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Food Price Subsidy and Malnutrition Problems

Impacts of Economic Liberalization on Food Demand and

Dietary Adequacy

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ABSTRACT

There is a strong trend in this era among most of the developing countries towards economic liberalization and free market application. Egypt is a representative country as a case study that has passed several steps towards this direction. Such trend has impacts on the household welfare during the transition period of transformation, particularly on food consumption and, in turn, on the dietary adequacy of the low income people. It was found that such movements of free price food will cause a deficiency in protein quality (net protein utilized). Such deficiency will be harmful to vulnerable groups whom are going to be productive adults in the future. From the sustainable development view, it is important to secure adequate protein of good quality for those groups, till the economic growth due to liberalization reaches the level enough to make the low income households able to purchase the adequate protein of better food commodities such as milk and eggs or fish.

The study recommended that during the transforming transition period, there should be a social role of the governments. The theme of the government role should, in general, the implementation of gradual, target-oriented nutritional programs. Such programs could reduce the political and budgetary costs associated with competitive market pricing of wheat, and at the

same time improve the well-being and nutritional status of the poor. The target-group oriented policies would generally be more cost-effective than a general food subsidy.

The study specified these programs as short-run programs, which are "*school lunch program*", Enriched bread program and food stamps program. Also the study identified the theme of the long-run programs which are: To give more attention to legumes in agricultural development plan, To give more emphasis in the research towards genetic improvements in the protein characteristics of cereals and other staple food crops and To orient the animal products sector development policy towards the production of milk, poultry products and fish, rather than red meat as animal protein sources that fulfill the economic principals **(comparative advantage),** as well as, the social objective of the food policy.

INTRODUCTION

Most if not all countries are moving rapidly towards economic liberalization. Egypt is a reprehensive case study, which passed several positive steps along this way. Therefore, the study's policy implications will be suitable for many other developing countries, particularly in Middle East and Africa.

For a long time **(about two decades)**, government intervention in Egypt's food economy was extensive and complex. Major food items such as cereals, beans, cooking oil, sugar, and to some extent meat are subsidized through consumer prices. The subsidy policy goals of the government of Egypt were to provide a low cost of living to match to be comparable to contemporary low wage rates in order to reach social equity for the population. Many factors have accentuated food demand. The high demand growth relative to production, increased: he reliance on food imports. Increased quantities of imports and higher international prices have caused serious economic difficulties for the government.

Economic liberalization has become effective since 1986. Its ultimate goal is to eliminate entirely the food subsidy as well as all other subsides and provide the suitable conditions of the economy that make the comparative advantage be effective. Simply, the principal of the comparative advantage will allocate the resources for the food products which can be produced at the international costs **(or less)** without subsidy and let others which are produced locally at higher cost levels to be imported and sold in the local market at the boarder prices. The expected increase in food prices causes a decrease in the quantity purchased by households due to the demand relations. The impacts of such changes in the economic policies on the demand for major food commodities and the nutritional adequacy, and associated indirect impacts on the standard of living are the objectives of this paper. The nutrition adequacy for all population classes is a social goal of the sustainable development, even, under free economy system. Finally, the paper discusses and proposes alternative policies which might improve nutritional status and achieve the social goals of the development. The major food items that are concerned in this paper are cereals, legumes, oils and sugar, because they represent the bulk of the Egyptian diet and they are major items affected by eliminating the price subsidy.

METHODS

Estimation of energy and protein requirements:

Average daily per capita energy requirements by sex and age group of moderate activity is adopted from estimates by the Food and Agricultural Organization **(FAO)** and the World Health Organization **(WHO)**.[1] The population structure was derived from the published data of the 1986 population census of Egypt by **CPMAS.**

Protein requirement is estimated using the Protein/Energy Ratio **(P: E)**, i.e. the percentage of total calories that come from protein **(evaluated as eggs and milk protein)**. However there are

strong evidences that such recommended ratio by **FAO** is too low for long term maintenance of a normal adult in developing countries. Acute infections are quite frequent among underprivileged populations, particularly, young children, which implies the need of protein above the recommended level to allow for rapid repletion before the next acute episode worsens the degree of depletion. [2] Further adjustment of the protein requirement is also recommended [3] for, a predominantly, vegetal protein diet as is the case in many developing countries. Therefore, 12% E.P. ratio is applied in this study as a base to estimate the minimum recommended protein level for each population category.

Estimation of energy and protein dietary intake:

The average per capita food consumption of each food item is deducted from the food balance sheet of Egypt published by the Ministry of Agriculture of Egypt **(Central Administration for Agricultural Economic and Statistics).** The average daily per capita energy consumption was derived based on the calorie content of each food item [4]

The protein intake is calculated as gross protein **(GP)** in grams, based on the protein content of each item and the Net Protein Utilized **(NPU)** is derived from GP by using the **(B.V.)** of each food item per capita consumed. [4]

Estimation for food demand relations:

Demand relations are adopted in this study using the estimates of the direct price elasticities and all other cross elasticities. The concerned food commodities in this study are classified as grains group, which includes wheat, maize and rice, as substitutes, and the food commodities outside that group which are sugar and fats and oils. The third group is the aggregate nonfood expenditure. With respect to food grains group, the direct price elasticities and the cross elasticities among the grains prices are derived from previous studies (5, 6, and 7). The cross elasticities estimates between grains and other food commodities outside the grains

group as well as other nonfood group are estimated using the Frisch model [8] *which is presented by the following equation:*

(Cross Elasticity) $_{ij}$ - (Income Elasticity) $_i$ * W $_j$ { 1 + (Income Elasticity) $_i$

$\overline{\qquad\qquad\qquad\qquad}$

(Marginal Utility of Money) }

Where i and j are commodities symbols and W_j represents the ratio of expenditure on commodity j to the total expenditure.

Application of this model is required to estimate the income elasticities of the concerned commodities. The available most recent data were those of the household budget survey of 1981 conducted by **CAPMAS**. The best fitted model estimated for the income consumption relationships, i.e. **(Engle's curve)**, was the double log. Function. The marginal value of money .vas taken from previous research.[5]

Retail price changes:

The changes in retail price of each concerned commodity was estimated as the difference between the retail price in 1986 **(the base year of economic liberalization scheme)** and the boarder price of imports at the retail level to express the expected free market prices. The later is calculated as the average world imports price per Kg. of each commodity using the free exchange rate at that year. To make such price compatible at the retail level the marketing margin of the concerned commodities are added and the differences between the two prices are made as percentage from the base year **(current)** price.

Net impacts of the free price movements on food consumption:

The relative percentage change in per capita consumption is derived from the demand -elations estimates (demand elasticities) and the relative changes in retail prices, using the following equation:

Relative change in consumption= Σi * Δ pi+Σ (€ ij * Δpj)

Where ϵ_i = Direct price elasticity of the food commodity i, ϵ_{ij} = the cross elasticity of the effect of the price change of commodity j on the consumption of the commodity i; Δ_{Pi},

and Δp_{ij} are the percentage changes in the retail price of the commodity i and the commodity j, respectively.

RESULTS AND DISCUSSION

Changes in nutritional pattern between seventies and eighties

Table 1, presents a comparison between nutritional level and pattern in 1974/75 and 1385/86, i.e. over one decade. It is apparently, clear that there was a significant improvement of average per capita dietary intake. The energy intake was increased by 25% and the net protein utilized intake by vegetables and fruits increased significantly at the expenses of wheat. Wheat importance in energy intake was 53% in 1974/75 and decreased to 38% in 1985/86, even though its consumption level was increased from about 150Kg to 161 Kg. The gross protein level over the concerned period increased from 75.6 grams to about 85.6 grams associated with an increase in net protein utilized from about 47.7 grams to about 53.6 grams between 1975 and 1986, but the quality of protein intake did not improve. The average weighted Biological value of protein in 1974/75 was about 62.9% and it reached 62.6% in 1985/86. This improvement was mainly due to the increase in both fish and poultry consumption level but not the red meat or milk consumption.

Table 1: Comparison between the average per capita nutritional pattern in seventies versus eighties in Egypt

Food item	1974/ 1975		1985/ 1986	
	Kcal.	%	% Kcal.	%
Wheat	1,448	53.1	1,296	37.7
Rice	258	9.3	306	8.9
Maize	347	12.7	656	19.1
Legumes	76	2.8	75	2.2
Fats & Oils	255	9.3	320	9.3
Sugar	151	5.5	248	7.2
Animal Products	125	4.6	295	8.6
Vegetables &	69	2.5	241	7.1
Total	2,728	100.0	3,437	100.0
	Grams	%	Grams	%
Vegetal Protein	64.7	85.5	72.6	84.6
Animal Protein	11.0	14.5	13.2	15.4
Total	75.7	100.0	85.8	100.0
Protein Quality		62.9		62.6
Net Protein Utilized	47.7		53.6	

It is important to mention that the grains are still the main food group in the Egyptian diet. This group provides 68.2% of the total energy and 73.5% of the net protein utilized. Accordingly, the expected increase in the prices of these commodities will cause significant effects on the dietary adequacy.

Relative impacts of free economy system on food consumption:

   Table 2, presents the estimates of the direct demand price elasticities and all other cross elasticities of the major food items and relative increase in the retail price of each commodity which result in the relative change in per capita consumption of all concerned food commodities in negative except that of maize. The relative magnitude of decrease in per capita consumption varies between 13.25% for wheat to 52.4% for oils. The demand for maize is expected to increase by about 16%, to substitute the important indicator to think about making bread from a mix of corn and wheat.

Table 2: Relative change in per capita food consumption due to economic liberalization derived from demand relations matrix and expected price changes.

Food item	Estimates of direct and cross demand Elasticities for food and nonfood items						% Change in per capita consumption
	Wheat	Rice	Maize	Legumes	Sugar	Oils & Fats	
Wheat	-0.29	0.27	0.29	0.004	-0.013	-0.28	-13.25
Rice	0.34	-0.54	0.21	-0.004	-0.016	-0.046	-39.18
Maize	0.17	0.14	-0.19	-0.002	-0.006	-0.017	+15.80
Legumes	-0.002	-0.001	-0.001	-0.46	-0.002	-0.004	-45.21
Sugar	-0.01	-0.002	-0.002	-0.002	-0.516	-0.22	-34.75
Oils	-0.033	-0.23	-0.007	-0.007	-0.024	-0.75	-52.39
Non-Food Groups	-0.027	-0.012	-0.001	-0.011	-0.041	-0.09	-11.41
Retail price PT/Kg.:							
Current	23	25	25	39	32	34	
Free	40.1	42.9	31.9	77	43.7	56.3	
% Increase in Retail Price Due to liberalization	74	72	28	97	37	66	

Impacts of free market economy on dietary availability:

Table 3, shows that the movements of the major food items towards the international prices under free economy will decrease the daily per capita dietary calories availability by 613 Kcal., i.e. by 18% from that level under subsidized prices. The decrease will extend also to protein availability, which decreases by about 5.4 grams of net protein utilized, i.e. by about 10% of the intake under subsidized prices. How does such decrease in dietary availability affect the dietary adequacy? This is examined in the following section.

Table 3: Impacts of economic liberalization on Egyptian per capita daily intake of dietary energy and protein

Food item	Annual Per capita consumption before Economic liberalization	% change in per consumption due to (Kg) economic liberalization	Change in per capital consumption	Change in daily per capital intake	
				Kcal.	Net protein utilize (grams)
Wheat	161.0	-13.34	-21.48	-206	-4.1
Rice	31.0	-39.18	-12.14	-120	-1.3
Maize	66.0	+15.80	+ 10.50	+104	+ 1.6
Legume	7.5	-45.21	-3.39	-32	-1.2
Sugar	23.4	-34.75	-8.13	-86	00.00
Oils & Fats	13.3	-52.39	-6.97	-169	00.00
Total				-613	-5.0

Source: estimated by using tables 1 and 2.

Impacts of free market economy on dietary adequacy

Table 4, shows the balance of the average daily per capita caloric and protein at both the subsidized prices and market prices of the major food items. The average caloric intake is above the recommended level. The percent of surplus is about one-third of the intake. There are some evidences that most of this excess energy is simply wasted or utilized as animal feed.([6]) The high caloric intake was mainly due to the food subsidy policy, particularly, when we compare Egypt with other countries in the

same income range.

Therefore, the expected decrease in average daily per capita intake from calories due to economic liberalization would not be harmful, i.e. to make the dietary adequacy below the safe allowances. In fact the free prices would rationalize the intake towards more healthy level. In quantity, the surplus will be about 17%, which may cover the expected variability in the requirements due to the type of work.

Table 4: Impacts of economic liberalization on nutrition adequacy for per capita daily requirements in Egypt

Criteria	Kilo-calories		Net protein utilized (gm)	
	At subsidized prices	At free market prices	subsidize Price	At free market price
Intake	3.437	2.824	53.6	48.6
requirements	2.351	2.351	66.1	66.1
Surplus or Deficit	+903	+473	-12.5	-17.5
(%) of difference i	+38.4	+16.7	-23.3	-36.0

Source: Estimated from table 3 and the requirements were calculated as shown in the text.

Impacts of free market economy on dietary protein adequacy

As shown from table 1, most of the Egyptian energy and consequently, the protein "take are from vegetal sources. Therefore, an adequate caloric intake does not ensure that protein requirements are met for households or individuals. Protein quality is very important. After adjusting the consumption scale and the protein quality intake according to the B.v., and the bulk of vegetal sources, as well as the higher safe allowances needed for the developing :countries, it was found that the intake is not enough to meet the protein requirements, not :~:y under

free market conditions, but the deficit is also exist under subsidized prices.

Table 4, shows that under subsidized prices the deficit in the daily dietary net protein Utilized was about 23% of the intake and such gap would enlarge to be about one-third of the -take under free market economy.

Impacts of liberalization of the food prices on consumption of nonfood commodities

The household welfare is not only determined by the level and quality of the daily diet but it is also based upon the adequacy of other nonfood items. According to the family budget survey data of CAPMAS of the year 1981, the food expenditure was 54% of the total expenditure and the nonfood expenditure was 46%. From table 2 it is clear that liberalization of the food prices will take a portion of the budget that should be allocated for nonfood items which is estimated as 11.5%. If the real income has not been raised enough (about 5.3% per year) to compensate such decrease in nonfood expenditure there would be deterioration in The welfare level, in addition to that, the average weighted inflation in the food bill for the Concerned food commodities would be about 16%, i.e. additional growth in the per capita income is needed of about 4% per year. In total it is not possible to induce an annual economic Growth of about 9%, i.e. about 12% in the gross domestic product (by adding a population growth of 3%). This result will lead us to the social role of the government under free economy conditions.

Social role of government and dietary adequacy

The theme of the government should, in general, be the implementation of gradual, target- oriented nutritional programs. Such programs could reduce the political and budgetary costs associated with competitive market pricing of wheat, and at the same time improve the well-being and nutritional status of the poor. The target-group oriented policies would generally be more

cost-effective than a general food subsidy.

Increasing the availability of food does not automatically result in nutritional improvement for all income groups. Low-income consumers may spend a large part, and in some cases all of their income on food, yet be unable to afford a nutritionally adequate diet.([9]). Hence, a policy aimed at reducing the food gap may require more than a simple increase in agricultural production. In addition a country planning long-term food availability is based on the national average figures for projected national food demand, which does not reflect the income distribution pattern. A previous research work([5]) showed that 50% of the urban population and more than 70% of the rural population are suffering from protein quality deficiency. Even, for the population segments that have a dietary gross protein which covers the requirements, it is mainly of vegetal nature. Such consumption of the available diet may provide adequate protein for adults through the ***"Complementary effects of the Amino Acids"*** of the gross protein. However under the conditions of stress of any kind, either infections or populations... etc., it requires a diet higher in protein value than that supplied by cereal-based food, particularly for low income people.

In developing countries, the majority of the populations are within the categories of the vulnerable groups. Those are infants, young children, pregnant and lactating women.

The continuing high prevalence of protein malnutrition among children is quite clear once the intake is less than the requirements. There are basic evidences that they are the most vulnerable group suffering from malnutrition. The traditional diet is frequently so bulky that they have difficulty in eating enough of it to meet fully either caloric or protein needs, not only the recommended allowances for healthy children, but also to cover the needs for those suffering from ether infection diseases, particularly low income groups.

On the other hand, once the good quality protein such as

animal products are of high income elasticity. The higher income will make the households able to have more protein and to cross the gap of deficiency. Therefore, the economic development under free market conditions on the long run will create enough economic growth to deal with the root of the problem. However, there are sustainable numbers within the vulnerable groups who will not receive sufficient incomes in the near future. Waiting a generation or two for creation of enough economic development to do away with protein malnutrition, means acceptance of continued high morbidity and mortality and of the impairment of physical and mental performance of future adults, upon whom economic and social development depends.

Role of government on short-run

During the transitional period of the developing economy from central planned to free market, there is a need for a specific action programs **"a crash program"** for securing the nutritional status of the vulnerable groups.

School lunch program is urgently needed or, in fact, renewed as it was in fifties and sixties. The suitable rich protein sources for such meal should be milk (the cheapest animal protein source at international prices) mixed with grains as a cake and enriched with dates to cover the deficiency in iron that suppose to be in this meal. This suggestion for developing countries should start now and continues for some years till the free market positive impacts become effective.

Enriched Bread program is another short run plan that should be taken into consideration. One option is to supplement the cereal with peanut or soy-preparation, both are high in protein content. The latter alternative raises the importance of evaluating the nutritional impacts of the two alternative uses of soybeans: either for poultry feeds (the present situation) or as a processed food for human consumption (it is well known in American countries as a nutrition dish).

Food stamps program is a program which tends to provide supplementary food purchases only for low-income people. It is also an income relief policy because of the substitution of bonus stamps to purchase food. The characteristics of the program are similar to the negative income tax system and benefits could be allocated according to family size and income

Role of government on long-run

__Giving more attention to legumes in agricultural developments,__ It is apparent that with the continuing rapid increase in world population, the developing governments found that it is easier and cheaper to provide the basic staple, whether it is, a cereal or a starchy root, then to increase legumes, oilseeds or animal proteins. These food items, rather than, cereals are more important sources of protein to complement cereals in diets. Legumes in particular are the cheapest source of protein and the most concentrated energy source. It should be mentioned that the free market prices will, drastically, decline the per capita consumption of legumes by 50% (Table 2).

__To give more emphasis in the research__ towards genetic improvements in the protein characteristics of cereals and other staple food crops, because the grains are still the bulk of the Egyptian diet.

__To consist between economic and social objective of development,__ The study showed that the deficit in protein quality will affect negatively, mainly the vulnerable groups, whom are in need of cheap concentrated high nutritive value protein. The suitable sources of protein that fulfill such Goals are milk, Fish and Eggs. The optimum resources allocation under economic liberalization, will give priority to these target products at the expenses of red meat, because They also satisfy the comparative advantage principal, i.e. to be produced, locally, at compatible international costs level and create the highest profit.[9]

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