



The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

TMD DISCUSSION PAPER NO. 2

PRICE COMPETITIVENESS AND VARIABILITY IN EGYPTIAN COTTON: EFFECTS OF SECTORAL AND ECONOMYWIDE POLICIES

Romeo M. Bautista and Clemen Gehler

Trade and Macroeconomics Division

**International Food Policy Research Institute
1200 Seventeenth Street, N.W.
Washington, D.C. 20036-3006 U.S.A.**

January 1995

TMD Discussion Papers contain preliminary material and research results, and are circulated prior to a full peer review in order to stimulate discussion and critical comment. It is expected that most Discussion Papers will eventually be published in some other form, and that their content may also be revised. Funding for the present paper was provided by the U.S. Agency for International Development in connection with the IFPRI Project on Maintaining Food Security in Egypt (USAID Grant No. 263-0225-6-00-3102). Views expressed in the paper are solely those of the authors and do not necessarily reflect official views or statements of policy of the U.S. Agency for International Development.

ABSTRACT

This paper examines the role of price incentives in the observed decline in cotton production in Egypt during the 1980s and in the apparent improvement in recent years. The following determinants (in an accounting sense) of the changes in the relative producer price of cotton during 1980-92 are quantified: (1) changes in the foreign price; (2) changes in the real exchange rate; and (3) changes in nominal protection and the marketing margin. An estimated model of the real exchange rate for Egypt is used to provide a further decomposition of the changes in the relative cotton price that isolates the effect of policy-related factors.

The comparative effects of sectoral and economywide policies are analyzed based on three alternative policy regimes in terms of the average price and variability of annual price levels over the period 1971-92. Government interventions are found to reduce both the long-run price incentive and short-run price variability in Egyptian cotton. Various approaches in dealing with commodity price instability in the context of a more open trade regime are indicated.

Contents

1.	Introduction	1
2.	Price Incentives and the Real Exchange Rate: How Relevant to Cotton Production in Egypt?	7
3.	Attributing Real Exchange Rate Changes to External and Policy-related Factors	16
4.	Relative Cotton Prices Under Alternative Policy Regimes	21
5.	Summary and Conclusions	29

Tables

1.	Cotton area, production, and yield since 1975	2
2.	Cotton and total exports, 1975-92	4
3.	Indices of cotton farmgate price and production cost per unit, 1975-92 (1965-67 = 100)	8
4.	Production cost and net returns from alternative crop rotations, 1987-92	9
5.	Decomposition of changes in the relative farmgate price of cotton, 1979-92	15
6.	Decomposition of changes in real exchange rate and in relative farmgate price of cotton into exogenous and policy-related factors, 1979-92	20
7.	Measures of protection and real exchange rate overvaluation, 1971-1992 (in percent)	25
8.	Average levels and instability indices of relative cotton prices, 1971-92	27

Figures

1.	Cotton production in Egypt, 1980-93	3
2.	Cotton yield in Egypt, 1980-93	3
3.	Relative price of cotton under alternative policy regimes, 1971-92	12
4.	Relative price of cotton, by variety, 1983-92	13
5.	Ratio of cotton procurement price to export price, by variety, 1983-92	24

1. INTRODUCTION

Cotton has traditionally been the most important cash and export crop in Egypt. As late as the mid-1980s, 11 percent of total crop area was planted to cotton, which contributed about 14 percent of total crop value-added. Also, foreign exchange earnings from cotton exports accounted for about two-thirds of total agricultural exports, for 34 percent of non-petroleum exports, and for 14 percent of the country's total export revenue. Moreover, in an economy with a persistent problem of low labor force utilization, the estimated employment of about one-half million workers in the production and marketing of cotton and cotton products is of some policy significance.

Even in the context of the declining importance of agriculture in the Egyptian economy,¹ the rapid deterioration of the cotton sector during the 1980s is striking. Area planted to cotton was reduced by 19 percent, and cotton production by 43 percent, between 1980 and 1989 (Table 1). Average cotton yield was also on a downward trend, declining from 7.18 to 5.03 kentars per feddan during 1980-89. More recently, however, there has been an upturn in cotton production and yield (Figures 1 and 2), their 1990-93 average levels exceeding the corresponding 1989 levels by 15 percent and 30 percent, respectively.

What has been called the "Egyptian cotton problem" (Goueli and El Miniawy 1993:30) is also reflected in the sector's export performance. In 1978-79 an annual average of 2.8 million kentars of cotton lint were exported, accounting for one-fifth of the country's total export earnings (Table 2). By 1991-92 the corresponding export quantity was only 0.3 million kentars, the share in export earnings being reduced to less than two percent.

There are both price and nonprice factors underlying the cotton sector's poor performance during the 1980s, some of which can be attributed to past economic policies. Among the nonprice factors, the reduced allocation of public funds for cotton research would seem especially important. This is reflected in the annual budget of the Cotton Research Institute (the only place in Egypt where high-yielding cotton varieties are being developed), which had been scaled back during the 1980s in real terms and as a proportion of total agricultural research investments (Goueli and El Miniawy 1993:33-34).

Government interventions affecting the price incentives for cotton production would also have adversely influenced sectoral performance. Not only cotton-specific intervention policies but also those that affect the producer prices of competing crop are relevant. Moreover, because cotton is a tradable (export) good, trade and macroeconomic policies that influence the real exchange rate are a critical determinant

¹ While real GDP grew by 8.1 and 3.0 percent annually during 1974-85 and 1985-90, respectively, the agricultural growth rates for the corresponding periods were 2.7 and 2.1 percent (World Bank 1989, 1993). As a result, the share of agriculture in GDP declined from 29.5 percent in 1974 to 18.3 percent in 1990.

Table 1--Cotton area, production, and yield since 1975

Year	Area (thousand feddans)	Production (thousand kentars)	Yield (kentar/ feddan)
1975	1346	6702	4.98
1976	1248	6884	5.52
1977	1423	6978	4.90
1978	1189	7547	6.35
1979	1196	8177	6.84
1980	1245	8941	7.18
1981	1178	8418	7.14
1982	1066	7689	7.21
1983	998	6788	6.80
1984	984	6659	6.77
1985	1081	7345	6.79
1986	1055	6902	6.54
1987	980	6029	6.15
1988	1014	5422	5.35
1989	1006	5055	5.03
1990	993	5169	5.21
1991	851	5023	5.90
1992	840	6006	7.15
1993	888	6894	7.80

Source: Ministry of Agriculture, Undersecretariat for Agricultural Economics and Statistics, Statistics Department.

Figure 1 -- Cotton production in Egypt, 1980-93

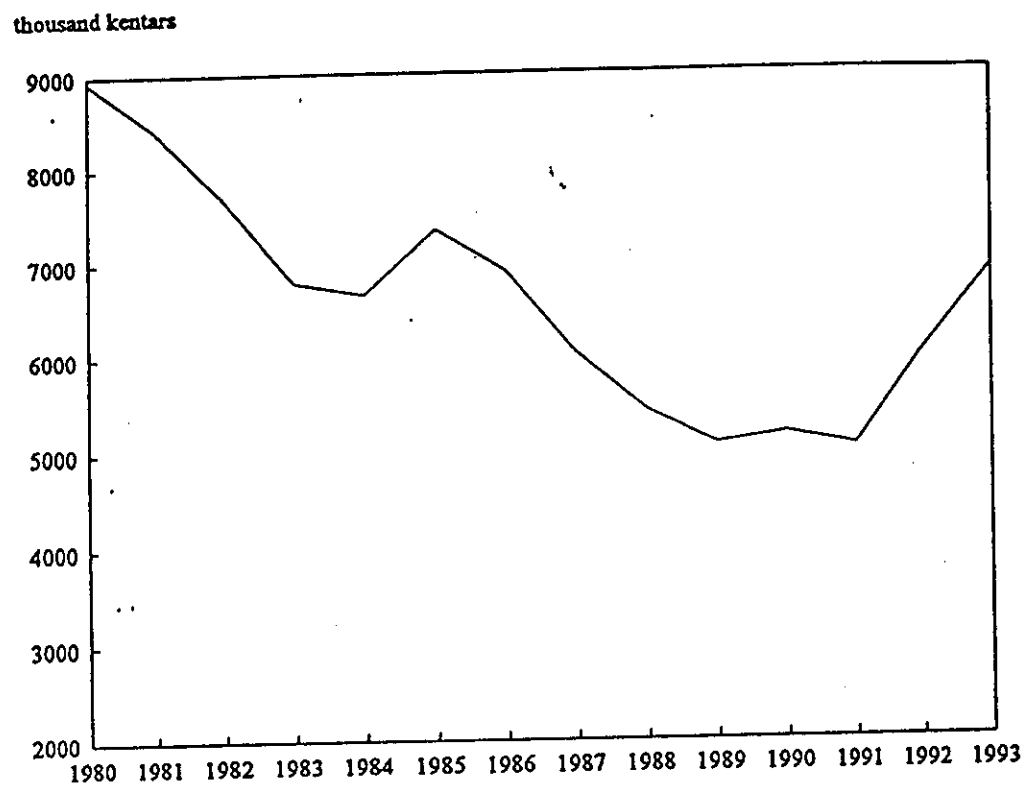


Figure 2 -- Cotton yield in Egypt, 1980-93

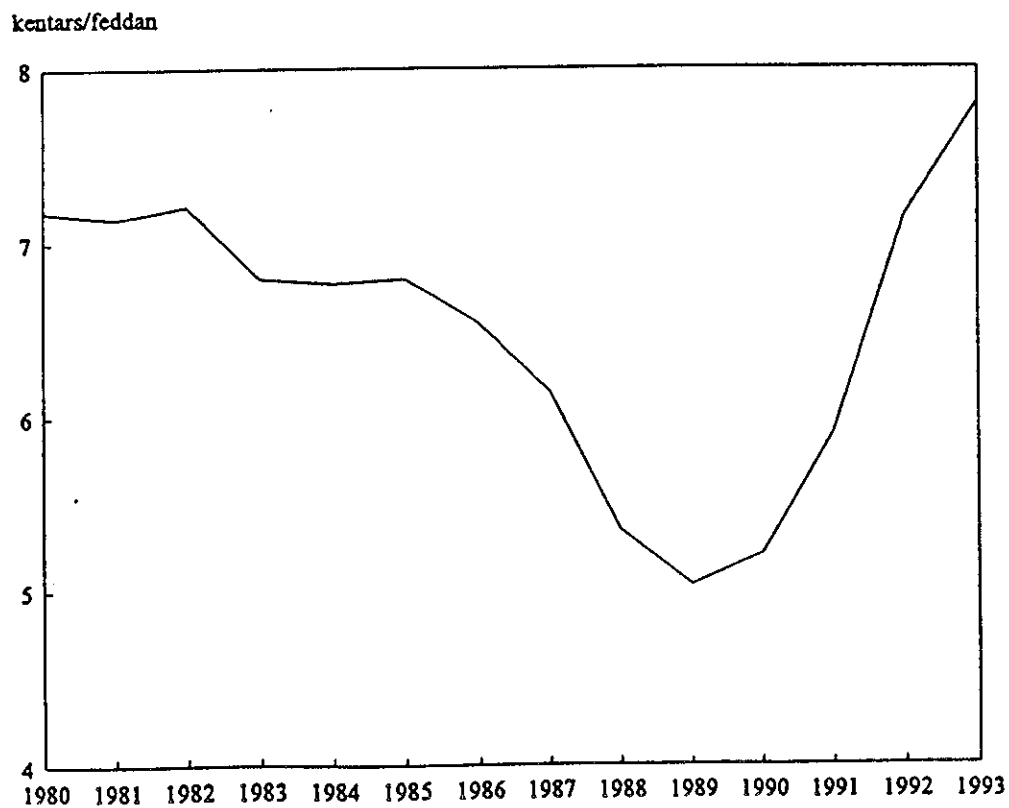


Table 2--Cotton and total exports, 1975-92

Year	Cotton Exports (Lint)		Total exports (LE million)
	Quantity (thousand kentars)	Value (LE million)	
1975	3703	201.1 (36.7)	549
1976	3304	154.8 (26.0)	596
1977	2878	182.3 (27.3)	668
1978	2659	131.5 (19.3)	680
1979	2932	267.3 (20.8)	1288
1980	3281	296.4 (13.9)	2133
1981	3551	320.0 (14.1)	2263
1982	4003	286.0 (13.1)	2184
1983	4178	308.8 (13.7)	2250
1984	3486	340.1 (15.5)	2198
1985	2876	299.0 (11.5)	2600
1986	2913	308.4 (15.0)	2054
1987	2598	272.1 (8.9)	3046
1988	2596	318.6 (8.0)	3994
1989	1168	594.2 (10.4)	5735
1990	789	562.2 (8.1)	6954
1991	260	193.4 (1.6)	11765
1992	376	175.2 (1.7)	10173

Source: CAPMAS (Central Agency for Public Mobilization and Statistics). International Financial Statistics (IMF).

Note: Numbers in parentheses are percentages of cotton export value to total exports.

of production incentives for cotton. Thus, an economywide perspective is necessary for a complete representation of the price competitiveness of the cotton sector in Egypt and its implications for policy.

In the present study, two aspects of the price environment for cotton producers in Egypt are jointly examined, relating to long-run price incentives and short-run price variability. This differs from common practice in agricultural policy analysis to focus on either price stability or producer incentives as the central policy goal. At least in the case of Egypt, apart from the usual policy interest in long-run price incentives, "stabilizing producer prices has been a predominant objective of Egyptian agricultural policy" (Dethier 1989:41).

Government interventions in agricultural markets that create a wedge between domestic and foreign prices affect producer welfare through the induced changes in the average level and variability of domestic prices. The latter consideration merits special attention in low-income countries--and within these countries, particularly in rural areas--where the capital market is highly imperfect and the management of consumption risk is costly. Among rural households the instability of agricultural prices can be a threat to income and food security.

Insulating domestic producers from the volatility of world commodity prices can lead, however, to a lower average domestic price of the product than would prevail otherwise. While price stabilization efforts are meant to affect short-run price behavior, they have in practice also altered long-run price incentives for domestic producers. Indeed, there is a growing body of evidence that government price interventions have tended to tax export crop production heavily in low-income countries (Krueger et al. 1988, Bautista and Valdés 1993).

Major reforms in sectoral and economywide policies are currently being implemented in many developing countries--in part to redress the price bias against agricultural products, especially export crops. A common feature of these comprehensive reform programs, often actively supported by the two Bretton Woods institutions, is the movement toward an open trade regime and neutrality of price incentives across production sectors. This has given rise, among other things, to some apprehension among developing-country policymakers that the inherent volatility of world commodity prices will be transmitted more fully to the domestic price structure under a more open trade policy.

In Section 2 of this paper, we investigate the role of price incentives in the observed decline in cotton production in Egypt during the 1980s and in the apparent improvement in recent years. The contributions of the following determinants (in an accounting sense) of changes in the relative producer price of cotton are quantified and the influence of government policies in each is briefly examined: (1) changes in the foreign price; (2) changes in the real exchange rate; and (3) changes in nominal protection and the "marketing margin."

Section 3 focuses on the causal determinants of the real exchange rate, analyzing the separate influences of exogenous and policy-related variables based on an econometrically estimated model of the real exchange rate for Egypt. The estimated real exchange rate equation is used to provide a further decomposition of the changes

in the relative farmgate price of cotton during 1980-92--in terms of the changes due to external factors and of the changes due to domestic policies.

The comparative effects of sectoral and economywide policies on the relative producer price of cotton are analyzed in Section 4, which yield differing time profiles of the relative cotton price facing domestic producers under three alternative policy regimes considered for the period 1971-92. The results of the analysis indicate the extent to which the domestic cotton price would adjust if policy-induced market distortions were removed. We examine the average price and variability of annual price levels over the period under each policy regime, and find that indeed government interventions served to reduce both the long-run price incentive and short-run price variability in Egyptian cotton. Various approaches in dealing with commodity price instability in the context of a more open trade regime are indicated.

The paper ends, in Section 5, with a brief statement of findings and some concluding comments on their implications for agricultural pricing policy in Egypt.

2. PRICE INCENTIVES AND THE REAL EXCHANGE RATE: HOW RELEVANT TO COTTON PRODUCTION IN EGYPT?

Indices of the average cotton farmgate price and of production cost per unit in Egypt are given in Table 3 for each year during 1975-92. A rough indicator of the changing profitability of cotton production is given by the ratio of the farmgate price index to the index of production cost per unit, shown in the third column of the table. Two striking observations are that the annual values of this ratio (1) decreased continuously and drastically in the early 1980s (by 41 percent between 1979 and 1983), and (2) throughout the 1980s were consistently lower than the 1979 value. Also, significant increases were sustained from 1987 through 1992. These comparative values of the profitability indicator for cotton are remarkably consistent with the observed decline in output performance during the 1980s and subsequent improvement in the more recent period.

Competition from other crops can be taken into account by examining costs of production and net returns for alternative crop rotations. The crop combinations in the five major rotations in Egypt are: cotton-short berseem, wheat-maize, wheat-rice, long berseem-maize, and long berseem-rice. Annual production costs and net returns for each of these rotations are shown in Table 4 from 1987 to 1992. Also contained in the table are the annual values of their ratio, representing a rate-of-return measure. It can be seen that the net returns per unit cost of the cotton-short berseem rotation were much lower in comparison with the other crop rotations during 1987-89, but which subsequently increased so that by 1992 farms using the former rotation were earning a significantly higher average rate of return than those using the other crop rotations. This is an additional indication of the lack of price competitiveness in the cotton sector during the 1980s that presumably influenced its poor output performance. In like manner, the improving net returns since 1989 would have affected favorably the subsequent upturn in cotton production observed above.

Several studies have investigated quantitatively the price responsiveness of cotton supply in Egypt based on a multi-market framework, as reviewed by Dethier (1989) and the Center for Adult and Continuing Education (1992). The latter also estimates econometrically output supply elasticities for cotton and three competing crops (wheat, maize, and rice). Some striking results from the CACE study include the highly significant short-run, own-price elasticity estimates of 0.692 for LS cotton and 0.526 for ELS cotton, and the corresponding long-run elasticity estimates of 2.254 and 0.784, respectively. These are much higher than the elasticity values used by Dethier (1989), based on Esfahani's (1984) estimates, in the calculation of the output effects of government interventions in Egypt.

It is difficult not to agree with the conclusion from the CACE study "that the Egyptian farmer is price responsive and that he is responding rationally to economic signals" (p. 36). El-Saadany and Abu-Rawash (1989) also find that farmer's decisions on cultivated area for cotton have been affected by the relative changes in crop

Table 3-- Indices of cotton farmgate price and production cost per unit, 1975-92
(1965-67 = 100)

Year	Farmgate price (1)	Production cost per unit (2)	Ratio index (3) = 100 x (1)/(2)
1975	155	136	114
1976	195	150	130
1977	210	181	116
1978	213	157	136
1979	285	181	157
1980	288	222	130
1981	354	300	118
1982	366	358	102
1983	397	429	93
1984	451	458	98
1985	591	488	121
1986	592	548	108
1987	697	645	108
1988	875	752	116
1989	1229	852	144
1990	1602	856	187
1991	1930	1000	193
1992	2303	995	231

Source: Table 7 in Emara (1993:14).

Table 4-- Production cost and net returns from alternative crop rotations, 1987-92

Year	Cotton and short berseem	Wheat and maize	Wheat and rice	Long berseem and maize	Long berseem and rice
Production cost (LE/feddan)					
1987	716	709	777	616	684
1988	746	781	826	690	736
1989	797	878	882	792	796
1990	1000	1017	1006	968	958
1991	1115	1191	1257	1132	1198
1992	1249	1377	1503	1317	1443
Net return (LE/feddan)					
1987	349	764	654	662	552
1988	342	736	581	679	524
1989	538	1343	1313	819	790
1990	765	1523	1510	960	946
1991	1204	1385	1501	955	1071
1992	2013	1301	1438	965	1102
Net return ÷ cost of production					
1987	0.49	1.08	0.84	1.07	0.81
1988	0.46	0.94	0.70	0.98	0.71
1989	0.67	1.50	1.49	0.97	0.99
1990	0.76	1.50	1.50	0.99	0.99
1991	1.08	1.16	1.19	0.84	0.89
1992	1.61	0.94	0.96	0.73	0.76

Source: Table 4 in Emara (1993:8).

procurement prices, as well as by the relative returns from competing crops. With respect to cotton yield, the unfavorable price environment during the 1980s apparently induced cotton producers to compensate for the low net returns by planting cotton late to get an extra cut of berseem, by picking cotton only once to reduce labor cost, by intercropping cotton with vegetables, and by selling or diverting subsidized fertilizers to uncontrolled and more lucrative crops (El Saadany 1994a).

Based on the simulation results from a multi-market equilibrium model of competing agricultural products in Egypt, O'Mara et al. (1992) estimate that removal of the wedge between the farmgate and border prices of cotton in 1990, other government policies remaining the same, would have resulted in a 34.2 percent increase in land allocated to cotton production. After a review of previous empirical studies, Bell (1992) concludes that the major reason for the downtrend in cotton production during the 1980s was "the failure of the farmgate price to provide returns commensurate with other crops" (p.40).

If the farmgate price had been so unfavorable to cotton relative to other crops, would it be correct to place the blame entirely on government policies? Analytically, the relative price of any crop in a given year is the outcome of several influences, including both policy and nonpolicy factors. In the latter category would be the international (border) price of the product in foreign currency, which is exogenously determined under the small-country assumption. In a hypothetical case of sustained deterioration in the international price of an agricultural product, maintaining the relative farmgate price of that product is not likely to be the best policy choice if the promotion of comparative advantage and efficiency of domestic resource use is a policy objective. It also bears emphasizing that the domestic price of any tradable good is necessarily influenced by the real exchange rate. The latter can be affected by the country's external terms of trade (see below), which is outside the control of policymakers.

For purposes of policy analysis, it is useful to decompose the evolution of the relative farmgate price over a given period into factors determined by world market developments and those related to government interventions. A framework for analyzing the evolution of the relative farmgate price of cotton is developed below, distinguishing between the effects of exogenous world price changes and those of changes in government policies affecting domestic relative prices.

Denote by P_t the cotton farmgate price (in LE) in year t , and by P_t^* the border price (in U.S. dollars). By definition,

$$P_t = P_t^* E_t (1-t_x) (1-m_t) \quad (1)$$

where E_t is the nominal exchange rate in year t , t_x is the implicit export tax (or negative "nominal protection") rate on cotton, and m_t is the "marketing margin" (including transport cost and normal profits) that makes P_t and P_t^* comparable. Since the entire cotton output is sold to the government during the period of analysis (1979-92), the farmgate (producer) price is equal to the procurement price. The weighted

average of procurement prices for various cotton varieties is used here,² the weights based on the production of lint and waste (following Dethier 1989:50-52).

It is of course not the nominal price but the relative price of the product that affects producer behavior. We consider here the evolution of the cotton farmgate price relative to the consumer price index,³ i.e., $p_t = P_t/CPI_t$. Equation (1) can then be written

$$p_t = p_t^* RER_t (1-t_x) (1-m_t) \quad (2)$$

where p_t^* is P_t^* deflated by the general level of foreign prices, proxied here by the U.S. wholesale price index (WPI_{us}), and $RER_t (=E_t WPI_{us}/CPI_t)$ is the real exchange rate in year t . This empirical measure of the real exchange rate is an approximation of that used in theoretical discussions representing the foreign price of tradable goods, expressed in domestic currency, relative to the price of nontradable goods.

Taking natural logarithms on both sides of equation (2) and then taking first differences, we have

$$\Delta \ln p_t = \Delta \ln p_t^* + \Delta \ln RER_t + \Delta \ln (1-t_x) + \Delta \ln (1-m_t) \quad (3)$$

where Δ is the first difference operator. Equation (3) shows that any observed change in the relative farmgate price of cotton over a given period can be decomposed into four components: (1) the change in its border price; (2) the change in real exchange rate; (3) the change in (direct) nominal protection; and (4) the change in marketing margin.

Changes in government policies are usually associated with components (2) and (3). The latter is completely determined by shifts in sectoral (cotton) trade and pricing policies, while the former is jointly determined by changes in macroeconomic or economywide policies and in such exogenous factors as the external terms of trade (see below). Moreover, component (4) is also partly determined by government policies, since transport cost between the farmgate and the port (border) is a function of public infrastructure expenditures and fuel subsidies. Finally, we do not consider component (1) to be policy determined; while Egypt has some monopoly power in the international trade of extra-long staple cotton, it has not been systematically exploited

² Procurement prices for the major cotton varieties have changed over the years in a more or less parallel manner. This is shown in Figure 3, based on price data for 1983-92 reported in Dethier (1989) and Emara (1993). It would appear, therefore, that aggregation bias is not a significant problem in the use of a weighted average farmgate price in the present study. Indeed, even the ratio of procurement price to export price shows a remarkably parallel movement over the same period among the different cotton varieties (Figure 4).

³ We make use of the index of urban consumer prices, which is considered more reliable than its rural counterpart (Ikram 1980). It correlates strongly with the World Bank's implicit GDP price deflator for Egypt (an alternative proxy for the general level of domestic prices) from 1970 to 1980, after which the latter takes on increasingly lower values.

Figure 3-- Relative price of cotton, by variety, 1983- 92

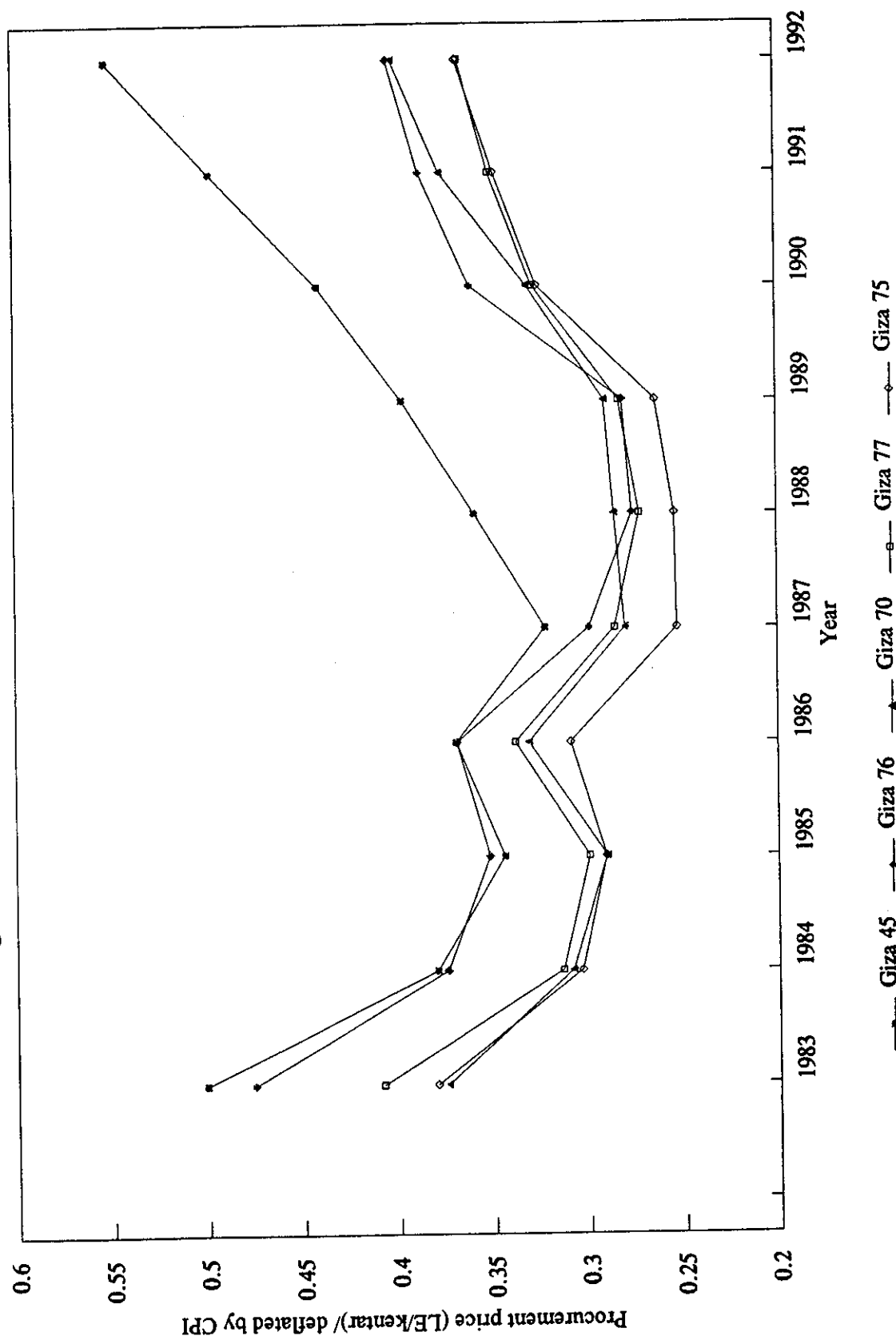
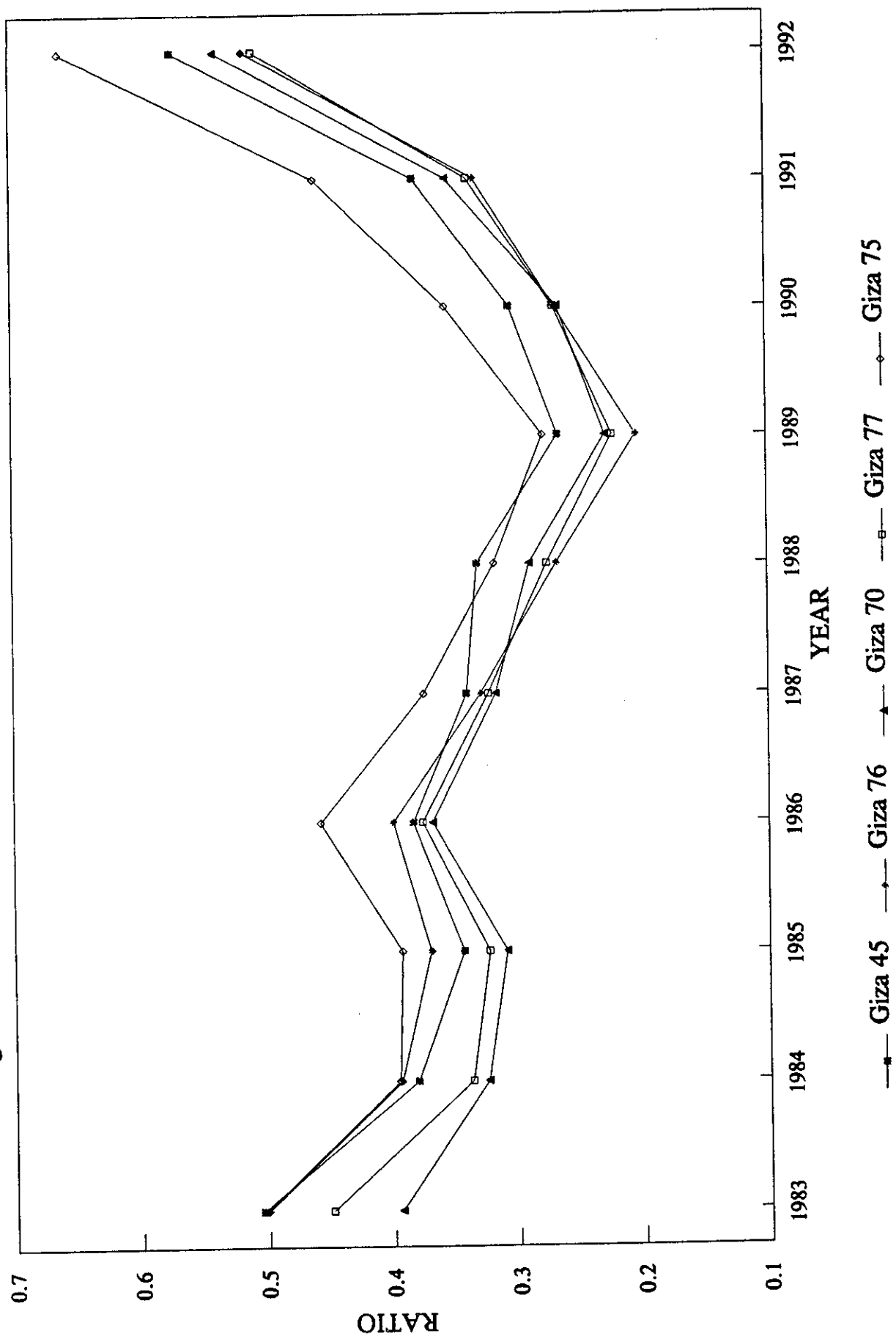


Figure 4-- Ratio of cotton procurement price to export price, by variety, 1983-92



and in any case, only an export tax of about 10 percent on those cotton varieties can be economically justified (based on World Bank estimates).

The annual values of $(1-t_x)(1-m_i)$ in equation (2) can be calculated from time series data on farmgate and border prices when expressed in the same currency. It is not easy, however, to separate out for each year the changes in nominal protection and in marketing margin. Considering that the latter, conceptually, should reflect the normal (competitive) profits rather than actual profits, we can follow the assumption commonly used in the analysis of the evolution of agricultural prices (e.g., Quiroz and Valdés 1993) that the marketing margin m_i remains constant over time. Alternatively, the implicit export tax rate t_x can be interpreted to include the effects on the producer price of cotton arising from government policies that determine transport cost and other transaction costs incurred in moving the export product from the farmgate to the port, in which case it is reasonable to still associate the third term in the right-hand side of equation (3) with changes in direct (cotton-specific) government interventions. In either case, the last term (pertaining to the marketing margin) is set equal to zero.

Changes in the real exchange rate, as a component in the decomposition of the changes in relative farmgate price, can be associated with the shifts in macroeconomic policies that represent indirect price interventions of the government. Whether the real exchange rate in Egypt has also been subject to the exogenous influence of the external terms of trade will be addressed in the next section of this paper.

The calculated changes in relative farmgate price of cotton for various subperiods during 1980-92, and their decomposition into the three main components as identified above, are presented in Table 5. The first point to note is that the relative farmgate price decreased significantly only in the first half of the 1980s. This price reduction for cotton producers went beyond the decline in relative foreign price of cotton, having been reinforced by a real exchange rate appreciation (i.e., a lower RER) and increased direct taxation (or reduced direct protection). In the second half of the decade, the foreign price of cotton soared, but only one-sixth of the percentage increase was passed on to cotton farmers; there was a further appreciation of the real exchange rate and a more significant increase in direct taxation. Subsequently, in the face of a declining foreign price of cotton during 1990-92, Egyptian policymakers "leaned against the wind" and substantially increased direct protection to cotton producers. There was almost no change in the real exchange rate but even so, the net result on the relative farmgate price was a marked increase during the three-year period.

The negative trends of the real exchange rate and of direct protection to cotton production during the 1980s are contrary to what one would regard as a policy improvement, considering that the late 1970s was already characterized by a severe RER overvaluation and direct taxation of cotton (Dethier 1989). The agricultural policy reforms undertaken during 1990-92 (including particularly the increased procurement prices for cotton) undoubtedly led to the dramatic increase in direct protection. However, the slight real exchange rate appreciation which even added to the observed reduction in RER during the 1980s, indicates that macroeconomic policies

in the early 1990s did not help reduce the incentive bias against cotton and other tradable goods.

As pointed out above, the real exchange rate is a function of both policy and nonpolicy factors, the latter including the foreign terms of trade. Therefore, the contribution of external developments to the observed changes in relative farmgate price of cotton goes beyond the changes in the relative foreign price of cotton. In the following section, we investigate quantitatively the exogenous and policy-related determinants of the real exchange rate. The separate effects of the two sets of variables determining the RER, which can be reinforcing or offsetting, are then incorporated into the decomposition of the changes in relative farmgate price of cotton to derive the net contributions of external shocks and of changes in government policies during specific subperiods in 1980-92.

Table 5--Decomposition of changes in the relative farmgate price of cotton, 1979-92

	1979-84	1984-89	1989-92
Changes in relative farmgate price	-33.0	7.4	31.2
Changes in relative foreign price	-20.5	44.2	-11.4
Changes in real exchange rate	-6.3	-10.4	-3.5
Changes in direct protection	-6.2	-26.4	46.1

Source: Authors' calculations.

Note: The entries are 100 times the calculated changes in natural logarithms of the variables, which therefore approximate the percentage changes over the indicated subperiods.

3. ATTRIBUTING REAL EXCHANGE RATE CHANGES TO EXTERNAL AND POLICY-RELATED FACTORS

The real exchange rate plays an intermediary role in transmitting the price incentive effects of trade and macroeconomic policies to tradable goods production. It is of course the real exchange rate, rather than the nominal exchange rate (which the government can control directly), that is relevant in the assessment of the relative profitability of tradable goods.

In an accounting sense, movements of the real exchange rate are due to movements of the nominal exchange rate, foreign prices (exogenous to the small country), and the general level of domestic prices. Because domestic prices are affected by nominal exchange rate changes (to an extent determined by the accompanying fiscal and monetary policies), there is no one-to-one correspondence between the nominal and real exchange rate.

Behaviorally, changes in the real exchange rate are explained in the theoretical literature (see, for example, Edwards 1989) in terms of at least four variables. These are: the country's external terms of trade, trade policies, the current account balance, and the nominal exchange rate.

THE TERMS OF TRADE

If export prices fall relative to nontradable goods while import prices remain constant--hence, the terms of trade deteriorates, the supply of nontradables will increase. At the same time, the demand for nontradables will decrease due to both income and substitution effects. Therefore, the real exchange rate must depreciate (based on the above measure, increase) to eliminate the excess supply and restore equilibrium in the nontradable goods market. If the deterioration in the terms of trade arises from an increase in import prices, the induced income and substitution effects on demand will be in opposite directions; if the substitution effect is stronger, the real exchange rate will depreciate (Dornbusch 1980). The greater the substitutability between nontradables and importables in consumption, and the greater the influence of export prices on the terms-of-trade change, the more likely will a depreciation of the real exchange rate result from a deterioration in the terms of trade (Bautista 1987).

TRADE POLICIES

An import quota or tariff (export subsidy) raises the domestic price of importables (exportables), which encourages their domestic production and induces lower consumption, leading to a decrease in imports (an increase in exports). Resources are reallocated toward the tradable goods sector away from nontradable

goods production. The reduced supply of nontradables results in an increase in their price and hence in a decrease in the real exchange rate. It is well known, for example, that the adoption of import-protection policies to promote industrialization has helped sustain an overvalued exchange rate in many developing countries. In contrast to the terms-of-trade variable, this determinant of the real exchange rate is within the control of policymakers.

The Current Account

The expected relationship between the current account balance and the real exchange rate is positive. A deficit in the current account implies an excess demand for foreign exchange, and its accommodation through reserve drawdowns or capital inflows serves to defend an artificially low real exchange rate. The positive relationship is reinforced by the possibility of a reverse causality in which a higher (lower) real exchange rate, other things the same, may lead to an improvement (deterioration) in the current account. For many developing countries in which the domestic capital market is underdeveloped and not integrated to the world financial system (in part due to government restrictions on private capital movements), the current account balance can be considered a policy variable, determined largely by macroeconomic policies including foreign borrowing policy.

The Nominal Exchange Rate

There is wide agreement in the literature that while changes in the nominal exchange rate can affect the short-run behavior of the real exchange rate, they will not have a long-run effect (Edwards 1989). The real exchange rate being a relative price variable, its long-run level is not likely to be influenced by nominal variables.⁴ However, in the short run, a change in the nominal exchange rate may facilitate the adjustment of the real exchange rate to the changes in real variables. Without accompanying measures addressing the "fundamentals" (e.g., liberalizing the trade regime, reducing the gap between national income and expenditure), a nominal devaluation will not lead to a sustained real devaluation; it may only raise the general price level without changing relative prices in the economy.

Based on the foregoing considerations, the following specification of the real exchange rate equation for Egypt is adopted:

$$\ln RER = f(\ln TOT, \ln (1+t_m^o)/(1-t_x^o), CA, \Delta \ln E) \quad (4)$$

where TOT is the external terms of trade index, CA is the current account surplus as a ratio of GDP (expressed in percent), t_m^o is the implicit tariff rate for all imports, t_x^o

⁴ Some authors (e.g., Turnovsky 1987) have argued that a systematic relationship between the nominal and real exchange rates is possible if there is wage indexation.

is the implicit tax rate for all exports, and the other variables (E and RER) are as defined earlier. The subscript t in each variable has been omitted. Note that the nominal exchange rate is entered as a first difference, which is meant to reflect the short-run character of its influence on the real exchange rate. Our measure of the NER variable is the weighted average of official, commercial, and free-market exchange rates (Dethier 1989:135).

Concerning the CA variable, relatively large amounts of "official transfers" appear in the Egyptian current account for many years. The measure used for CA in our empirical analysis is the "current account balance before official transfers" (based on World Bank data), assumed to be the more sustainable component of the current account.

Using annual data for the observation period 1970-92, OLS estimation of equation (3) yields the following result:⁵

$$\begin{aligned} \ln RER = & -0.339 + 0.260 \ln TOT + 0.204 CA - 0.746 \ln TRP \\ & (2.70) \qquad (2.11) \qquad (-7.03) \\ & + 0.344 \Delta \ln E \\ & (3.11) \end{aligned} \tag{5}$$

where TRP is the trade policy variable represented by $(1+t_m^o)/(1-t_x^o)$, and the numbers in parentheses are the t-values of the coefficient estimates. The adjusted coefficient of variation is 0.828, indicating a relatively high degree of explanatory power of the estimated equation.

All the regression coefficients are significant, and have the expected signs except perhaps that of the terms of trade which turned out positive. As discussed above, however, the qualitative effect of terms-of-trade changes on the real exchange rate is in theory ambiguous. That the coefficient of $\Delta \ln E$ proved to be highly significant supports the hypothesis of a short-run influence (i.e., within one year) of the nominal exchange rate on the RER: About 35 percent of say, a nominal devaluation is translated into a real devaluation. What can sustain the latter beyond the first year is any one or a combination of the following: (1) the external terms of trade improves; (2) trade restrictions are reduced; and (3) macroeconomic policies promote an improvement of the current account. The first is outside the control of policymakers. With respect to the second, a 10 percent decline in TRP will lead to a 7.5 percent increase in RER. On the other hand, a ten percentage point rise in CA (reduction in the current-account deficit) will yield an RER depreciation of 2 percent.

The estimated coefficients in the RER equation (5) can be used, jointly with relevant entries in Table 5, to derive an alternative decomposition of the changes in

⁵ Equation (5) is deemed superior to the other regression results obtained, considering standard statistical criteria and the economic implications of the magnitude and signs of alternative coefficient estimates; in particular, specifying a lagged RER adjustment à la Koyck-Nerlove proved less satisfactory.

relative farmgate price of cotton that differentiates between the changes due to external factors and changes due to domestic policies. Such decomposition is given in the lower part of Table 6, which in effect substituted out the "changes in real exchange rate" in Table 5 with their policy and nonpolicy determinants as shown in the upper portion of Table 6.

The net contribution of government policies, including both direct and indirect price interventions, to the observed changes in the relative farmgate price of cotton is seen from Table 6 to have varied significantly over the period 1980-92. During the 1980s, especially in the second half of the decade, shifts in government policies only exacerbated the incentive bias against cotton production. There was a sharp reversal, however, in the early 1990s with the implementation of agricultural policy reforms directly affecting the cotton sector. As can be discerned from the upper part of Table 6, the influence of changes in economywide policies on the relative cotton price through the real exchange rate had been insignificant since the mid-1980s.

The exogenous component of RER changes, consisting of the foreign terms-of-trade shocks, is also seen to have had only a small contribution to the evolution of the farmgate price of cotton relative to the changes in foreign cotton price throughout the period. With respect to the distinction between the changes in exogenous and in policy-related factors as they affected the relative cotton price, one observes that their impacts were reinforcing (both negative) in the early part of the 1980s but offsetting subsequently. The "leaning-against-the-wind" policy since the mid-1980s is seen (from the third and last rows of Table 6) to characterize the sector-specific, but not economywide, government interventions.

The foregoing analysis has focused on the changes in the factors that determined the evolution of the relative producer price of cotton during 1980-92, making an assessment of the relative contributions of external shocks and of changes in sectoral and economywide policies. It examines what has happened, not what might have happened under a different set of government policies. In the next section of this paper, we address the question of how the relative cotton price in Egypt would have adjusted to the removal of incentive biases arising from sector-specific and economywide policies. The results of the analysis are suggestive of the scope for policy improvement that existed during the period, specifically toward the cotton sector but also viewed from a macroeconomic perspective.

Table 6--Decomposition of changes in real exchange rate and in relative farmgate price of cotton into exogenous and policy-related factors, 1979-92

	1979-84	1984-89	1989-92
Real exchange rate	-6.3	-10.3	-3.5
Exogenous factors	7.6	-16.6	-3.0
Policy-related factors	-13.9	5.3	-0.5
Relative cotton price	-33.0	7.4	31.2
Exogenous factors	-12.9	50.8	-14.4
Policy-related factors	-20.1	-43.4	45.6

Source: Authors' calculations.

Note: Exogenous factors consist of the external terms of trade and, for the changes in relative cotton price, also the foreign price of cotton; policy-related factors consist of the current-account balance, overall trade policy, direct protection to cotton, and nominal exchange rate.

The entries are 100 times the calculated changes in natural logarithms of the variables, which therefore approximate the percentage changes over the indicated subperiods.

4. RELATIVE COTTON PRICES UNDER ALTERNATIVE POLICY REGIMES

Recent research has shown that it is useful in policy analysis, especially in the context of developing countries, to distinguish between government interventions that affect relative agricultural prices (1) directly, i.e., policies aimed specifically at the agricultural sector, and (2) indirectly, i.e., those aimed at other production sectors (in particular, manufacturing) and macroeconomic policies that influence agricultural prices through the real exchange rate. They are referred to here simply as direct and indirect interventions. The actual (or historical) policy regime can then be compared with two counterfactual policy regimes: (1) sectoral free trade, in which there is an absence of direct interventions; and (2) economywide free trade, in which there is an absence of total (direct and indirect) interventions.

Since the early 1960s when the cotton sector was nationalized in Egypt, direct intervention has consisted of government controls on area planted to various cotton varieties, determination of the amount and varieties for export and domestic use, and crop procurement at fixed producer prices. There were insignificant increases in the procurement price during the 1960s. It has increased measurably since 1974, the year when "Infitah" or open-door policy was declared. However, the farmgate price of cotton continued to be much lower than the border price at the official exchange rate (Dethier 1989). Even with the comprehensive policy liberalization program initiated in 1986, in which many aspects of government control on agricultural production, marketing and prices were dismantled, cotton continued to be subject to fixed producer prices and crop procurement. While decontrol and liberalization of the cotton sector have been delayed, large increases in the procurement price (in nominal terms) began in 1989. More recently, the government has developed a Cotton Liberalization Implementation Plan that will establish in a few years a "free-market system for cotton production and marketing."

The relative farmgate prices of cotton corresponding to the historical and sectoral free-trade regimes can be represented, respectively, by $P_1 = P_h/\text{CPI}$ and $P_2 = P_{bo}/\text{CPI}$ where P_h is the historical (procurement) price of cotton, P_{bo} is the border-price equivalent⁶ at the official exchange rate (E_o), and CPI is the consumer price index. By definition, the "direct protection rate" for cotton is the proportionate excess of the actual producer price from the border-price equivalent evaluated at the official exchange rate, that is,

$$\text{DPR} = \frac{P_1 - P_2}{P_2}, \quad (6)$$

⁶ This is derived, following Dethier (1989:56-59), by adjusting for ginning, transport, handling, marketing, and other transaction costs to make the comparison of the border and farmgate prices at the same distribution point.

where a negative DPR indicates that P_2 is greater than P_1 , in which case there is direct price "disprotection" or taxation.

Domestic relative prices of tradable agricultural products are influenced not only by sector-specific policies but also by economywide trade, fiscal, monetary, and nominal exchange rate policies. In Egypt, import restrictions to protect domestic industry and expansionary macroeconomic management have caused significant real exchange rate overvaluation for many years. The relative price of cotton under the policy regime of economywide free trade is given by $P_3 = P_b^*/CPI^*$, where P_b^* is the border price of cotton evaluated at the "equilibrium" exchange rate (E^*), and CPI^* is the consumer price index with the tradable goods component calculated at border prices using the equilibrium exchange rate.

The equilibrium exchange rate is defined here as the exchange rate that would have prevailed under conditions of current account balance and unrestricted foreign trade. It follows closely the Krueger et al. (1988) definition, and associates the equilibrium exchange rate with the economywide free-trade regime. To estimate the equilibrium real exchange rate RER^* , we make use of the estimated equation (5), imposing the required conditions that the current account is in balance and that there are no trade restrictions ($t_m^o, t_x^o = 0$)--i.e., setting the policy variables CA and $\ln TPR$ equal to zero. The divergence of the actual RER for each year from the corresponding RER^* so estimated is the rate of exchange rate distortion,

$$RERD = \frac{RER - RER^*}{RER^*}. \quad (7)$$

Note that, by definition, $RER^* = E^*WPI_m/CPI^*$ where E^* is the equilibrium nominal exchange rate and CPI^* is the consumer price index in Egypt with the tradable goods component calculated at border prices using E^* . Obviously, the measures of exchange rate bias used in other studies based on the black market exchange rate (von Braun and de Haen 1983) and free-market exchange rate (Goueli and El Miniawy 1992) do not correspond to our measure of exchange rate distortion.

The "total protection rate" for cotton is the proportionate excess of the actual producer price from the border-price equivalent evaluated at the equilibrium exchange rate, that is,

$$TPR = \frac{P_1 - P_3}{P_3}. \quad (8)$$

A measure of the differential between total and direct protection is given by the "indirect protection rate," represented here by

$$\begin{aligned} \text{IPR} &= \text{TPR} - \text{DPR}(P_2/P_3) \\ &= \frac{P_2 - P_3}{P_3}, \end{aligned} \quad (9)$$

which indicates also the difference between the border-price equivalents evaluated at the official and equilibrium exchange rates. It is readily seen that IPR is equal to the rate of exchange rate distortion RERD in equation (7), since $P_2/P_3 = \text{RER}/\text{RER}^*$. Therefore, producers of cotton (and other tradable goods) are indirectly penalized when Egyptian trade and macroeconomic policies lead to an overvalued real exchange rate (which renders IPR negative). Until a sustainable current account balance is achieved and artificial barriers to foreign trade are removed, RER overvaluation and the adverse influence on production incentives for cotton will persist.

The time profiles of P_1 , P_2 , and P_3 over the period 1971-92 are shown in Figure 5. Table 7 contains average values of the estimated direct, indirect, and total protection rates for specific subperiods during 1971-92. It is evident that both direct and indirect government interventions have had significant adverse effects on price incentives for cotton producers. This conforms to the now stylized fact about the price bias in developing-country policies against agricultural products, especially export crops (Bautista and Valdés 1993).

Markedly higher values of the relative cotton price under the sectoral and economywide free-trade regimes are observed relative to the historical price levels for many years, particularly during the 1970s and, somewhat surprisingly, in the recent years of agricultural policy reform from 1989 to 1992. The explanation for the latter observation, relating to direct protection, would be that the liberalization of cotton policies had been delayed and that, despite what might be regarded as large increases in the nominal procurement prices of cotton since 1989, they had been effectively undercut by the country's rapid inflation (compared to foreign inflation), higher foreign-currency prices of cotton, and increases in the nominal official exchange rate.

On the other hand the divergence between P_2 and P_3 (due to indirect interventions) during 1989-92 is seen to be lower relative to the earlier subperiods. This resulted from the much improved current-account balance and general import liberalization, especially involving nonagricultural products. That indirect taxation of the cotton sector in Egypt is found, on average during the period of study, to be less significant than the negative price effect of direct interventions reflect the more dominant role of sectoral policies. This differs from the general tendency observed among developing-country governments to discriminate more heavily against agriculture through macroeconomic or economywide policies (Schiff and Valdés 1992).

Did government interventions result in a less unstable domestic price for cotton producers during the period? It is quite evident from Figure 5 that sectoral policies (direct government interventions) were highly price-stabilizing, based on the comparative time profiles of P_1 and P_2 . As pointed out by Dethier (1989:71), "government policy for cotton prices...was to stabilize the buying price for farmers," and that "the government absorbed fluctuations in export prices." By contrast, it

Figure 5-- Relative prices of cotton under alternative policy regimes, 1971- 92

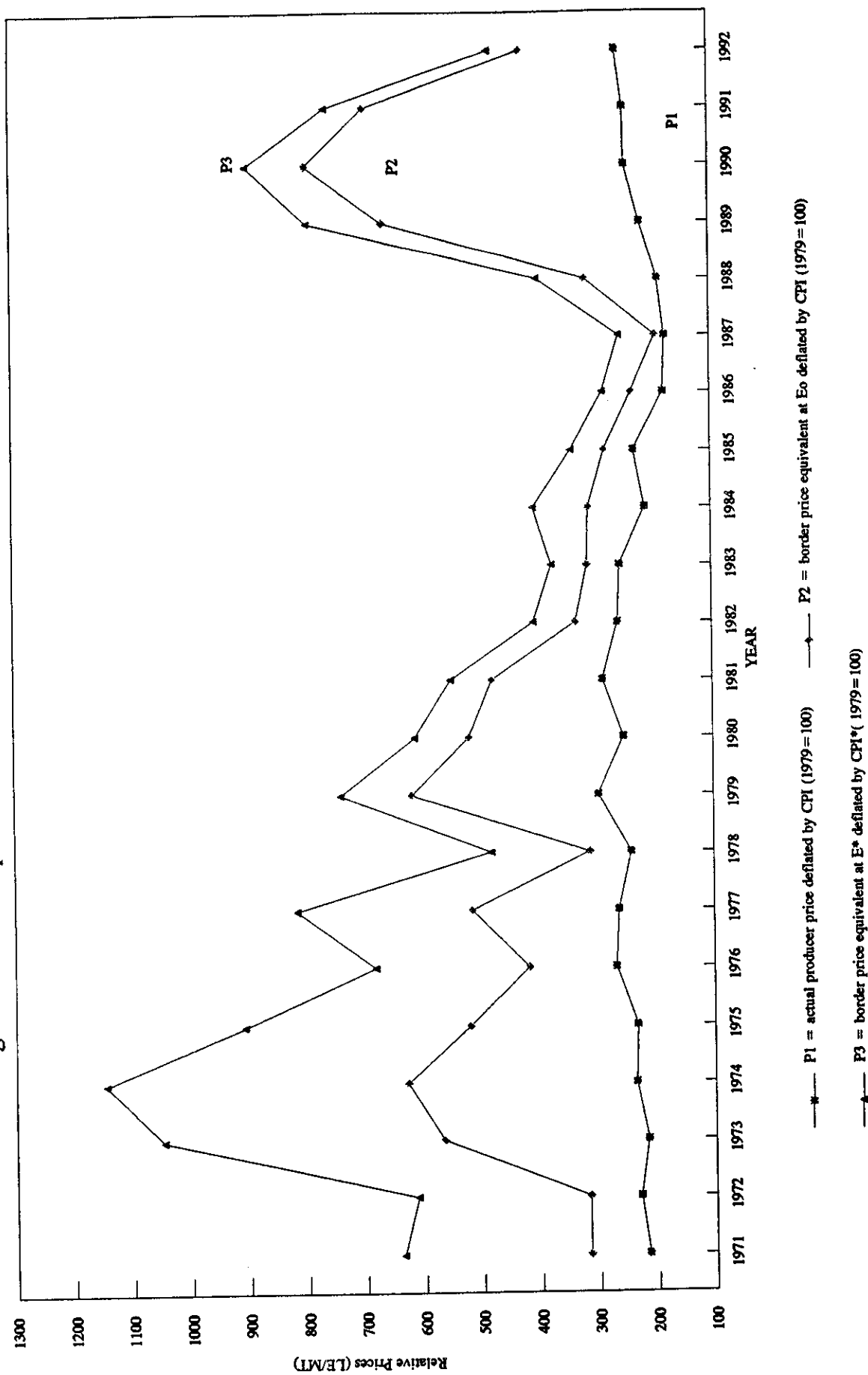


Table 7-- Measures of protection and real exchange rate overvaluation, 1971-1992
(in percent)

	1971-79	1980-84	1985-88	1989-92
Direct protection rate				
($= \frac{P_1 - P_2}{P_2}$)	-44	-32	-22	-60
Total protection rate				
($= \frac{P_1 - P_3}{P_3}$)	-67	-44	-38	-65
Indirect protection rate				
($= \frac{P_2 - P_3}{P_3}$)	-40	-17	-20	-12

Source: Authors' calculations.

Notes: P_1 = actual farmgate price of cotton deflated by CPI
 P_2 = border price equivalent at official exchange rate deflated by CPI
 P_3 = border price equivalent at equilibrium exchange rate deflated by CPI*.

Base year for consumer price index is 1979.

would appear from a visual comparison of the P_2 and P_3 profiles that indirect interventions did not affect much the variability of domestic cotton prices.

These observations are corroborated quantitatively in Table 8 by the comparative values of the instability index, calculated as the detrended coefficient of variation, for the relative cotton price under the three alternative policy regimes. Thus, P_2 and P_3 are seen to be almost three times more unstable than P_1 . Without indirect interventions, one could expect the relative price of cotton in Egypt, during a typical year, to be 38.1 percent lower or higher than the trend value for that year, based on the calculated instability index for P_2 ; with indirect interventions, the probability is reduced by less than a percentage point. With direct and indirect interventions (i.e., the actual policy regime), the degree of instability is dramatically lowered to only 13.5 percent.

Also shown in Table 8 are the calculated average cotton prices under the three policy regimes for the period 1971-92. It would appear that Egyptian cotton producers could have benefited from the removal of direct interventions in terms of a substantial increase (86 percent) in the average price of their product. Doing away with indirect interventions would have resulted in an additional 39 percent price increase. Clearly, there has been a tradeoff between long-run (average) price incentives and short-run (inter-year) price variability. The Egyptian government managed to reduce substantially the volatility of annual world cotton prices but at a cost of significantly lowering the price incentives for domestic cotton producers.

What matters to risk-averse producers is of course not the price variability as such but the variability of their income. In the case of a tradable good, the domestic price is unaffected by changes in the level of output; indeed, the direction of causality is the opposite in that the producer price is a determinant of domestic supply. In a comparative static, partial equilibrium analysis, one can expect that price variability is positively related to the variability of producer income. However, if dynamic and general-equilibrium price effects are incorporated in the supply response, the correlation between product price and income variability becomes tenuous.

Our previous study on price variability and producer welfare in Egyptian cotton (Bautista and Gehlhar 1993) investigates the effects of adopting sectoral and economywide free-trade regimes on the relative farmgate price of cotton and on producer income.⁷ The calculated values of average income and income variability under the three alternative policy regimes are used, following the analytical approach developed by Newbery and Stiglitz (1981), to derive the two components of the change in producer welfare induced by a shift from one policy regime to another: (1) the "transfer benefit," indicating the increase or decrease in average income; and (2) the

⁷ Minor differences in two aspects of that study with the present one may be noted: (1) the nominal farmgate price of cotton is deflated by the nonagricultural price index, not by the urban CPI; and (2) the period covered is 1965-91, not 1971-92. The findings of the two studies concerning the average level and instability of the relative cotton price under each of the three policy regimes are quite similar.

"pure stabilization benefit" or risk premium, indicating the monetary gain (loss) from a reduction (increase) in income instability.⁸

Table 8--Average levels and instability indices of relative cotton prices, 1971-92

	Average level	Instability (percent)
Relative prices		
P ₁	238	13.5
P ₂	444	38.1
P ₃	619	37.3

Source: Authors' calculations.

Notes: P₁ = actual farmgate price of cotton deflated by CPI.
P₂ = border price equivalent at official exchange rate deflated by CPI.
P₃ = border price equivalent at equilibrium exchange rate deflated by CPI*.

Prices are in LE/mt.

Base year for consumer price index is 1979.

Moving from the historical policy regime to either of the two free-trade regimes is shown in that study to improve producer welfare. Based on some reasonable values of the coefficient of risk aversion, the pure stabilization benefit (which ranges from -1.1 to 14.9 percent of average income) is found to be consistently dominated by the transfer benefit (from 65 to 155 percent of average income). This suggests that the welfare gains for cotton producers from the adoption of an explicit price stabilization

⁸ The risk premium arising from a shift from policy regime i to policy regime j is given by $-0.5r(\sigma_j^2 - \sigma_i^2)$ where σ_i and σ_j are the coefficients of variation of the income variables associated with the two policy regimes, and r is the Arrow-Pratt measure of relative risk aversion.

program, e.g., a variable export tax/subsidy scheme,⁹ would likely be outweighed by the welfare gains from policy improvements that have a lasting effect on producer prices.¹⁰ Based on the above findings, reforms in both sectoral and economywide policies in Egypt will yield a substantial transfer benefit to cotton producers which the reduced risk premium arising from the increased price variability is not likely to offset to any significant extent.

It bears emphasizing that the most reliable mechanism for coping with product price instability is a flexible production system in which farmers are free to make decisions on what and how to produce, and to market and store their products based on market price expectations. Also, the first-best policy is to let normal market forces do most of the stabilization (Knudsen and Nash 1993). Market-determined price changes send signals to economic agents that should not be unduly suppressed. In recent years, as indicated above, the Egyptian government has removed various aspects of direct control on agricultural production and marketing, including crop area allocation and delivery quotas. This serves to enlarge the scope for effective farmer response to relative price changes--for example, by diversifying the price risk and growing several crops with a low covariance of prices.

The adverse effects of price variability can be further mitigated by government policies that can facilitate production shifts toward more profitable crops induced by relative price movements. The development of rural infrastructure (including transport and communications facilities) and provision of support services serve to reduce the farmer cost of responding to price fluctuations and ease the transition to new product mixes as relative prices change.

Other market-oriented mechanisms that can help alleviate the cost of price instability include the smoothing of income stream for farmers through improved access to credit, and policies that promote the development and use of commodity futures and options markets as a means of reducing short- and long-term price uncertainty (Masuoka 1990). Indeed, it is important to correct existing market distortions, whether policy-induced or institutionalized, that hinder the natural development of rural credit markets and financial hedging instruments before considering any pro-active government interventions to deal with agricultural price variability.

⁹ This involves the use of a buffer fund, which collects export taxes when export prices are high and gives subsidies to producers when export prices are low, and is widely regarded as superior to other price stabilization schemes that (1) require government handling and storage of commodities and (2) ignore the longer-term relationship between foreign and domestic prices (see, for example, Knudsen and Nash 1993).

¹⁰ See, for example, the results obtained for Malaysian rubber and Philippine copra as reported in Bautista and Gehlhar 1992.

5. SUMMARY AND CONCLUSIONS

What happens to agriculture is likely to be a major determinant of the success or failure of economic policy reform in Egypt, given the predominant weight of agriculture and the rural sector in the national economy. It is also reasonable to assume that food security for rural households, as well as at the national level, will be enhanced by an improved agricultural performance during the period of reform.

In this paper, we have examined the effects of government policies on price incentives for producing cotton, the most important cash and export crop in Egypt. The focus of our study is the period since the early 1980s, a period of dramatic developments in the cotton sector. For virtually the entire decade cotton production, yield and area planted were on a relatively steep downward trend. This was followed by a significant upturn in yield and output, beginning in 1989. That the improved performance of the cotton sector started three years after the official adoption of a comprehensive policy liberalization program is a reflection of the delayed implementation of reform measures benefiting cotton producers.

Our findings indicate significant increases, from 1989 to 1992, in the farmgate price of cotton relative to the unit production cost, as well as in the net returns to cotton production, that presumably influenced the turnaround in cotton production and yield. In reverse manner, the unfavorable incentive structure in the earlier period contributed to the rapid decline of the cotton sector.

Decomposition analysis reveals that the reduction in the relative price farmgate price of cotton during the first half of the 1980s exceeded the decline in relative foreign price of cotton, having been reinforced by an appreciation of the real exchange rate and increased direct (sector-specific) taxation. By contrast, there was a marked increase in the foreign price during the second half of the decade but which was passed through to cotton producers only to a limited extent as the real exchange rate further appreciated and direct taxation substantially increased. Finally, in recent years of decontrol and liberalization in the cotton sector, the relative farmgate price showed remarkable improvement--even as the foreign price of cotton declined sharply--attributable not to any real exchange rate depreciation but to significant increases in direct protection.

To be able to distinguish between the contributions of changes in government policies and of exogenous shocks (external developments) to the observed changes in the relative farmgate price of cotton, an analysis of the causal determinants of the real exchange rate is undertaken. The exogenous influence on the real exchange rate is represented by the external terms of trade, while the policy-related factors are the current-account balance (determined by macroeconomic policies), trade policy, and the nominal exchange rate. The results indicate that the exogenous component of real exchange rate changes had only a minor contribution to the evolution of the relative farmgate price of cotton throughout the period. Since the mid-1980s "leaning-against-the-wind" characterized sector-specific, but not economywide, policies: Changes in the relative foreign price of cotton were accompanied by offsetting changes in direct

protection to the cotton sector. However, substantial benefits accrued to cotton producers in the form of increased relative farmgate prices only during the early 1990s.

What would have been the relative farmgate price of cotton under the counterfactual regimes of sectoral free trade (no direct interventions) and of economywide free trade (no direct and indirect interventions)? We have addressed this question in terms of the calculated average values of direct and total protection rates for cotton for various subperiods during 1971-92, the long-run price incentives for cotton represented by the average relative farmgate price for each of the three policy regimes, and the cotton price variability associated with each policy regime.

The results of our analysis indicate that cotton producers in Egypt had been penalized heavily by the distortionary price effects of sectoral policies such as the low procurement prices of cotton; removal of direct interventions would have increased the relative farmgate price by 46 percent on average during 1971-92. Moreover, the economywide policies adopted, including import protection to promote domestic industry and macroeconomic policies that overvalued the real exchange rate, exacerbated the incentive bias against cotton production; removal of such indirect interventions would have raised the relative farmgate price by an additional 28 percent on average during the period.

On the other hand, government policies toward the cotton sector had been successful in reducing significantly the price variability for cotton producers. The historical farmgate price of cotton is found to be nearly one-third less variable than the corresponding prices under the two counterfactual free-trade regimes. However, the amount of the risk premium (pure stabilization benefit) associated with the reduced income variability due to government interventions compared unfavorably with the negative transfer benefit resulting from the reduced average income for cotton producers. Our assessment, therefore, is that the removal of policy-induced biases against cotton production would have had a significantly positive effect on producer welfare.

Actually, there is no inherent conflict between the adoption of a more open trade regime and unbiased macroeconomic policies to improve agricultural production incentives on the one hand and government efforts to manage domestic price instability on the other. The two objectives are conceptually distinct and can be kept separate in practice. Thus, we have emphasized above the need to rely on market-based mechanisms to reduce price variability or to mitigate its adverse effects. These include government policies that help "lubricate the rural economic structure," such as the improvement of rural infrastructure and provision of support services, facilitating farmer response to relative price changes and reducing the transactions cost of shifting production to newly profitable crops. Increasing the access of rural producers to credit and the use of options and futures markets also serve to reduce the cost of agricultural price instability.

If the political reality is such that explicit price stabilization has to be undertaken, transparent trade measures such as variable tariffs and subsidies would be preferable to government handling and storage of commodities or other costly

administrative mechanisms. Government monopoly of the international trade of agricultural products and reliance on any kind of quantitative trade restrictions are also inferior in that they encourage rent-seeking, economic corruption, bureaucratic red tape, and wasteful paperwork.

We can conclude from the above discussion that government interventions in Egypt have significantly discriminated against the cotton sector, in terms of both sector-specific and economywide policies. Not even the recent increases in cotton procurement prices (in nominal terms) have compensated cotton producers to the extent of price incentives associated with a free-market system. This suggests to us that delays in implementing government plans to liberalize cotton production, marketing, ginning, and exporting will likely continue the price bias of sectoral policies against cotton producers.

With respect to economywide policies, it is important that the recently initiated trade reforms toward lower tariff and nontariff barriers (especially on highly protected manufactured products) be intensified and that prudent fiscal and monetary policies to strengthen the country's external account continue to be adopted. Among other things, this will reduce the degree of real exchange rate overvaluation, benefiting not only producers of cotton and other export goods but also those of import-competing products in agriculture and the rest of the economy.

REFERENCES

- Bautista, R. M. 1987. *Production incentives in Philippine Agriculture: Effects of trade and exchange rate policies*. Research Report 59. Washington, D.C.: International Food Policy Research Institute.
- Bautista, R. M., and C. G. Gehlhar. 1992. Domestic price stabilization of export crop prices: Philippine copra and Malaysian rubber. *The World Economy* 15:779-792.
- . 1993. Export price variability, government interventions, and producer welfare: The case of Egyptian cotton. Paper submitted for presentation at the 1994 Congress of the International Association of Agricultural Economists, August 22-29, 1994, Harare. December. (Processed).
- Bautista, R. M., and A. Valdés. 1993. *The bias against agriculture: Trade and macroeconomic policies in developing countries*. San Francisco: ICS Press for the International Center for Economic Growth and the International Food Policy Research Institute.
- Bell, T. M. 1992. *The Egyptian cotton industry*. Paper submitted to USAID/Cairo. June. (Working copy).
- Beshay, A., M. El-Sentrecy, A. Abu-Rawash, A. Emara, A. Nassar, M. Abel, and T. Bradley. 1989. *An evaluation of prices of major agricultural commodities in Egypt in relation to world prices*. Economic Working Paper No. APAC-89-(10). Ministry of Agriculture and Land Reclamation. Undersecretariat for Agricultural Economics and Statistics.
- Center for Adult and Continuing Education. 1992. An assessment of the potential for liberalization of the cotton production, trade and ginning sector. Paper submitted to the Principal Bank for Development and Agricultural Credit. American University in Cairo. August. (Processed).
- Dethier, J. J. 1989. *Trade, exchange rate, and agricultural pricing policies in Egypt*. Vols. I and II. World Bank Comparative Studies. The Political Economy of Agricultural Pricing Policy. Washington, D.C.
- Dornbusch, R. 1980. *Open economy macroeconomics*. New York: Basic Books Inc.
- Edwards, S. 1989. *Real exchange rates, devaluation and adjustment in less developed countries*. Cambridge, Mass.: MIT Press.

- El-Saadany, R. 1994a. Policy issues concerning domestic stabilization of cotton prices and producer income. Paper prepared for the IFPRI project on food security and structural adjustment in Egypt. February. (Processed).
- . 1994b. Policy environment since the early eighties that affected Egyptian agriculture and cotton sector. Paper prepared for the IFPRI project on food security and structural adjustment in Egypt. February. (Processed).
- El-Saadany, R., and A. Abu-Rawash. 1989. *Economic effects of increasing procurement prices of Egyptian cotton*. Economic Working Paper No. APAC-89-(4). Ministry of Agriculture and Land Reclamation. Undersecretariat for Agricultural Economics and Statistics.
- Emara, A. 1993. Economic impacts of the agricultural price policy on cotton crop in Egypt. Paper prepared for the IFPRI project on food security and structural adjustment in Egypt. December. (Processed).
- Esfahani, H. 1984. A system-wide analysis of the impact of policy on agricultural performance in Egypt. Ph.D. dissertation. Department of Economics, University of California, Berkeley.
- Goueli, A. and A. El Miniawy. 1993. Food and agricultural policies in Egypt, 1970-1990. Ford Foundation. June. (Processed).
- Ikram, K. 1980. *Egypt: Economic management in a period of transition*. A World Bank Country Economic Report. Baltimore: Johns Hopkins University Press.
- Knudsen, O. and J. Nash. 1993. Agricultural price stabilization and risk reduction in developing countries. In *Bias against agriculture*, eds. R. M. Bautista and A. Valdés. San Francisco: ICS Press for the International Center for Economic Growth and the International Food Policy Research Institute.
- Krueger, A. O. , M. Schiff and A. Valdés. 1988. Agricultural incentives in developing countries: Measuring the effect of sectoral and economywide policies. *World Bank Economic Review* 2: 255-271.
- Löfgren, H. 1993. Egypt's program for stabilization and structural adjustment: An assessment. *Cairo Papers in Social Science* 16:20-37.
- Masuoka, T. 1990. *Asset and liability management in the developing countries: Modern financial techniques*. PRE Working Paper No. 454. World Bank. Washington, D.C.

- Newbery, D. and J. Stiglitz. 1981. *The theory of commodity price stabilization: A study in the economics of risk*. Oxford: Clarendon Press.
- O'Mara, G. T., E. El Hawary, I. Soliman, B. Mostapha and A. S. A. Shneshin. 1992. *The response of Egyptian farmers to cotton policy interventions*. Paper prepared for USAID/Cairo. October. (Processed).
- Quiroz, J. and A. Valdés. 1993. Agricultural incentives and international competitiveness in four African countries: Government interventions and exogenous shocks. In *Agricultural policy reforms and regional market integration in Malawi, Zambia, and Zimbabwe*, eds. A. Valdés and K. Muir-Leresche. Washington, D.C.: International Food Policy Research Institute.
- Schiff, M., and A. Valdés. 1992. *A synthesis of the economics in developing countries*. Vol. 4 of *The political economy of agricultural pricing policy*. Baltimore: Johns Hopkins University Press for the World Bank.
- Turnovsky, S. 1987. Optimal monetary policy and wage indexation under alternative disturbances and information structures. *Journal of Money, Credit and Banking* 19:157-180.
- von Braun, J. and H. de Haen. 1983. *The effects of food price and subsidy policies on Egyptian agriculture*. Research Report 42. International Food Policy Research Institute. Washington, D.C.
- World Bank. 1989. *Trends in developing countries, 1989*. Washington, D.C.
- _____. 1993. *Trends in developing countries, 1993*. Washington, D.C.