AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

378.5694
C45
8903

המרכז למחקר בכלכלה חקלאית

THE CENTER FOR AGRICULTURAL ECONOMIC RESEARCH

WORKING PAPER NO. 8903

CAPITAL STRUCTURE OF AGRICULTURAL COOPERATIVES IN ISRAEL

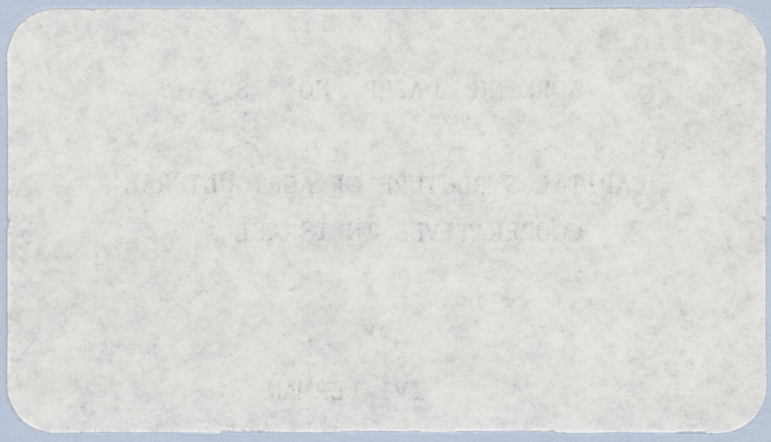
by

ZVI LERMAN

WAITE MEMORIAL BOOK COLLECTION
DEPARTMENT OF AGRICULTURE AND APPLIED ECONOMICS
232 CLASSROOM OFFICE BLDG.
1994 BUFORD AVENUE, UNIVERSITY OF MINNESOTA
ST PAUL, MN 55108

Rehovoth, Israel, P.O.B. 12

רחובות, ת.ד. 12



The working papers in this series are preliminary and circulated for the purpose of discussion. The views expressed in the papers do not reflect those of the Center for Agricultural Economic Research.

מאמרי המחקר בסידרה זו הם דווח ראשוני לדיון וקבלת הערות. הדעות המובעות בהם אינן משקפות את דעות המרכז למחקר בכלכלה חקלאית.

CAPITAL STRUCTURE OF AGRICULTURAL COOPERATIVES IN ISRAEL

Zvi Lerman
The Center for Agricultural Economic Research

In this paper, we present some examples of the capital structure of different types of agricultural cooperatives in Israel. We compare the capital structure based on historical accounting systems with capital structure based on current-value financial statements adjusted for long-term inflation. We also discuss the capital structure of Israeli agriculture as a whole and give some information about recent developments in raising of capital by Israeli agricultural cooperatives in the securities market.

The paper is mostly based on ongoing research at the Department of Agricultural Economics and Management of the Hebrew University in Rehovot, Israel and on some preliminary results of graduate theses currently in progress. The data on different types of agricultural cooperatives analyzed in this paper are derived from original financial statements; the general data on Israeli agriculture and economy are from various standard publications of the Bank of Israel and the Central Bureau of Statistics.

---

* The research was supported in part by the Center for Agricultural Economic Research, Rehovot, Israel. I acknowledge the useful comments of Yoav Kislev.

1. A TYPOLOGY OF ISRAELI AGRICULTURAL COOPERATIVES

Israeli agriculture is agriculture of cooperatives: 70% of agricultural land is cultivated by production cooperatives and around 90% of agricultural product is of cooperative origin. Private farmers who are not members of production cooperatives also rely on various service cooperatives, such as citrus handling and packing facilities or water supply cooperatives. The highly developed cooperative structure of Israeli agriculture is traceable to the socialist background of the Jewish settlers in the early 1920s, who set the tone for the future by adopting the kibbutz (collective village) and the moshav (a comprehensive village-level cooperative association) as the preferred models of agricultural settlement.

Table 1 presents a schematic typology of agricultural cooperatives in Israel. The primary level--kibbutzim, collective moshavim (moshav shitufi in Hebrew), and moshavim--are the production cooperatives, differing basically by the degree of cooperative control of consumption and production. Input purchasing and produce marketing are centrally organized in all primary cooperatives (at least in principle). The secondary level are the regional service cooperatives, the so-called "regional enterprises"--sorting, packing, and storage facilities, feedstuff mills and elevators, cotton gins, poultry processing plants. Another type of secondary cooperative is the "purchase organization" (irgun kniyot in Hebrew). Originally established to handle centralized input purchasing and produce marketing for

their member cooperatives in each region, the purchase organizations developed into powerful financial intermediaries raising bank credit and allocating it to their members.

Table 1
TYPES OF AGRICULTURAL COOPERATIVES IN ISRAEL

A. PRIMARY COOPERATIVES

	Degree of cooperation			
	Consumption	Production	Purchasing/ marketing	Finance
Kibbutz	Yes	Yes	Yes	Yes
Collective moshav	No	Yes	Yes	Yes
Moshav	No	No*	Yes	Yes

B. SECONDARY COOPERATIVES

	Functions	Ownership structure
Regional enterprises	Primary services Secondary processing	Primary cooperatives or regional purchase organization
Purchase organizations	Purchasing/marketing Credit intermediation	Primary cooperatives

*Note: Scale crops (citrus orchards, wheat, cotton) are sometimes handled cooperatively also in the moshav.

The membership of the secondary cooperatives comprises the primary cooperatives in the corresponding region. Kibbutzim and moshavim as a rule maintain separate secondary cooperative organizations in each region, and the collective moshavim usually join the kibbutz regional cooperatives because of greater

organizational affinity. The ownership structure of regional service cooperatives ("regional enterprises") does not follow a uniform pattern: some regional enterprises are owned directly by the primary member cooperatives (on patronage principles), while others are owned by the regional purchase organization, which in turn is owned by the primary cooperatives in the region.

Kibbutzim and collective moshavim have no parallel in the UK and the USA because of their cooperative agricultural production. Moshavim and secondary regional cooperatives are similar in their purchasing, marketing, and primary processing functions to UK multipurpose cooperatives and US regional cooperatives. However, in Israel one of the major functions of agricultural cooperatives is raising credit for their members--a function normally handled (at least in the US) by specialized cooperative banking institutions. This financial intermediation leaves a distinctive imprint on the balance sheets of agricultural cooperatives in Israel and again seems to be without parallel in other Western countries.

2. FINANCIAL COOPERATION

Most of agricultural land in Israel is property of the State, and it is leased to the farmers for cultivation. This automatically introduces a downward bias in the farm asset structure in Israel compared to UK or USA, say. It can be argued, of course, that a smaller asset base means smaller financing requirements for Israeli farmers, but national ownership of land

also means that Israeli cooperative farmers have no collateral to offer to the banks. In addition, Israeli agriculture is traditionally regarded as "agriculture of paupers": the farmers usually were new immigrants arriving in Israel (and before that in Palestine) without any equity and it was up to the national "sponsoring agencies" to provide them with basic means of production, including capital. The same principles, by extension, have applied in recent years to established Israelis moving into new agricultural settlements: joining a kibbutz never required any equity contribution (one simply does not "buy a share" in the kibbutz), while very little equity was required to start a farm on a new moshav, as the government and the sponsoring agencies took care of all the startup costs.

As a result, financial cooperation has developed into one of the major functions of all agricultural cooperatives in Israel: instead of land and individual equity, security is provided by the pooled production resources of the members who are all mutually liable for the debt of the cooperative (on mutual liability arrangements in Israel, see Zusman (1988)).

Credit intermediation under the umbrella of mutual liability is all pervasive in Israeli agriculture. Kibbutzim in law represent their members to the banks and raise money centrally. Farmers on a moshav, unlike kibbutz members, have individual financial needs, yet usually they will not apply directly to the bank for a loan: they borrow all the money that they need from their primary cooperative, the moshav association, which is expected to recover the loans from produce marketing revenues.

The moshav association, in turn, will raise money from the banks on the strength of mutual guarantees of the moshav members or go straight to its secondary regional cooperative--the purchase organization--for more loans. The purchase organization relies on a much broader base of mutual guarantees provided by all its primary member cooperatives in its financial dealings with banks and suppliers. The credit raised by the purchase organization is normally channeled to its members--the moshavim or regional enterprises--in back-to-back arrangements. A detailed analysis of the financial relationships between a purchase organization and its member moshavim and affiliated regional enterprises was recently published by Kislev and Marvid (1988).

3. ORGANIZATIONAL ASPECTS OF BALANCE SHEET STRUCTURE

The distinctive organizational characteristics of the different types of agricultural cooperatives described above have clearcut implications for their balance sheet structure. Table 2 presents a comparison of the 1984 balance sheets of four types of agricultural cooperatives: a purchase organization, a moshav association, a regional enterprise, and a kibbutz (collective moshavim have been omitted, as they are basically similar to kibbutzim). The four cooperatives used in Table 2 and in the following analysis were picked at random from our data base, with the intention of providing an illustration of typical cases. A much larger sample is required of course in order to make valid generalizations. With this caveat in mind, we will now proceed to

discuss briefly the main features of balance sheet composition in different types of cooperative organizations in Israel.

Table 2
COMPARATIVE COMPOSITION OF BALANCE SHEETS
OF FOUR TYPES OF AGRICULTURAL COOPERATIVES
(in % of historical total assets, September 1984 data)

	Purchase organization	Moshav	Regional enterprise	Kibbutz
Fixed assets	0.2%	1.2%	2.0%	10.9%
Financial investments	8.1	1.6	0.5	51.5
Loans to members--long term	28.8	30.9	0.0	0.1
Total long-term assets	37.1	33.7	2.5	61.5
Loans to members--current	49.0	44.8	48.9	0.0
Other receivables	13.9	11.0	34.9	32.3
Inventories	0.0	10.5	13.7	5.2
Total current assets	62.9	66.3	97.5	37.5
Total assets	100.0	100.0	100.0	100.0
Equity	0.4	2.9	6.0	33.7
Debt-long term	30.0	39.6	26.0	24.5
Bank loans--current	36.4	4.5	7.4	15.7
Loans from members	15.5	5.4	23.1	0.1
Loans from purchase organization	--	40.1	--	11.6
Other payables	17.7	7.6	37.5	14.5
Total current liabilities	69.6	57.5	68.0	41.9
Total	100.0	100.0	100.0	100.0

Fixed assets

The first distinguishing factor between different types of cooperatives is their fixed asset base.

Among the primary cooperatives, kibbutzim and collective moshavim cooperatively own all the productive assets (with the exception of land), which are accordingly shown as fixed assets on the cooperative balance sheet. In moshavim, on the other hand, the productive assets are mostly owned by the individual

farmers and are not shown in the balance sheet of the moshav association. The moshav balance sheet includes only the cooperatively owned assets, both productive (e.g., a garage, a packing shed, citrus orchard irrigation equipment) and services (a communal swimming pool, a library, or a basketball court). Thus, Table 2 shows that the kibbutz fixed assets account for 10.9% of the balance sheet, while in the moshav the fixed assets represent as little as 1.2% of total assets of the moshav association. Although admittedly the reported historical value of the fixed assets is biased downward by inflation (see Sec. 5), the differential should remain even in current-value financial statements.

Among the secondary cooperatives, the purchase organization is merely an administrative and financial shell: its fixed assets at most include an office building, some office equipment, automobiles for its officers, and possibly a computer (more often than not, most of these assets are simply leased). Regional enterprises, on the other hand, are multipurpose cooperatives performing a variety of service and processing functions for their members (moshavim or kibbutzim). These are basically business organizations with a full complement of productive fixed assets--buildings, machines, vehicles, plant and equipment, and their asset structure is similar to that of any other industrial corporation. In absolute values, the net (historical) cost of the fixed assets of the regional enterprise in September 1984 financial statements was NIS 136 thousand, whereas the net fixed assets of the purchase organization were reported at NIS 32

thousand. The very small percentage of fixed assets in the regional enterprise in Table 2 is a historical accounting fallacy: as we shall see in Sec. 5, the current value of fixed assets adjusted for inflation accounts for 41% of the 1984 total assets in this regional enterprise.

Thus in terms of asset structure, we expect the regional enterprises and the kibbutzim to have the highest component of fixed assets in their balance sheet, followed by moshavim, and finally the regional purchase organizations.

Inventories

Kibbutzim and regional enterprises are cooperative producers with work in process and finished produce inventories. The inventories accordingly account for 13.7% of the total assets of the regional enterprise and 5.2% of the total assets of the kibbutz. The purchase organizations, on the other hand, are intermediaries and generally should have no inventories. For the purchase organization in Table 2, the inventories are zero. A purchase organization will sometimes carry inventories if, for instance, it maintains regional supply stores in the interest of ensuring fast and efficient deliveries to members.

Moshavim carry inventories only to the extent that they have collective crops (such as citrus orchards, wheat, or cotton) or maintain a supply depot or a supermarket for their members. In a moshav where all production is concentrated on individual farms, produce and work in process inventories do not appear on the moshav cooperative balance sheet. The moshav in Table 2 has

inventories that account for 10.5% of total assets: this moshav operates a large cooperative citrus orchard, and these inventories in their entirety represent orchard work in process.

Financial investments

All agricultural cooperatives have some financial investments in marketable securities (valued at market) and in other higher-level cooperatives (shown at historical values). The level of these financial investments fluctuates over time, depending on market conditions, but in general it is not too high. The figures in Table 2 for the three cooperatives except the kibbutz are fairly typical: the regional enterprise is in the service and production business, and like any other business corporation usually has no funds to invest in the market (0.9% of total assets in 1984). The purchase organization, in line with its role as a financial intermediary, is likely to have a higher tendency to "play the market", and the financial investments on its balance sheet are much higher--8.1% (of which 1% is invested in whole or partly owned regional enterprises). The moshav is somewhere in the middle with 1.6%: its main function is purchasing and marketing services, but it also acts as a kind of financial intermediary and is likely to have excess funds (sometimes members' funds) for investment.

A striking exception is the kibbutz in our table: more than half its assets are reported as financial investments. Again, there is a very good organizational reason for this feature. These investments represent outside pension funds and saving

schemes, which the kibbutz must maintain in order to ensure future security of its members when they retire from production. In a moshav, saving and pension is the responsibility of the individual member and it does not show on the moshav balance sheet. It may well be that not all the kibbutzim can afford to save at such a high rate as the kibbutz in Table 2. Yet the principle of saving for the members is always there.

Equity

Productive assets must be financed by a mix of equity and debt, preferably with matching maturities. The Israeli agricultural cooperatives, however, appear to be totally unconscious of the importance of equity in their capital structure. This is due in part to traditional factors (government and sponsoring agencies have normally provided all the required financing and banks used to lend to agriculture without regard to standard debt-to-equity or debt-to-assets measures) and in part to the illusion of negligible equity created by historical accounting in an inflationary environment.

Agricultural cooperatives in Israel vary in their reliance on the two standard sources of equity: contributions from members and retention of annual surplus. In kibbutzim, the only source of equity is retained surplus: kibbutz members do not make outright equity contributions to their cooperative. A moshav may, and occasionally does, call upon its farmer members to contribute to "equity capital reserves". On the other hand, there is usually no automatic retention of surplus from moshav activities: the moshav

services to members are costed so as to minimize the annual surplus, and the actual surplus or deficit is routinely allocated to members' current accounts at year end. A similar practice is observed in purchase organizations.

Moshavim and purchase organizations are intermediaries, and in principle they can operate on a relatively narrow equity base. Moreover, they have a constituency of members who in principle can be called upon to contribute equity when necessary, and as a consequence they apparently believe that they can afford to maintain a lower equity base than the self-supporting kibbutzim. Thus, the equity base of the moshav in Table 2 is merely 2.9% and that of the purchase organization is 0.4%. The equity base of the kibbutz on the other hand is 33.7%. Again a caveat is in order: this high equity component is linked with the high rate of saving of this particular kibbutz, and not all kibbutzim are as successful in building up equity.

The regional enterprises, like ordinary business corporations, are probably somewhat more conscious of the need to maintain an equity base in their capital structure. Their business contacts with the banks have apparently taught them the importance that outside creditors attach to financial ratios. They can rely on both sources of equity, periodically turning to their members (kibbutzim or moshavim) for infusion of new equity capital, while supplementing it with retention of annual surplus. The equity base of the regional enterprise in Table 2 is 6.0%, much higher than for the moshav and the purchase organization. This percentage should be still higher when the financial

statements based on historical accounting principles are adjusted for inflation (see Sec. 5 below).

Thus, the equity ranking of agricultural cooperatives also runs from kibbutzim and regional enterprises to moshavim and finally to purchase organizations.

Debt

Kibbutzim and regional enterprises need to borrow mainly in order to finance their production activities. Their total financing needs are determined in the usual way by some asset turnover measure and the level of borrowing is adjusted to make up the shortage remaining after equity financing.

Moshavim and regional purchase organizations, on the other hand, act as financial intermediaries. They borrow not so much to finance their (very limited) production activities as to allocate loans to their members (member farmers in moshavim, member moshavim and regional enterprises in purchase organizations).

Given these characteristics, we expect the balance sheets of moshavim and purchase organizations to show a very high proportion of external debt in their liabilities and also a very high proportion of loans to members in their assets. Thus, the debt of the purchase organization in Table 2 (excluding supplier credit) is 81.9% of the balance sheet and the corresponding figure for the moshav is as high as 89.6% (of which 40.1% is from its regional purchase organization). Loans to members, on the other hand, account for 77.7% and 75.7% all assets in the purchase organization and in the moshav, respectively. Thus, most

of the debt raised by these cooperatives is channeled to their members.

The regional enterprise also gives very liberal credit to its members: 48.9% of total assets in Table 2. These are not loans to members in the same sense as in purchase organizations and moshavim. Rather this represents straight advances to producers for future produce deliveries, and much of it is actually financed by advances that the regional enterprise receives from various marketing boards and export organizations. In some regional enterprises (foodstuff mills, for instance), this is a natural supplier credit to members purchasing the enterprise's output. Thus, "other payables" in Table 2, which include advances from customers, is 37.5% for the regional enterprise, compared to merely 17.7% for the purchase organization and 7.6% for the moshav.

Despite these conceptual differences, the fact remains that a very high percentage of the assets of the agricultural cooperatives in Israel (except kibbutzim) are current loans to their members. As a result, the current or quick ratio is virtually useless as a measure of short-term solvency for these cooperatives: a high ratio may merely indicate that the members owe a lot of money to the cooperative. In a crisis, the members and the cooperative will be similarly hit. Members will not repay their debt to the cooperative, which in turn will be unable to meet its obligations to the creditors despite the attractively high current ratio. The problem does not arise in kibbutzim, where all consumption is cooperative and members do not borrow

money from their kibbutz (unlike moshav farmers).

Table 3 and Fig. 1 present a brief summary of our discussion of the balance sheet composition of agricultural cooperatives, highlighting the main differences in asset and capital structure between the four cooperative types in a slightly different classification.

Table 3
SUMMARY OF COMPARATIVE BALANCE SHEET COMPOSITION OF AGRICULTURAL COOPERATIVES
(in % of historical total assets, September 1984 data)

	Purchase organization	Moshav	Regional enterprise	Kibbutz
Fixed assets and financial investments	8.3%	2.8%	2.5%	62.4%
Loans to members	77.8	75.7	48.9	0.1
Other current assets	13.9	21.5	48.6	37.5
	100.0	100.0	100.0	100.0
Equity	0.4%	2.9%	6.0%	33.7%
Outside debt (including suppliers)	84.1	51.7	70.9	54.7
Cooperative credit (from members and purchase organization)	15.5	45.5	23.1	11.7
	100.0	100.0	100.0	100.0

Figure 1 (a)
Asset Structure of Cooperatives

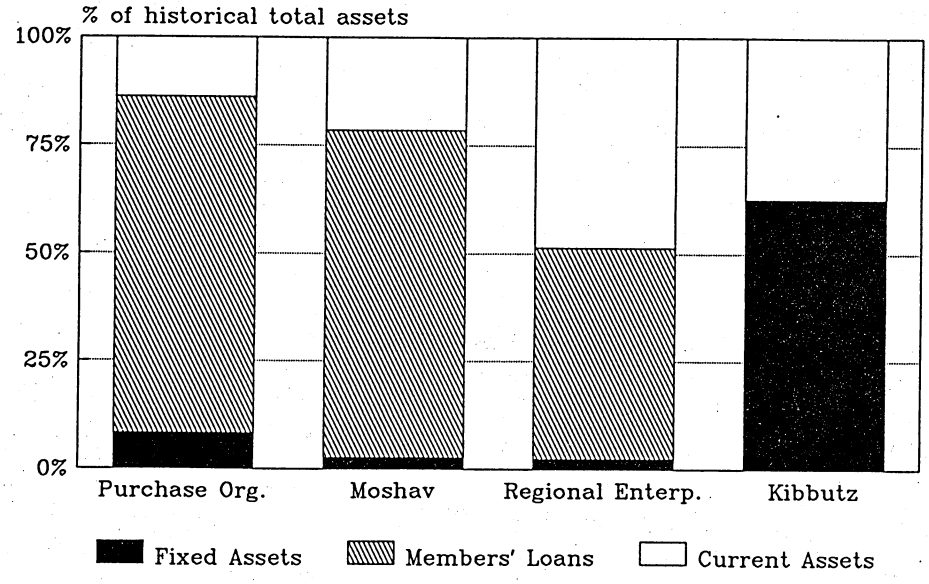
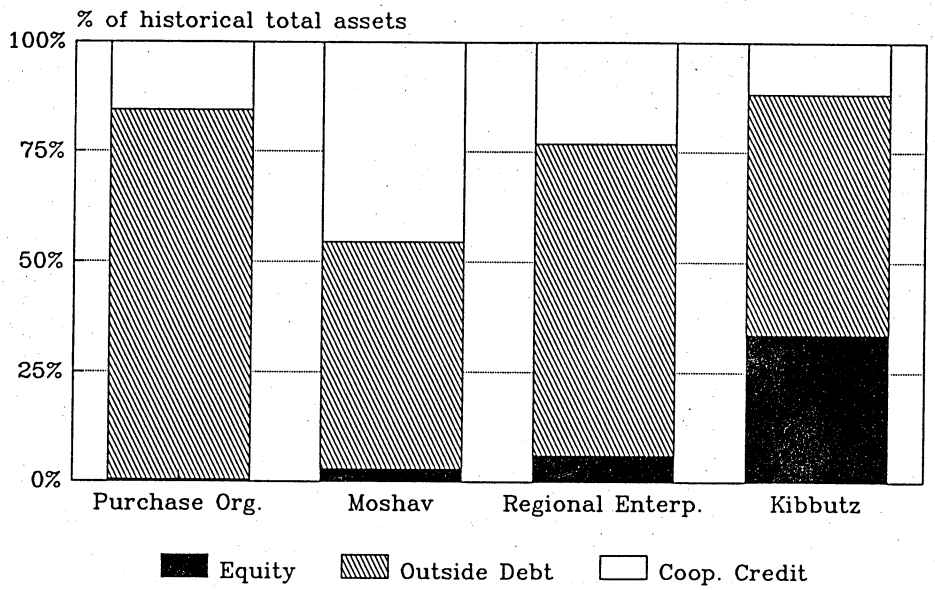


Figure 1 (b)
Capital Structure of Cooperatives



4. EVOLUTION OF THE CAPITAL STRUCTURE OF COOPERATIVES OVER TIME

The variation of the book equity component (in percent of total assets) over time is shown in Fig. 2 for the four different types of cooperatives discussed above. Over most of the time, the equity component of the kibbutz and the regional enterprise was significantly higher than the equity component of the moshav and the regional purchase organization, in line with what we have seen in Tables 2 and 3 above.

The equity of the kibbutz shows a definite upward trend over time (from 20% to 40% on average between 1973 and 1984), although the last two years of the sample period are characterized by a sudden dip--possibly the result of losses on marketable investments suffered in the 1983 stock market crash and a premonition of the impending crisis which hit the Israeli agriculture in 1985-86. The equity of the regional enterprise remained high and fairly static between 1966 and 1978 (around 25%-35% of total assets), then slid precipitously because of poor business performance and management problems. Since 1982, the equity component of the regional enterprise has rebounded somewhat, but on the whole the book equity of the regional enterprise dropped from over 20% of total assets in the late 1960s to less than 5% in mid-1980s. Although the poor business performance between 1979 and 1982 prevented sufficiently rapid formation of new equity, it seems that the decline of the equity component of the regional enterprise is to a large extent due to the historical accounting illusion (see Sec. 5).

Fig. 2.
Equity Component of Cooperatives

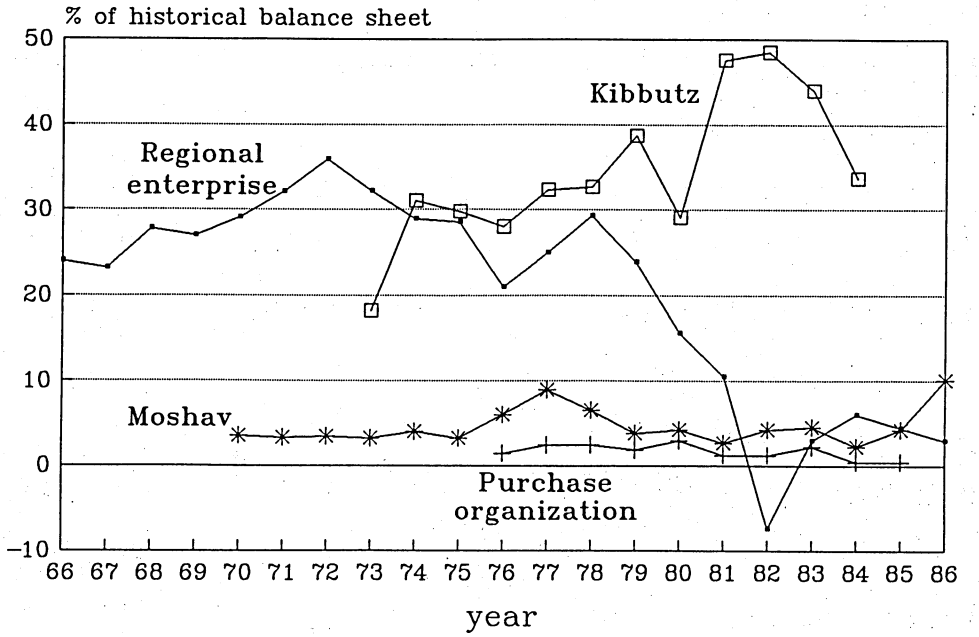
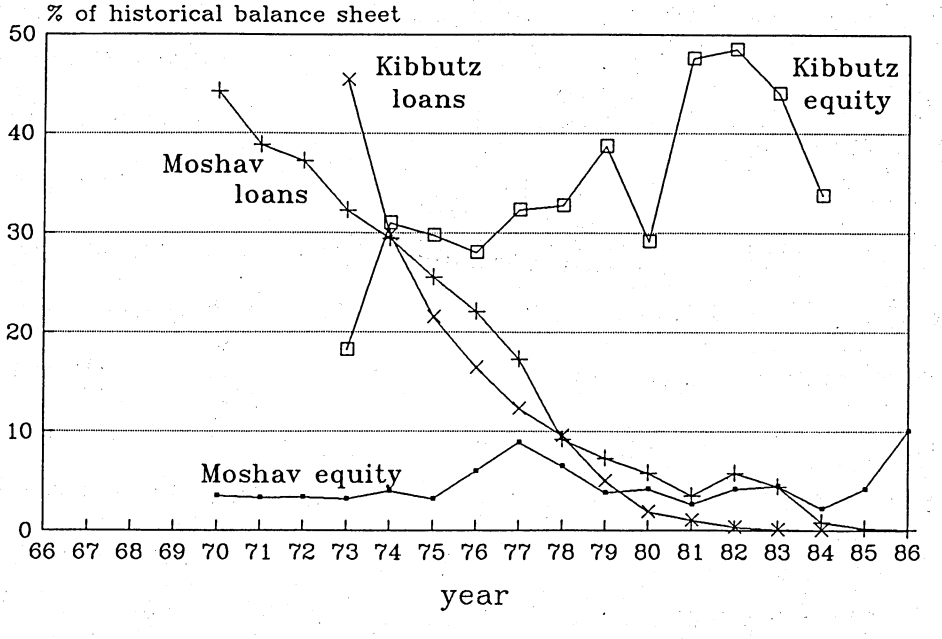


Fig.3
Equity and Settlement Loans



The moshav and the purchase organization, unlike the kibbutz and the regional enterprise, have consistently operated at a very low level of equity--3% to 4% of total assets for the moshav and 1% to 2% for the purchase organization. There has been no apparent attempt to increase the equity base, possibly because these cooperatives operate under the misapprehension that they can always call on their members to contribute new equity in case of need and therefore do not need to maintain any reserve of equity. The actual experience in 1986 has shown this thesis to be false: the fortunes of the cooperatives and their members are closely interlinked, and when the cooperatives start feeling the crunch, it is unlikely that the members will be able to come to their rescue. Even intermediaries need an equity cushion to protect them against adversity.

An interesting inference about different attitudes to accrual of equity in kibbutzim and moshavim follows from Fig. 3. This figure shows the two equity curves of the kibbutz and the moshav from Fig. 2, superimposing on them the curves of the unlinked loans received from the sponsoring agencies. These were special loans made available by the Settlement Department of the Jewish Agency to the agricultural settlements in the 1950s and 1960s, at very low rates of interest and without any indexation. Initially, the weight of these loans in the kibbutz or moshav balance sheet was very significant: thus the sponsoring agency loans in 1973 represented 32% of the moshav balance sheet and 45% of the kibbutz balance sheet. These loans have never been repaid: both the kibbutz and the moshav still carry them on their balance

sheet, but at historical, unindexed values. The persistent inflation since 1973 has dramatically increased the current part of the balance sheet, so that historically-denominated unlinked loans have virtually shrunk to zero compared to the current components. This is clearly demonstrated by the dramatic decrease of the two loan curves in Fig. 3.

We know that inflationary erosion of unindexed loans automatically produces capital gains, which accrue to the owners and are usually retained as part of the equity base. This apparently has been the practice in the kibbutz, where the erosion of unlinked loans is accompanied by growth of the equity component. The moshav has reaped precisely the same capital gains--yet its reported equity has not increased. It seems that, instead of retaining the inflationary gains, the moshav has distributed them to the members, in line with the general practice of cooperative behavior.

5. EQUITY AND FIXED ASSETS IN CURRENT-VALUE FINANCIAL STATEMENTS

The financial statements of agricultural cooperatives, like those of most business corporations, follow the historical accounting conventions, which basically means that both fixed assets and equity capital are presented in historical value. Working capital (current assets and current liabilities), on the other hand, is reported in current money units. This is also true of long-term indexed loans, which, at least in Israel, are reported at their year-end (i.e., current) values, including

indexation increments. In an inflationary environment, this inevitably reduces the proportion of book fixed assets and book equity over time, and the balance sheet inexorably shifts toward an ever increasing proportion of current (working) capital.

We saw in Fig. 2 that the book equity component of the regional enterprise decreased from around 25% of total assets in late 1960s to around 5% in mid-1980s. The reported fixed assets of the regional enterprise declined from 76% of total assets in 1966 to less than 5% in mid-1980s--and yet the production volume increased over the period by a factor of 23, measured in constant prices. Since the economic value of productive assets is determined by the product or the cashflows that they generate, it is reasonable to assume that the real value of the fixed assets of this regional enterprise in 1986 was much higher than the book value.

A revaluation of the fixed assets of the regional enterprise was carried out by Yaakobi (forthcoming), following the technique previously applied by Levy and Lerman (1987) to estimate the current-value (as opposed to historical) capital structure of Israeli industry. Fig. 4 plots the fixed assets of the regional enterprise using the historical book values and the inflation-adjusted current values. The revalued fixed assets still show a decline over the years, yet it is nowhere near as steep as the decline in book values. The revalued assets declined from 76% of total assets in 1966 to 52% in 1986 (as opposed to 5% in the historical balance sheet). Part of the residual decline in fixed assets is attributable to a structural change in operations of

the regional enterprise, which involved an upward shift in inventory levels (from around 1% in late 1960s to 8%-9% in 1984-1985).

The increase in the current value of fixed assets compared to their book value increases the balance sheet total. Technically, to preserve the balance sheet equation, the liabilities and equity side of the current-value balance sheet must be increased accordingly. The only item that can be legitimately adjusted is the equity. The difference between the current value of assets and the historical book value constitutes (unrealized) holding capital gains that accrue to the owners and increase the equity capital. Fig. 5 compares the historical equity of the regional enterprise to the revalued equity, adjusted to include the holding capital gains on fixed assets. The adjustment for holding capital gains totally reversed the trend: instead of declining book equity, we now observe an increase in the equity component from 24% to over 50% of the current-value balance sheet.

This result demonstrates what we have called "the historical accounting illusion." The fact that the book equity constitutes a small percentage of a balance sheet does not necessarily mean that the cooperative operates without equity: the holding capital gains on its productive fixed assets in times of inflation constitute unrealized retention which is not captured by historical accounting, and book equity inevitably understates the true economic value of equity. Thus, even if book equity looks small, it does not mean that it is ignorable and unimportant.

Fig. 4
Fixed Assets of the Regional Enterprise

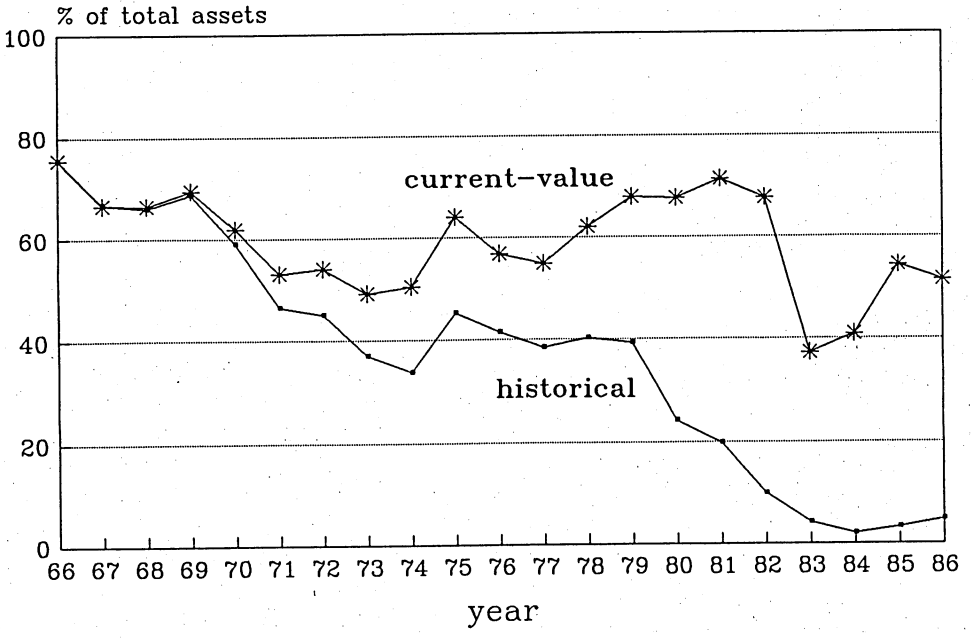
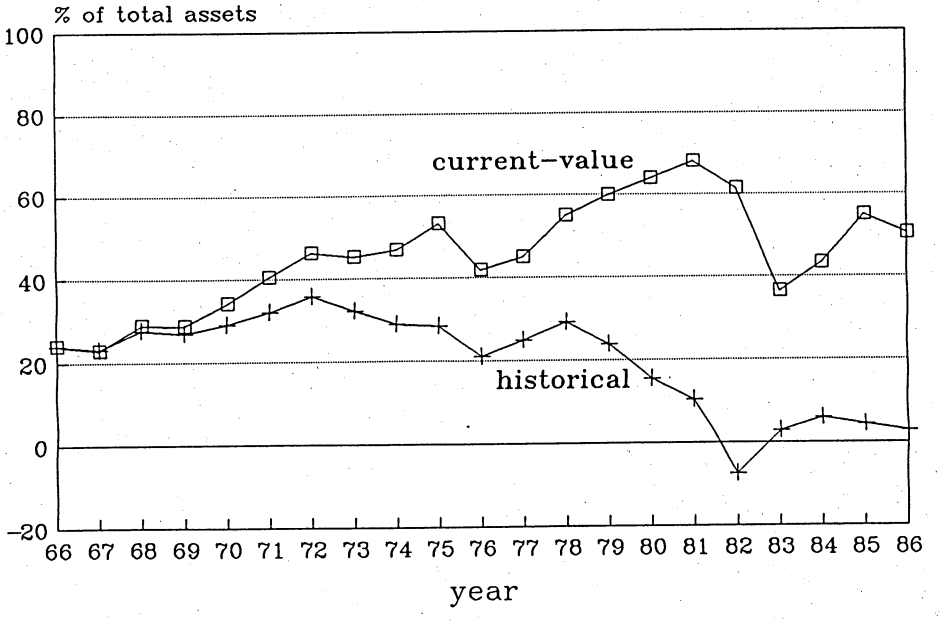


Fig. 5
Equity of the Regional Enterprise



6. DEBT AND CAPITAL STOCK IN ISRAELI AGRICULTURE

We stated at the very beginning that Israeli agriculture is agriculture of cooperatives. Having analyzed some cases of individual agricultural cooperatives, we will now look at the entire agricultural sector, which in Israel is mostly an aggregation of cooperatives.

The last 20 years have been characterized by an overall increase of the supply of bank credit in Israel, yet the demand of the agricultural sector for debt has been expanding faster than the total supply since 1978. Fig. 6 shows how the growth curve of agricultural credit overtakes the growth curves of total bank credit in the economy and credit to industry.

On the other hand, agricultural capital formation lagged behind the expansion of agricultural credit over the last 20 years, which resulted in rapid growth of leverage in agriculture (Fig. 7). The ratio of agricultural debt to net capital (in constant prices) increased dramatically from 19% in 1969 to over 90% in 1987. In the manufacturing industries, the leverage was initially much higher: 52% debt-to-net capital ratio in 1969. Yet over the entire 18-year period, the change in industrial leverage was quite small, while agriculture in aggregate appears to have lost virtually all its equity (see Fig. 7).

Another measure of the dramatically increasing debt burden in agriculture is the debt-to-gross product ratio, which increased by a factor of 4 for agriculture over the period 1969-1986, while the corresponding increase for the entire economy was

Fig. 6
Growth of Real Bank Credit

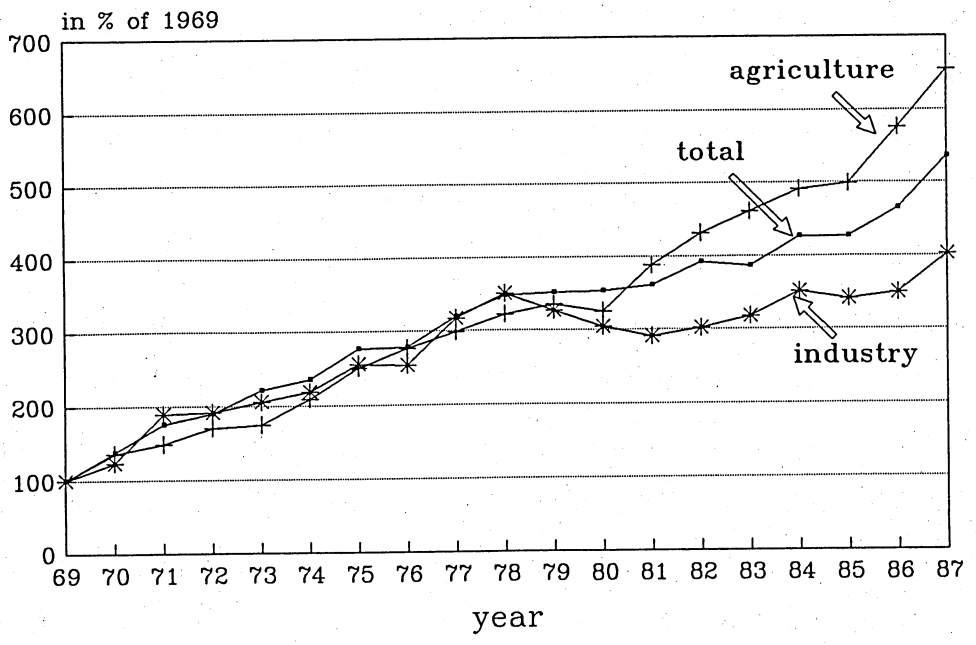
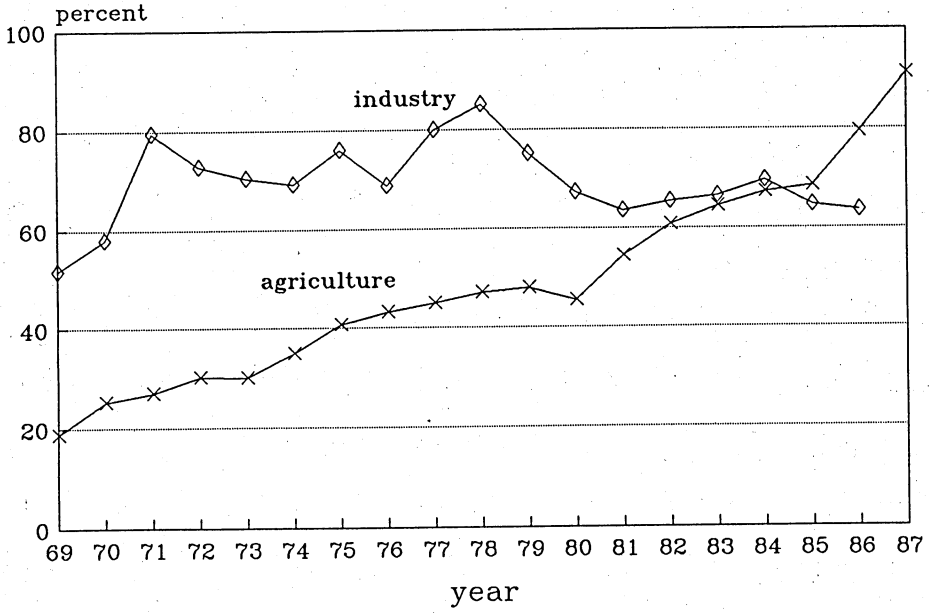


Fig. 7
Debt to Net Capital Stock

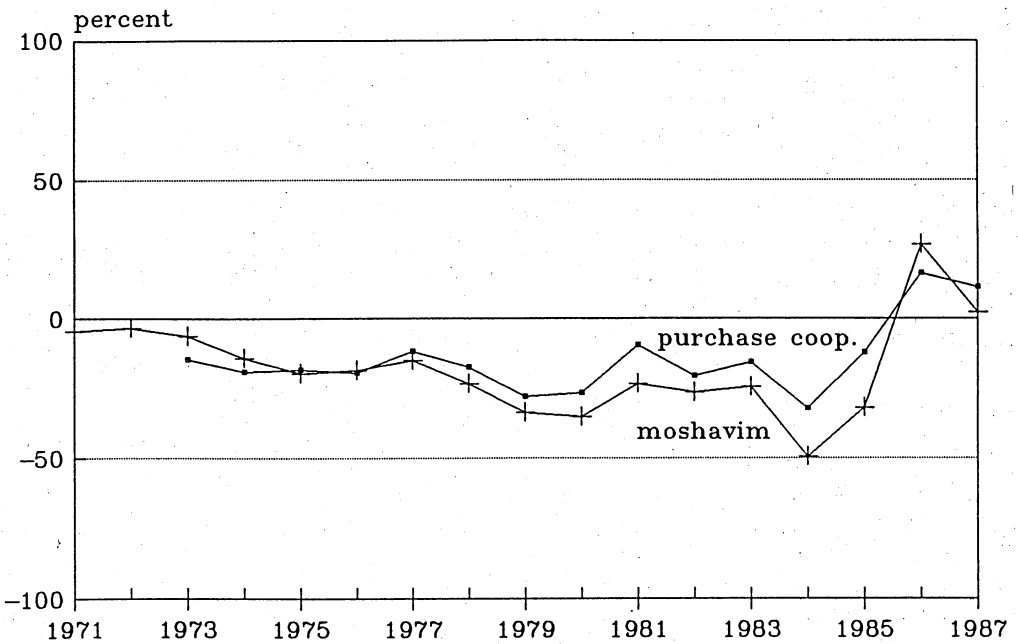


by a factor of around 2. Yet the rapidly growing debt burden remained largely unnoticed and unfelt until quite recently. This was probably due to the generally negative weighted-average cost of debt to agriculture and industry until around mid-1980s. Since the very inception of the State of Israel, real market rates usually fluctuated around zero, while government-directed loans were available to both agriculture and industry at highly subsidized terms, resulting in deeply negative effective interest rates. After 1980, however, the short term rates seem to have caught up with persistent inflation, overshot, and stuck despite the drop in inflation rates since 1985. In parallel, the change in government investment encouragement policy has rapidly eliminated the various loan subsidies. Combination of both these factors increased the effective average rate on the entire loan mix of agriculture and industry, which has turned definitely positive in real terms since 1983.

Preliminary results obtained for a different sample of eight agricultural cooperatives (four moshavim and four regional purchase organizations -- all "financial intermediaries") reveal that the real effective cost of all loans from all sources was becoming progressively more negative between 1971 and 1984 (see Fig. 8). In 1983-1984, with inflation rates rising to 300%-400% per annum, the nominal average cost of debt indeed soared, but still not fast enough, and the real cost of debt actually reached an all-time low of between -30% and -50% in 1984. But then the inflation broke as a result of government policy and dropped precipitously from 400% in 1984 to 100% in 1985 and down to 25%

in 1986. The nominal rates were caught on their upward path and inevitably overshot producing a prohibitive real effective cost of debt of between 16% and 27% in 1986. As the inlation subsided further to 19% in 1987, the real rates relaxed somewhat, but still remained in the neighborhood of 10%.

Fig. 8
Real Cost of Debt of Cooperatives



At this point, many agricultural cooperatives reached the brink of bankruptcy: their operating revenues were insufficient to bear the (no doubt temporary) high cost of debt in 1985-1986 and they could no longer roll over their maturing loans. According to the official report of a government committee set up in 1986 to investigate the financial crisis in agriculture (the Ravid Committee), the total outstanding debt of 423 moshavim and their associated regional cooperatives as of September 1986 was

1.16 times their annual gross revenue or 14 credit-months (before deducting any input costs and farmer consumption needs). The enormity of the debt burden becomes quite clear if we note that this corresponds to 14 times the annual net savings (after deducting an estimate of production expenses and consumption needs): the moshavim on average will need 14 years to repay their accumulated debt (including the debt of their regional cooperatives). Since a large proportion of this debt is actually short-term, there is no way that agriculture will be able to service its debt without appropriate rescheduling maturities.

All this seems to indicate that many agricultural cooperatives were not very efficient in forming capital and equity reserves during the long period of negative real interest rates and eroding debt (1971-1984). This is borne out by our previous discussion of the relatively slow growth of capital stock in agriculture and the increasing ratio of debt to capital.

7. CONCLUSIONS

There are at least two lessons to be learned from the Israeli experience. First is that agricultural cooperatives should not play banks to their members. They lack the controls (both internal and external) and the managerial expertise that normally safeguard banks from failure. Moreover, they are too closely involved with their members to say no to overborrowing, and the close correlation of their interests and activities with those of their members leads to "domino collapse" in times of

adversity.

The second lesson is the importance of equity. If your investments are insufficiently profitable for capital formation and accrual of equity, then do not invest, however cheap and attractive the loans. You cannot bootstrap yourself indefinitely: investing without a sufficient equity base will ultimately lead to financial disaster. Everybody knows this in theory--but the practice of Israeli agricultural cooperatives seems to have been different, and this has lead to the inevitable financial crisis.

So far, no cooperatives or cooperative-related organizations in Israel have attempted to improve their equity base by selling shares to the general public. Raising equity capital in the stock exchange requires establishment of comprehensive control mechanisms to protect the shareholders' interests in the distribution of residual earnings. Cooperatives, with their member-oriented and patronage-based policies, usually have no such systems, which automatically precludes their raising equity from non-members. Some cooperatives in the UK and the USA have recently started raising new equity capital through stock issues to the public, while introducing appropriate organizational measures designed to protect the interests of the two distinct groups of shareholders: members and non-members.

In Israel so far the only activity of the cooperative sector in the securities market has been in the form of long-term bond issues of the two national kibbutz movements, which for the first time in 1987 raised NIS 120 million (around US $75 million) in 12-year, 7.5% bonds linked to the consumer price index. This is

not cheap, but the proceeds of these bond issues were intended to help first- and second-level agricultural cooperatives roll over and reschedule their short-term bank debt, which became particularly burdensome following the 1985-1986 crisis. Bonds, of course, raise more debt, not equity, but the unprecedented experiment of Israeli cooperatives turning in 1987 to the securities market to raise capital from non-members is highly significant and in all probability will lead to more novel and creative approaches to raising capital in the future.

REFERENCES

KISLEV, Y. and MARVID, A. (1988), A Supply Cooperative of Moshavim: Plants, Economic Functioning and Finance [in Hebrew], The Magnes Press, The Hebrew University, Jerusalem (1988).

LEVY, H. and LERMAN, Z. (1987) "Estimating the Cost of Capital Under Inflation--Israeli Industry, 1971-80," Bank of Israel Economic Review, No. 59, pp. 64-87.

YAAKOBI, U. (forthcoming), Financial Implications of Differences in Business Strategy of Regional Agricultural Cooperatives [in Hebrew], MSc Thesis, Department of Agricultural Economics and Management, Faculty of Agriculture, The Hebrew University, Rehovot, Israel.

ZUSMAN, P. (1988) Individual Behavior and Social Choice in a Cooperative Settlement, The Magnes Press, The Hebrew University, Jerusalem.

PREVIOUS WORKING PAPERS

6901 Yoav Kislev and Hanna Lifson - An Economic Analysis of Drainage Projects.

6902 Yair Mundlak and Ran Mosenson - Two-Sector Model with Generalized Demand.

6903 Yoav Kislev - The Economics of the Agricultural Extension Service. (Also in Hebrew).

7001 Dan Yaron and Gideon Fishelson - A Survey of Water Mobility on Moshav Villages. (Hebrew).

7002 Yakir Plessner - Computing Equilibrium Solutions for Various Market Structures.

7003 Yoav Kislev and Yeshayahu Nun - Economic Analysis of Flood Control Projects in the Hula Valley, Stage One - Final Report. (Hebrew).

7004 Yoav Kislev and Hanna Lifson - Capital Adjustment with U-Shaped Average Cost of Investment.

7005 Yair Mundlak - Empirical Production Functions with a Variable Firm Effect.

7006 Yair Mundlak - On Some Implications of Maximization with Several Objective Functions.

7101 Yair Mundlak and Assaf Razin - On Multistage Multiproduct Production Function.

7102 Yakir Plessner and Meri G. Kohn - Monopolistic Behavior in Situations of Expectation Motivated Demand.

7103 Yakir Plessner and Meir G. Kohn - A Model of Optimal Marketing Policy.

7104 Yoav Kislev and Yakir Plessner - An Applicable Linear Programming Model of Inter-Temporal Equilibrium.

7105 Aharon Ben-Tal and Eitan Hochman - Bounds on the Expectation of a Convex Function of a Random Variable with Applications to Decision Making Under Uncertainty.

7106 Yair Mundlak and Zvi Volcani - The Correspondence of Efficiency Frontier as a Generalization of the Cost Function.

7107 Uri Regev and Aba Schwartz - Optimal Path of Interregional Investment and Allocation of Water.

7108 Eitan Hochman and Hanna Lifson - Optimal Control Theory Applied to a Problem of an Agricultural Marketing Board Acting as a Monopolist.

7201 Mordechai Weisbrod, Gad Stretiner, Dan Yaron, Dan Shimshi, Eshel Bresler - A Simulation Model of Soil Variation Moisture. (Hebrew).

7202 Yoav Kislev, Yakir Plessner, Aharon Perahia - Multi-Period Linear Programming with a Consumption Application. (Hebrew).

7203 Ran Mosenson - Fundamental Dual Price-Rent Relations in Input-Output Analysis - Theory and Application.

7204 Yoav Kislev and Benjamin Nadel - Economic Analysis of Flood Control Project in the Hula Basin. (Hebrew).

7301 Yigal Danin and Yair Mundlak - The Effect of Capital Accumulation on a Well Behaved n-Sector Economy.

7302 Pinhas Zusman - Power Measurement in Economic Models.

7303 Aba Schwartz, Uri Regev and Shmuel Goldman - Estimation of Production Functions Free of Aggregation Bias with an Application to the Israeli Agriculture.

7401 Yakir Plessner - A Theory of the Dynamic Competitive Firm under Uncertainty.

7402 Robert E. Evenson and Yoav Kislev - A Stochastic Model of Applied Research.

7501 Meir G. Kohn - Competitive Speculation.

7601 Yoav Kislev and Uri Rabiner - Animal Breeding -- A Case Study of Applied Research.

7602 Jack Habib, Meir Kohn and Robert Lerman - The Effect on Poverty Status in Israel of Considering Wealth and Variability of Income.

7701 Yoav Kislev, Michal Meisels, Shmuel Amir - The Dairy Industry of Israel.

7702 Yair Mundlak - Agricultural Growth in the Context of Economic Growth.

7703 Meir Kohn - Beyond Regression: A Guide to Conditional Probability Models in Econometrics.

7801 Yair Mundlak - Models with Variable Coefficients - Integration and Extension.

7802 Yigal Danin and Meir G. Kohn - An Analysis of the Israeli Grain Market and Purchasing Policy.

7803 Yoav Kislev - The Monetary Approach to the Israeli Balance of Payments.

7804 Meir Kohn - A Theory of Innovative Investment.

7805 Yair Mundlak and Joseph Yahav - ANOVA, Convolution and Separation, A Fresh View at Old Problems.

7806 Meir Kohn - Why the Dynamic Competitive Producer Should Not Carry Stocks of his Product.

7901 Yair Mundlak - Agricultural Growth - Formulation, Evaluation and Policy Consequences.

7902 Dan Yaron, A. Dinar and S. Shamlah - First Estimates of Prospective Income Losses Due to Increasing Salinity of Irrigation Water in the South and the Negev Regions of Israel. (Hebrew).

7903 Yair Mundlak - On the Concept of Non-Significant Functions and its Implications for Regression Analysis.

7904 Pinhas Zusman and Michael Etgar - The Marketing Channel as an Equilibrium Set of Contracts.

7905 Yakir Plessner and Shlomo Yitzhaki - The Firm's Employment Policy as a Function of Labor Cost Structure.

7906 Yoav Kislev - Management, Risk and Competitive Equilibrium.

7907 Yigal Danin and Yair Mundlak - The Introduction of New Techniques and Capital Accumulation.

7908 Yair Mundlak - Elements of a Pure Theory of Forecasting and the "After Keynesian Macroeconometrics".

8001 Yoav Kislev and Willis Peterson - Prices, Technology and Farm Size.

8002 David Bigman and Haim Shalit - Applied Welfare Analysis for a Consumer Whose Income is in Commodities.

8003 David Bigman - Semi-Rational Expectations and Exchange Rate Dynamics.

8004 Joel M. Guttman - Can Political Entrepreneurs Solve the Free-Rider Problem?

8005 Yakir Plessner and Haim Shalit - Investment and the Rate of Interest Under Inflation: Analysis of the Loanable Funds Market.

8006 Haim Shalit - Who Should Pay for Price Stabilization?

8007 David Bigman - Stabilization and Welfare with Trade, Variable Levies and Internal Price Policies.

8008 Haim Shalit, Andrew Schmitz and David Zilberman - Uncertainty, Instability and the Competitive Firm.

8009 David Bigman - Buffer Stocks and Domestic Price Policies.

8101 David Bigman - National Food Policies in Developing Countries: The Experience and the Lesson.

8102 David Bigman - The Theory of Commodity Price Stabilization and Buffer Stocks Operation: A Survey Article.

8103 Yoav Kislev and Willis Peterson - Induced Innovations and Farm Mechanization.

8104 Yoav Kislev and Yakir Plessner - Recent Inflationary Experience in Israel.

8105 Yair Mundlak - Cross Country Comparison of Agricultural Productivity.

8106 Michael Etgar & Ilan Peretz - The Preference of the German Market for Quality Tomatoes (Hebrew).

8107 Tzvi Sinai - The Profitability of Land Development for Agriculture in Israel (Hebrew).

8108 Ilan Beeri - Economic Aspects of the Settlement Project in Yamit (Hebrew).

8119 David Bigman - Stabilization and International Trade.

8110 Nava Haruvi and Yoav Kislev - Cooperation in the Moshav.

8111 Michal Meisels-Reis - Specialization and Efficient in the Poultry Industry in Israel (Hebrew).

8112 Joel M. Guttman - Matching Behavior and Collective Action: Theory and Experiments.

8113 Yair Mundlak - Various Aspects of the Profitability of Milk Production.(Hebrew)

8114 Yair Mundlak & Joseph Yahav - Inference with Stochastic Regressors.

8201 Pinhas Zusman & Clive Bell - The Equilibrium Set of Dyadic Contracts.

8202 Yoav Kislev & Shlomit Farbstein - Capital Intensity and Product Composition in the Kibbutz and the Moshav in Israel.

8203 David Bigman - Food Aid and Food Distribution.

8204 Haim Shalit and Shlomo Yitzhaki - Mean-Gini, Portfolio Theory and the Pricing of Risky Assets.

8205 Rafi Melnick & Haim Shalit - The Market for Tomatoes: An Empirical Analysis. (hebrew)

8206 Dan Yaron & Hillary Voet - Optimal Irrigation With Dual Quality (Salinity) Water Supply and the Value of Information.

8207 David Bigman & Itzhak Weksler - Strategies for Emergency Stock Planning.

8208 Eli Feinerman & Dan Yaron - The Value of Information on the Response Function of Crops to Soil Salinity.

8209 Eldad Ben-Yosef - Marketing Arrangement for Vegetable Exports-Analysis Using the Contract Approach (Hebrew).

8210 Dan Yaron, Amiram Cooper, Dov Golan & Arnold Reisman - Rural Industrialization - Analysis of Characteristics and an Approach to the Selection of Industrial Plants for Kibbutz Settlements in Israel.

8211 Dan Yaron, Ariel Dinar, Hilery Voet & Aharon Ratner - Economic Evaluation of the Rate of Substitution Between Quantity (Salinity) of Water in Irrigation.

8212 Dan Yaron & Aharon Ratner - The Effect of Increased Water Salinity of Moshavim in the South and Negev Regions of Israel.

8213 Joel Guttman & Nava Haruvi - Cooperation, Part-Time Farming, Capital and Value-Added in the Israeli Moshav.

8214 Leon Shashua & Yaakov Goldschmidt - The Effect of Type of Loan on the Firm's Liquidities During Inflation. (Hebrew).

8301 David Bigman - The Typology of Hunger.

8302 Joel Guttman - A Non-Cournot Model of Voluntary Collective Action.

8303 Leon Shashua & Yaakov Goldschmidt - Break-Even Analysis Under Inflation.

8304 Eli Feinerman & Dan Yaron - Economics of Irrigation Water Mixing Within A Farm Framework.

8305 David Bigman & Shlomo Yitzhaki - Optimizing Storage Operations: An Integration of Stochastic Simulations and Numerical Optimization.

8306 Michel Jichlinski - Empirical Study of World Supply and Demand of Cocoa: 1950-1980.

8407 Heim Shalit - Does it Pay to Stabilize the Price of Vegetables? An Empirical Evaluation of Agricultural Price Policies.

8408 Yoav Gal - A National Accounts Approach to the Analysis of A Moshav Economy -- Application to Moshav Ein-Ha'Teva (Hebrew).

8409 David Bigman - Trade Policies and Prce Distortions in Wheat.

8410 Yair Mundlak - Endogenous Technology and the Measurement of Productivity.

8411 Eli Feinerman - Groundwater Management: Efficiency and Equity Considerations.

8501 Edna Schechtman and Shlomo Yitzhaki - A Measure of Association Based on Gini's Mean Difference

8502 Yoav Kislev and Israel Finkelshtain - Income Estimates of Agricultural Families. (Hebrew)

8503 Yoav Kislev - The Development of Agriculture in Israel (Hebrew)

8504 Yair Mundlak - Capital Accumulation the Choice of Techniques and Agricultural Output

8505 Yair Mundlak - Agricultural Growth and the Price of Food.

8506 Yoav Kislev and Arie Marvid - Mazon Lachai--Economic Analysis (Hebrew).

8507 Haim Shalit and Shlomo Yitzhaki - Evaluating the Mean-Gini Approach To Portfolio Selection.

8508 Amos Golan and Haim Shalit - Using Wine Quality Differential in Grapes Pricing.

8509 Ariel Dinar and Dan Yaron - Municipal Wastewater Treatment and Reuse: I. Treatment Optimization and Reuse for Regional Irrigation.

8510 Ariel Dinar, Dan Yaron and Yakar Kanai - Municipal Wastewater Treatment and Reuse: II. Sharing Regional Cooperative Gains from Reusing Effluent for Irrigation.

8511 Yair Mundlak - The Aggregate Agricultural Supply.

8512 Yoav Kislev - Aspects of Agricultural Development in Israel.

8601 Eli Feinerman and Yoav Kislev - A Theory of Agricultural Settlement.

8602 David Bigman - On the Measurement of Poverty and Deprivation.

8603 Dan Yaron and Aharon Ratner - Regional Cooperation in the Use of Irrigation Water, Efficiency and Game Theory Analysis of Income Distribution.

8604 Yair Mundlak and David Guy - Supply and Demand of Summer Fruits.

8605 Eli Feinerman - A Note on Mean Preserving Spread of Price Distribution.

8701 Dan Yaron, Ariel Dinar and Aharon Ratner - The Applicability and Usefulness of Cooperative Game Theory in the Analysis of Equity Issues in Regional Water Resource Problems.

8702 Yoav Kislev and Arie Marvid - Mishorim--A Regional Cooperative of Moshavim.

8703 Eli Feinerman and Paul B. Siegel - A Daynmic Farm Level Planning Model for Optimal Feedlot Production and Marketing" An Illustration for a Situation in Israel.

8704 Bigman, David - Optimal Provision of Public Goods: Normative and Bargaining Solutions.

8705 Bigman, David and Paul D. McNelis - Indexation, Contract Length, and Wage Dispersion under Rapid Inflation: The Israeli Experience 1979-1984.

8706 Levy, Haim and Zvi Lerman - Testing the Predictive Power of Ex-Post Efficient Portfolios.

8707 Levy, Haim and Zvi Lerman - Internationally Diversified Bond and Stock Portfolios.

8801 Bigman, David, Becker Nir and Hector Barak - An Economic Analysis of Wheat Growing in the Northern Negev Region and an Evaluation of the Drought Compensation Program. (Hebrew).

8802 Csaki, Csaba - Hungarian Agricultural Policy in the 80's: Economic Management and Organization of the Hungarian Agriculture.

8901 Arye Volk - Factors Affecting Growth of Debt on the Family Farms in a Moshav.

8902 Yoav Kislev, Zvi Lerman & Pinhas Zusman - Experience with Credit Cooperatives in Israeli Agriculture.

8903 Zvi Lerman - Capital Structure of Agricultural Cooperatives in Israel.