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OPTIMAL EXPORT TAXES IN THE SHORT AND LONG RUN: PAKISTAN'S POLICIES TOWARD RAW JUTE EXPORTS

by

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Optimal Export Taxes in the Short and Long-Run: Pakistan's Policies Toward Raw Jute Exports

I. Introduction

Jute has always been second only to rice as a mainstay of the East Pakistan economy: jute occupies about 8% of total cropped acreage in the Province as the major source of cash income for the small farmer. The jute industry contributes almost thirty percent of gross value added in organised industry, and a great deal of employment and activity is generated in trade, transportation, banking and other services to collect and handle the crop. For the nation as a whole, exports of raw jute and jute manufactures contributed fifty-three percent of all export earnings during the Second Plan period, and this contribution remained at fifty percent for the first three years of the Third Plan period.

The performance of this key sector has been poor, however, over the entire period of Pakistan's independence. Production, acreage and yield, have been essentially stagnant: output rose by only 6% from the earliest period 1947-51 to the most recent, 1963-67. Over this same span, production of jute and allied fibres (kenaf, mesta) increased in the rest of the world by no less than 320%, the bulk of this in India, Nepal and Thailand, countries facing similar production conditions. Consequently, virtually <u>all</u> the increase in the world's consumption of the fibre, which grew at an average annual rate in excess of three percent, has been supplied by countries other than Pakistan. Pakistan's share in world productio

of jute and allied fibres has declined from 65% in the earlier period to 32% in the more recent, with no reduction in the rate of decline in market share.

The deterioration in Pakistan's market position has actually been much even graver than implied by the figures given above, since other materials have made substantial inroads as substitutes for jute in its traditional uses. In packaging uses, cotton bags, multi-wall paper bags, and bulk handling widely replaced jute bags in the developed countries. In the period 1938-1961 jute consumption in these countries might have grown by about 50% more than it actually did, had its use risen as fast as the production of commodities traditionally packed in jute bags.[1/] The relatively high and unstable prices of jute over the period were shown in the source just cited to have been important causes, along with general packaging trends, of this process of substitution. Moreover, since this substitution has involved investment in new bagging or handling equipment, it has been largely irreversible in the short run.

In the decade of the 1960's, an even more serious competition arose. Products made from synthetic materials, polypropylene and high-density polyethylene, were developed and introduced as specific substitutes both in jute's traditional packaging markets and in the rapidly-expanding, promising market of fabric backing for tufted carpets. Polypropylene, the preferred material, was first produced commercially in the late 1950's, a polymerization of propylene, which is a minor by-product of the refinery process. Since then capacity has been expanded very rapidly, and now represents a $500,000,000 investment in which virtually all the world's major petrochemicals producers have participated. Prices have fallen by 60% over the decade as competition among producers

has increased and economies of large-scale production have been achieved. Moderate future reductions are anticipated as the result of process improvements.[2/] By far the major application of polypropylene has been in the production of moulded goods; products of film and tape, which compete with jute, continue to be a minor outlet - probably less than five percent of total consumption. Therefore, producers of the basic material will probably continue to establish prices on the basis of cost, and demand conditions in their major markets. It is unlikely, in other words, that competition with jute on 5% of polypropylene rates would lead producers to lower prices to the point that would undermine profits on the remaining 95%.

In the early 1960's leading polypropylene producers, companies like Dupont, Shell, ICI and Phillips, motivated by the need to expand their sales to capture important economies of scale, collaborated with leading European and American jute processors in developing an extruded film which could be slit into tapes, then woven into fabric. There were several years of experimentation, market research and product development before commerical production began in 1965 and 1966.[3/] During this period jute spinners, carpet tufters, and the makers of jute mill machinery were all drawn into the process of developing a substitute for jute, not only in the hope of finding a superior and more economical raw material, (and in the case of the machinery makers, the hope of re-equipping the European jute industry with specially designed high-productivity processing equipment) but also from fear of being left behind in the race with their own competitors by a technological improvement in which they had not participated. During this period, neither the Indian nor the Pakistan authorities took vigorous action to

reduce or to stabilize prices at levels compatible with the erosion of their monopoly position, despite ample warning of the imminent entry of giant firms with far superior abilities to develop and modify products to suit the requirements of consumers, and to sell and service their customers much more ably than could the jute industry. It is emphasized that there was nothing inevitable, like autonomous technological progress, which dictated the synthetic's entry. Market opportunities, the vulnerability of jute, dictated the key decisions to commit substantial resources for research and development in the field of stretched tape substitutes. The investment decisions to enter commercial production were preceded by careful market projections and profitability calculations. Ha jute prices been sufficiently low and stable, the entry of these petrochemicals producers could have been prevented or delayed. For example, synthetic carpet backing came on the market in the U.S. in 1965 at a price of 26¢ per square yard, just a penny or two over the price of the jute backing at that time. Since then, competition has brought the price of jute backing down to 19¢, facilitated by more generous export exchange rates in India and Pakistan, and the synthetic is selling in the range of 17-19¢, a reduction of 30% in a five-year period. Had the price of the jute product been brought down to its present level five years ago, before the entry of the synthetic producers, then that investment would not have appeared nearly as attractive. It would have taken longer for prospective entrants to recover development costs, the pay-back period would have lengthened, and the investments would have appeared much more risky. The chemical companies' aggressive search for new markets might not have focussed so rapidly o jute had the industry presented more formidable competition. Now that

entry has successfully taken place, it is mucn more difficult to deter further expansion of synthetic sales. What scanty cost data exists, primarily in the FAO study already cited, indicate that at least a further 30% fall in the price of jute goods would be required to eliminate the super-normal profits now obtainable from sales of synthetics.

The major producers of synthetic substitutes are companies who had been traditional processors of jute, just as the leading designers of specialized high-speed processing equipment are, in Europe, the traditional makers of jute mill machinery. Often, they operate in formal collaboration with the chemical producers. By 1969 woven and non-woven, spun-bonded polypropylene carpet backing had captured 30% of the U.S. tufted carpet market,[4/] and industry sources forecast no further absolute increase in the use of jute for backing. This is damaging, since tufted carpet sales continue to increase in the U.S. at an annual rate of 14%, with excellent prospects for wider usage in commercial and other public buildings, and with largely unrealised potential as a low-cost residential floor covering with high income elasticity of demand in Europe. Despite initial technical difficulties, continued product development has made synthetic backing a close substitute for jute. It has the disadvantages of a) less dimensional stability, b) sensitivity to high temperatures experienced during the dyeing process, c) a lighter, less substantial "feel", and d) poorer bonding with the latex undercover. On the other hand, its advantages are a) less needle deflection, b) greater tensile strength, which permits high-speed operations at greater densities, c) suitability for use in carpets exposed to moisture, and d) lower processing costs. In addition, the uniform quality, stable and gradually falling prices, superior customer service and produc

development,[5/] short supply lines and attractive prospects have enabled polypropylene to penetrate jute's markets extremely rapidly at approximately the same prices.[6/] Backing costs are only ten percent of the total carpet costs, and since producers have been expanding rapidly in a buoyant market, stability, reliability and ready availability have been factors in winning customers away from jute. As the industry expands into the low cost residential carpeting market, price sensitivity will play an increasingly important role.

Somewhat less is known about the present level of polypropylene's sales in the sacking area; although, as in backing, it is a very close substitute for jute hessian and sacking. Jute sacks have greater friction and are easier to stack, they have a somewhat higher re-use value, and are less subject to deterioration in strong sunlight. On the other hand, the synthetic bags are lighter, better looking, stronger on impact, give greater cover due to the flat weave, are less subject to deterioration in moisture, and result in less contamination of the sack's contents - especially of fibres like cotton and wool. The synthetic sack's major advantage is the possibility of using specially designed, high-speed, integrated processing equipment to manufacture bags, thereby eliminating many of the processing costs. At least one major machinery maker has been supplying for several years an integrated plant costing about the same as a jute mill of that capacity, but with man-hour productivity fifteen times as high. For this reason, and because of the lower materials cost, a recent FAO study estimated that raw jute prices would have to fall by at least 40% from their trend values to be competitive with polypropylene tape.[7/] The trade literature in recent years has reported a great deal of investment in processing equipment for the manufacture of bagging from tape, which foretells

rapid increases in production and market share. In particular, an end to U.S. involvement in Vietnam will release considerable capacity presently engaged in producing sandbags to be re-directed toward civilian markets. Much of this competition from polypropylene will strike in the market for hessian cloth, a finer variety than jute sacking cloth. Unfortunately, since Pakistan already controls most of the world's untied markets for sacking, the industry's hopes for future expansion are focussed on the finer end of jute's product range: that is, on hessian cloth, carpet-backing cloth, and specialities. It is precisely this range of goods that the European industry produces, and this range which is most severely threatened by synthetics. Without exaggeration, one can say that it is the future of Pakistan's jute sector which is being undermined by this competition. Little comfort can be obtained either by repeating the conventional admonition that the jute-producing countries should try harder to develop new uses for jute. Given the close technical substitutability of jute and synthetic tape, and the vastly superior abilities of companies like Dupont and ICI in product development, it is overwhelmingly likely that jute will remain three steps behind in the race for new markets henceforth.

II. Pakistan's Policies Toward Raw Jute Exports

Immediately after Partition East Pakistan was left with 80% of world jute production, and no processing facilities whatever. All the mills of undivided India stood on the Hooghly near Calcutta, and were fed through well-organised supply lines reaching up into the East Bengal hinterland. In the bitter aftermath of Partition, it was not unnatural that the Pakistan government should act to force the terms of trade in its favor for this, its major foreign exchange earner,

through taxation, acreage limitation, and other restrictionist devices. So doing, the officials of the new regime were following closely the precepts of their colonial mentors: the British had long taxed raw jute, and had introduced acreage controls as early as 1940 in order to exploit a presumed inelastic world demand.[8/] Direct revenue requirements were also important: in the first decade of its existence, the Central Government drew ten percent of its total tax receipts directly from the jute trade through export taxes.

Despite the massive smuggling over the Indian border which was the trade's inevitable response to the export tax, subsequent events reinforced the Pakistan government's position. The Korean War boom sent jute prices skyhigh and export tax rates were more than doubled in an attempt, largely ineffectual, to skim off the excess world demand and to insulate the local economy from a destabilising price rise. The post-war slump and Pakistan's consequent balance of payments crisis made any short-term loss of foreign exchange earnings seem inadmissible. The year 1951 also marked the start of production in Pakistan's first jute mills, the fruits of the earliest industrial promotion efforts in East Pakistan. It was inevitable that Pakistan would try to expand its industrial capacity in cotton and jute textiles, just as India would try to expand its jute and cotton acreage. Liberal financial assistance was provided to the industrial interests who pioneered in the jute industry, and who within a few years would face the task of competing with the established Indian mills in export markets. Once the Pakistan mills were established, their technical inexperience, high labor costs, erratic power supplies and the sketchy industrial infrastructure were combatted

by the mills' advantage in raw materials costs. The Government accentuated this advantage through the export tax on raw jute, which came to be regarded as a mainstay in the industrial promotion effort until the initiation of the export bonus system. Even thereafter, mill interests have continued to be effective lobbyists against any policy change which might have the effect of raising their raw materials costs relative to those of their overseas competitors.

The inter-regional fiscal effects of the Government's treatment of raw jute assumed greater policy significance during the 1950's. Because of the entrepreneurial skills of immigrant groups, their easier access to credit, licenses, and undervalued imports of capital goods and intermediates, as well as extremely high or absolute levels of protection, industry expanded most rapidly around Karachi. The West's growing import deficit was financed from capital inflows and from the East's foreign trade surplus,[9/] while the relatively unfavorable exchange rate set for raw jute and other primary commodities - which provided virtually all of East Pakistan's exports - reduced the income-generating effects of these foreign exchange earning activities, given the short-run downward inelasticity of supply. The international trade restrictions which suppressed an exchange rate which was overvalued even after the devaluation of 1955 implied that East Pakistan's deficit in trade with the West, which represented considerable trade diversion, was valued at inflated internal prices, on the average well above international levels. This system of dual exchange rates had the consequence of inflating industrial profits in the West (and in the East, to the lesser extent that the East participated in industrial growth), most of which were reinvested, while restraining agricultural and commercial incomes in the East.

Since 1959 the manipulation of import licenses, with favorable provisions for exporters, has been increasingly less important in creating multiple effective exchange rates than has the export bonus voucher system. This system has been extensively described.[10/] Raw jute has always been excluded from its benefits, along with raw cotton and some other primary commodities. Bonus rates have varied among manufactured commodities and over time, but most export items, including all jute manufactures now enjoy a rate of thirty percent. The bonus premium in the last year or two has been fluctuating in the range of 170-180%, although its mean value over the earlier years was closer to 150%. On the import side, most intermediates and materials require 50% payment in bonus vouchers; while consumer goods on the bonus list require surrender of 100% of the value in bonus vouchers. These differential exchange rates on the triangular pattern of trade which emerged in the 1950's provided a large part of the mechanism for the transfer of resources from East to West, an outflow which as late as 1967 may have been as large as Rs. 100 crores.[11/]

In a system of multiple exchange rates, measurement of the effective discrimination against raw jute requires first a specification of the appropriate marginal value of foreign exchange. Hufbauer has shown that for broad categories of export products marginal effective exchange rates were about Rs. 12 to the dollar in 1967,[12/] and the rates on some individual items were probably considerably higher. Unpublished studies of import policy by Phillip Thomas, and published work of M. Alamgir,[13/] indicate marginal rates of nominal protection for certain import substitutes in excess of Rs. 20 to the dollar. For these commodities effective rates of

protection must have been even higher. However, such extremely high marginal costs of foreign exchange apply only to a small fraction of total trade. They are undoubtedly unintended aberrations of a discriminatory policy, and should not be taken as approximations to any equilibrium exchange rate. Quite minor reallocations of foreign exchange would undoubtedly eliminate such extreme domestic scarcities and wipe out the highest values of effective protection. Many have proposed, without much analytical foundation, that a rate between Rs. 8 and Rs. 9 to the dollar should be taken as an "equilibrium" value of foreign exchange, although Hufbauer has presented several telling arguemnts for a much higher value [14/] of Rs. 15 to Rs. 18. For illustrative purposes in this study, the extent of discrimination against exports of raw jute will be measured with reference to the effective rate of protection afforded to exporters of jute manufactures. Since jute manufactures have been rewarded less generously than some other industrial exports, and very much less so than many import-competing activities, this could result in an under-estimation of the adverse discrimination. Table I presents relevant data. For raw jute, nominal and effective rates of protection are taken as equal, since the use of purchased inputs in jute cultivation has been negligible. The nominal rate is taken to be the official rate less the export tax converted into an average ad valorem value. [15/] In the jute textiles industry, raw jute has been taken as the only current input (the only other ones of any importance are batching oil and furnace oil, and these are less than ten percent of total costs), and the average input coefficient under free trade has been

Table I

Effective Exchange Rates for Jute and Jute Manufactures

	Export Tax on Raw Jute as % Ad Valorem a)	Effective Exchange Rate on Raw Jute b) Rs:$	Nominal Exch. Rate c) on Jute Mfgs	Effective Exch. Rate d) on Jute Mfgs	Implicit Tax on e) Raw Jute
1952-53	15.5	2.86			
1953-54	13.5	2.92			
1954-55	12.7	2.95			
1955-56	12.9	4.14			
1956-57	11.7	4.19			
1957-58	11.1	4.22			
1958-59	11.6	4.20			
1959-60	12.7	4.14	5.50	6.86	40%
1960-61	7.1	4.42	5.55	6.68	33%
1961-62	9.8	4.28	5.68	7.08	39%
1962-63	10.7	4.24	5.72	7.20	41%
1963-64	11.2	4.22	5.60	6.98	40%
1964-65	4.2	4.55	5.60	6.68	32%
1965-66	4.7	4.52	5.58	6.64	32%
1966-67	4.0	4.56	5.82	7.08	36%
1967-68	-	4.75	7.30	9.84	52%
1968-69		4.75	7.30	9.84	52%

a) Calculated by dividing specific tax by fob unit value

b) Calculated as the official exchange less the implicit tax

c) Total value of bonus vouchers earned by exports of jute manufactures relative to fob export value, times the official exchange rate

d) Current inputs into jute manufacturing taken as raw jute with an input coefficient of 0.5

e) Calculated as the effective exchange rate for raw jute relative to the effective rate for jute manufactures

taken as 50%. Since imports of jute mill machinery have been priced at the official exchange rate plus modest tariff, the long-term effective exchange rate for jute manufactures has been actually somewhat above that indicated by this calculation. See below for difficulties in measuring effective protection of jute manufactures. (In fact, the coefficient is closer to 60% in India due to the higher raw materials costs and lower labor costs. In Pakistan, the coefficients appear to be 60% for sacking and about 55% for hessian, but Pakistan mills seriously overstate their raw jute costs for a number of reasons.) The nominal exchange rate on exports of jute manufactures was constructed by relating the value of bonus incentives granted to such exports to the total f.o.b. export value, since the provisions of the scheme have changed over time along with the bonus premium.

On this basis, it appears that during the last decade the implicit tax on raw jute exports has varied between thirty and forty percent ad valorem. On the average, more than a third of export proceeds have been taxed away from an activity which has traditionally provided more than half Pakistan's foreign exchange earnings. What else is striking in Table I is that during the last two years, from 1967-68, the implicit tax on raw jute exports has risen drastically, precisely at a time when its markets are being most severely threatened. This has come about from an increase in the bonus rates applicable to exports of jute manufactures together with an appreciable rise in the premium value of bonus vouchers, which have combined to double

the effective incentive to exports of jute goods during a period when raw jute benefited only by removal of a vestigial four percent export tax.[16/] Such an increase in discrimination is very questionable *prima facie*, if for no other reason than the fact that as Pakistan's share in world jute exports has fallen, the elasticity of foreign demand for Pakistan jute must have risen. Therefore, under any formulation of optimal tariff theory, the extent of discrimination should have been reduced, rather than increased. But, since in addition, the emergence of close synthetic substitutes on internationa markets has unquestionably made the elasticity of demand much more elastic also, the policy of the Pakistan government is even more difficult to comprehend.

III. The Economic Rationale for Raw Jute Policy

Among the several bases outlined in the preceding section for the Pakistan Government's discriminatory policies against raw jute exports, the dominant *rationale* has been the contention that since foreign demand is inelastic, an export tax is required to maximise the national gains from trade and any reduction in that tax would result in foreign exchange loss or a net reduction in potential welfare or both. This justification, with its implication of rational ("the scientific tariff") economic management, has obviously been more attractive politically than one which rests on overt redistributional considerations - between agriculture and industry, between East and West, or between public and private sectors. Furthermore, the Government has had no difficulty whatever in sustaining this rationale, since the overwhelming weight of professional economic opinion has

concurred that foreign demand for Pakistan jute is inelastic, and an export tax (perhaps even a higher one) is required to maximise the gains from trade. This body of opinion has included the judgments not only of international agencies like USAID and IBRD, and economists of the Harvard Advisory Group, but also those of prominent Pakistani economists.[17/] As late as 1968 it was possible to find one of the most distinguished Pakistani economists reasoning from the presumption that foreign demand for raw jute is inelastic.[18/] In view of this weight of professional judgment, perhaps the Government of Pakistan cannot be faulted too severely for continuing to act according to its redistributional proclivities.

Such unanimity among economists must be thought rather surprising, however, considering the evidence available during the past decade or so: Pakistan's rapid loss of market share; the phenomenal sustained rise of acreage in Thailand at an average rate of 40% per year, which enabled her to capture 41% of world exports of jute and allied fibres by 1966; the development and commercial marketing of close synthetic substitutes which won extremely fast user acceptance. This evidence has not been seriously regarded. Instead, judgments have been based on econometric attempts to measure short-term foreign demand elasticities. These numerous statistical studies have typically used single-equation or simultaneous-equation methods to estimate the effect on raw jute exports (or foreign imports) of current, unlagged movements in the price of raw jute relative to that of some substitute material, like cotton or kraft paper.[19/] A common specification of the demand relationship is

$$D_t = a + bP_t + cY_t + dt + e_t$$

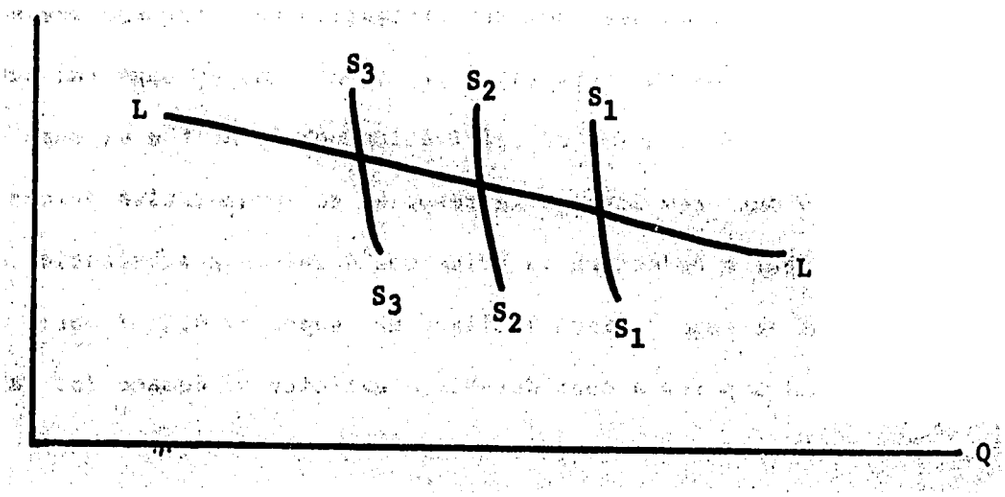
where D is demand, P the unlagged relative price variable, Y an

index of activity in jute-using sectors, and t a time trend representing "technological" factors. Not surprisingly, the estimated short-term price elasticities have been low, and the time trends adverse and highly significant. The concurrent response to price shifts is often little more than inventory fluctuation in the importing countries: since jute prices have been notoriously volatile, most processors conduct small buffer operations - reducing stocks when prices are high and buying heavily in the slumps. Most of the reaction to anticipated sustained price movements involves re-equipment or conversion, occurs with a lag, and is picked up in the trend variables. In other words, in terms of Figure I, as raw jute exports from Pakistan have moved up the long-term demand schedule depicted as LL, economists from time to time have estimated the short-run demand schedules SS, and found that indeed they are inelastic. On this basis, despite perhaps some vague misgivings, they have then reassured the Pakistan Government of the soundness of its policies to tax the jute sector.

Is the long-run foreign demand for Pakistan's raw jute very elastic? In order to be sure of the correct answer to this question, it is necessary to define carefully what is meant by the long run. The foreign demand for Pakistan's jute is identically equal to the world demand less the amount supplied by other producers. The demand response to a change in price has therefore two components: the response of world demand to a change in price, and the response of supply in other producing areas to a change in price.[20/] With reference to the latter component, the long run is defined as a period long enough to permit all changes in expectations fully to be realized, and reflected in production changes. Agricultural economists have long ago told us that cultivators respond only gradually

FIGURE I

Long-Run and Short-Run Demand Functions for Pakistan's Raw Jute



to a change in price, as its persistence convinces them of a permanent change in the relative profitabilities of alternative resource allocations. Thus, the full shift in acreage and other farm inputs following a change in relative crop prices will be completed only after the lapse of some years. In the case of Thai kenaf, a detailed study has indicated that the one production-period price elasticity of acreage has been high (about 2.5, due largely to the fact that kenaf is grown as a supplemental cash crop in the Northeast, where land is relatively abundant, and on upland plots, where it competes only with corn and upland rice), but that the long-run price elasticity has been appreciably higher, in the range of 3.6 to 5.8, depending on which estimate is adopted. There is no reason to expect asymmetry in this response: neither irrigation nor improved seeds were important sources of the very rapid growth of Thai acreage and output. Rather, it was an expansion of cultivation partly at the expense of other crops, partly onto new acreage in response to remunerative prices. The evidence is that a reduction in price would induce a substantial decline in Thai kenaf acreage. Since Thailand now supplies 41% of world exports, this in itself implies a considerable elasticity of demand for Pakistani output.

The long-run world elasticity of demand for raw jute and allied fibres must be defined analogously to subsume all relevant responses to price changes. If an increase in jute prices induces investment, then the long run must be defined as the period in which the results of that investment are fully realized. In particular, if an increase in jute prices induces investment in product development and equipment design which results in the availability of a substitute material and machinery on which to process it, these price-induced shifts should be included within the long-run demand function. This is no more than the "entry" problem,

which has been fully explored in the literature of industrial organization years ago. More conventionally, the long-run demand function must also include all changes in the capacity for production of existing synthetic substitutes which will be forthcoming at a given price for raw jute, with the price of the synthetic free to adjust to the price of jute.

Thus, had the policy-makers in India and Pakistan been far-seeing fifteen years ago, and included in this assumed foreign demand function the potential entry of synthetic fibres into their end-use markets, they would have reduced their quest after monopoly profits. Had they been alert seven years ago, and observed the imminent entry of these substitutes, they would rationally have reduced prices even more vigorously.

The situation at present is different, and the options more limited. Polypropylene tape products have successfully entered and captured significant portions of major markets in the short span of five years. How now should long-term elasticity be measured? The economists' conventional response would be to make a statistical ex post estimate from observed historical price-quantity variations. In another ten years there will be enough observations to make this estimate with a fair degree of statistical reliability. Should present policies continue in the meantime for lack of firm statistical evidence, it will then be possible to look back on the extent to which production of synthetics has continued to grow and expand its market share, and from these observations estimate ex post the true elasticity, for which information all concerned will be grateful.

The alternative, somewhat more useful as a basis for policy guidance, is to make an ex ante estimate of demand elasticity from information presently available on the degree of substitutability between polypropylene and jute in jute's main uses, and from cost conditions in

polypropylene products. This report has already presented the case that both in bagging and in carpet-backing the synthetic is regarded as closely substitutable for jute, with small difference in use characteristics -- some favorable, some unfavorable. Consequently, any large price differential between the two should not be expected, and this has been verified by market behavior to date. Furthermore, the production of the synthetic product takes place under conditions of constant or mildly declining long-run average costs, due to the elastic supply of basic polypropylene and economies of scale in production. It follows that the supply of jute's principal substitute is virtually infinitely elastic in the long run, with respect to price: a price adequate to provide an acceptable return on investment would induce continued entry into and expansion of the industry.

If this is true, then economic reasoning alone provides a compelling basis for a high estimate of the long-run world elasticity of demand for jute and jute goods. Due to close substitutability in end uses, little price differential can be sustained between jute and synthetic products. Given the high long-run supply elasticity of synthetics, any attempt to maintain the price structure above the long-run normal supply price for synthetics will lead to super-normal profits in the industry, rapid expansion of output and sales, and rapid loss of markets for jute. The long-run world demand for jute under these conditions must be very high, approaching the long-run supply elasticity of polypropylene.

This conclusion is entirely consonant with the rapid loss of jute's market share to polypropylene during the last four years: what we are witnessing is the adjustment process under way. At the present price level, polypropylene suppliers are making high profits, and rapidly raising both capacity and market share. It will be extremely costly to

wait for additional ex post evidence to accumulate, since this evidence consists of the loss of markets for Pakistan's principal export. It should be clear on ex ante and empirical grounds that Pakistan no longer has any significant long-run monopoly power in the supply of carpet-backing, bagging, or raw jute itself.

IV. Optimal Export Taxes in the Long-Run and the Short-Run

The foregoing discussion of Pakistan's jute policy and its consequences highlights a problem in economic theory which is relevant to commodity trade policies in many developing countries. The foreign demand for Pakistan's jute is fairly inelastic in the short-run, but very elastic in the long-run. This is typical: demands for most commodities are the more elastic, the more adjustment time is allowed, especially export demands which subsume price-induced shifts in the allocation of resources in other potential supply areas. For most internationally traded commodities, one would expect that a sustained increase in the world price would over time induce fresh supplies from new producing areas. In an age of organised industrial research, one would also expect the development of effective substitutes, especially for intermediate goods, which do not have the support of strongly established consumer tastes and preferences.

The theory of the optimal tariff, or optimal tax on foreign trade, has been developed in terms of "the" relevant elasticities. But, if long-term elasticities differ markedly from short-term elasticities, which are the relevant ones? The implications for policy are important, as the history of jute demonstrates, and a wrong choice could be disastrous. The classic literature on the subject provides no guidance,[21] with the exception of a remark by

R.F. Kahn:

> "It is, of course, easy to exaggerate the quantitative significance of the terms-of-trade effect by taking a short-period view and correspondingly low values for the elasticities. On the other hand, the really long-period elasticities are not the relevant ones: no country will ignore the immediate future altogether and fail altogether to discount the distant future. And the greater the country's economic difficulties the more will it be concerned with the more immediate future, the smaller the relevant elasticities, and the greater will be the optimum tariff."22/

This, of course, grasps the essentials of the problem. The optimum policy will depend not only on the short-term and long-term elasticities, but also on the length of time which must elapse before the long-run has finished, and on the Government's rate of time discount. One can imagine a very substantial tax which would be perfectly rational even in the fact of near-infinite long-term demand elasticity, provided that the rate of time discount be sufficiently high and the full demand response be sufficiently slow in appearing.

Although the economics of the solution are intuitively clear, an explicit reformulation of the optimal tariff conditions to encompass these inter-temporal effects is still warranted to clarify the valid policy issues. In the simple analysis which follows, it is assumed that the foreign import supply elasticities are infinite, which is plausible for most developing countries. It is also assumed that there are no cross-elasticities of foreign demand among the export commodities. This is not a plausible approximation in the case of raw jute, because of the obvious relation with exports of jute manufactures. This relation is discussed in the following section; but, since it

has little effect on the <u>inter-temporal</u> aspects of the problem, is ignored in the formal analysis of the problem.

In order to bring out the difference between short and long-run elasticities, foreign demand (x) is made dependent on the history of prices (p) as follows:

$$1)\quad x(t) = A - bB\int_{-\infty}^{t} e^{-b(t-s)}p(s)ds.$$

In words, foreign demand depends linearly on a weighted sum of all past prices, the weights declining exponentially with time, so that most recent prices have the most effect on current demand.[23/]

The interpretation of the parameter values will become clear. The immediate demand response to a change in price is

$$2)\quad \frac{\partial x(t)}{\partial p(t)} = -bB \quad ,$$

and the total demand response to a unit change in price at a particular time <u>s</u> is

$$3)\quad \int_{s}^{\infty} \frac{\partial x(t)}{\partial p(s)}\, dt = -bB \int_{s}^{\infty} e^{-b(t-s)}dt = -B.$$

In other words, the long-term demand elasticity differs from the short-term elasticity by a factor of b, where b varies from zero to one. The larger is b, the faster the demand response.

The objective function is specified in terms of net national benefits (P), interpreted as the difference between export revenues and the resource cost of exports (C):

$$4)\quad P(t) = x(t)p(t) - C(x(t)).$$

The objective is taken as the maximisation of a discounted stream

of net national benefits over an infinite horizon, the discount factor (r) to be intepreted as the social rate of time discount.

5) $$\int_0^{\infty} e^{-rt} P(t)dt = \text{maximum}$$

The method of solution of this problem is to invert the demand function to express price as a function of quantity demanded, to substitute this expression into the objective function, and then to derive conditions necessary for optimum export levels. These conditions can be translated into conditions for optimum export prices, and, by comparing the optimum price with that which would prevail under competitive free trade, optimal tariff conditions can be derived. It is a convenient characteristic of the exponentially weighted demand function that it can be easily inverted through differentiation with respect to time:

6) $$\frac{dx}{dt} = -bB\left(p(t) + \frac{x(t) - A}{B}\right)$$

which is solvable for price in terms of demand and its rate of change over time ($\dot{x}$):

7) $$p(t) = \frac{A - x}{B} - \frac{\dot{x}}{bB}$$

This expression for price is then substituted into the objective function:

8) $$\text{max.} = \int_0^{\infty} e^{-rt}\left(\frac{(A-x)x}{B} - \frac{\dot{x}x}{bB} - C(x)\right)dt = \int_0^{\infty} W(t, x, \dot{x})dt$$

According to Euler's theorem in the calculus of variations, a necessary condition for a maximising function is

9) $$\frac{d}{dt} W_{\dot{x}} = W_x$$

This can be worked out as follows:

10) $W_x = e^{-rt}\left(\frac{A - 2x}{B} - \frac{\dot{x}}{bB} - C'(x) \right)$

11) $\frac{d}{dt} W_{\dot{x}} = \frac{e^{-rt}}{bB} (rx - \dot{x})$

This leads to the necessary condition

12) $\frac{A - 2x}{B} - \frac{rx}{bB} = C'(x)$

It also follows that

13) $\dot{x} = 0$ and $p = \frac{A - x}{B}$, so

14) $p - \frac{x(r + b)}{bB} = C'$

15) $p \left(1 + \frac{1}{e_\ell} \left(\frac{r + b}{b} \right) \right) = C'$,

where e_ℓ is the long-run demand elasticity $\frac{p}{x}(-B)$. Since in competitive equilibrium, producers' receipts will be equated with marginal resource costs, the optimal tax can be estimated as a percentage of the export price:

16) $T^* = \frac{1}{e_\ell} \left(\frac{r + b}{b}\right) = \frac{1}{e_\ell} \left(1 + \frac{r}{b}\right) = \frac{(r + b)}{e_s} = (r + b)T^s$

where e_s is the short-term demand elasticity, $\frac{p}{x}(-bB)$, and T^s is the tax which would be levied if <u>only</u> the short-term demand elasticity were taken into consideration, and all lagged demand response were ignored or treated as exogenous technological "trend".

These are the major results of the analysis, and can be stated as follows:

a) The optimum tax depends on the long-term and short-term elasticities, the relationship between them, and on the social time discount rate.

b) The optimum tax is higher, the higher the discount rate, the slower the demand response, and the lower the long-term elasticity.

c) The optimum tax differs from that which is calculated under static assumptions using the long-term elasticity by a factor of $(1 + \frac{r}{b})$, where r is the discount rate and b is the ratio between short-term and long-term elasticity.

d) The optimum tax differs from that which is calculated under static assumptions using the short-term elasticity by a factor of (r + b), with these parameters defined as above.

It is clear from these results that a short-sighted trade policy which neglects future demand responses will result in a serious over-taxation of the export sector. Suppose the long-run elasticity is five times the impact elasticity, and the social time discount rate is 10% per year. Then, the optimum tax is

17) $t^* = (.10 + .20)\ t^s = .30\ t^s$;

that is, only 30% of the short-sighted tax rate. A tax rate which ... three times too high would result in serious welfare losses through restrictions in the volume of trade.

Suppose the long-term demand elasticity for Pakistan jute is 10. This is certainly not an over-estimate, in view of the close relation of substitutability with polypropylene tape, and the high measured long-term supply elasticity of kenaf in Thailand. Then, if the discount rate is taken as 10%, and the value of b is taken as .05, .10, and .20 alternatively, the respective optimum tax rates are 30%, 20%, and 15%. All of these are well below the present implicit tax rate,

very conservatively estimated at 52% of export earnings. Most statistical studies of the demand for Pakistan raw jute indicate an estimate of 0.5 for the impact elasticity of foreign demand and of about .05 for b, given a long-run elasticity of 10, although the considerable short-run supply elasticity of 2.5 in Thailand would suggest a higher figure for b. If .05 is accepted, an optimal ad valorem export tax of 30% on raw jute implies a nominal exchange rate of Rs. 6.8 to the dollar, compared to the present rate of Rs. 4.75, taking the implicit exchange rate of 9.8 for jute goods as a norm. This implies a nominal rate of subsidy of 44% for raw jute exports, which at the present bonus premium rate of 180 would necessitate an export bonus of 25%. The closest existing bonus rate is 20%.

At this exchange rate for raw jute, the incomes of jute growers and traders in East Pakistan would be considerably increased in the short run, and world prices would be reduced to a level at which jute could more successfully compete with synthetics. The relative strength of these two effects would depend on the extent of supply elasticity in Pakistan. Production in other areas would be discouraged. The short-run changes in price internally and externally which would result from this step depend on the timing, the stock position of the processing sector in Pakistan and overseas, crop prospects in Pakistan and other producing countries, and a number of other factors which would influence short-run demand and supply conditions. Without knowledge of these specifics, it is impossible to predict by how much external prices would fall immediately, or how much internal prices would rise.

V. Other Considerations

A. The Effects on the Jute Industry in Pakistan

The impact on the jute industry in Pakistan of a reduction in the implicit tax on raw jute is important to consider for three reasons: 1) on the practical side, because of the importance of the jute industry in the East Pakistan economy, and the necessity that its growth be sustained, if possible; 2) on the theoretical side, because of the importance of demand cross-elasticities in formulating optimal tariff policy; and 3) because of the influential opposition of this industry to any such change in policy.

There is no reason why <u>any</u> of these points should be of critical importance, for the simple reason that any benefits afforded to raw jute exports need not be, and should not be, at the expense of the jute industry. In Table I it was shown that the effective rate of protection enjoyed by the jute industry is moderate, and probably well below the marginal value of foreign exchange in the Pakistan economy. There is no reason why this rate of protection should be reduced. If anything, it could be increased, so that Pakistan's competitive position could be strengthened against synthetics and against the Indian industry But, there is no reason why processor should benefit at the expense of grower, or grower at the expense of processor. The

appropriate change in jute policy would be a reduction in the implicit tax on raw jute, and a compensating increase in the incentive given to exports of jute goods, to leave the latter's effective rate of exchange unaffected. To accomplish this, if the rate for raw jute were raised to Rs. 6.8 to the dollar, the nominal exchange rate for jute goods should rise from Rs. 7.3 to Rs. 8.3 to the dollar. At present levels of the bonus premium, this implies that all jute goods should be moved up from a bonus rate of 30% to the top rate of 40%.

This structure of nominal and effective exchange rates would not only bring about a badly needed reduction in the world price level for jute and jute manufactures, but also would have the effect of reducing the degree of discrimination in the jute sector, a phenomenon which has occasioned gross irrationalities in the market for sacking, in which most of Pakistan's fabric exports are concentrated. As Table II indicates, Pakistan had even by 1966-67 taken over the bulk of world sacking exports from India, with the exception of Soviet-bloc countries, the U.A.R., a few other nations with which India has bilateral trade agreements. Pakistan has had a competitive advantage of about 25% in sacking, and in fact has become the price setter in sackin markets. This has not been the case for exports of hessian and carpet-backing, in which Pakistan's share is considerably smaller Pakistan exporters have largely followed the Calcutta price pattern. The major effect of the extreme discrimination against raw jute prices, combined with the rapid growth in mill capacity

in Pakistan, has been to force world sacking prices to very low levels relative to the price of the raw material. In fact, for a period during 1968, the FOB price of sacking was below the FOB price of the equivalent batch of raw jute. This, of course, is wholly irrational, with disastrous effects: overseas processors had no recourse but to turn rapidly to other raw materials or press for high barriers against imports of jute goods. The jute trade in Pakistan openly petitioned the Government to take remedial action:

> "Bonus has merely served to reduce the international price of jute goods offered by Pakistan. Is it not wishful thinking on our part to expect a foreign buyer to buy the lowest grade of Pakistan's raw jute, say PWD, at £ 109 per ton FOB, when he can very well obtain the finished B Twills from Pakistan at £ 93 FOB per ton, and for that matter, hessian at £ 115 per ton." 24/

It is clear that this sort of discrimination is unsustainable as a trade policy. The industry's effective rate of subsidy will have to be provided in other ways. (Incidentally, economists who believe that rates of effective protection are good indicators of relative efficiency should ponder the interpretation of this negative rate of value added at world prices in sacking, and the high rates of effective protection implied for hessian. Do these rates provide any information about the efficiency of the Pakistan industry?)

If, as a better policy, raw jute exports are awarded a twenty percent bonus incentive and jute goods exports an additional ten percent, the annual supply of bonus vouchers would increase by approximately Rs. 22.5 crores. This would be an increase in supply of about sixty percent. In order to maintain the premium value of vouchers, additional demands would have to be created by extending bonus provisions to more categories of imports - primarily capital goods, some intermediates, and perhaps some invisibles. This would involve, for example, imposing "cash-cum-bonus" requirements on an additional Rs. 45 crores of imports. While the desirable distribution of these added import costs would be the subject of additional study, the implied average devaluation - barring any offsetting changes in tariffs or the like - would be roughly sixteen percent, based on total merchandise imports. The short-run incidence of the rise in import costs would be largely on corporate profits, largely in West Pakistan. An indidental result would probably be to raise the presently low rates of effective protection to capital goods industries, and to raise the cost of imported capital goods to a level more nearly reflecting their scarcity value.

In terms of the optimal tax argument, since the long-term elasticities of foreign demand both for raw jute and for jute goods will be high, and prices determined by the price of synthetic substitutes, it is only the short-term effect of a change in raw jute policy which is of significance.[25/] Since Pakistan is the

price setter in sacking markets with a considerable price advantage over India, the short-run effect of an increase in raw jute exports *ceteris paribus* would be to *raise* Pakistan's supply curve for sacking and, if anything, to firm up sacking prices. In world markets for hessian, carpet-backing and specialities, which absorb a large fraction of Pakistan's raw jute exports as a higher-grade raw material but in which Pakistan's present market share is low, the effects of greater raw jute exports at lower export prices would be to reduce prices of the finished goods *ceteris paribus*. In other words, the relevant cross-elasticities are different in the case of sacking, for which Pakistan sets the world price and other jute goods, for which Pakistan does not. Since these cross-elasticities tend to cancel each other out, they can be safely omitted from consideration as a first approximation. Furthermore, since the desirable policy would actually cause a reduction in both raw jute prices and jute goods prices, the scope for any cross-elasticities to have effect would be severely limited.

It is much more meaningful to think in terms of the Pakistan industry's long-term prospects. It now contributes about thirty percent of total large-scale industrial output, and at the moment there appears no emerging industry of comparable size or prospects in East Pakistan. Yet, large-scale industry must continue to grow at an annual rate of ten percent or more, to accomodate the expected increases in urban labor force and to

generate rapid growth in ancillary urban economic activities. If the jute industry grows at only five percent per year, say, during the Fourth Plan period, then other industry will have t achieve a rate above fifteen, which may be difficult. It is highly desirable that the jute industry continue to grow by ten percent per year. However, world demand for jute is expected, subject to a wide margin of uncertainty, to grow not much more than three percent annually. It is clear that Pakistan must continue to increase its market share in manufactured goods, at the expense both of India and of processors in the more developed nations. This implies efforts to break into the remaining markets for Indian sacking, but, more importantly, to shift rapidly in the direction of hessian, carpet-backing, and specialities, which are the fastest growing segments of the trade in any case. This should be possible for Pakistan to achieve, at least with respect to its competition with India. Jute goods now contribute less than eighteen percent of total Indian exports, and it is the newer industries which are expected to provide most of the export growth there. Also, internal demand for jute goods in India is growing rapidly, and Pakistan has a considerable advant-- in the cost of finer grades of the raw material, which is not much grown in India. Wage costs in West Bengal have been rising rapidly, and industrial investment has been low. A very large proportion of Indian loomage is more than twenty-five, or even fifty years old, and there is little interest in modernisation. Moreover, Pakistan's share in these faster-growing markets for jute goods is still quite low, as Table II illustrated. Success for Pakistan during the Fourth Plan would imply that India's total exports of jute goods stay constant, encompassing some decline in sacking and some rise in

Table II

EXPORTS OF JUTE GOODS FROM INDIA AND PAKISTAN, BY REGION, 1966-67

Destination	India	Pakistan	(2) (1)+(2)	India	Pakistan	(4) (3)+(4)
	Hessian and Carpet-Backing			('000m.t.)	Sacking Cloth	
	(1)	(2)	(2)	(3)	(4)	(4)
U.K.	23.4	8.4	38.5%	3.4	4.8	58.5%
Other W. Europe	11.7	4.0	25.5%	6.3	10.2	61.8%
U.S.S.R.	47.8	0.7	1.4%	65.1	-	0.0%
Other E. Europe	27.9	0.1	0.4%	18.0	5.4	23.1%
Far East	0.9	5.6	86.1%	10.5	29.5	73.7%
Africa	17.6	18.7	51.5%	49.8	104.2	67.6%
U.S.A.	261.3	54.1	17.2%	3.6	-	0.0%
Canada	42.8	3.0	6.6%	-	-	-
Argentina	4.5	6.4	58.7%	0.2	0.1	33.3%
Other America	14.1	2.8	16.6%	7.4	16.4	68.9%
Australia	25.5	2.0	7.3%	25.1	42.2	62.7%
N. Zealand	6.2	-	0.0%	7.2	5.9	45.0%
Others	12.3	14.8[b]	54.6%	10.1	12.6[c]	55.5%
TOTALS	498.0[a]	120.2	19.4%	206.7	232.0	52.8%

a) of which 134,000 tons are carpet-backing cloth
b) includes only the middle eastern countries; excludes 206 tons to other countries
c) includes only the middle eastern countries; excludes exports of 609 tons to other countries

Source: PJMA
IJMA

other exports, while Pakistan's exports grow in volume by sixty percent, as follows:

TABLE III

A Possible Distribution of World Jute Goods Exports

	1970	1975 ('000 metric tons)
World	1,500	1,800
India	1,000 (67%)	1,000 (56%)
Pakistan	500 (33%)	800 (46%)

If this is to be accomplished, then it is greatly in Pakistan's interest to protect overseas markets from competition from synthetics, until the Pakistan industry has installed sufficient capacity to capture them herself, and to discourage any further expansion in the Indian industry. In other words, Pakistan should try to pursue an aggressive pricing policy to preserve its future markets rather than be content with short-run profits. Profit levels in the more dynamic branches of the industry are high in Pakistan, and there is ample investment interest. These profit levels can be protected, while world prices are brought down. This will result in somewhat lower foreign exchange earnings in the short-run. Indeed, foreign exchange earnings in the jute sector during the Fourth Plan period could remain roughly constant despite the large increase in the volume of exports of jute manufactures. However, these would be earnings which could more readily be sustained. The alternative is a continuing and probably irreversible drop in foreign exchange earnings over a longer period.

B. The Effects on the Supply of Raw Jute in Pakistan

The extent of the long-term supply elasticity of raw jute in East Pakistan is of considerable importance, because if supply is unresponsive to price inducements, then the policies suggested above will be powerless to arrest the decline of Pakistan's position in the world jute sector, and attempts to lower the world jute price level will instead have the primary effect of transferring rental income to the owners of lands suitable for jute cultivation. Such a transfer might not be undesirable from the standpoint of regional or personal equity, since most jute lands in East Pakistan are in small holdings, but the basic problem of the sector would remain.

There have been a large number of attempts to estimate the response of acreage to shifts in the relative prices of jute and paddy, or to shifts in gross revenues from jute and paddy cultivation.[26/] Most of these, especially those referring especially to East Pakistan, are of questionable reliability, because of serious biases in the underlying data series. Nonetheless, the indicated elasticities of acreage with response to shifts in the relative prices of jute and paddy lie between 0.5 and 1.0, in the long-run. One would expect that the higher figures should be more relevant to recent periods, since the spread of the market economy reduces the constraint of subsistence farming and tends to increase supply elasticities.

The more important element of long-term supply elasticity is the yield response, however. It is in this area that price

policy has most retarded output growth in East Pakistan, by reducing the return on modern inputs used for jute cultivation below the level obtainable if applied to the competing paddy crop. Three and four-fold increases in yield have been obtained from balanced fertilisation, improved seeds, line sowing, and improved cultivation, not only in controlled fields but by leading farmers throughout the Province.[27/] However, these increases depend on proper adoption of a package of inputs and methods, and do not result from any dramatic technological change, like a greatly improved seed, which would instigate the adoption of an entire package. Furthermore, the returns on most inputs, especially to fertiliser, are lower in jute than in paddy cultivation, especially on IR-8 paddy cultivated in the aus season. Therefore, a cultivator with limited credit or cash resources would tend to use his purchased inputs more heavily on his paddy fields, rather than on his jute plots. And this is precisely what has happened. To the extent that there is any information on the use of purchased inputs by crop, this information shows that they have overwhelmingly gone into paddy. This represents a serious misallocation of resources, since the farmers' price for jute has been less than half the world price valued at the probable scarcity value of foreign exchange, while the farmers' price for paddy has been 50% over the world price, on the same basis. Therefore, the derived demand for inputs for use on rice has been inflated over socially optimum levels, and the derived demand for inputs for use on jute has been considerably depressed. In the long run, this can be redressed by increasing the cultivators' returns in jute growing, partially through an appropriate price policy and partially

through an intensified research effort to find dramatically higher yielding varieties with better retting and processing characteristics. However, it is only the price policy which can be effective at once; the fruits of any research or extension effort will mature only after some years, not in time to counter the immediate threat of foreign competition. The same consideration invalidates the numerous cost comparisons that have been made between jute and aus rice, in terms of the resource costs of foreign exchange saved or earned. For purposes of resource allocation, comparisons of <u>average</u> production costs are irrelevant; only relative marginal costs matter. Presumably, cultivation of each crop is expanded until the long-run marginal costs just are covered by the prices to the cultivators. And, since farmers' prices have been considerably distorted with reference to international prices, to the detriment of jute cultivation, it follows immediately that acreage as well as other farm inputs have been insufficiently devoted to jute. A more rational export policy would improve efficiency in production, while encouraging a considerable expansion of supply and an improvement in Pakistan's long-term position as an exporter of raw jute and jute manufactures.

Footnotes

1. A.K.M. Ghulam Rabbani, "Jute in the World Economy: A Statistical Study," unpublished Ph.D. dissertation, Univ. of London, 1964, Ch. 3.
2. FAO, Study Group on Jute, Kenaf and Allied Fibres, Impact of Synthetics on Jute and Allied Fibres, CCP:JV 68/ Working Paper No. 2, Rome, July, 1968.
3. This material is based largely on interviews with industry personnel in the U.S.
4. U.S. Dept. of Commerce, Current Industrial Reports, Rugs, Carpets and Carpeting: Third Quarter 1969, Wash. 1970.
5. Indian and Pakistan authorities anticipate that at least the market for secondary backing, a layer of fine jute cloth often added to the underneath of a carpet for better appearance and weight, would remain secure for jute in the 1970's. By late 1969, however, a leading producer was already advertising a synthetic secondary backing.
6. It has not been realized in Pakistan, at least, that U.S. producers have followed this pricing policy. Rather, the small differential has been taken as a measure of jute's competitiveness!!
7. FAO, op. cit., p.65.
8. Gov't. of Pakistan, Ministry of Commerce, Report of the Jute Enquiry Committee, Karachi, 1960, p.165.
9. This development has been analyzed in M. Akhlaqur Rahman, Partition, Integration, Economic Growth and Inter-regional Trade: A Study of Inter-wing trade in Pakistan 1948-1959, Pakistan Institute of Development Economics, Karachi, 1963.

10. H. Bruton and S.R. Bose, The Export Bonus Scheme, PIDE, Karachi, 1963.

Q.K. Ahmad, "The Operation of the Export Bonus Scheme in Pakistan's Jute and Cotton Industries, PDR, Spring 1966.

R. Soligo and J.J. Stern, "Some Comments on the Export Bonus, Export Promotion and Investment Criteria," Ibid.

11. Roger Norton, "Some Aspects of Inter-wing Resource Transfer in Pakistan," USAID/Dacca, mimeo, 1968.

12. G.C. Hufbauer, "West Pakistan Exports: Policy and Performance," in Walter P. Falcon and Gustav F. Papanek, (eds.) Development Policy II - The Pakistan Experience. Cambridge: Harvard Univ. Press (in press) 1970.

M. Alamgir, "The Domestic Prices of Imported Commodities in Pakistan: A Further Study," PDR, Spring, 1968.

14. Hufbauer, op.cit.

15. Collection of the data underlying Table I and many of the calculations were carried out with the assistance of M. Mahfazur Rahman, Asst. Chief, Planning and Development Dept., GOEP.

16. The increase in the implicit tax against raw jute does not depend on comparison with incentives for jute goods exports. The rise of the bonus premium has increased the incentive to all bonus exports, and raised the effective exchange rate for bonus and cash-cum-bonus imports. Also, the bonus scheme has been widened and tariffs increased, implying selective devaluation from which raw jute was excluded.

17. For example,

a) A.K.M. Ghulam Rabbani, op. cit., ch.3.

b) G.F. Papanek, Pakistan's Development, Cambridge, Mass. 1967, p.248.

c) Richard Mallon, "Export Policy in Pakistan," PDR, Spring, 196

d) Q.K. Ahmad, "The Operation of the Export Bonus Scheme in Pakistan's Jute and Cotton Industries, Ibid, p.16.

e) R. Soligo and J.J. Stern, "Some Comments on the Export Bonus, Export Promotion and Investment Criteria," Ibid, p.48.

18. Nural Islam, "Commodity Exports, Net Exchange Earnings, and Investment Criteria," PDR, Winter, 1968, p.595.

19. A.K.M. Ghulam Rabbani, op.cit.

R. Mallon, op.cit.

K.A.T.M. Hasan Imam, "Export Demand Elasticities in Pakistan's Jute Trade," Pakistan Institute of Development Economics, Research Report No. 40, October, 1965.

N.K. Choudry, "An Econometric Analysis of the Import Function for Burlap (Hessian) in the USA," Econometrica, July, 1958.

An exception is Nurul Islam, who tried (unsuccessfully, due to data and time peculiarities) to estimate the long-term price elasticity of demand in the U.K., Nurul Islam, "Experiments in Economic Analysis of an Import Function," Pakistan Economic Journal, Sept./ Dec., 1961.

20. J.R. Behrman, Supply Response in Underdeveloped Agriculture

21. The classic references in the development of the theory are:

J.S. Mill, Essays on Some Unsettled Questions of Political Economy (L.S.E. reprint, 1948), p.24-36.

C.F. Bicherdike, "The Theory of Incipient Taxes," Economic Journal, 1906.

F.Y. Edgeworth, Papers Relating to Political Economy, Vol. II (1925) p. 340 ff.

A.P. Lerner, "The Diagrammatical Representation of Demand Conditions in International Trade," Economica, 1934.

N. Kaldor, "A Note on Tariffs and the Terms of Trade," Economica, 1940.

T. Scitovsky, "A Reconsideration of the Theory of Tariffs," Review of Economic Studies, 1941-2.

I.M.D. Little, "Welfare and Tariffs," Review of Economic Studies, 1948-9.

J. de V. Graaff, "On Optimal Tariff Structure," Review of Economic Studies, 1949-50.

22. R.F. Kahn, "Tariffs and the Terms of Trade," Review of Economic Studies, 1947-48.

23. Asst. Professor Christopher Sims helpfully pointed out the advantage of this particular specification.

24. M. Ilahi, President, Narayanganj Chamber of Commerce and Industry, "Jute Trade in Pakistan," Annual Jute Supplement, Pakistan Observer, Dec. 30, 1968, page II.

25. Considering only the corss-elasticities of demand for jute exports (x_1) and jute goods exports (x_2), the static optimum tax on raw jute (t_1) is given by:

$$t_1 = \frac{\partial p_1}{\partial x_1}\frac{x_1}{p_1} + \frac{\partial p_2}{\partial x_1}\frac{x_1}{p_2}\left(\frac{p_2}{p_1}\right)$$

$$= \frac{1}{\epsilon_{11}} \quad \frac{1}{\epsilon_{12}}\left(\frac{p_2}{p_1}\right)$$

where ϵ_{11} and ϵ_{12} are elasticity and cross-elasticity of demand respectively. See J. de V. Graaff, "On Optimal Tariff Structures," Review of Economic Studies, 1949-50.

26. See GOEP, Planning Dept., Long-Term Jute Policy and A Programme for Increasing Jute Production in Pakistan, Dacca, 1968, for a review of the estimates.

The data bias stems from two sources: 1) underreporting of acreage during the period of acreage controls. When these controls were relaxed, reported acreage increased and reported yields, declined, output estimates being subject to verification through independent data on crop dispositions. 2) A gradual change-over from acreage estimation by inspection to estimation by sampling, which gave considerably higher figures. The official figure was interpolated between the two each year, with increasing weight being placed on the sampling estimate, which imparted a spurious upward trend to the acreage series.

Since this trend coincided with a period of rising agricultural (jute and rice) prices in East Pakistan,

26. (cont'd.)

regression equations for jute acreage are best fit onto the absolute level of jute prices. For example, the following series of regressions fit by the author imply that cultivators respond much more attentively to the jute price level, than to the relative prices of jute and rice, or to the relative gross returns from jute and paddy cultivation. This result is economically irrational and statistically spurious. It merely indicates how tenuous are the results of the econometric work done in this field

Furthermore, since over the period of the (mostly spurious) acreage increase, rice prices have risen more than jute prices, the measured supply elasticities are biased toward zero.

A = acreage of jute in East Pakistan

P_j = growers' level jute price during planting season

P_p = growers' level paddy price during planting season

R_j = average gross revenues per acre from jute cultivation,

= growers' level price x average per acre yield.

R_p = average gross revenues from paddy cultivation,

= growers' level price x average per acre yield of aus paddy.

1) $\text{Log } A_t = 2.88 + 0.03\text{Log } A_{t-1} + 0.33\text{Log } P_{jt} \quad \bar{R}^2 = 0.55$

(0.55) (0.13) (0.07)

26. (cont'd.)

2) $\text{Log } A = 3.28 + 0.19 \text{ Log } A_{t-1} + 0.30 \text{ Log}\left(\frac{r_{jt}}{P_{pt}}\right) \quad \bar{R}^2 = 0.30$

(0.67) (0.17) (0.09)

3) $\text{Log } A_t = 3.43 + 0.13 \text{ Log } A_{t-1} + 0.18 \text{ Log}\left(\frac{R_{jt}}{R_{pt}}\right) \quad \bar{R}^2 = 0.01$

(0.82) (0.20) (0.11)

27. These questions are covered in detail in GOEP, Planning Dept., "Report of the Committee on ... Increasing Production of Jute on a Long-Term Basis," Dacca, 1969.