EGYPTIAN PUBLIC FOOD PROGRAM STUDY

Report on Task 5—Food Subsidies and the Government Budget in Egypt

Prepared by
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Under Grant No. AID/DSAN-G-0259, Project No. 931-1275.

Submitted to U.S. Agency for International Development, January 1984.

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SUMMARY

This report examines the evolution of public expenditures on subsidies and their budgetary implications. A broad approach is deliberately taken in order to highlight the importance of economic and political changes in Egypt. It is neither possible to understand the role of public subsidies nor to place them in proper perspective without an appreciation of the changing political circumstances both internal and external. Further, the report goes beyond the question of public revenues and expenditures. It examines the public sector activities in the context of broad sectoral balances, both domestic and external.

The process of economic liberalization following a decade of repression (1965-1974) is proceeding. Marked changes have occurred in all sectors of the economy. Private investment is now a much greater proportion of total investment, the volume of foreign transactions at the free market exchange rate is possibly as much as one half of all such transactions, and foreign trade has risen from 15 percent of GDP in 1972 to 45 percent in 1980. But the liberalization proceeds fitfully, and is still surrounded by much uncertainty as emerging political and economic groups seek to form new alliances, and have a voice in the allocation of resources. In all this, the role of the state is changing--emphasis has been on investment, spurred by the revenues from petroleum exports, and on subsidies and transfers.

Much attention has been focussed on the growth of these subsidies and their increasing importance or even domination in the country's public finances. It is certainly true that since the mid-1970s real per capita subsidies have risen in an unprecedented fashion. It is important to note that while the increase in 1974 was due in part to the rise in world commodity prices subsidy levels did not fall when those prices retreated from their peaks. Clearly other forces were operating. These included the end of military conflicts with the October War in 1973, the rise in export receipts, and the political and economic liberalization of the al-infitah policy. The rise in subsidies was not a happenstance event, triggered by world commodity prices and perpetuated by a government lacking the political will or the administrative capacity to control them. Despite the pervasiveness of this view, it is argued that the rise in subsidies was a reflection of deliberate economic policies and changing political circumstances.

The growth in subsidies took place at a time when the total resources available to the economy were expanding. In fact less than one seventh of the growth in resources between 1970 and 1981 was dedicated to increased subsidies. Overall

public investment has risen faster than public consumption. Investment and subsidies have claimed an increased share of total public expenditures. If health and education expenditures are included as investment then the recent rise in subsidies has not outstripped investment.

The budget deficits have risen, but a level of expenditure which would be consistent with external balance would have required cuts in expenditures far in excess of the subsidies. They alone cannot account for the increased foreign borrowing nor the domestic credit creation. Extra resources have come from external aid, borrrowings and a surge in foreign exchange receipts. However, it would be a gross overstatement to claim Egypt has simply consumed these. In comparison to the growth in total command over resources and the restructuring of the social priorities in the Egyptian economy, the growth of food subsidies seems more modest than frequently portrayed.

1. INTRODUCTION

Recent developments in Egyptian food policy have focussed attention on the increasing role of government intervention in food markets. The system of food subsidies has become a major tool of Egyptian social welfare policy. The magnitude of the system is such that its ramifications are felt in all sectors of the economy. The revenues and expenditure of the central government, the incidence of the taxes and the benefits, and the effect on other elements of public expenditure are all clearly related to the government's role in food production, marketing and foreign trade.

Developments in the last decade are often seen as a new dimension of Egyptian policy. Certainly it is true that social expenditures on food subsidies have risen both in real terms and as a proportion of the gross domestic product. However, it is perhaps useful to recall that the state's role in the food sector is neither novel nor large, by historical comparison.

State granaries have existed in Egypt since Pharaonic times. In a society whose entire economic life blood is a quasi-public good, it is not surprising that the role of the state should have been more extensive than in other societies. And when the production and consumption of food represents a large proportion of total economic activity, it is of no further surprise to find that state intervention was an important feature of Egyptian grain markets. Controls over foreign trade, retail price fixing, subsidized sales from state granaries, the provision of market inspectors (a wheat police), heavy taxes (often in the form of forced deliveries) on merchants and brokers, controls on milling rates and the weight of the loaf, public distribution to the indigent--all these were hallmarks of Egyptian food policy in Pharaonic times through the eras of the Fatimids and the Mamluk Sultans, moderating only perhaps in the middle of last century with the demise of Mohammed Ali and his successors. After military endeavors, it is unlikely that any other single factor has been as important an influence on Egyptian public expenditures as its food policy. These expenditures have been greater or less in the past depending on the policies and attitudes of the rulers of the time, the external fortunes of the country, the conditions of the harvest, and the level of military expenditures. That the extend of public involvement in food markets and the associated government costs is currently seen as being "high" or "excessive," needs to be tempered by the historical record.

None of this is to suggest that the current fiscal impact of food policies is in any way insignificant. In fact quite the contrary is true--and the ramifications are so widespread that to disentangle them is not a trivial task. In undertaking

such a task, it is vital that the fiscal aspects of the subsidies be viewed in a broader political and economic context. For this reason, aspects of the political economy of subsidies are discussed in the next section.

After reviewing the evolution of government revenue and expenditure (Section 3), particular attention is focussed on the levels of public investment, in an attempt to reveal any crowding out of investment by subsidies. In the following section, a perspective on subsidies and the internal and external balances is given through a model of the type used in financial programming. The final section provides a synthesis of the government budget and the financing of its deficits, integrating the monetary and external sectors.

2. THE POLITICAL AND ECONOMIC SETTING

An increasing share of the gross domestic produce falling in the public domain has characteristized industrial countries for over a century. One theory to account for this has been the "ratchet effect" of wars. Large government bureaucracies were built up during period of military endeavor and never fully dismantled. So that after each successive round of war, the size of the government sector was increased. While this theory finds some superficial support, it does not explain why neither the level nor the growth of the public sector differs between combatants and non-combatants in World War II.

Peltzman[1/] notes that government spending on subsidies and transfers has grown faster than other elements of public expenditures. In fact, amongst industrial countries subsidies and transfers represent an average of 55 percent of total public expenditures. He argues that a decline in income inequality and the emergence of a politically articulate, homogeneous middle class has accounted for a major growth in government in the last fifty years. In fact more equality generated a political demand for still more income equalization, and hence a growing demand for subsidy and transfer programs. He concludes "there is nothing inevitable or inexorable about the growth of government, nor is there some arbitrarily limiting ratio of government to GNP. Instead, our argument is that the size of the government responds to the articulated interests of those who stand to gain or lose from politicization of the allocation of resources."

Peltzman demonstrates that the same measures describing inequality and political articulateness are useful in explaining the variation across LDC's in the ratio of public expenditure to gross domestic product (G/GNP). Further, LDCs appear to be following a similar path to developed countries. When the levels of the characteristics of LDCs are used as explanatory variables all the difference between the LDCs and DCs in the G/GDP ratio is explained. He concludes "as (if) the LDCs overall level of economic development, their degree of income inequality and the (personal) characteristics of their population approach those of contemporary DCs, the recent slow growth of LDCs' government sectors will accelerate." He notes that the extent to which the gap is closed will vary with political developments. Any impediment to the evolution of democratic political institutions will tend to dampen the growth in the public sector.

1/ S. Peltzman, "Growth of Government" Journal of Law & Economics (23), 1980: 209-285.

Since 1973 Egypt has undergone a series of important economic and political changes. At the time of the October War with Israel the economy had been supporting a major military effort for eight years. Real personal incomes had grown little if at all for much of the population. Per capita consumption of wheat, the major staple had fallen. Since the Suez War of 1956, the economic and political orientation of Egypt had been increasingly dominated by its relation with the Eastern bloc countries. Trade, much of it bilateral and even barter, had been with Eastern Europe and the Soviet Union. Foreign investment and aid from western countries had all but dried up. Planning and management systems had evolved which placed heavy emphasis on the materials planning approach and the use of highly centralized controls. Little if any reliance was placed on the use of market signals as allocative devices. The economy had faced severe restrictions on foreign exchange, and the import of investment goods had been neglected in order to acquire war materials.2/ As a consequence the immediate post-war outlook was bleak; a large and inefficient bureaucracy, a depleted capital stock, shortages of parts and raw materials, and foreign debt repayments beyond the capacity of the country to generate foreign exchange. There is evidence that foreign policy and economic concerns were closely linked throughout this period.

In 1956, the nationalization of the Suez Canal and the appeal to the Soviet Union were Egypt's response to gaining control of the resources needed to build the Aswan High Dam and expand agricultural output. The action was in large part precipitated by the refusal of the USA and UK to back a loan for the extension of the dam. To some extent the union with Syria in the United Arab Republic can be seen as an attempt to acquire access to more agricultural land and produces. Furthermore, the need for economic support from other Arab nations was not unrelated to political and military decisions. Sadat reported that the country had reached the "zero stage" economically in 1973 and could not have met debt repayments or purchased foreign wheat in 1974. "But as soon as the battle of October 6 war was over, Arab brethren came to our aid with $500m-- this sum would never have come had we not taken effective action as regards the battle."3/

2/ In part from 1967 to 1973 imports of food were significantly lower and chemicals higher than in other years. See Grant M. Scobie, Food Subsidies: Their Impact on Foreign Trade and Exchange in Egypt, Research Report No. 40, International Food Policy Research Institute, Washington, D.C. August 1983.

3/ Cited by J. Waterbury, "The Opening," American University Field Staff Reports (Northeast Africa) 20 (1975): 1-8.

The economic and political motives were clearly intertwined in all of these manouvers; and they continued to do so be. The economic policy which evolved after the October war placed new reliance on restoring trade and investment with western countries and with encouraging private economic activity in the domestic sector. These strategies were formally cast in the form of Law 43 of 1974, and have become known as Al-infitah, or the opening. It was both an economic and political opening.

At first glance there is an irony in the fact that the new economic order with its greater reliance on market signals, foreign trade and investment and private economic activity has been accompanied by burgeoning public sector consumption. It was the announced policy for the public sector to withdraw from some of the areas which it had dominated. While public consumption as a proportion of gross domestic product had grown quite modestly, expenditure on subsidies now represents a major share of public consumption expenditure.

There has been a tendency to attribute this increase to the rise in commodity prices in 1973-74. Certainly subsidy expenditures rose in these years; but importantly, they did not decline subsequently. The growth in real per capita expenditures on subsidies fails to support the hypothesis that the large rise in subsidy expenditures was simply a transitory phenomenon associated with a temporary rise in world market prices.

An alternative view is suggested by the model of government expenditures developed by Peltzman. The economic changes were both accompanied by, and engendered changes in the nature of the country's politics. Access to new economic resources had lead to new discussion as to their allocation. Choucri and Eckaus[4/] note that "liberalization of domestic politics had made it possible for political groups of diverse persuasions to emerge and make demands upon the system" (p. 79). The economic opening has been in effect coupled with a corresponding political opening, in which an increasingly vocal and powerful vox populi has strengthened the government's commitments to social policies whose origins lay in the 1952 revolution. Their expression has simply been quelled by the long periods of hardship imposed by military endeavors. The strength of those forces has been demonstrated in the reaction to attempts to limit their access to economic and political power for instance in the food riots of January 1977.

4/ N. Choucri and R. S. Eckaus, "Interactions of Economic and Political Change: The Egyptian Case," World Development, 7 (1979): 783-797.

The riots of 1977 were only one in a series of such disturbances which characterized the merging political and economic circumstances. In 1975 workers from the Helwan iron and steel plant had rioted chanting "Ya batal al-Ubur, fee alfutur," or hero of the (canal) crossing, where is our breakfast?" These events occurred at a time when the economy's command over resources was growing in an unprecedented manner.5/ The next section examines these trends.

5/ H. Alderman, J. von Braun, S. A. Sakr, Egypt's Food Subsidy and Rationing System: A Description, Research Report 34, (Washington, D.C.: International Food Policy Research Institute, October 1978), pp. 59-62.

3. THE GOVERNMENT BUDGET

The large share of total revenues comes from indirect taxes. These comprise taxes on goods and services, foreign trade taxes and consumption excises (Table 1). Such dependence on indirect taxation reflects ease of collection rather than ability to pay.

Taxation has kept pace with economic growth, but has not shifted markedly in the decade, as indicated by a GDP elasticity of 1.03. Personal income taxes have remained a minor portion of the tax burden; their share of government revenues has declined from a high of 3.6% in 1973 to 1.8% in 1978. During this period private incomes of professionals and entrepreneurs have grown while the government's ability to monitor and tax such incomes has lagged.

In recent years, however, business profit taxes have risen faster than GDP. Much of the revenues come from the petroleum sector and the Suez Canal. Assessment of profits of private sector business is weak and public sector profits are fairly small, even if easier to tax. Property taxes have remained fairly constant in nominal terms despite inflation and a significant real estate boom.

Taxes on goods and services are one of the major sources of indirect tax revenues. Their share of GDP has declined from about 5.5% in the early 1970s to around 4.5% in the later 1970s. The excise tax structure has been characterized by a widespread use of specific (as opposed to ad valorem) duties, a narrowly based tax structures, and considerable latitude of public enterprises in sales tax assessment and timing of payment. On July 1981, the government passed a new consumption tax law that seeks to unify tax rates between domestically produced and imported commodities, unify tax rates on the same commodities, and to base taxes of imported commodities on their value.

Foreign trade taxes are the major source of indirect tax revenues and their share in GDP has tended to increase considerably due to the rapid growth of import after 1974 and the progressive devaluations of the Egyptian pound.

Table 2 shows the evolution of total resource use in the Egyptian economy over a 32 year period from 1950 to 1981. In the first part of the table the flows are shown in nominal terms. However, over this period inflation has accelerated making the use of deflated data almost obligatory.

Table 1

Government Revenue

(LE million)

	1970/71	1972	1973	1974	1975	1976	1977	1978	1979
Direct taxes	162	170	178	197	256	345	460	613	743
Indirect taxes	457	472	499	552	784	996	1530	1563	1841
Foreign trade taxes	196	194	205	231	400	538	979	920	904
Other taxes	39	39	43	59	63	86	97	141	213
Local government revenue	56	58	60	67	92	89	114	142	156
Total government taxes revenue	619	642	677	749	1040	1341	1990	2176	2584
Non-tax revenue	61	80	77	97	120	101	113	119	230
Total government revenue	680	722	754	846	1160	1442	2103	2295	2814
GDP at market prices	3203	3390	3808	4339	5218	6727	8283	9671	12409

Source: Ministry of Finance, Cairo 1981

Table 2

(a) Egypt: Availability and Use of Resources (LEm. Current Prices)

	1950	1955	1960	1965	1970	1975	1979	1981
GNP	918	1047	1446	2322	3007	4713	13213	21592
Net Imports	-16	-1	+6	+107	+191	+1122	+1095	+1739
Total Available	902	1046	1452	2429	3198	5835	14308	23331
Gross Investment	110	154	192	44	426	1329	3812	5150
Consumption								
- Public	136	185	242	455	756	1213	2375	3630
- Private	656	707	1018	1560	2016	3293	8121	14551
Total Use	902	1046	1452	2429	3198	5835	14308	23331

Source: K. Ikram and IBRD, Unpublished data and IMF

(b) In Constant 1975 LE Per Capita

Gross Investment	10	12	13	22	17	36	61	60
Consumption								
- Public	13	14	17	24	31	33	38	42
- Private	62	54	71	83	81	89	130	168
Total Use	85	80	101	129	129	158	229	270
Pop. (mill.)	20	23	26	29	33	37	41	43
CPI[a/] (1975=100)	53	57	55	65	75	100	152	201

a/ CPI: consumer price index

Sources: as for Table 2(a)

Furthermore, the population has more than doubled over the same period, and for this reason the second part of Table 2 gives the pattern of resource in constant LE (1975) expressed on a per capita basis. It is important to interpret these data in the context of the political and economic background sketched in section 2. The total command over resources had been growing albeit erraticaly, since 1950. But with heightened military expenditures, and changing foreign and economic policies, the period from 1965 to 1975 saw no real growth in income. Over the same decade real private consumption was virtually static, having initially fallen.

Since the mid-1970s a marked recovery has occurred. A more open economy, greater investment, resumed flows of aid and substantial foreign exchange earnings (from petroleum, the canal tourism and remittances) have all contribute to doubling the real per capita command over resources since 1970. It is important to note that real investment and private consumption have risen more rapidly than public consumption. A more detailed breakdown of the flow of resources is given in Table 3. The widely recognized increase in public expenditures on subsidies is immediately evident.

In real per capita terms the expenditures on subsidies have also risen substantially. The impression of burgeoning public expenditures on subsidies is reinforced by noting their increased share in gross domestic product (10 percent), in total public expenditures (50 percent) and as share of gross investment (50 percent). (see Table 4).

How has it been possible to accommodate these rises in expenditures on subsidies? The answer lies principally in the expanded total command of resources that the Egyptian economy has enjoyed since 1973. Between 1970 and 1981 subsidy expenditure rose rapidly in nominal terms. However, the real available resources grew by LE140 per capita in this period (see Table 2); the real increase in subsidies was about LE20 per capita. From 1975 to 1981 the growth in resources was about LE120 per capita, while real subsidies grew by LE7 per capita. In other words, during the period of rapidly expanding subsidy expenditures, only 6 percent of the increase in total available resources was dedicated to increased subsidies.

Table 3

Egypt: Sources and Uses of Total Resources

Year	Gross Domestic Product	Investment			Consumption					Total Expenditure on Consumption and Investment	Net Factor Income	Balance[b]/ (Net Exports)
		Gross Domestic Investment	Education Health	Total	Public			Private	Total			
					Subsidies	Other[a]/	Total					
	LEm	LEm	LEm	LEm	LEm	LEm	LEm	LEm	LEm	LEm	LEm	LEm
1950	930	110	27	137	8	81	89	656	745	882	-12	+36
1955	1056	154	39	193	5	113	118	707	825	1018	-10	+28
1960	1443	192	73	265	12	138	150	1018	1168	1433	[illegible]	+13
1965	2340	414	123	537	35	332	367	1556	1923	2460	-18	-138
1970	3058	426	193	619	24	563	587	2016	2603	3222	-52	-216
1975	4861	1329	285	1614	622	928	1550	3293	4843	6457	-148	-1744
1979	12409	3812	480	4292	1370	1895	3265	8121	11386	15678	1143	-2126

(a) Total Current Expenditures Less Education and Health

(b) Calculated from GNP ≡ GDP + NFI ≡ C + I + (X-M).

Source: IBRD, unpublished sources and K. Ikram, Egypt: Economic Management in a period of transition, Baltimore: Johns Hopkins University Press, 1980

Table 4

Egypt: Share of Subsidies[a/] in GDP, Investment and Public Consumption

Year	Real Per Capita Subsidies	Subsidies as a Share of Gross Domestic Product	Gross Domestic Investment	Public Consumption
	LE	%	%	%
1950	0.8	1	7	6
1955	0.4	0	3	3
1960	0.8	1	6	5
1965	1.9	2	8	8
1970	1.0	1	6	3
1975	16.8	13	47	51
1979	22.0	11	48	58

a/ These subsidies are purely the recorded subsidies in the government accounts. There are a host of indirect subsidies to the food sector arising from multiple exchange rates, subsidies prices of agricultural inputs, no charge for irrigation water, cheap credit and price controls on fields. It would probably not take an over zealous social accountant to double the figure reported as trading losses of the General Authority of Supply Commodities.

Source: based on Tables 2 and 3

4. INVESTMENT AND SUBSIDIES

It is clear that central government expenditures on subsidies have risen very substantially in real per capita terms. This occurred during a period of notable changes in the economic and political climate. It is pertinent to enquire of the consequences for public and private investment. Was this rise in consumption expenditures met by sacrificing investment? Were present consumption levels simply reducing growth and mortgaging future income streams?

From Table 4, it was evident that subsidies represent both a larger share of public consumption, and have grown substantially relative to gross domestic investment. But Table 5 provides a clearer picture of the changes in fixed investment. Real per capita public investment doubles between 1965 and 1979. The effect of the 1967-73 conflict is evident in the real fall in public investment noted during those years. Certainly, real per capita public spending on subsidies rose even faster than investment suggesting some diversion of resources toward current consumption. However, overall public investment has risen faster than public consumption expenditures. After a decline during the war years, public investment was increased at a rate more rapid than total public consumption. This implies that the growth in subsidies has come not at the expense of investment so much as at the cost of growth in other public services. It is of interest to note that the period since Al-infitah has corresponded to a sharp rise in the ratio of private to public investment. This is completely consistent with the goals of the revised economic policy.

The mix of public expenditure has changed, placing greater emphasis on investment and subsidies and less on defense and other services. Investment and subsidies now account for almost 80 percent of total government expenditures whereas in 1965 they represented 37 percent (Table 6). The mix of public expenditures has been highly responsive to the new economic and political climate.

There does not seem to be any strong evidence that increases in subsidies have come at the expense of investment.[6/] If public investment is taken to include

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6/ This is confirmed also by von Braun and de Haen's reporting of a high positive correlation found between the time series of the shares of non-agricultural public investment and food subsidies but a negative one for the relatively small public investment in agriculture and food subsidies. J. von Braun, H. de Haen, The Effects of Food Price and Subsidy Policies on Egyptian Agriculture, Research Report 42, (Washington, D.C.: International Food Policy Research Institute, 1983).

Table 5

Egypt: Public Investment

Year	Ratio of Public Investment to Public Consumption	Ratio of Private to Public Investment	Real Public Investment Per Capita
	%	%	LE
1965	77	8	18
1970	42	13	13
1975	87	17	28
1979	109	31	35

Source: Basic data from K. Ikram, ibid.

Table 6

Egypt: Shares of Total Government Expenditure

Year	Defense	Fixed Public Investment	Health, Education Community Services	Subsidies
	%	%	%	%
1965	23	34	12	3
1970	33	31	19	2
1975	24	42	12	25
1979	13	50	11	26

Source: Basic data from Ministry of Finance, Cairo 1981.

expenditures on health and education (investment in human capital) then the recent trends toward higher subsidies have not outstripped investment (Table 7). Of course, if all the increase in subsidy expenditures had been dedicated toward investment then total future growth and incomes would be higher. But the same argument would apply to any other element of government expenditure.

The proportion of total resource use in the public domain has risen from less than 20 percent in the 1950s, to about 35 percent at the end of the 1970s. However, the ratio has changed during the 1970s jointly with the mix of public consumption expenditures. The public sector has grown and now controls a greater proportion of total resources than at the time of the revolution. As the relative political strength of claimant groups has varied over the last decade then so has both the mix of public activity, and the ratio of public to private activity. The state has become more concerned with transfers and less with production and investment relative to the private sector.

It is of course true that some of the freedom which permitted this has come from foreign loans and grants. Table 3 shows the development of the uses and sources of income in greater detail. A significant proportion of the rise in Egypt's resources has come from net factor income (largely remittances) and export receipts (from the Suez Canal, petroleum, and tourism). The increase in net foreign inflows is shown in the last column of Table 3. Even if all the subsidy expenditures had been financed from foreign grants and borrowing, and net factor income from abroad they would have required less than half the increase in the last decade. These resources have naturally given the government greater freedom to respond to the political pressures for claims on resources; but it would be a gross overstatement to claim that Egypt has simply consumed the additional resources. Substantial rises in investment have occurred simultaneously. In fact the rise in expenditures on subsidies while of itself dramatic, has not been out of keeping with the growth of investment and consumption expenditures. These are shown in Figure 1 expressed in real per capita terms.

The manner in which the government deficits have been financed is examined in section 6 which provides a synthesis of the sectoral balances.

Figure 1 - Growth of Subsidies, Investment and Consumption
(LE 1975 per capita)

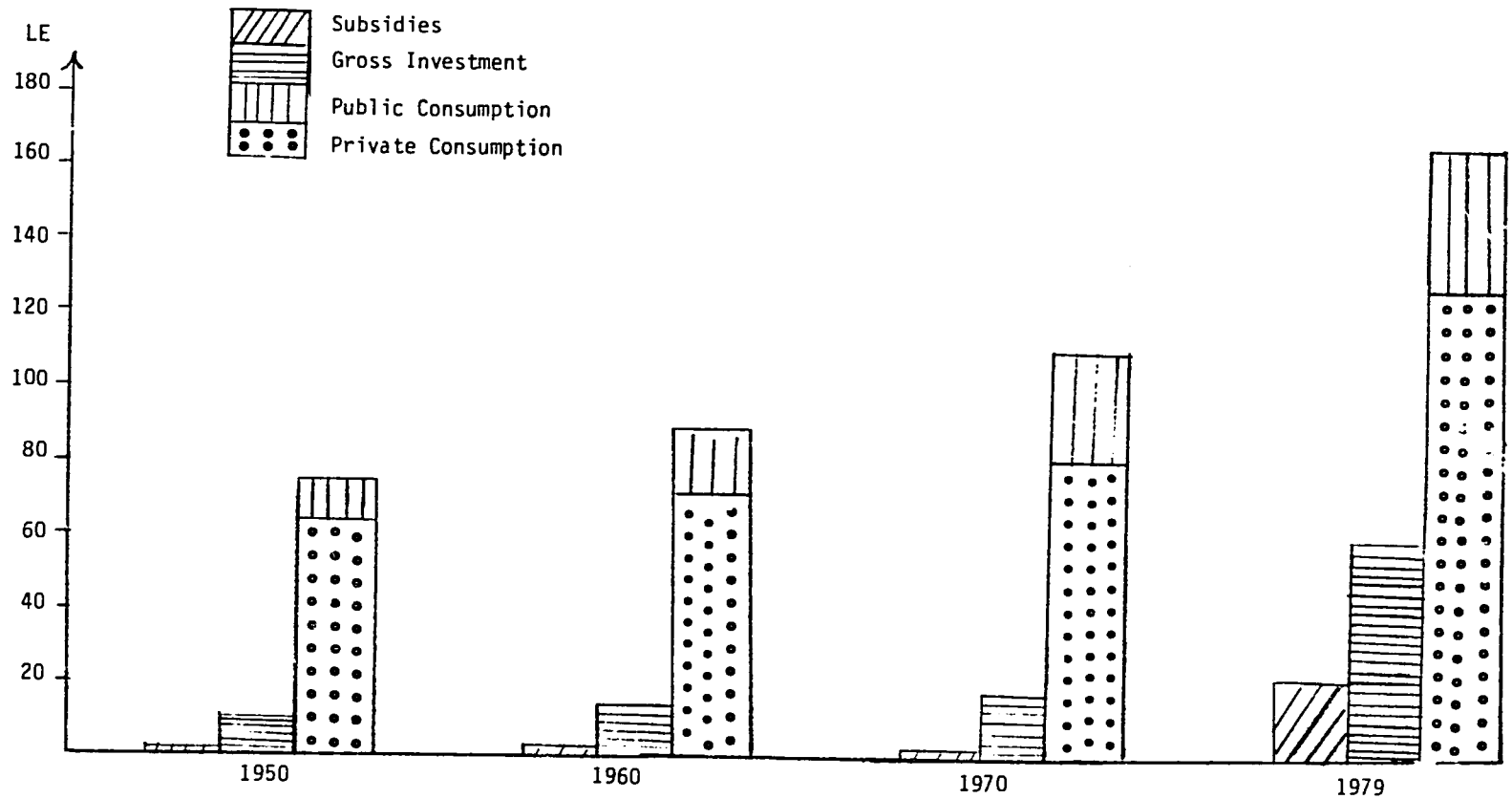

Table 7

Egypt: Investment and Subsidies

Year	Public Investment[a/] LEm.	Subsidies LEm	Ratio %
1965	473	35	7
1970	508	24	5
1975	1337	622	47
1981-82[b/]	4192	2000	48

[a/]Includes expenditures on health and eduction

[b/]Budgeted

Source: Basic data from Ministry of Finance, Cairo 1983

5. FINANCIAL PROGRAMMING: A PERSPECTIVE ON INTERNAL AND EXTERNAL BALANCES

It is clear that the Egyptian government has increased its expenditures on subsidies very rapidly both in nominal and real terms. Some of the real resources required to undertake these expenditures have been acquired by deficit financing. This in turn leads to an expansion in the money supply at a rate faster than the growth in demand for real money balances. As a consequence, domestic inflation accelerates and there is a decline in net foreign assets. The objective of this section is to estimate the rate of expansion of domestic credit and of government expenditure on subsidies which are consistent with equilibrium in the balance of payments, or alternatively with no change in the net stock of foreign assets. This question was posed by Franco in a study of Ghana[7/], although the model developed here differs somewhat from that which he employed. The approach is basically that of the so called "financial programming" used by the IMF for balance of payments stabilization.[8/] This typically involves setting limits on the rate of expansion of the monetary base through restricting the central bank's financing of government deficits or loans to the commerical banking system. The limits are set so that targets for external equilibria are not jeopardized by excessive deficit financing.

The first equation of the Polak[9/] model is for imports. The present study draws on earlier work[10/] in which an import demand function was derived from a model of Central Bank behavior[11/]. It is assumed that the Central Bank controls the allocation of foreign exchange in such a way as to endeavor to restore foreign exchange

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7/ G. R. Franco, "Domestic Credit and the Balance of Payments in Ghana" Journal of Development Studies 15 (2): January 1979, pp. 202-215.

8/ An example is found in International Monetary Fund, IMF Institute, Financial Policy Workshops: The Case of Kenya, Washington, D.C. 1981, esp. Chapters 10-11.

9/ The Polak model is described and applied in the IMF, Financial Policy Workshops, Chapter 7. For the original papers see IMF, Monetary Approach to the Balance of Payments, Washington, D.C. 1977.

10/ G. M. Scobie, Government Policy and Food Imports, Chapters 5 and 6.

11/ W. H. Hemphill, "The Effect of Foreign Exchange Receipts on Imports of Less Developed Countries", IMF Staff Papers (November 1974): 637-677.

holdings (R) to their desired level (R*) while simultaneously keeping imports at some desired level (M*).

Formally;

Objective 1: Restore R: $\Delta R_t = R_t^* - R_{t-1}$

Objective 2: Imports $M_t = M_t^*$

Now add these two equations. The left hand will be $M_t + \Delta R_t$ which is simply total foreign exchange available (F_t). But there is no guarantee it will be sufficient to allow $F_t = R_t^* - R_{t-1} + M_t^*$. The actual levels of ΔR_t and M_t may not necessarily equal the desired levels. Appendix 1 provides the details of the model estimating the rate of expansion of domestic credit and of government expenditures on subsidies consistent with equilibrium in the balance of payments.

A summary of the implications for monetary policy are given in Tables 16 and 17 (Appendix 1) in both tables the first column shows the balance of payments deficit. This is expressed by the change in net foreign assets as a ratio of the broad money supply (M2). In Table 16, the results of applying equation (19) as developed in Appendix 1 are shown. This gives the change in the domestic credit component of the monetary basis that would have been required in order to achieve external equilibrium. The actual changes in domestic credit are shown for comparison. The balance of payments registered a deficit of 27.9 percent in 1978, or alternatively a fall in net foreign assets of LE1,456m. The Central Bank increased domestic credit by LE2,819m. If the bank had used external equilibrium as its sole criterion for conducting monetary policy it should have reduced net domestic credit by LE4,532m. This is not to imply that such a strategy is necessarily the most desirable for the bank to pursue. However, this approach and the results in Tables 16 and 17 does serve to highlight the pressure on the balance of payments and the foreign exchange market created by an acquiescent monetary authority financing the government budget deficits.

In Table 17 a similar set of results are presented. In this case the actual and required government expenditure on subsidies is shown. Again it must be stressed that nothing about this model suggests that external balance should be a criterion for selecting the level of domestic expenditures on consumer subsidies. The purpose is simply to demonstrate the other variables are held constant. In 1978, the actual change in expenditures on food subsidies was LE250m, while balance of payments equilibrium would have required a decline of LE5,577m. This serves to stress that the external deficits were not solely due to expenditures on subsidies.

6. MACRO ECONOMIC ACCOUNTING: A SYNTHESIS

In this section we examine the budgetary and monetary aspects of food subsidies and their financing. After an overview of formal accounting of the major flows is presented.

If the growing expenditures on subsidies represented true internal transfers then it is unlikely that any secondary effects on growth and investment would be major. It is always possible of course that the group being taxed may have had a different marginal propensity to save than the beneficiaries of the transfer so that total savings might change. But the gross effect of such differences is not likely to be large.

On the other hand if the additional expenditures are not matched by a comparable growth in revenues then there is a public resource gap which must be covered by creating offsetting liabilities. These may be held by domestic residents and institutions, or by foreigners. The nominal level of the public resource gap has risen (Table 8), but was constant between 1975 and 1979 when viewed in real per capita terms (Table 9). However, the amount of the deficit financed by loans from foreigners was raised substantially. Some of the additional consumption and investment expenditure has created liabilities to foreigners. This has increased the supply of goods and services currently available but reduced the amount available at some future period. Those foreign liabilities represented future claims by non-residents on Egyptian goods and services.

If the same amount of the deficit has been financed by creating domestic liabilities with the non-bank public then the public expenditures would have been met from current domestic savings. This amount would presumably have been invested in productive activities in the private sector. Hence, the country's privately owned capital stock would have been less by the amount of the deficit financed by public borrowing. If the loan was spent on current consumption through subsidies than no offsetting publicly sponsored productive investment will have taken place. There would be an obligation incurred to repay those loans at some future date, but no additional income streams have been provided. Hence domestic borrowing displaces private investment and generates no additional public income streams. The future liabilities are, however simply transfers from taxpayers to bond holders. This constrasts with the creation of foreign liabilities in which future claims on Egyptian goods are issued. But in this case there is no diminution in the production stock of domestic capital even if the public expenditure is entirely for current consumption.

Table 8

Overall Public Resource Gap
(LE million, current prices)

	1970/71	1972	1973	1974	1975	1976	1977	1978	1979
1. Indirect taxes	457	472	499	552	784	996	1530	1563	1841
2. Direct taxes on private income				92	97	122	136	135	147
3. Direct taxes on public sector income	162	170	178	105	159	223	324	478	596
4. Total gross government revenue	619	642	677	749	1040	1341	1990	2176	2584
5. Total government consumption	661	730	765	899	1298	1670	1628	2012	2375
6. Gross government savings (before subsidies)	-42	-88	-88	-150	-258	-329	362	164	209
7. Consumer subsidies	3	11	89	410	622	434	650	900	1370
8. Net government savings (after subsidies)	-45	-99	-177	-560	-880	7630	288	-736	-1161
9. Net Public Economic Sector Financial savings	165	151	96	287	317	449	496	773	1118
a. transferred profits	101	81	137	188	154	243	384	539	1001
b. Investment self financing	87	100	127	150	210	331	268	473	350
c. other public sector revenues	61	80	78	97	120	101	113	119	230
d. public authority deficits	-41	-62	-188	-87	-93	119	-139	-185	-229
e. interest on public debt	-43	-48	-58	-61	-74	107	-130	-173	-234
10. Public Sector stock accumulation	n.a	n.a	n.a	174	275	263	337	250	270
11. Social Security Surplus	188	214	224	245	253	295	353	381	456
12. Total Consolidated Public Savings (8+9+10+11)	308	266	143	146	-35	244	898	668	683
13. Public Investment Expenditure	358	414	451	791	1373	1431	1839	2463	2857
14. Overall Public Resource Gap	50	148	308	645	1408	1187	941	1795	2174

Source: K. Ikram, ibid.

Table 9

Egypt: Real Per Capita Deficits and Foreign Financing

Year	Real Per Capita Level of	
	Government Deficit	Foreign Financing
	LE	LE
1962	21	2
1965	27	5
1970	11	-
1975	37	6
1979	37	9

Source: Ministry of Finance, Cairo 1981; National Bank of Egypt, Economic Bulletin, various volumes

Presumably, however, there is not an infinitely elastic demand by foreigners to hold Egyptian bonds. As a consequence a third type of financing has been used, and one which has widespread implication. This is the creation of domestic credit or the obligatory purchase of government paper by the central bank. This has been an important source of funding of the budget deficits in Egypt. The growth in these claims is shown in Table 10. Their growth has been accompanied by a strikingly parallel growth in the domestic money supply, and in fact, the elasticity of the money supply with respect to central bank financing of the deficits is virtually equal to one. Through this inflationary tax the government has acquired command of some of the additional goods and services which have been used in the provision of public subsidies and for public gross fixed investment.

If the Central Bank finances a deficit for food subsidy expenditures then the monetary base rises by an amount corresponding to the domestic credit creation. If the government were to spend that entire amount on the acquisition of imported food, the net foreign asset component of the monetary base would fall by a corresponding amount. Hence, under these circumstances there would be no direct inflationary impact from the deficit spending as the total supply of goods would have risen by an amount equal to the additional social demand for food.

The cost of the food subsidies is only partly represented by additional imports. Some is met by domestic production, and in all cases domestic services (in transport, processing and distribution) must be added. Deficit financing will have a direct inflationary impact in proportion to the share of these items in total food subsidy expenditures.

However, while there is no direct inflationary impact on food imports acquired through foreign borrowing, there may well be an indirect effect. The foreign borrowings will require a future reduction in total absorption relative to expenditure. This may come about through reduced private savings as a result of higher taxes to create a budget surplus; or alternatively reduced government demand for future goods and services. Any future reluctance on the part of the government to raise taxes or reduce government expenditures will result in deficit financing. The net effect will be an inflationary tax of a magnitude sufficient to acquire control over goods and services necessary to repay the foreign loan. Current inflation will simply have been substituted for future inflation. Alternatively, to the extent that such effects are anticipated current portfolio changes will result in an excess demand for goods and an excess supply of money balances whose value is expected to fall as a consequence of the liability which has to be met. In this event that

Table 10

Egypt: Monetary Survey

Year	Central Bank Claims on Government	Money Supply (M2)
	LEm.	LEm.
1960	261	485
1965	616	852
1970	975	1053
1975	2634	2430
1980	8093	9017

Source: National Bank of Egypt, Economic Bulletin, various volumes

future inflationary effect will be transmitted back to the current period, and the inflationary tax felt over a number of years.

It is pertinent to ask whether the inflationary effect of deficit financing might itself affect investment. In an unfettered world with fully anticipated inflation then the real impacts are likely to be small. But in a world with sticky capital markets, imperfect information, lingering but extensive bureaucratic intervention, and uncertainty over future changes of policy it would be expected too much for the level of investment to have continued to grow unabated. Clearly with high domestic inflation and an uneven system of price fixing some activities will be less attractive than others. Agricultural investment in certain products has undoubtedly suffered as resources moved into the production of uncontrolled crops and livestock produce 12/. Similarly, inflation in the presence of uncertain controls has encouraged a change in the portfolio of investments, with a surge in private housing construction, probably at the expense of investment in manufacturing. To attribute such changes in food subsidies would be an overstatement but it seems plausible that the inflationary financing of deficits, in part attendant on subsidized food consumption, has altered the mix and probably the level of private investment. The low rates of domestic interest relative to the euro-dollar rate has encouraged significant currency diversification, and probably meant more holding of foreign financial assets at the expense of domestic investment. These effects have been accentuated by the presence of interventions, rationing and controls which still characterize the economy.

Attention is now given to a formal analysis of the sectoral balances between the government budget, the current account, foreign capital flows and saving and investment in an open economy. These balances and the relations that govern them provide a consistent framework for examining the macro economic and foreign trade implications of spending on the subsidy scheme.

12/ For a detailed analysis of the implications of food subsidies for public spending in agriculture, see Joachim von Braun and Hartwig de Haen, The Effects of Food Price and Subsidy Policies on Egyptian Agriculture, Research Report 42, (Washington, D.C., International Food Policy Research Institute, 1984).

A convenient starting point is the identity

$$Y \equiv C + I + G + (X-M) \qquad (1)$$

in which the value of output produced (or national income) is equal to spending on all goods by domestic residents (C + I + G). Imports (M) must be subtracted, and exports (X) added, as an extra source of demand for domestic output. Let total absorption by domestic residents be defined as (C + I + G) ≡ E, so that

$$Y \equiv E + (X-M),$$

from which it follows that

$$(M - X) \equiv (E - Y)$$

or the excess of domestic absorption over the value of output is exactly the excess of imports over the value of exports. In other words, a current account deficit is equivalent to a level of absorption of all goods by domestic residents in excess of the value of output (or income).

National income (Y) is equivalent to the value of all current production of goods and services, or the gross national production (GNP). It is important to distinguish between GNP and gross domestic production (GDP), especially for Egypt. The value of GNP has exceeded that of GDP by an increasing margin because of net factor incomes from abroad (see Table 11). Much of this income is remittances from Egyptians working abroad, and it currently represents about 15 percent of total GNP. The increase has been very marked in recent years. Up until the mid 1970s Egypt's net factor income was negative as it met obligations on loans.

Starting with equation (1) and adding net international transfers (F) to both sides while subtracting taxes (T) from both sides yields

Table 11

Egypt: Gross Product (National and Domestic) and Net Factor Income: 1950-1980

Year	Gross Domestic Product	Net factor income		Gross National Product	Net Factor Income as a Proportion of GNP
		Workers' Remittances	Total		
	LEm	LEm	LEm	LEm	%
1950	929.9	n.a	-11.9	918.0	-
1955	1056.0	n.a.	-9.5	1046.5	-
1960	1443.2	n.a.	+2.6	1445.8	-
1965	2340.1	3.5	-18.2	2321.0	-1
1966	2473.8	4.1	-18.3	2455.5	-1
1967	2522.9	4.1	-22.6	2500.3	-1
1968	2614.7	4.4	-29.9	2584.8	-1
1969	2833.9	3.9	-40.5	2793.4	-1
1970	3058.4	2.5	-51.8	3006.6	-2
1971	3241.1	2.8	-60.7	3180.4	-2
1972	3389.0	35.4	-9.8	3380.1	0
1973	3644.6	37.5	-19.1	3625.5	-1
1974	4197.0	82.0	-112.0	4085.0	-3
1975	4861.0	159.1	-148.0	4713.0	-3
1976	5828.0	481.0	-154.0	5674.0	-3
1977	7551.0	627.0	+207.0	7758.0	+3
1978	8602.0	1231.0	+487.0	9089.0	+5
1979	11179.6	+1548.3	+2080.4	13260.0	+16
1980	14488.4	+1779.7	+2433.6	16922.0	+14

Sources and Notes:

GDP, Net Factor Income and GNP are from Ikram, Economic Management in a Period of Transition, pp. 398-399 for 1950-1978. The remaining data were supplied by the World Bank, and the USAID Mission, Cairo.

$$Y + F - T \equiv C + I + (G-T) + (X+F-M) \qquad (2)$$

The left hand side is disposable income which is either consumed (C) or saved (S) so that

$$(X+F-M) \equiv (S-I) + (T-G) \qquad (3)$$

The left hand side of (3) is the net foreign surplus which arises only if savings exceed investment in the private sector, or if the government has a surplus. In other words, if domestic absorption is less than income so there is net domestic saving, then there will be a corresponding flow of net foreign investment. While the private sector in Egypt has had positive net savings, government expenditures have exceed revenues so that as a whole the economy has had negative net savings, and equivalently, net foreign investment. These balances are shown in Table 12 for the years 1974 to 1979. The flow of net foreign investment is equivalent to the rate at which the stock of claims on foreigners (or liabilities to foreigners) is changing. If Egyptians are consuming more goods and services than are domestically produced then net saving is negative and the stock of liabilities to foreigners is increased. This stock is referred to as net foreign assets (NFA). Total domestic saving is simply equal to the acquisition of claims or liabilities on the rest of the world, or the change in the stock of net foreign assets.

At any given moment that stock of claims is part of the monetary base, as it is an asset of the Central Bank. The Central Bank also holds claims on the government and the commercial banking sector, which together comprise the domestic credit component (DC) of the monetary base. The stock of high powered money (H) is then given by

$$H \equiv NFA + DC \qquad (4)$$

The composition of the base is shown in Table 13. Equation (4) provides the link with the domestic flows of net saving (private and public) and the monetary sector. From (4) it is evident that the change in the net foreign asset holdings of the Central Bank is simply

$$\Delta NFA \equiv \Delta H - \Delta DC$$

Table 12

Egypt: Sectoral Balances: 1974-79

Year	Private Investment (I)			Private Saving(s)	S-I	T-G	Net foreign Investment
	Fixed	Changes in stocks	Total				
	LEm	LEm	LEm	LEm	LEm	LEm	LEm
1974	68	116	184	153	-31	-813	-844
1975	184	184	368	795	+427	-1388	-961
1976	303	176	479	1124	+645	-1265	-620
1977	371	224	595	1100	+505	-1270	-765
1978	453	166	619	1882	+1263	-2077	-814
1979	815	140	955	2034	+1073	-2624	-1545

Sources and Notes:

Data on investment and savings are supplied by the World Bank, deficit (T-G) is from Table 20, and Net Foreign Investment is the sum of net private saving and net government saving; i.e. (S-I) + (T-G). Other data are taken from: G. Scobie, Food Subsidies in Egypt: Their Impact on Foreign Exchange and Trade, Research Report 40, Washington, D.C.: International Food Policy Research Institute, 1983, pp. 54-59.

Table 13

Balance Sheet of the Central Bank of Egypt (as of July 31, 1981)

Assets (Sources of Monetary Base)		Liabilities (Uses of Monetary Base)	
	LEm		LEm
Net Foreign Assets	-2264	Reserves	1356
Domestic Credit		Currency	3870
Claims on Government	6917	Government Deposits	1175
Claims on Commercial Banks	1589		
Claims on Other Financial Institutions	319		
Other Items (Net)	610		
Total Sources	6401	Total Uses	6401

Source: IMF, International Financial Statistics 34(11), November 1981, P. 141

or the excess of money expansion (ΔH)over domestic credit expansion (ΔDC). The policy implication that follows is simply that increased net foreign liabilities (or losses of foreign reserves) can only be avoided by limiting the rate of domestic credit expansion. The linkage between the changes in net foreign assets and the monetary base can be severed if the Central Bank sterilizes the reserve flows, whereby any changes in net foreign assets are offset by a compensatory change in the domestic credit component of the monetary base. The composition of the Central Bank's portfolio is then altered but the level of the base is held constant. Where there are only limited markets in government liabilities the bank's ability to make such compensatory adjustments is often itself limited.

In order to complete the linkage to the money supply, it is necessary to incorporate the balance sheet of the commercial banking sector (Table 14). The money supply is then given by the liabilities of the consolidated banking system, and defined as either M1 (narrow) or M2 (board) money supply. M1 is currency plus demand deposits, while, M2 includes time, saving and foreign deposits in addition. From the consolidated balance sheet of the banking system we have the identity that the total assets (net foreign assets and domestic credit) are equal to total liabilities (currency, and demand and other deposits), or

$$NFA^b + DC \equiv M2$$

or
$$\Delta NFA^b \equiv \Delta M2 - \Delta DC \qquad (5)$$

Now the total domestic credit (DC) is comprised of liabilities of the government to the Central Bank (DC^g) and the liabilities of the nonbank public to the commercial bank (DC^{nb}) implying

$$\Delta DC \equiv \Delta DC^g + \Delta DC^{nb} \qquad (6)$$

Now net public saving is equivalent to the acquisition of claims of the banking system and foreigners on the government, or

$$(G-T) \equiv \Delta DC^g - \Delta NFA^g \qquad (7)$$

Table 14

Balance Sheet of the Commercial Banking Sector in Egypt
(as of July 31, 1981)

Assets		Liabilities	
Net Foreign Assets	1149	Demand Deposits	1543
Reserves	1465	Time, Saving and Foreign Currency Deposits	5053
Claims on Government	3738	Government Deposits	1488
Claims on Private Sector	4390	Counterpart Funds	52
Claims on Other Financial Institutions	499	Credit from Central Bank	1438
		Other Items (Net)	1667
	11241		11241

Source: IMF, International Financial Statistics, 34 (11) November 1981, p. 41.

This identity highlights the fact that government deficits are financed by domestic and foreign borrowing. Estimates of both these items are given in the Table 15, for the years 1947 to 1981.

From equations (5) and (6)

$$\Delta DC^g \equiv (\Delta M2 - \Delta DC^{nb}) - \Delta NFA^b \qquad (8)$$

while from (7)

$$\Delta DC^g \equiv (G-T) + \Delta NFA^g \qquad (9)$$

Combining the right hand sides of (8) and (9) and rearranging gives

$$\Delta NFA^b \equiv (T-G - \Delta NFA^g) + (\Delta M2 - \Delta DC^{nb}) \qquad (10)$$

which gives the change in the net foreign assets of the banking system as the amount of the government deficit financed by the domestic banking system plus the increased indebtedness of the non-bank public. It follows that an increase in the stock of liabilities of foreigners ($\Delta NFA^b < 0$) corresponds to either a budget deficit financed by the domestic banking system or an increase in net private indebtedness to the banking system. The latter occurs when an increase in claims of the public on the banking system (the money supply) increases less than the rise in claims of the banks on the public (domestic credit to the public).

The components of equation (10) for the years 1974 to 1981 are given in Table 15. The rapid rise in subsidy expenditures by the Central Government has been accompanied by an increasing budget deficit. Some of this has been financed by foreign borrowing, but there has been a marked increase in the domestically financed component ($T-G - \Delta NFA^g$). As a consequence, the domestic credit component of liabilities of the government has expanded, and with it the monetary base and the money supply. The money supply has grown more rapidly than the banks' claims on the public, so net public indebtedness has actually fallen. Some of this rise in the money supply is associated with an increase in foreign currency deposits of the non-bank public (stemming from remittances). Partly as a consequence, there has been a fall in net foreign liabilities of the overall banking system.

Table 15

Egypt: Net Foreign Assets and Deficit Financing: 1974-1981

Year	Government expenditures on subsidies	Budget deficit (T-G)	Change in net foreign assets of government (ΔNFA^g)	Budget deficit financed by domestic borrowing ($T-G-\Delta NFA^g$)	Change in net public indebtedness to banking system ($\Delta M2-\Delta DC^{nb}$)	Change in net foreign assets of banking system (ΔNFA^b)
	LEm	LEm	LEm	LEm	LEm	LEm
1974	410	-813	-119	-694	+651	-43
1975	622	-1388	-210	-1178	+397	+781
1976	434	-1265	-488	-777	+828	+51
1977	650	-1270	-464	-806	+1074	+268
1978	900	-2077	-705	-1372	-84	-1456
1979	1370	-2624	-481	-2143	+2112	-31
1980	1446	-2293	-853	-1440	+1927	+487
1981	1861	-2901	-741	-2187	+2728	+541

Notes:

Changes in net public indebtedness ($\Delta M2 - \Delta DC^{nb}$) is found as the difference ($\Delta M2 - \Delta DC^{nb}$) = $\Delta NFA^b - (T-G - \Delta NFA^g)$.

APPENDIX 1: FINANCIAL PROGRAMMING: THE MODEL

By assuming a quadratic cost function in which the arguments are the squared deviations of actual from desired levels of imports and reserves, it can be shown that the resultant import demand function is of the form given in equation (12) below.

An alternative and illustrative approach to the derivation of the import equation can be seen in Figure 2 1/. On the vertical axis is the actual change in reserves and on the horizontal, the desired change in reserves. Both are expressed as a ratio of the excess (or short fall) in foreign exchange supplies. Along the locus of points described in line 1, desired changes in reserve holding equal the actual change implying the first objective is met. Conversely, along the locus points described by line 2, actual changes in reserves are equal to the excess of receipts over desired imports implying that the second objective is met i.e., desired imports. The compromise values between these two objectives lie within the shaded area and a simple approximation by a linear ration (line 3) is used to describe this set of trade-offs. If $0 < \gamma < 1$ is the slope of this policy trade-off function then

$$\frac{\Delta R_t}{F_t - M_t^*} = (1-\gamma) + \gamma \left[\frac{R_t^* - R_{t-1}}{F_t - M_t^*} \right] \qquad (11)$$

To this equation is added those for the desired levels of reserves and imports, and utilizing the identity ($F \equiv M + \Delta R$) the equation for imports (see 2) can be directly derived. The level of national income is included as a shifter of the import function, which primarily reflects the underlying policy objectives in the allocation of foreign exchange.

The second equation of the model is simply an identity stating that the monetary base or stock of high powered money (H) is the sum of net domestic credit and net foreign assets as in equation (4), Chapter 6. The third equation implies a constant proportional change between nominal income and money supply where the parameter v is the average (and marginal) income velocity of money. Changes in the stock of net foreign assets are given by the identity (14) and the total foreign exchange constraints by the final identity (15).

1/ W. H. Hemphill, "The Effect of Foreign Exchange", p. 676.

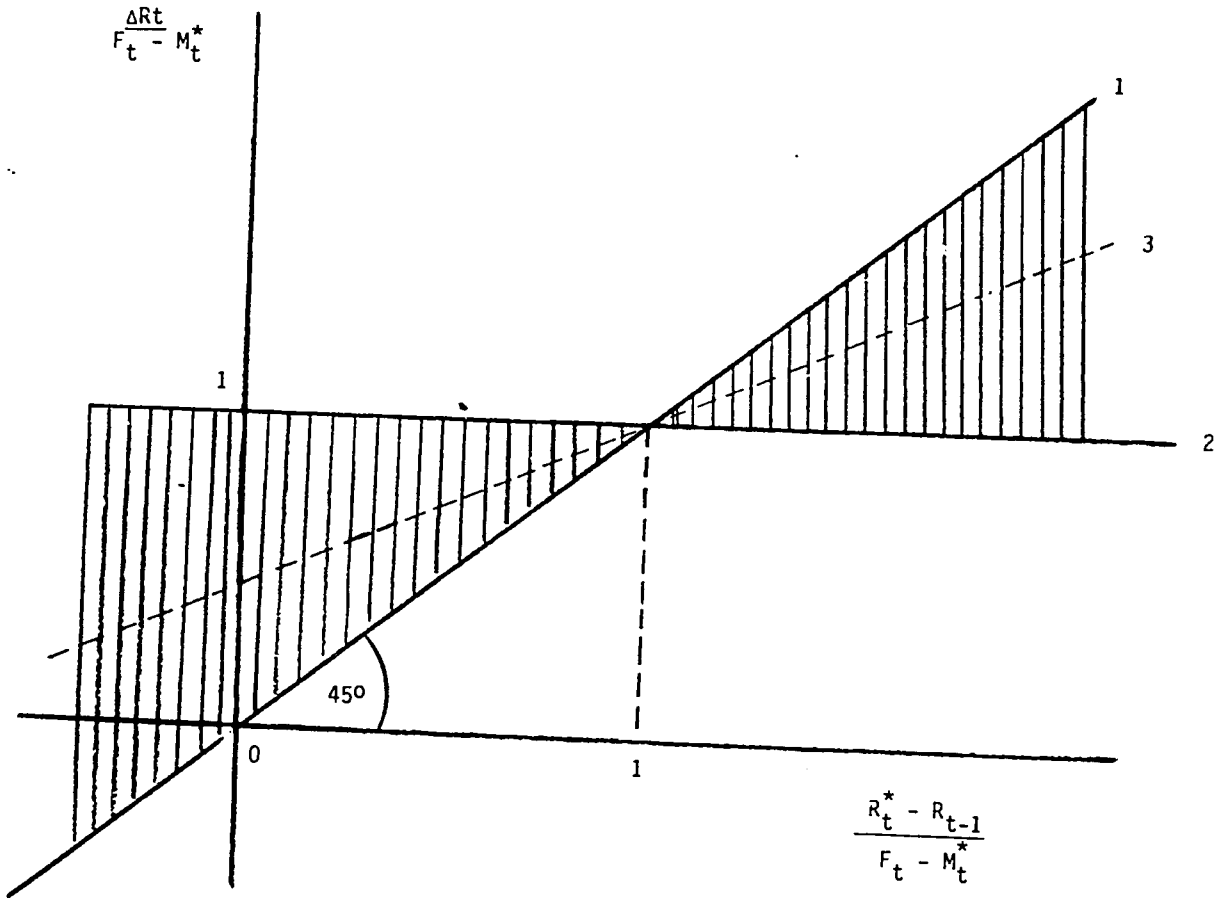

Figure 2 - A Model of Foreign Exchange Policy

$$M = m_0 + m_1 R_{-1} + m_2 F + m_3 \Delta F + m_4 Y \quad (12)$$

$$H \equiv DCN + NFA \quad (13)$$

$$Y = vM_S = v(aH) = v' (DCN + NFA) \quad (14)$$

$$NFA \equiv NFA_{-1} + R - R_{-1} + K \quad (15)$$

$$F \equiv M + R - R_{-1} \quad (16)$$

where

M = imports
R = foreign exchange reserves
F = total foreign exchange available
Y = national income
M_S = money supply
H = monetary base (or stock of high-powered money)
DCN = net domestic credit component of the monetary base
NFA = net foreign assets
K = net capital inflows defined as ($NFA - NFA_{-1} + M - X$

Rewrite (16) as

$$R \equiv F - M + R_{-1}$$

and substitute into equation (15) to give:

$$NFA = NFA_{-1} = F - M + K \quad (17)$$

Now substitute (14) into (12), and using (16) to obtain

$$M = \gamma^{-1} [m_0 + m_1 R_{-1} + m_2 F + m_3 \Delta F + m_4 v (DCN + NFA_{-1} + F + K]$$

where

$$\gamma = 1 + m_4 v'$$

This can now be substituted into (16) to yield

$$NFA = NFA_{-1} + F - (1/\gamma) [m_0 + m_1 R_{-1} + m_2 F + m_3 F - m_3 F_{-1} + m_4 v' (DCN + NFA_{-1} + F + K)] + K$$

and collecting terms

$$NFA = \gamma^{-1} [m_0 + NFA_{-1} + (1 - m_2 - m_3) F - m_3 F_{-1} - m_1 R_{-1} - (\gamma - 1) DCN + K] \tag{18}$$

Taking the total differential of this gives an expression for dNFA, which if set equal to zero assures the balance of payments is in equilibrium. It is then possible to solve for the rate of net domestic credit expansion which would be consistent with that equilibrium. Such a value is given by

$$dDCN \Big|_{dNFA = 0} = (\gamma - 1)^{-1} [dNFA_{-1} + (1 - m_2 - m_3) dF - m_3 dF_{-1} - m_1 dR_{-1} + dK] \tag{19}$$

As particular interest focusses on the expenditure by the government on subsidies (GF) we can recast the problem in order to estimate the change in subsidy expenditures which would have been consistent with balance of payments equilibrium. Let

$$DCN \equiv DCUN + DCP \tag{20}$$

where DCUN is the net liabilities of the public sector to the Central Bank, and DCP are the Central Bank's claims on the private sector.

$$DCN \equiv DCUN_{-1} + (GF + GN - T) + DCP \tag{21}$$

where GN is all other government expenditures. The change in the net stock of public sector liabilities to the Central Bank is given by the size of government deficit financed through domestic credit creation. Replacing DCN in (18) with the above expression, taking the total differential of net foreign assets and solving for the change in government subsidy expenditures consistent with balance of payments equilibrium yields the following:

$$\begin{aligned} dGF \Big|_{dNFA=0} &= (\gamma-1)^{-1} [dNFA_{-1} + (1-m_2-m_3)\, dF \\ &\quad - m_3 dF_{-1} - m_1 R_{-1} + dK] \\ &\quad - dDCUN_{-1} - dGN + dT - dDCP \end{aligned} \tag{22}$$

Both expressions (19) and (22) involve parameters from the structural equations (12) and (14). After appending random error terms these equations were estimated by two-stage least squares using annual observations for the period 1947 through 1981. The fitted equations are given below. The t-statistics appear in parentheses under their respective coefficients, which

$$\begin{aligned} M = &-276.34 + 1.04R + 0.32F + 0.55\Delta F + 0.20Y \\ &(7.97)\ (8.51)\quad (4.77)\quad (7.18)\quad (8.08) \end{aligned}$$

$$Y = \underset{(105.4)}{1.93}\ H$$

are all significant and bear the expected signs.

By taking the first derivation of equation (18) the domestic credit multiplier on the balance of payments can be found.

$$\frac{\partial NFA}{\partial DCN} = \frac{(\gamma-1)}{\gamma} = -\frac{m_4 v'}{1+m4v'} = -\frac{0.39}{1.39} = -0.28$$

This result implies that an expansion of net domestic credit of LE1m will lower net foreign assets by LE 280,000. Expressing this as an elasticity implies that a 10 percent rise in net domestic credit will lead to a 3 percent fall in net foreign assets, when evaluated at 1981 values of the variables.

Table 16

Egypt: Required Versus Actual Changes in Domestic Credit for Balance Payments Equilibrium

Year	Balance of Payments[a] Surplus (+) Deficit (-)	Actual Change in Domestic Credit	Required Change in Domestic Credit[b]	Deviation
	LEm	LEm	LEm	
1950	0.7	31	-71	-102
1951	-1.6	21	-75	-96
1952	-16.8	11	-127	-138
1953	-2.3	-6	259	265
1954	-3.3	19	-73	92
1955	-8.4	38	-18	-56
1956	-8.6	105	-36	-141
1957	-11.5	59	-40	-99
1958	-4.6	13	-32	-45
1959	-5.9	73	-14	-87
1960	-3.1	77	54	-23
1961	-4.8	88	-34	-122
1962	-9.9	99	-144	-243
1963	0.1	142	263	122
1964	-1.8	104	-300	-404
1965	-1.4	85	-96	-181
1966	-5.3	91	-176	-267
1967	-2.8	91	126	35
1968	-0.3	75	-161	-236
1969	-0.9	62	173	111
1970	-3.9	106	51	-55
1971	-7.6	150	-348	-498
1972	1.8	122	10	-112
1973	6.0	160	388	228
1974	-2.1	524	157	-367
1975	-32.1	1249	1727	-2976
1976	1.6	549	1114	1663
1977	6.5	734	625	-109
1978	-27.9	2819	4532	-7351
1979	-0.4	1405	39	-1366
1980	0.5	1722	-4250	-5972
1981	0.5	1105	-4085	-5190

a/ Change in net foreign assets as a percentage of the broad money supply.

b/ From equation (19)

Table 17

Egypt: Required Versus Actual Changes in Government Expenditure on Subsidies for Balance of Payments Equilibrium

Year	Balance of Payments[a] Surplus (+) Deficit (-)	Actual Change in Expenditure on Subsidies	Required Change in Expenditure on Subsidies[b]	Deviations
	LEm	LEm	LEm	LEm
1950	0.7	1	-94	-95
1951	-1.6	-1	-3	-2
1952	-16.8	6	-174	-180
1953	-2.3	4	228	224
1954	-3.3	-10	-119	-190
1955	-8.4	-2	-41	-39
1956	-8.6	-1	-166	-167
1957	-11.5	2	-138	-140
1958	-4.6	-4	55	59
1959	-5.9	6	-59	-65
1960	-3.1	4	44	40
1961	-4.8	-3	-337	-334
1962	-9.9	8	-147	-155
1963	0.1	29	22	-7
1964	-1.8	-14	-569	-555
1965	-1.4	3	-116	-119
1966	-5.3	0	-287	-287
1967	-2.8	11	162	151
1968	-0.3	-5	-319	-314
1969	-0.9	-8	136	144
1970	-3.9	-9	11	20
1971	-7.6	18	-446	-464
1972	1.8	0	239	-239
1973	6.0	94	315	221
1974	-2.1	274	-400	-674
1975	-32.1	212	-2412	-2624
1976	1.6	-188	-2338	-2150
1977	6.5	216	58	-159
1978	-27.9	250	-5577	5827
1979	-0.4	470	-3570	-4046
1980	0.5	76	-6022	-6098
1981	0.5	415	-5751	-6166

a/ Change in net foreign assets as a percentage of the broad money supply.

b/ From equation (22)

BIBLIOGRAPHY

Choucri, N. and Eckaus, R. S. "Interactions of Economic and Political Change: The Egyptian Case," World Development, 7 (1979): 783-797.

Franco, G. R. "Domestic Credit and the Balance of Payments in Ghana". Journal of Development Studies 15 (2) (January 1979): 202-215.

Hemphill, W. H. "The Effect of Foreign Exchange Receipts on Imports of Less Developed Countries", IMF Staff Papers (November 1974): 637-677.

International Monetary Fund. IMF Institute, Financial Policy Workshops: The Case of Kenya. Washington, D.C., 1981, Chapters 10-11.

_____. Financial Policy Workshops, Chapter 7. Original paper IMF, Monetary Approach to the Balance of Payments, Washington, D.C. 1977

Peltzman, S. "Growth of Government", Journal of Law and Economics 23 (1980): 209-288.

Scobie, Grant M. Food Subsidies: Their Impact on Foreign Trade and Exchange in Egypt, Research Report 40, Washington, D.C.: International Food Policy Research Institute, August 1983.

von Braun, Joachim and de Haen, Hartwig. The Effects of Food Price and Subsidy Policies on Egyptian Agriculture, Research Report 42. Washington, D.C.: International Food Policy Research Institute, 1984

Waterbury, J. "The Opening", American University Field Staff Reports (Northeast Africa) 20, (1975): 1-8.