THE AMERICAN EXPERIENCE IN FOOD STAMPS.

Application of the Effect of Household Size on the Cost of Subsidy through the Ration Books in Egypt

By

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The Egyptian Government opened the discussion for the role of food subsidies in the Egyptian eeonomy at the end of the Seventies. The discussion took several phases. In the first phase, it was focused on whether to keep or cancel the prevailing food price subsidy system. For political and social reasons the government figured out that keeping the system would be the best policy for that time, although the government was aware of the diseconomic effects on consumption and cropping patterns.

The second phase was based on finding options of the current food policy. Food stamps and cash transfer were introduced as alternatives that might be considered. These two systems would allow farm prices to be determined by the market forces which might solve the misalloca- tion of resources due to price distortion in the Egyptian agriculture economy. FSP was suggested for specific food items and to be distri- buted through similar channels of the current distribution system of the subsidized food items. Stamps could be freely traded or redeemed for each (see Alderman p, 62) But the government found that the two sug- gested systems might not solve the increasing deficits in the government budget and would increase food prices and consequently cost of living. This might lead to a strong demand for increasing government salaries

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especially recently the gap between private sector and public sector salaries is widening.

The third phase of discussing food price subsidy policy which is the contemporary phase is mainly focused on reducing the subsidy costs since the government policy was and still to keep the prevailing food price subsidy system. The Ministry of Supply made some modifications to lower these costs. One of these changes was to lower the number of participants in the program by restricting ration books to certain categories of the society. But the elimination of those participants decreased the number atmost by 10%. Almost 38 millions were registered in the ration books in 1980, divided approximately equally between rural and urban sectors.

A second change was distributing subsidized foods at different level of prices. For instance wheat flour is sold at six levels, this multi-prices system put a greater burden on the MOS to control the market and there is impossibility in doing it. On the other hand, the MOS opened new distribution channel through work places in the government offices to make sure that subsidized items will reach the target groups. It seems it is a replacing system for the increasing demand for raising government employees' wages by providing them with less costly foods.

Economic and social changes in the status of the population was not obviously reflected in the mechanism of the subsidy program. The main factor was the difficulty of defining and reaching the target groups. The MOS estimated rougly a rich line instead of poverty line and suggested using red and green ration books reflecting some changes in the percentages of the subsidy. (a). The MOS did not declare how this line was estimated. A poverty line was estimated in rural areas in 1981/82 (see Ali, Sonia P, 62) by a linear programming method by which it came

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(a) Personal discussion with Dr. Ahmed Abdel Gafar, Ministry of Supply.

out that about L,E 26 per month per person was the adequate cost of living.

After nationalization of main industrial firms the government took over importing, storing, processing and distributing foods, minimizing costs of these operations were not among the government objectives. Low rate of labor productivity in public sector, increase of some input prices, lack of efficiency in management caused a big raise in cost of production and marketing per unit of public sector's products which absorbed a greater portion of the subsidy. Decreasing these costs would lead to shrinkage in the subsidy costs. There is no estimation of the administrative costs for each Egyptian pound of the subsidy.

Other modifications were suggested such as subsidizing only inferior goods which will direct the subsidy automatically to low income people. But the government did not take it.

This paper tries to convey the actual experience of the food stamps program (FSP) in the United States to the Egyptian policy makers. It explains the history, objectives, eligibility requirements, distribution channels, mathematical model and location of the needy people. Also it discusses the theoretical aspects of the three alternatives, food stamps, cash transfer and price subsidies. It estimates the effect of household size on the cost of subsidy of the main food items distributed through the ration books in Egypt.

I. The Food Stamp Program in the United States :

   A. History and Objectives :

The FSP started in the United States after the agriculture depression in the 1920's and the general economic depression in the 1930's. At the beginning, the objective was to support farm prices and stabilize farm income both be expanding consumption of some agricultural commodities and by removing the excess supplies from the market.

The Federal Surplus Relief corporation was the first government agency organized for the purpose of purchasing surpluses of farm products from the market. Unemployed persons, needy families, charitable institutions and school lunch programs were its main outlets.

The first food stamps program was introduced in 1939 in Rochester, New York with twenty-one thousand participants. The system was to sell orange stamps to persons on relief at a price equal to their value. At the same time, blue stamps were provided free at the ratio of two oranges for one blue. Orange stamps were used to purchase any type of food, while the blue stamps could be used only to buy surplus commodities. Those surpluses were declared monthly by the Secretary of Agriculture. The distribution of orange stamps were approximately equal to the recipients' average food expenditures.

At the beginning of World War II, the need for the FSP increased due to the shrinkage that took place in the U.S. export market and the continuing large unemployment. But soon after the end of the war in 1942, the FSP was terminated as unmarketable surpluses in agricultural products and widespread unemployment had disappeared.

In 1949, a Food Distribution Program was introduced which authorized the USDA to absorb surpluses in food commodities by distributing them to needy persons in institutions rather than households. This program was rather more effective in removing seasonal or localized surpluses. Therefore, in 1961 the FSP was reintroduced. The program was quite similar to the initial program, except it used only one of color of stamps.

The program was at that time for dual purposes. It was still used as an outlet for food surpluses and also a way to alleviate distress among needy persons. But, after four years it was seen that the ability of the program to solve the problem of excess production was limited. Beside, the surpluses in agricultural products actually disappeared. Yet, the

FSP continued to help needy persons to attain a certain level of nutrition.

The new system introduced in 1961, enabled households meeting the eligibility requirements to purchase food stamps at prices below their face value. At that time the purchase requirements and stamps allotments differed according to region, household size, and income level.

Some improvements were introduced in 1972 to make the national eligibility standards and benefits uniform. Program benefits were made available to more needy persons such as the elderly and low income persons. The amount required to purchase the full stamp allotment was lowered but still increased with increases in income. In fact, the cash value of this allotment did not vary with household income, but the amount of income the household had to spend to receive this allotment increased as household income rose.

In 1974, the system allowed a semi-annual adjustment of FS allotments and income eligibility to reflect changes in food prices. Of course the continuous increase in food prices and the unemployment rate in the U.S., increased the need of the low income household for the FSP.

In 1977, the elimination of purchase requirements of FS took place which allowed zero income persons to participate in FSP. About 19 million (8.6% of the population) participated in the program. This also lowered the administrative costs. Also receivers of FS were allowed to purchase any food products except for certain imported food.

The current system is almost the same program, only it allows for a monthly adjustment of the allotments and consequently income eligibility. It gives FS to needy persons for a limited period of time which ranges between two and six months. Besides, the unit concept changed from household unit to economic unit. The total costs of FSP in 1980/

81 was about 8,685 million and 21.1 million participants . About one third of the costs is administration costs which means that every dollar of food stamps issued costs about 35.

B. Eligibility Requirements :

The definition of those who are eligible to benefit from the FSP was subject to some changes. The criteria of FS allotments changed from measuring recipients eligibility according to a low cost nutritionally minimum diet to a low cost nutritional adequate diet. The diet specified in the program was developed by the Department of Agriculture and is known as "Thrifty Food Plan". This plan contains the amounts of food that might be used by a family to meet its required daily nutrients.

In the current program, one person with zero income would receive food coupons with a value of 75 per month. The quantity of food coupons increases at a decreasing rate with increases in family size. The family income left after deducting other expenses such as rent, utilities, etc. is used as an indicator of the quantity of coupon allotment. The maximum amount of deduction is 85 per household per month. It increases to 115 for households containing elderly or disabled members. Also physically, mentally fit and non-student unemployed members applying to FS, must accept suitable employment offered to them. Otherwise they will not be eligible. (tables (1) and (2).

C. Food Stamps Channels :

Demanders of FS must apply to the Department of Social Services or designees in their area. If they are eligible according to every area criteria,(3) they are authorized to receive food coupons from the issuance agent in their country. Recipients of FS can use them to buy all kinds of food except some ineligible items such as alcoholic drinks and tobaccco.

(b) Alter and Blanc!fort(3), Persoral discussion with Dr. Sabria Lane, University of California, Berkely and John Zimmerman, Department of Social Service, Danis, California.

Figure (1) : Food Coupons Channels in U.S.
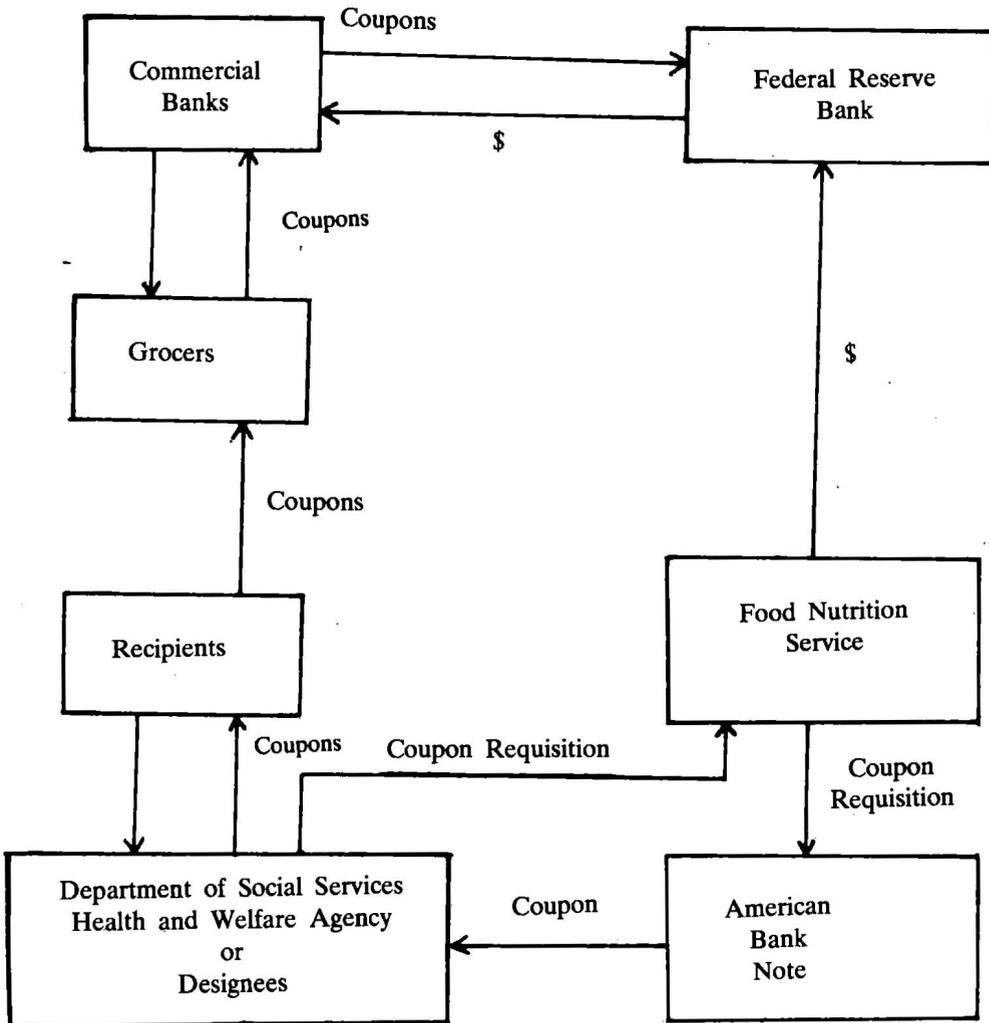
Source : Alter, Rolf and Lane, Sylvia.

Not all grocery stores accept FS because of the cost of cashing coupons in the banks. These banks cash coupons received, at the Federal Reserve Bank which in turn cashes them at the Food and Nutrition Services at the state level. American Bank Note issues the coupons and send them to the Issuance Agents on the country level (See Figure (1).)

The Human Nutrition Information Service of the U.S. department of Agriculture estimates the thrifty food plan which is used as the base for the coupon allotment for the Food Stamp Program. The thrifty food plan (T) is the least costly of the four food plans. The other plans are the low cost plan (LC), the moderate-cost plan (MC) and the liberal plan (L). The four plans provide well balanced diets, but they differ according to family income available for food expenditure, time and skill in preparing meals.

Table (A) – The Food Plans Distribution According to Family Size and Income in U.S.A.

Family Income (000) $	Family Size					
	1 person	2 persons	3 persons	4 persons	5 persons	6 persons
2.5 - 5	T or LC	T or LC	T	T	T	T
5 - 10	MC	LC	T or LC	T	T	T
10 - 15	L	MC	L C or MC	LC	T or LC	T or LC
15 - 20	L	L	MC	L C or MC	LC	T or LC
20 - 30	L	L	M C or L	MC	L C or MC	LC
30 - 40	L	L	L	M C or L	M C or L	MC
40 - more	L	L	L	L	L	M C or L

Source : Peterkin, Betty, Family Food Budgeting for Good Meals and Good Nutrition, SEA, Consumer, Nutrition Center, September 1980. p. 4

As family income increases while family size decreases, the family has better choice to the plan that satisfies their needs and food habits. On the contrary, a family has to follow the thrifty plan as family income decreases or family size increases. The thrifty plan will satisfy their nutritive needs from the least costly sources beside some mainly food habits.

D.   The Mathematical Model :

The recent Thrifty Food Plan (1983) includes quantities of food for children at four ages (1-2, 3-5, 6-8 and 9-11 years), for women at three ages (12-19, 20-50, and 51 and over), and for men at four ages (12-14, 15-19, 20-50, and 51 and over). These ages and sex reflect different needs of quantities of nutritive values.   In the program foods are grouped into 31 groups covering most available foods, either divided according to nutrients availability or prices or other factors.   For examp'e, vegetables are grouped either under high nutrient vegetables or other vegetables.   While fruits are either vitamin C-rich fruits or other fruits. Meanwhile, meats are divided to low cost and high cost meats.

The USDA uses the quadratic programming to minimize the differences between the nutritions and economical food plan and the consumption patterns.   As the USDA believes that the food plan will be most acceptable to households if it disrupts their usual food practices the least.   The computerized mathematical model is used to help minimize the changes that households eligible for food stamps needed to make in their consumption patterns to meet the goal of obtaining a nutritious diet at the cost level of the thrifty food plan.   The program increases the quantities of food sources that contain low fat, cholesterol, calories and sodium.   For example, the dry beans cereal, and flour groups are economical sources of folacin, iron, magnesium, and zinc.   They also contain little or no fat and cholesterol.   Meat although a good source of iron and zinc, and other nutrients, its use is somewhat subset to cost limits.   Fats and sugar groups are inexpensive sources of energy but are less attractive to food plans than are flour, cereal, bread, and dry bean groups, which are better sources of several nutrients.   The thrift food plan rely mainly on potatoes and other fresh vegetables, citrus and other fresh and juices fruits, flour rice, pasta and other bread group, milk and yogurt and a variety of meats.

The Thrifty Food Plan is calculated by applying a quadratic programming model for each sex - age category. The program minimizes costs subject to dietary standard, cost specifications and food group upper and lower quantity limits.

$$\sum_{j=1}^{J} \frac{q_1 (q - x_j)^2}{q_j}$$ or in matrix notation
$$- 2q^{TW}x + x^{TWX}$$

subject to $AX \geqslant b$

$c^T x \leqslant \bar{c}$

$LL_j \leqslant x_j \leqslant UL_j$

where q_1 is the quantity of milk group in the consumption pattern, q_j is the quantity of foods in the consumption pattern. A is a matix of nutritive values while X is a vector of food group quantities which satisfies the objective function and the constraints. $\bar{C}^T$ is the transpose of a vector of prices per pound of food group, meanwhile, C is the upper bound for total food cost. Upper limits (UL_j) and lower limits (LL_j) on quantities of each food group for each sex age category are defined as constraints in the program, q is a vector of food group quantities in the consumption pattern, q^T is the transpose of q. While W is a vector of weights applied to scale the deviations between vectors q and X i.e. W_j equals q_1/q_j are the diagonal elements of W.

The program selects the optimum quantities of the whole food groups that represent a little change from the quantities of the food consumption pattern to meet the specified constraints. The quantity of milk group in the consumption pattern is used as weight to set the changes as percentages rather than changes in absolute quantities of food groups. Therefore, the program minimizes the total change of weighted squared deviations from the amount of food groups in the consumption pattern rather than a large change in one group to meet specifications.

The USDA provides consumers with a sample of a variety of nutritious meals at low cost. These sample meals show how to buy and use food to serve nutritions, and low cost diets to a family of four persons. This family is composed of a man and a woman (20-54 years old) and two children (6-8 and 9-11 years old). Adjustments for individuals in households of other sizes could be done taking into consideration economy of scale factors. The suggested sample meals provide three meals and a snack per day. The meals do not assume a superior skill in shopping and are based on consumers' food habits and price available to them. The meals contain less of foods with little or no nutritional value, such as soft drinks, coffee, and tea and of course no alcoholic beverages. The cost of the sample meals is about $ 58 per week in April 1983 and it is updated monthly by using the percentage change in price indexes of food groups. Indexes for these food are collected each month by representative sample of stores in selected cities across the country for 2400 food items. The updated prices of foods are weighted by the average quantities of foods used by the survey of households to derive prices per unit for the food group. The cost for the food groups for each category are totaled and multiplied by 4.333 to convert weekly costs to monthly costs and rounded to estimate the cost for a month. Participants who generally receive full food stamp allotment, the value of these food stamps is equal to the monthly cost of the sample meals ($ 58 per week). Menus, tips for planning nutritions meals recipes, and food budgeting tips are all available in USDA publications to help homemakers to economize their food expenses and in the meantime purchasing nutritious meals (c)

E.   Estimation of The Effect of Household Size on The Cost of Diets :

Generally less money is spent for food per person in large households than in small ones. This hypotheses have been tested and substantiated in several household consumption international studies. Large

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(c) Kerr and Peterkin (7) and personal meeting with Richard Kerr, Agriculture Research Service, U.S. Agriculture Department, Maryland.

households buy food in larger quantities at lower unit costs, use food more efficiently with less spoliage and waste, and they may be more efficient in food management because of lower per capita income. These hypotheses have not been tested in the consumption pattern in Egypt

The magnitude of these economies can be estimated from the cost of diets among households of different sizes from a family budget survey of 1974/75 and 1981/82 in rural and urban areas in Egypt. Food expenditure was classified by two ways, one by household sizes while the other by household expenditure. Stepwise multiple regressions were run on annual expenditure on food per person with respect to household size, squared household size, total annual expenditure per person and cost of low cost diet for individuals in households not allowing for economy of scale.

The food expenditure per person in households of different sizes was determined when total expenditure per person (proxy to income) was held constant at the means of the total sample. Then household size adjustment based on food expenditure per person in households of different sizes were determined by setting household of four persons equal to one hudred (table 3). It was found that in urban and rural areas in 1974/75 and rural area in 1981/82 that the expenditure on food per person decreased by the increase in household size at an increasing rate. While in urban 1974/75 the cost of food per person increased by the increase of income per person but at a decreasing rate due to increase of household size. In rural 1974/75 the relation was linear and the expenditure on food per individual increased by the increase in income but decreased by the increase in household size at a constant rate. In urban areas in 1981/82 the relation between the cost of food per individual and family size was not significant while the impact of the increase of income was linear on the cost of food per person. The variable of cost of low cost diet for individuals in households not allowing for economy of scale was not significant in rural 1981/82.

From table (4), it was found that the cost of food of a household of size one person will be on average about 110 which means that the person living alone by himself will cost 10% more for food than an individual in a family of four.   Meanwhile for 2 and 3 persons food will cost 6 and three percent more respectively per person than the family of four.   While a family of 5 or 6 individuals and seven or more, the food cost per one will be less by 3 and 5 percent respectively than the cost of food per person in a family of four.

Participants in U.S. receive different amounts of food coupons according to their family size and net income.   The amount increases with the increase of family size but at a decreasing rate as mentioned before.   It also decreases by the increase of net income after adjusting it (Table 2).

In the case of Egypt, participants in the ration books receive equal amounts of tea, oil, sugar and rice.   No differences between regions, but within the region, same amounts are offered to each one.   In Cairo and Giza cities the total subsidy an individual receives through the ration book for the four basic items is about P.T. 74.64[3] per month in 1984, Taking into consideration economies of scale this subsidy will be P.T. 64.45 for a family of six persons or more.   Calculating the toal differences of the subsidy through the ration books with and without economies of scale, it come out to be L.E. 33.3 millions per annum which shows that applying the economies of scale worth to do the changes. And to facilitate the calculations, a table could be distributed to the shops showing the total value of the four items for each family size (table 5).

F. Location of Needy People ;

Head of household demanders of FS in U.S.A must apply to the department of Social Services or designees in their area.   Each household has to fill an application form notifying household monthly cash

income and saving and number of people living in the same home and eat together. The Department receives the filled forms and has to take action within 30 days from the date the form is received. If the demander's gross income is less than certain level of income (table 1) classified according to household size, then she or he is eligible for food stamps and has to fill out another detailed application form by the help of workers at the time of her or his interview. The second form asks for more information about the demander such as : if anyone living in the same home and receive food stamps or any other food programs in the same month or the previous month, full names, birthdates, citizenship, employment condition, students, vehicle owner, saving account. wage earner, name of employer, source of other income, disabled child or adult. rent property taxes, insurance, gas consumption, water electricity, telephone, fuel for cooking and personal helps in house payments.

Those who give false information or trade or sell food stamps, or use food stamps to get ineligible items such as alcoholic drink and to-bacco, Federal law provides that they may be permanently disqualified from the food stamp program. In addition, they may be fined up to $ 10,000 and/or imprisoned for up to five years. Sometimes, the Department asks for witnesses to sign the second form.

Receivers of food coupons have to notify the Department in 10 days if their gross monthly incomes received by household increase or decrease than $25, change of address, anyone moves in or out of the home and changes in properties. If participants fail to report a change and because of this they receive food stamps benefits they are not entitled to, they may have to repay them.

Figure (3) shows from the family budget survey 1974/75-that the percentages of purchases on food items is higher than the nonfood items at low income households in urban and rural areas. The picture was reversed at high income households. The equality of the two items

Figure (3) : Percentages of Expenditures on Food and Non-Food
Items to Total Expenditures.
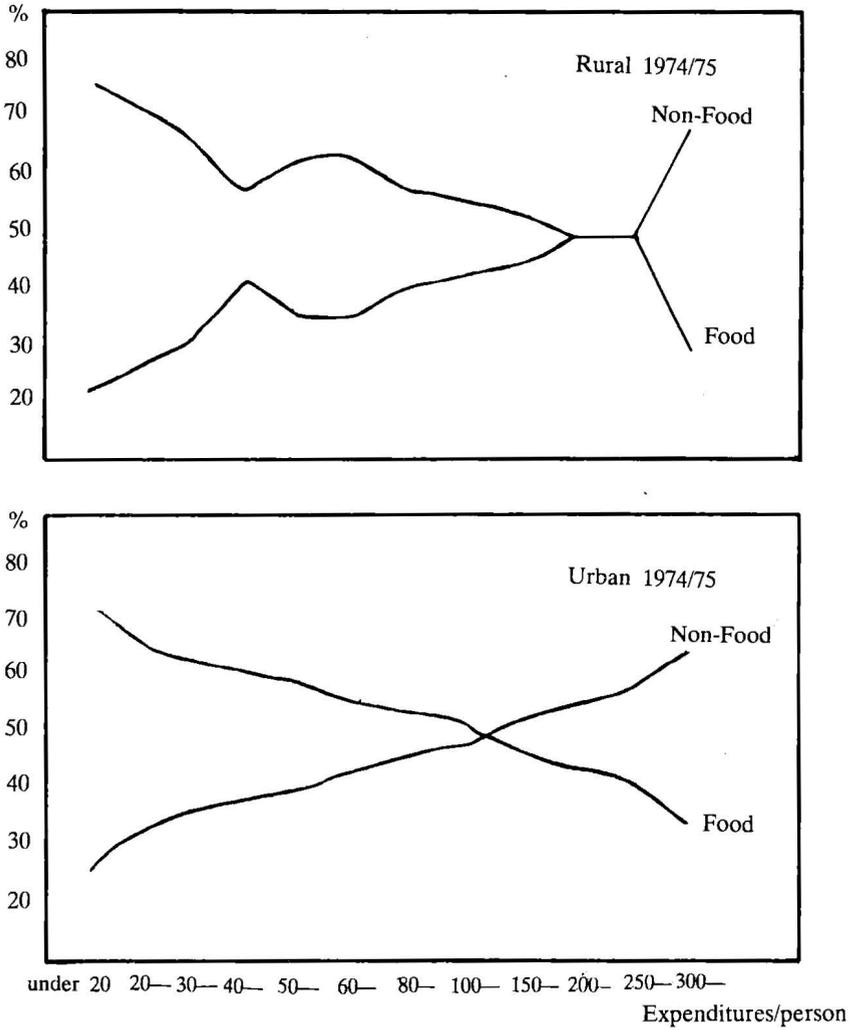
happens at higher income level in rural areas than in urban areas. There-
fore the relation between the two items can show the standard of living
and can be used as a measure to identify the needy people. From the
results obtained previously (see 2) p12) in which came out that the poverty
line in rural Egypt was about LE. 25.8 per person per month in 1981/82
it can verify that at that level of income the percentage of expenditure
on food item is about 60%. Then, it could be useful to be used as an
indicator to poor people as those with that percentage of purchase on
food or more are the people in need of the subsidy.

II. The Theoretical Framework of The Impact of Food Coupons,
Cash Transfer and Price Subsidy on Participants' Expenditure on
Food :

There are two ways to demonstrate the impact of the three food
programs on their participants' behaviour. First, it can be illustrated
by showing the relation between income per household and food expendi-
ture and the different effect of the three food programs on this relation.
In another way, it can be displayed by showing the relation of household
expenditure on food and nonfood purchases before and after joining one
of these food programs.

As it has been shown by Larry Salathe in figure (4) line AB shows
the assumed linear relationship between households income and food
expenditure before participating in any subsidy program. Line CFE
represents the relation between the value of food coupons the household
who is eligible to receive FS and the household's income. The value of
food coupons received per household is constant (CF) at household
income OF', it declines after F' as income further increases and reaches
zero at income E level. That means at zero income, participants receive
OC value of food coupons. In the meantime, their previous expenditure
on food (OA) will be freed to purchase non-food items. Line CD
indicates the level of expenditure on food that provides households with

Figure (4) : Theoretical Framework of FSP

Income per household
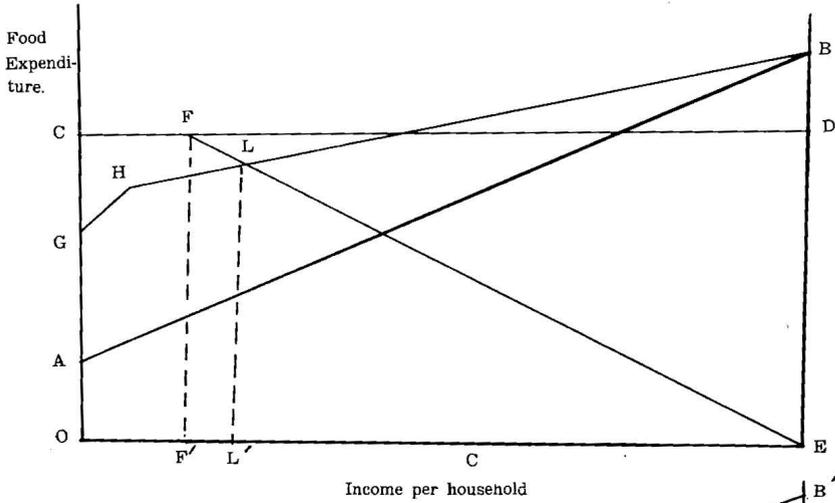
Source : Salathe, Larry E.

Income per Household
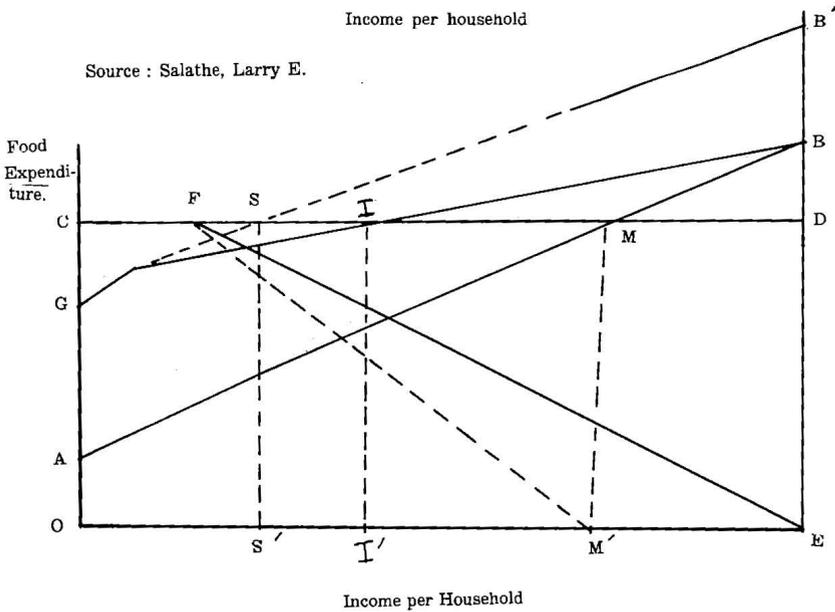
an adequate nutritional level. Assuming that participants will receive the subsidy as cash rather than food coupon - on the same base that cash transfer will decrease after F' income - the eligible participants can allocate the cash on food or non-food items. It is expected that food coupons will cause households to spend more on food and less on other items as food coupons force participants to allocate at least the value of food stamps to purchase of food. Line GHB explains the food expenditure and income relationship after receiving cash rather than food coupons. Participants at zero income receiving cash would spend a total of OG on food in the same way as receiving additional income. This would release from their previous income the amount equal to OA plus GC and would be spent on non-food items. Line CFLB shows the relationship between expenditure and income for FS participants assuming the marginal utility derived from food is greater than zero i.e. households desire to spend more on food than their income permit. From the figure (4) it can be seen that households below L' will spend more on food if they receive coupons not cash. Households with incomes at or above L' can allocate the same amount of income to food and non-food under the two programs.

The unrationed price subsidy program in which participants are all the consumers (the case of Egypt) will cause an upward shift of AB line as consumers are capable of purchasing more food at the same level of income. Assuming a linear relationship between food expenditure and income and a positive marginal utility of food and a uniformed marginal propensity to spend on food out of income, it is expected that A, B' would be parallel to AB line. Participants of FS or cash transfer programs at I' or further level of income would consume food more than the adequate nutritional level by the amount of the area IDB, while participants of price subsidies will consume more by the amount SIDB'. Therefore, the increase in food consumption would be more than the increase by food coupons and cash transfer programs otherwise price subsidy program is rationed or subsidizing only commodities which poor

people eat (inferior **goods**).   Beside the Food Stamps Program and cash transfer should only cover people who are not able to attain the adequate nutritional level i.e. participants further less than M' income.

The effect of the three food programs on households' expenditures on food and nonfood items can be illustrated graphically as shown in figure (5) and explained by Mark Brown and S.R. Johnson (pp 3-5) Line AB shows the households opportunities to allocate their expenditure on food and nonfood items.   Households choose any of the bundles u_1 or u_i or others reflecting their differences in households, composition and other socio-economic conditions.

Participating households in the FSP or cash transfer program would receive a quantity worth AC in food, and have budget constraint ACB'. As the different subsidy programs would affect expenditure pattern in most cases as if it were cash.   This follows that participants choose a consumption bundle to the right of point C along line CB'. If the household chooses point C, it may or may not be equivalent to cash transfer, it will be as unrestricted income transfer. On the other hand, when tangency does not occur, the household would prefer unrestricted income transfer and choose a commoditiy bundle to the left of point C along segment A C.   Thus, if households purchase food valued higher than the level of the food subsidy, they are treating the subsidy as a direct unrestricted income transfer.

Assuming participants will **have** the same preferences over commodities after joining one of the food subsidy programs, then they are allowed to move from indifference curve U_1 to U_2. On the other hand, perhaps participants are aware of the nutritional requirements, then they will shift towards food (from U_2' to U_2) instead of moving from point 1 to 2' as receiving an equivalent unrestricted income transfer.

As Shlomo Reutilinger (pp 46-47) illustrated figure (6) the previous two relations in one graph. The curve OZ shows the income expenditure

Figure (5) : Effects on Household's Expenditures on Food and Non
Food Items Before and after Food subsidy.

Non Food
Expenditure
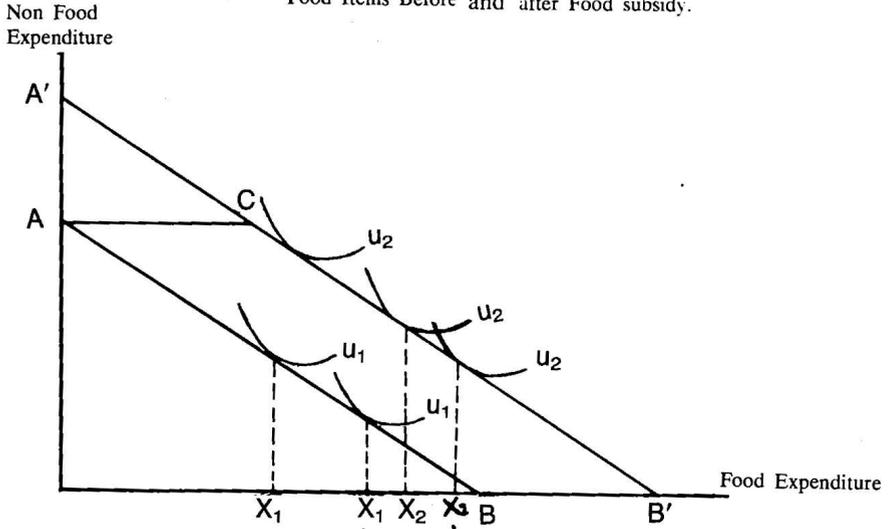
Source : Brown, Mark and Johnson S.R. p. 25.

Figure (6) : The relation Between Food and Non-food purchases and
Income.
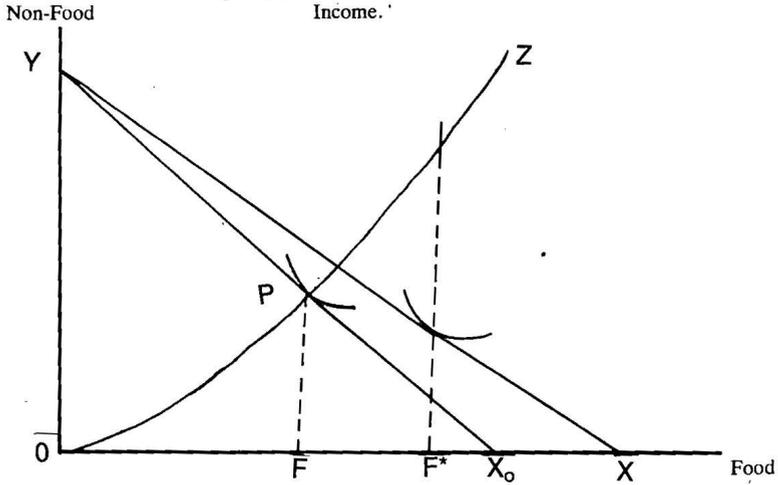
Non-Food

Source : Reutlinger, Shlomo and Selowsky, Marcelo. p. 47

line. It explains the household's preference for allocating increasing levels of income to food and nonfood items given that the price ratio of food and nonfood remains constant.

Introducing one of three food programs would cause an increase of the household's food consumption from his initial level to a higher optimal point of another indifference curve. Measuring the marginal propensity to spend on food (the slope OZ line), income elasticity, income distribution of participant in the range of income induced by the food program would give knowledge about the shape and location of the consumer's indifference map.

As food price subsidy program will shift the budget line Y_0X_0 to Y_0X assuming food consumption has a positive utility, price elasticity of food demand is inelastic. But that program might release part of the household's previous expenditure on food (income effect) to nonfood items.

CONCLUSION

The FSP in U.S.A started in a small area with a very small fraction of participants, then gradually it covered the whole nation. Now approximately 8 percent of the population participate in the program. Therefore, if Egypt will try to apply FSP or would like to reduce the subsidy cost, it should cover only the low income people in small area. It is known that the problem is how to locate those low income people.

Also, if FSP or another subsidy program like the existing one, it should be limited by a certain period (5 years program for example) with the possibility of extending it to another period or not. Beside allowing a semi annual or at least annual adjustment of food coupons allotment or price subsidy by the index number of price would be a reasonable procedure to adjust the program. Also participants are not supposed to continue in the program if they move to a better income line.

Beside subsidy program should differ according to family size applying economy of scale to reduce the program cost. Applying the economy of scale on the distribution of the rationed items in Egypt would reduce the subsidy cost by LE. 33.3 million in 1984.

The study suggests an empirical estimate of the change in the marginal propensity consumption in a sample of post-participants of ration books compared with participants in rationbooks to measure the effect of the quantity received through rationbooks on their nutrition level or to see the differences in the consumption expenditure relationship. It is expected that at high income households, the consumption pattern will not be affected. The only complain that might be raised is the non-capability of purchasing a commodity when it disappears in market while the only way of getting it is through the rationbook. In this case, FS reselling will arise, not because of the existence of two prices for a commodity but to solve the non-availability of the product.

SUMMARY

Advantages and disadvantages of the existing food pricing and distribution system in Egypt have been discussed and assessed in many ADS Working Papers and many Government and International Agency Reports. It seems that policy makers are striving for improving the existing system, and looking for alternatives to eliminate the disadvantages. 3 major alternatives are introduced and discussed in this paper. The first is the Food Stamps (coupons) Program, and the second is the Cash Transfer Program beside the price system. Theoretical discussion of the impact of these alternatives on consumer's choice and welfare is presented.

The first food stamp program was introduced in the U.S. in 1929. The main objective was to absorb the excess of supplies of some agricul-

tural products but later its objective changed to help needy person to attain a certain nutritional level. The current program provides people under the poverty line with free food coupons to buy all kinds of food except alcoholic drinks and tobacco. The allotment of food coupons differs according to household size and income. The amount of FS received per participant decreases by the increase in family size. The program allows a semi annual adjustment of the FS allotment and eligibility to reflect the changes in food prices.

Applying the economy of scale on the distribution of the main four rationed items in Egypt, it came out that an adjustment could be done to decrease the subsidy per person by the increase in the family size as follow :

Ration book with one person   takes subsidy as it is

Ration book with two persons   take subsidy less by 4%

Ration book with three persons   take subsidy less by 6%

Ration book with four persons   take subsidy less by 9%

Ration book with five persons   take subsidy less by 12%

Ration book with six or more persons   take subsidy less by 14%

The total reduction in the subsidy cost would be LE. 33.3 million in 1984.

The theroretical section of the paper discusses, the relationship between household food expenditure and income of participants. Increases in income due to FS would permit participants to spend more on food purchases. In the meantime, part of their previous income will be freed to purchase non-food items. This situation will occur also if a cash transfer will be made rather than distributing food stamps. But under FSP, participants are forced to allocate at least the value of the FS to purchase food.

Footnotes

(1) If two households are helping each other then they are considered as one economic unit although they live under two roofs.

(2) Statistical Abstract of the United States, U.S. Department of Commerce, Bureau of the Census, 1981.

(3) It is adjusted by the index number of prices in the area.

(4) Each person receives. 75kg. of sugar at a price of P.T. 10/kg,. 45kg. oil at a price of P.T. 10/kg., 40 gm tea for P.T. 5.5, 40 gm. tea for P.T. 10.5 and one kilo of rice at a price of P.T. 5/kg The total amount paid is P.T. 33/person/month. It costs P.T. 107.64 at prices in Giza and Cairo cities in 1983/84.

Table (1) - Maximum Gross and Net Monthly Income to Receive Allotment in U.S.

House-hold Size	Max. Gross Income	Max. Net Income	Av.Net Income per head	House-hold Size	Max. Gross Income	Max. Net Income	Av.Net Income Per Head
1	$ 507	$ 390	390	11	2176	1676	152
2	674	519	260	12	2343	1805	150
3	841	647	216	13	2510	1924	149
4	1008	775	194	14	2677	·2063	147
5	1175	904	181	15	2844	2192	146
6	1342	1032	172	16	3011	2321	145
7	1508	1160	166	17	3178	2450	144
8	1675	1289	161	18	3345	2579	143
9	1842	1418	158	19	3512	2708	143
10	2009	1547	155	20	3679[1]	2837[2]	142

Source: State of California, Department of Social Services, Health and Welfare Agency.

(1) Add $ 167 for each additional member

(2) add $ 129 for each additional member.

Table (2) - Monthly Coupon Allotments Based on Adjusted Net Income and
Household size in U.S.

House-Hold Size	Adj. Net zero Income	Adj. Net Income $27-30	Adj. Net Income $61-63	Adj. Net Income $1527-1530	House-hold Size	Adj. Net zero Income	Adj. Net Income $27-30	$60-63	$1527-1530
1	$ 75	$ 66	56	-	11	626	617	607	167
2	139	130	120	-	12	683	674	664	224
3	199	190	180		13	740	731	721	281
4	253	244	234	-	14	797	788	778	338
5	300	291	281	-	15	854	845	835	395
6	360	351	341	-	16	911	902	892	452
7	398	389	379	-	17	968	959	949	509
8	455	446	436	-	18	1025	1016	1006	566
9	512	503	493	53	19	1082	1073	1063	623
10	569	560	550	110	20	1139	1130	1120	680

Source: State of California, Department of Social Services,
Health and Welfare Agency.

Table (3) - The Relation Between Per Capita Food Expenditure and Household
Size in 1974/75 and 1981/82

Expenditure on Food/Person	Intercept	Household Size	Total Expenditure/Person	Household size squared	Correlation Coefficient
Urban 1974/75 (a) by expenditure	43.635		0.286 (9.865)	-0.745 (2.216)	0.993
(b) by household size	46.333	- 6.867 (2.905)	0.293 (4.038)	0.415 (3,236)	0.9997
Rural 1974/75 (a) by expenditure	155.166	-21.838 (5.540)	0.156 (4.358)		0.986
(b) by household size	24.074	-3.495 (5.757)	0.421 (10.752)	0.235 (5.410)	0.999
Urban 1981/82 by governorates	14.960		0.420 (14.640)		0.958
Rural 1981/82 by governorates	226.302	-74.478 (2.575)	0.530 (20.112)	6.487 (2.676)	0.985

Table (4) - Estimation of Cost of Food by Household Size Holding Income Per Person Constant

Urban 1974/75			Rural 1974/75			Rural 1981/82	Index : 4 person = 100			
Number of households	Expenditure on food per person LE	Estimated expenditure on Food Holding Total Expenditure constant	Number of households	Food expenditure LE/person	Estimated Food expenditure holding total expenditure constant	Estimated Food Expenditure Holding Total Expenditure Constant	Urban 1974/75	Rural 1974/75	Rural 1981/82	Average Urban & Rural 1974/75
287	98	80.4	221	59	49.8	261	102.9	116.4	181.3	110
697	85	79.6	330	57	47.0	206	101.9	109.8	143.1	106
801	74	78.9	384	50	44.7	164	101.0	104.4	113.9	103
1149	65	78.1	487	45	42.8	144	100.0	100.0	100.0	100
1285	55	77.4	578	40	41.5	119	99.1	97.0	82.6	98
1219	48	76.7	551	37	40.5	116	98.2	94.6	80.6	96
991	45	75.9	499	35	40.1	126	97.2	93.7	87.5	95
691	43	75.2	374	35	40.1	148	96.3	93.7	102.8	95
453	40	74.4	219	34	40.6	184	95.3	94.9	127.8	95
420	44	73.8	359	43	41.6	233	94.5	97.2	161.8	96

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Table (5   ) Family size, Expenditure on Food and Percentages to
Total Expenditures in 1981/82

Governorates	Urban % on Food	Rural % on Food	Urban		Rural	
			Family Size	Expenditure on Food LE/Person	Family Size	Expenditure on Food LE/Perso
Cairo	47.3	-	4.99	160	-	-
Alexandria	50.9	-	4.96	130	-	-
Port Said	50.1	-	5.65	182	-	-
Suez	53.6	-	5.72	112	-	-
Damietta	56.0	58.4	6.16	116	5.75	176
Dakahlia	56.2	60.9	5.22	150	5.68	114
Sharkia	53.7	59.7	4.73	136	5.95	102
Kalubia	50.0	60.7	5.28	104	5.67	96
Kafr El-Sheikh	55.9	62.1	5.42	156	6.37	120
Gharbia	50.3	59.8	5.09	147	5.80	117
Menoufia	52.0	60.3	5.81	116	5.49	112
Beheira	54.8	65.2	6.13	152	7.06	131
Ismailia	50.4	60.0	5.75	173	5.67	138
Giza	56.0	58.3	4.95	153	5.67	159
Beni-Souef	49.7	68.7	5.34	144	5.42	87
Fayoum	56.8	61.2	5.13	117	5.83	97
Minia	53.8	64.5	5.56	111	4.71	114
Assiut	55.4	61.0	5.58	105	5.52	103
Souhag	53.2	62.1	5.10	123	5.53	104
Kena	52.0	53.2	5.41	149	5.48	110
Aswan	51.1	61.1	5.23	134	5.17	106

Source: Family Budget Survey 1981/82.
Central Agent of Public Mobilization and Statistics

Table (6): The percentages of Households' Expenditures On Food and Non-Food Items. 1981/82.

Location	Urban			Rural		
	1964/65	1974/75	1981/82	1964/65	1974/75	1981/82
Lower Egypt						
Food	54.5	52.7	53.1	63.0	60.1	61.1
Non-Food	45.5	47.3	46.9	37.0	39.9	38.9
Upper Egypt						
Food	53.1	51.5	52.0	63.8	63.7	60.5
Non Food	46.9	48.5	48.0	36.2	36.3	39.5
Cairo						
Food	48.2	49.1	47.3	-	-	-
Non Food	51.8	50.9	52.7	-	-	-
Total Egypt						
Food	53.8	52.1	52.6	63.4	61.9	60.8
Non Food	46.2	47.9	47.5	36.6	38.1	39.2

* Preliminarly data

Source: Family Budget Surveys, Central Agency For Public Mobilization and Statistics, 1964/65, 1974/75 and 1981/82.

Table (7): Percentages of Number of Rationbooks
For Different Sizes of Households In
Rural Areas in 1980

Goreernrates	Percentage of Number of Rationbooks For Households of Sizes						Total
	One Person	Two persons	Three persons	Four persons	Five persons	More than 5 persons	
Giza	4.4	10.2	11.7	15.6	24.0	34.1	100.0
Klubia	10.2	14.4	15.3	15.9	11.3	32.9	100.0
Port Saed	3.5	6.9	8.8	12.0	12.6	56.2	100.0
Ismalia	5.1	10.2	12.2	14.9	18.5	39.1	100.0
Domiatta	4.2	10.6	14.7	13.8	14.2	42.5	100.0
Dakahlia	5.6	12.7	13.3	14.6	15.2	38.6	100.0
Sharkia	7.2	13.1	11.7	14.4	16.8	36.8	100.0
Garbia	6.8	12.5	12.1	13.8	20.7	34.1	100.0
Menoufia	9.0	14.0	13.3	14.1	16.7	32.9	100.0
Behera	4.4	11.7	10.2	12.6	16.3	44.8	100.0
Kafer El-Sheigh	5.2	10.1	12.5	14.3	26.0	31.9	100.0
Bani Souef	8.1	13.8	15.3	20.7	14.3	27.8	100.0
Fayoum	4.3	11.6	16.2	17.2	17.1	33.6	100.0
El-Minia	5.7	14.4	15.5	15.5	20.8	28.1	100.0
Assuit	4.6	11.1	13.3	13.2	18.7	39.1	100.0
Souhag	4.2	9.3	12.3	13.2	14.7	46.3	100.0
Kena	3.8	11.5	15.1	16.1	20.3	33.2	100.0
Aswan	6.9	13.7	14.2	13.2	15.1	36.9	100.0
Marsa Matrouh	5.8	4.4	8.0	9.0	10.7	62.1	100.0
El Wadi El-Gadeed	6.9	16.2	11.0	14.3	11.3	40.3	100.0
Total	5.9	12.3	13.2	14.7	17.9	36.0	100.0
Total Ration-books	231913	480817	517484	575559	697489	1408153	3911415
Total Parti-cipants	231913	961634	1552452	2302236	3487445	10674131	19209811

Source: Ministry of Supply.

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Table (8):   Percentages of Number of Rationbooks
For Different Sizes of Households In
Urban Areas in 1980

Goreernrates:	Percentage of Number of Rationbooks For Households of Sizes.						Total
	One, person	two persons	Three persons	Four persons	Five persons	More than 5 persons	
Cairo	9.1	10.4	12.6	16.8	20.4	30.7	100.0
Giza	6.5	10.0	12.9	17.3	17.6	35.7	100.0
Klubia	6.7	8.6	17.7	15.6	14.0	37.4	100.0
Alexandria	9.4	12.5	19.2	14.6	14.0	30.3	100.0
Port Saed	11.5	18.7	15.5	16.4	15.1	22.8	100.0
Ismalia	9.8	14.0	14.0	13.4	18.3	30.5	100.0
El-Suize	8.1	11.0	11.8	14.0	15.6	39.5	100.0
Domiatta	6.9	13.1	13.7	15.5	15.2	35.6	100.0
Dakahlia	7.1	16.0	13.6	13.5	15.7	34.1	100.0
Sharkia	9.3	15.9	14.6	14.4	15.3	30.5	100.0
Garbia	6.8	9.1	12.8	16.5	17.4	37.4	100.0
Menoufia	8.7	12.0	12.4	13.9	15.1	37.9	100.0
Behera	4.8	10.0	9.7	11.8	21.1	42.6	100.0
Kafer El Sheigh	7.8	12.1	14.1	15.0	17.9	33.1	100.0
Bani Souef	12.7	16.8	20.2	17.8	13.6	18.9	100.0
Fayoum	8.7	13.0	15.2	15.5	19.0	28.6	100.0
El-Minia	6.6	15.8	14.4	16.8	16.3	30.1	100.0
Assuit	6.4	13.2	14.8	14.6	16.6	34.4	100.0
Souhag	5.6	11.3	11.9	14.9	17.5	38.8	100.0
Kena	6.6	13.0	14.4	15.5	19.7	30.8	100.0
Aswan	8.7	12.4	14.5	15.9	16.2	32.3	100.0
Marsa Matrouh	5.3	7.7	9.0	12.3	14.1	51.6	100.0
El-Wadi El-Gadeed	11.8	11.3	9.6	15.2	10.4	41.7	100.0
El-Baher El-Ahmer	6.0	10.1	13.3	15.6	14.9	40.1	100.0
Sinaa El-Shamalia	16.7	9.7	9.8	11.6	12.0	40.2	100.0
Total	8.3	11.8	14.2	15.6	17.4	32.7	100.0
Total Ration-books	323198	462982	557526	611078	683262	1278924	3916970
Total Parti-cipants	323198	925964	1672578	2444312	3416310	9821659	18604021

Source: Ministry of Supply.

Table (9): Differences of costs of Ration Books in Egypt 1984 with and without Economy of scale

Household Size	Subsidy/person with economy of scale Pt/ month	Differences with and without economy of scale Pt/month		Differences in Total ration books month/LE		Total value Paid by consumers in the ration book LE/month	
		Person	Ration book	Rural	Urban	with out econ. of scale	with econ. of scale
One	74.64	-	-	-	-	0.33	0.33
Two	71.93	2.71	5.42	26060	25094	0.66	0.71
Three	69.89	4.75	14.25	73741	79447	0.99	1.13
Four	67.85	6.79	27.16	156322	165969	1.32	1.59
Five	65.81	8.83	44.15	307941	301660	1.65	2.09
Six +	64.45	10.19	61.14	860945	781934	1.98	2.59

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