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CONSEQUENCES OF CHANGES IN SUBSIDY
POLICY IN EGYPT*

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Summary

The size and welfare impact of the government budget allocations for subsidies in Egypt, as in a number of other developing countries, have become a focus of attention and controversy both internally and for international assistance agencies. The conventional diagnosis, which has been reinforced by recent analyses, has been that a reduction in subsidies will reduce both the balance of payments deficit and the price inflation which are characteristic problems. There are, however, a number of different dimensions of subsidy policy and it is shown here that the effects obtained from modifications along one of these dimensions may be quite different from changes in other directions. These results are generated by the use of a general equilibrium model constructed for the Egyptian economy.

The type of subsidy reduction whose results are most unambiguously deflationary is an increase in the official selling price which reduces the subsidy rate paid by the government. If the goods are rationed, i.e. if, at both the original and the new selling price, the quantities made available are not sufficient to satisfy the demand at that price, a change in the subsidy rate will not reduce the quantity purchased. But the higher price, and reduced subsidy rate, will increase the total consumer expenditure for the rationed and subsidized commodities and, thus, reduce the income available for expenditure in other ways. Reductions in private and government spending generate the deflationary effects ascribed to the subsidy reduction. As the levels of economic activity fall, imports are also reduced and there is a deflationary effect on prices. The effects are, in a general way, the same whether or not the subsidized goods are produced competitively in the domestic economy and whether or not the subsidy is provided through direct sales to consumers or through production subsidies to producing firms, so long as the goods are rationed.

The impact of these changes in worsening the nutritional status of the lower income groups in particular has been emphasized.

Yet even a simple subsidy rate reduction will have differential effects on the various classes and types of income recipients and consumers. This is due to their differential participation in and reliance upon the subsidized goods for their consumption. Since, in Egypt, the urban population participates in the subsidy program more than do rural groups, a reduction in subsidy rates would affect them most strongly. Lower income groups, as can be inferred, also would suffer more than upper income groups.

Suppose, however, that subsidies are lowered by decreasing the quantities of goods made available in the ration shops, supplied either from imports or from required deliveries of such goods from domestic production at an official price. Such a policy might also result from a straight forward desire on the part of a government to reduce imports and government expenditures. In this case subsidy reduction means that fewer goods are available to consumers at the prevailing subsidized price. The effects of this type of policy are quite different from the foregoing. Expenditures which would have been made on the subsidized goods in the ration shops spill over on to the products of the domestic economy and, conceivably, depending on government policy, on to uncontrolled imports from abroad. If there is some degree of supply responsiveness in the domestic economy, there will be a real increase in output as a result. So the effect will be to stimulate the economy.

It can generally be expected, that there will be a reduction of the foreign trade deficit as a result of a policy of decreasing the supply of subsidized goods to consumers. Although the increase in domestic output generates some new imports, that does not offset the original effect. The government budget deficit is also reduced by this type of policy, not only because of the reduction

in expenditures on subsidies but also because of the improvement in the levels of overall economic activity increases tax yields. The price effect of this policy does tend to be inflationary. This is in part just the result of moving up rising supply curves as costs rise with increasing production of the output which substitutes for the loss of the subsidized goods. This effect would be reduced by more elastic supply response. But the price increases are also part of the macroeconomic adjustment necessary to raise income to bring saving and investment into equality.

The distributional consequences of this latter type of subsidy policy are rather different from the former. In this case, the induced increases in agricultural output shift income toward that sector and as well, more than proportionately to the lower income groups there.

The alternative approaches to subsidy reduction therefore provide a contrast between expansion and contraction as policies for stability and growth even when balance of payments difficulties require new adjustments.

The policies tested here were "pure" ones, either a change in subsidy rates or in the quantities provided. "Mixed policies which are combinations of the two alternatives, would have mixed effects. The general equilibrium model solutions provide many interesting and important details as well as general lessons, some of which have already been mentioned. It should be noted that the results are generally but not completely symmetric to reductions or increases in subsidy rates or quantities. The differences have their major source in the relative ease of expanding or contracting domestic production. Thus an increase in the quantities of subsidized goods supplied from imports

ceteris paribus, will tend to worsen the balance of payments deficit, increase the government deficit and deflate the domestic economy.

It would be mistaken to think of changes in subsidy policy as simple economic tools. Just as clearly it would be desirable to have a clear set of economic priorities in making subsidy policy. If the primary objective is a reduction in the trade deficit, that can be accomplished in more than one way: it is not necessary to deflate the economy to do it, if there is some responsiveness in domestic production. Analogously, a reduction in the government deficit might or might not be associated with attempts to reduce price inflation via subsidy policy.

The advantages of a general equilibrium analysis of economic policy become clearer from this particular application as the approach makes detailed perceptions possible which otherwise could not be achieved. If the perceptions reveal complications not previously appreciated, that is just the beginning of wisdom.

Consequences of Changes in Subsidy Policies in Egypt

I. Introduction

One of the features of the Egyptian economy which is among the most striking and also the most controversial is the role of government subsidies. There are production subsidies and consumption subsidies which are direct expenditures from the government budget and there are indirect subsidies created by fixing the prices of the output of some government enterprises below their true scarcity value. There are difficulties in measuring the effective magnitudes of all three types, especially of the latter, but; in whatever manner they are tallied, the subsidies have a significant impact on the government budget, the balance of payments and consumer welfare.

It is not surprising that subsidy policy in Egypt is controversial. There is a macroeconomic debate because the subsidies, both direct and indirect, contribute to the government deficits which are financed by central bank credit and foreign capital. There are arguments that these deficits are major contributors to the domestic inflation. The subsidized use of some commodities requires imports and/or discourages exports and, thus, helps generate balance of payments deficits. There are microeconomic effects on the production side as the subsidized prices may induce inefficient use of resources. On the consumption side, the subsidies are an important device for maintaining minimum levels of consumption but the distribution of benefits reflects the virtual absence of control over access to the subsidized commodities.

International lenders typically generate macroeconomic skepticism about the subsidy program and, domestically, there is disputation as to the

allocation of benefits and the political consequences and social justice of any modifications in the present system. It is generally conceded that the riots of 1977, which are a political landmark, were set off by a sudden, major change in subsidy policies. After abandoning those changes, subsidy levels have subsequently been reduced on most commodities but subsidy policy still generates contention.

There have already been insightful macro and microeconomic studies of the effects of reduction in consumer subsidies and the contribution of those subsidies to the nutritional well being of Egyptians.¹ However, a number of issues remain to be investigated. As will become clear, the existing studies, without revealing their limitations, deal with only a small range of actual and potential policies. Since the controversies mingle macroeconomic as well as microeconomic issues, an analytical approach is required which can operate at both levels. Such a capability is one of the virtues of the general equilibrium models (GEM) which have been developed for the Egyptian economy.² The models will, therefore, be used here to study subsidy issues.

The next section contains a qualitative discussion of the subsidy system. Section III describes the design of tests of changes in subsidy policy. Section IV presents the results of the application of the GEM models to obtain quantitative results in tests of changes in subsidy policy.

II. The magnitude and distribution of subsidies.

The subsidy system in Egypt is a complex one, composed of direct production and consumption subsidies and indirect subsidies resulting from control of prices of public enterprises at levels below scarcity values. In Egypt the direct consumer subsidies and production subsidies are created when government trade or marketing authorities sell to consumers or producers at prices less than their costs. The subsidies are, therefore, measured by the difference between the revenues gained from the sale of the subsidized goods and the costs of purchasing them. In principle indirect subsidies generated by public sector enterprise selling at prices below costs could be measured in an analogous manner but that has not been attempted. The Social Accounting Matrix (SAM) in Table I prepared for 1976 provides a partial illustration of the variety of these subsidies and indicates some magnitudes for that year. The direct production subsidies to each sector are shown in line 30, columns 1 through 12 of the SAM. In only two sectors, #5, the food processing industries, and #6, the textiles industry, are these subsidies at all large in absolute terms but in these sectors they amount to slightly less than 12 per cent and 10 per cent, respectively, of the value of gross output. In the other sectors, the direct production subsidies are, typically, less than two per cent of the value of gross output.

Direct subsidies to consumers

The difference between the costs of provision of subsidized commodities to consumers and the revenues from their sales does not measure the contribution to welfare of the subsidy program yet it provides some perspective on the effects of the direct subsidy program. According to the SAM the costs of the purchases by the government for direct subsidies, indicated in the Government Trade and Government Trade Import rows for the Household sector were 79 and 216 million Egyptian pounds respectively in 1976. Since subsidies to the Household sector

amounted to 168 million pounds, the revenue from sales to the Household sector by government supply authorities was 127 million pounds (E£ 295 - E£ 168). The ratio of 127/295 indicates that the sales price was 43% of the cost of providing the subsidized commodities. It may be noted that this cost includes not only the purchase price paid by the government authorities but also the distribution costs. Thus, on the average, direct subsidies to consumers lowered the cost of buying the subsidized group of commodities by 57 per cent. Table 2 provides additional insight as to the significance of the direct subsidies to consumers. Lines (1) and (2) give summary descriptions of the income distribution data in the SAM. Line (3) indicates the direct subsidies paid per person in the various income brackets and line (4) shows the subsidies as a percentage of income for each person in each income bracket. It should be noted that the direct subsidies were allocated among income groups in proportion to their expenditures on each commodity.

It is strikingly clear from Table 2 that both income and subsidies were concentrated in urban areas with 66 per cent of income and 81 per cent of subsidies being received in this part of the economy. Thus, subsidies per person and as a share of income were much higher in urban than in rural areas. Yet, it is also true that taxes and net transfers from the private sector to government, the latter consisting of the net payments into the social welfare system, were also substantially higher in urban than in rural areas as demonstrated in lines (5) and (6) of Table 2.

There is some progressiveness in the tax system as shown in line (6) of Table 2 by the larger percentages of higher incomes which were taxed away in both urban and rural areas. But the progression in the tax system alone was

Table
SOCIAL ACCOUNT
FOR EGYPT
(MILLION)

(Σ1-12)

SECTORS RECEIVING DELIVERING SECTORS	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	
	STAPLE FOOD	NON-STAPLE FOOD	COTTON	OTHER AGRICULTURE	FOOD PROCESSING INDUSTRY	TEXTILE INDUSTRY	OTHER INDUSTRIES	CONSTRUCTION	CRUDE OIL & PRODUCTS	TRANSPORT & COMMUNICATION	HOUSING	OTHER SERVICES	TOTAL INTERMEDIATE	TOTAL FINAL DEMAND	U. LOWEST 60%	U. MIDDLE 30%	
1. Staple Food	45 6722	-	-	-	179.6283	-	-	-	-	1.3611	-	10.18230	238	217	22.0	13.5	
2. Non-Staple Food	1,676.13	37,25629	0.47003	5.91269	350.7248	1.05422	0.38918	-	-	0.61618	-	17.61671	416	852	179.6	186.6	
3. Cotton	-	-	0.40303	-	1.53937	73.09589	0.00489	-	-	-	-	-	-	75	160	1.6	0.3
4. Other Agriculture	64.58846	282 05030	9.92237	2.13755	5.95715	34.46759	1.86421	-	-	0.61798	-	0.27845	392	72	14.3	16.4	
5. Food Processing Ind.	-	39 82283	-	-	141.30160	3.77228	9.60896	-	-	2.17375	0.00846	93.21643	290	1232	324.5	275.1	
6. Textile Industry	1,83642	0.05167	3.29803	0.02107	1.41447	310.59280	1.30919	1.11537	0.22304	0.26195	0.02569	53.05054	373	512	79.9	97.2	
7. Other Industries	9,35269	0.18335	2.91491	0.21883	1.54634	13.57468	164.4493	11.28970	9.00784	8.51700	0.16177	70.89040	292	1100	95.6	99.1	
8. Construction	-	1,17015	0.13579	-	0.67014	1.77580	0.99110	0.57402	2.42426	9.24410	5.66571	14.45822	37	599	-	-	
9. Crude Oil & Products	12.73104	30.59438	3.91501	2.00618	3.41795	12.06315	11.03780	30.66330	127.4586	35.36494	-	80.81433	355	254	21.9	18.4	
10. Transport & Comm.	0.20957	0.40542	0.21384	0.02967	0.54438	2.08350	0.68208	2.16599	0.21176	2.10867	0.00697	31.34770	40	537	30.0	45.4	
11. Housing	0.03204	0.01099	0.01148	0.00192	1.00936	0.65231	0.40390	0.79597	0.41906	0.35143	-	8.31325	10	132	16.7	39.4	
12. Other Services	2.90146	16.47459	7.71460	0.67209	31.34575	33.86751	10.25930	335.3957	12.25550	26.38286	2.13139	488.03130	968	2150	208.3	223.2	
13. Total Inputs Σ 1-12	130	408	29	11	719	487	201	382	157	87	8	867	3486	7817	994.4	1014.6	
14. VALUE ADDED	317	806	202	438	164	330	669	254	324	454	134	2049	6041				
15. U. Lowest 60%	0.0	0.0	0.0	0.0	40.566	94.863	86.788	36.260	0.928	52.356	34.076	631.429					
16. U. Middle 30%	0.0	0.0	0.0	0.0	45.179	89.870	89.106	35.473	28.425	61.263	40.122	646.964					
17. U. Top 10%	0.0	0.0	0.0	0.0	64.255	92.267	98.106	98.267	45.648	79.381	50.801	683.607					
18. R. Lowest 60%	135.140	289.890	90.312	180.294	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
19. R. Middle 30%	87.207	240.066	58.509	128.291	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
20. R. Top 10%	79.652	225.044	53.179	129.415	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0					
21. HOUSEHOLD VALUE ADDED	302	755	202	438	160	277	274	170	75	193	125	1962	4923				
22. Gov. & Pub VALUE ADDED	15	61	-	-	14	53	295	84	249	261	9	87	1118				
23. Gov. Conventional																	
24. Gov. Trade					25								25		20.2	15.2	
25. Gov. Trade Imports	12	37	10	8	391							94	652		50.7	45.2	
26. Other Imports	7	22	4	16	9	47	435		66	61			656		16.5	30.4	
27. TOTAL IMPORTS	19	59	14	23	425	47	435		66	61		94	1208				
28. Imp. Tariffs	1	6			166	12	100		42				326				
29. IND. TAXES					205	65	35		15			20	340		37.9	39.2	
30. Subsidies (-)	-12	-10	-10	-8	-182	-66	-3		-8	-15		-12	-346		-63.8	-48.4	
31. Gov. Transfers															78.7	94.3	
32. Div. Taxes					25	30	65		13			100	223		6.2	33.7	
33. Σ 28-30																	
34. Priv. Savings															-96.8	-96.2	
35. Gov. & Pub. Savings																	
36. Gov. Conv. Deficit																	
37. Gov. Trade Deficit																	
38. Foreign Finance																	
39. Change in Stocks																	
40. TOTAL SAVINGS																	
41. GROSS PROD	455	1268	235	464	1522	885	1392	636	809	877	142	3118	11303		1043	1126	
POPULATION (Mill)																	
Income Shares															0.3002	0.31	
Population Shares																0.664	
Per Capita Income															81.497	176.84	
Income per Earner															260.79	563.11	

*Source: Eckaus, R. S., McCarthy, F. D. and Mohie Eldin, A. (1979)

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Table 1

L ACCOUNTING MATRIX
FOR EGYPT 1976 *
(MILLIONS £E)

G1 G2 G3

16.	17.	18.	19.	20.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.	37.	38.	39.	40.	41.	
U. MIDDLE 30%	U. TOP 10%	R. LOWEST 60%	R. MIDDLE 30%	R. TOP 10%	TOTAL HOUSEHOLD	GOV. & PUB. SECTOR PURCHASES	GOV. CONVENTIONAL	GOV. TRADE	PRICE DIFF.	EXPORTS	TOTAL EXPORTS	IMPORT TARR.	IND. TAXES	SUBSID.	GOV. TRANS.	DIR. TAXES	PRIV. INVS.	GOV.'S PUB. INVS.	GOV. CON. INVS.	GOV. TRADE INVS.	FOREIGN INVS.	AS	TOTAL INVS.	T.T. GROSS PRODUCTION		
13.5	5.3	22.6	7.1	4.5	76		14	95	17		17															
186.6	110.7	114.0	65.8	53.3	710		60	28	4	49	53												18	16	455	
0.3	0.4	1.8	0.6	0.5	5			100	55		85								1				1	1268		
16.4	11.8	7.2	4.3	2.0	56					16	16														235	
275.1	140.4	234.6	100.6	70.8	1146		60			26	26												10	10	464	
97.2	55.1	38.2	30.9	25.7	327		27			109	109												46	49	1522	
99.1	60.3	45.1	23.3	18.6	343		268			89	89								3				40	49	885	
-	-	-	-	-	-																		400	400	1392	
18.4	9.4	11.8	4.7	2.8	69		35		100	49	149												599	599	635	
45.4	170.8	7.8	6.3	4.7	265		100			172	172												1	1	609	
39.4	55.3	4.4	3.9	8.3	126		4																		677	
223.2	182.7	78.1	83.4	76.3	802		1013	12		171	171												122	122	142	
1014.6	772.2	565.4	310.9	268.5	3928		1571	265	176	681	857												1065	113	3118	
																										6647
										65.1																1043
										89.9																1126
										93.0																1305
										25.42																721
										20.46																535
										18.12																603
										310	310															6233
																										1414
																										1324
15.2	7.8	19.9	11.4	4.7	79			768		119	110	477	469		378											1012
45.2	31.9	44.1	29.4	14.7	216								21													768
30.4	89.3	11.8	19.5	18.7	125+																					1172
					341																			391		1940
					60																			91		477
39.2	31.1	19.3	15.0	7.5	150																					490
-48.4	-23.6	-12.9	-9.8	-9.5	-168		145	358																		-
94.3	123.0	-	-	-	296																					296
33.7	70.7	3.7	15.1	25.6	155																					378
																										-
-96.2	202.8	89.9	143.5	172.8	394	1414	-393	-389																		394
																										1414
																										-389
																										-389
											654															654
																										-
1128	1205	721	635	503	6233	1414	1324	1012	176	1110	1940	477	490	-	296	378				1687		113	1680		1680	
0.399	2.133	10.130	5.069	1.690																						
0.3241	0.2757	0.4099	0.3042	0.2859																						
0.658			0.442																							
176.965	611.814	71.112	106.544	297.633																						
563.10	1867.80	227.56	337.74	962.43																						

48

TABLE 2

Income Shares, Direct Subsidies, Net Direct Subsidies, Taxes and Transfers
by Income Class in 1976*

	Urban			Rural		
	Lowest 60%	Middle 30%	Upper 10%	Lowest 60%	Middle 30%	Upper 10%
(1.0) Distribution of total household income (%)	19.93	21.52	24.94	13.78	10.22	9.61
(2.0) Distribution of sectoral household income (%) by sector	30.02	32.41	37.57	40.98	30.42	28.60
(3.0) Subsidies per capita (¥E)	+4.99	+7.56	+11.06	+1.27	+1.93	+5.62
(4.0) Subsidies per ¥E of income	0.06	0.04	0.02	0.02	0.02	0.02
(5.0) Taxes and Transfers per capita	-9.59	-26.12	-105.39	2.26	5.94	19.59
(6.0) Taxes per ¥E of income	-0.12	-0.15	-0.17	-0.03	-0.06	-0.07
(7.0) Net Subsidies Taxes and Transfers per capita	-4.61	-18.57	-94.33	-1.00	-4.00	-13.96
(8.0) Net Subsidies Taxes and Transfers per ¥E of income	-0.06	-0.11	-0.15	-0.01	-0.04	-0.05

*Plus signs indicate net subsidy; minus signs indicate net taxes.

slight; the per capita income in the top urban income bracket was 5.7 times the per capita income in the lowest urban income bracket. Yet the share of taxes on income paid by the top income bracket, at 17 per cent, was only about 40 per cent more than the 12 per cent average tax on income in the lowest urban income bracket. The situation was generally the same in rural areas. Interestingly, most of the progression in both urban and rural areas was between the lowest and the middle income brackets with only a slight degree of progression from middle to upper income brackets.

The effect of direct subsidies in changing the impact of the fiscal system is shown in lines (7) and (8). The larger subsidies, per capita, received by the middle and upper income groups, as compared to the lowest income group, had the effect of making a larger absolute reduction in the burden of the fiscal system for the former groups. But, since subsidies are a falling proportion of income as income rises, the direct subsidy program increased markedly the net progressiveness of the fiscal system. On balance the net effect of the direct subsidy and tax system together was to place a heavier burden on urban dwellers than on persons in rural areas.

There are indications that the character of the subsidy system has changed somewhat. Table 3, reproduced from a paper by Professor Lance Taylor, shows the changing composition of the budgetary allocations for commodities supplied under the direct subsidy system.³ Wheat, wheat flour, and maize have always and still do account for the major part of direct subsidies. The reductions in government expenditures on these commodities was due entirely to the drop in world prices. As shown elsewhere by Taylor, the physical quantities purchased and distributed have increased continuously from 1973 to 1978. The most striking change in the composition of subsidized goods supplied directly to consumers has been in the increasing provision of frozen meat. Although there is no doubt

Table 3
Budgetary Allocations for Major "Supply" Commodities (LE million)*

<u>Item</u>	<u>1973</u>		<u>1974</u>		<u>1975</u>		<u>1976</u>		<u>1977</u>		<u>Projected 1978</u>	
	Values	Per cent	Values	Per cent								
Wheat	70.8	67.1	194.1	64.7	135.1	45.5	152.3	55.6	117.5	36.1	127.6	32.1
Flour	8.2	7.8	27.0	9.0	27.6	9.3	25.8	9.4	31.6	9.7	19.6	4.9
Corn	4.4	4.2	16.5	5.5	29.2	9.8	23.1	8.4	40.6	12.5	49.2	12.4
Lentils	0.6	0.6	2.2	0.7	6.3	2.1	9.0	3.3	9.4	2.9	14.6	3.7
Beans	0.3	0.3	0.7	0.2	5.2	1.8	6.0	2.2	2.0	0.6	6.0	1.5
Fats and Oils	20.7	19.6	59.4	19.8	91.2	30.7	57.4	21.0	84.9	26.1	95.9	24.1
Frozen meat	-	-	-	-	0.5	0.2	-	-	20.4	6.3	37.0	9.3
Frozen fish	0.5	.5	-	-	2.0	0.7	0.2	0.1	0.4	0.1	2.3	0.6
Tea	-	-	-	-	-	-	-	-	18.3	5.6	45.6	11.5
	105.5	100.0	299.9	100.0	297.1	100.0	273.8	100.0	325.1	100.0	397.8	100.0

*From Lance Taylor, Food Subsidies in Egypt, October 1979, MIT

that all income classes benefit from this last addition to the subsidy program, middle and upper income groups benefit most because the lower income groups cannot afford to take advantage of the subsidized supply to the same extent.

There are several immediate implications of these simple comparisons. One is that any across-the-board reduction in subsidies would have had a greater impact on the lower rather than on the upper income groups because the subsidies are a larger proportion of the incomes of the low income groups. An across-the-board reduction would also have reduced the purchases by the lower income groups of the "luxury" food items because they would need to increase their expenditures on bread, flour and legumes in order to maintain consumption levels of these basic components of their diets. Thus, if existing progressiveness of the fiscal system in 1976 were not to be lost by changes in the subsidy program, the changes must be designed to also reduce the participation in the program by the upper income groups or increase the benefits going to low income groups or there must be compensating tax changes. Since there is no means or "income" test for access to the subsidy program, and since, presumably, such a test is not administratively feasible, there are only a few ways in which the subsidy program can be modified to maintain progressiveness in the overall fiscal system if subsidies are reduced. For example, restriction of the amounts of meat and fish provided through the subsidy program to the relatively low levels at which consumption occurs in the lower income groups would maintain this component of the diet of these groups but reduce the subsidization of the upper income groups.

Some microeconomic effects of reducing the subsidy program have been analyzed previously by Taylor who concluded that, even with compensating

macroeconomic policies, the elimination might reduce food consumption among the poor by 100-200 calories per day. Without compensating policies, the reduction in caloric consumption would be much more severe.⁴ On the other hand, the maintenance for a number of years of fixed prices for major subsidized commodities has lowered their relative prices substantially in the face of general inflation. There can be little doubt that this has promoted some undesirable substitution and wastage of these commodities although it is difficult if not impossible to know how significant that is. The stories about feeding subsidized bread to chicken and livestock cannot be added up to a quantitative estimate.

Production subsidies

An inspection of the SAM indicates that of the LE 514 million in total subsidies in 1976, LE 346 million were production subsidies rather than subsidies which were paid more or less directly to consumers through sales in the ration shops. Only the production subsidies have an explicit effect on market prices as distinct from the controlled prices of directly subsidized commodities. Determination of these effects requires a detailed analysis but some rough orders of magnitude can be inferred from the SAM. Table 4 indicates the ratios, in per cent, of subsidies to the value of gross production in 1976. Production subsidies were concentrated in the agricultural, food processing and textile sectors. The four agricultural sectors accounted for 11.6 per cent of total production subsidies; food processing alone received 52.6 per cent, mainly for baking bread; and the textile sector received 24.9 per cent. Altogether these sectors received 89.1 per cent of total subsidies, which was 6.3 per cent of the total value of the output of these sectors plus the value of government trade imports which also supplied the subsidized commodities. This average is somewhat misleading, however, as the subsidies were concentrated on a relatively few items, which are the most important components of the sectors' sales.

TABLE 4

Share of Subsidies in Prices of Producing Sectors (per cent)
in 1976

Sector	
1 Staple food	2.6
2 Non-staple food	0.8
3 Cotton	4.3
4 Other agriculture	1.7
5 Food processing industries	12.0
6 Textile industry	9.7
7 Other industry	0.2
8 Construction	-
9 Crude oil and products	1.3
10 Transport and communication	2.6
11 Housing	-
12 Other services	0.4

The SAM does not indicate the distribution of the consumption benefits of the indirect subsidies. A separate calculation, essentially using the same method employed to distribute the benefits of the direct subsidies, has been done with the results shown in Table 5.

Line (1.0) presents the estimates of production subsidies for consumption distributed across income classes and line (1.1) indicates the percentage shares of the total received by each income class. The production subsidies are larger than the direct subsidies for all rural income groups but this is true only for the upper ten per cent of urban income recipients. For purposes of comparison the total direct subsidies and their distribution across income classes are reproduced from Table 2. It can be seen that rural groups receive a larger share of production subsidies than urban groups although this result may, to some extent, reflect the method of allocating the subsidies rather than the reality. In particular, subsidies to the food processing industry as are other production subsidies are allocated according to expenditures on its products. But most of the subsidies to this industry actually go to bread bakeries to which access is more limited in rural than urban areas. On the other hand rural groups benefit in the same way as urban groups in most of the other production subsidies. The effect of the differences in the distribution of the benefits of production subsidies is to make the total subsidy system more redistributive than the direct subsidies alone.

When production subsidies are added to the net direct subsidies, taxes and transfers as shown in Table 2 the effect is to reduce the net burden on all groups in absolute terms and to substantially increase the progressiveness in the system. This reinforces the argument made above that subsidies generate most of the progressiveness in the Egyptian subsidy, tax and transfer system. Thus, any change which is contemplated in the system must take into account not only the overall budget effects but the equity implications as well.

TABLE 5

Distribution of Production Subsidies, Direct Consumption Subsidies
Taxes and Transfers Among Income Classes in 1976*

	Urban			Rural			Total
	Lowest 60%	Middle 30%	Upper 10%	Lowest 60%	Middle 30%	Upper 10%	
(1.0) Production Subsidies ₹E	52.0	48.1	26.7	35.0	16.8	12.6	191.2
(1.1) Distribution	27.2%	25.2%	13.9%	18.3%	8.8%	6.6%	
(2.0) Direct Subsidies ₹E	63.8	48.4	23.6	129.9	9.8	9.5	168.0
(2.1) Distribution	38.0%	28.8%	14.0%	7.7%	5.8%	5.7%	
(3.0) Total Subsidies to Consumers	115.9	96.5	50.3	31.2	26.7	22.1	359.2
(3.1) Distribution	32.3%	26.9%	14.0%	8.7%	7.4%	6.2%	
(4.0) Production Subsidies Per Capita	4.1	7.5	12.5	3.5	3.3	7.4	
(5.0) Production Subsidies Per ₹E Income	.05	.04	.02	.05	.03	.03	
(6.0) Total Subsidies, Taxes & Transfers Per Capita	-.51	-11.07	-81.83	2.5	-.7	-6.56	
(7.0) Total Subsidies, Taxes, & Transfers Per ₹E Income	-.01	-.07	-.13	.04	-.01	-.02	

*Minus signs indicate net taxes.

Indirect subsidies resulting from public enterprise pricing policies

As noted earlier, there are indirect subsidies which result from the sale of output of public enterprises at prices below their scarcity values. There are obvious examples in the petroleum, electricity and housing sectors in which dual price systems exist with substantial sales at a price less than a market price and, in some cases below costs. For example, since petroleum and its products are internationally traded commodities and foreign exchange is scarce, the internal scarcity value of a barrel of crude oil or a gallon of gasoline is equal to the value of the foreign exchange which could be earned from its sale. In fact, however, the domestic price of oil products is one-third or less of the international price. Electrical power is not an internationally traded commodity but, to the extent that costs are unduly low because fuel is under-priced, unit costs and prices based on them are also too low. Public housing is also provided at rental rates far below any free market rental. The hidden subsidies on petroleum and electricity are available to all buyers. The subsidy involved in public housing is restricted to just those fortunate enough to obtain an apartment in a public project.

The SAM, in itself, cannot identify such indirect subsidies as it adjusts market prices only in those cases in which direct subsidies appear. The underpricing of goods and services which occurs when public enterprises or authorities forego charging scarcity prices and, as a result, make smaller profits than otherwise, or take losses, is not shown in the SAM explicitly. It is reflected in a lower amount of government and public enterprise value added than would otherwise be the case.

III. The microeconomic theory and the design of tests of changes in subsidy policy

A. Adjustments in direct subsidies to consumers

General equilibrium models are necessary for the analysis of subsidy policy as the effects of a change in one sector will reverberate in other sectors as substitution takes place in response to relative prices or availabilities, when goods are rationed. Changes in real incomes will also generate reactions in other sectors. One of the consistent macroeconomic results of previous analyses of price subsidies using such models is that a reduction in subsidy levels may depress an economy.⁵ This result, obtained both for direct and indirect subsidies is, in some respects, counterintuitive, and appears to contradict earlier results obtained using simpler models of the effects of food aid in developing countries.⁶ Thus it is desirable to make more explicit the accounting and the theory of the policy tests to be made.

The apparent simple rationale for the previous results, obtained through the complex calculations of the models, is that a reduction in direct subsidies, is, in effect, a decrease in disposable income of consumers and in government expenditures. The decreases in consumption and government demands depress overall levels of economic activity. A reduction in indirect subsidies, i.e. those going to producing firms, increases prices and also reduces real consumption with effects which flow through the rest of the economy. There is no doubt that both the calculated results and the rationalizations of them are correct for the particular manner in which the tests were made. As will be shown, however, the conditions which generate the results are rather special.

In contrast to the rationale above, it is well recognized that the provision to a developing country of food grains, which compete with domestic production, will lower both prices and domestic production and have a generally depressing effect on an economy. This can be offset only by a conscious government policy of stimulating total demand so that both the subsidized supply the the pre-existing domestic supply are absorbed.

This type of "foreign aid" is, in terms of its market effects, roughly equivalent to the provision of consumer goods at subsidized prices as practiced by the Egyptian government. A reversal of the process, i.e. a reduction in the supply of goods, as explored in the previous test, would have a reverse effect. By this reasoning, a reduction in direct subsidies would stimulate rather than depress the economy.

Both of the above arguments can be true only if they do not apply to the same conditions and, on inspection, that turns out to be the case. The tests which have previously been done with the GEM models on the effects of subsidy reduction change only the total value of subsidies and make no adjustment in quantities supplied. Yet, the latter adjustment was an integral part of the second story described above. Two different kinds of policy packages are being compared and give two different results, which should surprise no one.

Subsidy policy can rely on price or quantity instruments or a combination. For example, one of the motivations for subsidy reduction is to decrease government spending and the associated government deficits. That might be achieved under certain conditions simply by increasing somewhat the price at which subsidized goods are sold. That may or may not affect the quantities provided under subsidy, depending on the policy directives and, especially, on whether the goods continue to be rationed.

A different type of policy is the reduction of the quantity of goods provided under subsidy. The objective, sometimes pursued under the pressure of international lending agencies, may be the reduction of imports to alleviate a balance of payments deficit and/or government budget deficit. Or there may be a domestically generated intent to reduce dependence on foreign assistance to which the imports of subsidized goods contribute. Whether prices or quantities are adjusted, it has been clear for some time that the omission of real changes in supply as part of food supply policy may omit much of what is interesting and important.

One feature of the accounting in the Social Accounting Matrix, which is an essential part of the GEM structure, lends itself to the omission of the supply aspects of subsidy policy. All imports are treated as if they were non-competitive. That means that exogenous changes in the quantity of imports such as may be induced by subsidy policy changes will not operate within the model either to augment or displace the demand for domestic production. If such changes are to take place, they must be imposed on the system.

Still another aspect of the accounting in the GEM might be misleading as to the effects of subsidies on consumer expenditure and deserves clarification. In calculating the disposable income of consumers which can be spent on domestically produced goods, the direct subsidies on consumer goods are added as if they were positive transfer payments which supplement disposable income. The expenditures by government on subsidized goods are subtracted, to take into account the fact that the amounts available for domestic expenditure on unsubsidized goods must exclude the spending on subsidized goods. For each income class the relevant part of the term which defines total consumer expenditure on non-subsidized goods is defined as:

(Earned income - taxes - transfers to government - savings + direct subsidies - government expenditures on subsidized goods)

Direct subsidies are the difference between the amounts paid by consumers and the amounts paid by the government in buying the goods for distribution to consumers. The expression for subsidies and government expenditures when restated in algebraic terms which distinguish prices and quantities is:

$$- (P_s Q_s - P_g Q_s) - (P_g Q_s)$$

where: P_s = the price paid by consumers for the subsidized goods;

P_g = the price paid by government in buying the subsidized goods
for distribution

Q_s = the quantity of subsidized goods.

Government traded goods purchased both domestically and abroad have been aggregated for purposes of this simple demonstration.

The term in the first parenthesis is negative as payments by consumers for subsidized goods are less than the payments by government. Thus, with a minus sign in front of the first parenthesis, making the whole term positive, subsidies appear to become a transfer payment to consumers. The term in the second parenthesis is, again, simply the government expenditures on subsidized goods.

It can be seen that the algebraic expression reduces to $-P_s Q_s$. Thus, the net effect of adjusting consumer incomes by adding subsidies and subtracting government expenditures on subsidized goods by the government, though somewhat hidden, is only to subtract all consumer expenditures on subsidized goods. Subsidies are not really treated as if they were a positive transfer payment to consumers, although on first glance it may appear so. Rather, subsidized purchases are subtracted from total consumer spending, as if consumers made their decisions on such purchases prior to and without regard to other types of expenditures.

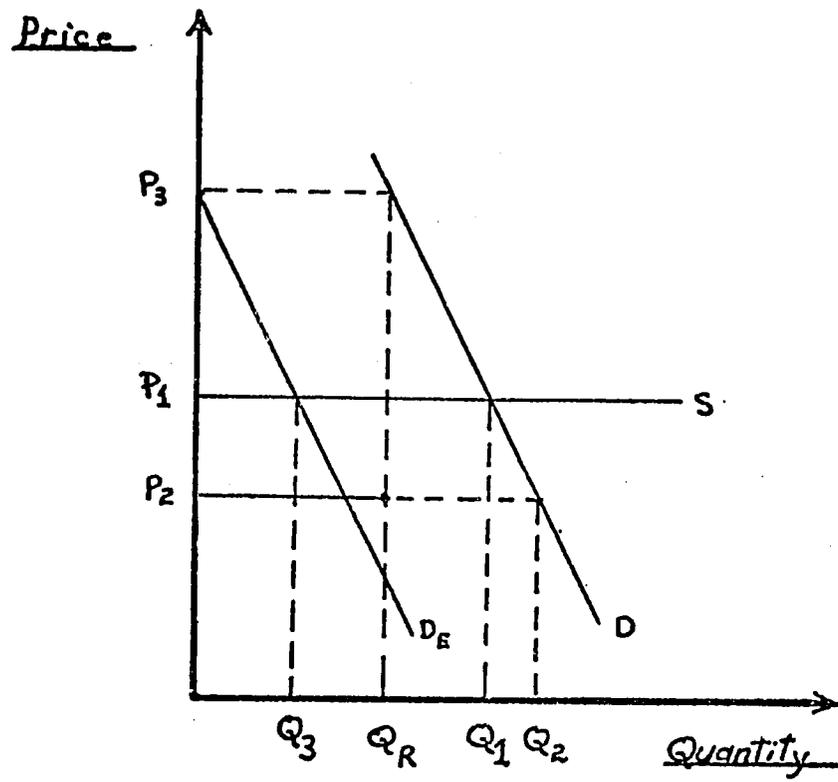
The foregoing discussion suggests that there are issues which deserve clarification and, thus, the potential usefulness of a modest amount of microeconomic theory in order to make explicit the reasoning involved in the accounting and to carefully design tests of the effects of subsidy policy changes. The theory to be used is conventional supply and demand, "partial" equilibrium analysis, thus no attempt will be made to capture sectoral interdependence. While that might be attempted in a simple model,

it is cumbersome even in a simple model as the effects of rationing have to be taken into account.⁷ The partial equilibrium approach will, in any case, suggest the issues which will be resolved in the general equilibrium model computations which will be reported.

Figure 1 represents what is, perhaps, the simplest case: a foreign supply of goods for which there is no domestic production, such as tea and coffee. The supply schedule is perfectly elastic at price P_1 since Egypt is a "small country" whose demand has no significant effect on world prices. The government supply authority purchases the commodity at P_1 and sells it to consumers at P_2 , with a subsidy of $P_1 - P_2$ on each unit. If the amount Q_2 demanded at P_2 were purchased and resold to consumers, no non-price rationing would be necessary. If only $Q_R < Q_2$ were purchased and resold, then Q_R would have to be rationed by cards, queues or some other device. In this case, there is an excess demand, D_E , which would result in imports of Q_3 at price P_1 unless the government exercised quantitative controls over such imports.

In the case represented by Figure 1, if there is rationing such as at Q_R , it is possible to change administered prices between P_3 and zero without any corresponding changes in quantities purchased and sold by government authorities if only direct - or partial equilibrium - effects are taken into account. At selling prices above P_1 there would be no subsidy and there would have to be quantitative controls over imports to maintain the government price as non-government imports would have a lower price.

Changes in the selling price of the subsidized commodity when it is subject to rationing do not involve any quantity changes in imports or demand. If the price is subsidized but the commodity is not rationed, then changes in subsidy price levels which leave consumers on their demand schedules will imply corresponding changes in quantities purchased by consumers and, therefore, changes in import levels.

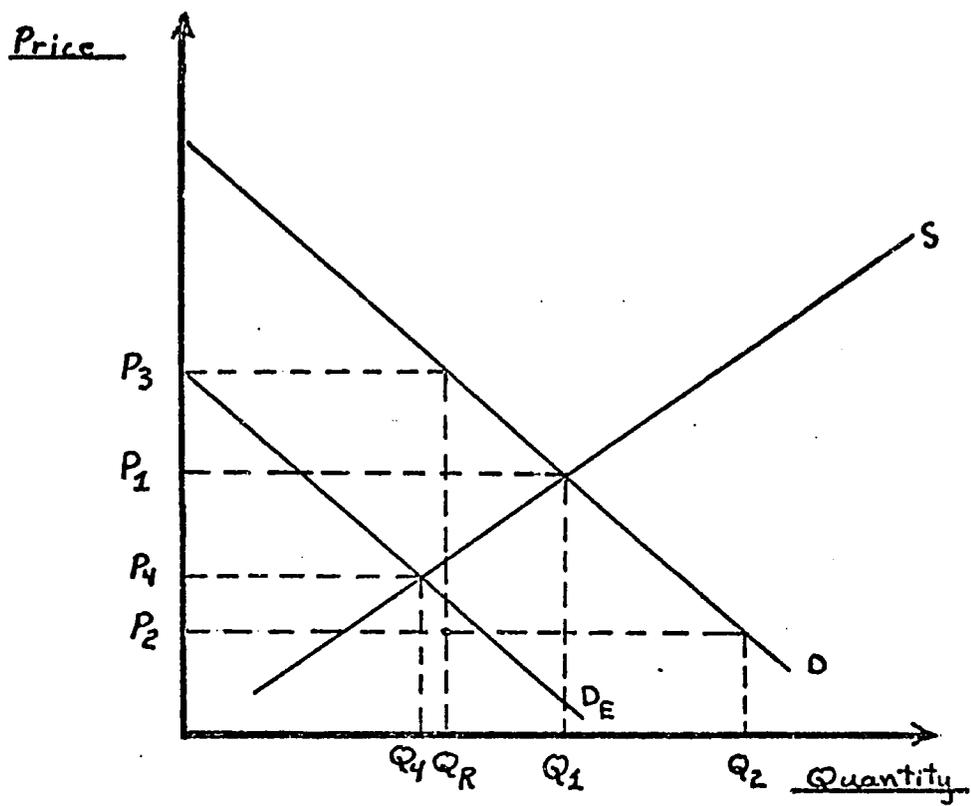
Figure 1

In the context of the GEM model a subsidy policy change which is solely a change in the price of rationed goods can be tested by changing the direct subsidy entries for each class of consumers with the consequences to be worked out in the model's solution. A subsidy policy change which involved quantity changes with or without price changes would require additional exogenous adjustments in the data before tests could be made. Not only would the entries in the value of subsidies to each consumer class have to be altered but the total value of the imports of the subsidized goods would have to be adjusted to reflect the import quantity change. If goods were rationed, the excess demand function would have to shift as a result of a change in the rationed amounts. If there were no rationing, the quantities implicit in the entries in the government trade import and the rows would also have to change to reflect movement to a different point on the demand schedules.

In this as in the following partial equilibrium analyses it can be surmised that a change in expenditures on a subsidized commodity which takes a noticeable fraction of total expenditure will have indirect consequences through the effects on income available for other types of consumption. However, in order for those indirect effects to take place there must be some responsiveness of domestic production to shifts in demand and prices. That assumption will underlie all the later tests to be done with the GEM models which are "general equilibrium" tests.

The next case is that of a change in the subsidized price of a commodity which is also purchased abroad by the government supply authority but for which there is as well a domestic supply. This describes the supply conditions for frozen chicken and meat which are good if not perfect substitutes for domestic chicken and meat. Again there are differences between the situation in which the subsidized supply fully satisfies demand at the subsidized

price and the situation in which it must be rationed. In Figure 2 D and S are the domestic demand and supply schedules respectively. P_1 and Q_1 are the price and quantity levels which would prevail in a competitive market without any other source of supply. Suppose, however, that Q_R of the good is provided at the price P_2 by government supply authorities. Since Q_R is less than Q_2 , the amount which would be demanded at P_2 , there must be rationing of Q_R among consumers. In this case, as in the previous case there is an unsatisfied, or excess, demand, above the rationed quantity. That is D_E which is $D - Q_R$. The interaction of D_E with the private supply S generates a private, non-subsidized price P_4 at which Q_4 is demanded and supplied. Thus a rationed supply and subsidized price co-exist with an unrationed supply and unsubsidized price. It can be seen that at prices below P_4 the quantity Q_R would be purchased by consumers from government sources before they turned to private sources. But at a government price above P_4 , but less than P_1 , private sources would be preferred for that part of consumer demand which could be satisfied at a price less than the subsidized price.

Figure 2

It should be noted that there is an implicit assumption in this type of conventional analysis of subsidized supply that all types of potential consumers exercise equal access to the rationed supply. That may not be the case, because middle and upper income groups may prefer to pay a somewhat higher price rather than to stand in queues or because these people are not issued ration cards. If this condition prevails, then the demand which is left "unsatisfied" by the supply of rationed goods cannot be determined by subtracting the rationed supply Q_R from the total demand D_1 to obtain the "excess demand", D_E . In this case the demands of the particular income or social groups which are satisfied by the supply of the rationed commodity would have to be identified and subtracted from the total demand in order to determine the excess demand.

If enough of the goods were provided under subsidy via imports so that demand were fully satisfied, e.g. if at P_2 the amount Q_2 was supplied then, of course, rationing would not be necessary and there would be no place for domestic supply. In this circumstance any change in the price of a subsidized commodity must be accompanied by a quantity change in a test of policy. Since the supply is from imports by government authorities, the import adjustment would have to be imposed exogenously in the use of the GEM model for testing the policy by adjustments in the government trade import row. Even if the quantity supplied under subsidy did not fully satisfy demand, then any change in the subsidy price above P_4 , the level at which the domestic supply plus the subsidized supply would just clear an uncontrolled market, would require a change in imports. The adjustment is necessary in this, as compared to the previous case, because there is a competing domestic source of supply which will take a larger share of the market if the subsidized price is raised, even for a fixed supply, above P_4 . It would also be necessary to adjust the excess demand function,

since that is calibrated on the assumption that all the subsidized supply will be taken. If it is not, because its price, though subsidized, is nonetheless below the price at which additional domestic supply would be provided to substitute domestic for subsidized foreign goods, the substitution must be recognized by shifting the excess demand function.

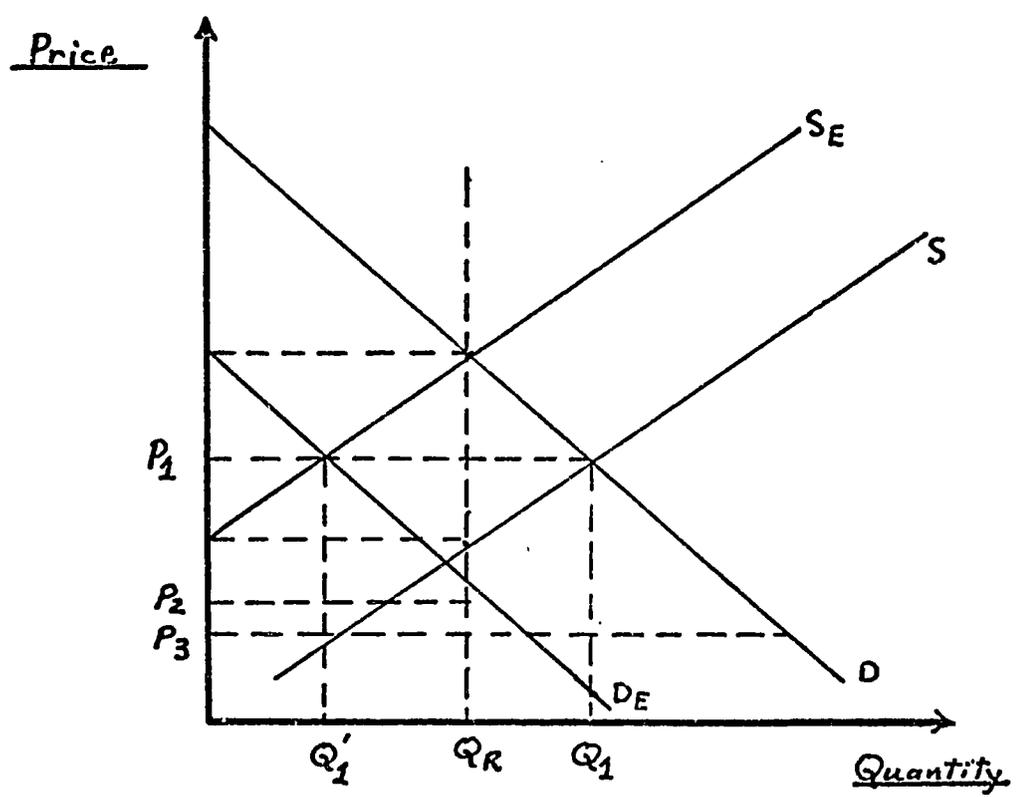
Turning next to change in policy which involves a change in quantity alone, or along with a change in the price at which the subsidized goods are sold, more extensive changes in the data inputs to the GEM model would be required to analyze this case. The entries in both the subsidy rows and the government trade import rows must be adjusted to reflect changes in the quantity supplied as well as in prices, if those occur. And as in the last example, the constant term in the private demand functions must also be adjusted to reflect the shift in the excess demand functions.

Another type of Egyptian direct subsidy program has been one in which all - or a substantial part - of the goods provided to consumers with a subsidy were purchased domestically by the government supply authority. Those domestic "purchases" have been both compulsory deliveries at an imposed price. Figure 3 illustrates a subsidy program based on domestic purchases. P_1 and Q_1 are the price and quantity which would prevail if there were no government intrusions in a competitive market. Suppose, however, that the government requires that Q_R be delivered to its supply authority at a price P_2 . The goods are then resold to consumers through a ration program at a price P_3 . The subsidy per unit is $P_2 - P_3$. There is both an excess demand, $D_E = D - Q_R$, not satisfied by consumer purchases through the rationing scheme, and an excess supply, $S_E = S - Q_R$, which is available from producers once they have satisfied the compulsory delivery requirements. The price which clears the market which exists outside the compulsory delivery system and rationed and subsidized consumer sales is P_1 with a quantity of Q_1 being bought and sold.

Changes in either the compulsory delivery price or the price at which rationed sales are made or both with no changes in the quantity transacted will change the net earnings of sellers and the consumer surplus of buyers and, of course, the receipts of sellers or the expenditures of buyers, respectively, or both. Tests of changes in this type of policy require a different set of adjustments than the previous tests in which the purchase prices of the government supply authority are fixed by the foreign market price. First, if only the selling price of the subsidized good P_3 is changed and the good continues to be rationed, then only the direct subsidy entries need be changed as quantities purchased and sold remain unaffected. Second, if the compulsory delivery price is changed, but the quantity purchased and its selling price is not, then two adjustments must be made. The value of government trade purchases and the amount of the subsidy must both be changed to reflect the new compulsory delivery price and the new effective subsidy rate to consumers. Third, if there is a change in the amount of compulsory deliveries and, thus, in the amounts offered for sale even without a change in prices, then again both the value of government trade purchases and subsidies must be adjusted. However, in this latter case it is also necessary to shift the excess demand functions of consumers since the amounts they are provided under subsidy change and, therefore, the demand which they exert in the marketplace also change. Finally, there may be combinations of all the above policy changes which, in turn, will require for their investigation combinations of the adjustments described above.

In all the analysis above it has been assumed that if there were, in the aggregate, rationing for a particular commodity, i.e. quantities supplied were less than quantities demanded at the subsidized price, then

Figure 3



it would prevail for each income class. Of course, this need not be the case. A subsidized price which rations upper income groups might clear the market for lower income groups. There might be, subsequent to purchase at the ration shops, "re-contracting" among buyers so that lower income groups sold some of their subsidized purchases to higher income groups. That would eliminate the rationing among the groups by means of an "unofficial" price which cleared the market but there would still be rationing of the subsidized quantities for some groups at the official price.

If tests are to be made of changes in subsidy policies in which rationing does not prevail among all income classes, then, those classes for which it does not prevail must be treated differently from the classes for which it does.

B. Adjustments in production subsidies

As noted earlier, production subsidies, i.e. those which are paid to producers, are quantitatively more important than the subsidies on goods sold directly to consumers by government authorities; the 1976 SAM indicates that the former were twice as large as the latter. Of the total production subsidies the largest part is for wheat purchased by bakeries for bread, which was more than 50 per cent of these subsidies in 1976 and more than one-third of total subsidies.

The analysis of production subsidies and the effects of policy changes are complicated by the regulations and controls which are associated with them and conditions of joint production. In addition, the price-quantity adjustments of the GEM models are not of the type conventionally envisaged. On the demand side, there is a more or less standard demand schedule. The differences are on the supply side. Suppose there were an upward shift in the demand schedule, as the result, say, of an increase in one of the parameters. At existing prices, that would generate an increase in quantity demanded, an increase in sectoral outputs and inputs, including an increase in value added. The manner in which this value added is produced and, therefore, the price of the value added will depend on the production function and the resource constraints. Thus the price associated with the new level of production will not, in general, be equal to the original price. A process of iteration will then take place to adjust price and quantities to be consistent with the newly located demand schedule and the resource constraints and production functions. This iteration process is not the one which is envisaged in the conventional "story" about competitive entrepreneurs responding to prices, but the typical result nonetheless is to generate an upward sloping supply schedule. Now, however,

the final result will be a shift in the positions of the supply and demand schedules as well as reflecting shifts along the schedules. That is, the GEM model iterations are general equilibrium adjustments rather than partial equilibrium adjustments of the supply-demand geometry.

It must always be kept in mind that the Egyptian markets which are analyzed are not, in fact, fully competitive, as they are represented in the GEM and are required for the use of conventional supply-demand analysis. While there seems to be no reason to believe that private bakeries in Egypt have monopoly power, there are other non-competitive elements in bread markets. These include the government bakeries, which are not subject to the same competitive pressures as private bakeries. Prices and qualities of most types of bread are fixed and, in some circumstances, government authorities may intervene to require supplies to the market. A special complicating factor in the subsidized supply of wheat to bakeries is the ability of the latter to upgrade the wheat quality so that it can be used in producing bread of higher quality and higher marginal returns. With these cautions in mind, the conventional diagrams can be used to indicate the parameter adjustments associated with changes in production subsidy policies.

Suppose there were a specific production subsidy of a constant amount on each unit of output in a particular sector. This analytically familiar case can be portrayed by Figure 4. The unsubsidized supply curve would be S_1 and the subsidized supply curve would be S_2 . At the initial equilibrium price and quantity, P_2' and Q_2' , the amount of the subsidy per unit is $P_1' - P_2'$. The total amount of the subsidy is $(P_1' - P_2') \cdot Q_2'$. If there should be an increase in the amount of the subsidy from $P_1' - P_2'$ to $P_1'' - P_3$ that would shift the supply curve to S_3 . The new

equilibrium price and quantity would be P_3 and Q_3 . The new total subsidy would be $(P_1'' - P_3) \cdot Q_3$.

As is well known, the difference between the initial price P_2 and the new price P_3 would be less than the increase in the subsidy, indicating a division of the benefits between consumers and producers. The proportions of that division would, in turn, depend on the demand elasticity.

Tests of changes in direct production subsidy rates require first an adjustment of the subsidy rate itself. That subsidy rate is the total amount of production subsidy in the box for the particular sector divided by the gross output of the sector, assuming that subsidies are paid on gross output and not just on the amount sold to consumers as distinct from sales for other purposes.

Production subsidies in Egypt are provided for bread production by selling the wheat to bakers at prices which are below market prices. In recent years, the subsidized wheat inputs have been entirely imported. The provision of a specific subsidy based on input rather than on output raises no analytical problem as long as there is a fixed relation between the input and output and there is only one source for the input. Neither condition holds in Egypt, although it is possible, without doing too much violence to reality, to assume the former relation exists. As noted above, the quality of flour sold to bakers can be upgraded by them by sifting it, so that it becomes suitable for the production of higher quality bread and bakery products. The incentive to exploit this possibility arises because the prices of the various qualities of bread are controlled so that the profit rates vary and, according to the conventional wisdom, the rate is negative on the lowest qualities of bread. Thus, even though there are some weight losses involved in upgrading the flour, it appears

to pay to carry that out. However, it will be assumed here that the government has enough instruments of direct control to insure that the output of the various qualities of bread correspond to the output composition desired by the supply authorities. Thus the fixed relation between inputs and outputs can be assumed.

The second issue, the existence of more than one source for the subsidized input, is important because there is no scope in the GEM models for substitution among intermediate inputs. Their proportions are determined by fixed coefficients. That applies to the mix between domestically produced and imported inputs as well because all imports are treated as if they were noncompetitive.

There is, however, domestic production of wheat which is undoubtedly affected by domestic prices which are, in turn, influenced by the supply of imported wheat. Some part of the domestic supply may even be available at prices below even the subsidized prices of the imports. Thus, if the subsidy rate should change, the proportion of the total supply which comes from domestic sources would also change.

Figure 5 presents an analysis of this latter situation. S is the domestic supply schedule, without any subsidy and D , the demand schedule. P_m is the foreign price at which Egypt can import. P_1 is the price which would prevail if there were no imports and/or subsidies and Q_1 is the quantity transacted in this case. P_2 is the controlled price of the wheat with a subsidy of $P_m - p_2$ being provided on each unit of Q_m imports. Given the demand schedule D , the amount demanded at the controlled price, P_2 , would be Q_2 . The sum of domestic and foreign supply at the price P_2 is Q_2' which is less than the amount demanded so there must be some non-price rationing mechanism. If the controlled price rises to P_3 in conjunction

with a reduction of the subsidy to $P_m - P_3$, then the quantity demanded and offered from domestic and foreign sources is Q_3 . The important point in this case is that the mix between domestic production and imports will change. If the changes in subsidy policy push the bread market to a point like P_3 and Q_3 , then, in effect, the domestic and foreign input coefficients must change in the SAM to reflect the new conditions. The wheat input coefficient into the bread industry, which in the SAM is the delivery from staple agriculture to the food processing industry, would have to be adjusted as would the coefficient indicating imports to the food processing industry.

It is, perhaps, also obvious that similar changes would have to be made if the quantity of imports made available under the subsidy program were changed. The import coefficient and the domestic input-output would both require adjustment.

C. Adjustments in indirect subsidies.

It will be recalled that "indirect" subsidies were identified as those resulting from deliberate underpricing of output by government enterprises with the objective of lowering prices to producers or consumers. They may or may not be a source of accounting losses to the enterprises but not all accounting losses can be attributed to underpricing for the purpose of subsidization. Thus, neither the existence nor the amounts of such subsidies are easy to ascertain. There are some clear cases, however, notably the underpricing of petroleum and its products. The underpricing of electricity is partly due to the underpricing of petroleum, a major input for the thermal generation of electric power. But it is also possible that there electricity is underpriced simply out of a desire to subsidize certain classes of users.

Figure 4 may be used to represent this type of subsidy. The effective supply schedule is shifted downward by the amount of the subsidy, with a change in the market price and the quantity consumed. It should be noticed in this case that there is no rationing of the sales of the commodity. Any change in subsidy levels will, therefore, be associated with changes in the volume of transactions.

There is no obvious place for changes in subsidies of this type in the Social Accounting Matrix. The value added by labor in government enterprise is included with the value added in private firms in the social accounting matrix and value added of public enterprises includes only that attributable to capital and other primary factors. To the extent goods produced by government enterprise are underpriced, value added is understated. While simply changing value added in government enterprise might seem to be the most straight forward means of adjusting subsidy levels, this type of change would generate an increase in demand for the primary factors which produce value added. In fact, presumably the value added not collected is simply a rent foregone by the enterprise and changes in this rent do not require changes in input requirements.

There are at least two ways of testing for changes in implications of subsidy policies of this type. One means is simply to increase the amount of value added by the change which is envisaged in the subsidy. That would call for a greater use of primary factors in the production of the value added, however, with corresponding changes in the returns to the factors in limited supply. This type of adjustment in effect rejects the argument that the earnings foregone through subsidy are a rent. Another device is to change indirect taxes on the sector by the amount of the subsidy. That would not require any more factor inputs and would result in the change in government revenues which would actually be associated

Figure 4

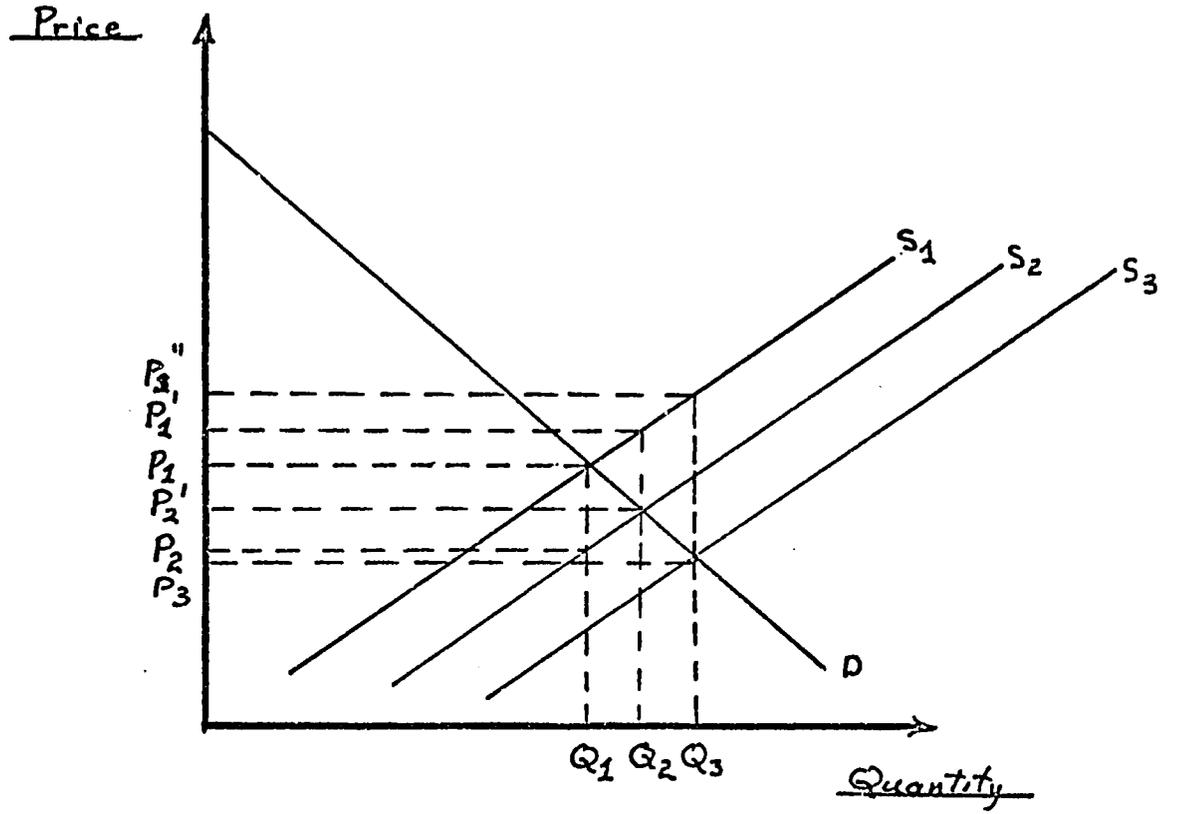
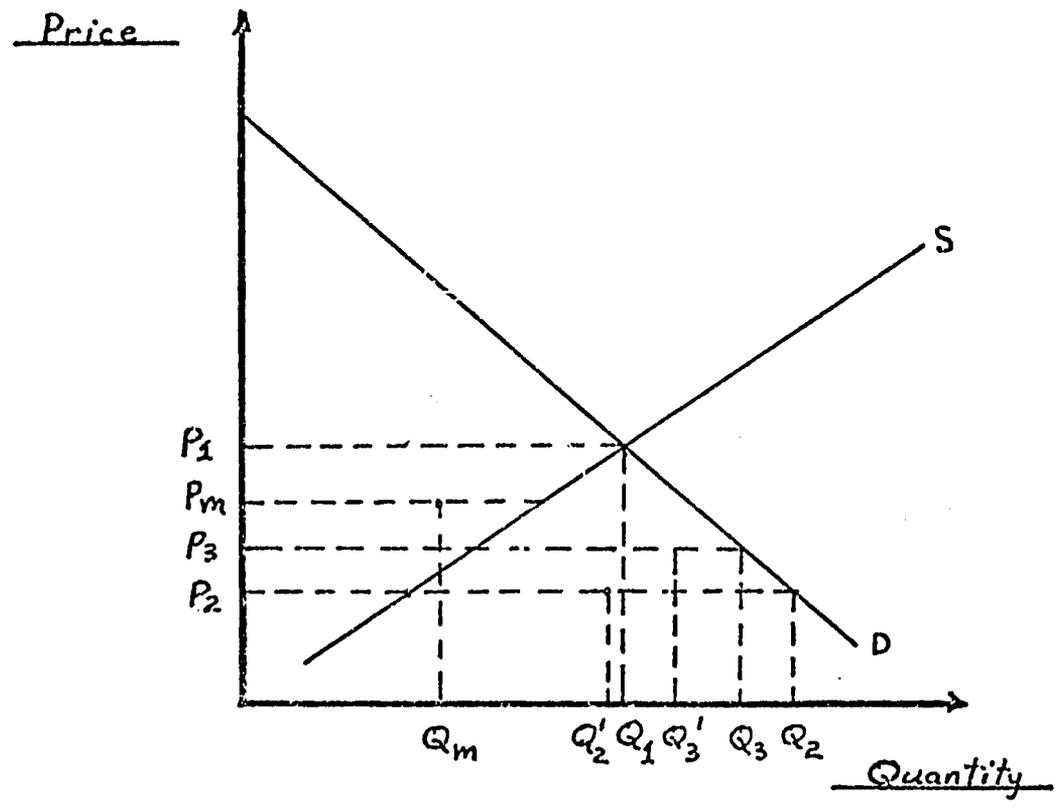


Figure 5



with a change in prices of goods subsidized by underpricing the output of government enterprise. In both cases the change in quantities demanded would occur endogenously as a response to price changes.

As noted earlier, the partial equilibrium analysis which has been presented omits the indirect effects of changes in subsidies. These indirect effects are, in fact, difficult to trace, as suggested by the limited degree of development of the theoretical literature on the subject. Thus a computable general equilibrium model is an excellent device for testing the economy-wide implications of changes in subsidy policies. The simple partial equilibrium analysis above only indicates the parameters which must be altered to carry out the tests. Yet the simple theory also indicates that the tests must be carefully designed because the structure of the models does not quite reproduce the conventional competitive market structure which is the reference point.

IV. Tests of the consequences of subsidy adjustments

The previous discussion has outlined alternative subsidy policy adjustments and analyzed their qualitative implications. While the partial equilibrium effects of the subsidy policy changes could be identified, the general equilibrium effects can not be determined without a general equilibrium model. In this section the GEM III model will be used to provide quantitative illustrations of the consequences of particular types of subsidy policy adjustments.⁸

The tests described below are only a beginning, because the objective here is not to propose or design policy or to provide a complete basis for designing policy. Rather, the purpose is to illustrate the effects of alternative approaches to subsidy policy and their consequences and, by so doing, to provide the ingredients for thinking carefully about subsidies.

The analysis will proceed through a series of quantitative tests of the policies which have been previously analyzed in a qualitative and "partial equilibrium" manner with the conventional tools of microeconomic supply and demand schedules. Finally, the results of the various tests will be contrasted. In each of the tests the sources of the subsidized goods and the use of price or quantity changes will be distinguished. It will typically be assumed that those subsidized goods provided directly to consumers are rationed.

The data used are all for 1976 and were prepared for the 1976 Social Accounting Matrix. This means that the tests conducted are "as if" tests, i.e., as if those conditions prevail which are represented in the 1976 SAM. There are, even so, many qualifications which must be attached to the results. The SAM reflects a number of approximations as does the GEM

model used to test the subsidy policies. In particular it should be noted that the particular numerical results are sensitive to both the specific values of the consumer demand elasticities employed, for which the estimates can be regarded now only as rough approximations, and to the sectoral production functions, whose parameters are even more approximative. In addition the factor supply constraints in the various sectors are chosen to isolate those regarded as most restrictive, having in mind the need to limit the number of these constraints in order to maintain the feasibility of solutions. In calculating the amounts of the subsidies for the various categories of goods, the distribution costs of all subsidized goods have been allocated in the proportions of the purchase costs of individual commodities to total purchase costs. Therefore, although there is an apparent precision in the solutions, the quantitative results should be regarded with some skepticism except insofar as they indicate qualitative patterns. In particular it would be mistaken to accept numerical results based on 1976 data as indicative of the quantitative implications of current policies.

Test 1

Change in direct subsidies to consumers by a change in price of imported commodities, for which there is no domestic production, with rationing prevailing.

The goods which fall into this category are the non-staple foods: edible oils, fats (animal), tea and coffee with the following accounting in thousands of £E:

	Purchases	Sales	Profit/Loss
	138,783	92,255	-46,528
Share of distribution costs	<u>7,786</u>	<u> </u>	<u>- 7,786</u>
Totals	146,569	92,255	-54,314

The share of total distribution costs of £E 42,707 is calculated at $(138,783/803,913 - 42,707) \cdot (42,707)$ where 803,913 are the total cost of purchases of subsidized goods.

In the test carried out it will be assumed that subsidies are reduced to 10% of the value of purchases by an increase in the selling price of the rationed commodities:

	Purchases	Sales	Profit/Loss
New situation	146,569	131,912	-14,657

The subsidy reductions are spread across the various income classes in their proportions of total consumption of non-staple food.

This is the type of test which has been done previously with general equilibrium models and for which the general nature of the results are well-known. The test is repeated here only to provide a basis for comparisons.

The results of this test are shown in Tables 1- 1 through 1- 5. As can be seen in the tables, the results are generally deflationary, as predicted from the qualitative analysis above and consistent with the previous analysis which has been done of changes in subsidy policy.³ Output and prices fall in every sector with the relative changes reflecting the different demand elasticities, production parameters, and factor supply conditions as well as all the other structural conditions of the SAM and the GEM.

The fact that the deflationary effects are so thoroughgoing supports the rationale of the results. The reduction in subsidies is a reduction in real personal income, and given the nature of the tax system, an increase in government saving. With investment, government consumption and export components of final demand remaining unchanged, the only possible result is general deflation. The macroeconomic adjustment requires a decrease in personal income and saving to maintain the total saving-investment equality.

The impact of the deflation can also be seen in the reductions in real factor demands which take place and, perhaps most dramatically, in the changes in household consumption of the various income classes. Without commitment to the exact magnitudes because of the many uncertainties in the data, it appears likely that the general patterns shown are correct. The lower income classes suffer more than the upper income classes and the rural income groups more than urban income groups because of differences in sources of their income.

While the deflationary effects of the subsidy reduction might be unintended, the foreign trade balance and government budgetary effects are the ones which are usually sought by advocates of reductions in

consumer subsidies. There is a slight reduction in exports, which is a price effect, a larger reduction in imports and a more than 6 per cent reduction in the trade deficit. There is also an even more substantial increase in government savings, 35 per cent. The average price reduction faced by each income class, reflecting its particular composition of expenditures is shown in Table 1- 4 . The differences are small.

There are some income distributional consequences of the changes in subsidies as might be expected, but they are relatively small. Table 1- 3 shows the income distribution of disposable income and total expenditure before and after the change in subsidy policy. In general, the relative positions of the lowest income classes in both urban and rural areas decline slightly. The relative position of the middle and upper income classes in urban areas improves slightly and the position of the middle and upper income classes in rural areas deteriorates slightly.

4/12

Table 1-1
Output and Prices
After Reduction in Direct Subsidy Rates

	GROSS OUTPUT			COMMODITY PRICES	FACTOR PRICES		
	FINAL	INITIAL	CHANGE		LAND	CAPIT AL	LABOUR
STAPLE FOOD	453.843750	455.000000	-0.254121	0.992735	0.988677	1.000000	0.989101
NON-STAPLE FOOD	1262.80347	1268.00000	-0.409821	0.993446	0.988677	1.000000	0.989101
COTTON	234.696456	235.000000	-0.128317	0.993008	0.988677	1.000000	0.989101
OTHER AGRICULTURE	462.097168	464.000000	-0.410093	0.991392	0.988677	1.000000	0.989101
FOOD PROCESSING IND	1515.92017	1522.00000	-0.399463	0.996121	1.000000	0.987942	1.000000
TEXTILE INDUS.RY	880.993652	885.000000	-0.452695	0.995101	1.000000	0.989618	1.000000
OTHER INDUSTRIES	1388.97388	1392.00000	-0.217394	0.997888	1.000000	0.994010	1.000000
CONSTRUCTION	635.872070	636.000000	-0.020115	0.998699	1.000000	1.000000	0.999579
CRUDE OIL AND PRODUCTS	608.171387	609.000000	-0.136061	0.986147	1.000000	0.979268	1.000000
TRANSPORT AND COMM	574.056350	577.000000	-0.509818	0.996546	1.000000	1.000000	0.991686
HOUSING	141.239792	142.000000	-0.535358	0.991390	1.000000	0.985486	1.000000
OTHER SERVICES	3110.11084	3118.00000	-0.253020	0.999102	1.000000	1.000000	1.000000
TOTAL	11268.7695	11303.0000	-0.302844				

19/1/5

Table 1-2
Labour, Capital and Land Demands
After Reduction in Direct Subsidy Rates

	PRIVATE SECTOR			GOVERNMENT SECTOR	
	LABOUR	CAPITAL	LAND	LABOUR	CAPITAL
STAPLE FOOD	128.12332	87.53593	72.62469	13.02837	14.88598
NON-STAPLE FOOD	272.31128	291.06445	165.50742	23.20743	50.61760
COTTON	92.29967	62.46410	46.97961	0.0	0.0
OTHER AGRICULTURE	197.08957	78.66815	160.44986	0.0	0.0
FOOD PROCESSING IND	39.45911	93.64026	0.0	16.21243	14.03554
TEXTILE INDUSTRY	49.86400	110.08138	0.0	115.42473	53.13966
OTHER INDUSTRIES	41.69188	67.56894	0.0	163.51186	294.99219
CONSTRUCTION	37.52577	38.11499	0.0	94.34351	83.96436
CRUDE OIL AND PRODUCTS	3.97448	53.92175	0.0	16.67229	248.99454
TRANSPORT AND COMM	10.95140	17.13025	0.0	164.77580	256.83154
HOUSING	48.85925	74.36826	0.0	1.03210	6.96622
OTHER SERVICES	436.07617	654.11426	0.0	866.84448	86.77985

2110

Table 1-3
Household Incomes by Income Size Class and Location
After Reduction in Direct Subsidy Rates

		YH ¹	YD ²	YET ³	YE ⁴
	Lowest 60%	1037.89697	1011.18628	1107.51245	999.24463
Urban	Middle 30%	1121.00977	1037.42578	1135.18994	1036.03125
	Upper 10%	1293.91699	1127.49561	925.64087	855.36987
	Lowest 60%	713.46167	721.41626	652.24707	569.81812
Rural	Middle 30%	528.90283	522.79126	380.92651	325.76245
	Upper 10%	498.02710	481.23950	310.14771	283.51343

¹Gross income

²YH + subsidies - transfers - direct taxes

³YD - private savings

⁴YET - expenditures on purchases from government trade sector and imports to government trade sector - indirect taxes

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Table 1-4
Household Consumption by Income, Levels and Per Cent Changes
from Original
After Reduction in Direct Subsidy Rates

Section	Urban Income Recipients						Rural Income Recipients					
	Lowest Sixty Percent		Next Thirty Percent		Highest Ten Percent		Lowest Sixty Percent		Next Thirty Percent		Highest Ten Percent	
	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change
1	21.970	-0.134	13.496	-0.029	5.298	-0.034	22.541	-0.259	7.080	-0.281	4.464	-0.357
2	178.704	-0.499	126.158	-0.237	110.517	-0.166	113.217	-0.687	65.252	-0.833	52.880	-0.788
3	1.593	-0.096	0.300	-0.106	0.400	-0.038	1.597	-0.198	0.599	-0.190	0.500	-0.037
4	14.234	-0.460	16.364	-0.217	11.790	-0.084	7.167	-0.465	4.182	-2.740	1.980	-1.013
5	323.115	-0.427	274.491	-0.221	140.082	-0.226	232.980	-0.690	100.027	-0.569	70.338	-0.652
6	79.000	-1.127	96.912	-0.296	54.967	-0.242	37.500	-1.832	30.539	-1.168	25.437	-1.022
7	94.905	-0.727	98.669	-0.435	60.080	-0.365	44.766	-0.736	22.826	-2.035	19.335	-1.351
8	0.0		0.0		0.0		0.0		0.0		0.0	
9	21.873	-0.122	18.404	0.020	9.411	0.120	11.773	-0.226	4.687	-0.280	2.792	-0.238
10	29.561	-1.464	44.204	-2.634	163.937	-0.505	7.647	-1.963	6.165	-2.147	4.643	-1.217
11	16.485	-1.287	39.196	-0.517	55.257	-0.078	4.348	-1.173	3.765	-3.459	8.219	-0.977
12	206.457	-0.885	221.853	-0.604	151.987	-0.467	77.325	-0.993	62.654	-1.177	75.460	-1.101
13	15.381	-0.769	30.138	-0.863	89.782	-0.581	11.412	-1.623	19.266	-1.198	18.477	-1.194

Price Indices .99601 .9960 .9963 .9957 .9961 .9964

217

Table 1-4
 Household Consumption by Income, Levels and Per Cent Changes
 from Original
 After Reduction in Direct Subsidy Rates

Section	Urban Income Recipients						Rural Income Recipients					
	Lowest Sixty Percent		Next Thirty Percent		Highest Ten Percent		Lowest Sixty Percent		Next Thirty Percent		Highest Ten Percent	
	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change
1	21.970	-0.134	13.496	-0.029	5.298	-0.034	22.541	-0.259	7.080	-0.281	4.484	-0.357
2	178.704	-0.499	186.158	-0.237	110.517	-0.166	113.217	-0.687	65.252	-0.833	52.860	-0.788
3	1.598	-0.096	0.300	-0.106	0.400	-0.038	1.597	-0.198	0.599	-0.190	0.500	-0.087
4	14.234	-0.460	16.364	-0.217	11.790	-0.084	7.167	-0.465	4.152	-2.740	1.980	-1.013
5	323.115	-0.427	274.491	-0.221	140.082	-0.226	232.980	-0.690	100.027	-0.569	70.338	-0.652
6	79.000	-1.127	96.912	-0.296	54.967	-0.242	37.500	-1.832	30.539	-1.168	25.437	-1.022
7	94.905	-0.727	98.669	-0.435	60.080	-0.365	44.768	-0.736	22.826	-2.035	19.335	-1.351
8	0.0		0.0		0.0		0.0		0.0		0.0	
9	21.873	-0.122	18.404	0.020	9.411	0.120	11.773	-0.226	4.687	-0.280	2.792	-0.298
10	29.561	-1.464	44.204	-2.634	169.937	-0.505	7.647	-1.963	6.165	-2.147	4.643	-1.217
11	16.485	-1.287	39.196	-0.517	55.257	-0.078	4.348	-1.173	3.765	-3.459	8.219	-0.977
12	206.457	-0.885	221.353	-0.504	151.987	-0.467	77.325	-0.993	62.654	-1.177	75.460	-1.101
13	15.381	-0.769	30.138	-0.863	88.782	-0.581	11.412	-1.623	19.266	-1.198	18.477	-1.194

Price Indices .99601 .9960 .9963 .9957 .9961 .9964

8114

Table 1-5
Macroeconomic Variables
After Reduction in Direct Subsidy Rates

	FINAL	INITIAL	CHANGE
EXPORTS	1283.9788	1286.0000	-0.1572
IMPORTS	1933.7290	1940.0000	-0.3232
IMPORTS-EXPORTS	649.7502	654.0000	-0.6498
INVESTMENT	1565.3149	1567.0000	-0.1075
STOCKS	112.5213	113.0000	-0.4237
TOTAL INVESTMENT	1677.8362	1680.0000	-0.1288
PRIVATE SAVINGS	389.8887	394.0000	-1.0435
PRICE DIFFERENCE	177.5236	176.0000	0.8657
GOVT. SAVINGS	812.9326	632.0000	28.6286
DOMESTIC SAVINGS	1202.8213	1026.0000	17.2340

GOVERNMENT SECTOR

	EXPENDITURE	REVENUE	NET
PUBLIC UNDERTAKING	0.0	1402.0500	1402.0500
CONVENTIONAL	1708.4285	1316.6467	-391.7817
TRADE	1263.5205	1066.1848	-197.3357
TOTAL	2971.9490	3784.8816	812.9326

Test 2

Change in direct subsidies by a change in quantity provided of imported goods, for which there is no domestic production, with rationing prevailing.

These are also the non-staple goods: edible oils, fats (animal), tea and coffee with the following values in thousands of Egyptian pounds:

	Purchases	Sales	Profit/Loss
	138,783	92,255	--46,528
Share of distribution costs	<u>7,786</u>	<u> </u>	<u>- 7,786</u>
	146,569	92,255	-54,314

The share of total distribution costs attributable to these commodities is estimated as in Test 1.

In the test carried out it will be assumed that these subsidies are completely eliminated by stopping the imports of the quantities which had been provided: This means:

(1) Direct subsidies to consumers are reduced by LE 54 million with the reductions spread across consumers in proportions of non-staple food in each income class;

(2) Government trade imports are reduced by LE 146 million, with the reductions spread across income classes in the same as above;

(3) Consumer demand functions adjusted by increasing the constant term for each income class by amounts in (2). This is done under the assumption that there would be a shift to domestically produced non-staple goods by the amount that expenditure is reduced on imported subsidized goods.

The rationale for this adjustment is that when the estimation of the original consumer demand functions was done, they had to be adjusted to take into account the amounts made available at subsidized prices under rationing. That is, the original demand equation corresponds to D_E in Figure 1 or 2. Eliminating the subsidized and rationed supply moves consumers to their basic total demand curve, D.

Tables 2- 1 to 2- 5 present the results of this test. The effects of this type of change are quite different from the previous one. There is a shift from consumption of imports to domestic consumption which stimulates domestic economy. As can be seen in Table 2- 1 output rises in every sector as a result of the increased demand for the output of the non-staple goods sector which has multiplier effects on the rest of the economy. The largest changes are in the agricultural sectors reflecting the location of the initial increases in demand and the estimated demand elasticities. Prices also rise most in the agricultural sectors as a result of the induced effect on land prices which increases costs of value added and, therefore of total production.

The changes in household incomes reflect the different degrees of participation of each income class in the value added in the various sectors. The elimination of the subsidies decreases the relative shares of incomes of the urban income classes as could be expected from the concentration of output and income increases in rural areas. There is a slightly larger shift in the position of the lowest income group in rural areas than in the shares of the upper two income classes. However, it should be emphasized that the consumption levels of all income classes rise.

Some of the overall effects are those typically desired by advocates of subsidy reduction. Imports fall, indicating that the direct effect of the reduction in subsidized imports is greater than the induced increase in imports resulting from the improvement in domestic incomes. Although induced government expenditures increase slightly, the decrease in expenditures on subsidized imports is larger so that total expenditures fall. On the other hand, there is an increase in revenues due to higher domestic levels of activity. The net result is a substantial increase in government spending as shown in Table 2- 5. Contrary to conventional objectives of

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Table 2-1
Output and Prices
After Reduction in Non-Competitive Imports of Consumer Goods
Provided Under Direct Subsidy

	GROSS OUTPUT			COMMODITY PRICES	FACTOR PRICES		
	FINAL	INITIAL	CHANGE		LAND	CAPIT AL	LABOUR.
STAPLE FOOD	459.444336	455.000000	3.174579	1.055963	1.088218	1.000000	1.085731
NON-STAPLE FOOD	1307.30908	1268.00000	3.100085	1.050603	1.068218	1.000000	1.085731
COTTON	235.677521	235.000000	0.713839	1.053770	1.088218	1.000000	1.085731
OTHER AGRICULTURE	475.604492	464.000000	2.500968	1.066823	1.088218	1.000000	1.085731
FOOD PROCESSING IND	1588.59229	1522.00000	4.375313	1.033274	1.000000	1.132646	1.000000
TEXTILE INDUSTRY	899.517578	885.000000	1.640404	1.025290	1.000000	1.032151	1.000000
OTHER INDUSTRIES	1409.87109	1392.00000	1.283842	1.012845	1.000000	1.035797	1.000000
CONSTRUCTION	636.319336	636.000000	0.050210	1.009000	1.000000	1.000000	1.001044
CRUDE OIL AND PRODUCTS	614.962402	609.000000	0.979048	1.107102	1.000000	1.161489	1.000000
TRANSPORT AND COMM	574.663086	577.000000	-0.405011	1.005454	1.000000	1.000000	0.993402
HOUSING	142.645203	142.000000	0.454368	1.007719	1.000000	1.012375	1.000000
OTHER SERVICES	3160.27783	3116.00000	1.355927	1.006282	1.000000	1.000000	1.000000
TOTAL	11515.8750	11303.0000	1.883349				

8/5/74

Table 2-2
Labour Capital and Land Demand
After Reduction in Non-Competitive Imports of Consumer Goods
Provided Under Direct Subsidy

	PRIVATE SECTOR			GOVERNMENT SECTOR	
	LABOUR	CAPITAL	LAND	LABOUR	CAPITAL
STAPLE FOOD	128.86866	96.66170	72.86028	12.81946	16.07825
NON-STAPLE FOOD	271.70703	318.79102	164.69215	22.53296	53.94788
COTTON	90.46701	67.20508	45.92188	0.0	0.0
OTHER AGRICULTURE	199.63734	87.46991	162.08304	0.0	0.0
FOOD PROCESSING IND	45.67778	94.05090	0.0	18.13879	13.62486
TEXTILE INDUSTRY	52.61237	110.71892	0.0	119.63107	52.50143
OTHER INDUSTRIES	43.40816	67.51231	0.0	170.41829	295.04834
CONSTRUCTION	37.52446	38.16953	0.0	94.34486	84.08853
CRUDE OIL AND PRODUCTS	4.71009	53.87640	0.0	19.77829	249.04019
TRANSPORT AND COMM	10.95135	17.15979	0.0	164.77473	259.27759
HOUSING	50.14888	74.30382	0.0	1.12971	9.02867
OTHER SERVICES	443.11011	664.66528	0.0	880.82715	88.17964

250

Table 2-3
 Household Incomes by Income Size Class and Location
 After Reduction in Non-Competitive Imports of Consumer Goods
 Provided Under Direct Subsidy

		YH ¹	YD ²	YET ³	YE ⁴
	Lowest 60%	1063.21216	1020.24121	1118.91650	1043.15210
Urban	Middle 30%	1152.54590	1054.72070	1155.23511	1084.74756
	Upper 10%	1336.15747	1155.74951	947.79687	897.64624
	Lowest 60%	780.88721	786.23999	710.53394	652.79370
Rural	Middle 30%	578.76538	569.53320	414.29419	375.55688
	Upper 10%	545.63232	524.76685	337.32104	318.98413

¹Gross income.

²YH + subsidies - transfers - direct taxes

³YD - private savings

⁴YET - expenditures on purchases from government trade sector and imports to government trade sector - indirect taxes

234

Table 2-4
 Household Consumption by Income Levels and Per Cent Changes from Original
 After Reduction in Non-Competitive Imports of Consumer Goods Provided Under
 Direct Subsidy

Section	Urban Income Recipients						Rural Income Recipients					
	Lowest Sixty Percent Level		Next Thirty Percent		Highest Ten Percent		Lowest Sixty Percent Level		Next Thirty Percent		Highest Ten Percent	
	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change
1	23.031	4.686	14.183	5.060	5.507	3.901	24.749	9.507	7.870	10.843	4.789	6.425
2	179.025	-0.320	188.948	1.258	111.982	1.158	123.725	8.531	71.966	9.371	56.987	6.918
3	1.685	5.329	0.311	3.508	0.416	3.896	1.756	9.729	0.667	11.158	0.531	6.277
4	14.003	-2.073	16.248	-0.928	11.811	0.089	7.798	8.302	4.289	-0.245	2.120	5.991
5	332.203	2.374	283.551	3.072	143.793	2.416	256.908	9.509	111.395	10.731	75.986	7.325
6	76.010	-4.868	99.208	2.066	56.265	2.115	41.837	9.521	34.096	10.343	27.923	8.652
7	96.671	1.120	101.257	2.177	61.889	2.635	49.775	10.366	25.892	11.123	21.553	9.964
8	0.0		0.0		0.0		0.0		0.0		0.0	
9	21.799	-0.463	18.728	1.782	9.436	0.387	12.679	7.452	5.135	9.246	2.935	4.830
10	28.618	-4.607	38.561	-15.064	173.965	1.853	8.757	12.266	7.058	12.031	5.188	10.374
11	15.120	-9.460	38.017	-3.510	56.885	2.367	4.912	11.638	4.381	12.321	9.184	10.656
12	209.911	0.773	226.931	1.672	156.850	2.718	86.580	10.857	70.733	11.566	83.489	9.423
13	15.817	2.046	30.655	0.840	91.811	2.812	12.995	12.026	21.822	11.907	20.561	9.954
Price Indices	1.0289		1.0267		1.0194		1.0324		1.0284		1.0250	

437

Table 2-5
Macroeconomic Variables
After Reduction in Quantities of Non-Competitive Imports of Consumer Goods
Provided Under Direct Subsidy

	FINAL	INITIAL	CHANGE
EXPORTS	1296.3340	1266.0000	0.8036
IMPORTS	1830.9678	1940.0000	-5.6202
IMPORTS-EXPORTS	534.6338	654.0000	-18.2517
INVESTMENT	1577.8933	1567.0000	0.6952
STOCKS	116.0124	113.0000	2.6658
TOTAL INVESTMENT	1693.9055	1680.0000	0.6277
PRIVATE SAVINGS	427.1523	394.0000	8.4143
PRICE DIFFERENCE	164.3314	176.0000	-6.6299
GOVT. SAVINGS	919.3362	632.0000	45.4646
DOMESTIC SAVINGS	1346.4885	1026.0000	31.2367

GOVERNMENT SECTOR

	EXPENDITURE	REVENUE	NET
PUBLIC UNDERTAKING	0.0	1478.4709	1478.4709
CONVENTIONAL	1728.9795	1377.2151	-351.7644
TRADE	1147.5439	940.1736	-207.3704
TOTAL	2876.5234	3795.8596	919.3362

reducing subsidies, the increases in prices are quite general.

The policy of reducing the quantities of subsidized imports has the expected effects of stimulating domestic activity and prices. However, perhaps somewhat unexpectedly, that is not associated with an increase in the balance of payments deficit, but rather the opposite, and, as well an improvement in the government budget position as well.

It must be emphasized, however, that all of these effects depend on the indigenous availability of resources to meet the increase in demand for domestic production, i.e. on a significant elasticity of domestic supply. If that were not the case, the price increases would have been much greater. By assumption, the goods are not produced domestically. The non-competitive - with-domestic-production nature of the imports is lost in the sectoral aggregation however. So it must be assumed that there are other domestically produced goods which are close substitutes. The argument is implicit in many subsidy programs that the domestic resource situation is quite tight. In this case the provision of imported goods at subsidized prices helps to hold down prices. Reducing that foreign supply has a general stimulating effect. Supply elasticities may be low for various reasons, including institutional rigidities and resource constraints. Even if true overall, it would be reasonable to expect shifts in agricultural production toward the commodities whose relative price has increased most because of the elimination of the subsidized supply.

Test 3

Change in direct subsidies by change in price of imported goods which are rationed, for which there is also a domestic supply, but for which there are no non-government imports. The domestic supply does not involve compulsory deliveries.

These commodities are frozen meat, frozen chicken, and sugar with the following accounting in thousands of £E:

	Purchases	Sales	Profit/Loss
	71,496	77,137	+ 5,641
Share of distribution costs	<u>4,011</u>	<u> </u>	<u>+ </u>
	75,507	77,137	1,630

By the simple definition of subsidies as a situation of losses by the Egyptian supply authority, there are no subsidies on this group of commodities, entirely because of the profits made in selling frozen meat. Presumably, although this is the case, the selling prices are still below market prices for domestically produced meat. Otherwise the imported meat would not be sold. Without knowing the relative prices of domestic and foreign meat, it is impossible to stipulate precisely by how much the selling price of the imported meat could rise without losing its price advantage and no longer be subject to rationing. However, it will be assumed that selling prices can rise by 50% without violating this condition. So sales are increased to £E 116 million; profits go up by the amount of £E 39 to £E 40. Therefore, in this test subsidies are reduced by £E 39.

As in Test 1 in which prices are increased, in this case also, the effect is to depress the economy and for the same reasons. The results are shown in Tables 3-1 to 3-5. The fact that there is a domestic supply of the commodities has no distinctive effect on the outcome for two reasons. In the first test, the non-competitive nature of the subsidized imports was

hidden by the high degree of aggregation in any case. And, secondly, the goods are still assumed to be rationed because, in spite of the reduction in subsidy and increase in the official price, that price is still lower than the domestic, unconstrained market price.

The rationale of the changes is the same as for Test 1: there is a drop in real income and in government expenditure. Consumption falls, in part resulting from the decline in real income associated with the increase in prices but mainly as a result of the macroeconomic adjustment. With investment and exports exogenously determined and government saving larger as a result of the decline in government expenditures, private income must decline in order to reduce private saving and thus, achieve the necessary saving - investment condition.

Thus, as desired by some proponents of decreases in subsidies, the trade balance improves and the government deficit is reduced. In this case prices actually fall slightly, suggesting that it would be realistic to expect at least an associated reduction in inflationary pressures.

460

Table 3-1
Output and Prices
After Increase in Prices of Competitive Imports of Consumer Goods
Provided Under Direct Subsidy

	GROSS OUTPUT			COMMODITY PRICES	FACTOR PRICES		
	FINAL	INITIAL	CHANGE		LAND	CAPIT AL	LABOUR.
STAPLE FOOD	452.282959	455.000000	-0.597152	0.981740	0.971783	1.000000	0.972808
NON-STAPLE FOOD	1254.75073	1268.000000	-1.044694	0.983532	0.971783	1.000000	0.972808
COTTON	234.113403	235.000000	-0.377275	0.982453	0.971783	1.000000	0.972808
OTHER AGRICULTURE	459.208818	464.000000	-1.015341	0.978487	0.971783	1.000000	0.972808
FOOD PROCESSING IND	1506.27759	1522.000000	-1.033010	0.990190	1.000000	0.969063	1.000000
TEXTILE INDUSTRY	874.171143	885.000000	-1.223599	0.987079	1.000000	0.972136	1.000000
OTHER INDUSTRIES	1383.96680	1392.000000	-0.577098	0.994410	1.000000	0.984170	1.000000
CONSTRUCTION	635.644043	636.000000	-0.055968	0.996503	1.000000	1.000000	0.998835
CRUDE OIL AND PRODUCTS	606.711670	609.000000	-0.375752	0.962418	1.000000	0.943806	1.000000
TRANSPORT AND COMM	568.987543	577.000000	-1.388639	0.990609	1.000000	1.000000	0.977454
HOUSING	139.971497	142.000000	-1.428523	0.977152	1.000000	0.961659	1.000000
OTHER SERVICES	3096.85791	3118.000000	-0.678066	0.997618	1.000000	1.000000	1.000000
TOTAL	11213.0078	11303.0000	-0.796180				

997
169

Table 3-2
Labour Capital and Land Demands
After Increase in Prices of Competitive Imports of Consumer Goods
Provided Under Direct Subsidy

	PRIVATE SECTOR			GOVERNMENT SECTOR	
	LABOUR	CAPITAL	LAND	LABOUR	CAPITAL
STAPLE FOOD	128.31316	86.22162	72.77780	13.09967	14.72090
NON-STAPLE FOOD	272.34888	286.30957	165.63385	23.32443	50.03487
COTTON	92.53452	61.59151	47.12862	0.0	0.0
OTHER AGRICULTURE	196.43974	77.11725	160.02092	0.0	0.0
FOOD PROCESSING IND	38.66137	93.58296	0.0	15.96666	14.09206
TEXTILE INDUSTRY	48.87659	109.84190	0.0	113.89374	53.37775
OTHER INDUSTRIES	41.28737	67.58240	0.0	161.88521	294.97754
CONSTRUCTION	37.52640	38.08725	0.0	94.34286	83.90120
CRUDE OIL AND PRODUCTS	3.83124	53.93138	0.0	16.06789	248.98418
TRANSPORT AND COMM	10.95113	16.88397	0.0	164.77394	255.11409
HOUSING	47.71465	74.42552	0.0	1.05897	8.90966
OTHER SERVICES	434.21802	651.32690	0.0	863.15063	86.41005

Table 3-3
Household Incomes by Size Class and Location
After Increase in Prices of Competitive Imports of Consumer Goods
Provided Under Direct Subsidy

		YH ¹	YD ²	YET ³	YE ⁴
	Lowest 60%	1030.45923	994.48436	1090.12012	982.62817
Urban	Middle 30%	1112.17896	1022.08252	1119.07617	1020.69849
	Upper 10%	1288.21924	1114.71533	914.52319	844.83081
	Lowest 60%	702.09839	708.04199	639.97437	558.85815
Rural	Middle 30%	520.47485	513.03052	373.42651	319.14136
	Upper 10%	489.97046	472.06641	303.74243	277.53906

¹Gross income

²YH + subsidies - transfers - direct taxes

³YD - private savings

⁴YET - expenditures on purchases from government trade sector and imports to government trade sector - indirect taxes

2015

Table 3-4
 Household Consumption by Income Levels and Percent Changes
 After Increase in Prices of Competitive Imports of Consumer Goods
 Provided Under Direct Subsidy

Section	Urban Income Recipients						Rural Income Recipients					
	Lowest Sixty Percent Level		Next Thirty Percent		Highest Ten Percent		Lowest Sixty Percent Level		Next Thirty Percent		Highest Ten Percent	
	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change
1	21.922	-0.353	13.488	-0.091	5.294	-0.115	22.450	-0.662	7.052	-0.671	4.456	-0.971
2	177.252	-1.308	185.254	-0.721	110.107	-0.536	112.002	-1.753	64.488	-1.994	52.163	-2.133
3	1.596	-0.253	0.299	-0.329	0.399	-0.125	1.592	-0.506	0.597	-0.455	0.499	-0.237
4	14.125	-1.224	16.282	-0.721	11.759	-0.349	7.114	-1.197	4.018	-6.551	1.944	-2.789
5	320.917	-1.104	273.347	-0.637	139.470	-0.662	230.492	-1.751	99.225	-1.366	69.568	-1.740
6	77.601	-2.877	96.377	-0.847	54.713	-0.703	36.445	-4.593	30.044	-2.769	25.004	-2.708
7	93.822	-1.860	97.894	-1.217	59.681	-1.026	44.264	-1.853	22.165	-4.872	18.901	-3.566
8	0.0		0.0		0.0		0.0		0.0		0.0	
9	21.847	-0.241	18.407	0.038	9.429	0.313	11.742	-0.493	4.673	-0.575	2.779	-0.761
10	28.885	-3.715	42.056	-7.366	168.377	-1.419	7.418	-4.903	5.979	-5.093	4.550	-3.211
11	16.161	-3.226	38.784	-1.563	55.155	-0.263	4.273	-2.889	3.589	-7.982	8.085	-2.593
12	203.579	-2.267	219.460	-1.676	150.715	-1.300	76.146	-2.502	61.607	-2.828	74.088	-2.899
13	15.195	-1.970	29.675	-2.385	87.865	-1.606	11.125	-4.093	18.937	-2.886	18.113	-3.140
Price Indices	0.9897		0.9897		0.9905		0.9890		0.9899		0.9907	

26

Table 3-5
Macroeconomic Variables
After Increase in Prices of Competitive Imports of Consumer Goods
Provided Under Direct Subsidy

	FINAL	INITIAL	CHANGE
EXPORTS	1280.6738	1286.0000	-0.4142
IMPORTS	1923.5569	1940.0000	-0.8476
IMPORTS-EXPORTS	642.8831	654.0000	-1.6998
INVESTMENT	1562.5320	1567.0000	-0.2851
STOCKS	111.7542	113.0000	-1.1025
TOTAL INVESTMENT	1674.2861	1680.0000	-0.3401
PRIVATE SAVINGS	333.5566	394.0000	-2.6506
PRICE DIFFERENCE	179.9486	176.0000	2.2435
GOVT. SAVINGS	820.4419	632.0000	29.8167
DOMESTIC SAVINGS	1203.9985	1026.0000	17.3488

GOVERNMENT SECTOR

	EXPENDITURE	REVENUE	NET
PUBLIC UNDERTAKING	0.0	1381.9102	1381.9102
CONVENTIONAL	1694.4719	1305.0103	-389.4617
TRADE	1233.7192	1061.7126	-172.0066
TOTAL	2928.1912	3748.6331	820.4419

Test 4

Change in direct subsidies by change in quantity of imported goods, which are rationed, for which there is also a domestic supply, but for which there are no non-government imports.

If these commodities are frozen meat, chicken and sugar, any reduction in quantities provided would reduce the small profit apparently made on this group of commodities, specifically on imported meat. This is a case, however, in which the definition of a subsidy rate as the difference between purchasing and selling price is particularly misleading as the domestic cost and price of imported meat, at least, is substantially above the import price.

Assuming that the provision of these commodities under subsidy is eliminated, government trade imports are reduced by £E 76 million. Subsidies are actually increased by £E 3 million ($=2 \times 1.6$) since profits of that amount are eliminated from the total supply authority accounts. The constant term in the non-staple food private demand is increased by £E 76 million.

The various amounts are distributed across income groups in the proportions of their consumption of non-staple goods.

This is also a case in which the elimination of imported goods which are provided under subsidy will stimulate the domestic economy as it responds to the transference of demand to internal sources of supply. It is again assumed that the domestic economy has capacity which will permit it to expand in response to the new stimulus. Since the commodities are, in fact, produced domestically, the test is less artificial than Test 2 in which it was assumed that there was a shift to domestic substitutes for goods not produced within Egypt.

The results of this test are shown in Tables 4-1 through 4-5. The largest increase in output is in the non-staple food sector, to which demand formerly satisfied by imports is directly transferred. However, there are induced demands which run through the economy resulting from the increased output and income in the non-staple food sector. Overall, there is a 3.5 per cent increase in output. Prices rise in all sectors as money incomes rise to achieve macroeconomic equilibrium. That is consistent with a rise in the prices of land, labor and capital under increased pressure to produce additional output. As is usual, of course, the particular pattern of product and factor price increases reflects the constraints which are imposed with respect to the availability of factors to the particular sectors.

Under the assumptions for this test the distribution of income shifts toward the rural sectors. The largest increases in the relative shares go to the lowest rural income class. This is true both for disposable income, which includes the effect of subsidies, and for total private, non-subsidized expenditure. The declines in relative shares of the urban income groups are slightly greater for the lower than for the highest income groups. These changes are borne out by the corresponding decreases in private household consumption which occur in the two lowest urban

income classes as compared to the increases in consumption among all the rural income classes.

The foreign trade balance improves somewhat and the government budget deficit declines substantially, both the direct results of the reduction in government expenditures on imported commodities. The effective increase in the general price level for all income groups is 5 to 6 per cent.

These changes are quite different from those induced by changes in the prices of subsidized commodities but are, on reflection, not surprising. As pointed out above, it is well known that the subsidized import of commodities which compete with a domestic sector will tend to depress that sector. Only if there are off-setting measures such as general investment programs will these depressing effects be offset. In the tests which are run there are no offsetting effects so the impact of the change in subsidy policy is fully revealed. It should also be noted that the generally stimulating effects of this policy are not necessarily desirable as they do contribute to price inflation, even under the factor supply conditions assumed.

In effect this solution provides a "general equilibrium" analysis of an issue raised some time ago with respect to the effects on domestic agriculture of the supply to developing countries of food aid under conditions of "differential distribution." The particular case examined is the withdrawal of that food aid, but the results can be interpreted in the reverse order. It may also be inferred that the macroeconomic effects could be offset only by a conscious government policy of stimulating the economy.¹⁰

496

Table 4-1
Output and Prices
After Reduction in Quantities of Competitive Imports of Consumer Goods
Provided Under Direct Subsidy

	GROSS OUTPUT			COMMODITY PRICES	FACTOR PRICES		
	FINAL	INITIAL	CHANGE		LAND	CAPIT AL	LABOUR
STAPLE FOOD	460.157471	455.000000	1.133510	1.036508	1.056829	1.000000	1.054746
NON-STAPLE FOOD	1294.13599	1268.00000	2.061197	1.032863	1.056829	1.000000	1.054746
COTTON	236.966461	235.000000	0.836792	1.035013	1.056829	1.000000	1.054746
OTHER AGRICULTURE	473.053467	464.000000	1.951178	1.043017	1.056829	1.000000	1.054746
FOOD PROCESSING IND	1554.46289	1522.00000	2.132910	1.019855	1.000000	1.066036	1.000000
TEXTILE INDUSTRY	907.358643	885.000000	2.526400	1.026633	1.000000	1.059132	1.000000
OTHER INDUSTRIES	1408.34277	1392.00000	1.174049	1.011470	1.000000	1.032703	1.000000
CONSTRUCTION	636.708008	636.000000	0.111322	1.007361	1.000000	1.000000	1.002317
CRUDE OIL AND PRODUCTS	613.561035	609.000000	0.748938	1.080736	1.000000	1.121457	1.000000
TRANSPORT AND COMM	592.095215	577.000000	2.616155	1.018275	1.000000	1.000000	1.043028
HOUSING	145.755173	142.000000	2.644486	1.042905	1.000000	1.073413	1.000000
OTHER SERVICES	3160.42407	3118.00000	1.360618	1.004963	1.000000	1.000000	1.000000
TOTAL	11483.0078	11303.0000	1.592566				

9/10/71

Table A-2
Labour Capital and Land Demands
After Reduction in Quantities of Competitive Imports of Consumer Goods
Provided Under Direct Subsidy

	PRIVATE SECTOR			GOVERNMENT SECTOR	
	LABOUR	CAPITAL	LAND	LABOUR	CAPITAL
STAPLE FOOD	127.45319	92.85732	72.07147	12.76239	15.54986
NON-STAPLE FOOD	272.09888	310.13989	164.98152	22.75468	52.92401
COTTON	91.39282	65.95529	46.40642	0.0	0.0
OTHER AGRICULTURE	199.59259	84.95462	162.09767	0.0	0.0
FOOD PROCESSING IND	42.67885	93.86151	0.0	17.21805	13.81416
TEXTILE INDUSTRY	53.80446	110.98460	0.0	121.43199	52.23610
OTHER INDUSTRIES	43.28114	67.51642	0.0	169.90691	295.04419
CONSTRUCTION	37.52336	38.21693	0.0	94.34602	84.19653
CRUDE OIL AND PRODUCTS	4.54854	53.88577	0.0	19.09590	249.03099
TRANSPORT AND COMM	10.95189	18.01791	0.0	164.77493	272.23022
HOUSING	53.07419	74.16650	0.0	1.21608	9.16629
OTHER SERVICES	443.13062	664.69604	0.0	880.86768	88.18370

267

Table 4-3
Household Incomes by Size Class and Location
After Reduction in Quantities of Competitive Imports Provided To Consumers
Under Direct Subsidy

		YH ¹	YD ²	YET ³	YE ⁴
Urban	Lowest 60%	1066.53320	1045.60937	1144.59253	1052.00122
	Middle 30%	1155.14014	1073.97656	1174.71704	1089.23242
	Upper 10%	1340.34204	1165.87769	957.58545	896.86841
Rural	Lowest 60%	759.24414	769.06738	695.45972	624.45923
	Middle 30%	562.85278	557.37988	406.40894	358.83887
	Upper 10%	530.48682	513.60718	331.36426	308.57544

¹Gross income

²YH + subsidies - transfers - direct taxes

³YD - private savings

⁴YET - expenditures on purchases from government trade sector and imports to government trade sector - indirect taxes

Table 4-4
Household Consumption by Income Levels and Percent Changes
After Reduction in Quantities of Competitive Imports Provided to Consumers
Under Direct Subsidy

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Section	Urban Income Recipients						Rural Income Recipients					
	Lowest Sixty Percent Level		Next Thirty Percent		Highest Ten Percent		Lowest Sixty Percent Level		Next Thirty Percent		Highest Ten Percent	
	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change
1	22.075	0.342	13.518	0.130	5.314	0.268	23.046	1.974	7.230	1.834	4.597	2.166
2	182.036	1.356	188.587	1.065	112.052	1.222	119.882	5.160	69.357	5.405	55.836	4.757
3	1.604	0.253	0.301	0.476	0.401	0.289	1.624	1.500	0.607	1.240	0.503	0.529
4	14.445	1.011	16.554	0.940	11.903	0.870	7.464	3.673	5.082	18.197	2.125	6.248
5	328.878	1.349	277.913	1.023	142.421	1.439	246.211	4.949	104.236	3.615	73.538	3.867
6	82.476	3.224	98.452	1.289	55.938	1.521	43.210	13.115	33.172	7.353	27.237	5.979
7	97.941	2.448	101.115	2.034	61.634	2.212	47.422	5.149	26.275	12.770	21.156	7.937
8	0.0	-100.000	0.0	-100.000	0.0	-100.000	0.0	-100.000	0.0	-100.000	0.0	-100.000
9	21.764	-0.620	18.229	-0.388	9.345	-0.583	12.024	1.896	4.783	1.758	2.846	1.639
10	31.397	4.658	50.886	12.085	176.155	3.135	8.886	13.926	7.153	13.544	5.037	7.167
11	17.175	2.847	40.288	2.255	55.747	0.809	4.808	9.276	4.797	23.000	8.801	6.030
12	214.825	3.132	229.626	2.879	156.980	2.803	83.483	6.892	68.080	7.382	81.241	6.476
13	15.937	2.816	31.672	4.183	92.406	3.478	12.902	11.228	20.967	7.524	20.017	7.045

Price Indices

1.0208

1.0206

1.0188

1.0221

1.0202

1.0186

262

Table 4-5
 Macroeconomic Variables
 After Reduction in Quantities of Competitive Imports Provided To Consumers
 Under Direct Subsidy

	FINAL	INITIAL	CHANGE
EXPORTS	1296.7393	1286.0000	0.8351
IMPORTS	1893.2710	1940.0000	-2.4087
IMPORTS-EXPORTS	596.5317	654.0000	-8.7872
INVESTMENT	1576.2419	1567.0000	0.5898
STOCKS	115.5473	113.0000	2.2542
TOTAL INVESTMENT	1691.7891	1680.0000	0.7017
PRIVATE SAVINGS	415.3879	394.0000	5.4284
PRICE DIFFERENCE	167.8652	176.0000	-4.6220
GOVT. SAVINGS	863.1274	632.0000	36.5708
DOMESTIC SAVINGS	1278.5154	1026.0000	24.6116

GOVERNMENT SECTOR

	EXPENDITURE	REVENUE	NET
PUBLIC UNDERTAKING	0.0	1480.4924	1480.4924
CONVENTIONAL	1740.5173	1362.9731	-377.5442
TRADE	1243.1042	1003.2834	-239.8208
TOTAL	2983.6216	3846.7490	863.1274

Test 5

Change in production subsidy rates for imported goods, which are rationed, for which there is also a domestic supply.

The test will apply to wheat, flour and maize imports supplied to the food processing industry. The values in thousands of Egyptian pounds are:

	<u>Purchases</u>	<u>Sales</u>	<u>Profit/Loss</u>
Meat	274,711	149,449	-125,262
Flour	75,355	52,574	- 22,781
Maize	<u>49,640</u>	<u>26,566</u>	<u>- 23,074</u>
	399,706	228,589	-171,117
Share of distribution costs	<u>22,425</u>		<u>- 22,425</u>
Totals	422,131	228,589	- 193,542

The present subsidy rate, i.e. the proportion of the purchase price paid by the government is $1 - \frac{228,589}{422,131} = 1 - .5415 = .4585$.

If this rate is cut in half, to .2293, the value of sales to consumers would be 325,360 and the subsidies would be 96,771. So subsidies will be reduced to ££ 97 million.

The results of this test are shown in Tables 5-1 through 5-5 . They are generally similar to those for Test 1, which consisted of a reduction in the direct subsidy rates on imported goods for which there was no competing domestic supply. In this case there is a domestic supply, but there is no recourse to it. That is because the structure of the model does not permit the endogenous substitution of domestically produced goods for imports and no exogenous adjustment is made. The rationale is that the imported goods are sold at prices much less than the domestic supply price even after the increase in subsidy rates. As a result, the production subsidy reduction raises prices and, thus is, again, like a decrease in real income. There is a decrease in private savings but a much more than offsetting increase in government savings. The consequences are a decline in effective demand for the output of all the sectors ranging from about 0.7 to slightly over 3 per cent. There are price declines in all but the food processing sector which are at a maximum about 3.5 per cent.

The distributional consequences of the changes embodied in this test are, likewise, virtually identical to those of Test 1, with the outstanding feature of virtually no changes of any magnitude.

Corresponding to the declines in income, there are reductions in household consumption across all income classes and producing sectors. The price changes for the consumption baskets of the various income groups are almost negligible.

20/9

Table 5-1
Output and Prices After Reduction in Subsidy
Rates on Specific Competitive Imports Provided to Producers

	GROSS OUTPUT			COMMODITY PRICES	FACTOR PRICES		
	FINAL	INITIAL	CHANGE		LAND	CAPIT AL	LABOUR
STAPLE FOOD	683.856689	455.000000	50.298157	1.206542	1.344865	1.000000	1.348507
NON-STAPLE FOOD	1243.49805	1268.000000	-1.932330	1.189432	1.344865	1.000000	1.348507
COTTON	236.627121	235.000000	0.692392	1.202193	1.344865	1.000000	1.348507
OTHER AGRICULTURE	482.718506	464.000000	4.034161	1.260007	1.344865	1.000000	1.348507
FOOD PROCESSING IND	1501.70508	1522.000000	-1.333437	1.200722	1.000000	0.960175	1.000000
TEXTILE INDUSTRY	904.174316	885.000000	2.166589	1.061821	1.000000	1.050583	1.000000
OTHER INDUSTRIES	1411.02710	1392.000000	1.366889	1.015524	1.000000	1.038141	1.000000
CONSTRUCTION	635.866699	636.000000	-0.020959	1.013614	1.000000	1.000000	0.999562
CRUDE OIL AND PRODUCTS	615.241455	609.000000	1.024869	1.112778	1.000000	1.169652	1.000000
TRANSPORT AND COMM	560.177490	577.000000	-2.915512	0.995337	1.000000	1.000000	0.952874
HOUSING	141.537186	142.000000	-0.325926	0.995627	1.000000	0.991187	1.000000
OTHER SERVICES	3139.56494	3118.000000	0.691627	1.014969	1.000000	1.000000	1.000000
TOTAL	11555.9727	11303.0000	2.238101				

Table 5-2

Labour Capital and Land Demands
After Reduction in Subsidy Rates on Specific Competitive Imports Provided to Producers

	PRIVATE SECTOR			GOVERNMENT SECTOR	
	LABOUR	CAPITAL	LAND	LABOUR	CAPITAL
STAPLE FOOD	175.49808	163.46263	99.69930	16.62631	25.89980
NON-STAPLE FOOD	236.61223	344.80493	144.13763	18.46385	54.90475
COTTON	84.43568	77.90565	43.07483	0.0	0.0
OTHER AGRICULTURE	194.42908	105.80579	158.64467	0.0	0.0
FOOD PROCESSING IND	38.31567	93.55620	0.0	15.85073	14.11923
TEXTILE INDUSTRY	53.31639	110.87692	0.0	120.69923	52.34338
OTHER INDUSTRIES	43.50436	67.50917	0.0	170.80576	295.05151
CONSTRUCTION	37.52579	38.11435	0.0	94.34360	83.96289
CRUDE OIL AND PRODUCTS	4.74302	53.87445	0.0	19.91739	249.04138
TRANSPORT AND COMM	10.95092	16.45909	0.0	164.77512	248.70049
HOUSING	49.13188	74.35309	0.0	1.10003	8.97940
OTHER SERVICES	440.20581	660.30908	0.0	875.05396	87.60168

2/5

Table 5-3
 Household Incomes by Size, Class, and Location
 After Reduction in Subsidy Rates on Specific Competitive
 Imports Provided to Producer

	YH ¹	YD ²	YET ³	YE ⁴
1	1050.27344	1029.02612	1126.50024	1016.94141
2	1138.28540	1057.81689	1157.08789	1056.40112
3	1319.33252	1147.36426	942.33691	870.96143
4	963.78882	976.08594	882.64795	771.29761
5	704.33130	697.35376	508.43481	434.97363
6	664.15869	642.90015	414.73584	379.21704

¹Gross income

²YH + subsidies - transfers - direct taxes

³YD - private savings

⁴YET - expenditures on purchases from government trade sector and imports to government trade sector - indirect taxes

2/15

Table 5-4
 Household Consumption by Income Class and Percent
 Changes After Reduction in Subsidy Rates on Specific Competitive
 Imports Provided to Producers

Section	Urban Income Recipients						Rural Income Recipients					
	Lowest Sixty Percent		Next Thirty Percent		Highest Ten Percent		Lowest Sixty Percent		Next Thirty Percent		Highest Ten Percent	
	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change
1	21.171	-3.769	13.312	-1.395	5.171	-2.427	23.725	4.980	7.375	3.874	4.787	6.368
2	156.980	-12.595	168.601	-9.646	100.537	-9.181	129.302	13.423	73.607	11.864	60.940	14.334
3	1.558	-2.610	0.286	-4.783	0.390	-2.443	1.661	3.793	0.616	2.632	0.508	1.555
4	11.929	-16.590	13.953	-14.919	10.359	-12.214	7.767	7.873	5.671	31.886	2.317	15.840
5	295.832	-8.825	257.034	-6.567	129.660	-7.650	260.084	10.863	107.377	6.736	77.676	9.712
6	66.685	-16.529	90.946	-6.434	52.233	-5.204	57.286	49.964	38.408	24.299	32.381	25.997
7	89.003	-6.900	93.568	-5.582	56.221	-3.447	53.976	19.681	33.312	42.969	26.281	34.089
8	0.0		0.0		0.0		0.0		0.0		0.0	
9	20.132	-8.075	17.451	-5.155	8.896	-5.367	13.232	12.133	5.124	9.028	3.175	13.398
10	25.984	-13.386	30.112	-33.673	163.418	-4.322	12.480	60.002	9.530	51.275	6.339	34.871
11	13.551	-18.859	33.777	-14.271	53.852	-2.619	6.647	51.068	8.157	109.157	11.498	38.533
12	192.142	-7.757	207.687	-6.950	146.864	-3.822	97.602	24.971	78.382	23.630	96.319	26.237
13	14.599	-5.814	27.844	-8.408	86.113	-3.568	16.337	40.832	24.233	24.273	24.037	28.538
Price Indices	1.1148		1.1018		1.0661		1.1373		1.1146		1.0978	

Table 5-5

Macroeconomic Variables

After Reduction in Subsidy Rates on Specific Competitive Imports Provided to Producers

18/9

	FINAL	INITIAL	CHANGE
EXPORTS	1314.5471	1265.0000	2.2198
IMPORTS	1778.2261	1940.0000	-8.3389
IMPORTS-EXPORTS	463.6790	654.0000	-29.1011
INVESTMENT	1582.9294	1567.0000	1.0166
STOCKS	121.8894	113.0000	7.8667
TOTAL INVESTMENT	1704.8186	1680.0000	1.4773
PRIVATE SAVINGS	518.8015	394.0000	31.6755
PRICE DIFFERENCE	146.3735	176.0000	-16.8332
GOVT. SAVINGS	907.8325	632.0000	43.6444
DOMESTIC SAVINGS	1426.6340	1026.0000	39.0481

GOVERNMENT SECTOR

	EXPENDITURE	REVENUE	NET
PUBLIC UNDERTAKING	0.0	1475.0427	1475.0427
CONVENTIONAL	1752.3936	1413.5107	-338.8828
TRADE	1105.1687	876.8413	-228.3274
TOTAL	2857.5623	3765.3948	907.8325

Test 6

Change in quantities of imported goods provided as production subsidies for which there is also a domestic supply.

This test will also apply to wheat, flour and maize. It will also be assumed that the quantities supplied under subsidy are reduced in this test in order to decrease government expenditures on imported goods. The reduction in quantities will be assumed to be one-half for all three goods but the subsidy rate will be assumed to stay the same.

In this case government trade imports to sector 5 are reduced by £E 211 million to £E 130 million and subsidies by 98 million to £E 84 million. Since lesser amounts of subsidized wheat, flour and maize are provided from imports, per unit of total output, more must be provided, per unit of output, from domestic production. Therefore, the domestic deliveries from sector 1, staple food, to sector 5, food processing, must rise by £E 211.

The effects of this adjustment are quite substantial, as seen in Tables 6-1 through 6-5 . The imposed shift from imports to domestic supply elicits a 50 per cent increase in output in the staple food sector at the consequence of a 21 per cent increase in price. The other sectoral adjustments reflect the conflicting influences of induced income effects and price effects. In some sectors the net effect on output is negative; in other sectors it is positive. The largest of these induced output effects is 4 per cent, in the "other agriculture" sector. Non-staple food output actually falls. It should be kept in mind as always that the results depend on the assumptions as to the availability of resources to respond to the increased demand for domestic production. Since land and labor supplies are assumed to be constrained in all the agricultural sectors, overall there is an induced increase in the use of capital. In

addition there is a sharp shift in the use of land and labor in agriculture away from non-staple food and cotton, in particular, towards staple food production.

The induced price increases in agriculture and the non-staple food sector are all about 20 per cent reflecting the pressure on domestic resources in the agricultural sectors.

The distributional effects are those which might be expected in the circumstances. In general the rural income groups benefit at the expense of the urban groups, with respect to both their gross incomes and total expenditures. The lowest classes of income recipients in urban and rural areas have the largest changes, negative and positive, respectively. This shows up, in turn, in the substantial corresponding changes in the household consumption of each group. The urban income groups are forced to reduce their consumption across the board and the rural income groups raise their consumption.

The macroeconomic changes are also quite important. Imports fall by more than 8 per cent. The trade deficit is decreased by 29 per cent and both government and private savings rise. Overall prices of the consumption baskets of the various income groups rise from 6.6 to 13.7 per cent.

This type of subsidy policy change is clearly stimulating to the economy. The extent to which the stimulation takes the form of real output or price increases depends on the availability of unused resources and/or the speed with which new resources can be supplied or existing resources transferred to the staple food sector. But the latter also will, in reality, require price increases. Thus, while subsidy reduction of this type will achieve the most obvious goals of improvement in the

balance of payments and government deficit, those achievements will come at the expense of price stability. The shifts in income distribution must also be of concern. The putative experiment of providing subsidies, where none before existed, would reduce the share of the lowest rural income classes especially. The response, in shifting from staple to non-staple food production corresponds to the recent actual changes in Egyptian agriculture. That does not imply that subsidization of staple foods is alone responsible for the observed shift but it does suggest that such subsidization may have been an influence contributing to the shift in the use of agricultural resources.

This is a test which provides a different type of general equilibrium analysis of the old issues of the effects on the domestic economy of an exogenous supply of food aid. In this case much of the grain is purchased at especially favorable prices. The outcomes are not uniform in all the sectors and in some sectors the impact is rather perverse. Yet the overall effects on incomes and output correspond to what might have been expected from previous partial equilibrium analyses.

542

Table 6-1
 Output and Prices After Reduction in Quantities of
 Competitive Imports of Staple Food Provided
 Provided under Subsidy to Food Processing Industry

	GROSS OUTPUT			COMMODITY PRICES	FACTOR PRICES		
	FINAL	INITIAL	CHANGE		LAND	CAPITAL	LABOUR
STAPLE FOOD	683.856689	455.000000	50.298157	1.206542	1.344865	1.000000	1.348507
NON-STAPLE FOOD	1243.49805	1266.000000	-1.932330	1.189432	1.344865	1.000000	1.348507
COTTON	236.627121	235.000000	0.692392	1.202193	1.344865	1.000000	1.348507
OTHER AGRICULTURE	482.718506	464.000000	4.034161	1.260007	1.344865	1.000000	1.348507
FOOD PROCESSING IND	1501.70508	1522.000000	-1.333437	1.200722	1.000000	0.960175	1.000000
TEXTILE INDUSTRY	904.174316	885.000000	2.166589	1.061821	1.000000	1.050583	1.000000
OTHER INDUSTRIES	1411.02710	1392.000000	1.366889	1.015524	1.000000	1.038141	1.000000
CONSTRUCTION	635.866699	636.000000	-0.020959	1.013614	1.000000	1.000000	0.999562
CRUDE OIL AND PRODUCTS	615.241455	609.000000	1.024869	1.112778	1.000000	1.169652	1.000000
TRANSPORT AND COMM	560.177490	577.000000	-2.915512	0.995337	1.000000	1.000000	0.952874
HOUSING	141.537186	142.000000	-0.325926	0.995627	1.000000	0.991187	1.000000
OTHER SERVICES	3139.56494	3118.000000	0.691627	1.014969	1.000000	1.000000	1.000000
TOTAL	11555.9727	11303.0000	2.238101				

Table 6-2
Labour Capital and Land Demands
After Reduction in Quantities of Competitive Imports
of Staple Food Provided Under Subsidy to Food Processing Industry

	PRIVATE SECTOR			GOVERNMENT SECTOR	
	LABOUR	CAPITAL	LAND	LABOUR	CAPITAL
STAPLE FOOD	175.48808	163.46263	99.69930	16.62631	25.89980
NON-STAPLE FOOD	236.61223	344.80493	144.13763	18.46385	54.90475
COTTON	84.43568	77.90565	43.07483	0.0	0.0
OTHER AGRICULTURE	194.42908	105.80579	158.64467	0.0	0.0
FOOD PROCESSING IND	38.31567	93.55620	0.0	15.85073	14.11923
TEXTILE INDUSTRY	53.31839	110.87692	0.0	120.69923	52.34318
OTHER INDUSTRIES	43.50436	67.50917	0.0	170.80576	295.05151
CONSTRUCTION	37.52579	38.11435	0.0	94.34360	83.96289
CRUDE OIL AND PRODUCTS	4.74302	53.87445	0.0	19.91739	249.04138
TRANSPORT AND COMM	10.95092	16.45909	0.0	164.77512	248.70049
HOUSING	49.13188	74.35309	0.0	1.10003	8.97940
OTHER SERVICES	440.20581	660.30908	0.0	675.05396	67.60168

2/19

Table 6-3
 Household Incomes by Size, Class, and Location
 After Reduction in Quantities of Competitive Imports of Staple Food
 Provided Under Subsidy to Food Processing Industry

	YH ¹	YD ²	YET ³	YE ⁴
1	1050.27344	1029.02612	1126.50024	1016.94141
2	1138.28540	1057.81689	1157.08789	1056.40112
3	1319.33252	1147.36426	942.33691	870.96143
4	963.78882	976.08594	882.64795	771.29761
5	704.33130	697.35376	508.43481	434.97363
6	664.15869	642.90015	414.73584	379.21704

¹Gross income

²YH + subsidies - transfers - direct taxes

³YD - private savings

⁴YET - expenditures on purchases from government trade sector and imports to government trade sector - indirect taxes

Table 6-4

245

Household Consumption by Income, Class, and Percent
Changes After Reduction in Quantities of Competitive Imports of Staple
Food Provided Under Subsidy to Food Processing Industry

Section	Lowest Sixty Percent Level		Urban Income Recipients Next Thirty Percent Level		Highest Ten Percent Level		Rural Income Recipients Lowest Sixty Percent Level		Next Thirty Percent Level		Highest Ten Percent Level	
		% change		% change		% change		% change		% change		% change
1	21.171	-3.769	13.312	-1.395	5.171	-2.427	23.725	4.980	7.375	3.874	4.767	6.358
2	156.980	-12.595	168.601	-9.646	100.537	-9.181	129.302	13.423	73.607	11.864	60.940	14.334
3	1.558	-2.610	0.286	-4.783	0.390	-2.443	1.661	3.793	0.616	2.632	0.508	1.555
4	11.929	-16.580	13.953	-14.919	10.359	-12.214	7.767	7.873	5.671	31.886	2.317	15.840
5	295.832	-8.835	257.034	-6.567	129.660	-7.050	260.084	10.863	107.377	6.736	77.676	9.712
6	66.685	-16.539	90.946	-6.434	52.233	-5.204	57.286	49.964	38.408	24.299	32.381	25.997
7	89.003	-6.900	93.568	-5.582	58.221	-3.447	53.976	19.681	33.312	42.969	26.281	34.889
8	0.0		0.0		0.0		0.0		0.0		0.0	
9	20.132	-8.075	17.451	-5.155	8.896	-5.367	13.232	12.133	5.124	9.028	3.175	13.398
10	25.984	-13.386	30.112	-33.673	163.418	-4.322	12.480	60.002	9.530	51.276	6.339	34.871
11	13.551	-18.859	33.777	-14.271	53.852	-2.619	6.047	51.068	8.157	109.157	11.498	38.533
12	192.142	-7.757	207.687	-6.950	146.864	-3.822	97.602	24.971	78.382	23.030	96.319	26.237
13	14.599	-5.814	27.844	-8.408	86.113	-3.568	16.337	40.832	24.233	24.273	24.037	28.538

Price
Indices

1.1148

1.1018

1.0661

1.373

1.1146

1.0978

215

Table 6-5
 Macroeconomic Variables
 After Reduction in Quantities of Competitive Imports
 of Staple Food Provided under Subsidy to Food Processing Industry

	FINAL	INITIAL	CHANGE
EXPORTS	1314.5471	1286.0000	2.2198
IMPORTS	1778.2261	1940.0000	-8.3389
IMPORTS-EXPORTS	463.6790	654.0000	-29.1011
INVESTMENT	1582.9294	1567.0000	1.0166
STOCKS	121.8894	113.0000	7.8667
TOTAL INVESTMENT	1704.8186	1680.0000	1.4773
PRIVATE SAVINGS	518.8015	394.0000	31.6755
PRICE DIFFERENCE	146.3735	176.0000	-16.8332
GOVT. SAVINGS	907.8325	632.0000	43.6444
DOMESTIC SAVINGS	1426.6340	1026.0000	39.0481

GOVERNMENT SECTOR

	EXPENDITURE	REVENUE	NET
PUBLIC UNDERTAKING	0.0	1475.0427	1475.0427
CONVENTIONAL	1752.3936	1413.5107	-338.8828
TRADE	1105.1687	876.8413	-228.3274
TOTAL	2857.5623	3765.3948	907.8325

Test 7

This is a test of the differential effects of change in the production subsidy rate on textiles which are assumed to be imported but for which there is also a direct supply. For this test production subsidies on textiles will be reduced by 20%, i.e. 17 from 86 to 69.

Qualitatively this test is analogous to Test 5. The precise results are shown in Tables 7-1 through 7-5. The magnitude of the change in that test, however, is substantially larger. The results are, in general, also qualitatively similar. The overall effect is deflationary for the same reasons which explain the impact of other types of reductions in subsidy rates. In this case, however, the output effects and price effects are concentrated in the textile rather than the agricultural and food processing sectors.

The balance of payments deficit is reduced as a result of the general deflation in the economy and the government deficit also is reduced, primarily because of the reduction in government spending on the textile subsidies.

195

Table 7-1
 Output and Prices
 After A Reduction in Competitive Imports Provided
 Under Subsidy to the Textiles Industry

	GROSS OUTPUT			COMMODITY PRICES	FACTOR PRICES		1950
	FINAL	INITIAL	CHANGE		LAND	CAPITAL	
STAPLE FOOD	454,273,522	455,000,000	-0.159630	0.994826	0.991731	1.000000	0.992031
NON-STAPLE FOOD	1265,10359	1266,000,000	-0.228006	0.995238	0.991731	1.000000	0.992031
COTTON	234,200,333	235,000,000	-0.340264	0.995268	0.991731	1.000000	0.992031
OTHER AGRICULTURE	462,559,570	464,000,000	-0.310437	0.993716	0.991731	1.000000	0.992031
FOOD PROCESSING IND.	1518,52344	1522,000,000	-0.228421	0.997391	1.000000	0.993092	1.000000
TEXTILE INDUSTRY	874,900,635	885,000,000	-1.141171	1.022246	1.000000	0.973939	1.000000
OTHER INDUSTRIES	1390,00105	1392,000,000	-0.137855	0.998680	1.000000	0.996197	1.000000
CONSTRUCTION	625,903,809	636,000,000	-0.015124	0.999421	1.000000	1.000000	0.999623
CRUDE OIL AND PRODUCTS	609,416,016	609,000,000	-0.095892	0.990238	1.000000	0.985338	1.000000
TRANSPORT AND COMM.	575,027,053	577,000,000	-0.341585	0.997698	1.000000	1.000000	0.99424
HOUSING	141,524,979	142,000,000	-0.334522	0.994638	1.000000	0.990710	1.000000
OTHER SERVICES	3112,78833	3118,000,000	-0.167148	0.999921	1.000000	1.000000	1.000000
TOTAL	11273,2969	11301,0000	-0.262790				

955b

Table 7-2
 Land, Labor and Capital Demands
 After A Reduction in Competitive Imports Provided under
 Subsidy to the Textile Industry

	PRIVATE SECTOR			GOVERNMENT SECTOR	
	LABOUR	CAPITAL	LAND	LABOUR	CAPITAL
STAPLE FOOD	128.13277	87.80174	72.62091	13.02005	14.92277
NON-STAPLE FOOD	222.49170	292.12036	165.59634	23.20251	50.75666
COTTON	42.02150	62.40014	40.83214	0.0	0.0
OTHER AGRICULTURE	197.18976	78.94133	160.51123	0.0	0.0
FOOD PROCESSING IND.	39.67117	93.65532	0.0	16.27925	14.02030
TEXTILE INDUSTRY	48.97957	109.86966	0.0	114.05489	53.35735
OTHER INDUSTRIES	41.78175	67.56593	0.0	163.87326	294.90512
CONSTRUCTION	37.52568	38.11887	0.0	94.34370	83.97318
CRUDE OIL AND PRODUCTS	3.99900	53.92009	0.0	16.77576	248.90635
TRANSPORT AND COMM.	10.95143	17.17758	0.0	164.77570	259.54590
HOUSING	49.11963	74.35477	0.0	1.09967	8.97849
OTHER SERVICES	436.45142	654.67749	0.0	867.59082	86.85455

095

Table 7-3
 Household Incomes by Size, Class, and Location After Reduction
 in Competitive Imports Provided Under Subsidy to the Textile Industry

	YH ¹	YD ²	YET ³	YE ⁴
1	1037.78198	1016.78735	1113.10205	1009.84612
2	1121.19092	1041.93091	1138.71118	1040.53638
3	1299.17964	1130.01221	928.08569	857.78955
4	715.50464	724.63379	655.26660	572.60156
5	530.45312	525.19800	382.91748	327.59155
6	499.51099	483.52246	311.92090	285.20728

¹Gross income

²YH + subsidies - transfers - direct taxes

³YD - private savings

⁴YET - expenditures on purchases from government trade sector and imports to government trade sector - indirect taxes

955

Table 7-4
 Household Consumption and Percent Change By
 Income, Class and Location After Reduction in Competitive
 Imports Provided Under Subsidy to the Textile Industry

Section	Lowest Sixty Percent Level		Urban Income Recipients Next Thirty Percent		Highest Ten Percent		Rural Income Recipients Lowest Sixty Percent Level		Next Thirty Percent		Highest Ten Percent	
	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change	Level	% change
1	21.993	-0.034	13.498	-0.018	5.298	-0.030	22.571	-0.127	7.087	-0.184	4.451	-0.197
2	179.355	-0.137	186.325	-0.147	110.549	-0.137	113.611	-0.341	65.442	-0.544	53.028	-0.436
3	1.660	-0.028	0.300	-0.072	0.400	-0.035	1.598	-0.102	0.599	-0.128	0.500	-0.050
4	14.249	-0.075	16.380	-0.123	11.791	-0.078	7.185	-0.211	4.224	-1.758	1.998	-0.531
5	123.972	-0.163	274.648	-0.150	140.141	-0.185	233.716	-0.377	100.214	-0.343	70.527	-0.385
6	77.753	-0.687	96.132	-1.099	54.385	-1.298	36.719	-3.677	30.199	-2.267	25.168	-2.070
7	55.347	-0.307	98.705	-0.298	60.124	-0.292	44.913	-0.415	22.979	-1.379	19.440	-0.615
8	0.0		0.0		0.0		0.0		0.0		0.0	
9	21.917	0.076	18.404	0.023	9.406	0.003	11.792	-0.066	4.692	-0.176	2.796	-0.130
10	29.225	-0.573	44.589	-1.725	170.101	-0.409	7.716	-1.081	6.209	-1.448	4.666	0.722
11	16.642	-0.346	39.242	-0.401	55.238	-0.113	4.373	-0.623	3.806	-2.428	2.252	0.579
12	267.439	-0.413	222.232	-0.434	152.110	-0.386	77.641	-0.588	62.891	-0.819	75.773	-0.690
13	15.647	-0.344	30.223	-0.583	88.904	-0.443	11.493	-0.926	19.343	-0.807	16.565	0.723
Price Indices	0.9993		0.9997		0.9992		0.9998		0.9998		0.9999	

Table 7-5

155

Macroeconomic Variables
After Reduction in Competitive Imports Provided
Under Subsidy to the Textiles Industry

	FINAL	INITIAL	CHANGE
EXPORTS	1287.5042	1286.0000	0.1170
IMPORTS	1935.3645	1940.0000	-0.2389
IMPORTS-EXPORTS	647.8604	654.0000	-0.9388
INVESTMENT	1506.2151	1567.0000	-0.0501
STOCKS	113.8519	113.0000	0.7539
TOTAL INVESTMENT	1680.0669	1680.0000	0.0040
PRIVATE SAVINGS	391.0791	394.0000	-0.7413
PRIVATE DIFFERENCE	177.0580	176.0000	0.6012
GOVT. SAVINGS	816.3020	632.0000	29.1617
DOMESTIC SAVINGS	1207.3811	1026.0000	17.6785
GOVERNMENT SECTOR			
	EXPENDITURE	REVENUE	NET
PUBLIC UNDERTAKING	0.0	1404.7275	1404.7275
CONVENTIONAL	1710.7361	1320.3721	-390.3640
TRADE	1265.1057	1067.0442	-198.0615
TOTAL	2975.8418	3792.1438	816.3020

Conclusions

In spite of its length, this paper has not exhausted the analysis of subsidy policies, having confined itself to conditions under which there is rationing when there are direct subsidies and avoiding a full and explicit analysis of the pricing implications of production subsidies. Nonetheless some new emphases, if not completely novel conclusions, emerge.

The quantitative, general equilibrium tests confirm the preceding partial equilibrium analyses which indicated that the effects of subsidy policies will vary depending on the character of the change, the demand conditions for the commodities to which the policies are applied and the conditions of domestic production.

Recent analyses of subsidy policies using a general equilibrium model have emphasized the deflationary effects of reductions in food subsidies. Results presented here demonstrate that this result is obtained when the policy change consists of an increase in the prices at which the rationed and subsidized goods are sold. When the policy change is a decrease in the amounts made available, the overall and sectoral effects can be quite different and may, in the aggregate, be stimulating. The different results are a consequence of the domestic supply response to decreases in subsidized supply. It may be inferred that there would be analogous reactions to a decrease in subsidies resulting from an increase in price, if the price increase was sufficient to decrease, if not eliminate, the need for rationing. In this latter case also there would be some "spillover" to the domestic market.

The GEM models provide a general equilibrium framework for the analysis of alternative subsidy policies. The model thus can provide a more satisfactory answer to the questions raised a number of years ago as to the effects of the provision of food to developing countries under economic assistance programs. Some of the conclusions previously reached were confirmed and all were

substantially enriched. In general the analyses showed that the distributional effects of reducing subsidy rates tend to be regressive while the effects of reducing the quantities of subsidized imports tend to shift the distribution of income toward the agricultural sector.

Table 8 shows in a summary fashion the distributions of disposable income and total consumption expenditures which result from each test of subsidy policy. There are changes which shift incomes from rural to urban groups or vice versa and from lower to upper income groups and vice versa.

Obviously the results produced by the tests which have been made only illustrate the many outcomes which are possible. It is also obvious from these exercises, which show a diversity and a ramification of implications that have not heretofore been made explicit, that subsidy policies have in the past been made without full consideration of their implications. The tools which have been used here to analyze these implications are far from adequate, but they can be used to produce more insights and policies which are more likely to achieve the effects desired than any other analytical methods now available.

Table 8

Distributions of Disposable Income

Income Class	Initial Condition	Test						
		1	2	3	4	5	6	7
Urban								
Lowest 60%	.206	.205	.200	.206	.194	.209	.185	.207
Mid 30%	.212	.213	.206	.219	.201	.214	.191	.212
Upper 10%	.229	.236	.226	.231	.220	.232	.207	.230
Rural								
Lowest 60%	.147	.145	.154	.147	.161	.144	.176	.147
Mid 30%	.107	.105	.111	.106	.117	.105	.126	.107
Upper 10%	.098	.096	.103	.097	.108	.096	.116	.098

Distributions of Total Consumption Expenditure

Income Class	Initial Condition	Test						
		1	2	3	4	5	6	7
Urban								
Lowest 60%	.246	.245	.239	.245	.232	.248	.225	.245
Mid 30%	.254	.257	.248	.255	.242	.257	.233	.254
Upper 10%	.210	.215	.205	.211	.201	.211	.192	.210
Rural								
Lowest 60%	.140	.138	.149	.140	.157	.137	.170	.140
Mid 30%	.080	.078	.086	.080	.091	.078	.096	.080
Upper 10%	.070	.068	.073	.069	.077	.068	.084	.070

Footnotes

1. See Taylor, L. (1979-1) and (1979-2).
2. Eckaus, R.S., McCarthy, F.D. and Mohie Eldin, A. (1979).
3. Taylor, L., (1979-1).
4. Taylor, L., (1979-1).
5. Taylor, L., (1979-2); McCarthy, F.D. and Taylor, L. (1980).
6. Fisher, F.M., (1963), and Schultz, T.W. (1960).
7. See Neary, J.P. and Roberts, K.W.S. (1980) for an enlightening general equilibrium analysis of household behavior when there is rationing.
8. Eckaus, R.S., McCarthy, F.D. and Mohie Eldin, A. (1979).
9. Taylor, L., (1979-2).
10. See Fisher, F. (1963) for a corresponding result.

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3. McCarthy, F.D. and Taylor, H., "Macro Food Planning Policy: A General Equilibrium Model For Pakistan," The Review of Economics and Statistics, 62, 1, Feb., 1980, 107-121.
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