Kibbutz's economic status. In the analysis that follows, I use four alternative measures as the main explanatory variables, a couple of which intend to measure the wealth-shock and a couple measure a Kibbutz's post-crisis wealth.

7.1 Variables

The following are the variables used in the regression:

7.1.1 Equality ($c_H^* - c_L^*$)

The level of income equality chosen by a Kibbutz is my dependent variable. Since this is a discrete variable that can be ranked from high to low, I employ an Ordered Probit regression, as discussed in more details below.

Since the early 2000s, Kibbutzes have shifted away from full equality by introducing various degrees of differentiating reforms. By 2003, Kibbutzes self reported themselves into categories that can be ranked by their level of income equality.¹⁷:

- “Full sharing” (*Shitufi*) (39 Kibbutzes). Kibbutzes in this category maintain full income equality, such that all members in a Kibbutz receive an equal budget regardless of their contribution.
- “Sharing with differential pay in the margin” (29 Kibbutzes). In these Kibbutzes, a member’s budget is mostly shared equally, but contains a small percentage based on her own earnings.
- “Combination of sharing and differential pay” (35 Kibbutzes). Similar to the previous category, with a higher fraction of a member’s budget based on her earnings.
- “Safety-net ” (110 Kibbutzes). A member’s budget in these Kibbutzes is mostly based on her earnings, but contains a fraction that is based on income sharing to provide safety net.
- “Community settlement” (*Yeshuv Kehilati*) (3 kibbutzes). Kibbutzes in this category essentially dissolved the partnership, and their members keep their entire earnings.

In 2003, a public committee that was formed by the government to examine the question of “what is a Kibbutz today?.” confirmed that each Kibbutz could choose its distinctive way and its level of sharing, as long as it keeps minimal level of mutual guarantee among members. The government accepted the committee’s recommendations, making the various categories accepted forms of the Kibbutz.

¹⁷For a list of the Kibbutzes by categories, see Getz 2003 and Gavish 2003. About 40 Kibbutzes are still debating their status.

As can be seen, the majority of Kibbutzes have chosen medium levels of equality, ranging from a high, albeit not full, level of equality in the earnings distribution (“differences-in-margin” and “combined model”), to a low, albeit substantial, level of equality that provides low-ability members with “safety net”. Only 3 Kibbutzes have abandoned equality altogether, thus, they are excluded from the analysis (including them does not affect the results).

Since the differences between the second and third categories (“sharing with differential pay in the margin” and “combination of sharing and differential pay”) is smaller compared to the other categories, I use two alternative specifications, one that groups the two categories and one that does not.

7.1.2 Common Wealth (K)

This is the main explanatory variable. I employ four alternative measures of either a Kibbutz’s wealth-shock or its post-crisis wealth:

“ECONOMIC STATUS” IN 1994 (first measure of K): Following the debt crisis, as part of an attempt to resolve the crisis and to reach an agreement between the government, the banks and the Kibbutzes, Kibbutzes were divided into 4 groups, reflecting how severely they were hit by the financial crisis. The first group contained Kibbutzes that remain strong and do not need assistance (31 Kibbutzes). The second group contains Kibbutzes that were somewhat hit, but do not need assistance (42 Kibbutzes). The third group contained Kibbutzes that were hit harder and, although eventually be able to repay their debts, these Kibbutzes “could use assistance” (104 Kibbutzes). The fourth group contained Kibbutzes that were hit badly and could not repay their debts without assistance (27 Kibbutzes).¹⁸

CREDIT RATING IN 1995 AND 2002 (second and third measures of K): After the crisis (in 1995 and later in 2002), each Kibbutz was assigned a credit rating by Dunn and Bradstreet (D&B) Company. The credit rating was built to reflect how severely the Kibbutz’s economy was hit by the financial crisis and how wealthy the Kibbutz is post-crisis. The credit rating is calculated by D&B based on the following parameters: debt per member, ability to repay debt as reflected by economic forecasts of the Kibbutz Arrangement Board; type and diversification of industries; Kibbutz’s land value.¹⁹

¹⁸Debts that were beyond the Kibbutz’s ability to ever repay were erased.

¹⁹D&B did not rate Kibbutzes before the crisis. This is not coincidental, as Kibbutzes were then much more homogenous in their living standards and this was further ensured by the mutual guarantee across Kibbutzes (that was dissolved post-crisis).

The credit rating was assigned to Kibbutzes by D&B Company both in 1995, as a number from 1-4, and in 2002, as a number from 1-100. The measure from 1995 is appropriate as it reflects the economic position of the Kibbutz after the debt crisis but before major differential reforms were implemented. The 2002 credit rating is more elaborate, but might potentially reflect in part the effect of differential reforms on credit rating, since the differential reforms had already been discussed by 2002. This potential reverse causality might introduce a bias. However, the direction of the bias works against the hypothesis that I test. That is, the shift away from full equality by a Kibbutz is designed to keep productive members inside, thus improving the Kibbutz's credit rating. This makes it even more difficult to document a positive correlation between a Kibbutz 2002 credit rating and its degree of equality.

FIXED CAPITAL IN 2000 (a measure of K):²⁰ This is a continuous measure of the post-crisis value of Kibbutzes' common property. The fixed capital was divided by a million for presentation purposes.

7.1.3 Ideology

MOVEMENT AFFILIATION (proxy for level of ideology): Kibbutzes are autonomous units but they belong to movements that coordinate their activities. There are three major Kibbutz movements today. The biggest is the Takam Movement (60% of Kibbutzes), then the Kibbutz Artzi Movement (32%) and the religious Kibbutz Movement (6%) that was excluded from the analysis.

The historiography of the Kibbutz suggests that the various movements can be ranked according to their attitudes towards equality. Kibbutz Artzi holds the most left wing ideology and has traditionally been considered more conservative in preserving Kibbutz values.²¹ Even within the Takam, one can separate Kibbutzes according to their ideology towards egalitarianism, as was revealed in an ideological split during the 1950s.²²

I employ two specifications of movement affiliation. The first specification is a dummy variable for Kibbutz Artzi Movement and the second is a variable from 1-3 that gives a value of 1 to Kibbutzes that

²⁰Unfortunately, there are no systematic balance sheets that are available for earlier years.

²¹Kibbutz Artzi was formed by a leftist eastern European group called Ha'shomer Ha'tzair. It was an independent political group, but was supported by the Socialist League (a small party).

²²In the early 1950s Meuhad movement was divided into Meuhad (around 2/3) and Ihud (1/3). Ihud continued to support Mapai. Meuhad supported the leftist Mapam, was pro-Soviet during the cold war and its supporters often celebrated Soviet occasions such as Stalin's birthday. Forty eight Kibbutzim remained in the Meuhad movement and twenty three joined the Ihud. Kibbutzim and sometimes even families were split to Ihud and Meuhad supporters and hundreds of individuals transferred to another Kibbutz. In 1980, Ihud and Meuhad reunited again to form the Takam. See Near 1997, pp. 210-215.

are affiliated with the traditionally less ideological group of the Takam Movement, a value of 2 to ones affiliated with the more ideological group of the Takam, and a value of 3 to Kibbutzes of Kibbutz Artzi. The regression results are robust to the two alternative definitions of ideology.

If ideology plays a role in a Kibbutz's decision of whether to reduce the level of equality, a Kibbutz affiliated with a more ideological movement will tend to remain more equal.

7.1.4 Control Variables

NUMBER OF MEMBERS AND CANDIDATES in 1995: The shirking problem might get worse with size since peer pressure might be less effective in large groups, making bigger Kibbutzes less likely to choose a high level of equality. On the other hand, bigger Kibbutzes may provide better insurance, as there is more diversity in members' occupations, making them more likely to choose a high level of equality. The results are the same when using membership instead of members and candidates, and they are robust for the choice of the year.

NUMBER OF MEMBERS EXITING THE KIBBUTZ IN 1987-1995: This variable is meant to capture the severity of the adverse selection from the kibbutz in the period after the crisis but before the shift away from full income equality. Again, results are robust to the exact definition of the period.

If, when choosing the level of redistribution, the Kibbutz is responding to undesired post-crisis adverse selection, one expects a positive effect of previous exit on the level of equality chosen.

NUMBER OF INDIVIDUALS JOINING FROM OUTSIDE THE KIBBUTZ IN 1987-1995: This variable is meant to capture a Kibbutz's "attractiveness" in the pre-reform period that might not be captured by a Kibbutz's wealth. The assumption is that the more members who joined the Kibbutz in the post-crisis and pre-reform period, the more attractive is the Kibbutz. However, this variable may be problematic as it reflects both demand and supply considerations. Results are shown to be robust (and even stronger) to the exclusion of this variable. The period 1987-1995 was chosen to reflect the value of the Kibbutz in the crisis period, but before major differential reforms were undertaken. The results are robust to the exact definition of post-crisis and pre-reform period.

LAND SIZE: Holding constant the membership size, a larger common land area means that on average each member has more land inside the Kibbutz, which might make it more costly for members to exit the

Kibbutz. Thus, we expect that the more land a Kibbutz owns, the higher the level of equality it maintains.

HOUSEHOLD SIZE in 1995: Larger households may face higher switching costs upon exiting the Kibbutz, and they may benefit more from the Kibbutz local public goods due to their non-exclusive nature. Therefore, Kibbutzes whose households are bigger are expected to implement a higher level of equality.²³

7.2 Ordered Probit Analysis

Whereas multinomial discrete choice models ignore the ordinal nature of the level of equality, OLS regression would attach a cardinal meaning for the four levels of equality.²⁴ Therefore, I employ an ordered Probit regression model, which treats outcomes as ordinal rather than cardinal. A Kibbutz is assumed to have its “preferred” equality level D_{2i}^* and choose the equality level category D_{2i} closest to its preferences. Let x_{1i} be a vector of characteristics of Kibbutz i , including a Kibbutz credit rate; movement affiliation; average age of population; average household size; population size (number of members and candidates); land size number of individuals joining in 1987-1995; number of members exiting in 1987-1995. More specifically, let D_{2i}^* be the (unobserved) preferred level of equality of Kibbutz i .

$$D_{2i}^* = \beta' x_{1i} + \varepsilon_i \quad (3)$$

where $\varepsilon_i \sim N(0, 1)$. Although D_{2i}^* is not observed, we do observe to which of the four categories it belongs. In particular,

$$\begin{aligned} D_{2i} &= 1 \text{ if } D_{2i}^* \leq 0 \\ &= 2 \text{ if } 0 \leq D_{2i}^* \leq \mu_2 \\ &= 3 \text{ if } \mu_2 \leq D_{2i}^* \leq \mu_3 \\ &= 4 \text{ if } \mu_3 \leq D_{2i}^* \end{aligned} \quad (4)$$

therefore, $Prob(D_2 = 1) = \Phi(-\beta' x_1)$, $Prob(D_2 = 2) = \Phi(\mu_2 - \beta' x_1) - \Phi(-\beta' x_1)$, $Prob(D_2 = 3) = \Phi(\mu_3 - \beta' x_1) - \Phi(\mu_2 - \beta' x_1)$, $Prob(D_2 = 4) = 1 - \Phi(\mu_3 - \beta' x_1)$. Summary statistics are presented in

²³In the past, when children used to live in special residences outside parents' homes, most households in the Kibbutz consisted of only the parents. Nowadays, children live with their parents.

²⁴See Greene 1997, p.926.

TABLE 4 and the Ordered Probit regression results are presented in TABLE 5. Each column in TABLE 5 represents a different regression with a different measure of Kibbutzes' post crisis wealth.

The coefficients in the Ordered Probit model do not have a clear interpretation.²⁵ Therefore, I calculate the marginal effects of changes in x_1 for the probability of each equality level. The marginal effects are $\frac{\partial Prob(D_2=1)}{\partial x_1} = -\Phi(-\beta'x_1)$, $\frac{\partial Prob(D_2=2)}{\partial x_1} = [\Phi(-\beta'x_1) - \Phi(\mu_2 - \beta'x_1)]\beta$, $\frac{\partial Prob(D_2=3)}{\partial x_1} = [\Phi(\mu_2 - \beta'x_1) - \Phi(\mu_3 - \beta'x_1)]\beta$, $\frac{\partial Prob(D_2=4)}{\partial x_1} = \Phi(\mu_3 - \beta'x_1)\beta$ and they are presented in TABLE 6 for the specification with 3 categories of equality, and in TABLE 7 for the 4-category specification. The following are the main findings of the regressions:

Result 1 *The wealthier the Kibbutz, the more income equality it implements:*

As predicted, wealthier Kibbutzes are more likely to maintain a high level of income equality, and poorer Kibbutzes are more likely to choose a low degree of income equality. This result is general and holds for all the wealth measures discussed above, as shown in TABLE 8 (for 3-categories of equality) and TABLE 9 (for the case of 4-categories of equality). The tables presents the relevant coefficient from nine regressions and shows the marginal effects of the different wealth measures on a Kibbutz's degree of income equality. The wealthier the Kibbutz (and the less it was hit by the wealth shock), as measured by the its economic status, credit rating in 1995 and 2002, fixed capital and the number of members who joined it, the more likely it is to maintain a higher degree of income equality. For example, an increase in one unit in an average Kibbutz's credit rating increases the probability that it remains fully egalitarian by 30% (from 13.6% to 18.3%). Similarly, the probability that a Kibbutz maintain full income equality increase by over 20% (from 13.6% to 16.6%) when 10 individuals joined it from outside in the previous decade. On the contrary, the probability that an average Kibbutz chooses a relatively low level of equality ("safety net") is estimated to be 57%, which decreases by about 12% points with a unit increase in credit rating and by about 9% points when 10 individuals joined from outside in the previous decade.

FIGURE 6 and FIGURE 7 illustrate the unconditional likelihood of Kibbutzes that were hit differently by the crisis (as measured by their economic status in 1994) to choose full income equality, as well as their likelihood to choose a low level of income equality ("safety net"). FIGURE 6 suggests that the higher a

²⁵See Greene 1997 pp. 926-929 and Amemiya 1985 pp. 292-293.

Kibbutz's post-crisis wealth, the more likely the Kibbutz is to choose full income equality. Notice that even among Kibbutzes that remained wealthy, only 35% of Kibbutzes maintain full income equality. The reason for this is that the economic environment in which Kibbutzes operate has changed during this period. The 1990s in Israel was in a period of high tech boom, which increased members' outside option and might have made Kibbutzes less attractive compared to cities. This development, however, affected Kibbutzes similarly, since Israel is a very small country and members' outside option is similar regardless of their Kibbutz. Thus, to the extent we observe differences across Kibbutzes, this is a result of the Kibbutz-specific wealth shock rather than changes on the outside.

Similarly, FIGURE 7 suggests that the lower a Kibbutz's post crisis wealth, the more likely the Kibbutz is to choose a low level of income equality (i.e. the "safety net" category).

Result 2 *No effect of ideology on equality:*

A Kibbutz that is affiliated with a more ideological movement does not maintain a higher degree of equality. On the contrary, under certain specifications, Kibbutzes from a more ideological movement are slightly more likely to choose a lower level of equality.

Result 3 *More exit in the pre-reform period induces a lower level of equality:*

Kibbutzes respond to high exit by reducing their level of equality. 10 more members who left a Kibbutz in the period 1987-1995 decrease the probability that a Kibbutz will maintain full equality by 0.9% points and increase the probability it will choose a low level of equality by 1.7%.

Result 4 *Membership size does not have a significant effect on a Kibbutz's level of equality.*

Since it is not the case that smaller Kibbutzes are more likely to implement a higher level of equality, this implies that the shirking problem is mitigated similarly regardless of a Kibbutz's size. That is, even large Kibbutzes are probably small enough to make peer pressure effective. Alternatively, the gains from insurance in big Kibbutzes might be offset by the increased shirking problem, such that there is no effect of membership size on the level of equality.

Result 5 *The larger a Kibbutz's land, the higher the level of income equality the Kibbutz maintains:*

An increase of 1000 square meters in a Kibbutz's land size increases its probability to choose full equality by 3% points (from 13.6% to 16.6%), but decreases the probability the Kibbutz chooses a low level of equality by 5% points (from 57% to 52%).

Result 6 *Household size does not affect a Kibbutz's degree of equality.*

8 Insurance, Peer Pressure and Further Lock In Devices in the Kibbutz

This section provides further evidence that insurance and lock-in devices are important considerations in the kibbutz, and that Kibbutzes' organizational form reflects an attempt to mitigate the shirking problem.

8.1 Insurance in the Kibbutz

First, insurance is an important consequence of full equality across members. Kibbutzes bylaws guaranteed "equality and cooperation in production, consumption and education", which meant that income of all members and profits from all operations of an individual were pooled by the Kibbutz and distributed equally.²⁶ Since an average Kibbutz consists of four hundred members with different occupations and abilities, and who work in different industries, equality guarantees full insurance against a worker's type and against other idiosyncratic shocks to members' income. Such income shocks might result from illness, unemployment, disability and a shock to one's industry or productivity. In early days, the newcomers often got sick with malaria and "as much as half of the work force could be idle because of illness on a given day" (Near 1990, p. 39). As Israel developed and more people acquired higher education, full equality also provided Kibbutz members with insurance against shocks to their human capital, which does not exist elsewhere.²⁷

Yet, insurance is not only a by-product of equality, but is also a main objective of the Kibbutz. In particular, mutual aid across members within a Kibbutz and across Kibbutzes have been fundamental

²⁶In practice, Kibbutzes used a few distribution techniques that both ensured equality, took into account heterogeneity in needs and preferences and were within the Kibbutz budget constraint (Barkai 1977). Some goods, such as food (in the communal dining hall), medical care, retirement benefits, child rearing and education were distributed directly for free. Children were housed in separate living quarters until the 1970s and were offered fourteen years of education at the Kibbutz's expense. Other commodities, especially durable ones, were at first directly allocated to members and later (by the end of the 1920s) were divided into categories (e.g. clothing) within which a member could choose his preferred bundle.

²⁷The only insurance markets available against shocks to human capital are life insurance and disability insurance.

principles of Kibbutzes. The Kibbutz movement committed to “provide the economic, social, cultural, educational and personal needs of members and their dependents... (and) to ensure a decent standard of living for Kibbutz members and their dependents”, as well as to “have mutual aid with other Kibbutzes and rural villages” (Source: Kibbutz’s bylaws). Regardless of the source of risk, a Kibbutz member knows that whatever her circumstances might be and whatever her ability and the income she brings to the Kibbutz, she (and her family) will always be provided with an average income and be taken care of when necessary.²⁸

An insurance interpretation of the Kibbutz movement predicts that living in the Kibbutz and splitting total output equally is more attractive in times of recessions than in times of expansion. FIGURE 8 illustrates that membership in the Kibbutz has been roughly countercyclical in the period 1966-2000. The correlation between Kibbutz membership and the growth of GDP per capita in that period is -0.22.²⁹ For the period 1922-1947, the correlation between Kibbutz membership and the growth of NNP is -0.14 (the data on Israel’s NNP in this period is taken from Metzger 1998).

Insurance has always been an important reason for members to live in a Kibbutz. In a survey conducted in late 1960s comprising over a thousand members of the first and second generations (Rosner et al 1990), the factors “guaranteeing full social security”, “freedom from economic concern and competition” and “guaranteeing an adequate standard of living” were ranked as important objectives for Kibbutz members. These three factors taken together were ranked second in importance only to “establishment of a just society”, which itself contains insurance elements. More respondents highlighted such economic concerns than ideological objectives such as “fostering fellowship among members”, “promotion of socialism”, “service to the country”, “absorption of immigrants”, etc. Even today, when many Kibbutzes go through differential reforms, surveys of public opinion conducted in Kibbutzes in the last two decades (by the Center for Kibbutz Studies) indicate that the vast majority of members view the mutual guarantee as a crucial element for the future of the Kibbutz.

The language used by Kibbutzes today in defining their new status illustrates the importance of in-

²⁸Itzhak Tabenkin, an early leader in the Kibbutz, commented that “in the conquest of work in town and country, in the conquest of the soil, the need for the kvutza [Kibbutz] always appeared; for we were alone and powerless, divorced from our parents and our environment, and face to face with the difficulty of life - the search for employment, illness, and so forth...”.

²⁹I do not have demographic information on Kibbutzes for the period 1948-1966.

surance and mutual aid. A Kibbutz that remains fully egalitarian is called *Shitufi* (Hebrew for “sharing”) and even one that shifts away from full equality is called a “safety net” Kibbutz, to emphasize that even a widely reformed Kibbutz will provide insurance and never let members starve.

8.2 Mitigating Moral Hazard: Peer Pressure and Mutual Monitoring

Moral hazard has typically been alleviated in the Kibbutz by mutual monitoring and peer pressure, which were supported by the establishment of a general meeting, communal dining hall and other social gathering places, and an information transmission mechanism based on gossip. A veteran of the first Kibbutz (*Degania*) describes how peer pressure was implemented when a member shirked: “nobody said a word to him. But in the evening, in the dining hall, the atmosphere around him was such that the following morning he got up and left the *Kvutza* [Kibbutz]” (Near 1992. p. 38). Appendix A provides a more detailed discussion of moral hazard in the Kibbutz.

8.3 Lock-in Devices

First, a key principle of Kibbutzes is communal ownership of all property, i.e. Kibbutz members own no private property. A Kibbutz member does not even own his house, and can enjoy his share in the Kibbutz enterprises only as long as he stays in the commune. The importance of this principle is revealed in the Kibbutzes’s bylaws, which suggest that

“each Kibbutz member must live inside the Kibbutz, bring to the possession of the Kibbutz his full working power and any income and assets he owns and/or receives from any source, and the Kibbutz determines the member’s job and takes care of all his needs including the needs of his dependents.”

The high dependence of members on their Kibbutz are illustrated throughout the bylaws, which state that “the property of the Kibbutz cannot be distributed among members, both when the Kibbutz persist and when it is dissolved”, and that “the Kibbutz does not distribute profits in any way, and every surplus goes to the Kibbutz”. Another part of the document stresses that “Kibbutz members are not allowed to sell any of the assets they use, cannot get gifts from outside the Kibbutz, and that the Kibbutz can seize

members' property.”

Even today, surveys of public opinions highlight the importance of common ownership, as 80% of respondents mention it as an important element for the future of the Kibbutz.

Second, Kibbutzes are based on high provision of local public goods, such as swimming pools, green public areas, a pollution-free environment, tennis courts, cultural center, etc. Naturally, the local public goods can only be enjoyed by Kibbutz members.

Third, Kibbutzes typically had members acquire human capital that is specific and is more useful inside the Kibbutz than it is outside. In fact, the large agriculture base of the Kibbutz, although rooted in the founders' belief that only Jewish agriculture would buy the Jews the rights to the land of Palestine, also served as a “lock in” device, long after such ideology was gone. For many years, the Kibbutz movement opposed to higher education and Kibbutzes only financed members who studied a “required occupation” such as agronomy, which is more useful inside than outside the Kibbutz.

9 Kibbutz History Reinterpreted

Although the Kibbutz has been the subject of a large body of research, few attempts have been made to provide a coherent explanation for both the long persistence of and the recent change in the Kibbutzes. The sociological literature points to ideological factors in the success, and recent decline, of the traditional Kibbutz.³⁰ The failure of the traditional Kibbutz is viewed as the result of a disappearance of collectivist values and a rise of individualism among Kibbutz members.³¹ According to these claims, members are no longer ideological socialists and they lack the “pioneering spirit,” the solidarity and the altruism that characterized members in the past. Ideology-based explanations fail to account for the timing of the recent shift away from equality and for differences in the equality levels across Kibbutzes. The current economic literature on the Kibbutz movement has speculated about the conditions required for the stability of the traditional Kibbutz movement, but is silent about the recent shift away from full equality. Moreover, the literature is based on stylized facts rather than on systematic data analysis, full equality in distribution

³⁰See, for example, Talmon 1970, Don 1995, Getz and Rosner 1996, Rosolio 1999, and Leviathan and Rosner 2000.

³¹Abel 1983 argues that cooperatives can only succeed when incentives such as ideology and solidarity are more important than economic incentives.

of income is assumed rather than derived, and the focus is placed on the Kibbutz movement as a whole without accounting for the substantial heterogeneity across Kibbutzes.³²

In this paper, I show that a selfish utility maximization approach to Kibbutzes - which are often claimed to be driven by ideology - is consistent with the creation of Kibbutzes, their persistence, their main identifying features, such as their high level of equality and common ownership of property, their recent shift away from full equality and the substantial heterogeneity in their levels of equality. More specifically, I suggest that Kibbutzes are insurance devices, trading off between equality and negative selection.

The Kibbutz movement was founded by individuals who can be regarded as ex ante homogenous in their ability and potential income, and who came to a new land full of uncertainties. The literature emphasizes that one of the “main characteristic of the Kibbutzes (at the outset was) homogeneity. Kibbutzes were established by young unattached individuals who share a comparatively long period of social, ideological, and vocational training.” (Talmon 1972, p. 2).

They wanted insurance, but must have realized that members who would turn out to have high abilities might leave the Kibbutz. To make ex-post exit costly, they decided to abolish all private property and to own all wealth commonly, which served as a lock-in device. A member could not take along his share in the Kibbutz property upon leaving. This strong lock-in ensured that only a small fraction of exceptionally high types left the commune. This bonding in the ex ante stage enabled the creation of Kibbutzes based on full income equality.

In later generations, Kibbutz-born individuals could stay in their Kibbutz regardless of their ability, which provides insurance against their type. Once Kibbutzes established their common wealth, entry from the outside was restricted and regulated to avoid adverse selection in entry and Kibbutz-born individuals staying in their Kibbutz became the main source of membership growth. Mutual monitoring and peer pressure, which were supported by institutions such as the communal dining hall and an information transmission mechanism based on gossip, allowed the Kibbutz to maintain equality while mitigating the shirking problem. Appendix B describes why Kibbutzes are not more widespread despite the valuable

³²See, for example, Satt 1991, Satt and Ginzburg 1992, Helman 1993, Satt 1995, and Keren, Levhari and Byalsky 2000. Barkai 1977 is based on data collection, but assumes ideological factors and analyzes the Kibbutz movement as a whole.

insurance they provide.

As long as the common wealth of Kibbutzes was high, full income equality could be implemented and high ability members stayed. The wealth shock weakened the lock-in and resulted in exit of the most educated and skilled members. The more severely the Kibbutz was hit by the crisis, the higher the exit rates it experienced. To alleviate the massive exit, Kibbutzes reduced their level of income equality. The higher a Kibbutz's post-crisis wealth, and the less exit it experienced, the higher the level of equality the Kibbutz implemented. The vast majority of Kibbutzes maintain some level insurance and provide at least a "safety net" for their members.³³

10 Conclusion

I use the Kibbutz to study how potential moral hazard and adverse selection determine contractual relationship in organizations. Mutual monitoring and peer pressure replace monetary incentives in mitigating moral hazard. The common ownership of all property makes it costly for members to leave, thus mitigating adverse selection and allowing Kibbutzes to implement a high level of equality. I show that the tradeoff between insurance and adverse selection determine the level of income equality within a Kibbutz. The higher the common wealth of a Kibbutz, the less exit and the higher the level of equality implemented.

The Israeli Kibbutzes are thought-provoking communities that reflect a genuine attempt to create an alternative society. Kibbutzes have persisted while implementing high levels of income equality. Even Kibbutzes, however, have failed to produce "new human beings" who are selfless and care about the group more than about themselves. However, the facts that Kibbutz members respond to economic incentives in their migration decisions and that Kibbutzes respond to economic incentives in their decision on their level of income equality do not undermine the importance of Kibbutzes as fascinating experiments in voluntary socialism, nor do they undermine their great achievements. On the contrary, the long persistence of Kibbutzes despite having to deal with the economic problems associated with equality makes the Kibbutzes communities even more interesting for social scientists and their achievements more meaningful. Their

³³Surveys of Public Opinion conducted in Kibbutzes in the period 1990-2002 indicate that although most members support differential reforms, members still want to have some level of equality and more than 70% object to wages that are as differentiated as in the city. When asked for their most preferable way of life when abstracting from any practical consideration, it appears that whereas most members do not want to live in a traditional Kibbutz, they also do not want to live in a city. Most of them prefer something in the middle.

willingness to implement fundamental reforms to adapt to their economic environment accounts for their ability to survive, and it what distinguish Kibbutzes from other utopian communities. Their remarkable flexibility demonstrates their survival skills and viability, and implies that they can continue to survive into the 21th century, even if in an altered form. But even if Kibbutzes will eventually disappear, they have taught us that human nature can be shaped by the appropriate incentives to be cooperative, considerate and socailly desirable.

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APPENDIX A: How Was Moral Hazard Alleviated?

Moral hazard is expected to arise in an egalitarian environment. To illustrate this, assume there are N members $i = 1, \dots, n$. Each member can choose an effort level $a_i \in A_i = [0, \infty)$ with a private cost of v_i , where $v_i : A_i \rightarrow R$ is strictly convex, differentiable, increasing and $v_i(0) = 0$. The effort level a member chooses is either not publically observable or it is observable but cannot be verified (by a court for example). Assume that the members' actions determine a joint monetary outcome $X : A \rightarrow R$, which is allocated equally among the members. X is strictly increasing, concave, differentiable and $X(0) = 0$. Utility is $u_i(m_i, a_i) = m_i - v_i(a_i)$, that is, u_i is additively separable in money and effort and linear in money.

Theorem 1 *If all output is distributed equally, the free-rider problem would arise (this is a special case of Holmstrom 1982).*

Proof. We will show that the Nash Equilibrium (NE) in the noncooperative game is never the Pareto Optimal one and the choice of effort made by individuals in the NE will always be smaller than the Pareto optimal effort level.

Assume by contradiction that there is NE, a^* , which is Pareto optimal, i.e solves:

$$\text{Max}_{a \in A} X(A) - \sum_{i=1}^n v_i(a_i)$$

a^* solves the F.O.C:

$$\frac{dX}{da_i} = \frac{dv_i}{da_i} \quad \forall i = 1, \dots, n$$

The payoffs of each agent from this game is $\frac{1}{N} * X(a) - v_i(a_i)$. Since a^* is NE, it also solves:

$$\frac{1}{N} * \frac{dX}{da_i} = \frac{dv_i}{da_i} \quad \forall i = 1, \dots, n$$

For $N > 1$, the above two equations contradict each other. We can see that in the NE, $a_i < a_{\text{pareto}}$. In other words, people will free ride, anticipating others do so as well. As a result, everyone is worse off than in the case where everyone decides not to shirk. ■

Nevertheless, despite the fact that the potential problem of “parasites” has bothered Kibbutz members for many years, moral hazard was believed to be on a small scale. Researchers of the Kibbutz movement

have even found that Kibbutz members tend to have higher motivation levels than non-members (e.g. Tannenbaum et al 1974, Palgi 1984, Rosner and Tannenbaum 1987, and Shimoni et al 1994).

Moral hazard was alleviated for a combination of two factors. First, effort in the Kibbutz is (imperfectly) observable, since most members work inside their Kibbutz, a member's colleagues are also his neighbours and members interact repeatedly. The high proximity of members ensures information transmission and mutual monitoring among them. Supporting organizations such as the general meeting, the communal dining hall, the weekly newspaper, intensive gossip and other social gathering places, facilitated information transmission among Kibbutz members. Although members are rarely expelled from the Kibbutz, tight monitoring and peer pressure can make the life of a shirker unbearable in the commune (see quote in text). At the same time, "the Kibbutz secretary, treasurer, and farm manager enjoyed the esteem and prestige (and power) of their positions, and this benefit was sufficient compensation" (Gavron 2000 p. 9). Moreover, leadership positions were rotated to provide incentives to members.

The importance of peer pressure in the Kibbutz was highlighted by Lieblich 1981, Barkai 1986 and Keren, Levhari and Byalski 2000. A similar logic applies for professional partnerships (see Kendel and Lazear 1992) and for tenured professors in the academia, who are rarely dismissed but continue to publish, among other reasons, due to imperfectly observable effort and peer pressure.³⁴

To summarize, Kibbutzes were able to reduce information asymmetries and to make effort partially observable, which, together with effective peer pressure and information transmission mechanisms alleviated the shirking problem.³⁵ This allowed the Kibbutz to provide members with valuable insurance without the usual consequence faced by insurance companies of reduced effort. At the same time, information transmission mechanisms and peer pressure are less efficient in big groups, which rationalizes why a Kibbutz cannot be "too big".

APPENDIX B: Why Isn't the Kibbutz a More Widespread Phe-

³⁴Kendel and Lazear 1992, Lang and Gordon 1995, Gaynor and Gertler 1995 predicted that "partnerships tend to be formed among individuals who perform similar tasks because mutual monitoring is more effective" (Kendel and Lazear 1992 p. 816). However, the Kibbutz is composed of individuals with different occupations working in different industries and who perform different tasks. Mutual monitoring is still effective in the Kibbutz since the interaction among members and the information transmission mechanisms are more intensive in a Kibbutz than it is in professional partnerships.

³⁵Other explanations for lack of free riding in the Kibbutz are the importance of 'intrinsic rewards' (as opposed to 'extrinsic rewards') in determining motivation, and members' ability to pre-commit to match work contributions of fellow members (Guttman (1978) and Guttman and Schnytzer (1989)).

nomenon?

If Kibbutzes provide such a valuable insurance, why do only 2.6% of the Israeli population live in a Kibbutz? And, why don't we observe kibbutzes in other parts of the world? The answer to these questions is related to the homogeneity of founders and to their cultural beliefs, as well as to the needs of Zionist Jews in Palestine and Israel.

First, the model highlights the importance of ex ante homogeneity in creating common ownership of property. As discussed in the text, the founders of the Kibbutz movement can be regarded as homogenous at the time they joined the Kibbutz, but this is not usually the case.

Second, there is a cost associated with living in a Kibbutz. Living in a Kibbutz implies that one has little privacy, that individualism is discouraged, that one has to give up the centrality of the family in favor of her community, and that one's children are raised in special residences outside home. One of the founders of the first Kibbutz (Degania) said in a meeting that "there must be no privacy. All privacy interferes with our communal life. All of us are obligated to participate in the expense of raising children - not just the parents". Such requirements facilitated mutual monitoring and peer pressure and enabled the insurance mechanism to work without moral hazard. Similarly to the cases of religious sects studied by Iannaccone (1992) and Berman (2000), these practices can be interpreted as "efficient prohibitions" inducing members to better monitor each other or as costly sacrifices that induce members to signal their sincere intention to live in the Kibbutz.

The founding generation of the Kibbutz movement was ideological Socialist and Zionist, and was not reluctant to give up privacy, individualism and the central role of the family. They were often young individuals without families who came from Russia and Eastern Europe during the second (1904-1914) and third (1919-1923) waves of migration to Palestine as pioneers who wanted to establish agriculture communes based on Jewish labor.³⁶ The founders were influenced by socialist movements in their home countries and by the Soviet revolution, and were trained (before migrating) in youth movements such as *He'chaluz* ("the pioneer") and *Ha'shomer Ha'tzair* ("the young guard") for hard physical work and communal life. They were joined by Palestine-born Jews who rejected their parents' way of life and wanted to experience a

³⁶The data I collected from primary sources in Israel reveal that in the late 1930s and early 1940s, 80% of Kibbutz members were under 35 years old and that the vast majority of members came from Eastern Europe and Germany.

new way of life.³⁷ That is, the origin of the Kibbutz movement reflects certain cultural circumstances and illustrate once again that cultural factors are important in institutional choice (e.g. North (1990), Greif (1994), Mokyr (2002), Botticini and Eckstein (2004)).

A comparison between the Kibbutz and the Moshav, a different agriculture cooperative in Israel, illustrates the role of culture in institutional choice. The Moshav is defined as “an agricultural cooperative, which is a village in itself and its main aim are to organize and to settle its members as *independent-individual farmers*, working by themselves and holding *private means of production and property* and *maintaining cooperation* in supply, marketing, and *mutual aid*, and fulfilling the function of a municipal authority”. Like the Kibbutz movement, the Moshav is based on agriculture and buys its inputs and markets its products collectively. Moreover, an important ingredient of the Moshav is mutual assistance among members, which provides valuable insurance against volatile income. Unlike the Kibbutz movement, however, each individual works his own land and earns his own profits, and the family, rather than the collective, is the basic unit. Whereas the traditional Kibbutz can be thought of as a full insurance institution, the Moshav provides members with partial insurance. Individuals who joined a Moshav could have instead joined a Kibbutz or established a new Kibbutz but did not (despite the fact that the Kibbutz offered to its members better insurance than did the Moshav and also better economies of scale, and similar subsidies and credit advantages).

The reason a Moshav was preferred by some individuals over a Kibbutz was cultural. As already mentioned, Jews from Eastern Europe, especially young idealists who were in Socialist youth movements, were more ‘collectivist’ and did not care much about privacy and family. The Moshav was founded to answer “a distinct need for farmers who believed in cooperation but rejected the intense communal way of life of the *Kvutza* [Kibbutz]” (Gavron p. 29). Later on, when many Sephardic Jews from Middle Eastern countries poured into the new state of Israel, they joined a Moshav or settled in cities rather than a Kibbutz. This is hardly surprising: they were more ‘individualist’ and cared more for their privacy. The family was very important for Middle-Eastern Jews, and they rejected the Kibbutz concept of placing the commune before the family.

³⁷The second and third generations have already been born into the Kibbutz, so that it was the default for them and thus less costly sacrifice.

Such differences in cultural beliefs may have substantial effect on subsequent institutional development (Greif (1994)). Sephardic Jews joined the more individualistic Moshav, which placed the individual and the family at the center and provided partial insurance through mutual assistance. Ashkenazic Eastern European Jews joined the Kibbutz communes and enjoyed full insurance. Since moral hazard is potentially more severe in a Kibbutz (full insurance) than in a Moshav (partial insurance), organizations supporting peer pressure developed in the Kibbutz movement more than in the Moshav movement. Since adverse selection is potentially more severe in a Kibbutz than in a Moshav, Kibbutzes developed more “lock in devices” and heavy reliance on public goods (described in a previous section), which served as a “bond” that made it costly for members to leave.

TABLE 1

Kibbutz population, 1910-1999.

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

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

TABLE 2

Summary Statistics of Movers vs. Stayers, 1983-1995.

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

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

TABLE 3

Mover/Stayer Analysis of Kibbutz Members, 1983-1995.

Variable	Mean	$\frac{\partial \text{Prob}(\text{Move})}{\partial X}$
Specification		
<i>Personal characteristics:</i>		
Age	33.09	-0.025***
Age squared		0.001
Male	0.51	0.009
Family size	3.41	-0.018***
At Least High School Diploma	0.49	0.100***
White Collar	0.08	0.090**
Blue Collar	0.21	-0.093***
Born in Israel	0.71	-0.039
$\ln(I_{\{iC\}}^{0.5})$	7.35	
<i>Kibbutz characteristics:</i>		
Israel's North region	0.53	0.044*
Israel's South region	0.2	0.053*
<i>Selection parameter:</i>		
Mills ratio		
Predicted Probability		
Observations	1655	
R ²		
Adjusted R ²		
F		
LR ²		255.49***

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

Notes: "White Collar" are individuals working in either academic or managerial occupations. Blue Collar are individuals working in either unskilled occupation in industry or as service workers. "Israel's North region" includes the following districts: Sefad, Kinneret, Yizrael, Akko and Golan. "Israel's South region" includes Ashkelon and Beer-Sheva districts.

TABLE 4

Summary statistics of variables used in the regressions

Variable	Mean	Std. dev	Min	Max
Equality:				
Equality (1-4)	1.868	1.152	1	4
Equality (1-3)	1.603	0.762	1	3
Wealth (K):				
Economic status 1989 (1-4)	2.373	0.903	1	4
Joined 1987-1995	43.615	29.155	0	179
Credit rating 1995 (1-4)	2.209	0.84	1	4
Credit rating 2002 (1-100)	39.891	17.994	2	78
Fixed capital (millions) 2001	35.825	25.391	4.633	173.123
Switching costs (s):				
Land size	5487.44	2420.073	400	12000
Household size 1995	2.143	0.219	1.7	3
Ideology: Movement				
	1.935	0.862	1	3
Controls:				
Left 1987-1995	148.159	73.548	31	539
Membership 1995				

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

TABLE 5

Ordered Probit Analysis of the determinants of equality (3-categories)

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Wealth (K):						
Economic status 1994 (1-4)	0.341***		0.23**			
Joined 1987-1995		0.178***	0.017***	0.017***	0.016***	0.022***
Credit rating 1995 (1-4)				0.23**		
Credit rating 2002 (1-100)					0.012***	
Fixed capital 2001						0.012***
Switching costs (s):						
Land size	0.0001***	0.0001***	0.0001***	0.0001***	0.0001***	0.0001***
Household size 1995	-0.131	-0.17	-0.27	-0.21	-0.21	-0.28
Ideology: Movement	-0.01	-0.04**	-0.038**	-0.04**	-0.035**	-0.036**
Controls:						
Left 1987-1995	-0.003	-0.05***	-0.04**	-0.04**	-0.05***	-0.004**
Membership 1995	0.0001	0.0004	-0.0001	-0.0002	0.0001	-0.002**
Observations	181	184	181		176	152
LR χ^2	26.1	34.92	40.53	39.18	36.25	39.84
Pseudo R ²	0.075	0.098	0.1151	0.111	0.107	0.132

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

This table presents the results of six regressions, each using a different measure of the Kibbutz's wealth, as discussed in the text.

The dependent variable, which is the degree of equality maintained by the Kibbutz, has 3 categories:

“Low equality” refers to the “safety net” category.

“Medium equality” refers to both the “combined model” and the “differences in the margin” category.

“High equality” refers to Kibbutzes that maintain full income equality.

TABLE 6

Marginal effects of variable X on the probability of different levels of equality (3 categories)

Variable	<u>dPr(equality=low)</u> dX	<u>dPr(equality=medium)</u> dX	<u>dPr(equality=high)</u> dX
Wealth (K):			
Economic status 1994 (1-4)	-0.091**	0.040**	0.050**
Joined 1987-1995	-0.007***	0.003***	0.003***
Switching costs (s):			
Land size	-0.00005***	0.00002***	0.00003***
Household size 1995	0.109	-0.049	-0.061
Ideology: Movement	0.015**	-0.007**	-0.008**
Controls:			
Left 1987-1995	0.0017**	-0.0007**	-0.0009**
Membership 1995	0.00005	-0.00002	-0.00003
Pr(equality=low)	0.573		
Pr(equality=medium)	0.291		
Pr(equality=high)	0.136		

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

The “equality=low” category refers to the “safety net” category.

The “equality=medium” category refers to both the “combined model” and the “differences in the margin” category.

The “equality=high” category refers to Kibbutzes that maintain full income equality.

TABLE 7

Marginal effects of variable X on the probability of different levels of equality (4 categories)

Variable	dPr(equality=low) dX	dPr(equality=med _L) dX	dPr(equality=med _H) dX	dPr(equality=high) dX
Wealth (K):				
Economic status 1994 (1-4)	-0.096**	0.022**	0.022**	0.053**
Joined 1987-1995	-0.007***	0.001***	0.001***	0.004***
Credit rating 1995 (1-4)				
Credit rating 2002 (1-100)				
Fixed capital 2001				
Switching costs (s):				
Land size	-0.00005***	0.00001***	0.00001***	0.00002***
Household size 1995	0.077	-0.017	-0.017	-0.043
Ideology: Movement	0.014*	-0.003*	-0.003*	-0.008*
Controls:				
Left 1987-1995	0.016**	-0.0004**	-0.0004**	-0.0009**
Membership 1995	0.00005	-0.00001	-0.00001	-0.00002
Pr(equality=low)	0.573			
Pr(equality=med _L)	0.195			
Pr(equality=med _H)	0.096			
Pr(equality=high)	0.136			

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

The “equality=low” category refers to the “safety net” category.

The “equality=med_L” category refers to the “combined model”.The “equality=med_H” category refers to the “differences in the margin” category.

The “equality=high” category refers to Kibbutzim that maintain full income equality.

TABLE 8

Marginal effects of various measures of K on the probability of different levels of equality (3-categories)

regression	measure of K used	dPr(equality=low)	dPr(equality=medium)	dPr(equality=high)
		dX	dX	dX
(1)	Economic status 1989 (1-4)	-0.134***	0.055**	0.079***
(2)	Joined 1987-1995	-0.007***	0.003***	0.004***
(3)	Economic status 1989 (1-4)	-0.091**	0.040**	0.050**
	Joined 1987-1995	-0.007***	0.003***	0.003***
(4)	Credit rating 1995 (1-4)	-0.084**	0.037**	0.047**
	Joined 1987-1995	-0.007***	0.003***	0.003***
(5)	Credit rating 2002 (1-100)	-0.005**	0.002**	0.003**
	Joined 1987-1995	-0.006***	0.003***	0.003***
(6)	Fixed capital 2001	-0.005***	0.002**	0.003***
	Joined 1987-1995	-0.009***	0.040***	0.050***
(7)	Credit rating 1995 (1-4)	-0.123***	0.050***	0.073***
(8)	Credit rating 2002 (1-100)	-0.006***	0.003***	0.004***
(9)	Fixed capital 2001	-0.006***	0.002***	0.004***

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

This table presents the coefficients of the different measures of K. The first six columns refer to the six regressions presented in TABLE 3. Columns 7-9 show the coefficients from regressions with the indicated measure of K.

The “equality=low” category refers to the “safety net” category.

The “equality=medium” category refers to both the “combined model” and the “differences in the margin” category.

The “equality=high” category refers to Kibbutzes that maintain full income equality

TABLE 9

Marginal effects of various measures of K on the probability of different levels of equality (4-categories)

regression	measure of K used	<u>dPr(equality=low)</u>	<u>dPr(equality=med_L)</u>	<u>dPr(equality=med_H)</u>	<u>dPr(equality=high)</u>
		dX	dX	dX	dX
(1)	Economic status 1989 (1-4)	-0.138***	0.028***	0.029***	0.080***
(2)	Joined 1987-1995	-0.007***	0.001***	0.001***	0.004***
(3)	Economic status 1989 (1-4)	-0.096**	0.022**	0.022**	0.053**
	Joined 1987-1995	-0.007***	0.001***	0.001***	0.004***
(4)	Credit rating 1995 (1-4)	-0.091**	0.020**	0.020**	0.051**
	Joined 1987-1995	-0.007***	0.002***	0.002***	0.004***
(5)	Credit rating 2002 (1-100)	-0.005**	0.001**	0.001**	0.003**
	Joined 1987-1995	-0.006***	0.001***	0.001***	0.003***
(6)	Fixed capital 2001	-0.005***	0.001***	0.001***	0.003***
	Joined 1987-1995	-0.009***	0.002***	0.002***	0.005***
(7)	Credit rating 1995 (1-4)	-0.129***	0.026***	0.026***	0.076***
(8)	Credit rating 2002 (1-100)	-0.006***	0.001***	0.001***	0.004***
(9)	Fixed capital 2001	-0.006***	0.001***	0.001***	0.004***

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

This table presents the coefficients of the different measures of *K*. Each row represents a different regression with the indicated measure of *K*.

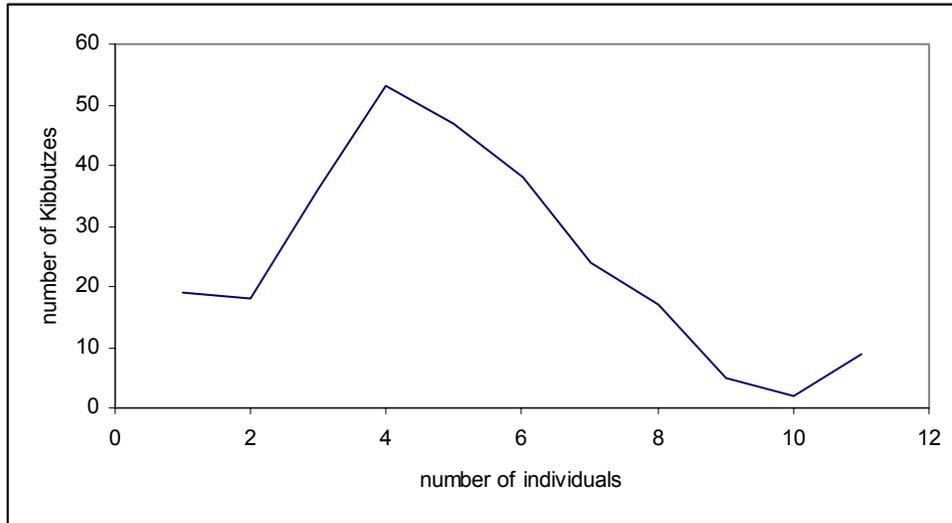
The “equality=low” category refers to the “safety net” category.

The “equality=med_L” category refers to the “combined model”.

The “equality=med_H” category refers to the “differences in the margin” category.

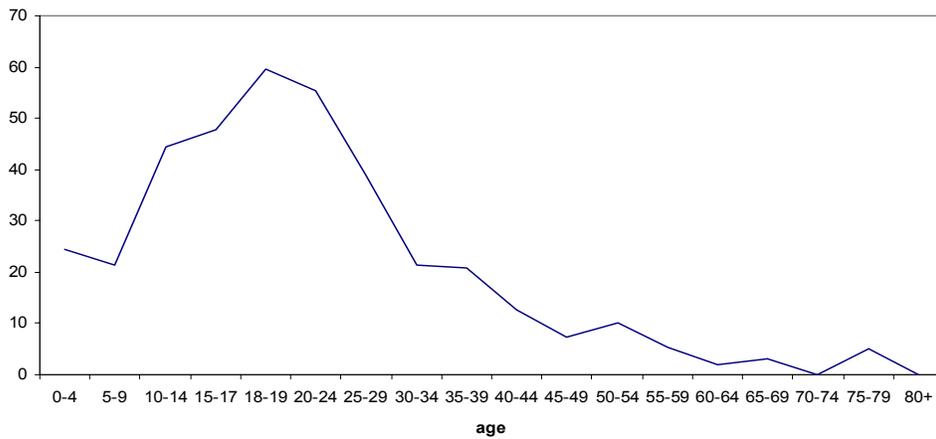
The “equality=high” category refers to Kibbutzes that maintain full income equality

FIGURE 1: Kibbutzes, by Number of Individuals



Source: Israel Center Bureau of Statistics, *Qibbutzim and Their Population 1995*

FIGURE 2: Emigration rate from the Kibbutz by Age, 1983-1995



Source: Linked 1983 and 1995 Israeli Population Censuses

FIGURE 3: Membership over time in Kibbutzes that were not hit by the crisis

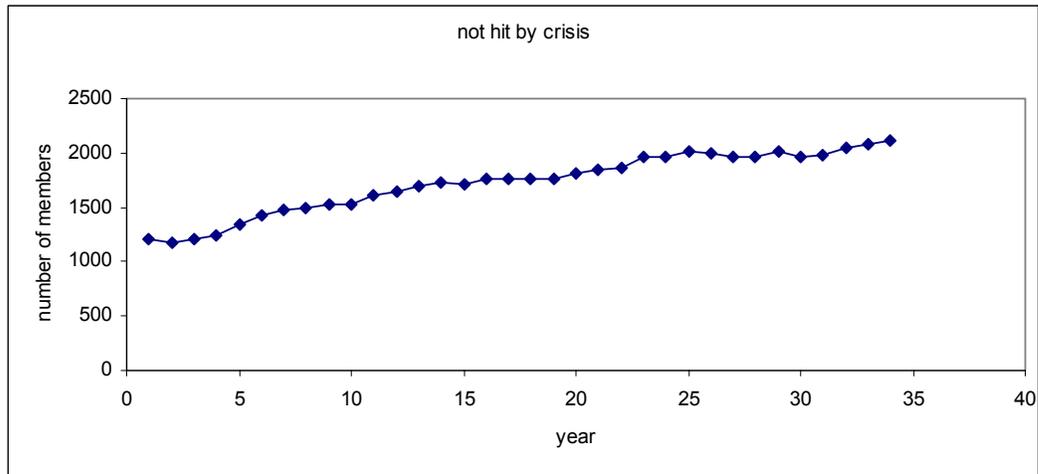


FIGURE 4: Membership over time in Kibbutzes that were hit severely by the crisis

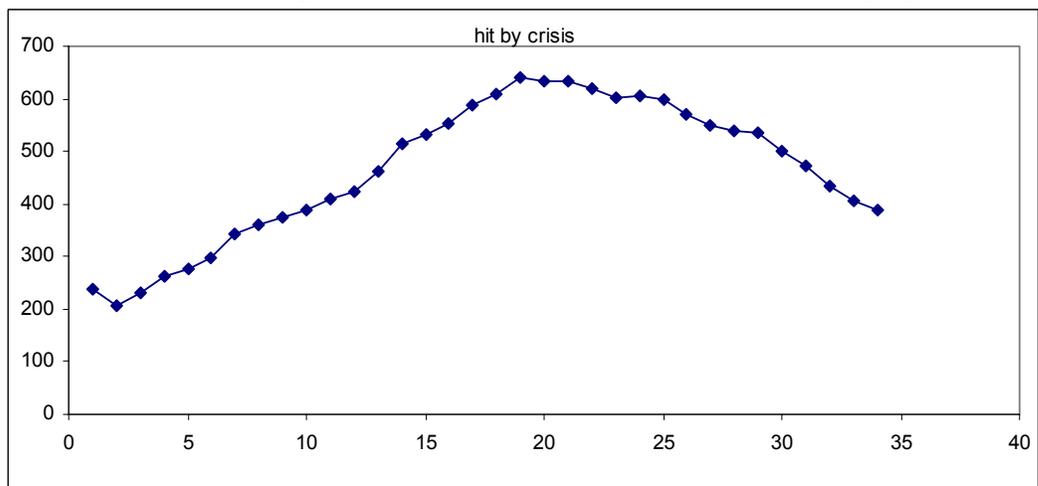
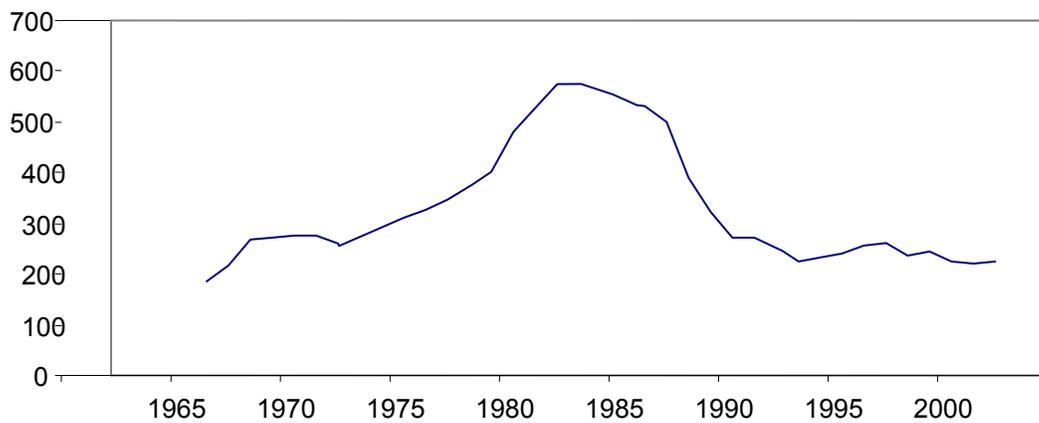


FIGURE 5: A Kibbutz that was hit by the crisis and introduced early reform



Source: Own Collected Data.

FIGURE 6:

Kibbutzes' likelihood to maintain full income equality, by economic status

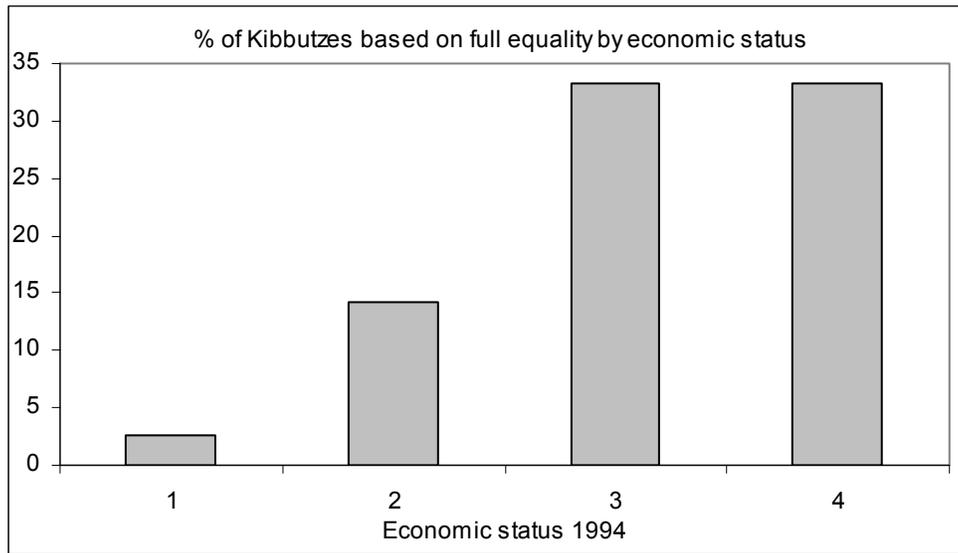


FIGURE 7:

Kibbutzes' likelihood to provide a low level of income equality, by economic status

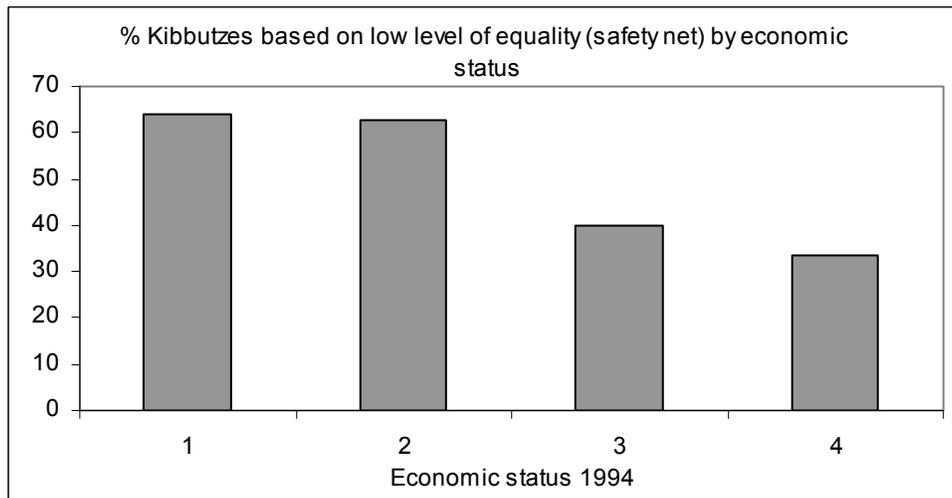


FIGURE 8: Countercyclical membership in the Kibbutz, 1966-2000

