

Cotton Textile and Leather Exports: What Cost Foreign Exchange?

by

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The senior author has elsewhere argued [8] that foreign exchange earned by the export of West Pakistan-manufactured goods has a high domestic cost. Much the same contention has been advanced by Hecox [7], Islam [9] and MacEwan [11]. In these papers the relationship between costs and earnings is usually based on fairly abstract assumptions. The purpose of this note is to reduce the calculations to a "plain man" level. Specifically, we try to calculate how many rupees of indigenous resources are expended to earn each extra rupee of foreign exchange which is received from exporting cotton textiles and leather goods rather than their primary ingredients, namely raw cotton and hides and skins¹. Since this note was written, the Board of Economic Inquiry, Lahore, at the request of the West Pakistan Planning and Development Department, has undertaken a wider study applying the same general approach used here.

To determine additional foreign exchange earned through the export of a manufactured good, the foreign costs of directly imported inputs (e.g., chemicals, depreciation on equipment) and electricity, together with the export value of the principal domestic input (e.g., hides or raw cotton) are deducted from export receipts on the finished product. Other domestically produced inputs, regardless of their indirect foreign-exchange component or their potential exportability², together with profits and wages, are treated as indigenous costs.

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¹In 1963, Bruton and Bose [2], and in 1966, Q. K. Ahmad [1] examined the input structure of cotton-textile production with a view to assessing the additional exports stimulated by the bonus-voucher scheme. These efforts bear some resemblance to the present exercise, but our interest is not whether total exports have been stimulated (they certainly have), but rather what has been the cost of stimulation.

²One of the criticisms volunteered against the theoretical formulation used by Hufbauer [8] is that *moveable* inputs are not necessarily *exportable* inputs. In the present exercise, we assume that only those inputs are exportable which in fact have a substantial export history. This excludes, for example, Pakistan-made chemicals and packing materials.

The data for the present exercise come from three main sources. For *export prices*, we have used the published trade returns [6], more specifically, averages of export unit values for 1965/66, 1966/67, and 1967/68. The assumption is made that all export receipts are reported, or at least that the underinvoicing percentage is approximately the same for manufactured export and their primary ingredients³. For the *structure of current inputs*, we have examined the 1965/66 and 1966/67 *Census of Manufacturing Industry* returns [3] submitted by selected large firms with substantial export sales. About five establishments each were examined for cotton yarn and cotton cloth, and about ten for leather. This selective approach, and the further subjectivity exercised in discarding some returns and accepting others, raises obvious hazards. Nevertheless, the resulting coefficients seem better to represent export costs than those available from other sources. Finally, for *fixed capital* employed in cotton-textile production, we turned to the West Pakistan Department of Industries which supplied figures on about eight recently constructed mills of 25,000-spindle size.

The findings are summarized in Table I. The underlying data on input structure appear in Tables II, III, and IV. The tables are accompanied by numerous explanatory notes. Certain qualifications, however, deserve mention here.

First, the data on leather inputs and export unit values exhibit much more variation than the comparable data for cotton textiles. The findings for leather accordingly deserve greater caution. Beyond that, the physical unit used by tanneries in reporting raw hide-and-skin purchases is the "piece" rather than the weight. The weight of a hide or skin varies considerably from animal to animal. In order to express other inputs on the basis of requirements per cwt of finished leather, it was necessary to assume that the tannery pays the same price per cwt for raw hides and skins as their export unit value reported in the trade statistics.

Second, export profits were calculated as a residual, starting with presumed receipts on export sales and subtracting the cost of purchased inputs, labour and depreciation. Presumed export receipts are taken to equal the reported *f.o.b.* export unit value plus the associated value of bonus-voucher premiums and, in the case of leather, the value of export-performance licences. The calculated residual profits comprise a very substantial proportion of indigenous "costs" for cotton yarn and goat and sheep leather.

Third, we have assumed that the manufacture of cotton yarn gives rise to a quantity of cotton waste equal to the difference between the reported weight of raw cotton consumed and the reported weight of finished yarn produced (very few yarn mills mention the sale of cotton waste in their Census returns). Furthermore, the byproduct cotton waste is regarded as an export companion to the cotton yarn.

³G. F. Papanek has questioned this assumption.

Fourth, cotton cloth has been analysed as a separate activity from cotton-yarn production. Thus, for the cotton-cloth industry, cotton yarn is taken as the primary material, and foreign-exchange earnings are calculated as the earnings above what might be obtained by exporting yarn. In practice, all large cloth mills (unlike handloom establishments) make their own yarn. Hence, the derivation of labour and electricity coefficients for cloth (Table III) requires an artificial segregation of the same inputs used in yarn production. The segregation was based on the experience of mills specializing solely in yarn production (Table II). Because cloth inputs were calculated in this manner, because the intra-mill transfer price of yarn is put at presumed receipts on yarn exports, and because the cloth price is based on (possibly understated) export receipts, an extremely modest financial profit shows up on the production of cloth.

Fifth and finally, we tacitly assume that foreign elasticities of demand are all infinite. This assumption, admittedly unrealistic, means that calculated indigenous costs per unit of foreign exchange earned need no elasticity correction. To the extent that foreign prices on existing export sales are driven down by additional offerings, Pakistan's true marginal earnings are smaller — and indigenous costs per extra unit of foreign exchange are larger — than our calculations indicate. On the other hand, when an exportable primary commodity is consumed as an input for a manufactured export, the nation presumably benefits from higher prices on remaining exports of the primary good. In principle, it is easy to correct for less than infinite demand elasticities both on output and exportable inputs [8] but since actual elasticities are an unknown magnitude, we have chosen to ignore this aspect.

The findings on indigenous cost of foreign exchange are presented in column (10) of Table I.

During the three years, 1965/66, 1966/67 and 1967/68, the indigenous cost of foreign exchange earned through the conversion of raw cotton into cotton yarn and cotton waste was approximately 2.4 times the official exchange rate, or 11.4 rupees per dollar. The annual experience during this period (not presented) deviated modestly from the three-year average. However, preliminary data for 1968/69 indicate a *much* higher cost than previously, perhaps 7 times the official exchange rate. The export price of raw cotton has recovered to about 2,400 rupees per ton, while cotton yarn and waste prices have declined (possibly because of the 30-per-cent bonus-voucher rates granted in January 1968) to 3,370 rupees and 890 rupees per ton, respectively⁴. At the present time, therefore, the cost of foreign exchange earned through yarn and waste exports may

⁴These figures are derived from [4a]. No adjustment was made for the difference in coverage between the raw cotton, cotton yarn, and cotton waste categories cited there and the categories used in Tables I and II, but appropriate adjustments would probably increase the indigenous cost to foreign-exchange ratio.

be as high as 33 rupees per dollar, even though the mills are still earning profits of perhaps 1,250 rupees per ton on yarn sold abroad.

Foreign exchange earned on cotton cloth exports, starting with yarn as an input, has cost about 4.6 times the official rate, or some 21.8 rupees per dollar. The ratio has been quite stable since 1965/66, and it has not been much affected by recent price trends.

Foreign exchange earned from calf, cow and buffalo leather exports appears to be negligible by contrast with what might alternatively be earned on raw hide exports and saved on foreign inputs. Goat and sheep leather, on the other hand, seems to bring foreign exchange at the comparatively modest cost of 2.8 times the official rate. These findings must be tempered by the doubts mentioned earlier on leather export unit value and input data.

To summarize: the manufactured exports examined here have generally made a positive contribution to foreign-exchange earnings during the past three years. The indigenous cost of this contribution substantially exceeds the cost of foreign exchange earned through exports of raw cotton, raw hides and skins, and other primary exports. How the cost compares with other manufactured exports or import substitutes cannot be determined from these findings. But the costs estimated here are well above the 1.75 shadow price frequently put on foreign exchange in planning exercises. Of course, the 1.75 figure may be too low and perhaps should be revised in the light of accumulated research [7 ; 8 ; 9 ; 11].

In the case of cotton yarn and certain leather exports, profits make up a considerable portion of indigenous costs. It may be questioned whether large profits (or, for that matter, wages paid to unskilled labour) represent a true use of scarce domestic resources. If money profits and wages overstate resource use, then the "real" indigenous cost of foreign exchange is lower than our calculations show. It should nevertheless be a matter of concern that profits on some exports are so large that the goods could be sold abroad at a gain to their manufacturers, but at a loss to the nation.

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TABLE I
EXPORT PRICES, FOREIGN-EXCHANGE EARNINGS AND INDIGENOUS COSTS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Item	Quantity unit	Average export price ^a (Rs.)	Bonus voucher rate ^b (per cent)	Average bonus-voucher premium ^c (per cent)	Total presumed receipts on export sales ^d (Rs.)	Immediate foreign-exchange component ^e (Rs.)	Foreign exchange earnings ^f (Rs.)	Indigenous costs ^g (Rs.)	Implied cost of foreign exchange ^h (Ratio)
Cotton yarn and waste ^j	per ton of yarn	4,030	20	160	5,330	3,070	960	2,260	2.4
Yarn ^k	ton	3,820	20	160	5,050	—	—		
Waste ^m	.21 ton	210	20	160	280	—	—		
Cotton cloth ⁿ ..	000'yds.	736	30	160	1,090	626	101	464	4.6
Calf, cow and buffalo leather ^p	cwt	190	30	160	311 ^r	190	—	121	indefinite
Goat and sheep leather ^q	cwt	545	30	160	894 ^r	346	199	548	2.8

^aFor cotton textiles, the average is found by adding the export unit values for 1965/66, 1966/67 and 1967/68 and dividing by three. For leather, the averages are found by dividing total value of exports between 1965/66 and 1967/68 by total quantity during the same period. The basic data appear in [6].

^bIn January 1968, bonus-voucher rates were generally increased by 10 per cent. The figures here reflect the rates prior to the increase.

^cApproximate average for 1965/66 through 1967/68.

^dExport price $\times$ (1 + bonus rate $\times$ bonus premium) plus, in the case of leather exports, an allowance for the value of export-performance licences. Export-performance licences for cotton yarn and cloth have generally been negligible.

^eSee Tables II, III, and IV.

^fColumn (3) minus Column (7).

(Footnotes continued on next page)

^sColumn (6) minus Column (7). See Tables II, III, IV for a breakdown of indigenous costs.

^hColumn (9) divided by Column (8).

^jCotton yarn and waste are joint products in the approximate ratio of .21 ton of cotton waste for each ton of yarn. See note g, Table II. We have assumed, in calculating export receipts and foreign-exchange earnings, that the accompanying cotton waste is exported along with the yarn.

^kPSTC Code groups 651301 through 651499, excluding cotton thread.

^mPSTC Code groups 263302 through 263399.

ⁿPSTC Code groups 652111 through 652299, excluding handloom cloth.

^pPSTC Code groups 611300, 611401 and 611402, as of 1967/68.

^qPSTC Code groups 611902 and 611903, as of 1967/68.

^rThe export-performance licence rate on leather was about 20 per cent during the period under review, and the assumed premium value of these licences has been put at 80 per cent. Consequently, the export-performance scheme makes an approximate contribution to calf, cow and buffalo export receipts of some 30 rupees per cwt and to goat and sheep receipts of some 87 rupees per cwt.

TABLE II
COTTON YARN AND WASTE INPUT STRUCTURE

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Inputs	Quantity unit	Price ^a (Rs.)	Immediate foreign-exchange component ^b (Rs. at official rate)	Physical requirements per ton of cotton yarn and associated waste ^c	Foreign-exchange costs per ton of yarn and associated wasted ^c (Rs.)	Indigenous costs per ton of cotton yarn and associated waste ^c (Rs.)
Raw cotton	ton	2,240 ^f	2,240	1.21 ^g	2,710	—
Electricity	kwh	.093	.025 ^h	1950	50	130
Labour	man-year ⁱ	1,460	—	.334	—	490
Spindles and associated plant and equipment	number of spindles	631 ^k	336 ^k	9.27 ^m ; expected life = 10 years ⁿ	310	270
Residual export profit	Rs. per ton of yarn ^a	1,370	—	—	—	1,370
Total:					3,070	2,260

^a The average *f.o.b.* export price, 1965/66 to 1967/68, is given for raw cotton. The 1965/66 prices reported in the *Census of Manufacturing Industry* [3] by yarn mills are used for electricity and labour. The cost of spindles and associated equipment was furnished by the West Pakistan Department of Industries. The profit (including some miscellaneous costs) is calculated as a residual starting with the presumed total receipts from exports of cotton yarn and the accompanying waste (Table I) and subtracting the inputs enumerated in the present table.

^b By immediate foreign-exchange component, we mean, in the case of raw cotton, the *f.o.b.* export value, and, in the case of other inputs, the portion directly imported.

^c Based on reports of the yarn mills.

^d Column (4) times Column (5), rounded to the nearest 10 rupees. Only depreciation is counted for plant and equipment.

(Footnotes continued on next page)

^eColumn (3) times Column (5) minus Column (6), rounded to the nearest 10 rupees. Only depreciation is counted for plant and equipment.

^fAverage of *f.o.b.* export prices for cotton, nes. (PSTC 263199) for 1965/66 and Cotton American, RG (PSTC 263101) for 1966/67 and 1967/68.

^gThis figure, derived from the 1965/66 *Census of Manufacturing Industry* reports for selected yarn mills, agrees reasonably well with the consumption figures for some 90 mills, as reported in the Central Statistical Office [5]. Also *cf.* Q.K. Ahmad [1, Table XIII]. The *Census of Manufacturing Industry* reports submitted by yarn mills generally neglect to mention the sale of cotton waste as a by-product. We have assumed that this is an oversight, and that cotton waste to the tune of 0.21 tons per ton of yarn (*i.e.*, the amount of raw cotton not converted to finished yarn) is in fact sold as waste.

^hBased on apparent WAPDA capital requirements per incremental kwh over the period 1960 to 1968, and the foreign-exchange component of capital costs. An interest rate of 10 per cent and an operating life of 15 years were assumed. W.C.F. Bussink's [4] ratio of industrial electrification costs to commercial, household, and agricultural electrification costs was used to adjust the results.

ⁱThe typical man-year is some 300 working days of 8 hours each.

^kThese figures are typical for the 25,000-spindle yarn mills constructed in 1967 and 1968. They probably represent more highly mechanized mills than those for which Census reports were examined.

^mBased on the experience of some 90 textile mills, as reported by the Central Statistical Office [5]. This coefficient assumes 3-shift operation.

ⁿThis is the expected life for 3-shift operation according to Khursheed Ahmad, textile engineer, PICIC.

TABLE III
COTTON CLOTH INPUT STRUCTURE

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Inputs	Quantity unit	Price ^a (Rs.)	Immediate foreign-exchange component ^b (Rs. at official rate)	Physical requirements per 000 yds. of cotton cloth ^c	Foreign exchange costs per 000 yds. of cotton cloth ^d (Rs.)	Indigenous costs per 000 yds. of cotton cloth ^e (Rs.)
Cotton yarn	ton	5,050	3,820	.134	512	164
Electricity	kwh	.093	.025	37	1	2
Chemicals ^f	Rs. per 000 yds. of cloth	100	30	<i>n.a.</i>	30	70
Miscellaneous materials ^g	Rs. per 000 yds. of cloth	30	—	<i>n.a.</i>	—	30
Labour	man-year	1,560	—	.078	—	121
Looms and associated plant and equipment	Number of looms	40,850 ^h	21,200 ^h	.039; expected life=10 years	83	76
Residual export ^k profit	Rs. per 000 yds. of cloth	1	—	—	—	1
Total: ..					626	464

Note: *n.a.* means not available.

(Footnotes continued on next page)

*The average export price plus bonus-voucher receipts, 1965/66 to 1967/68 (Table I), is used for cotton yarn. The prices reported in the 1965/66 *Census of Manufacturing Industry* returns [3] of selected cloth mills are used for electricity, chemicals, miscellaneous materials and labour. The cost of looms and associated equipment is based on data supplied by the West Pakistan Department of Industries for selected plants. The profit is calculated as a residual starting with presumed receipts from the export of cotton cloth (Table I) and subtracting the inputs enumerated in the present table.

^bBy immediate foreign-exchange component, we mean, in the case of cotton yarn, the *f.o.b.* export value, and, in the case of other inputs, the portion directly imported.

^cThe figure for cotton yarn is based on the reports of some 90 mills, as given by the Central Statistical Office [5]. The figures for other current inputs are based on the *Census of Manufacturing Industry* returns [3] of selected cloth mills. Since cloth mills invariably produce their own yarn, the electricity, chemicals and labour used in yarn production were deducted on the basis of the coefficients appearing in Table II. The figure for looms is again based on the Central Statistical Office data [5], while the expected life of looms (and hence their depreciation) is based on information supplied by Khursheed Ahmed, textile engineer, PICIC.

^dColumn (4) times Column (5). In the case of looms and associated plant and equipment, only depreciation is counted.

^eColumn (3) times Column (5) minus Column (6). Only depreciation is counted on plant and equipment.

^fSome of the principal chemicals are maize starch, sulphur black, and caustic soda. The very approximate division between domestic and imported chemicals is based on inspection of a few *Census of Manufacturing Industry* returns [3].

^gMainly packing materials and spare parts.

^hThese are figures for the additional cost of 500 looms and finishing equipment in a mill with 25,000 spindles.

^kThe modest profit rate stems from the artificial division, for the purposes of this exercise, between cotton-yarn and cotton-cloth production, and the valuation of yarn at its *f.o.b.* export price plus bonus-voucher receipts. In practice, cloth mills invariably produce their own yarn; as an integrated operation, therefore, the production of cloth would show a larger profit. Furthermore, there may be some understatement of *f.o.b.* export receipts on cotton-cloth sales. In 1965/66, the average receipts on cloth sales for selected mills amounted to 1,350 rupees per thousand yards, whereas the average reported *f.o.b.* export receipts plus bonus-voucher returns in that year were only 1,105 rupees per thousand yards. However, the exemption of cotton-cloth exports from excise duty would partly explain the difference.

TABLE IV
LEATHER INPUT STRUCTURE

(1)		(2)	(3)	(4)	(5)	(6)	(7)
Inputs		Quantity unit	Price ^a (Rs.)	Immediate foreign-exchange component ^b (Rs. at official rate)	Physical requirements per cwt of leather ^c	Foreign-exchange costs per cwt of leather ^d (Rs.)	Domestic costs per cwt of leather ^e (Rs.)
Hides and Skins							
Cow and buffalo hides ^f	..	cwt	165	165	1.00	165	—
Goat and sheep skins ^g	..	cwt	321	321	1.00	321	—
Electricity	..	kwh	.133	.025 ^h	8.8	—	1
Chemicals	..	Rs. per cwt	43	21 ^j	n.a.	21	22
Labour	..	man-year	1760	—	.0086	—	15
Plant and equipment ..	..	Rs. fixed investment per cwt	90 ^k	60	n.a.; expected plant life = 15 years ^m	4	2
Residual Export Profit							
Calf, cow, buffalo leather	..	Rs. per cwt	81	—	—	—	81
Goat and sheep leather	..	Rs. per cwt	508	—	—	—	508
Totals ..							
Cow and buffalo leather	..					190	121
Goat and sheep leather	..					346	548

Note: n.a. means not available.

*The prices for hides and skins are average export prices between 1965/66 and 1967/68. The prices for other inputs are based on 1965/66 *Census of Manufacturing Industry* returns [3]. The profit is calculated as a residual, starting with the presumed receipts from export sales (Table I) and subtracting the inputs enumerated in the present table.

^bImmediate foreign-exchange component means the export value of hides and skins, and the directly imported portion of other inputs.

^cBased on the *Census of Manufacturing Industry* returns [3]. We have assumed that there is no appreciable loss of weight in the conversion of hides and skins to leather.

^dColumn (4) times Column (5). Only depreciation is counted on plant and equipment.

^eColumn (3) times Column (5) minus Column (6). Only depreciation is counted on plant and equipment.

^fPSTC Code groups 211101 and 211102.

^gPSTC Code groups 211401 and 211707.

^hSee note h to Table II.

ⁱBased on inspection of three *Census of Manufacturing Industry* returns.

^kThe 1965/66 *Census of Manufacturing Industry* [3] fixed asset-to-output ratio for all leather tanneries was doubled to compensate for understatement due to inflation and overrapid financial depreciation. Cf. Khan and MacEwan [10].

^mThis assessment is based on the heavy nature of tannery equipment.