CA

WP#112

AGRICULTURAL DEVELOPMENT SYSTEMS
EGYPT PROJECT
UNIVERSITY OF CALIFORNIA, DAVIS

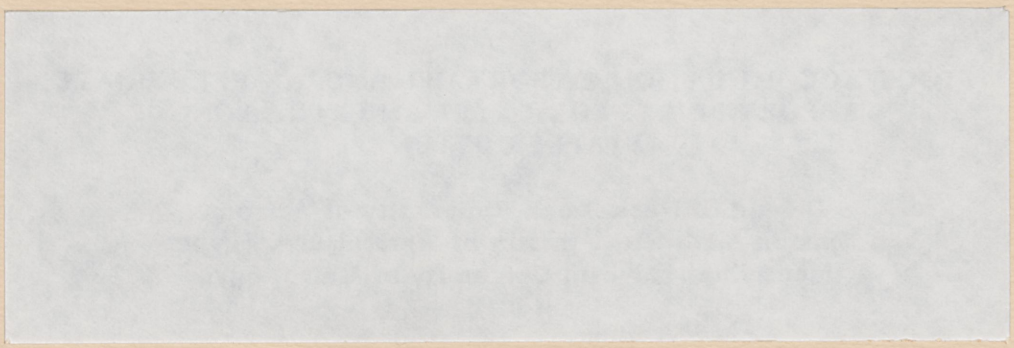
STOCK ACCUMULATION, EXPORT DEMAND, & APPROPRIATE EXPORT PRICES FOR EGYPTIAN EXTRA LONG STAPLE COTTON

By
Donald G. Heckerman, University of Arizona
Hassan A. Khedr, Ministry of Agriculture, Egypt
Hanna Kheir-El-Din, University of Cairo, Egypt

Econ-

WORKING PAPER

USDA/EGYPT



STOCK ACCUMULATION, EXPORT DEMAND, & APPROPRIATE EXPORT PRICES FOR EGYPTIAN EXTRA LONG STAPLE COTTON

By
Donald G. Heckerman, University of Arizona
Hassan A. Khedr, Ministry of Agriculture, Egypt
Hanna Kheir-El-Din, University of Cairo, Egypt

Assistance from the Agricultural Development Systems Project of the University of California, Egyptian Ministry of Agriculture, and USAID, is gratefully acknowledged, but the author is soley responsible for the views expressed in this paper.

Economics
Working Paper Series
No. 112

December, 1982

Agricultural Development Systems:
Egypt Project
University of California
Davis, Ca 95616

I. The Problem of Excess Stocks of Unsold Cotton

Egyptian stocks of unsold cotton have approximately doubled over the past five years. This rapid increase in unsold cotton has resulted in storage problems, wastage through deterioration of unprotected raw cotton, and losses of foreign exchange earnings due to falling world cotton prices as well as interest that would have otherwise been earned on foreign exchange reserves had the cotton been sold in world markets during the year when it was produced. This accumulation of cotton stocks has created serious problems for cotton policymakers who must struggle to bring annual exports and domestic consumption into balance with production in order to end stock accumulation and, hopefully, begin to reduce the existing uneconomic levels of stocks.

Table I contains data for end-of-crop-year stocks for the crop years 1970/71 through 1981/82. This data indicates that unsold stocks increased slowly and unevenly from 420,000 bales in August 1971 to 500,000 bales in August 1978. In the following three years stocks more than doubled to 1,040,000 bales before declining by 100,000 bales in August 1982. While the 1981/82 decline is gratifying, it is nevertheless true that three more years of comparable decreases are required before stocks will return to their August 1979 levels. The balance between exports and domestic consumption, on the one hand, and production, on the other, is destined to remain a high priority issue in coming years.

The next section of this paper explores the possibility of alleviating the stock problem by increasing exports. Because of data limitations, analysis is restricted to the demand for extra long staple exports from Egypt.

II. An Overview of World Extra Long Staple Markets

Discussion of world extra long staple (ELS) cotton markets begins with export statistics for the principal world exporters. Egyptian ELS exports are then considered in more detail.

Tables IIa and IIb report five year averages for the first and second halves of the 1970's for ELS exports from Egypt, Peru, Sudan, and the USA. Production for these four countries represent over 90% of world ELS production outside India and the USSR, so it is surely true (although not verifiable because of the absence of a comprehensive accounting for international trade in ELS fibers) that these four countries are the dominant ELS exporters. Important points to be noted include: (1) Sudan was the largest exporter in each period. (Note that this is not expected to continue since Sudanese production has fallen precipitiously since 74/75. Indeed, since 75/76, Sudan's ELS exports have exceeded ELS production by substantial amounts); (2) Egypt has experienced the largest absolute and percentage declines of the four exporters. This is not inconsistent with the fact that Egypt was originally more dependent on trade with India and the USSR than its competitors; (3) aggregate ELS exports for the four countries have fallen by 28.3 percent between the first and second halves of the 1970's; (4) the sharp decline in international trade in ELS fibers is due largely to decreases in Indian and Soviet imports. These decreases in imports together with large production increases in India and the USSR indicate that two of the largest importers (accounting for one-third of world imports in the earlier period) have engaged in massive import substitution. During 79/80 both India and the USSR were entirely self-sufficient; and, (5) other regions have experienced small absolute declines in ELS imports from the four major exporters. See the right

hand column of Table IIb. Eastern and Western European imports are up slightly, Far Eastern imports are virtually unchanged, and the People's Republic of China and the rest of the world import totals are down by slightly larger amounts.

Table III contains data on the volume of Egyptian ELS exports by region for the crop years 1970/71 to 1980/81. The most important points to note are: (1) total ELS exports have declined steadily throughout the period. By 80/81 exports were less than half the 70/71 level; (2) comparison of five-year averages by region reveals that virtually the entire decline can be traced to decreased exports to India and the USSR (countries where major increases in domestic production of ELS fibers made import substitution possible); (3) five year regional averages also reveal that increased sales (financed largely by bilateral trade agreements?) to the People's Republic of China have approximately offset declines in exports to Eastern Europe (which are no longer subject to bilateral trade agreements); and (4) five-year averages reveal that increases in exports to Western Europe approximately offset declines in sales to the Far East (excluding China) and the rest of the world. Note that the volume of Egyptian exports to the Far East are down despite the substantial increases in raw cotton "disppearance" and in textile manufacturing in the Far East during the last decade.

III. Estimating Demand Functions for Egyptian ELS Exports

Econometric estimates of the demand for Egyptian ELS exports are presented. Table IV summarizes these results. Three equations are reported. Each of the three has different implications for the responsiveness of export demand to the export prices determined by Egyptian pricing authorities. The implications of these alternative demand functions for the problem of controlling stock accumulations are derived in Section IV.

The dependent variable for each of the three regression equations reported in Table IV was the number of bales of Egyptian ELS exports to all countries excluding the Soviet Union, Eastern Europe, the People's Republic of China, the People's Democratic Republic of Korea, and India. Exports to these countries were excluded on the assumption that their demands were likely to be less price responsive and/or based on bilateral trade agreements (during the earlier years of our sample) whose terms are not necessarily reflective of hard currency export prices.

Each of the equations was estimated for the period which begins with the 1966/67 crop year and ends with 1980/81. Throughout this period the Egyptian authorities followed the practice of setting a dollar export price at the beginning of the crop year which was maintained with little variation throughout the year. (Official Egyptian policy is to raise prices if market conditions permit but to never lower prices.) Because of this policy, it is appropriate to assume that prices are exogenous and quantities exported are endogenous. Under these circumstances ordinary least squares is an appropriate estimation technique. All demand functions were estimated using logarithms of both dependent and independent variables.

Variables used to explain Egyptian ELS exports are income in consuming countries, Egyptian export prices, and prices of competing fibers. The proxy used for income in consuming countries was total OECD real gross domestic product in dollars. Prices of competing fibers included the dollar price per pound of polyester fiber delivered to U.S. mills and the U.S. farm price in dollars of middling 1 3/16" cotton fiber. These prices were deflated by the OECD gross domestic product implicit price deflator to obtain real dollar prices. Data for Egyptian F.O.B. ELS export prices in dollars were also

deflated by the same deflator. Income and polyester price data were for the calendar year while export volume, export price, and U.S. 1 3/16" price data were for the crop year beginning August 1 of the comparable calendar year and extending through July 31 of the following calendar year. As a result, income and polyester price data refer to a period which lags seven months behind export volume and cotton price data.

The three equations reported in Table IV have quite different implications for the price responsiveness of export demand. Equation One has the lowest standard error. That equation implies that exports are totally unresponsive to export prices within the crop year. The results indicate that export demand responds to prices in the preceding year. The point estimate of the elasticity of demand to lagged prices is 1.24. Equation Two reveals a point estimate of the elasticity of demand to current prices of about 1.24. Export demand also depends heavily on lagged export demand, which implies an additional distributed lag response to price changes over time. With a lagged export coefficient of about .44, the total responsiveness of export demand to a change in price after one year is about 144% of the response in the first year.

Equation Three, in contrast to Equations One and Two, has a price elasticity of demand which is not constant for all prices. The functional form for cotton prices used in Equation Three $\frac{1}{\frac{\text{Egyptian ELS price}}{\text{U.S. 1 3/16" price}} - 1}$ allows the elasticity of demand for Egyptian ELS exports to rise as the Egyptian ELS dollar export price approaches the U.S. 1 3/16" farm price. In the limit where the Egyptian export price is equal to the U.S. 1 3/16" price, the functional form guarantees that the price elasticity of demand for Egyptian ELS cotton is infinite. This functional form thus incorporates the reasonable assumption that Egypt could sell unlimited amounts of ELS cotton if it were to offer its premium quality

cotton at the same price as the much lower quality U.S. 1 3/16" cotton fiber. Since the world market volume for 1 3/16" cotton is much larger than the ELS volume, Egypt could surely charge such a price without fear of affecting the market price for 1 3/16" cotton. (That is, one can assume that the U.S. 1 3/16" cotton price is exogenous.) The point estimate of the elasticity of current price demand was 1.77 based on the Egyptian ELS and the U.S. 1 3/16" prices prevailing during the 1980-1981 crop year. Since this equation also contains a lagged endogenous variable whose coefficient is approximately .4, one would expect an additional 40% increase in the point elasticity of demand after one year.

IV. Changes in Egyptian Export Prices Required to Prevent ELS Stock Accumulations

This section attempts to identify the reductions in ELS export prices which would have avoided ELS stock accumulation during the 1977/78, 1978/79, and 1979/80 crop years. These required price reductions are then compared to the net social cost of growing ELS cotton to determine whether production of cotton in those years exceeded the socially profitable level. The section thus aims to determine whether recent stock accumulations are due to overproduction or to underpricing.

The approach adopted to answer this question of underpricing versus overproduction is a partial, static approach based on the comparison between three sets of prices, namely:

1. The f.o.b. export price of ELS Egyptian cotton.
2. The f.o.b. export price of LS Egyptian cotton.
3. The world price of ELS cotton which makes direct resource costs (DRC) equal to one for ELS cotton.[1]

The reason for comparing ELS and LS export prices is that the latter should be considered as the floor below which Egypt should be unwilling to export ELS cotton. ELS export price is compared to the world price that makes DRC equal to one because the latter represents the floor below which Egypt should not be producing ELS cotton.

Figure I represents demand and supply of ELS exports under different price assumptions. The supply of exports has been assumed fixed independently of the export price.[2] The shape of the supply function, however, does not affect the outcome of the analysis so long as equilibrium in the export market remains stable. The demand function is assumed less than infinitely elastic.

If case Ia applies, it appears that a reduction of the ELS export price would not clear the market - and hence prevent further stock accumulation - unless export price is reduced below the level which makes it profitable to the economy to grow ELS cotton. In this case a reduction of ELS production should be considered in addition to an export price reduction.

If case Ib is applicable, then an export price reduction would enable Egypt to sell all the supply of the new ELS cotton crop available for export and production of ELS cotton would continue to be profitable from the social point of view.

Figures Ic and Id show the long staple (LS) export price in addition to the export price of ELS and the world price which makes DRC equal to one. Only situations where the LS price falls within the range between the other two prices have been considered, since the world price for which DRC equal to one represents the floor below which Egypt should not go on producing ELS cotton. In cases Ic and Id, if an export price of ELS cotton equal to that of LS cotton does not clear the market of ELS cotton, then the supply of ELS exports should be reduced, since Egypt should not export ELS cotton at a price

lower than that of LS cotton. This conclusion holds even if ELS production remains profitable from the social point of view, since the price which makes DRC equal to one for LS cotton has been found consistently below the corresponding price for ELS cotton. This means that if ELS and LS were exported at the same price, LS cotton would be socially more profitable. If, however, the export price of LS is as shown by P_{LS2} in Figure Id, further stock accumulation may be stopped by reducing the export price of ELS and continuing to grow and export the same quantity as before,[3] ceteris paribus.

To investigate which of the preceding cases apply to Egypt, export prices for ELS and LS as well as the world prices which make DRC equal to one for both staple lengths are required. An estimate of the elasticity of demand is also necessary. The analysis covered three consecutive years, 1977/78, 1978/79, and 1979/80. Columns 1 and 2 of Table V show actual LS and ELS export prices. Columns 3 and 4 identify the world prices which make DRC equal to one for both staple lengths. These prices vary for the same staple length according to the production techniques adopted and according to production location. Since these prices represent the floor below which cotton is not socially profitable, only the highest prices which make DRC equal to one have been taken into consideration, as they reflect the lowest level of efficiency in producing cotton in Egypt.[4] These prices should also vary over time. However, they were assumed to be constant on the grounds that they are not expected to change significantly from year to year, particularly when the production techniques and efficiency level have remained fairly constant. Prices that make DRC equal to one have been assumed to change only as a result of the evaluation of 1979/80.

Column 5 indicates the precentage change in exports to market economies required to avoid accumulation of ELS stocks. Comparing the change in stocks

to the value of exports in 1977/78, 1978/79 and 1979/80, it appeared that the required change in stocks as a percentage of exports in the same year was successively 3.81%, 9.84%, and 73.24%, as shown in column 5 of Table V. These percentages assume that only exports to market-oriented economies will change in response to export price changes. If, for example, Eastern European export volume also responds to price changes, the "required" price changes reported in columns 6 and 7 are overstated.

With Equation One price changes within the year have no effect on demand within the year and hence cannot be used to prevent stock accumulation within the period that prices are lowered. However, price reductions do affect demand with a one year lag. In such a case, policymakers would either have to anticipate potential stock accumulations one year in advance and make price adjustments at that time or, alternatively, adjust prices in the year in which stock accumulations occur and then hold in inventory the excess amount for one year until price adjustments have time to eliminate the stock accumulations.

Column 7 for Equation One indicates that a 3.07% reduction in f.o.b. ELS export prices would have offset 1977/78 stock accumulation after one year. This would have required a price of 65.03 LE/M.K., which is reported in column 9. These results imply that Egypt could have prevented the accumulation of additional stocks in 1977/78, if the f.o.b. export price for ELS cotton had been 65.03 L.E./M.K. instead of 67.09 L.E./M.K. This price appears to be much higher than that which makes DRC equal to one and it is also higher than the LS export price. (Case Id seems to have been applicable with the f.o.b. price of LS at a level below that which would clear the market for ELS exports as shown by P_{LS2}). For 1978/79 the required export price of ELS cotton (43.66 L.E./M.K.) drops to almost the same level as that which makes DRC equal to one (45.11 L.E./M.K.). The f.o.b. export price of LS cotton was lower than

that which makes DRC equal to one and, therefore, is not relevant to decision making (Case Ib seems to apply to the year 1978/79). Finally, it appeared in 1979/80 that trying to prevent additional stock accumulation through price reduction alone would require cutting the price to 39.00 L.E./M.K. i.e., to a level far below that which makes ELS cotton production socially profitable. This means that area grown with ELS cotton should have been curtailed. (Case Ic).

Equations Two and Three imply that demand responds to price decreases within the crop year. These equations, which included lagged export levels, also imply that the price elasticity of demand is larger (by 43.7% in the case of Equation 2 and 40% for Equation 3) after a one-year lag than it is initially. The implication of these differences is twofold. First, it is now possible to identify percentage price reductions which can be implemented during the crop year to prevent stock accumulations at the end of the period. The price reductions required to prevent accumulation from occurring are reported in column 6. Column 7 indicates the price reduction which, if maintained for two crop seasons, will succeed in slowing accumulation within the crop year and wholly reversing it by the end of the next crop year. Equations 2 and 3 permit somewhat higher prices after one year than does Equation 1 for the 1977/78 and 1978/79 crop years. For the 1979/80 crop year Equations 2 and 3 permit much higher prices after one year. For Equation 3 the price required after one year (78.56 LE/MK) is only a bit below the DRC equal to one price (80.62) though it is still significaltly lower than the LS price of 84.23 LE/MK.

For several reasons the results reported above are likely to overstate the size of the price changes requried to eliminate stock accumulation.

Remember that the approach described above considers only the demand from market economies, while exports to nonmarket economies represent about 50% of total Egyptian ELS exports (see Table III). The numbers in Column 5 of Table V imply that all stock accumulations must be eliminated by adjusting sales to market economies. While it seems appropriate to assume that in the short run demand by market economies is more price sensitive than is demand in socialist countries, socialist demand is not necessarily totally insensitive to price. Nevertheless, the calculations reported in Table V do assume that socialist demand is completely insensitive to price changes. If, in fact, socialist demand increases even a bit when Egyptian prices are lowered, that increase in exports will contribute to stock reductions and hence alleviate the need for larger price reductions.

Remember also that the price elasticities reported in Table IV come from a sample which is conditioned by Egyptian export price policies over the last fifteen years. Two important characteristics of that price policy were relatively stable price levels over time (compared to other cotton prices) and dependence upon a relatively unchanging set of customers for the bulk of sales. In the light of this information it is not difficult to understand why demand in Equation One is found to be insensitive to current price. Established buyers are likely to be relatively insensitive to price. Those whose demands are most sensitive to price are likely to be occasional buyers who respond to especially favorable prices. By varying prices from year to year in a relatively narrow band, Egyptian pricing policies have probably excluded most such customers from the sample. The result is to measure the relatively low price elasticities of regular customers. One should not be surprised to find that unusually large changes in Egyptian prices will evoke larger and faster demand responses than those measured here.

Another limitation of this approach to determining whether the stock accumulation problem is one of overpricing or overproduction is that it considers a very short time horizon. The optimal solution to an inventory problem usually includes adjustment over more than one (or even two) periods. Other considerations such as cost of storage and the ability to make reversible adjustments in production are also important inputs into the decision. The analysis above ignores these considerations. The following section identifies a series of considerations which should be included in any careful decision about optimal production and export pricing policies.

V. A Multiperiod Approach to Cotton Production and Export Pricing Policies

This section identifies a series of issues which affect optimal cotton production and export pricing policies. One characteristic of this section is that it takes a longer time perspective than that of the analysis in the preceding section. This section also incorporates explicitly such considerations as the value to Egypt of additional foreign exchange earnings, the cost of storing cotton, and the desirability of changing the mix of ELS and LS cotton production.

Each of the demand functions reported in Table IV has the characteristic that demand is more responsive to price in the long run than in the short run. This has important implications for the production and export pricing policies chosen. The implications of different short run and long run price elasticities for pricing policies can perhaps be best understood by considering two polar strategies.

One strategy is to take short run advantage of the differences between short run and long run demand elasticities. If demand is relatively inelastic in the short run, a policy of high prices and limits on production will

maximize short run social returns and foreign exchange earnings. Consider, for example, the case in which demand is completely inelastic during the current crop year. The volume of exports, in effect, is already determined by last year's price. The effects of raising price include an increase in foreign exchange earnings and social returns for that year.

The long run effect of such a policy is also quite clear. If one raises price this year, next year's exports, foreign exchange earnings, and social returns will decline. Over time a policy of charging high prices will maximize the chance that other producers will expand production of ELS cotton (as the Soviet Union and India have done in the past), that induced technological change will create substitutes for ELS fibers, and that the loyalty of existing customers will erode as they are induced by higher prices to sample alternative qualities of cotton and synthetic fibers. The result after a period of years of a policy of high prices for short run benefit is likely to be maximum possible demand elasticity at the lowest price in the long run. To choose this approach is to trade high immediate social returns and foreign exchange earnings for low social returns and foreign exchange earnings in the future. In the extreme, such a pricing policy might lead eventually to the effective cessation of Egyptian ELS exports.

Contrast the policy of high prices in the short run to one of lower prices. An alternative strategy to that described above is to set ELS prices at the lowest acceptable price, that price where DRC is equal to one. In the short run such a policy will surely lower social returns and perhaps also reduce foreign exchange earnings (depending on whether the short run price

elasticity of demand is greater or less than one). On the other hand, such a policy will minimize stock accumulation and reduce storage costs. The long run effect will be to preserve or even increase foreign exchange earnings and social profitability.

The discussion so far has emphasized the long run effects of short run policy choices. It has not yet dealt with a multiperiod perspective on the stock accumulation problem which troubles Egyptian policy at this moment. The discussion turns now to that question. The starting point for any decision on dealing with existing stock accumulation is a long run perspective of optimal production and export levels. The best stock adjustment policy is likely to be strongly conditioned by whether production and exports are above or below long run optimal levels. If it is determined that production is above long run optimal levels, a decline in production will contribute to solving both long run and short run problems. However, if current production is at or below long run levels, the optimal short run production policy is much less clear cut. Whether one should temporarily reduce prices, or production depends on storage costs, the ease or difficulty in reducing and then increasing production again, the short run versus the long run price elasticity of demand, and the effects of adjustment on short term foreign exchange earnings. If it is difficult to temporarily decrease and then restore production levels, the remaining alternatives are to lower prices by large amounts and dispose of excess stocks as soon as possible or lower prices a bit and dispose of excess stocks over a longer period of time. The better of these alternatives depends on storage costs and the differences between short and intermediate run price elasticities of demand.

III. Information Required To Choose Rational Long Run Production and Export Price Targets

The preceding section concluded that identification of long run production and export price targets is the key to Egyptian cotton policy decisions. Knowledge of those targets will go a long way helping to find the appropriate solution for the stock accumulation problem. This section identifies some of the information needed to choose appropriate long run production and export targets for Egyptian ELS cotton.

Knowledge of long run export demand functions is needed. The responsiveness of export demand to world income growth, to prices of substitute fibers, and to Egyptian export prices should be carefully measured. Unfortunately, the demand functions reported in Table IV are most likely inappropriate for these purposes. Those estimates were designed to measure short run price elasticities of demand; long run elasticities which are derived from short run estimates are vulnerable to estimation bias. Additional statistical demand studies are required. One should also consider demand forecasting approaches which do do not rely exclusively on historical time series data. Among the items to be assessed are the likely future uses of natural and synthetic fibers, the technologies to be used in making apparel, and the composition of apparel demand in the next decade. Also required are forecasts of DRC's for producing ELS cotton. Of particular interest are recent sharp increases in productivity. If these productivity increases are permanent rather than temporary, and especially if additional productivity increases can be expected, DRC's adjusted for inflation can be expected to decline. Lower social costs due to higher productivity are likely to result in an increase in the optimal level of ELS exports.

Finally, setting long run targets requires information about future domestic requirements. These domestic requirements can be expected to have important impacts on production targets.

FOOTNOTES

[1]This price has been derived in the paper on "Efficiency of Cotton Production in Egypt".

[2]This assumption is not unrealistic in the case of Egypt as shown in the paper on "Cotton Supply Responses: A Case of Regulated Market".

[3]Figure Id may suggest that Egypt should expand ELS cotton production if demand is elastic. This, however, is not the issue under consideration.

[4]See paper on "Efficiency of Cotton Production in Egypt", op. cit.

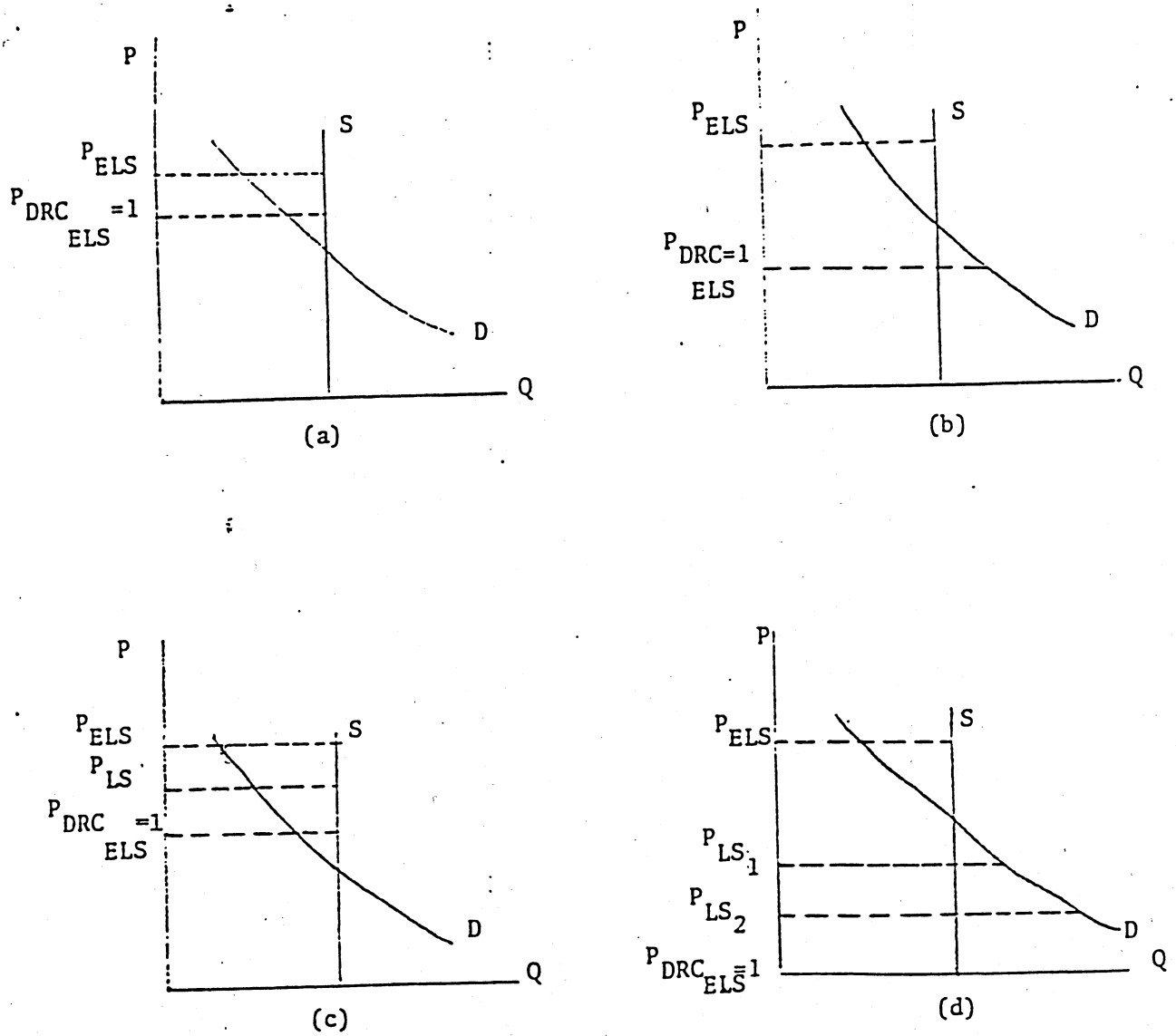


Figure I

The Relationship between the Export Prices of ELS and LS Cotton and the World Price at which DRC = 1.
ELS

TABLE I

Total End-of-Crop-Year Stocks of Cotton
for Arab Republic of Egypt, 1970-1982

DATA SOURCE: International Cotton Advisory Committee,
COTTON WORLD STATISTICS

Crop Year	1,000 Bales	
1970-71	420	
1971-72	410	
1972-73	385	
1973-74	400	
1974-75	530	
1975-76	420	
1976-77	550	
1977-78	500	
1978-79	630	
1979-80	750	
1980-81	1,040	
1981-82	950	(preliminary)

TABLE IIa

Total ELS Exports of Egypt, Peru, Sudan, USA 70/71-74/75 Averages

(1,000 Bales)

TO \ FROM	Egypt	Peru	Sudan	USA	Total
Western Europe	108.3	45.3	187.5	1.8	342.9
Eastern Europe	170.8	2.3	92.4	—	265.5
Far East	51.3	6.7	112.3	2.6	172.9
China (PRC)	38.4	—	127.1	—	165.5
India	83.0	3.4	128.9	.6	215.6
USSR	229.5	—	64.5	—	294.0
Rest of World	10.2	62.4	13.1	1.0	86.7
Total	701.5	123.1	725.8	6.1	1543.7 1556.5

TABLE IIb

Total ELS Exports of Egypt, Peru, Sudan, USA, 75/76 - 79/80 Average

TO \ FROM	Egypt	Peru	Sudan	USA	Total	Percent Change
Western Europe	124.2	43.4	176.6	7.5	351.7	+2.6
Eastern Europe	139.4	6.2	121.1	4.8	271.5	+2.3
Far East	46.7	4.6	108.5	10.0	169.8	-1.8
China (PRC)	72.6	.4	72.6	1.1	146.7	-11.4
India	9.4	—	21.5	—	30.9	-85.7
	56.8	—	23.2	—	80.0	-72.8
Rest of World	7.9	39.0	19.5	1.5	67.9	-21.2
Total	458.8	89.6	542.6	24.9	1118.5 1115.9	-28.2
Percent Change	-34.6	-27.2	-25.2	+400.1		
Absolute Change From Earlier Period	-242.7	-33.5	-183.2	+18.8	-28.3	

Note: Averages for the second period combine crop-year and calendar year data for Peru and Sudan. Thus these averages should be seen as indicative rather than definitive of true export volumes.

TABLE III

Egypt's ELS Export

Crop Year Beginning August 1

(1,000 bales)

Source: ICAC Cotton World Statistics
Oct., 81, Apr., 82, July 82

	70/71	71/72	72/73	73/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81	5 Year Averages 70/71-74/75	5 Year Averages 75/76-79/80
stern Europe	105.7	104.1	142.5	132.9	56.2	79.6	91.7	131.1	161.2	151.4	151.5	108.3	123.0
stern Europe	196.5	172.4	119.5	150.7	214.8	155.5	119.0	145.7	170.9	114.1	85.7	170.8	141.0
r East (Excluding PRC)	58.9	43.0	61.5	83.2	10.1	34.7	51.4	38.6	44.5	57.4	50.0	51.3	45.3
ina (PRC)	57.9	64.3	27.8	18.1	23.8	98.2	41.0	83.6	54.0	84.5	116.1	38.4	72.3
dia	153.3	109.8	90.6	53.9	7.6	8.6	12.3	17.3	9.0	——	——	83.0	9.4
SR	223.7	309.4	223.7	197.8	193.0	126.9	99.7	56.6	——	——	——	229.5	56.6
st of World	11.0	8.7	15.3	8.6	7.2	10.0	10.3	13.2	1.2	9.6	2.2	10.2	8.9
Total	857.0	811.7	680.9	645.2	512.7	513.5	425.0	486.1	440.8	417.0	405.5	701.5	456.5

TABLE IV

Estimates of Demand Functions

Equation One

$$\ln Q_t = \underset{(5.1)}{-1.24118} \ln P_{t-1} + \underset{(7.0)}{1.579} \ln Y_t + \underset{(7.7)}{0.83080} \ln S_t$$

$R^2 = .722$ SE = 0.19683 DW = 2.102

Equation Two

$$\ln Q_t = \underset{(3.6)}{3.25134} - \underset{(3.7)}{1.2448} \ln \frac{P_t}{L_t} + \underset{(2.5)}{0.43727} \ln Q_{t-1}$$

$R^2 = .565$ SE = 0.24599 DW = 1.885

Equation Three

$$\text{In } Q_t = \underset{}{2.99183} + \underset{(3.0)}{0.46857} \ln\left(\frac{1}{P_t/L_{t-1}}\right) + \underset{(2.1)}{0.39970} \ln Q_{t-1}$$

$R^2 = .467$ SE = 0.27233 DW = 1.990

Q_t = 1000's of bales of ELS exports to market economies

P_t = real dollar fob price of Egyptian ELS exports

Y_t = real dollar income in importing countries

S_t = real dollar price of polyester fibers

L_t = real dollar farm price of 1 3/16" middling cotton

(t - statistics are reported in parenthesis below relevant coefficient estimates)

TABLE V

Comparison of ELS Export Prices Required to Eliminate Stock Accumulation to Actual fob Export Price and World Price Which Makes DRC = 1 (LE/MK)

Year	Actual fob Export Price lagged		World Price for Which DRC = 1		Required % change in ELS Exports to Market Economies
	(1) ELS	(2) LS	(3) ELS	(4) LS	(5)
77/78	67.09	54.24	45.11	41.94	3.81
78/79	51.51	43.99	45.11	41.94	9.84
79/80	95.13	84.23	80.62	74.98	73.24

Year	% Change in Export Price Required to Control Stock Accumulation		fob Export Prices Required to Control Stock Accumulation	
	In Year of Accumulation (6)	After one Year (7)	In year of Accumulation (8)	After one Year (9)
		Equation 1		
77/78	Not Possible	-3.07	Not Possible	65.03
78/79		-7.93		43.66
79/80		-59.01		39.00
		Equation 2		
77/78	-3.06	-2.13	65.06	65.66
78/79	-7.90	-5.50	47.44	48.68
79/80	-58.84	-40.94	39.15	56.18
		Equation 3		
77/78	-3.62	-2.59	64.66	65.35
78/79	-6.86	-4.90	47.98	48.99
79/80	-24.38	-17.42	71.93	78.56