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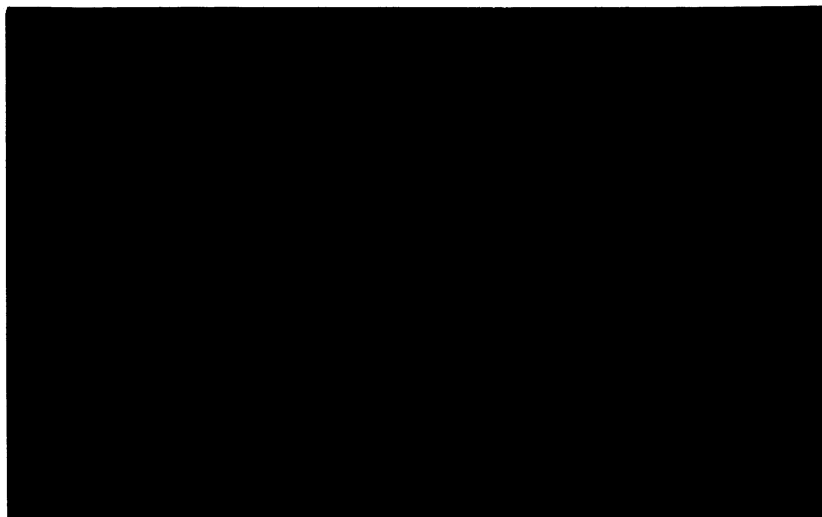
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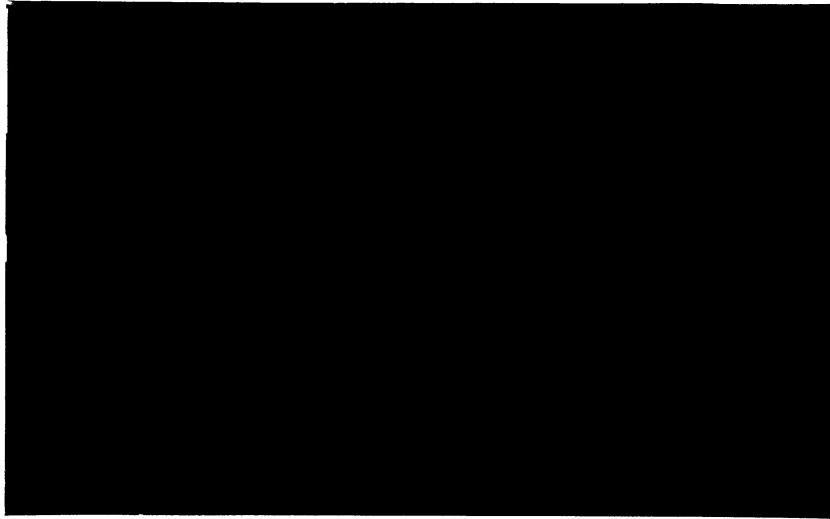
Working Paper



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**THE LIFE-CYCLE OF AGRICULTURAL
COOPERATIVES: EVIDENCE FROM
ISRAELI MOSHAVIM**

by

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The Life-Cycle of Agricultural Cooperatives:

Evidence from Israeli Moshavim

The life-cycle of cooperatives and that of their members are hard to distinguish. We use data on seven different groups of moshavim selected according to year of establishment, in two different periods, in order to separate initial conditions from life-cycle patterns. Individual farms' life-cycle phenomena, such as higher and more variable growth rates of "younger" farms, resemble those of business firms described in the literature. Heterogeneity levels are used as proxies for the cooperative's life-cycle patterns. We find that the initial levels varied across groups. Heterogeneity levels changed over time in accordance with a general convergence pattern. That pattern seems to depend on the age structure of farm operators and on the process of transferring farms to successive generations.

Key words: life-cycle; heterogeneity levels; establishment year.

The moshav is a unique form of agricultural cooperation: it is a collection of small family farms which benefit from economies of scale derived from the pooling of marketing, purchasing and loans (Zusman). The first moshav was established 70 years ago, and by now their number has exceeded 400. Since most of the moshavim (plural for moshav) are less than 40 years old, it seems that any evidence relating to life-cycle phenomena of these organizations is incomplete. However, only few of the moshavim are still operating as cooperatives, because the huge debts accumulated over the 1980's (Kislev et al.) resulted in social and economic agglomeration. Therefore, we have a perspective on their complete life-cycle.

A life-cycle of an organization is a relatively abstract concept. In the case of cooperatives, it is not independent of the life-cycle of the firm (Evans; Jovanovic; Nelson & Winter), which is the family farm in this case. In the appendix we show that farm firms rise and eventually decline, as the operator gets older. The most interesting piece of information about cooperatives is their "value added," or the extent to which they enhance the income of their members. This is what causes individual economic agents (farmers in this case) to cooperate. In the presence of the many externalities that exist in a moshav (Levi et al.), the value added is strongly related to the homogeneity level of the membership. When the members are heterogeneous, there is more scope for exploiting the externalities and for the prevalence of moral hazard, and the value added is diminished.

In this paper we attempt to learn about the life-cycle of the

moshav from farm attributes and evidence about heterogeneity levels, observed in different points in time and stages of the life-cycle. At this point we cannot distinguish between the life-cycle of individual farms and that of the moshav as a whole. However, this distinction is not as important as it seems because most of the farms started functioning at the time of establishment of the moshav. This topic is left for future research.

Background

Each moshav consists of all the residents of a single village. Production is individual as well as consumption, and only matters of mutual concern are handled collectively. These include activities such as purchasing, marketing and financial transactions, in which economies of scale exist. However, members are constrained by an external set of regulations imposed by higher-level institutions, by internal moshav constitution and by decisions of the elected governing bodies. They are also subject to externalities that prevail within the small, partly closed society of the moshav (Zusman).

The most important regulation concerns property rights. Cooperative members do not own their land, but rent it from the National Land Authority on a long-term basis. Thus, land is not tradable and members can only sell the right to use the land, including farm buildings and family residence, and move out of the

moshav. As a result, land cannot be used as a collateral for loans, and public provision of credit, with its known potential problems (Kislev et al.; Levy et al.), is necessary. Credit pooling is performed for reasons of risk sharing, and collective marketing enables the cooperative to control income flows and impose repayment of loans.

Another activity that used to be particularly regulated is off-farm work. Historically, off-farm work was prohibited in principle, in order to maintain the homogeneity of the population, which is crucial for the enforcement of internal regulations and therefore for the viability of the cooperative as a whole (Levy et al., Zusman). Also, farm production and input utilization levels of off-farm workers are likely to be lower than others', and impose negative externalities on all other members by weakening the position of the cooperative in external markets. In certain cases, moshavim punished off-farm workers, by excluding them from consumption credit available to members, for example.

Several industries within Israeli agriculture are heavily regulated. The most extreme example is the dairy industry. Dairy farmers are subject to strict production quotas. Milk marketing is centrally organized so that enforcement of quotas is almost complete. Quotas are not tradeable, but if one farmer doesn't produce his whole quota for several consecutive years, his quota will be cut and transferred to another farm, generally within the same moshav. Milk production has always been a stabilizing activity in Israeli farms. During the 1970's, when export markets for fruits

and flowers seemed promising, many farmers quit dairying. Most of them regretted that later, but that was irreversible.

Other than these and other common regulations, moshavim differ widely in degree and nature of cooperation (Haruvi & Kislev). Some have strong central planning, direction and public services, while others are only loosely organized communities. These differences are generated in part by the founding institutions and in part by endogenous life-cycle changes.

Examples of Life-Cycle Patterns

Assume that we investigate three different moshavim established at three different periods in the past: periods 1, 2 and 3, respectively. We observe certain attributes of farms in these moshavim at two different points in time: 1971 and 1981. We use the observed attributes to construct a measure of heterogeneity of farms in each moshav. We assume that each moshav had an initial heterogeneity level at the time of establishment, and that this measure is increasing over time, as a function of time since establishment and calendar time. We regard the effect of time since establishment as the life-cycle effect.

We now evaluate the possibility to separate these two effects in different scenarios. Consider first the case in which the change in the heterogeneity measure is linear in time since establishment and independent of calendar time. This is depicted in figure 1.¹ In

panel a, the initial levels depend on establishment year but don't change over time. Obviously, there is no identification problem here. In panels b and c, a linear change over time is added to the same initial levels. Note that heterogeneity relations can be reversed under different slopes. Under the linearity assumption, the slope and initial point are identified for each moshav separately, so that the case of different slopes (not in the figure) is also identified. In all of these cases, future change patterns are fully predicted.

Things are different when dropping the linearity assumption. In both panels of figure 2, change patterns are identical for all three moshavim, so that calendar time independence is maintained. All we can tell, given the two observation points, is whether the patterns are concave or convex. We cannot identify the initial levels. However, we can predict the future patterns of moshav #2 for 1991 and of moshav #3 for 1991 and 2001. These predictions are not possible, of course, unless the patterns are identical. Therefore, if independence of calendar time is relaxed, not much can be said about past or future change patterns.

In the following section, we analyze the 1971-81 data for seven groups of moshavim chosen according to time of establishment. We try to distinguish between cooperatives' life-cycle phenomena and those of individual farms. We also try to identify differences in initial conditions among groups, and isolate calendar time dependence of the change patterns.

Data and Results

The data used in this analysis are farm level observations derived from the matched 1971 and 1981 Israeli censuses of agriculture. The 1971 census included observations on 21930 family farms in moshavim, and that of 1981 included 28748 (State of Israel, Central Bureau of Statistics). The matched data set included 16110 farms that were successfully matched and provided sensible information.² These came from 393 villages that were divided to seven establishment-year groups (table 1).

Two major groups of moshavim can be identified: those established before Israel's independence in 1948, and those established in the 8 years following that. These groups differed widely in the ethnicity of the population (Sadan & Weintraub), in their geographic location, and in the quantity and quality of resource endowments. The division to sub-groups is also economically meaningful, as a comparison of the columns of table 1 reveals. This sub-division is even more important if one considers the ideological basis of the moshavim. Historically, they were based on strict equality among members (Berck & Levy), with strong authorities given to the governing bodies. These principles changed, however, in the rapidly developing economy of Israel and the trend away from Socialism, so that newly established moshavim are no longer based on equality and are less committed to central planning and cooperation.³

It is clear, then, that the initial economic conditions and

the initial levels of heterogeneity are different across groups. The initial economic conditions are likely to affect the time profiles of heterogeneity, so that the patterns will not be the same for the different groups, which makes the identification even harder. Moreover, the rapidly changing economic environment is likely to result in strong calendar time dependence of the heterogeneity patterns.⁴

We first try to learn about the life-cycle of farms by examining the changes in farm inputs over time (figure 3). It is clear that farms in older moshavim reduced their land use between 1971 and 1981, while those in younger moshavim increased it.⁵ Capital stock increased in all moshavim, but increased more in younger moshavim. It is probable that the land decrease in older moshavim was partly due to substitution of capital for land. There was no observable pattern in the changes of labor supply across groups. Overall, farms in younger moshavim grew faster than those in older moshavim between 1971 and 1981. This is consistent with the evidence on growth rates of business firms (Evans).

The concentration of milk production in the hands of fewer farmers (figure 4) is a natural consequence of technological change that enhances economies of scale.⁶ The higher rate of concentration among younger farms is consistent with Evans' finding that the standard errors of growth rates are also higher in younger firms. It is probable that exit and entry rates are higher in younger moshavim and therefore milk quotas change hands more frequently.

The percent of farm operators who work off the farm is higher

in younger moshavim than in older moshavim (table 1). Between 1971 and 1981, this percent has declined for most groups of moshavim (figure 5). The greater reduction for the younger groups is consistent with the view that at the first stage of the life-cycle of farms, farm income is too low and investments are too high for the farm to support the family, and therefore the operator works off the farm. Later, when farm income increases and the return to farm labor increases, more farm operators specialize in farming (Bollman). The two oldest groups are exceptions that can be explained as follows. In the second-oldest group, farm operators are old and reduce their labor supply as a whole, and therefore their off-farm participation rates decline. In the oldest group, it might be that the farms have been transferred to children between 1971 and 1981, and the children have higher off-farm participation rates than their old parents.⁷

Finally, we examine the evidence about heterogeneity levels. As explained before, equality was historically one of the most important principles for moshav ideologists. As a result, moshavim from the older groups had almost identical farms at time of establishment. We can say that they started with a heterogeneity level of zero. For younger moshavim, the strict equality principle was replaced by a practice of equal opportunities. For example, most of the land of a moshav could have been allocated to several farms, while the other farms would get loans or subsidies for the establishment of livestock or greenhouse farms.

We use measures of the variation of land use and capital stock

among farms in each group as proxies for the levels of heterogeneity.⁸ The changes in these measures are depicted in figure 6. The immediate observation is that heterogeneity levels have risen between 1971 and 1981. Land use variation has significantly increased especially in establishment year groups 3 and 4. Capital stock variation has in general increased more than land use variation. This is natural since capital investments are not subject to institutional constraints as land holdings are (Kimhi). The most dramatic increase was in the capital stock variation of the youngest moshavim, which has more than doubled. This is consistent with Evans' finding that growth rates in young firms vary more than in old firms. It seems that successful young farmers make large investments, while unsuccessful ones don't invest at all. Less dramatic but significant increases in the capital stock variation has occurred in groups 1, 2 and 3. These could be similar in operator's age to group 7, because a second generation of farmers is operating the farms.

To summarize, groups 1 and 2 exhibited increases in the capital stock but not the land use variations; in group 3, both variations have increased; in group 4 only land use variation has increased; groups 5 and 6 exhibited only slight changes; and group 7 recorded a dramatic increase in capital stock variation. We learn from these findings that the life-cycle of moshavim is not strictly concave or convex as in figure 2. It may even contain cycles. These cycles could be determined by stages in the life-cycle of individual farms, which depends on the life-cycle of the farm

operator. Results as in figure 6 could occur because of waves of transfers of farms to younger generations. This explains the qualitative similarity of the heterogeneity changes in groups 1-2 and group 7: the age structures of farm operators in these groups are likely to be similar.

We can support this view by observing that in 1971, land variation was highest and capital variation was lowest among the youngest moshavim.⁹ This can happen if land variability is due to initial heterogeneity levels whereas capital variability is a life-cycle phenomenon. According to this scenario, moshavim established after 1967 had unequal land allocations but relatively equal initial capital levels. Diverse capital investments occur early in the life-cycle of a farm operator, and this explains the increase in capital variability in the oldest and youngest groups.

Overall, we see that changes in heterogeneity levels were inversely related to the initial levels. 1981 heterogeneity levels were much more similar across establishment-year groups than those of 1971. It could be that as of 1981, the age structure of farm operators became more similar across groups, so that heterogeneity levels (and the levels of cooperation that they represent) approached some kind of a steady state. However, as said before, the financial crisis of the mid-80's destroyed the cooperative structure of most moshavim and they have practically reached the end of their life-cycle. This could be attributed in part to the high levels of heterogeneity that were reached by that time.

Summary and Conclusions

In the case of Israeli moshavim, it is difficult to separate the life-cycle patterns of the cooperatives from those of individual farms. It is also difficult to distinguish life-cycle effects from initial conditions and from calendar time dependence. We analyze data from the 1971 and 1981 censuses of agriculture, for seven establishment-year groups of moshavim, in order to shed light on these problems and try to identify the cooperatives' life-cycle.

We found that growth rates of farms in younger moshavim were higher and more variable than in older moshavim, which is consistent with Evans' findings about business firms. As of 1981, the young moshavim were not much behind the old ones, in terms of land use and capital stock. More farm operators work off the farm in younger moshavim than in older ones, but the difference declines over time. The evidence about off-farm participation rates suggests that the process of farm transfer to younger generations has an effect on the life-cycle of cooperatives.

The life-cycle patterns of moshavim are proxied by measurable levels of heterogeneity. The data support the hypothesis that starting levels of heterogeneity were higher in younger moshavim. Heterogeneity levels are rising over time, but not equally across moshavim, so that they are equalized over time. Different measures of heterogeneity such as land use and capital stock variability reveal different patterns. These help to support the idea that the age structure of farm operators within each moshav has a major

effect on life-cycle phenomena. Additional measures might shed more light on this puzzle.

Future research should explicitly distinguish between the life-cycle of an individual farm and that of the cooperative as a whole. This can be achieved by tracking the identity of farm operators across the census periods. Exits and entries should also be taken into account. The analysis should also control for other moshav attributes that affect the initial conditions and possibly the patterns of change.

Notes

1. In figures 1 and 2, we display the heterogeneity levels at the three periods of establishment and at 1971 and 1981, but we assume that only the latter two are observed.

2. The 1981 census included non-farm families that lived in moshavim; these were dropped in the matching process.

3. We implicitly assume that moshavim in each establishment year group are similar. This is not a strong assumption since the variation of moshavim within groups is small relative to the variation between groups.

4. Guttman & Haruvi found strong correlations between various economic attributes of moshavim and their "level of cooperation". We use proxies for heterogeneity levels instead.

5. The identity of the farm operator was not maintained throughout the period investigated, so farms that changed hands could be younger than the moshav (but not vice versa).

6. If milk production was not subsidized by the government, even the larger dairy farms of 1981 could not have been profitable.

7. This will be checked in future research, when the identity of the farm operator is taken into consideration.

8. Variations could be indications of the willingness of moshavim to depart from historical ideologies, or their inability to enforce the ideology on individual members (Kimhi).

9. This result has to be qualified. It is likely that variations among the moshavim in the youngest group are higher than in the other groups. That could be the source, at least in part, of the much higher land variability in that group.

References

Berck, P., and A. Levy. "The Costs of Equal Land Distribution: The Case of the Israeli Moshavim." *Amer. J. Agr. Econ.* 68(1986):605-14.

Bollman, R.D. *Off-Farm Work by Farmers*. Ottawa: Statistics Canada, 1979.

Evans, D.S. "Tests of Alternative Theories of Firm Growth." *J. Polit. Econ.* 95(1987):657-74.

Guttman, J.M., and N. Haruvi. "Cooperation and Part-Time Farming in the Israeli Moshav." *Amer. J. Agr. Econ.* 68(1986):77-87.

Haruvi, N., and Y. Kislev. "Cooperation in the Moshav." *J. Comparative Econ.* 8(1984):54-73.

Jovanovic, B. "Selection and the Evolution of Industry." *Econometrica*. 50(1982):649-70.

Kimhi, A., *Occupational Choice in Israeli Cooperative Villages*. Ph.D. Dissertation, University of Chicago, Chicago, Illinois, March 1991.

Kislev, Y., Z. Lerman, and P. Zusman. "Recent Experience with Cooperative Farm Credit in Israel." *Econ. Develop. and Cultur. Change* 39(1991):773-89.

Levy, A., M. Justman, and E. Hochman. "The Implications of Financial Cooperation in Israeli Semi-Cooperative Villages." *J. Develop. Econ.* 30(1989):25-46.

Nelson, R.R. & S.G. Winter. *An Evolutionary Theory of Economic Change*. Cambridge, Mass.: Harvard University Press, 1982.

Sadan, E., and D. Weintraub. "Ethnicity, Nativity, and Economic Performance of Cooperative Smallholding Farms in Israel." *Econ. Develop. and Cultur. Change* 28(1980):487-507.

State of Israel, Central Bureau of Statistics. *Agricultural and Rural Census 1981; The Village in Israel*. Jerusalem, 1985.

U.S. Department of Commerce, Bureau of the Census. "Agricultural Economics and Land Ownership Survey." *1987 Census of Agriculture, Volume 3, Part 2*. 1988.

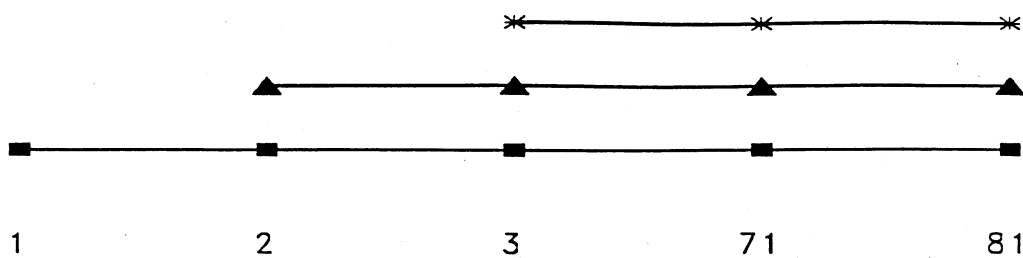
Zusman, P. *Individual Behavior and Social Choice in a Cooperative Settlement, The Theory and Practice of the Israeli Moshav*. Jerusalem, Israel: Magnes Press, 1988.

Table 1: Establishment-Year Groups of Farms

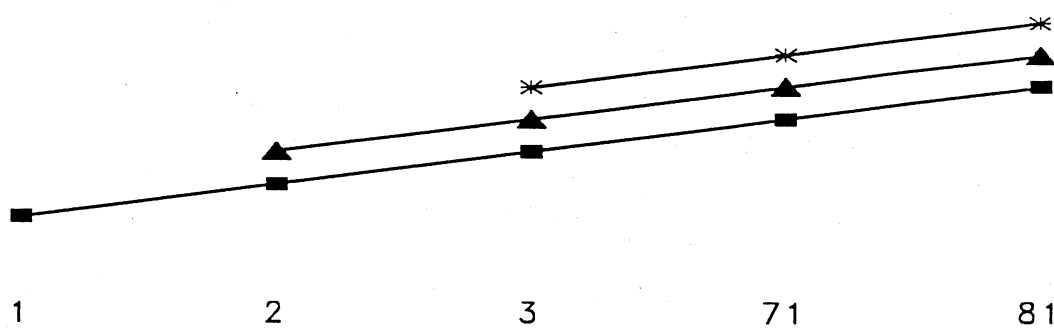
| Group | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|--|---------|---------|---------|---------|---------|---------|---------|
| Establishment years | 1921-35 | 1936-47 | 1948-49 | 1950-52 | 1953-56 | 1957-66 | 1967-71 |
| Number of Farms | 2218 | 1057 | 3550 | 5861 | 2546 | 714 | 164 |
| Average land used '71 ^a | 38.6 | 35.2 | 24.2 | 23.1 | 34.2 | 20.0 | 14.1 |
| Average land used '81 ^a | 32.8 | 26.9 | 19.6 | 20.6 | 32.0 | 20.9 | 21.8 |
| Average capital '71 ^b | 705 | 610 | 448 | 311 | 347 | 363 | 283 |
| Average capital '81 ^b | 1127 | 956 | 743 | 572 | 742 | 768 | 722 |
| % dairy farms '71 | 22 | 19 | 31 | 31 | 8 | 3 | 0 |
| % dairy farms '81 | 11 | 8 | 9 | 9 | 3 | .4 | 0 |
| Average number of cows in a dairy farm '71 | 15 | 14 | 11 | 7 | 9 | 6 | - |
| Average number of cows in a dairy farm '81 | 40 | 37 | 26 | 19 | 28 | 22 | - |
| % operators working off-farm '71 | 27 | 35 | 46 | 49 | 39 | 51 | 62 |
| % operators working off-farm '81 | 29 | 29 | 43 | 45 | 36 | 42 | 51 |

Notes: a. Measured in dunams (0.24 acre).
b. Thousands of Shekels (1981 prices).

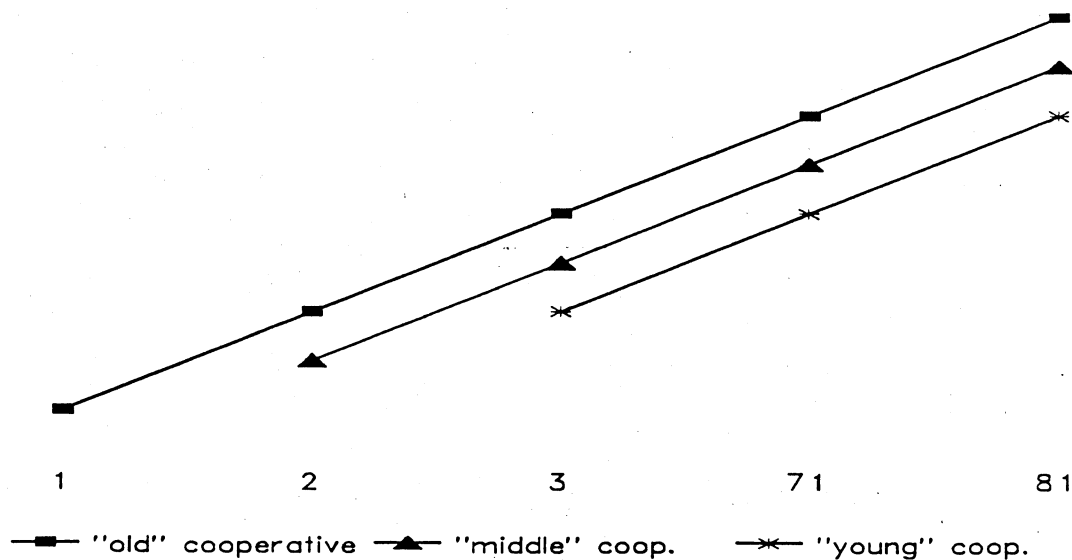
a.



b.



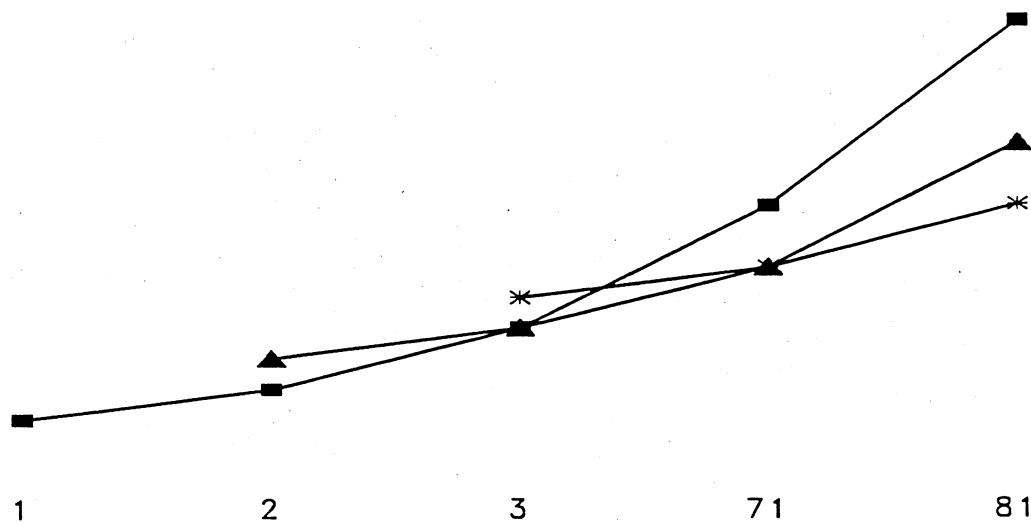
c.



—■— "old" cooperative —▲— "middle" coop. —*— "young" coop.

Figure 1: Examples of Linear Change Patterns

a.



b.

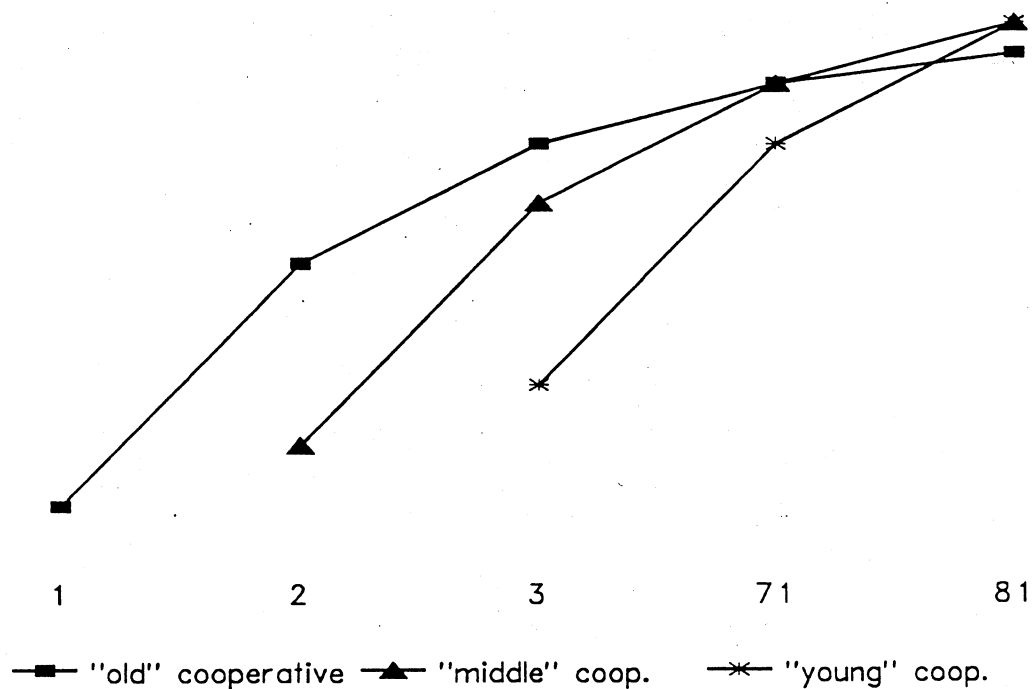


Figure 2: Examples of Identical Nonlinear Change Patterns

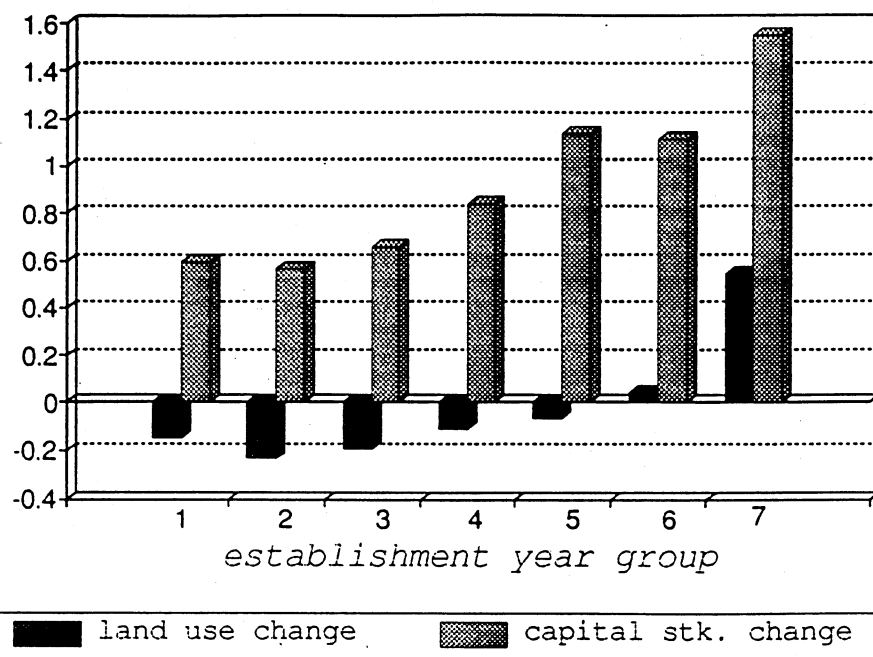


Figure 3: Changes in land use and capital stock: 1971 to 1981

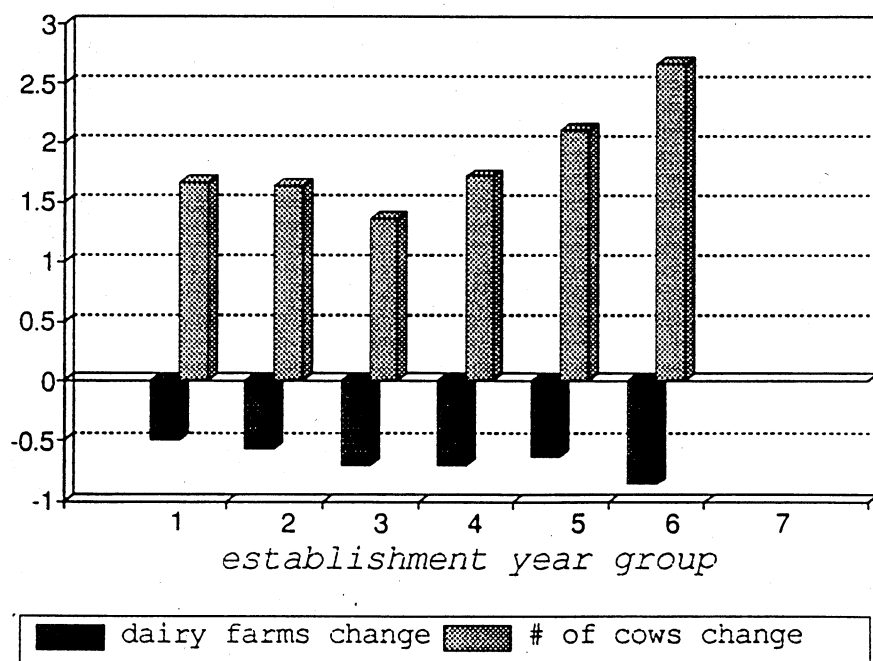


Figure 4: Changes in the number of dairy farms and the average number of cows per dairy farm: 1971 to 1981

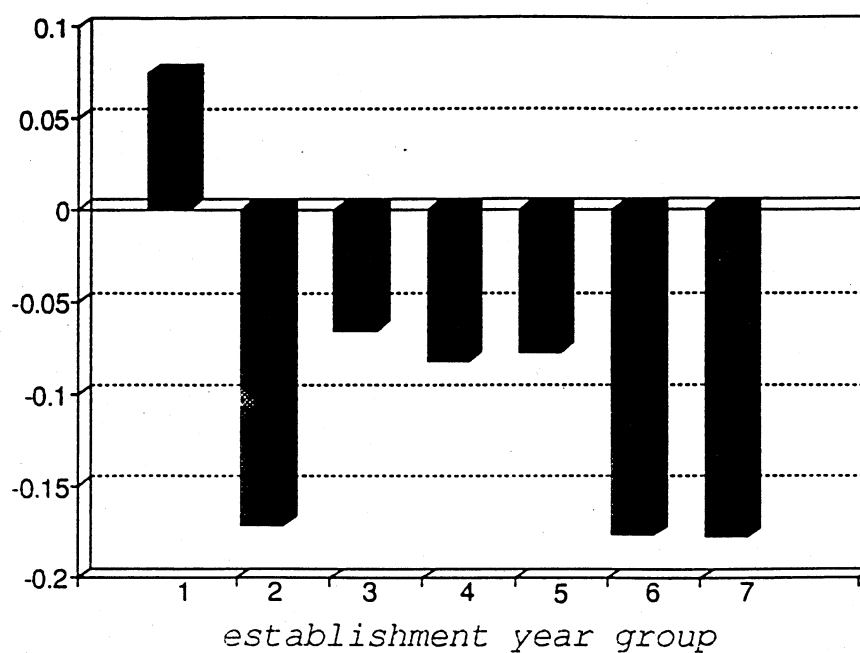


Figure 5: Change in the percentage of farm operators who work off the farm: 1971 to 1981

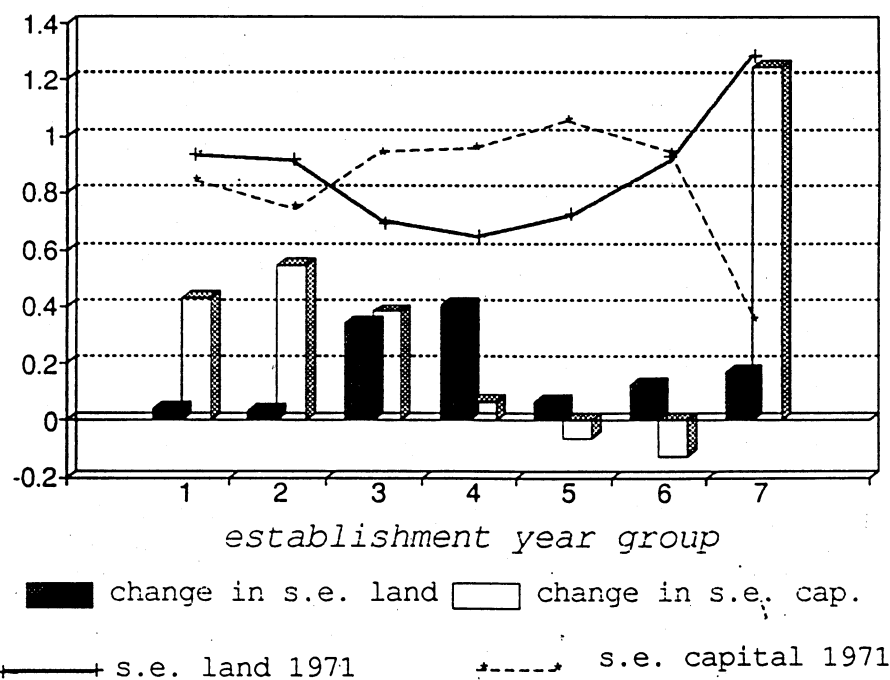


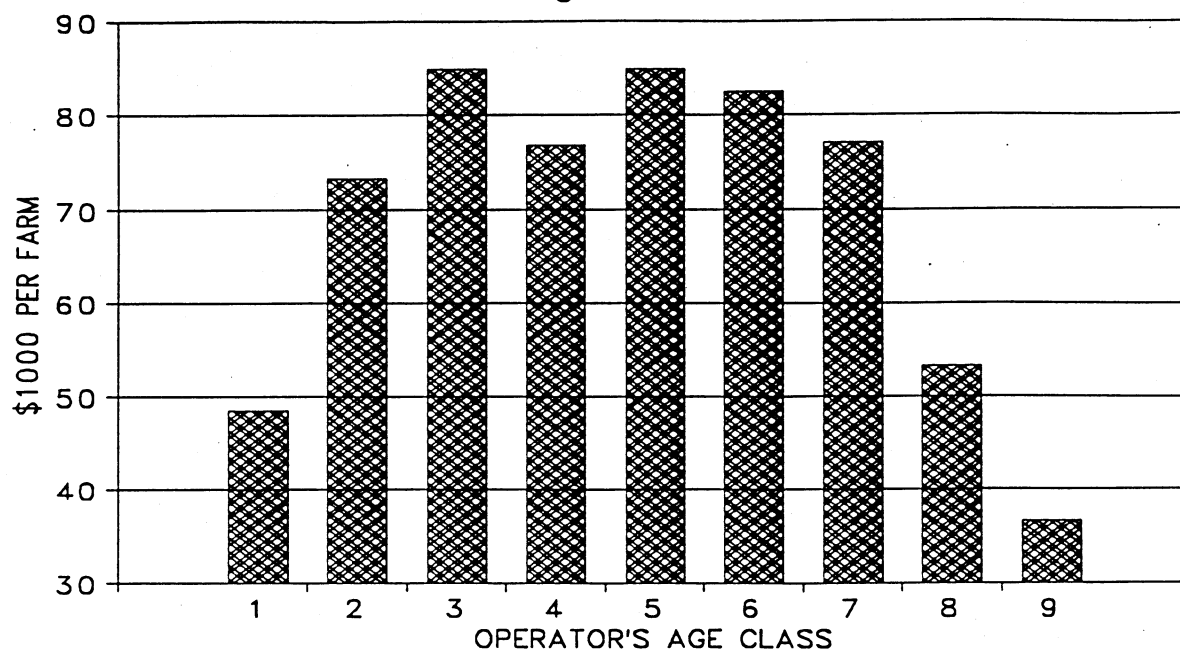
Figure 6: Standard errors of land use and capital stock in 1971 and changes from 1971 to 1981

Appendix

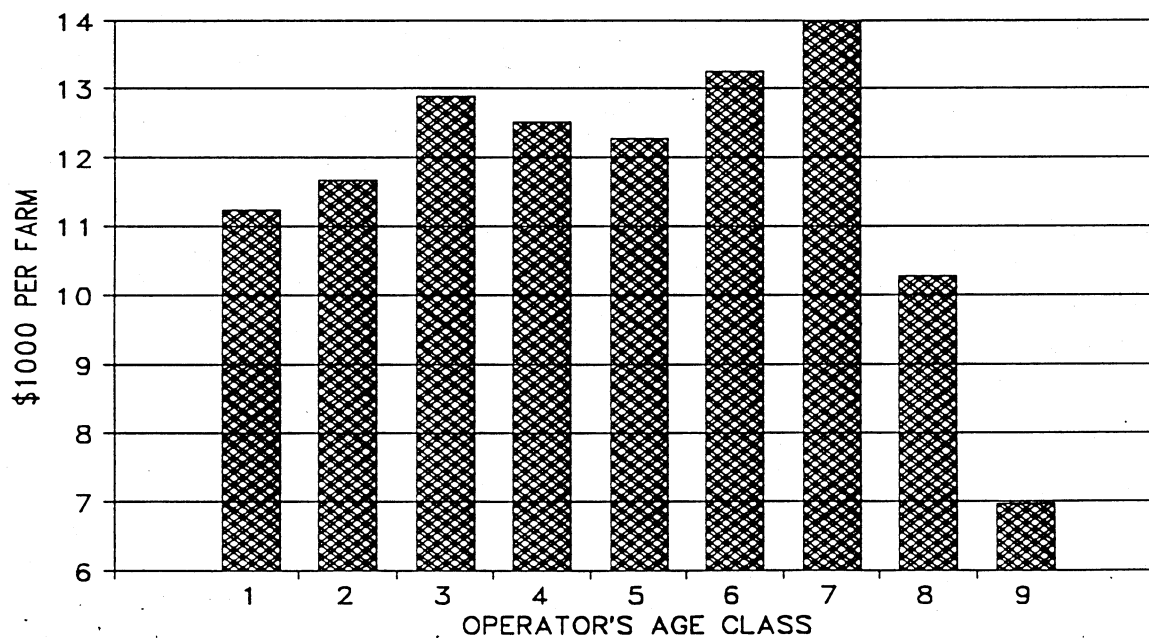
Using a cross section data, one can only compare farm operators of different age groups in order to derive implications regarding life-cycle phenomena. These implications are risky since cohort effects are not neutralized. However, since this is not the scope of this paper, we present evidence on the life-cycle of farm firms based on cross-section data. We use the 1988 Agricultural Economics and Land Ownership Survey data (U.S. Department of Commerce). In the next series of figures, profiles of several variables are described as functions of the farm operator's age. These variables include market value of agricultural products sold, net farm-related income, net cash farm income (net income from sales plus farm related income), total net cash income (including off-farm income), operator-owned farm assets, and total farm assets.

All these variables are compared across nine age classes of farm operators: under 25 years old, 25-34, 35-44, 45-49, 50-54, 55-59, 60-64, 65-69, and 70 years old and over. In the figures, these classes are denoted by the numbers one to nine. All these variables exhibit increasing and then decreasing age profiles. This supports the idea that the theory of the life-cycle of firms is applicable to agricultural operations as well.

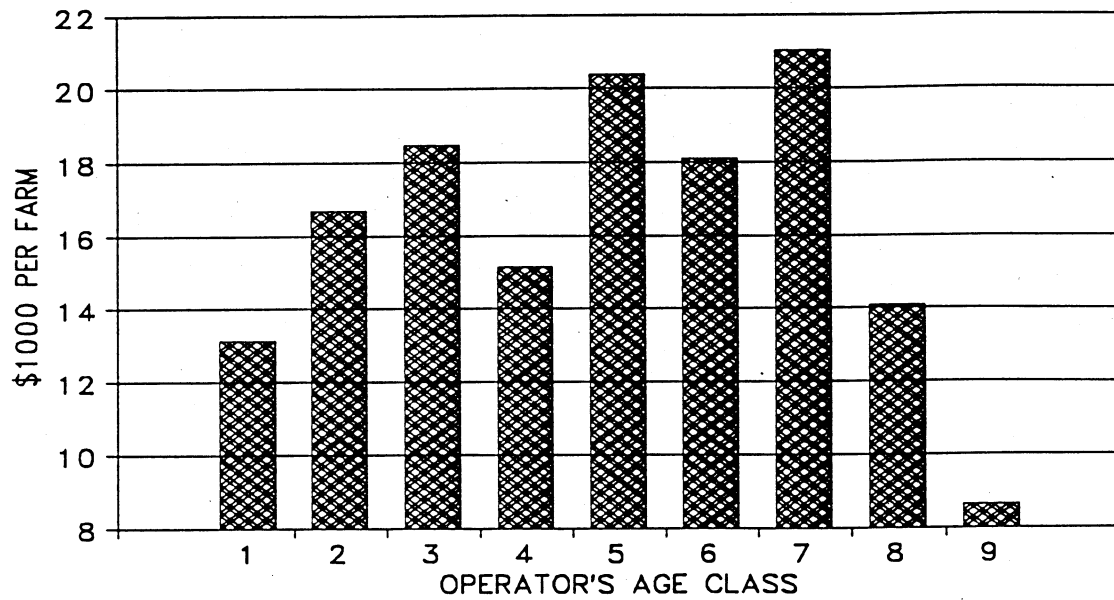
Value of Agricultural Products Sold



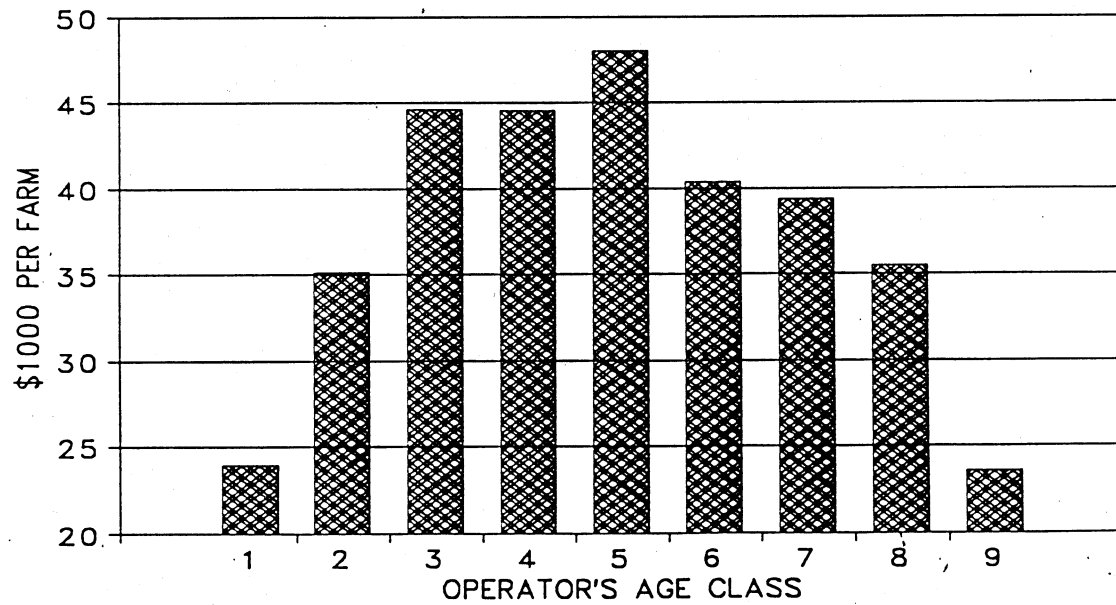
Net Farm-Related Income



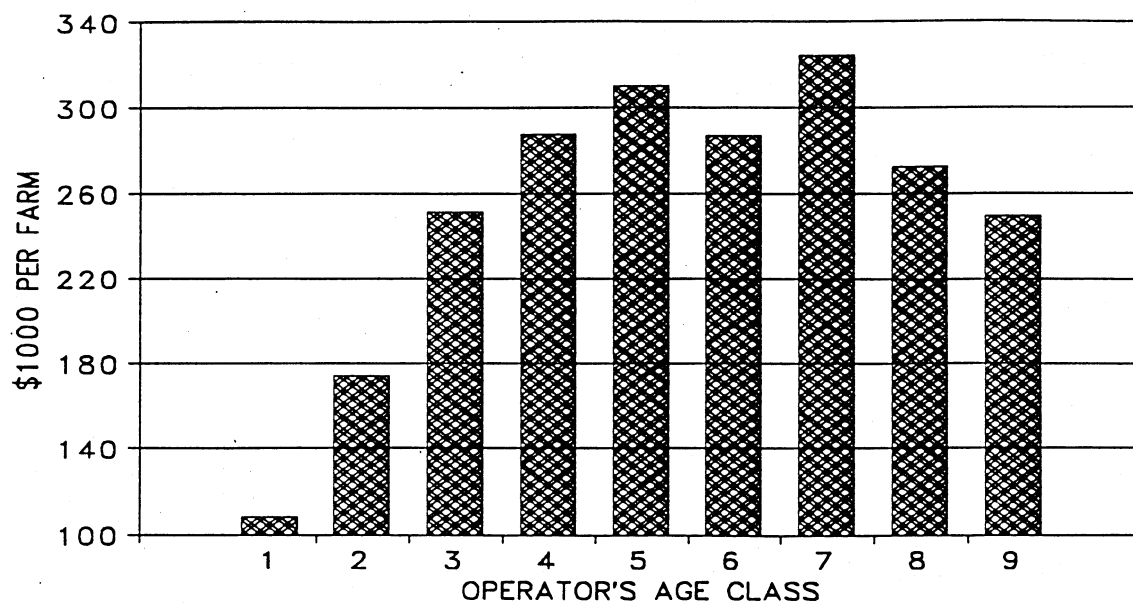
Net Cash Farm Income



Total Net Cash Income



Operator-Owned Farm Assets



Total Farm Assets

