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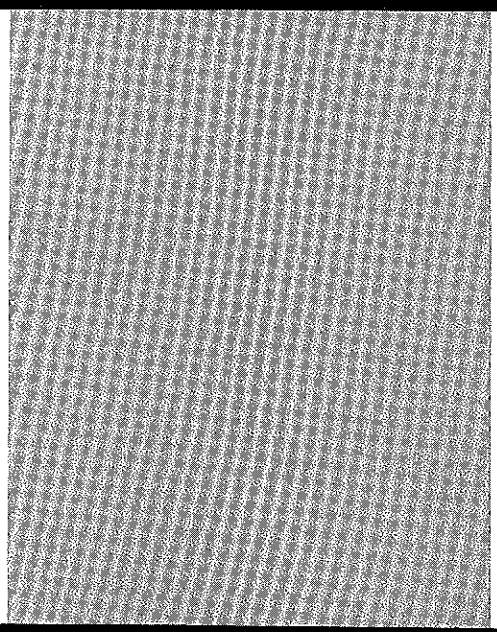

FOOD SUBSIDIES AND THE GOVERNMENT BUDGET IN EGYPT

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FOOD SUBSIDIES AND THE GOVERNMENT BUDGET IN EGYPT

by

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FOREWORD

Studies of food subsidies are an important part of IFPRI's research portfolio. Their primary purpose is to help governments of developing countries assess how current and alternative subsidy policies affect human nutrition, food consumption, income growth and distribution, fiscal costs, agricultural production, and foreign trade. Results from studies in several countries have been published as IFPRI's research reports. This working paper series was initiated to meet requests for additional information on the nature, implementation, and effects of subsidies in various countries. The food subsidy papers complement IFPRI's research reports on the subject by providing detailed descriptive analyses of operational and implementation issues and impacts.

Working papers are written primarily for those responsible for policy design, implementation, and analysis. They are intended to provide information about the nature and performance of various types of subsidy programs in order to facilitate interchange of such knowledge among countries. All the papers in the series present final results from completed studies and have undergone review.

High government costs are one of the principal problems of large-scale explicit food subsidies. In this paper, Grant M. Scobie examines the budgetary and monetary aspects of food subsidies in Egypt within a macroeconomic framework. A financial programming model is developed and applied to an analysis of the implications of alternative ways of financing the subsidies for the balance of payment and deficit spending. The findings reported in this paper complement research results presented in Government Policy and Food Imports: The Case of Wheat in Egypt, Research Report 29, and Food Subsidies in Egypt: Their Impact on Foreign Exchange and Trade, Research Report 40, both by Grant M. Scobie. Additional research on food subsidies in Egypt is reported in Egypt's Food Subsidy and Rationing System: A Description, Research Report 34, by Harold Alderman, Joachim von Braun, and Sakr Ahmed Sakr; The Effects of Food Price and Subsidy Policies on Egyptian Agriculture, Research Report 42, by Joachim von Braun and Hartwig de Haen; and The Effects of the Egyptian Food Ration and Subsidy System on Income Distribution and Consumption, Research Report 45, by Harold Alderman and Joachim von Braun.

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1. SUMMARY

This report examines the evolution of public expenditures on subsidies in Egypt 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 impossible to understand the role of public subsidies or 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 public sector activities in the context of broad sectoral balances, both domestic and external.

The process of economic liberalization following a decade of restriction (1965-74) is proceeding. Marked changes have occurred in all sectors of the Egyptian economy. Private investment is now a much greater proportion of total investment, the volume of foreign transactions at the free market exchange rate is perhaps a 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 it 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 focused on the growth of these subsidies and their increasing importance in or even domination of 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. Clearly other forces were operating. Military conflicts ended with the October War in 1973, export receipts rose, and the open-door (al-infitah) policy signified political and economic liberalization. The rise in subsidies was not a coincidental event. It was 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 here that the rise in subsidies was a reflection of deliberate economic policies and changing political circumstances.

The growth of 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 went 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 consistent with external balance would have required cuts in expenditures far in excess of the subsidies. Food subsidies alone cannot account for either the increased foreign borrowing or the domestic credit created. Extra resources have come from external aid, borrowing, and a surge in foreign exchange receipts. 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.

2. INTRODUCTION

Recent developments in Egyptian food policy have focused 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 system is so large that its ramifications are felt in all sectors of the economy. The revenues and expenditures of the central government, the incidence of taxes and benefits, and the effects 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 GDP. However, it is useful to recall that the state's role in the food sector is neither novel nor large.

State granaries have existed in Egypt since Pharaonic times. In a society whose entire economic lifeblood 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 no 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 a loaf of bread, public distribution to the indigent--all these were hallmarks of Egyptian food policy from Pharaonic times through the eras of the Fatimids and the Mamluk Sultans, moderated only in the middle of the last century with the demise of Mohammed Ali and his successors. Except for military endeavors, it is unlikely that any other factor has had as much influence on Egyptian public expenditures as its food policy. These expenditures have risen or fallen 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. The view that the current extent of public involvement in food markets and the associated government costs is "high" or "excessive," needs to be moderated by the historical record.

None of this is to suggest that the current fiscal effects of food policies are in any way insignificant. 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.

After reviewing the evolution of government revenue and expenditure, particular attention is focused on the amount of public investment in an attempt to reveal any crowding-out of investment by subsidies. A perspective on subsidies and the internal and external balances is given through a model of the type used in financial programming. Finally, a synthesis is made of the government budget and the financing of its deficits, integrating the monetary and external sectors.

3. THE POLITICAL AND ECONOMIC SETTING

In industrialized countries an increasing share of GDP has fallen in the public domain during the past century. One theory to account for this has been the "ratchet effect" of wars. Large government bureaucracies are built up during periods of military endeavor and never fully dismantled, so that after each successive round of war, the size of the government sector has increased. Although this theory has received some superficial support, it does not explain why neither the level nor the growth of the public sector differed between combatants and noncombatants in World War II.

Peltzman notes that government spending on subsidies and transfers has grown faster than other elements of public expenditures.[1] In fact, among industrial countries subsidies and transfers average 55 percent of total public expenditure. He argues that a decline in income inequality and the emergence of a politically articulate, homogeneous middle class have accounted for major growth in government in the last 50 years. In fact, more equality has generated a political demand for still more income equalization and hence a growing demand for subsidy and transfer programs. He concludes that "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 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 methods used to describe inequality and political articulateness are useful in explaining variation among less-developed countries (LDCs) in the ratio of public expenditures to GDP (G/GDP). Further, LDCs appear to be following a similar path to developed countries (DCs). When the characteristics of LDCs are used as explanatory variables, all of the difference in the G/GDP ratio of LDCs and DCs 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 growth in the public sector.

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

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 income 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 relations 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 that 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 postwar 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, Egypt nationalized the Suez Canal and appealed to the Soviet Union to gain 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 United States and United Kingdom 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 products. 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," he said.[3]

The economic and political motives were clearly intertwined in all of these maneuvers, and they continued to be so. The economic policy that evolved after the October War placed new reliance on restoring trade and investment with Western countries and with encouraging pri-

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[2]From 1967 to 1973 imports of food were significantly lower and chemicals higher than in other years. See Grant M. Scobie, Food Subsidies in Egypt: Their Impact on Foreign Exchange and Trade, Research Report 40, Washington, D.C.: International Food Policy Research Institute, August 1983.

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

vate 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, meaning "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 that it had dominated. Although public consumption as a proportion of GDP had grown quite modestly, expenditures on subsidies now represent 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; more 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 accompanied by and engendered changes in the nature of the country's politics. Access to new economic resources led to new discussion of their allocation. Choucri and Eckaus note that "liberalization of domestic politics had made it possible for political groups of diverse persuasions to emerge and make demands upon the system."[4] 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 had simply been quelled by the long periods of hardship imposed by military endeavors. The strength of those forces has been demonstrated by the reaction to attempts to limit their access to economic and political power--in the food riots of January 1977, for instance.

The riots of 1977 were only one in a series of such disturbances, which were typical of the merging political and economic circumstances. In 1975 workers from the Helwan iron and steel plant

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

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]

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[5]Harold Alderman, Joachim von Braun, Sakr Ahmed 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.

4. THE GOVERNMENT BUDGET

A 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 percent in 1973 to 1.8 percent 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, though easier to tax, are small. 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 percent in the early 1970s to about 4.5 percent in the late 1970s. The excise tax structure has been characterized by a widespread use of specific (as opposed to ad valorem) duties, a narrowly based tax structure, and considerable latitude given to public enterprises for assessing sales taxes and timing payments. In July 1981, the government passed a new consumption tax law in an attempt to unify tax rates between domestically produced and imported commodities, to 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. Their share in GDP has tended to increase considerably due to the rapid growth of imports after 1974 and the progressive devaluations of the Egyptian pound (LE).

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

Furthermore, the population has more than doubled during the same period, and for this reason the second part of Table 2 gives the pat-

Table 1--Sources of government revenue, 1970/71-1979

Source of Revenue	1970/71	1972	1973	1974	1975	1976	1977	1978	1979
					(LE million)				
Direct taxes	162	170	178	197	256	345	460	613	743
Indirect taxes	457	472	499	552	784	996	1,530	1,563	1,841
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 revenue from government taxes	619	642	677	749	1,040	1,341	1,990	2,176	2,584
Nontax revenue	61	80	77	97	120	101	113	119	230
Total government revenue	680	722	754	846	1,160	1,442	2,103	2,295	2,814
GDP at market prices	3,203	3,390	3,808	4,339	5,218	6,727	8,283	9,671	12,409

Source: Ministry of Finance, Cairo, 1981.

tern of resource use in constant 1975 LE expressed on a per capita basis. It is important to interpret these data in the context of the political and economic background outlined earlier. The total command over resources had been growing, albeit erratically, 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. At the same time, real private consumption, having fallen at first, was virtually static.

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 contributed to doubling the real per capita command of resources since 1970. It is important to note that real investment and private consumption have risen more rapidly than public

Table 2--Availability and use of resources in current and constant prices per capita, 1950-81

Basic Data	1950	1955	1960	1965	1970	1975	1979	1981
				(current LE million)				
GNP	918	1,047	1,446	2,322	3,007	4,713	13,213	21,592
	-16	-1	6	107	191	1,122	1,095	1,739
Net imports	902	1,046	1,452	2,429	3,198	5,835	14,308	23,331
Total available resources	902	1,046	1,452	2,429	3,198	5,835	14,308	23,331
Gross investment								
Consumption --	110	154	192	44	426	1,329	3,812	5,150
Public	136	185	242	455	756	1,213	2,375	3,630
Private	656	707	1,018	1,560	2,016	3,293	8,121	14,551
Total use	902	1,046	1,452	2,429	3,198	5,835	14,308	23,331
				(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
Population (millions)	20	23	26	29	33	37	41	43
Consumer Price Index (1975 = 100)	53	57	55	65	75	100	152	201

Sources: Khalid Ikram, Economic Management in a Period of Transition (Baltimore: Johns Hopkins University Press, 1980); World Bank, unpublished data; and International Monetary Fund.

Table 3--Sources and uses of total resources, selected years

Year	Investment				Consumption					Total Expenditure on Consumption and Investment	Net Income Factor	Balance[b] (Net Exports)
					Public							
	GDP	Gross Domestic Investment	Education and Health	Total	Subsidies	Other[a]	Total	Private	Total			
	(LE million)											
1950	930	110	27	137	8	81	89	656	745	882	-12	36
1955	1,056	154	39	193	5	113	118	707	825	1,018	-10	28
1960	1,443	192	73	265	12	138	150	1,018	1,168	1,433	3	13
1965	2,340	414	123	537	35	332	367	1,556	1,923	2,460	-18	-138
1970	3,058	426	193	619	24	563	587	2,016	2,603	3,222	-52	-216
1975	4,861	1,329	285	1,614	622	928	1,550	3,293	4,843	6,457	-148	-1,744
1979	12,409	3,812	480	4,292	1,370	1,895	3,265	8,121	11,386	15,678	1,143	-2,126

Sources: Taken from unpublished data supplied by the World Bank, and Khalid Ikram, Egypt: Economic Management in a Period of Transition (Baltimore: Johns Hopkins University Press, 1980).

[a]Total current expenditures less education and health.

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

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. Burgeoning public expenditures on subsidies are indicated by their increased share in GDP of 10 percent, in total public expenditures of 50 percent, and in gross investment of 50 percent (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 expenditures rose rapidly in nominal terms. However, the real available resources grew by LE140 per capita in this period (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 4--Share of subsidies in GDP, investment, and public consumption, selected years

Year	Real Per Capita Subsidies	Subsidies as a Share of: Gross Domestic Product	Gross Domestic Investment	Public Consumption
	(LE)		(percent)	
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

Sources: Based on Tables 2 and 3.

Notes: 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, subsidy prices of agricultural inputs, no charge for irrigation water, cheap credit, and price controls on fields. The figure reported as trading losses of the General Authority of Supply Commodities could easily double.

5. INVESTMENT AND SUBSIDIES

It is clear that central government expenditures on subsidies have risen 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? Does consumption at the levels subsidies allow simply reduce growth and mortgage future income streams?

From Table 4, it is evident that subsidies represent a large 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 public investment per capita doubled between 1965 and 1979. The effect of the 1967-73 conflict is evident in the fall in real public investment during those years. Certainly, real public spending per capita on subsidies rose even faster than investment, which suggests 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 increased at a rate more rapid than that of 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

Table 5--Public investment, selected years

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

Source: Basic data from Khalid Ikram, Economic Management in a Period of Transition (Baltimore: Johns Hopkins University Press, 1980).

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 expenditures 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 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 to 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 along 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, 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 true that some of the freedom that 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

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[6]This is also confirmed by von Braun and de Haen's reporting of a high positive correlation between the time series of the shares of nonagricultural public investment and food subsidies but a negative one for the relatively small public investment in agriculture and food subsidies (Joachim von Braun, 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, 1983]).

Table 6--Shares of total government expenditure, selected years

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

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

has simply consumed the additional resources. Substantial rises in investment have occurred simultaneously. In fact the rise in expenditures on subsidies, while in 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.

Table 7--Investment and subsidies, selected years

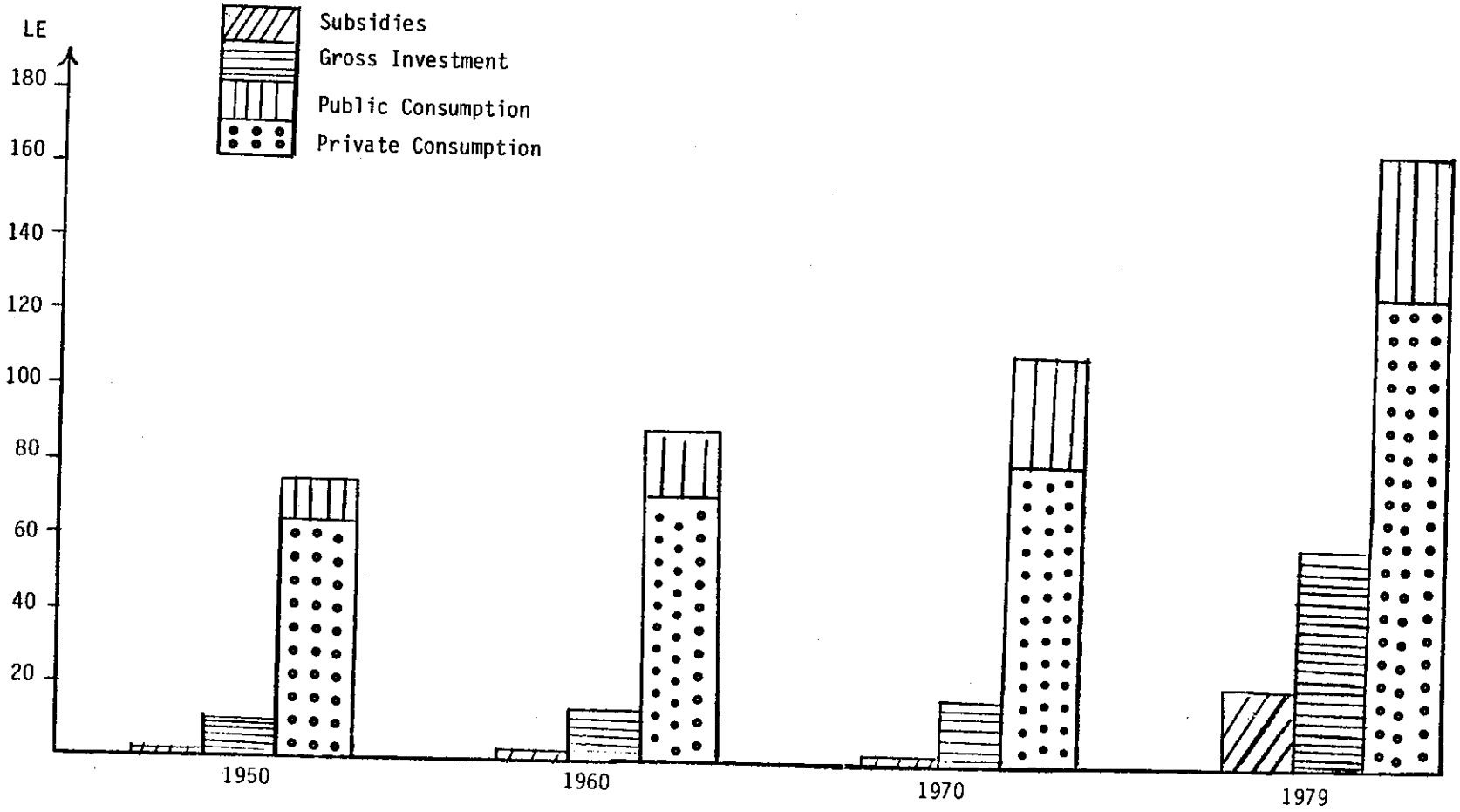
Year	Public Investment[a]	Subsidies	Ratio
	(LE million)		(percent)
1965	473	35	7
1970	508	24	5
1975	1,337	622	47
1981-82[b]	4,192	2,000	48

Source: Basic data from the Ministry of Finance, Cairo, 1983.

[a]Includes expenditures on health and education.

[b]Budgeted.

Figure 1--Growth of subsidies, investment, and consumption, 1950-79



Sources: Derived from data in Khalid Ikram, Economic Management in a Period of Transition (Baltimore: Johns Hopkins University Press, 1980); World Bank, unpublished data; and International Monetary Fund, International Financial Statistics 34 (November 1981).

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

It is clear that the Egyptian government has rapidly increased its expenditures on subsidies 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 here is to estimate the rate of expansion of domestic credit and of government expenditure on subsidies that 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 International Monetary Fund 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 commercial 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 model is for imports.[9] 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

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

[8]An example is found in International Monetary Fund, IMF Institute, Financial Policy Workshops: The Case of Kenya (Washington, D.C.: IMF, 1981), especially Chapters 10 and 11.

[9]Ibid. The Polak model is described and applied in Chapter 7. For the original papers, see International Monetary Fund, Monetary Approach to the Balance of Payments (Washington, D.C.: IMF, 1977).

[10]Grant M. Scobie, Government Policy and Food Imports: The Case of Wheat in Egypt, Research Report 29 (Washington, D.C.: International Food Policy Research Institute, 1981), 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.

exchange in such a way as to restore foreign exchange holdings (R) to their desired level (R*) while simultaneously keeping imports at some desired level (M*).

Formally,

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

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). 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 will not necessarily equal the desired levels. The Appendix provides the details of the model for estimating the rates 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 8 and 9: 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 8, the results of applying equation (19) are shown (the equation is found in the Appendix). This gives the change in the domestic credit component of the monetary base 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 LE1,456 million. The Central Bank increased domestic credit by LE2,819 million. If the bank had used external equilibrium as its sole criterion for conducting monetary policy it should have reduced net domestic credit by LE4,532 million. 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 8 and 9 do 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 9 a similar set of results is presented. In this case the actual and required government expenditures on subsidies are 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 level when other variables are held constant. In 1978, the actual change in expenditures on food subsidies was LE250 million, while balance-of-payments equilibrium would have required a decline of LE5,577 million. This serves to stress that the external deficits were not solely due to expenditures on subsidies.

Table 8--Required versus actual changes in domestic credit for the balance-of-payments equilibrium, 1950-81

Year	Balance of Payments[a]	Actual Change in Domestic Credit	Required Change in Domestic Credit[b]	Deviation
		(LE million)		
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	1,249	1,727	-2,976
1976	1.6	549	1,114	1,663
1977	6.5	734	625	-109
1978	-27.9	2,819	4,532	-7,351
1979	-0.4	1,405	39	-1,366
1980	0.5	1,722	-4,250	-5,972
1981	0.5	1,105	-4,085	-5,190

Source: International Monetary Fund, International Financial Statistics 34 (November 1981).

[a]This column indicates the change in net foreign assets as a percentage of the broad money supply.

[b]The numbers is this column are derived from equation (19).

Table 9--Required versus actual changes in government expenditure on subsidies for balance-of-payments equilibrium, 1950-81

Year	Balance of Payments[a]	Actual Change in Expenditures on Subsidies	Required Change in Expenditures on Subsidies[b]	Deviations
		(LE million)		
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	-2,412	-2,624
1976	1.6	-188	-2,338	-2,150
1977	6.5	216	58	-159
1978	-27.9	250	-5,577	5,827
1979	-0.4	470	-3,570	-4,046
1980	0.5	76	-6,022	-6,098
1981	0.5	415	-5,751	-6,166

Source: International Monetary Fund, International Financial Statistics 34 (November 1981).

[a]This column indicates the change in net foreign assets as a percentage of the broad money supply.

[b]The numbers in this column are derived from equation (22).

7. MACROECONOMIC ACCOUNTING: A SYNTHESIS

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 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, there is a public resource gap that 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 10) but was constant between 1975 and 1979 when viewed in real per capita terms (Table 11). However, the amount of the deficit financed by loans from foreigners rose substantially. Some of the additional consumption and investment expenditures created liabilities to foreigners. This has increased the supply of goods and services currently available but has reduced the amount that will be available at some future period. Those foreign liabilities represent future claims by nonresidents on Egyptian goods and services.

If the same amount of the deficit had been financed by creating domestic liabilities with the nonbank 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 smaller by the amount of the deficit financed by public borrowing. If the loan was spent on current consumption through subsidies, then no offsetting publicly sponsored productive investment would have taken place. There would be an obligation incurred to repay those loans at some future date, but no additional income streams would 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 bondholders. This contrasts with the creation of foreign liabilities in which future claims on Egyptian goods are issued. But in this case there is no diminution of the production stock of domestic capital even if the public expenditure is entirely for current consumption.

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--one that has widespread implications. This is the creation of domestic credit or the obligatory purchase of

Table 10--Overall public resource gap, 1970/71-1979

Public Resource	1970/71	1972	1973	1974	1975	1976	1977	1978	1979
	(LE million, current prices)								
Indirect taxes	457	472	499	552	784	996	1,530	1,563	1,841
Direct taxes on private income	...	...	...	92	97	122	136	135	147
Direct taxes on public sector income	162	170	178	105	159	223	324	478	596
Total gross government revenue	619	642	677	749	1,040	1,341	1,990	2,176	2,584
Total government consumption	661	730	765	899	1,298	1,670	1,628	2,012	2,375
Gross government savings (before subsidies)	-42	-88	-88	-150	-258	-329	362	164	209
Consumer subsidies	3	11	89	410	622	434	650	900	1,370
Net government savings (after subsidies)	-45	-99	-177	-560	-880	7,630	288	-736	-1,161
Net public economic sector financial savings	165	151	96	287	317	449	496	773	1,118
Transferred profits	101	81	137	188	154	243	384	539	1,001
Investment, self-financing	87	100	127	150	210	331	268	473	350
Other public sector revenues	61	80	78	97	120	101	113	119	230
Public authority deficits	-41	-62	-188	-87	-93	119	-139	-185	-229
Interest on public debt	-43	-48	-58	-61	-74	107	-130	-173	-234
Public sector stock accumulation	n.a.	n.a.	n.a.	174	275	263	337	250	270
Social security surplus	188	214	224	245	253	295	353	381	456
Total consolidated public savings	308	266	143	146	-35	244	898	668	683
Public investment expenditure	358	414	451	791	1,373	1,431	1,839	2,463	2,857
Overall public resource gap	50	148	308	645	1,408	1,187	941	1,795	2,174

Source: Khalid Ikram, Economic Management in a Period of Transition (Baltimore: Johns Hopkins University Press, 1980).

Table 11--Real per capita deficits and foreign financing, selected years

Year	Government Deficit	Foreign Financing
	(real LE per capita)	
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 issues.

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 12. Their growth has been accompanied by a strikingly parallel growth in the domestic money supply; 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 that 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 created. If the government were to spend that entire

Table 12--Monetary survey, selected years

Year	Central Bank Claims on Government	Money Supply (M2)
	(LE million)	
1960	261	485
1965	616	852
1970	975	1,053
1975	2,634	2,430
1980	8,093	9,017

Source: National Bank of Egypt, Economic Bulletin, various issues.

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, although there is no direct inflationary impact from 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 through 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 that has to be met. In this event, that 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 the real effects are likely to be small. But in a world with sticky capital markets, imperfect information, lingering and extensive bureaucratic intervention, and uncertainty over future changes of policy, it would be too much to expect the level of investment to continue 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.[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 all such changes to food subsidies would

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[12]For a detailed analysis of the implications of food subsidies for public spending in agriculture, see von Braun and de Haen, Effects of Food Price and Subsidy Policies.

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 Eurodollar rate has encouraged significant currency diversification and has 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.

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

A convenient starting point is the identity

$$Y \equiv C + I + G + (X - M), \tag{1}$$

in which the value of output produced (or national income, Y) 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 (E) 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 GNP. It is important to distinguish between GNP and GDP, especially for Egypt. The value of GNP has exceeded that of GDP by an increasing margin because of net factor incomes from abroad (Table 13). 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

$$Y + F - T \equiv C + I + (G - T) + (X + F - M). \tag{2}$$

Table 13--GDP, GNP, and net factor income, 1950-80

Year	GDP	Net Factor Income		GNP	Net Factor Income as a Proportion of GNP
		Workers' Remittances	Total		
		(LE million)			(percent)
1950	929.9	n.a.	-11.9	918.0	...
1955	1,056.0	n.a.	-9.5	1046.5	...
1960	1,443.2	n.a.	2.6	1,445.8	...
1965	2,340.1	3.5	-18.2	2,321.0	-1
1966	2,473.8	4.1	-18.3	2,455.5	-1
1967	2,522.9	4.1	-22.6	2,500.3	-1
1968	2,614.7	4.4	-29.9	2,584.8	-1
1969	2,833.9	3.9	-40.5	2,793.4	-1
1970	3,058.4	2.5	-51.8	3,006.6	-2
1971	3,241.1	2.8	-60.7	3,180.4	-2
1972	3,389.0	35.4	-9.8	3,380.1	0
1973	3,644.6	37.5	-19.1	3,625.5	-1
1974	4,197.0	82.0	-112.0	4,085.0	-3
1975	4,861.0	159.1	-148.0	4,713.0	-3
1976	5,828.0	481.0	-154.0	5,674.0	-3
1977	7,551.0	627.0	207.0	7,758.0	3
1978	8,602.0	1,231.0	487.0	9089.0	5
1979	11,179.6	1,548.3	2,080.4	13,260.0	16
1980	14,488.4	1,779.7	2,433.6	16,922.0	14

Sources: GDP, net factor income, and GNP are from Khalid Ikram, Economic Management in a Period of Transition (Baltimore: Johns Hopkins University Press, 1982), pp. 398-399 for 1950-78. The remaining data were supplied by the World Bank and the U.S. Agency for International Development Mission, Cairo.

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

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

where S - I = net private savings and T - G = net public savings. The left-hand side of equation (3) is the net foreign surplus that 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. Whereas the private sector in Egypt has had positive net savings, government expen-

Table 14--Sectoral balances, 1974-79

Year	Private Investment (I)			Private Savings	Savings Minus Investment (S - I)	Taxes Minus Government Expenditures (T - G)	Net Foreign Investment
	Fixed	Changes in Stock	Total				
				(LE million)			
1974	68	116	184	153	-31	-813	-844
1975	184	184	368	795	427	-1,388	-961
1976	303	176	479	1,124	645	-1,265	-620
1977	371	224	595	1,100	505	-1,270	-765
1978	453	166	619	1,882	1,263	-2,077	-814
1979	815	140	955	2,034	1,073	-2,624	-1,545

Sources: Data on investment and savings were supplied by the World Bank, deficit (T - G) is from the Appendix, Table 17, and net foreign investment is the sum of net private savings and net government savings, (S - I) + (T - G). Other data are taken from Grant 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.

ditures have exceeded revenues so that as a whole the economy has had negative net savings, and equivalently, net foreign investment. These balances are shown in Table 14 for the years 1974-79. 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 15. Equation (4) provides the link with the domestic flows of net saving (private and public) and the monetary sector. From equation (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 15--Balance sheet of the Central Bank of Egypt
(as of July 31, 1981)

Assets (Sources of Monetary Base)	(LE million)	Liabilities (Uses of Monetary Base)	(LE million)
Net foreign assets	-2,264	Reserves	1,356
Domestic credit		Currency	3,870
Claims on government	6,917		
Claims on commercial banks	1,589	Government deposits	1,175
Claims on other financial institutions	319		
Other items (net)	610		
Total sources	6,401	Total uses	6,401

Source: International Monetary Fund, International Financial Statistics 34 (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 16). The money supply is then given by the liabilities of the consolidated banking system, and defined as either M1 (narrow) or M2 (broad) money supply. M1 is currency plus demand deposits, whereas M2 also includes time savings and foreign deposits. From the consolidated balance sheet of the banking system, it is known that total assets (net foreign assets and domestic credit) are equal to total liabilities (currency, demand, and other deposits), or

Table 16--Balance sheet of the commercial banking sector
(as of July 31, 1981)

Assets		Liabilities	
	(LE million)		(LE million)
Net foreign assets	1,149	Demand deposits	1,543
Reserves	1,465	Time savings and foreign currency deposits	5,053
Claims on government	3,738	Government deposits	1,488
Claims on private sector	4,390	Counterpart funds	52
Claims on other financial institutions	499	Credit from Central Bank	1,438
		Other items (net)	1,667
Total	11,241	Total	11,241

Source: International Monetary Fund, International Financial Statistics 34 (November 1981), p. 41.

$$NFA^b + DC \equiv M2, \text{ or}$$

$$\Delta NFA^b \equiv \Delta M2 - \Delta DC. \tag{5}$$

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

$$\Delta DC \equiv \Delta DC^g + \Delta DC^{nb}. \tag{6}$$

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

$$(G - T) \equiv \Delta DC^g - \Delta NFA^g. \tag{7}$$

This identity highlights the fact that government deficits are financed by domestic and foreign borrowing. Estimates of both these items for the years 1947-81 are given in Table 17.

From equations (5) and (6),

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

whereas from equation (7),

$$\Delta DC^g \equiv (G - T) + \Delta NFA^g. \tag{9}$$

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

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

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 nonbank 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 17. The rapid rise in subsidy expenditures by the

Table 17--Net foreign assets and deficit financing, 1974-81

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 - ΔNFA^g)	Change in Net Public Indebtedness to Banking System ($\Delta M2 - \Delta DC^{nb}$)	Change in Net Foreign Assets of Banking System (ΔNFA^b)
			(LE million)			
1974	410	-813	-119	-694	651	-43
1975	622	-1,388	-210	-1,178	397	781
1976	434	-1,265	-488	-777	828	51
1977	650	-1,270	-464	-806	1,074	268
1978	900	-2,077	-705	-1,372	-84	-1,456
1979	1,370	-2,624	-481	-2,143	2,112	-31
1980	1,446	-2,293	-853	-1,440	1,927	487
1981	1,861	-2,901	-741	-2,187	2,728	541

Source: Derived from earlier tables.

Note: Changes in net public indebtedness ($\Delta M2 - \Delta DC^{nb}$) are found as the difference

$(\Delta M2 - \Delta DC^{nb}) = \Delta NFA^b - (T - G - \Delta NFA^g)$.

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 - ΔNFAG). 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 nonbank public (stemming from remittances). Partly as a consequence, there has been a fall in net foreign liabilities of the overall banking system.

APPENDIX -- 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.[13] 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 shortfall) in foreign exchange supplies. Along the locus of points described in line 1, desired changes in reserve holdings equal the actual change, implying that 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, that is, desired imports. The compromise values between these two objectives lie within the shaded area and a simple approximation by a linear ratio (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 are added the equations for the desired levels of reserves and imports. Utilizing the identity ($F \equiv M + \Delta R$), the equation for imports can be derived directly. 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). 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 identity (14) and the total foreign exchange constraints by identity (15).

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[13] Hemphill, "The Effect of Foreign Exchange," p. 676.

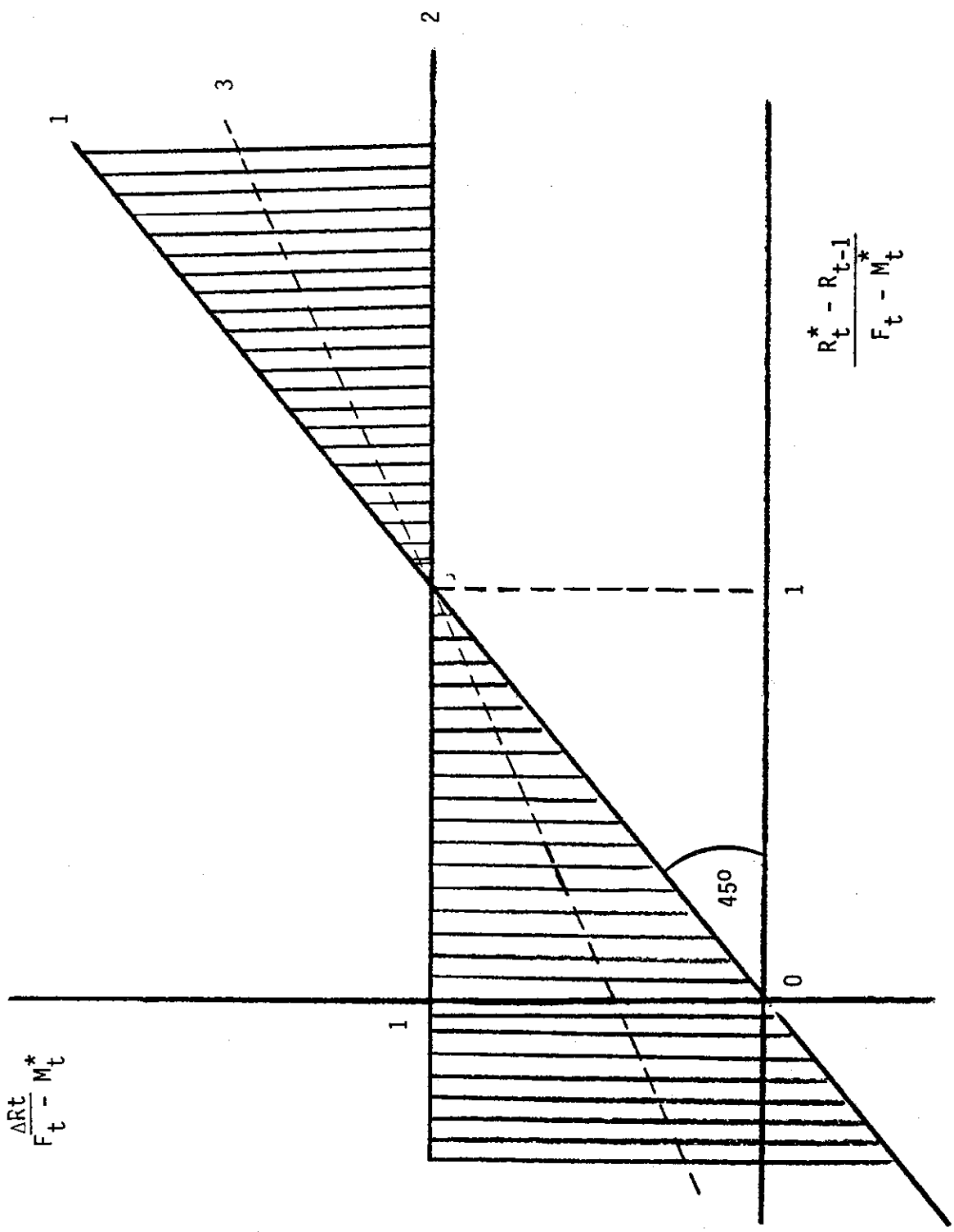

Figure 2--A model of foreign exchange policy

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

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

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

$$NFA \equiv NFA_{t-1} + R_t - R_{t-1} + K, \text{ and} \quad (15)$$

$$F \equiv M + R_t - R_{t-1}, \quad (16)$$

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, and
K = net capital inflows defined as $(NFA_t - NFA_{t-1} + M - X)$.

Rewriting equation (16) as

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

and substituting into equation (15) gives:

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

Equation (14) is now substituted into (12), and equation (16) is used to obtain

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

where

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

This can now be substituted into equation (16) to yield

$$NFA = NFA_{t-1} + F - (1/\gamma) [m_0 + m_1 R_{t-1} + m_2 F_t + m_3 F_t - m_3 F_{t-1} + m_4 v' (DCN + NFA_{t-1} + F + K)] + K,$$

and collecting terms

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

Taking the total differential of this gives an expression for $dNFA$, which if set equal to zero assures that the balance of payments is in equilibrium. It is then possible to solve for the rate of net

domestic credit expansion that would be consistent with that equilibrium. Such a value is given by

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

Because particular interest is focused on the government's expenditures on subsidies (GF), the problem is recast in order to estimate the change in subsidy expenditures that would have been consistent with the balance-of-payments equilibrium. Let

$$DCN \equiv DCUN + DCP, \quad (20)$$

where DCUN is the net liability of the public sector to the Central Bank and DCP is the Central Bank's claim on the private sector.

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

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 the government deficit financed through domestic credit creation. Replacing DCN in equation (18) with the above expression, taking the total differential of net foreign assets and solving for the change in government subsidy expenditures consistent with the balance-of-payments equilibrium yields:

$$dGF \Big|_{dNFA=0} = (\gamma-1)^{-1} [dNFA_{t-1} + (1-m_2-m_3)\, dF_t - m_3 dF_{t-1} - m_1 dR_{t-1} + dK] - dDCUN_{t-1} - dGN + dT - dDCP. \quad (22)$$

Both expressions (19) and (22) involve parameters from the structural equations (12) and (14). After appending random error terms these equations are estimated by two-stage least squares using annual observations for the period 1947-81. The fitted equations are given below. The t-statistics appear in parentheses under their respective coefficients, where

$$M = \underset{}{-276.34} + \underset{(7.97)}{1.04R} + \underset{(8.51)}{0.32F} + \underset{(4.77)}{0.55\Delta F} + \underset{(7.18)}{0.20Y} \text{ and } \underset{(8.08)}{}$$

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

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:

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

This result implies that an expansion of net domestic credit of LE1 million will lower net foreign assets by LE280,000. 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.

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