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THE SOCIAL ECONOMICS OF PARTICIPATORY CONSUMER COOPERATIVES

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Introduction

Cooperative Action is a social and economic phenomenon directly associated with the drama of the Industrial Revolution. Diverse groups from social reformers to farmers have organized cooperative ventures for a multitude of reasons during the past two centuries. Most have failed, and the cooperatives that have survived often seem limited in scope when compared to their founder's visions. Yet the cooperative idea continues to reappear, especially during periods of social and economic upheaval. Self-help through mutual aid does not seem to be an outmoded idea.

Participatory consumer cooperatives are organizations in which consumers not only contribute capital and patronage but also labor. Participation is as forthright and uncomplicated as purchasing groceries at wholesale for the cooperative group, or sharing the janitorial duties in a cooperative housing project. It could also be a group of farmers who react to the shrinking farm supply system by jointly purchasing and transporting items from a more distant source. But why would individuals want to participate in a cooperative venture? The social and economic reasons for cooperative action are a set of complex and interrelated forces. A political economist such as E.F. Schumacher, will respond differently to this question than will a neoclassical economist whose science is based upon narrowly defined individual incentives.

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This paper will develop a theory of participatory consumer cooperation. Its mathematical formulation is fairly straightforward. The social and economic ideas that converge in the theory, however, are more complex and their relative influence has been contested since the era of Adam Smith, if not earlier. Thus, before generalizing the "modern" or Rochdale theory of consumer cooperation to encompass participation, we will review the humanistic base for cooperation. The third section of the paper tests the participatory theory by resort to previous research on preorder consumer food cooperatives and an analysis of survey data from 21 midwestern preorder food cooperatives.

I. Cooperatives: Reaction to the Laissez-Faire Capitalism

Markets or locations for the trading and exchange of goods were focal points of most ancient civilizations. Yet just as the laws of the physical universe were not discovered until Newton appeared on the scene in the 17th century, the systematic explanation of the role that markets serve in economic life awaited Adam Smith in the 18th Century. Smith built his theory upon the benefits that are possible when exchange can occur. These benefits are from increasing social division of labor. Individuals can improve their material well being by specializing in the production of one or a few goods, and then "going to market" to trade for the other goods needed for sustenance.

> the certainty of being able to exchange all that surplus part of the produce of his own labor, which is over and above his own consumption, for such parts of the produce of other men's labor as he may have occasion for, encourages every man to apply himself to a particular occupation, and to cultivate and to bring to perfection whatever talent or genius he may possess for that particular species of business. [Smith, p. 17].

Smith's economics are a straight forward application of the humanistic beliefs of the 18th century--the power of human reason, the ability of man

to perfect his character and the importance of liberty to the nurture of moral fiber. The ensuing technical progress of the Industrial Revolution positioned the concept of specialization even more central to an explanation of the wealth of nations. Capital in the form of machines allowed for increasing specialization and unparalleled increases in labor productivity. Economies of size became apparent and the modern business firm was born as entrepreneurs sought to assemble in a least cost combination, large numbers of laborers performing prefunctory and specialized tasks with machines in factories. Craftsmen, yeoman farmers, and the unemployed became wage earners. The market system as explained by Adam Smith, i.e. the invisible hand, counseled that each individual in pursuit of his own material well-being benefited all of society. If entrepreneurs diverged from the least-cost combination or sought returns above costs, the 18th century concepts of equality and liberty, as embodied in freedom for other entrepreneurs to enter the industry, ensured that inept or aggrandizing behavior was not rewarded.

Although the technological break-throughs of the industrial revolution contributed to rapid economic growth, the excesses of the laissez-faire system of organization brought forth demands for social reform. The Utopian Socialists, among others, decried the working conditions in factories and the debasement of work as a social experience. Robert Owen was the first to shorten the work day to 10 hours, and to predict that eight hours would be the future standard. He lobbied successfully for child and women labor laws in England and championed popular education. Yet this social experimentalist placed greatest hope in cooperative communities such as New Lanark, Scotland; New Harmony, Indiana; Yellow Springs, Ohio; and several other towns in the United States. In 1825 Owen spent large amounts of his personal fortune to

establish his American communities and charged each with the broadest purpose.

> "to secure happiness to all its members ... by the adoption of a system of union and cooperation, founded in a spirit of universal charity" [Hinds, p. 139].

But Owen's concept of cooperation was not well thought out. Basically he felt that a community without private ownership would be a community without the excesses of industrial society. His confidence in his cooperative theories led him to the most robust test of his organizations. In public lectures and speeches before the U.S. Congress and President John Quincy Adams, and the general public, he invited everyone to join his cooperatives. It took only six weeks to attract 800 persons to New Harmony. (Hinds, p. 139). These cooperatives failed. His son explained their failure as follows:

> [Robert Owen] ...wanted honesty of purpose, and he got dishonesty. He wanted temperance, and instead he was continually troubled with intemperate. He wanted industry, and he found idleness. He wanted cleanliness, and found dirt. He wanted carefulness and found waste. He wanted to find desire for knowledge, but he found apathy. He wanted the principles of the formation of character understood, and he found them misunderstood. He wanted these good qualities combined in one and all the individuals of the Community, but he could not find them... [Hinds, pp. 143-144].

Fifteen years later the Transcendentalists of New England integrated Owen's humanist faith in the educability of man with their metaphysics. The very elite of New England society, including such personages as Nathaniel Hawthorne, formed Brooke Farm Community to practice their ideas. Brooke Farm was to be a bastion against the impact of industrialism and laissez faire capitalism upon men and women. The preamble of their articles of association stated the community's purpose as follows:

> ... to establish the external relations of life on the basis of wisdom and purity; to apply the principles of justice and love to our social organization in accordance with the laws of Divine Providence; to substitute a system of brotherly cooperation for one of selfish competition; to institute an attractive, efficient and productive system of industry; to diminish the desire of excessive accumulation by making the acquisition of individual property subservient to upright and disinterested uses; and to guarantee to each other forever the means of physical support and of spiritual progress. [Hinds, pp. 252-253].

Members of the community worked at common enterprises, earned equal wages, paid nominal rents, and no rent if sick or unable to work. Four years after its founding in 1841, Brooke Farm failed.

> "There were philosophers enough in it, but the hard fisted toilers and brave financiers were absent." [Hinds, p. 261].

The only groups able to muster unswerving commitment and sustain this pre-Rochdale type of cooperation for more than a few years were sectarian religious groups. The Amana community in Iowa and the Shakers are the most well known.[1/] Yet the concept of the cooperative as a community, organic and embracing the human and social needs as well as the economic needs of its members continues to attract social critics and philosophers.

Charles Reich, professor of law at Yale University, did not call for the reconstitution of Brooke Farm Community in his bestseller Greening of America [1970], however he did argue for a reappraisal of the values shared by the 19th century cooperatives.

> To survive, to regain power over our own lives we must transcend the machine. We must recapture the ultimate sovereign right to choose values for ourselves. Many philosophers and poets over the last century have called for a return to nonmachine values. But ... reality is not served by trying to ignore the machine. Our history shows that what we must do is assert domination over the machine, to guide it so that it works for the values of our choice ... The new consciousness seeks restoration of the nonmaterial elements of man's existence, the elements like the natural environment and the spiritual that were passed by in the rush of material development. It seeks to transcend science and technology, to restore them to their proper place as tools of man rather than as the determinants of man's existence." [Reich, pp. 351-352].

The thoughts of this latter-day Emerson were very popular among American youth during the 1960s and early 1970s, and indeed there has been a resurgence of interest in cooperatives. Yet again, transcendent and humanistic values seemed to fade in the face of the political and economic reversals of the post-Watergate era. Reich's call to replace materialistic values with higher transcendental ideals has not carried the day.

E.F. Schumacher's ideas on the condition of western society are also primarily a reaction to the economics that has been constructed upon Adam Smith's fundamental ideas. The title of his book, Small is Beautiful: Economics as if People Mattered, reveals his premise and conclusion in reverse order. His low esteem for the generality of Smith's theorem on the specialization of labor is obvious.

> The most potent method, (to increase output) . . . called "division of labour" and the classical example is the pin factory eulogised in Adam Smith's Wealth of Nations. Here it is not a matter of ordinary specialization, which mankind has practiced from time immemorial, but of dividing up every complete process of production into minute parts, so that the final product can be produced at great speed without anyone having had to contribute more than a totally insignificant and, in most cases, unskilled movement of his limbs. [Schumacher, p. 54].

> From the Buddist point of view, . . . To organise work in such a manner that it becomes meaningless, boring, stultifying, or nerve-racking for the worker would be little short of criminal; it would indicate a greater concern with goods than with people, an evil lack of compassion and a soul-destroying degree of attachment to the most primitive side of this worldly existence. [Schumacher, p. 55]

Markets fare no better with Schumacher. He would not rely upon their price signals as guides for the division of labor and product in society. He writes:

> The market therefore represents only the surface of society and its significance relates to the monetary situation as it exists there and then. There is no probing into the

> depths of things, into the natural or social facts that lie behind them. In a sense, the market is the institutionalisation of individualism and non-responsibility. Neither buyer nor seller is responsible for anything but himself. [Schumacher, p44)

This is a somewhat frivolous critique, for nowhere does he suggest a replacement for the market allocation system. His conclusion, small is beautiful, rules out centralist allocation techniques. Unless his wish is to ban exchange altogether markets must continue to function, imperfect as they may be from his viewpoint.

Schumacher amplifies his critique of markets into a general observation on economics as a science.

> Economics operates legitimately and usefully within a "given" framework which lies altogether outside the economic calculus. We might say that economics does not stand on its own feet, or that it is a "derived" body of thought--derived from meta-economics. If the economist fails to study meta-economics, or, even worse, if he remains unaware of the fact that there are boundaries to the applicability of the economic calculus, he is likely to fall into a similar kind of error as that of certain medieval theologians who tried to settle questions of physics by means of biblical quotations.[Schumacher, p. 46]

Meta-economics is akin to moral philosophy and metaphysics in its relation to economics. Schumacher does not deny the usefulness of economics he simply says that it is narrow, in fact so narrow that its practitioners often step over its bounds in attempts to address broader social and political issues. Two such topics that lie in the meta-economic area are the apportionment of property rights and technological change. Both are traditionally regarded as exogenous to economic analysis, yet Schumacher would make them the linchpin of his program to improve social welfare in the third world as well as in the developed countries. Let us examine first his ideas on technological change.

> [Developing countries] need in fact . . . the very thing I am talking about, which we also need: a different kind of technology, a technology with a human face, which, instead of making human hands and brains redundant, helps them to become far more productive than they have ever been before. I have named it intermediate technology . . . One can also call it self-help technology -- a technology to which everybody can gain admittance and which is not reserved to those already rich and powerful. [Schumacher, pp. 153-154]

The dilemma of this prescription is clear, either we sacrifice productivity by using less efficient small scale technology or new small scale technology must be developed. One must ask whether technological change can be controlled, and if so who should control it? Schumacher also assumes that minimum efficient scale determines the size of business firms and limits the entry of aspiring entrepreneurs, yet there is ample evidence that firms in several indistries are substantially larger than minimum scale.[2/] Developing small scale technology may not be sufficient to guarantee the growth of small scale firms in industries where barriers to entry due factors other than size economies are important.

If one were to attempt to implement Schumacher's ideas on scale and technology it would be necessary to enlist government to set research priorities, restructure industries, and unclog bureaucracies in large scale organizations so that individual choice, entrepreneurship and creativity can flow freely. Therefore Schumacher's agenda for developing small scale industry is not consonant with the traditional "libertarian dictum, "the government that governs least governs best." Perhaps this is why Theodore Rozak calls Schumacher "the Keynes of postindustrial society" in his introductory essay to Small is Beautiful. Schumacher's program for government action is a tripartite reallocation of property rights. Small scale enterprises would remain in private hands. The very large scale corporations would sell 50 percent of their equity to the central government rather than pay 50 percent income taxes. They would become quasi-public institutions.

Ownership of intermediate sized firms could be transferred to their workers and be run cooperatively.

Schumacher's ideas on ownership and cooperatives have been pretty much ignored, whereas his concern for appropriate technology has received much attention. The current debate over how research funds should be allocated between projects investigating large and small scale energy alternatives is a case in point. But one would be mistaken to regard the demand for small scale energy technology to be a result of Schumacher's desires for less specialized and more humane work. The fundamental issue is not worker alienation in the oil industry, or the division of labor narrowly construed. It is not the parable of the pin factory; rather it is the social division of labor among firms within markets and the economy. This curves back to questions of ownership that are more clearly seen as questions of power and the role of large corporations in the economy. At issue is not only the possible control of large corporations over product flow and prices, but also their influence upon political democracy. Charles Lindblom, a respected and distinguished professor of political science, concluded his recent study of political economy, Politics and Markets (1978) with this observation.

> . . . Enormously large, rich in resources, the big corporations... can, over a broad range, insist that government meet their demands, even if these demands run counter to those of citizens... Moreover, they do not disqualify themselves from playing the partisan role of a citizen--for the corporation is legally a person... They are on all these counts disproportionately powerful. The large corporation fits oddly into democratic theory and vision. Indeed, it does not fit. [Lindblom, p. 356]

This statement from Lindblom closes a full circle of thought on political economy for it evokes images of the merchantile system that Adam Smith sought to dismantle by writing Wealth of Nations. This classic work is, in Smith's own words, directed against "the monopolizing

spirit of merchants and manufacturers who neither are, or ought to be, the rulers of mankind."[3]

II. Rochdale Cooperative Theory and Participatory Consumer Cooperatives

When determining the contribution of the Rochdale Society of Equitable Pioneers to cooperatives most observers cite the principles of cooperation first enunciated by this group. Yet the recanting of these rules often obfuscates the fundamental shift in cooperative theory that accompanies their application. Cooperatives organized under the Principles are first and foremost business ventures, not vehicles for improving the temperament or moral character of mankind. Nor are they institutions that, more than other institutions, allow the true good of man to blossom. The original Rochdale cooperative was formed out of economic necessity by striking weavers who sought to stretch their food dollars.

When organized as business ventures to meet the needs of member-patrons, cooperatives by and large accept labor specialization, economies of size, and markets as part of the technical and economic environment in which they must operate. Yet modern cooperatives are not identical to the investor-owned corporation. The investment-ownership link is altered in cooperatives. Ownership is vested in the users with each number having one vote regardless of the amount of capital invested. Capital earns a limited rate of return and operating surpluses are shared in proportion to patronage. Writing in 1925 Edwin Nourse, an agricultural economist, noted that these variations in business methods do affect personal behavior in a way that can be beneficial for cooperative activity.

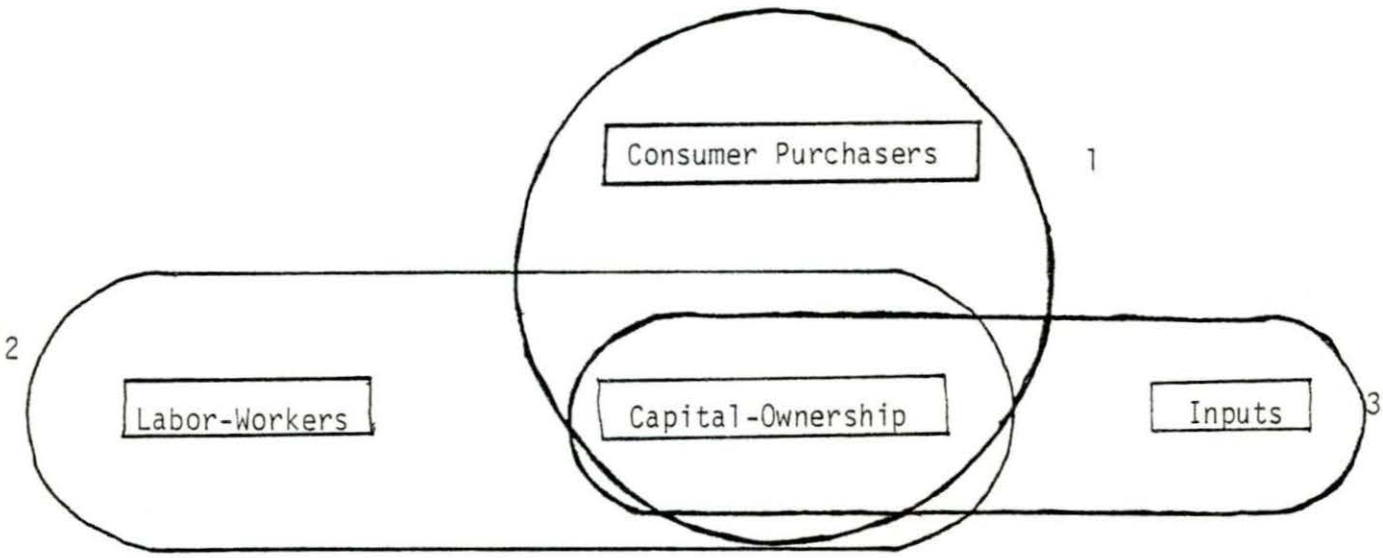
> The significance of a sense of personal participation as a means of improving the quality of business operations is constantly stressed by co-operatives and should be appreciated by students and the public. The consciousness that it is their business and that savings will rebound to their advantage goes far toward removing the impersonal character of modern industrial and commercial relationships and toward unifying and utilizing the sense of solidarity of a large number of individuals engaged in a common line of production. [Nourse, p. 16]

Although we by no means seek to diminish the social value of cooperation, this distinctive feature can also degenerate into bickering and arguments that are the undoing of a cooperative. Cooperation must be seen as a means to an end that encourages compromise and unity.

As was noted above when discussing the application of Schumacher's ideas, the fundamental issue of political economy is the social division of labor rather than the sociology of the workplace. Rochdale cooperatives organized efficiently and managed competently can affect the structure and performance of the economy. Nourse and others described the modern cooperative in a somewhat unglamorous and retributive fashion as the competitive yardstick of a market economy. Yet cooperatives do not spoilt the good fortunes of entrepreneurs any more than private enterprises spoil the fortunes of cooperatives. Ideally cooperatives restore competitive equilibrium by injecting balance into markets, limiting the ability of investor-owned corporations to take advantage of monopoly or shared-monopoly positions. Smith's invisible hand is particularly in need of cooperative aid when freedom of entry is inadequate to insure efficient production methods and prices at cost, as is the case when barriers to entry exist.[4]

There are three basic types of cooperatives: consumer, worker, and marketing or input cooperatives. In each type ownership is vested with a different set of participants in the business venture. Figure 1 illustrates that each form of cooperative integrates two functions previously separate and coordinated by markets. The consumer cooperative as indicated by circle 1 integrates purchasing with ownership and equity investment. In an economy of investor-owned firms, consumers purchase goods in the goods market and invest their savings in financial markets. The cooperative offers the opportunity to replace two markets with one. Worker cooperatives integrate labor supply with the supply of equity capital and ownership. Input cooperatives integrate the supply of inputs such as milk for bottling and distribution, or cranberries for processing with the supply of capital and ownership. In all cases capital and ownership are being integrated with another economic function; ownership is not separated from investment.

Figure 1: An Illustration of the Functional Integration Characteristics of Consumer, Worker and Marketing (Input) Cooperatives



Economists have developed rigorous mathematical theory to explain the operation of each type of cooperative.[5] Yet the schematic institutional theory presented in figure 1 suggests more general hypotheses. Since the different types of cooperatives replace different market transactions they address efficiency and equity issues in different markets. Note, however, that the capital market is a common element. Each type of cooperative could be formed in response to imperfections in financial markets. Also the impact of each type of cooperative action upon participants in the economy is different. Therefore it should not be surprising that particular types of cooperatives experience rapid growth or decline in particular sectors of the economy as economic conditions change over time.

The notion of a participatory consumer cooperative is represented by the union of circles one and two in figure one. Consumers provide not only necessary capital but also part or all of the labor to operate the cooperative. An individual deciding whether to join a participatory consumer cooperative must, in general, evaluate the benefits accuring from consolidating three market transactions into one. Joining the co-op has an impact upon his allocation of resources in the goods market, the capital market and the labor market.

Recently organized consumer food cooperatives furnish several examples of the participatory phenomenon. Small cooperative grocery stores and preorder buying clubs depend heavily upon direct consumer participation. In constructing a theory of participatory cooperation we will concentrate upon a member's decision to join the group endeavor. If no one joins, there is no cooperative. Also as conditions both endogenous and exogenous to the cooperative change, the number of the members changes. This approach is

based upon decision theory. It is more general than those of previous theoreticians who commence their analysis with the profit-maximization hypothesis and the neoclassical theory of the business firm.[6] What we seek to explain is when do individuals decide to organize cooperatives and the benefits associated with different sized cooperatives. Cooperatives can exist and benefit their members without maximizing any particular form of return to an individual member. Indeed any set of performance outcomes does not benefit, or shall we say satisfy, all members. Applying the calculus to this joint decision problem requires the analyst to construct a utility function with the different types of benefits as arguments for each member, aggregating individual utilities and then maximizing total utility generated by the cooperative. The incommensurables surrounding interpersonal utility comparisons convert the maximizing effort into an analytical fiction, and may well distract the analyst from the basic determinants of cooperative size and growth.

The theory developed here is specific to preorder cooperatives which are a special case because they require little investment in inventory or fixed assets. Thus capital investment aspects can be ignored purchase and time decisions need to be explained. Generalization is straight forward requiring only more mathematics and more complex decision rules.

Participating in a preorder food cooperative involves ordering food in advance of delivery, consolidating household orders into a group order, purchasing ordered items in bulk, transporting them to a distribution point, breaking them down into household orders and collecting payment. Members supply all the labor needed and coordinate the cooperative activity. When deciding to join a group an individual must determine whether the price savings on his food order is adequate compensation for the time contributed

to the co-op. More precisely an individual will join the cooperative if the shadow wage earned by participating is greater than the opportunity cost of time spent at the co-op.

A participant's shadow wage is a function of more than a cooperative's price level. Equations one and two can be used to compute a shadow wage.

1) $$W = \left[\frac{1}{1 - t(y)}\right] \left[\frac{S}{H}\right]$$

where

2) $$S = \left[\frac{D}{1 - D}\right] P$$

given:

W = shadow wage ($/hr)

t(y) = marginal tax rate ; a function of nominal income and expressed as a decimal

S = total savings during a given time period (dollars/period)

H = time contributed during a given time period (hours/period)

D = price savings expressed as a decimal

P = purchases in a given time period ($/period)

The individual's decision criteria can be stated mathematically as follows:

3) $$W = \frac{DP}{[1-t(y)]\ [1-D]\ H} \geq C(I)$$

where: C(I) = opportunity cost of participation ($/hr); an increasing function of real income.

Large values of D, percent savings over retail, increase the shadow wage. The percent spread between co-op and supermarket prices depends upon the supermarket price level which in turn is influenced primarily by labor costs and the degree of competition in the retail market. It also may reflect transport savings if the consumer needs to travel to a distant supermarket less often and the co-op's distribution point is nearby, as

would be the case in many rural or central city areas. Larger purchase volume, P, also increases the shadow wage to make joining more attractive. More time spent in cooperative activity reduces hourly returns ceteris paribus.

Change in nominal income has two components--change in the rate of inflation and change in real income. When nominal increase are due solely to inflation, the marginal tax rate increases increasing the shadow wage. The opportunity cost of participation, however, remains constant because it is a function of real income. The attractiveness of participation increases. This effect is stronger if inflation not only moves individuals into higher tax brackets but also results in lower real incomes. A change in real income with no inflation (an equal change in nominal income) is the only income effect that has an ambiguous impact upon the participation decision. It increases both the shadow wage and opportunity cost.

A consumer that values cooperation for meta-economic reasons may participate when the shadow wage is less than the opportunity cost. This possibility can be accommodated by adding a meta-economic value factor (M) to the left hand side of equation 3. The result is:

4) Join if $M + W > C$

This can also be written as:

5) Join if: $W > C - M$

Stronger meta-economic considerations have the same analytical effort as lower opportunity costs of participation. Cooperative size, as measured by the number of households, can also be introduced to the decision model by considering its impact upon efficiency. A cooperative is more efficient if it can distribute a given amount of groceries with lower time inputs from its members. Therefore efficiency is measured by the ratio between H and P. A lower H/P ratio produces a higher shadow wage. What we would

like to know is how efficient are preorder cooperatives and are larger units more efficient than smaller ones?

IV. Empirical Evidence

All of the parameters contained in equation 3-5 are measurable, however, some present a larger challenge to survey research than others. Measuring individuals' valuation of meta-economic factors and their opportunity costs is difficult. Krietner (1978, p. 141 - 142) found that active participants in cooperative stores were individuals who valued the social mission of the cooperative highly; however, he did not identify a schedule between meta-economic values and participation. Other researchers have concentrated their efforts upon measuring the shadow wage. Higher shadow wages enhance the attractiveness of joining a cooperative.

Curhan and Wertheim [1972] surveyed 24 preorder cooperatives in the Boston area during 1971. Detailed comparisons of cooperative and supermarket retail prices revealed that net savings of about one-third supermarket retail were realized for fresh produce. Savings on all other items was at best 20 percent --less in the instance of meat and more for bakery products, eggs and miscellaneous purchases. They conclude that on the average, consumers saved 25 percent by joining preorder cooperatives (Curhan and Wertheim, 1972 p. 34). Curhan and Wertheim also collected data from 225 participants in the cooperatives. They combined information on purchases and time commitments with their evaluation of savings over retail to estimate shadow wages.

> Cooperative leaders reported that member work commitments required an average of three-quarters hours per week, although members reported commitments of one and one-half hours per week. Cooperative shopping exclusive of work commitments, probably required two-thirds per week. The total time commitment for a typical member probably averaged

> one and three quarters hours per week, although the commitment for members heavily involved in cooperative operation exceeded three hours per week. Assuming average purchases by each group, this translates to savings of $3.62 per hour for the minimally involved member who did no work, $1.37 per hour for the typical member and less than $.80 per hour for involved members (Curhan and Wertheim, 1972, p. 37)

These estimates are understated by 15-25 percent because no consideration is given to the marginal tax rate. Moreover shopping time should not be included in the time requirement estimates. The opportunity cost concept is instructive here. Since consumers are not paid to shop at a supermarket they should not count time spent shopping at a coop. We recalculated their estimates for the "typical member" without shopping time (.67 hours) and assuming, conservatively, a 15 percent marginal tax rate. The shadow wage is then $2.51/hr. The federal minimum wage in 1971 was $1.60/hr.

Hoyt evaluated the economic return to participation for members of a large preorder cooperative in Sacramento, California during 1971. A random sample of 50 members was drawn from the total membership -- 366 consumers (Hoyt, 1974, p. 39). Price comparisons on all products purchased were made between the cooperative and the supermarket that respondents indicated as their shopping alternative. Two monthly orders were checked. The average cost of the monthly grocery basket purchased at the cooperative was $49.55. If purchased from the most likely alternative the same basket would have cost $63.18. The cooperative saved members, on average, 22 percent [Hoyt, p. 72]. Hoyt also found that the magnitude of the price differential was not related to order size. Individuals placing large orders seemed to save, on a percent basis, as much as those placing small orders. Sacramento Preorder Cooperative carries a full line of grocery, produce, fresh meat, and household items.

Although Curhan, Wertheim and Hoyt's research was conducted in 1971, their estimates of percent price savings (D in equation 3) are reasonably accurate indicators of current conditions. The remaining determinants of the shadow wage are the marginal tax rate (t) and the efficiency ratio (P/H). Tax rates are linked to income levels and exhibit relatively little variation. On the other hand the magnitude of the efficiency ratio can vary considerably and have a significant impact on the shadow wage. A survey of preorder food cooperatives in the midwest conducted during 1978 enables us to measure the efficiency of several cooperatives and evaluate the relationship between co-op size and efficiency.

Although 52 preorder cooperatives returned the survey only 21 provided data suitable for this analysis.[7/] An efficiency ratio for each cooperative was constructed that indicates the number of hours required to distribute $20 of groceries valued at invoice cost. Hours per $20 is used rather than hours per $1.00 so that the reported values of the efficiency ratio (E) have larger values, ranging approximately between one and ten. The relationship between the shadow wage and the efficiency ratio (E) is:

$$6) \quad W = \left[\frac{20D}{(1-D)(1-t)}\right] \left[\frac{1}{E}\right]$$

Where: E = hours per $20 cost of goods sold.

Figure 2 illustrates the relationships between the efficiency ratio and the shadow wage assuming price savings of 20 percent and a 20 percent marginal income tax rate. It is a hyperbolic curve that shifts vertically when the values of D and t are changed. The efficiency ratio has a very powerful and nonlinear impact upon the shadow wage.

Fig. 2. The Relationship between Average Shadow Wage (W) and the Efficiency Ratio (E) Assuming D=.2 and t=.2

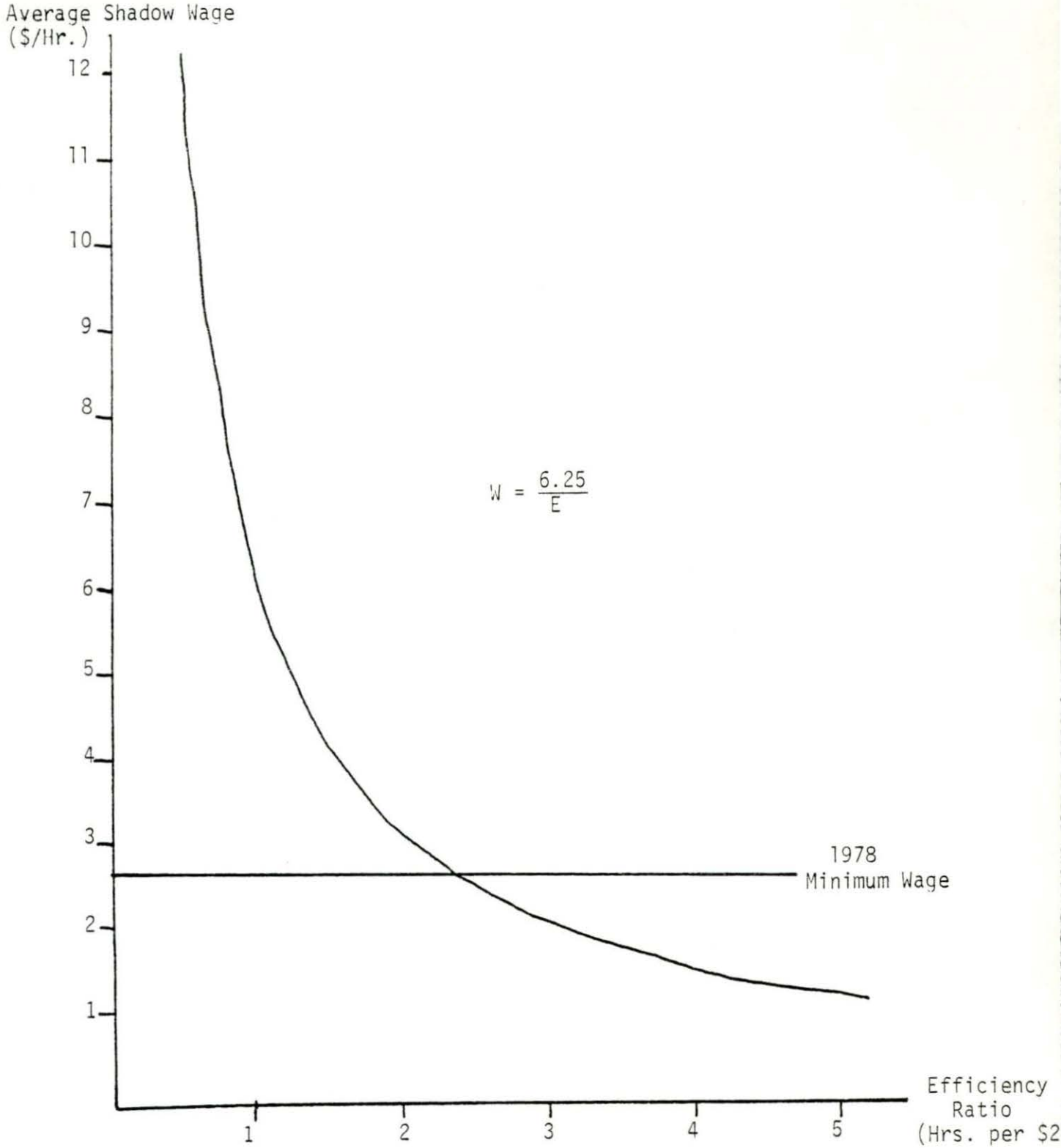


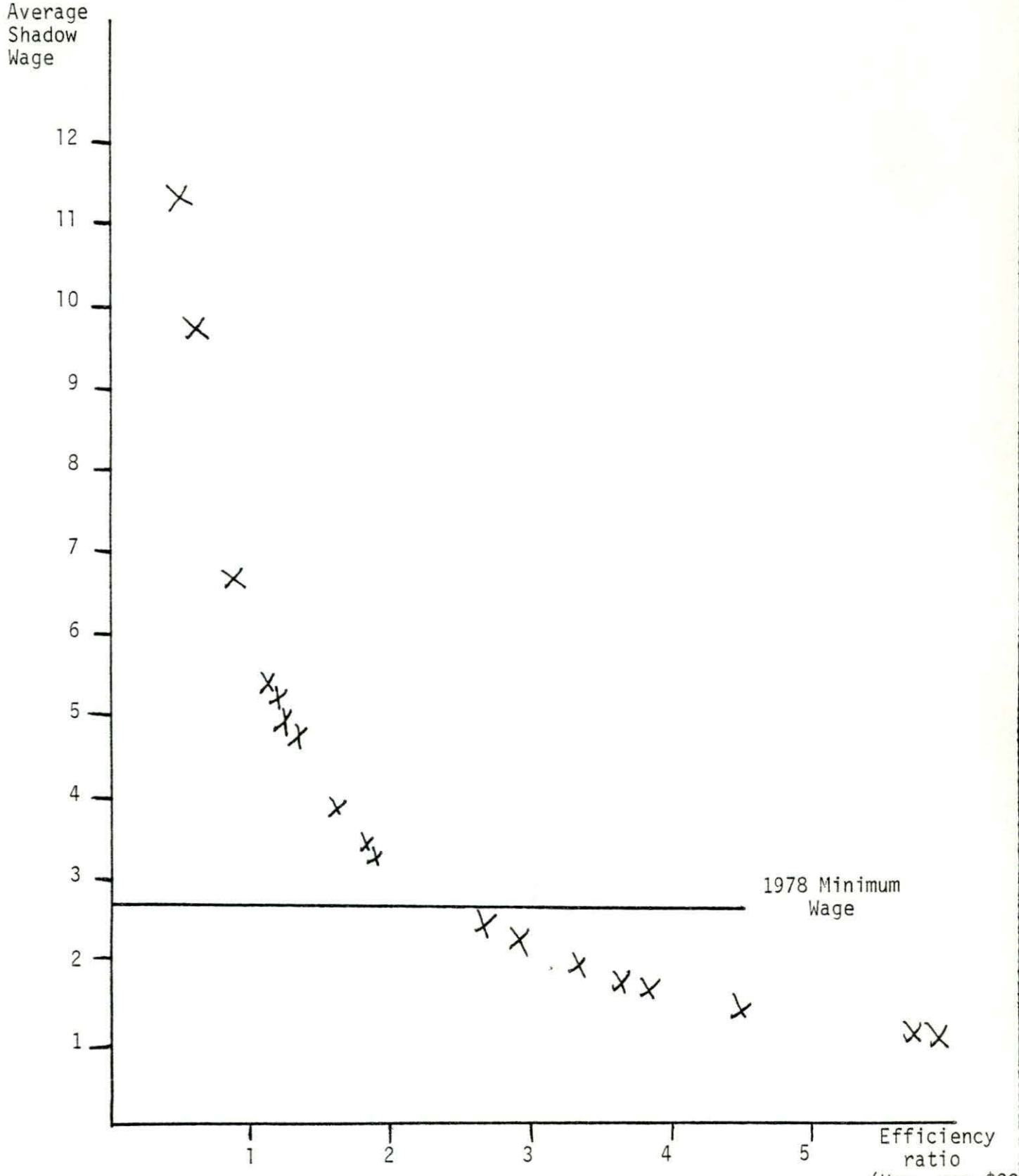
Figure 3 is a plot of efficiency values for 21 cooperatives on the curve previously illustrated. As noted with an asterisk, one co-op could not be plotted due to its low value of E and very high wage (18.90/hr), and two others could not be plotted because of their high E values and low wages ($.96/hr and $.87/hr). The variation among cooperatives is striking, yet the majority of the co-ops fall in the middle range of E values. One should emphasize that these are average values for the cooperative as a whole. Some individuals in cooperatives with low (high) average shadow wages could receive high (low) wages. An individual's wage depends upon his/her efficiency ratio rather than the group average.

It is also striking that the data plot centers upon the minimum wage. Eleven cooperatives lie above the minimum wage level and ten are below it. Of course this distribution shifts with changes in D and t, however the impact of changing D or t by reasonable magnitudes does not appreciably affect this conclusion.

There are a number of factors that explain the variation of the efficiency ratio and in turn the shadow wages earned. Multiple regression analysis can assess the relative importance of the underlying factors. Using data collected from the 21 cooperatives contained in figure 3 we can analyze the influence of four factors, the number of member households, the cost of goods sold per distribution, the average size of households orders, and the cooperative's product mix.

Number of Households: When the number of households in a pre-order cooperative increase, the amount of time required to coordinate the ordering and distribution process increases. Coordination depends very heavily upon communication among all members of the cooperative. As the number of members increases the communications network

Fig. 3 Observed Data Points on the Efficiency--
Average Shadow Wage Curve Assuming D=.2 and t-.2.*



*Three points could not be plotted. They are: E=.33, W=18.9; E=6.5, W=.96; and E=7.2, W=.87.

expands geometrically. Two persons can talk directly, with three persons each has two others to talk with, four have three others to talk with and so forth. This means that it is not only more difficult to talk to everyone individually, but also more difficult to obtain agreement. Leadership and decision-making processes can quickly become over-burdened. Transactions within larger groups take more time and may well take more time per unit of sales -- a diseconomy of size. As the cooperative grows larger and more impersonal, peer group pressure also becomes a less effective control for free riders. More members, perhaps due to frustration and impatience with time consuming group palavers, become lax in their cooperative responsibilities. For these reasons we hypothesize that the number of households is positively related to the efficiency ratio, i.e. larger groups require more time per unit of sales.

Cost of Goods Sold Per Distribution (CGD): This variable is calculated from annual cost of goods sold and the number of distributors per year.[8/] It measures a second dimension of size that is indicative of the physical distribution process rather than the decision-making dimension. Although preorder cooperatives differ from other retail businesses including cooperative stores because they have very low investments in fixed plant and equipment, they may still enjoy throughput economies. Handling small volumes of goods is not conducive to specialization or full utilization of volunteer labor. Setup and cleanup tasks can represent significant time costs. Preorder cooperatives handling larger volumes per distribution may allocate these fixed time costs over a larger volume. Therefore increasing cost of goods sold

per distribution can be expected to lower the time requirements per unit of volume, and hence lower the E ratio of the cooperative.

Average Order Size (O): The average order size, measured by cost of goods sold per household (CGD/H), is an alternative measure of phusical distribution economies. It is not necessary to introduce O, CGD, and H jointly into a model analyzing efficiency because, given values for two, the third is known exactly. Average order size is expected to be negatively related to the efficiency ratio when introduced in lieu of CGD. Larger orders per household enable a given group of households to allocate fixed time commitments, e.g. set up and clean up, over more grocery sales.

Binary Product Stage Variables (P24, P3,): Products handled by the cooperative vary in their value and time requirements for distribution. Low cost bulk items requiring repackaging such as flour and beans require large inputs of time relative to their value . Products requiring less handling, such as plastic or aluminum wrap, or high value items such as fresh meat may be expected to have a low time input per $20 of sales. At another point in our research, products were classified into five categories based upon their handling of characteristics. This was done to examine preorder cooperatives' procurement and sales growth patterns. The subsample of 21 cooperatives currently being analyzed however, only carry products in the first four stages. Product State I contains dry goods such as flour and beans, canned goods and dairy products--mainly cheeses. Stage II contains household items, books, and health and beauty aids. Stage III has eggs, prebaked goods and fresh produce. Stage IV has frozen foods and fresh meat.

Note that Stage II and Stage IV contain products that are relatively more expensive or easier to distribute than Stage I products. Therefore, a co-op with products in these Stages (P24 = 1) is expected to have a lower E ratio than other cooperatives. Stage III products are more expensive than Stage I products but their increased value may be cancelled by the increase in time requirements to distribute them. Therefore, it is unclear whether a co-op that carries stage III products (P3=1) has a higher E ratio.

One way to summarize these hypotheses is to present them in algebraic form.

6) $E = a_0 + a_1 H + a_2(\text{CGD or } O) + a_3 P2 + a_4 P3 + \varepsilon$

Hypotheses: $a_1 > 0, a_2 < 0, a_3 < 0, a_4 < 0$

Where:
- E = the efficiency ratio (Hrs/$20 COGS)
- H = the number of member households
- CGD = cost of goods sold per distribution
- O = average order size
- P24 = binary variable identifying product stage II
- P3 = binary variable identifying product stage III
- ε = the disturbance term

Table 1 presents the statistical results of the multiple regression analysis. Equation 1 evaluates the linear relationship between the efficiency ratio (E) and the number of member households (H). The coefficient for H is positive as hypothesized and statistically significant at the five percent level. The number of households in the sample range from 7 to 175 with all but one co-op falling at or below 100 units. Increasing H from 10 to 100 increases E by 2.7 units or 158 percent. One hundred households require on average two and one half times more labor input from members to distribute groceries. The R^2 value indicates that the equation explains 35.0 percent of the observed variation in E.[9/] Equation 2 introduces cost of goods sold per distribution

Table 1. Multiple Regression Equations Explaining Labor Efficiency in Preorder Consumer Food Cooperatives[1/]

Equation	Intercept	Households (H)	Cost of Goods per Distribution (CGO)	Average Order Size (O)	Product Stages II and IV (P24)	Product Stage III (P3)	Number of Observations	R^2	F-Ratio
1)	1.43	.0304 (3.20)**					21	.350	10.23**
2)	2.00	.0564 (3.88)**	-.00225 (2.23)*				21	.491	8.67**
3)	2.55	.0258 (2.64)**		-.0441 (1.45)+			21	.418	6.47**
4)	2.02	.0371 (4.10)**			-1.22 (1.65)+	-.0864 (.09)	19	.532	5.69*
5)	2.00	.0537 (3.392)**	-.00181 (1.27)		-.451 (.48)	.0296 (.03)	19	.581	4.84*

[1/] Significance Levels: ** = 1 percent, * = 5 percent, + = 10 percent

to evaluate the influence of physical distribution economies as well as the coordinating diseconomies measured by H. H becomes more strongly and positively associated with the E ratio. The coefficient for H nearly doubles in magnitude because in equation one H was undoubtably reflecting some of the influence of CGD. Co-ops with more households also tend to have higher sales. CGD is negatively related to the E ratio as hypothesized, and the coefficient is significant at the five percent level. Higher throughput leads to fewer hours per $20 of sales. The equation explains 49.1 percent of the variation in E and is significant at the one percent level with an F-ratio of 8.67.

Average order size (O) is introduced in lieu of CGD in equation 3. It provides less resolution between decision-making and distribution economies than does CGD. Not only is the t-value on H lower, the R^2 is substantially lower as well. Average order size, however, does perform as hypothesized. It is negatively related to E and significant at the 10 percent level suggestive that larger orders require less time per $20 of sales. The overall model remains significant at the one percent level.

The binary variables P24 and P3 are introduced in equation 4 along with number of households. H remains positively and significantly associated with E. Co-ops whose product mix covers stages II and IV, the relatively expensive and easy way to handle items have lower E ratios. The influence is statistically significant at the .10 percent level. The P3 product binary indicating distribution of eggs, baked goods and fresh produce has no influence upon the efficiency ratio. The coefficient is negative, but not significantly different from zero. R^2 is .501 and the F-ratio is adequate to guarantee overall significance at the five percent level.

The final equation introduces CGD jointly with the product stage variables and number of households. Its results are as hypothesized, however some multicollinearity is noticeable between CGD and P24 causing each to lose statistical significance. This is to be expected. Other things remaining constant co-ops carrying goods in stages II and IV -- high value items -- would have higher sales per distribution. This model explains 58.1 percent of the variation in E and is significant at the five percent level with an F ratio of 4.84.

Although this analysis rests upon only 21 cooperatives, it does indicate that two dimensions of size -- the number of households and sales volume -- strongly influence the average performance of preorder cooperatives. To interpret further the relative impact of these factors on performance we will use equation 2 of table 1 -- the most robust model containing both of these explanatory variables. The size and magnitude of the coefficients in equation 2 indicates that, for a given level of sales (CGD), preorders with more households are less efficient than smaller units. Yet, one must be careful here, because this equation measures the observed relationship among several cooperatives rather than what occurs when a given cooperative grows. In many instances sales will go up when new households join the cooperative. To analyze the net influence of expanding a cooperative's membership, it is convenience to rewrite equation 2 of table 1 making use of the definition CGD = OH:

7) $E = 2.00 + .0564\ H - .00225\ OH$

The net influence of adding new households depends upon the level of average order size (O) and the marginal influence of new households on it. But marginal influences are relatively small and may be offsetting, so it can be assumed

that the new households order size equals average order size, O, without compromising the analysis.

The impact of adding new members on E is as follows:

positive (less efficient) if O less than $25

zero (no change) if O equals $25

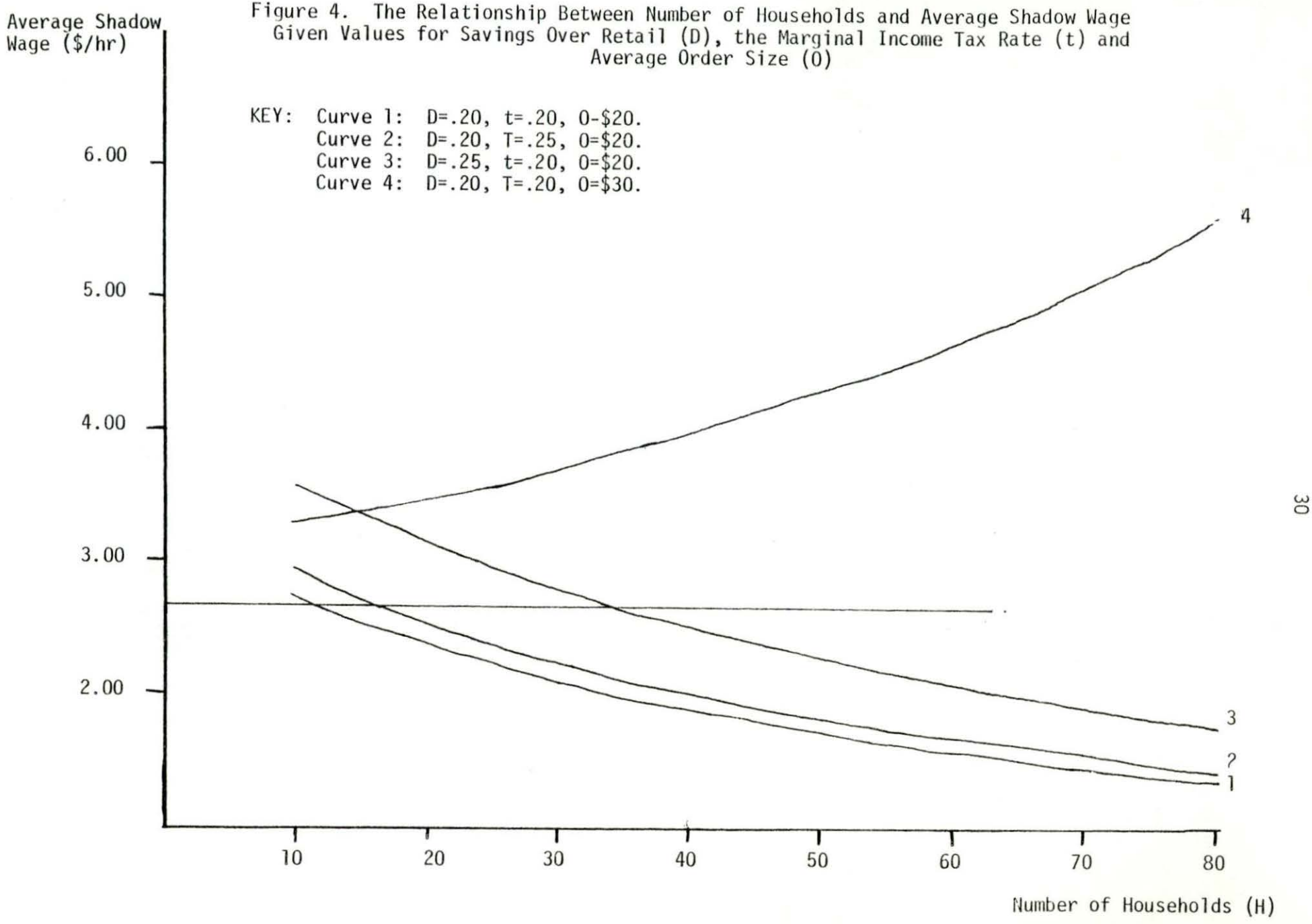
negative (more efficient) if O is greater than $25

The explanation for this complex result is straightforward. For order sizes less than $25 the increased time required for decision making and group coordination are only partially offset by the physical distribution economies due to increased sales; at $25 the diseconomies and economies exactly offset each other; and for large average order sizes coordination diseconomies are more than offset by throughput economies.

One should not regard $25 as a magic number. As food prices rise the switching value will also rise, and the limited sample size suggests that this analysis does more to establish the concept of a switch point than to give a precise estimate of its value.

Figure 4 uses the results of our efficiency analysis to determine the average shadow wage enjoyed by households in different sized cooperatives. The general equation for these curves can be obtained by substituting equation 7 into equation 6 . Values for all variables other than number of households are held constant at the indicated levels. The most striking fact is the sensitivity of the relationships between group size and average shadow wage to average order size. This is due to the competing influences on efficiency discussed above. Curve 1 assumes 20 percent savings over retailing, a 20 percent marginal income tax rate, and an order size of 20 dollars.

Figure 4. The Relationship Between Number of Households and Average Shadow Wage Given Values for Savings Over Retail (D), the Marginal Income Tax Rate (t) and Average Order Size (O)



per household. The average order size in this sample of 21 cooperatives is $20.42. Since order size is less than $25 curve 1 has negative slope. Increasing average order size to $25 would not only shift curve 1 up, it would also rotate the curve until it is a perfectly flat line at $3.12/hr. This curve is not drawn in figure 4, however curve 4 illustrates the impact of increasing order size to $30. The group size-wage relationship continues to shift up and, more important, it becomes strongly positive.

Curve 2 assesses the sensitivity of shadow wages to changes in the marginal income tax rate. A twenty-five percent increase is the tax rate from t = .2 to t = .25, producing a modest upward shift in the curve. Increasing savings over retail (D) twenty five percent from .2 to .25 has a very strong impact on the group size-wage relationship, shifting it upward. In fact the impact of a twenty-five percent increase in D from .2 is five times greater than the same percent increase in t from .2 [10].

The curves in figure 4 also give insight into the dynamics of cooperative growth and equilibrium group size. Assume that all individuals have the same opportunity cost of participation and it is the federal minimum wage rate, curve 3 describes their tax price savings situation accurately, and individuals can join or quit the cooperative at will. Also assume that individuals who join purchase the average order size amount of groceries so that the cooperative moves along curve 3 rather than jumping to nearby curves. Any group with less than (more than) 34 members will pay shadow wages (below) opportunity cost, hence individuals will join (exit) the group. The cooperative's equilibrium size is 34 households.

Relaxing the symmetry assumption on opportunity costs destroys equilibrium. At any given size there will be outsiders who have lower opportunity

costs and hence will join the cooperative. This lowers the shadow wage and will cause other households with higher opportunity costs to exit. Over time the cooperative will evolve towards households with lower opportunity costs, hence the size of the cooperative will expand driving down shadow wages until no one finds the preorder attractive. The result in that case might be revision to a smaller group (oscillating size over time), however the frustrations associated with lowered returns may sour the group on the merits of preorders. The results of unregulated growth would most likely be co-op failure.

The same dynamic suggests that preorder groups, which have average order size less than $25 and seek to preserve the economic viability of their cooperative, will impose limits on group size. If curve 3 in Figure 4 is based upon median values for D, t, and V, and the median opportunity cost equals the minimum wage, then democratic voting would limit size to the number of households where this curve and the minimum wage line intersect--34 households! This coincides with what Curhan and Wirtheim found when they re-examined twenty-four preorder food cooperatives in Boston three years after their initial survey. Writing in 1974 they observe:

> ... Cooperatives have overcome operating difficultires and achieved a kind of stability and maturity . . . (They) appear able to handle an annual turnover of membership of 30 to 35 percent without undue disruption. Although average membership has nearly doubled, most . . . cooperatives have elected to restrict their size usually to between 30 and 50 members. Many have waiting lists. People have to work regularly and frequently so members generally know each other. Small size reinforces the informal social patterns that allow the highly formalized work structure to operate. Indeed, the stability and success of individual . . . cooperatives can, in large part, be attributed to the decision to restrict their size. This policy results in a tight social group that is the foundation of the effective work group.11/

Once equilibrium is attained by consciously limiting size, e.g. at 34 households, the group will naturally attempt to expand sales per household. To a large degree their ability to do this depends upon how rapidly their federation warehouse expands its product line. A family can only consume

a limited amount of Stage I products - flour, beans, some canned goods, and cheese. Therefore it will be easier for the preorder to increase its average order size if their federation warehouse carries other products such as frozen and prebaked goods, more canned foods, fresh produce, and meats. As the cooperative expands average order size towards $25, the equilibrium size of the cooperative increases. At or above $25 there is no equilibrium size according to this theory. The cooperative would continue to expand along a curve such as curve 4, returning an ever higher average shadow wage to members.

The growth of many preorder food cooperatives seems to follow this pattern. After the group is established, a group size limit is set by members, over time this limit increases until many preorders have more than 50 member households. Those larger units with low sales per households may disappear. The ultimate fate of cooperatives that are expanding with high sales per households is probably determined by two forces not introduced in this simple model. As the product line expands percent savings over retail, assumed constant in this analysis, may decline. Curves such as Curve 4 in Figure 4 would then peak and decline after a certain group size. Also the distribution of benefits and evolution of leadership among households may limit shadow wage returns. In most cases as the group grows certain individuals develop leadership skills that may result in a centralization of operations under the aegis of a board of directors and staff. Unless these persons are willing to donate their time to the organization, compensation will become an issue, especially for the staff persons. As a result the cooperative may evolve into a grocery depot such as the Sacramento Co-op analyzed by Hoyt (1974). A depot can use sophisticated computer ordering methods, have

a well designed central distribution center, stagger distribution to its members so that is has a constant flow of product, organize member households in neighborhood blocks or work teams, and publish a newsletter regularly to facilitate member awareness and control of cooperative activities. Several preorder cooperatives in Flint, Michigan, for example, have been actively working towards consolidating their operations into a grocery depot.

Although the cross sectional analyses reported in this article provide evidence on the economic feasibility of preorder cooperatives, they do not explain in a direct fashion why preorder cooperatives have grown in popularity during the 1970s. The theories presented in Section I would suggest two hypotheses. Social values may have shifted towards attitudes more cognizant of the humanistic and meta-economic contributions of cooperatives. Yet this doesn't appear to be the case. Most observers agree that social values became more self oriented rather than group oriented during the 1970s. A second hypothesis derived from Schumacher's thesis would be that significant technological change has occurred enabling small food cooperatives to be as efficient as large retailers. There is little evidence to support this conjecture.[12] If one can rule out changes in "tastes" and technology -- the primary external forces of neoclassical economics -- what is left? The theory of participatory consumer cooperatives developed in Section II predicts that preorder cooperatives will multiply in response to at least two economic phenomena -- inflation and structural change in retail food markets that reduces competition.[13] Inflation that works against a progressive tax system pushes individuals into higher tax brackets without gains in real income.

During the 1970s many consumers have experienced declining real income as well as real tax increases. This squeeze play on consumer's disposable

income during the past decade has made preorder food cooperatives a more attractive alternative.

Several neighborhoods and communities have experienced a significant decline in the number of food outlets. Conversely market concentration, measured by the combined share of the four largest chains, has steadily increased in most local markets.[14/] Neighborhood and rural supermarkets have disappeared as the market leaders consolidate larger shares. The end result according to extensive statistical research by Marion et.al. (1979, p. 114) is that grocery prices can be as much as 8 percent above competitive price levels in some markets. The persistent trend away from competitive markets is another factor that has increased the price savings enjoyed by participants in consumer food cooperatives.

Some persons find allegations of monopoly in the economy distasteful. They prefer to believe that the economy is competitive regardless of the evidence, and only recognize a loss of choice and personal frustration when the situation is otherwise. Fortunately consumers need not necessarily be informed of the complex shifts in market structure and performance to successfully organize and operate a cooperative. Nor must they be educated to believe in the intrinsic value of one or several sectarian cooperative ideologies. The great advantage of the market system is that when consumers organize cooperatives in uncompetitive markets, they have a larger chance of returning real economic benefits and, over time, their growth exerts social control over the market place by encouraging competitors to become more responsive to consumer preferences, control costs and price at cost. Unless the trend towards

increasing market concentration is reversed and inflation controlled, food cooperatives will continue to multiply during the 1980's.

Conclusions

This paper has reviewed some of the roles that cooperatives can play in the social and economic activities of a community. Cooperatives are primarily a product of the Industrial Revolution, however cooperation that focused narrowly upon the division of labor and resulting social malaises usually has not been successful. Only religious or social groups who have devised very strong sanctions and spiritual incentives have been able to sustain cooperation as envisioned by the Utopian Socialists and Transcendentalists. This result is somewhat ironical, for these social experimenters and philosophers sought universal truths acceptable to all men and women, and founded organizations that were to establish social harmony.

The modern practice of cooperation, based upon the Rochdale Principles, is, in contrast, primarily a business venture created out of economic necessity. It accepts the social division of labor among firms and industries, as well as the specialization of labor within production processes. Yet properly organized and managed cooperatives can influence in a desirable fashion, social or meta-economic values and the performance of the market system.

Generalizing the theory of consumer cooperation to explain the behavior of participatory consumer cooperatives provided a framework for empirical research. Evidence from previous research as well as current efforts strongly suggests that the economic returns from participation are adequate

to insure the continued expansion of preorder food cooperatives. Curhan and Wertheim, and Hoyt each found price savings over retail supermarkets in excess of 20 percent. Combining these results with an analysis of labor efficiency and tax rates produces estimates of average shadow wages for different sized cooperatives. This return may be more than adequate to attract many individuals and families that have the modest amount of time required to participate in a cooperative. In many instances the predicted shadow wages are well above minimum wage.

In addition to estimating the level of return available to cooperative participants, a statistical analysis measured the relative influence of group size and sales volume on returns. Larger groups must devote more time per unit of sales to decision-making; but they enjoy throughput economies. Young cooperatives may be economically rational when they limit size between 30 and 50 households. Their initial size depends upon the savings over retail, the marginal income tax rates, order sizes, and opportunity costs of members. If average order size is less than $25, and the cooperative expands membership, returns decline and the co-op faces difficulty. However, if order sizes are above the switch point, then expanding membership increases average member returns. If order size depends primarily upon the product lines available to members, federation warehouses that expand product lines may encourage larger, more efficient preorder cooperatives to develop. When this occurs federations could appropriate some of the savings to expand services for the retail cooperatives. Current services include workshops on business management skills, communication skills, nutrition, and newsletters.

Preorder consumer food cooperatives have become more numberous during the 1970s. The Michigan Federation of Food Cooperatives, for example, organized in 1973 with 20 member groups. Today it serves more than 250 preorder cooperatives and co-op stores. It continues to expand rapidly. Other geographical areas are experiencing similar growth. Inflation and the changing structure of the food system are the two major economic forces fueling consumers' moves to cooperative food purchasing. Although consumer food cooperatives account for less than one percent of national retail food sales, their rapid growth during the 1980s may allow them to influence the performance of private retailers in some local markets. If this occurs some observers would acclaim that cooperatives are fulfilling at least one of their historic roles--enhancing competition, efficiency, and equity in the market system. Others would recognize preorder food cooperatives as an increasingly successful method of retail food distribution for a subgroup of consumers that wish to trade modest amounts of time for substantial price savings due to less service. Neither would be incorrect.

FOOTNOTES

1/ It is interesting to note that concern for the growth of trade unionism and the "enslavement of free working men" led Charles Nordhoff, a leading newspaper reporter of his era, to study the surviving cooperative communities in 1876. All of them were religious associations, however Nordhoff hoped to encourage disgruntled workers to direct their concern for organization toward cooperative communities. He though that this was especially appropriate since the "safety value" of free land on American frontier was rapidly disappearing. (See Nordhoff, 1966). His idea never caught on, but during the Great Depression the New Deal aided in the organization of agricultural production cooperatives to employ unemployed industrial workers. The program was discontinued during the McCarthy era for political reasons, but the policy made little economic sense. Chronic overproduction pointed to the need for fewer farmers, not more.

2/ See Shepherd (1979, p. 245) and Scherer (1975).

3/ As quoted in Blaug, p. 38.

4/ See Bain (1968) Ch. 8 for further explanation of barriers to entry. There are three basic sources of barriers to entry: economies of scale, high capital investment outlays, and product differentiation.

5/ See Vanek (1970) Helmberger and Hoos (1962), Enke (1945) and Carson (1977).

6/ See, for example, Carson (1977).

7/ One cooperative that furnished data was not included because it was in transition to a store. Another is not included because with 300 members it is substantially larger than the other cooperatives, from 7 to 175 households with all but one less than 101 households.

8/ Cost of goods sold is used instead of sales because it is a more accurate indicator of the cooperatives long-run volume. The two measures are nearly identical except for a few preorders that have gross margins above 10 percent to accumulate reserves. Such large margins are probably temporary changes. The correlation between cost of goods sold and sales is .995.

9/ This relationship remained statistically significant when the equation was rerun after deleting the 175 household observation.

10/ The ratio of wage elasticity with respect to D and wage elasticity with respect to t is $\frac{\eta_D}{\eta_t} = \frac{1 - t}{(1-D)D}$. Evaluated at t=.2, D=.2 gives

$\frac{\eta_D}{\eta_t}$ = 5 Ratios of elasticities involving the wage elasticity with respect to changes in O or H are complicated functions of several variables and not easily summarized.

11/ Curhan and Wertheim, (1975, p. 24). This conclusion applies to "surburban" buying clubs as opposed to two other categories of preorder cooperatives: "young" co-ops consisting of counterculture youth in downtown Boston and "urban" co-ops consisting of limited income minorities organized into co-ops by government anti-poverty workers. "Surburban" co-ops consisting of neighborhood groups and primarily young families must closely approximates the current sample.

12/ Microcomputers will give small businesses such as grocery depots and cooperative stores access to heretofore unavailable information processing, but none of the cooperatives in this study currently use them.

13/ See Hoyt, "Why the Renaissance of Consumer Food Cooperatives" in Cotterill (1980) for a full explanation of these and other factors accelerating the growth of consumer cooperatives.

14/ See Cotterill and Mueller (1979) for an econometric analysis and case studies of the change in local market concentration. Cotterill (1978) relates changing market structure to opportunities for consumer cooperative development.

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