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AN ASSESSMENT OF THE IMPACT OF
INDUSTRIAL POLICIES IN BANGLADESH

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1. Introduction and Methodology

An impression has been held in Bangladesh to the effect that, despite high investment incentives through two major industrial policy packages during the 1980s, the rate of growth of industrialization has been sluggish. Rather than accept that impression as valid, we first set ourselves the task of verifying whether or not the impression was well-founded.

The methodology of policy analysis is briefly discussed in this section. As a next step, we summarized the net incidence of all the policies into effective rates of assistance, so that, firstly, one can conceptualize what type and amount of assistance we are talking about and, secondly, the variations in policies could be related to changes in the objective variables. The magnitudes of policy variables by industry and over time were analyzed in paper 3 of this issue. The relevant results are summarized at the aggregate level and for pertinent sectors in Section 2.¹

Next we look at a number of industrial variables to verify the impression about entrepreneurs' responsiveness to policies. Prima facie evidence from observed performance is presented in

Section 3. The hypotheses formulated from the prima facie evidence are tested by econometric analysis in Section 4. Both inquiries confirmed the impression of the sluggishness of industrial investment and production.

Accordingly, we proceeded to investigate the causes of the poor response of entrepreneurs to industrial incentives. We followed a dual approach: (1) We went out to learn from the horse's mouth as to what had happened. That is, we interviewed industrial leaders--office bearers of industrial associations and corporations, bankers, labor leaders, and public officials--and had a 20-page questionnaire filled by them. The views expressed by industrialists were extensively verified by market-generated data, collected from existing sources as well as through new field surveys. The findings of the survey of industrial leaders were discussed in detail in paper 5 of this issue. They are also briefly summarized in Section 5A. (2) The root causes of the industrial malaise were dug up by bringing economic propositions to bear upon the observable causes given by industrialists and other sources. This is the right approach to baring the hidden costs effected by the reactions of various groups of producers and consumers to the malallocation of resources caused by high tariff walls and numerous domestic price distortions. The empirical analysis also underscores the neglect of industrial technology as the key source of productivity and growth. This discussion appears in Section 5B.

From the identification of probable root causes of sluggish industrial investment and production follow possible remedies and policy implications, which are spelled out in Section 6. It will be seen that while the causes diagnosed by different groups of participants in the survey of industrial leaders are, more or less, consistent with one another (though there are blames and counterblames as is usually the case when things do not go right), the remedies are scarcely identical. In particular, superficial differences appear as between the entrepreneurial face, the official face, and the worker face. Basic differences emerge between the three groups just mentioned, on the one side, and the economist, on the other side. The high magnitudes of the hidden costs of policies that are bared by economic considerations become a key to the explanation and understanding of the industrial malaise in Bangladesh.

Methodology of Policy

Analysis

Two aspects of the methodology of policy analysis used here may be distinguished: (a) the comparative aspect in which the state with policy is compared to the state without policy; and (b) the measurement and summarizing of numerous policies---some of which may be supplementary and complementary, some may offset the effect of some others, while there may be certain other policies which are neutral to the effects of others.

(a) The methodology of the impact analysis

The impact of policies may be measured by one or all of the following four methods, among others:

i) "Before" and "after" comparisons.--Comparisons are made between the magnitudes of the objective variable for two to three years "prior" to the policy reform and the period "posterior" to the policy reform. One may, for instance, use three-year annual means or three-year moving averages of ratios (with respect to recognized benchmarks, e.g., GDP), absolute values (in constant prices), rates of growth, or other relevant measures. The results are immediately discernible by inspection, for which graphs are quite informative. Through mental exercise, one may then think of relevant events and exogenous shocks to adjudge the net impact of policies.

Before-and-after comparisons become valid only when a major policy reform occurs. A change of policies in a small dose may not wield perceptible impact on objective variables. Fortunately for the analyst, Bangladesh has been a laboratory case, inasmuch as (1) policies have varied in small doses almost yearly since the base year of this study, 1974-75, and (2) there was a large, basic policy reform, called the New Industrial Policy in 1982 (NIP82), and another, somewhat smaller reform, called Revised Industrial Policy in 1986 (RIP86). The landmark liberalization policy was introduced in June 1986. Within less than a year

after that approximately half of the premier jute and cotton textile industries were denationalized and procedures were simplified at least in statutes. As such, the year 1982 serves as the fundamental break from the previous regime.

ii) "With" and "without" comparisons.--The "before-and-after" comparisons have a weakness, in that economic and other conditions may not remain the same after the reform, to enable the researcher to separate out the impact of policies. Moreover, policies may change over a drawn-out period in small doses rather than be concentrated in a short single period. A more appropriate approach is to compare the results "with" and "without" policies or "actual" versus "potential" outcomes. Since the "without" situation does not exist, one has to create it counterfactually. Counterfactual situations can be created by econometric analysis, preferably in a general equilibrium context, but even a partial equilibrium model may provide highly significant insights. A beauty of this method, if the equation/model is properly specified and expertly estimated, is that it reveals the probable quantitative impact of policy reform under ceteris paribus conditions.

Once a researcher resorts to econometrics, however, the simplicity for the noneconomist policymaker is lost. That cost may, however, have to be paid to discovering the hidden costs of policies, which economists specialize in and understand and which cannot always be done without the use of sophisticated methods.

iii) Cross-country comparisons.--Comparisons across , more or less similarly developed or underdeveloped countries, especially neighboring countries, are a third useful method of gauging the impact of special policy reforms. These comparisons are often quite symbolic in sending home the point. But there are pitfalls, in that no two countries are really alike, however equal they may appear. They may defy meaningful comparisons. That is not a serious problem for Bangladesh, as almost all South Asian countries have a lot in common. In this study, therefore, for main comparisons, we have selected Thailand as the eastern neighbor and India as the western neighbor of Bangladesh.

iv) Targets vs. performance.--One may also use a fourth method of comparing "performance" against "targets" of five year plans. The targets may, however, be unrealistic. Yet something may be gained by looking at this picture also.

If data permit, if an analyst can carry out all the four tests, and if, furthermore, the findings from one test are consistent with those from the alternative tests, they will merit our confidence much more than if results are based on a single method. This is the procedure followed in this study: To the extent relevant data are available, we carry out the analysis using all the four methods. The tests are not presented at a single point in this article. Some of them are scattered across different subsections of the study.

(b) Measuring policies
quantitatively

Not only policies are numerous and run into scores, some policies are qualitative, such as bans, controls, regulations, availability of an input at incentive prices, and so forth. Especially for the "with-and-without" methodology, policy variables have to be summarized, for example as income distribution is summarized by the Gini coefficient or efficiency is summarized by total factor productivity. The ERAs discussed in study of this issue serve that purpose.

(c) Measurement from both the
Source side and results side

A final aspect of methodology that may also be mentioned is that, as far as data permit, changes in pertinent variables are measured both from the results (effect) side and the source input) side. This is done with the same objective as that of alternative methods of policy analysis described in (a) above, namely to look for the consistency of findings from different angles. For instance, the results of technology are assessed by measuring total factor productivity growth, productivity and yield relative to neighboring countries, inter-firm efficiency differences related to differences in technology levels, competitiveness in export markets, investment which is both a cause and an effect of technology, and so forth. For the source side of technology, we measured input in R&D for S&T, number of research personnel with postgraduate degrees in R&D relative to the same measure for other countries, and a score of other indices of effort relative to comparable countries to promoting

technical innovations and productivity. The total number of tests carried out to assess the impact of policies, along with reference to the tables and figures where the findings are presented, is given in the array below:

Methodology	Variable	Source	Table	Fig.	Sluggish	Subsiding
"Before" and "After"	1. Investment: Sanctioned	DI	3a	3a	✓	
	2. Invest: Sanctioned	BOI	3b	3c	✓	
	3. Invest: Realized	BOI	3b	3c	✓	
	4. Invest: Realized	Plg. Commn	3a	3b	✓	
	5. Invest: Realized	BBS	3a	3b	✓	
	6. Inv: Imported Machinery	BBS	3c	3d	✓	
	7. Manuf Output	National Accts	4	3e	✓	
	8. Manuf Output	CMI	4	3f	✓	
	9. Per Capita Income	National Accts	5	3g	✓	
	10. Output per Employee	CMI	4	3h	✓	
	11. TFP	CMI	6	3i	✓	
	12. Exports	National Accts	5	5		✓
"With" and "Without"	13. Firm Efficiency with ERA	CMI	8		✓	
	14. TFP with ERA	CMI	9		✓	
	15. Investment with ERA: Micro	DI	10,11		✓	
	16. Investment with ERA: Macro	BOI	12		✓	
	17. Employment with ERA	CMI	13		✓	
Cross Country	18. Effort for technology, productivity, R&D	ESCAP	14,15,16		✓	
	19. Effort for productivity	ILO	17		✓	
	20. Results: Growth	UN Yearbook	7		✓	
	21. Results: Productivity	HIID Survey			✓	
Targets and Achievement Test	22. Two Year Plan	Plg Comm			Overachieved	✓
	23. Second Five Year Plan	Plg. Comm			Underachieved	✓
	24. Third Five Year Plan	Plg. Comm			Underachieved	✓
Prima Facie Evidence	25. Impression	Plan Comm				✓
	26. Views	HIID Survey:				✓
	27. Views	1. Ind. Leaders 2. Entrepreneurs				✓

2. What Policies Are We Talking About?

The basis for high expectations about industrial growth was the introduction of two major policy packages and other changes during the 1980s, including the New Industrial Policy of 1982 (NIP82) and the Revised Industrial Policy of 1986 (RIP86). These policies were aimed at providing generous incentives to private industrialists, simplifying the licensing and sanctioning procedures, liberalizing trade, privatizing, decentralizing, and introducing freedom of enterprise in general. Major thrust was to promote private investment, including foreign investment, in manufacturing industries. Small industries were assigned priority. Incentives were galore. Several policies overlapped. Others provided cumulated assistance. While we try to gauge the extent to which different policies have been availed of, it is not very practicable to identify the separate impacts of individual policies. For measuring year-to-year and interindustry changes in the net incidence of the plethora of industrial policies that have come into operation over the years in Bangladesh, moreover, it is useful to summarize them into one series. Such a series was prepared in this study by extending the well-known concept of the effective rate of protection (ERP), which takes into account, mainly trade policies, to include all

policies, trade plus domestic as well as those affecting material inputs and primary inputs (in addition to output). To distinguish the latter from the former, the relation is called here the effective rate of assistance (ERA). Apart from explicit fiscal and financial incentives, which directly bear upon prices of factors, material inputs, or products, the assistance in the form of price and quantity controls, import bans, and similar policies were also translated through appropriate methodologies into quasi-taxes and quasi-subsidies. Debt default was assumed as subsidy. Major industrial policies are summarized in Appendix A.

The ERA

ERAs and ERPs were calculated for about 100 products for a period of 14 years. They were averaged out at the four-digit-industry level, comprising of about 60 industries. The relation for ERAs was derived and detailed results were discussed in earlier Paper 2 of this issue. In this paper, we present an overall summary of the ERAs for the entire manufacturing industry to get an approximate picture of the changes in the magnitudes of the ERAs.

The results are given in Table 1 and Fig. 1. It may be adjudged by inspection that the effective assistance to the manufacturing industry increased by approximately 30 percent due to NIP82 but declined by about 13 percent from the peak of 1985-86 during the post-1986 period due to RIP86, such that the index of ERAs stood approximately 17 percent higher in 1986-88

compared to 1979-82.

It may be cursorily noted that trade assistance clearly dominates domestic assistance. The main source of an upward jump in ERAs after 1982 seems to be the liberalization and simplification of imports without perceptible reduction in product protection. But there are other reasons, which were discussed in Paper 3 in this issue.

Intersectoral Differences in ERAs

Relative differences in ERAs between pertinent sectors and groups of industries may also be noted, as they are useful for assessing the differential impacts of policies. Three such comparisons are reported here. (1) Small industries have succeeded in availing of much less effective assistance than large ones, as the 1989 multivolume study on textile and handloom industries of BIDS has revealed and as is indicated by the HIID/TIP estimates reported for several textile products in Item A.4 of Table 2. (2) Effective assistance of 200 to 400 percent to import-substitution group of industries is common, whereas that to export group varies from negative to a few percentage points above zero (Table 2 and Fig. 2). As will be seen below, these variations provide the first impression of possible differential impact of policies. (3) Effective assistance enjoyed by manufacturing industries is approximately 8 times as high as that available to agriculture, 5 times as high as services, and about 50 percent as high as the construction industry of the input-output table. See Item C of Table 2.

In summary, the young private manufacturing sector was provided generous assistance through public policies. The high levels of fiscal and financial assistance to industry--coupled with the privatization and divestment of nationalized industries, the liberalized environment and simplified import and sanctioning facilities--was the basis of high expectations for industrial growth.

3. "Before" and "After" comparisons:

Prima Facie Evidence

Lamentably, the contrary appears to have been the experience of the past 8 years: the rates of growth of pertinent variables, such as investment, have decelerated in relation to the earlier period, probably also in relation to what they would have been in absence of high ERAs, relative to targets, and in comparison to the rates of growth in neighboring countries. With a view to basing the conclusions on sound analysis, the performance is scanned from several angles, by different methods, different data sets, and for a number of pertinent variables.

Investment--Five independently generated data series of investment for Bangladesh were assembled. None is error-free. Therefore, only if findings are consistent with one another should the results be considered nontrivial. The five data series are the following: (1) The records of "sanctioned" investment of the Director General of Industries (DGI) which were

computerized by this project for a period of 10 years from 1976-77 through 1985-86, at the micro level by various classifications and dimensions and for 13 years upto 1988-89 at the aggregate level. This set of data is described in Appendix B, Section 2. (2) "Realized" investment at the aggregate level from the DGI and the Board of Investment (BOI) sources. (3) Aggregate estimates of the Planning Commission, prepared from bank credit and related information. (4) Aggregate estimates of BBS prepared as a part of national accounts. (5) Import of machinery and other capital equipment treated as a proxy for actual investment, available from BBS Statistical Yearbook. All the five estimates are reported in Tables 3a, 3b, and 3c and Figs 3a, 3b, 3c and 3d.

The shaded band in these figures marks out the year of landmark policy reform: the New Industrial Policy was enacted in June 1982 and within a year after that about 50 percent of the nation's premier industries, jute and cotton textile, were denationalized. Accordingly, the relevant periods for the before-and-after comparisons of the performance of the economy are from 2 to 3 years before 1982-83 as the base and the period subsequent to 1982-83 as the test period for an assessment of the impact of policies.

It may be seen that private investment has been anything but bustling during the 1980s. The absolute magnitudes of real investment in the post-NIP82 period are lower than before (Fig. 3a and 3b). Investment as a percentage of GDP has declined

significantly during the 1980s (Figs. 3b and 3d). All the five series yield the same result, namely private investment has been sluggish during the 1980s, especially since the NIP reform.

Furthermore, although the attainment of targets is not a valid criterion of performance, as targets can be realistic, conservative, or ambitious in relation to potentialities, the fact should be noted that actual private investment in the first 3 plans ending in 1985 was not far short of targets. In fact, private investment in the Two-Year (1978-79--1980-81) Plan was overachieved by 59%, while in the first and the 2nd FYPs it fell short of targets by only 13% and 19%, respectively. Private investment during the first 4 years of the Third Five Year Plan has reached only the 48% mark. Private manufacturing investment was planned to be about 4 times the planned investment in trade and services. The opposite has been realized, namely investment in trade and services has been twice as high as in manufacturing in the first 4 years of the plan.

Foreign investment has accelerated a bit, but is a trickle. In the past 3 years a total of US\$27 million was invested in Bangladesh by foreigners, which is only 0.4% of one percent of official foreign aid to Bangladesh. Not only private investment has decelerated. So has total investment, as may be seen from Table 3a and Fig. 3b.

The deceleration has occurred despite the fact that disbursed foreign aid has continued, more or less, unabated, on the average at approximately 9.3 percent of GDP, as may be seen

in Fig. 4. Undistributed committed aid is getting cumulated, and is over US\$5 billion as of December, 1989.

The importance of investment in economic development can hardly be overemphasized. In general, investment is not merely an accumulation of capital. It is also a source, a channel, as well as an effect of technological change and productivity growth. As a source, much of technological change becomes operative only when embodied in new machines [Solow, 1962] and man [Schultz, 1965]. It is also an effect of technological change, because cost-reducing technological innovations induce new investment. Therefore, when investment is sluggish, technology will be inert, and productivity will be tardy. Converse is also true: when no new innovation are coming forth, rates of return from investment will be low, and consequently investment will be discouraged.

Manufacturing Output.--Even though the curve of manufacturing output (as estimated for national accounts) has shifted upward from 7.4 percent of GDP during 1975-79 to 8.8 percent of GDP since 1979-80 (Table 4, Col. 1) the trend has turned downward ^{since} after the NIP. and the rate of growth is significantly lower in the latter period, according to one estimate (Col. 2) and negative according to a second source (Col. 4). The decline is significant. It has fallen even in absolute values according to the CMI, as may be seen from Table 4, Col. 4 and Fig. 3f.

Not surprisingly, industrial sickness has probably worsened, as is suggested by the list of "discouraged industries," which

has grown from 11 in 1986 to 21 in 1989. Currently, 50 percent of Bangladesh's formal-sector industry is estimated to be "sick," when industrial sickness is defined by less than 30% capacity utilization.

The rate of growth of manufacturing output has decelerated in the 1980s, whereas the rate of growth of manufacturing employment has probably accelerated (Table 4), implying a decline in productivity per worker, ~~which according to the CMI data has gone down at an annual rate of 6.3 percent (see the last column of Table 4 and Fig. 3h).~~ Independent estimates of the World Bank corroborate this finding. According to the latter source, the index of output per employee in 1986, with 1980=100, stood at 96 (World Bank, World Development Report, 1989, Table 7). ~~As individual year values of Table 4, Col. 6, show the World Bank index is understated.~~

GDP and per capita income--The rate of growth of GDP has also declined from 4.4% during 1975-76 to 3.34% during the 1980s upto 1986-87 (i.e., excluding the severe flood years of 1987 and 1988). See Table 5 and Fig. 3g. It has declined since. Real per capita income has been practically at a standstill since 1982-83 (Table 5, Col. 4, and Fig. 3g).

Productivity.--Total factor productivity or output per unit of input (as calculated,, following Solow [1957], see also Sahota [1968]) has probably declined in nearly 2/3rds of establishments, accounting roughly for about 2/3rds of manufacturing output between mid-Seventies and 1985-86 (see Table 6 and Fig. 3i).²

To summarize, in this subsection, we have presented over a dozen pieces of evidence (refer to the first 13 figures of this study) all of which consistently lead to the same conclusion: decelerating investment (from 5 different sources), declining total and single factor productivities, stagnant manufacturing output, unchanging per capita income, since the year of the NIP. Before, carrying out the ceteris paribus analysis, a few other aspects of the state of the economy are in order.

A few comparisons with neighboring countries

Comparisons with neighboring countries--Thailand, Pakistan, India--show that Bangladesh has been below these countries in productivity (see the 3rd line of Table 7). A finding of more serious concern is that the productivity gap has been increasing in the 1980s. An obvious inference is provided by the macro rates of growth of GDP, manufacturing output, agricultural output, and the like, as was seen in Table 5. Our factory visits and discussions with managers have thrown up some evidence, which remains to be more thoroughly verified, according to plant-level productivity of Bangladesh is lower than neighboring countries in numerous new industries and has declined in several old ones. Instances are fruit juices (the lowest marginal cost of pineapple juice in late 1989 was \$800 in Bangladesh against \$650 in Thailand); shrimp (Thailand's productivity per hectare 2000-4000 kilo, India 500-2000 kilo, Bangladesh significantly lower than

500)³; medical services (almost every expatriate in Dhaka runs to Bangkok even for routine hospital services); telephone (a legion); textile (almost daily confiscation of smuggled Indian sarees in large numbers in Bangladesh's markets is considered the tip of an iceberg); coir (Indian productivity is believed significantly higher than Bangladesh's); sugar (average recovery rate of sugarcane juice is reported to be 10.5% in India and 8.5% in Bangladesh); and so forth.⁴

The dismal picture of Bangladesh manufacturing industry in the 1980s is brought out by the comparative picture of productivity and earnings per worker for a dozen or so countries in Table 7b. Output per worker with its index for 1980 = 100 has declined from 116 in 1970 to 100 in 1980 to 96 in 1986. Compare this with Pakistan's performance of 51 in 1970 to 100 in 1980 to 179 in 1986. The same index was 186 for Indonesia, 142 for Thailand, 164 for India, and so forth. The change in earnings per worker is even worse for Bangladesh.

Low productivity, as stated above, is a result of low investment and decadent technology. The legal and contraband trade between Bangladesh and neighboring countries is explained by comparative cost advantage and differential import duties in the trading countries rather than absolute cost advantage.

Impact of differential intersectoral ERAs.--The next test is carried out by looking at possible influence of disparate levels of ERAs on different sectors. A pertinent experiment in this area is also available for Bangladesh. It was seen in Table 2 that two industrial groups of products have been given lower effective assistance than their counterparts in the same sector, namely handloom products relative to powerloom and mill products and export group relative to the import-substitution group. What has been their relative performances?

It has been found in a recent voluminous study by BIDS that the handloom industry has done more creditably than the powerloom and the mill industries in terms of rate of return, withstanding foreign competition, and relative expansion. As

between exports and the import-substitution group of products, the performance of the export sector, sketched in Fig. 5, though not spectacular is definitely much superior to the domestic sector. Among the national-accounts categories, practically only exports show an upward trend in the 1980s.

This finding is striking: lower the effective assistance, the higher the attainment. The lesson is worth pondering over: What rationale is there to give more assistance to those sectors which have done well with less of it relative to others which have had more of it? Sectors which have performed poorly are precisely the ones which have enjoyed high effective assistance.

A reason for the poor performance of public enterprises has been the prevention by government of exit (negation of competition) by loss enterprises of the public sector. A similar mistake that is currently being made is the assistance given by the government to sustain sick private industries. Were there a well-developed stock market in Bangladesh, the stock value of sick industries would fall. The present owners would suffer losses. Sick industries may go bankrupt. They may be shut down. If shut down, old equipment may be used as scrap. If sold out at loss, to present owners, new owners may start running them at profit. In the absence of proper stock market, the real value of an industry is not known. High-cost, sick industries are sustained. Productivity goes down. Growth deteriorates. The present owner is supported. The society as a whole suffers losses. The sustenance of sick industries is a national loss,

not national gain. It is only a private gain. The closure of such an industry is a bitter pill, but industrial health lies in swallowing it. The economic case for continuing that assistance is rather weak.⁵ The re-employment of workers is a problem, but is solvable.

4. "With" and "Without" Comparisons Or
Counterfactual Test:
An Econometric Analysis

We have seen that much less than an acceleration in industrialization due to the two major policy packages, the 1980s experienced a deceleration of growth, particularly in the manufacturing sector. That finding from nonstochastic analysis, however, is at best only a prima facie evidence for the absence of the impact of policies on industrialization. For there are other factors that might have offset the positive impact of policies. With a view to separating out the impact of policies by holding the effects of other factors constant, we carry out an econometric analysis. Here policies form a variable that varies from year to year and across in industries, namely the ERA. As such, we can carry out a counterfactual test of the impact of policies. Once again, we use a number of criteria to test the robustness of the result.

Efficiency.--Has efficiency been impacted by policies? A probable answer to this question is in the negative, as indicated

by the regression of firm efficiency (EFF) on ERAs and several control variables (Table 8).⁶ The series of the parameters of firm efficiency were estimated from a translog frontier production function fitted to panel data for several hundred firms over a period of 10 years. It may be seen that the ERA is negatively correlated with EFF and in several regressions significantly so. Two typical regressions are reported in Table 10. In plain language, efficiency has been negatively impacted by industrial policies of Bangladesh. Note that this is the net result after the effects of size, capital/output ratio, public or private ownership, and overall growth rate have been removed.

Another result that should also be noted from Table 10 is the positive effect of firm size on efficiency. Most small firms use primitive technology, which explains their low efficiency levels.

Productivity.--Next we test the influence of policies on year-to-year changes in productivity. The results are given in Table 9. Here several more influences than in the case of EFF are held constant. A point to be noted about this regression is that the data are not available for more recent years. The sample covers the period from 1974-75 through 1983-84. Nevertheless, to the extent the function is stable, the results would apply to the period also. The results of this regression are mixed. The coefficient of the ERA is negative or zero for the lowest two size-classes and the upper two size-classes, while positive and significant for the middle two size-classes

comprizing of 20 to 99 workers. It is also positive and significant for the overall regression. Dynamic firms with 20-99 workers probably availed themselves of the investment incentives. On the whole, however, the results should be considered inconclusive insofar as TFP is concerned. Further tests are in order.

Investment.--The main target of industrial policies is investment. Two regressions of investment from the DI data for the period 1976 through 1986 for a total of 2898 firms are presented in Table 10 (by two-digit industries) and Table 11 (overall regression with and without dummies for two-digit industries, year, size, and the index of vulnerability to natural disasters). It may be seen that the coefficient of ERA is negative and significantly so for each of the 7 two-digit industries (Table 10) and positive but not significantly different from zero in Table 11, no matter which set of variables is included. In other words, investment is either negatively impacted by Bangladesh's industrial policies or not impacted at all.

Aggregate investment (I) functions were estimated for 8 series of investment as follows:

- I1: Sanctioned investment, DI/BOI data
- I2: Realized investment, DI/BOI data
- I3: Private investment, BBS data
- I4: Private investment, Planning Commission data
- I5: Public investment, BBS data

I6: Public investment, Planning Commission data

I7: Total investment, BBS data

I8: Total investment, Planning Commission data

In none of the series, except the BBS, did any of the estimated coefficients at all acquire statistical significance. In interpreting these regressions, the fewness of observations and possible errors in data should be kept in mind. One effect of these two weaknesses can be large standard errors.

The R^2 and t values of coefficients for the 3 BBS series are only marginally different from one another. The better fit of the 3 BBS series is for I7: total investment, which is given in Table 12.

For this series the adaptive expectations model is not rejected as long as none of the three variables representing the supply of funds (foreign aid, remittances, and DFI loans) are included. This may be seen from the positive and significant coefficient of I_{t-1} in Regression 5. When one or more of these variables are included in the same regression, the adaptive expectations model seems to break down, as the coefficient of the lagged dependent variable loses its statistical significance. A possible inference from this finding--namely that the exogenous-fund, supply variable throws the endogenous, desire-to-invest, demand variable out--is that the former dominates the latter.

Among the other findings, the following may be noted: The coefficient of GDP is consistently negative in all the 4 regressions of Table 12, but not significantly so; the

coefficient of ERA is not significantly different from zero by a long shot in any regression (whether entered in logs or linearly); the coefficient of foreign aid is negative but not significantly; the coefficients of DFI loans and remittances are positive and highly significant when entered individually in separate regressions, or when the two are summed up to form one variable, but lose significance when entered separately in the same equation. Their contemporaneous values give superior regression results than their lagged values.

Employment.--Next we test the impact of policies on industrial employment. Here too the coefficient of ERA is negative and significantly so for each of the size-classes and in the overall regression (Table 13). The negative impact of policies on employment is as persistent as in the case of investment.

Conclusion

A possible conclusion that may be drawn from these macro investment functions is that investment in Bangladesh is probably influenced mainly by the availability of funds (for example, from remittances and banks) and not by high ERAs, not by cheapness of funds or other incentives. Foreign aid and domestic demand (as represented by GDP) probably encourage the type and quality of goods that are not produced by local industry, e.g., imports (legal or contraband). Industrial investment suffers. In summary, there is no evidence for fiscal and monetary incentives and related policies to have impacted investment or industrial

growth positively.

5. Possible Causes of the Failure of Policies to Promote Industrialization

A. Reasons given by industrialists

The causes for the nonresponsiveness of private industrialists to industrial policies, as advanced by entrepreneurs, with rebuttal by government officials, are discussed in Paper 4 in this issue. Very briefly the main reasons according to industrial leaders are their nonconfidence in the stability of policies bureaucratic sloth and poor implementation of policies; labor code unfavorable to the employer; indiscipline among workers; high cost of electricity; high returns and low risk in trade and smuggling relative to manufacturing production; widespread corruption; political patronage; and too many formalities and sanctions that they have to go through, which take a long time, during which government officials have to be entertained.

According to entrepreneurs, smugglers earn more money than traders and traders earn more than producers and with lower risk. Import policy is now quite liberal. This combined with large amounts of imports, consequent upon massive foreign commodity aid and availability of WES funds has, according to industrial leaders, created "a trader's paradise" in Bangladesh. Naturally, investment in industry is less attractive. Entrepreneurs underline the uncertainty of policy changes as a

discouragement to investment. The change in policy of fixing the WES rate and at first promoting the use of natural gas for brickfields and then all of a sudden prohibiting its use at all for brickfields are typical instances cited.

Many complaints are genuine, as are some of the confutations by the government official. But in several respects, both agents fail to see the real cause. Some of the root causes of Bangladesh's industrial malaise cannot be perceived without appropriate economic considerations being brought to bear upon them, in which the hidden costs of reactions of all groups affected are duly accounted for.

B. Application of economic propositions to observed facts and perceived impressions

When economic considerations are applied to the industrial problem, two critical problems of industrialization become transparent: (1) The root cause of most of Bangladesh's industrial ills is found to be high effective assistance. (2) The most neglected factor of growth in Bangladesh is technology. We substantiate this statement by an economic analysis of the main causes of industrial malaise list by entrepreneurs.

1. Efficiency loss due to high ERAs

Selected fiscal and financial incentives to investment, protection from domestic and foreign competition, price and quantity controls, and similar regulations aimed at promoting industrialization, all of which can be translated into "price

distortions," have been extensively used in Bangladesh. It is important to note that while these policies may or may not have direct benefits they certainly have indirect costs which increase exponentially with the magnitude of "price distortions." The costs arise from the diversion of resources from low-cost suppliers to high-cost industries caused by these policies. Two types of social costs of malallocation may be distinguished: (a) efficiency loss synonymously called deadweight loss, welfare cost, or excess burden, which is a pure loss of consumer's or producer's surpluses without any quid pro quo or which is an excess cost of production, resulting from the diversion of resources to the assisted high-cost sector, and (b) output loss due to the malallocation of resources to the assisted high-cost industry or to low-priority sectors other than the intended assisted sector. These are the "hidden costs" which only economic propositions can bare. The underlying theory of hidden costs is summarized in Appendix B, which is illustrated in Fig. 7.

Unless it can be shown that market prices are influenced toward shadow or border or other socially desirable prices rather than that they are distorted away from them, or are being regulated to internalize externalities, there necessarily are net costs of interference in market prices. In the context of development, it is generally believed that investment in general but industrial investment in particular has a higher social value than what is reflected by free market prices. Under this consideration, large social costs of interest rate distortions

are supposed to be offset by the correspondingly high social value of investment. Furthermore, even if there is no net increase in investment, but investment in a high-priority sector, for instance manufacturing investment, is substituted for investment in a relatively low-priority sector, for instance trade and services, that shift may also work towards lowering the costs of distortions.

Has anything like that happened in Bangladesh? Unfortunately, as seen in Section 3, neither of the two changes have taken place in Bangladesh: total investment has decelerated, manufacturing investment has gone down even more, while resources have been diverted to trade and services. Accordingly, there is not much that can be put in the opposite pan of the scale as an offset to the two costs of the malallocation of resources due to price distortions. As substantiated in Appendix C hidden costs of high ERAs are many, and assistance to a sector is apt to be misunderstood as being an unmixed benefit unless economic considerations are brought to bear upon them. The failure of high fiscal and financial assistance to promote industrialization in Bangladesh is entirely consistent with the predictions of economic theory.

2. Smuggling and corruption due to restrictions on trade

The root cause of smuggling is high protection. Higher the protection, the higher the expected gains from smuggling, and the greater the lure to enter smuggling trade. Furthermore, higher

the profits from smuggling and higher the rents from licenses and sanctions, the greater the mutual gain from sharing the rents by aiding and abetting such activities, the corruption that is so loudly voiced by entrepreneurs. Drug smuggling is a clear example: even the might of America has not succeeded in preventing drugs from being smuggled into the United States. When profits are high, smugglers can reduce their risk by bribing law-enforcement agents.

Smuggling arises not only due to restrictions on import, but also restrictions on export. An example is the impending ban on wet-blue hides to promote domestic production of leather goods in Bangladesh. Policymakers need not be surprised if wet-blue leather is smuggled out across the border, when the export ban takes effect in June 1990. Nor such a policy is conducive to promoting productivity. A more beneficial long-run policy would be to introduce appropriate technology in raising the quality of domestic leather and leather products, so domestic leather could compete with imported leather, and domestic leather products could sell in foreign markets.

3. Industrial sickness due to
high ERAs and lack of
technological innovations

There are two main reasons for industrial sickness: one, high-cost industries to begin with, and two, low productivity growth over time. The theory is illustrated in Fig. 7.

Competition from smugglers and substitutes as well as a crowding of domestic industries are among the proximate causes of industrial sickness. It is easy to see that both of these states are themselves caused by low levels of productivity and low growth or decline in productivity.

High-cost or low-productivity industries have been brought into existence and sustained by high protection from foreign and domestic competition. The assistance with which these industries are enabled to enter and are sustained to stay on in production is, however, nullified by substitutes and smuggled goods. Industrial producers complain of low demand for their products. The reason is that an unknown part of demand is satisfied by smugglers at lower prices. That creates industrial sickness. Productivity changes have been negative (as seen in Section 2) primarily because of lack of industrial innovations. Entrepreneurs crowd into a production line pioneered by a smart entrepreneur and create industrial sickness, because there are not many profitable new outlets to go around.

Cost curves have been lowered in this country artificially through high fiscal and financial assistance (high ERAs), which, as we have just seen, have had the opposite effect on the real costs of industries. Little attention has been paid to lowering the cost curves in real terms through industrial innovations. Programs of raising workers' skill levels and improving management practices have been carried out at modest levels. Whatever they are, they have not been accompanied with new

inputs, new avenues of investment, new products, improved process of production, technologically improved machines, or proper information--the main source of which is industrial R&D.

4. The most neglected factor of growth in Bangladesh:
technology--another set of cross-country comparisons

The notoriety of economists in not ever agreeing on economic issue is well-known. Surprisingly a general consensus seems to have emerged among them in the theory of "new development economics." It is that economic development depends critically on the achievement of rapid technical change. Technology is precisely the factor of growth that has been grossly neglected in Bangladesh. The neglect may be judged by reference to both sides of the technological process, namely the output or results side and the input or source side.

The results side.--The picture on the results side may be viewed at two planes: (a) The findings from changes in growth variables, e.g., investment in manufacturing, productivity, efficiency, employment, and other phenomena analyzed in Sections 3 and 4. We have seen that changes in these variables reflect little improvement in technology. (b) Experiences and judgments of production/marketing managers and other sources collected by HIID/Dhaka through factory visits and from scattered data sources about the comparative or competitive advantage of Bangladesh's industries. This source also confirms the decadence of technology, in Bangladesh, as indicated by the statistics given in Section 3, Subsection on productivity.

The source side.--A number of statistics on the effort and input in producing industrial innovations and increasing productivity have recently been assembled in a five-volume study by ESCAP [1989]. A few pertinent ones that reflect the state of arts in Bangladesh in comparison to its eastern and western neighbors are given in Table 14 (public support and organizational aspects of technology), Table 15 (advances and efforts in different areas of technology), and Table 16 (some basic statistics about the national capacity and environment of technology). It will be seen that Bangladesh is far behind in almost all aspects of technological effort and attainment. It has to go a long way to catch up with its neighbors, India in the west and Thailand in the east, not to speak of the East-Asian Tigers. A matter of great concern is that the gap is increasing every year that passes. The quantum of effort will be bigger, the relative capacity will be lower, the more the remedial action is delayed.

Another index of technological change is productivity growth. Indeed technological change is the main source of productivity growth. As discussed at length in Paper 1 of this issue (see also Sahota, NPO-ILO Seminar Paper, 1989), the early postwar South-Asian economic model was based on the first-generation development theory of the early 1950s, which neglected productivity. It overemphasised capital formation per se. At that time technological debate appeared mainly in relation to the choice between " machine that make machines"

versus the "machines that make consumer goods." The main strands of that model still persist in South-Asian countries, including Bangladesh, despite recent changes. Even the recent leap frog in high tech in India has not rectified the relative neglect of productivity. Following Solow's revealing article of 1957, which won him Nobel Prize 30 years later, India did institute a productivity council in 1958. Bangladesh did not do so until 1986. But even in India the treatment of productivity has remained cosmetic, as may be verified from Table 17. For instance, Singapore's productivity board, which started 10 years behind India, and which country has only 0.3 of one percent of India's population, consists of 255 members of the professional staff against India's 200. The results are not difficult to see. For instance, no visitor to Singapore and India (and Bangladesh for that matter) can miss experiencing wide differences in the productivities and efficiencies of the two countries--making long-distance calls, changing airline bookings, visiting a store, and so forth. For to understand productivity of an industrial plant requires special skill.

5. What went wrong with Privatization? Preconditions of efficiency were not satisfied

Privatization in general was a desirable reform. By itself, however, it is not a panacea for growth. Certain complementary changes are also needed. On the one side, there are public goods that ought also to be provided for the success of the private sector and that can be optimally provided only publicly, for

instance, R&D in developing industrial innovations for small industries. On the other side, private markets work best in competitive environment, which has been ignored in Bangladesh.⁷ In the denationalization process, two critical preconditions were ignored:

(1) The change was brought about without adequate analysis. The deficits of public enterprises of the early 1980s appear to have goaded the government on to get rid of some public enterprises at any cost. Several experts believe that some of the problems that are plaguing the denationalized firms could perhaps have been avoided had its first phase--namely analysis, policy design, and information--been duly carried out.⁸ The overwhelming evidence of the inefficiency of Bangladesh's public enterprises and the swelling international environment favoring the change could not obviate the need for the requisite analysis and the data needed for such major policy shifts.

(2) As stated before, private markets operate most efficiently under competitive conditions. Little attention was paid to competition when denationalization was carried out, whether within private firms, within public firms, or between the two sectors. In the latter area, private entrepreneurs feel that whatever competition there is is unfair, inasmuch as public enterprises enjoy certain facilities not available to private enterprises and the former also set wages though indirectly. There is no trust-busting in Bangladesh. It is well-known that while there is an economic role for a public monopoly, there is

hardly an economic case for a private monopoly, much less for a highly protected private monopoly.

The result of both of these drawbacks has been low efficiency and poor performance of the private sector.

6. Labor problems exacerbated
by lack of productivity growth

Four labor problems among others, have been mentioned by employers: (1) indiscipline among workers, (2) the labor code that lays down privileges but not duties of workers, (3) politicization of workers, and (4) too many workstoppages.

Indiscipline among workers.--Complaints are persistently heard that managers have been manhandled and beaten up in recent years, allegedly by workers. In the circumstances, investors in industry have not only financial risk, they also have the additional personal risk. This is not an attractive environment for entrepreneurs to invest in the Bangladesh industry. Employers remark that traders and indentors do not have to face workers and hence they are not subject to personal risks.

The labor code.--Firing of workers is not a simple option practically in any country today. Bangladesh has its share. Employers complain that the labor has a charter of privileges but not a charter of duties. The labor laws of Bangladesh need to be reviewed.

Politicization of workers.--Industrialists allege that outsiders become the office-bearers of unions who have little loyalty to the firm. The percentage of strikes due to political reasons in total was 17.6% in the 1970s, but has risen to 77.5%

in the 1980s, as may be seen from Table 18. This is despite the fact that, according to official statistics, in the Labor Administration Profile on Bangladesh, the membership of the labor unions sympathetic to the government exceeds 40%, whereas that of the combined membership of the unions directly sympathetic to the two main opposition parties is only about 12% (the Awami League 1.4% and the BNP 10.3%).

Too frequent strikes.--The annual average of the number of mandays lost due to work stoppages has declined since the present government came into power, but remains high from international standards.

Superficially these problems seem to have little to do with industrial policies and technology and productivity. When they are viewed in the perspective of a decrease in gross output per employee during the 1980s, however, some of the causes of the labor problems start showing up. The stagnation of labor productivity and that of real wages are largely due to a serious lack of technological and managerial improvements in industry. One of the reasons of cordial labor-management relations in Japan and Korea is that the workers in those countries receive two-digit raises in real wages year after year, because labor productivities go up at those rates. Workers are comfortable with the industrial system. The wage of Bangladesh worker has stayed put for years. To that extent, the frustration of workers is understandable.

In short, the main economic reason for the noted labor problems, is the stagnation of productivity and the main noneconomic reason is the politicization of unions.

6. Policy Implications

All roads lead to Rome: The root cause of industrial ills is the erstwhile medicine itself: high ERAs. The side effects of the treatment have become the source of more serious malady (industrial stagnation). The foremost logical policy reform therefore is to drastically reduce trade restrictions and effective fiscal and financial assistance to industries. Deregulate. That will remove the negative influence of policies on industrialization. In addition, the country needs a positive action to expedite industrialization. That positive action is to make up for the neglect of the critical factor of economic growth, namely to substitute technological incentives for fiscal and financial incentives.

The reliance on fiscal and financial incentives is misplaced and overplayed. Their hidden costs have not been exposed by Bangladesh economists. Nor has the high payoff from technology development, in terms of rapid rate of growth, been brought to surface by them. Policymakers have recognized the critical role of technology transfer from abroad in economic growth, but have not assigned due priority and have not allocated sufficient resources to this sector. For instance, 4 months before the

Revised Industrial Policy of 1986, the National Science and Technology Policy (NSTP) was issued, vide Bangladesh Gazette Extraordinary, Feb. 25, 1986. It provided for:

"a Technology Transfer Study Center to be instituted as a think tank for the NST. (p.1115)

With further development of a policy regime for technology transfer and institution of appropriate legal, fiscal and financial instruments for imported technology, a National Center for Technology Development and Transfer may be instituted in due course to serve as a focal point to provide information, training, consultancy and extension services in respect of technology transfer" (p.1116).

Nearly four years have passed. No action is known to have been taken. Industry has been stagnating. Such has been the back seat given to the transfer and adaptation of technology in Bangladesh. It is time to correct the course.

The key to the remedy of the malaise of Bangladesh's industry is a leap frog in technological innovations. Here technology is defined to include the entire package of hardwares, softwares, humanwares, inforwares, and orgawares in technology terminology, and disembodied (in organization, information, and environment) and embodied (in human beings, machines, and infrastructure) technology in economics parlance. Needed for improvements in technology development are a quantum increase in R&D allocation and a reform of the organization of the country's research infrastructure with a view to creating an appropriate capacity for the transfer of technology. The center of excellence planned in the NSTP, but not yet acted upon, is urgently needed. It will perform all the functions involved in

the development and transfer of technology: namely assessment of suitable technology from overseas; arranging/negotiating its transfer; digestion/adaptation of it or development from local sources; dissemination/diffusion among producers, generating feedbacks from industrial personnel, doing high-class need-based research to produce innovations for utility; identifying areas of potential growth through technology improvements; choosing the areas of technology on which to concentrate; identifying and hiring scientists/researchers/technologists/engineers of high competence, and doing all these with speed and challenge, so Bangladesh can get on the escalator and start narrowing the gap of productivity and technology.⁹ The bulk of Bangladesh's manufacturing sector consists of small and medium firms and cottage shops. These units use inferior technology. By themselves they are not likely to be capable of doing enough R&D to develop their own technologies, go fetch technology from abroad, or adapt transferred technologies, for decades to come. In short, it is time to drastically lower fiscal and monetary incentives and the over-regulation of the economy and substitute them by appropriate technology incentives.

Table 1.--Mean ERPs and ERAs for 21 manufacturing industries
of the I-0 table, for 1986-87

ERP or ERA	Year	Index of ERP or ERA
ERP	75	0.800395
ERP	76	0.862929
ERP	77	0.829689
ERP	78	0.854720
ERP	79	0.824610
ERP	80	0.864649
ERP	81	0.920902
ERP	82	0.908983
[NIP] ERP	83	0.912091
ERP	84	1.097078
ERP	85	1.153771
ERP	86	1.170995
ERP	87	1.038604
ERP	88	1.061590
ERA1	75	0.627321
ERA1	76	0.688227
ERA1	77	0.655632
ERA1	78	0.680090
ERA1	79	0.649941
ERA1	80	0.689980
ERA1	81	0.745770
ERA1	82	0.745770
[NIP] ERA1	83	0.734935
ERA1	84	0.913295
ERA1	85	0.955114
ERA1	86	0.972010
ERA1	87	0.839498
ERA2	88	0.862518

Table 2.--ERAs by groups of industries, 1989

Group of Industries	Effective Assistance (%)
A. <u>Import Substitution Group</u>	
1. <u>Steel & billets, etc</u>	
M.S. billetec, etc.	Infinite
M.S. rods	260-411
TV (black & white)	290
Electronic motors, etc.	31-53
2. <u>Chemicals, etc.</u>	
Acids	142-366
Sanitary wares	435
Paper and rubber products	Infinite
3. <u>Agro-based</u>	
Sugar	407
Edible oils	978
Cigarettes	Negative 47
4. <u>Textiles</u>	
Cotton yarn	113-513
Nylon yarn	181
Woven fabrics	115-213
Clothing	197-318
Handloom: Statutory	153
Actual (due to smuggling)	Negative
B. <u>Export Group</u>	
Readymade garments	25
Finished leather	73
Frozen fish	9
Ceramic tableware	7
PVC pipes	8
PVC cables	Negative
Textile fabrics	1
Jelly, ketchup, pineapple juice	Negative 2 to negative 4
Silk fabrics	16
Cotton vests	19
Nylon socks	11
Raw ju'e	Negative
Jute good	Negative
Fertilizer (nitrogenous)	Negative
C. <u>Domestic I-0 Sectors</u>	
Agriculture (No. of industries 8)	9
Livestock (No. of industries 1)	50
Industry (No. of industries 21)	70
Construction (No. of industries 6)	47
Power (No. of industries 3)	4
Services (No. of industries 8)	15

Source: Section A and B: TIP, Planning Commission (1989)
Table 2.2 realized; Section C: HIID/Dhaka: Statutory.

Table 3a.--Investment as a percentage of GDP, 1972-73
through 1987-88^a

Year	DGI ^b			Private		Public		Total	
	Sanctioned Investment as % of Industrial GDP			BBS Esti- mates	Plan Comm. Esti- mates	BBS Esti- mates	Plan Comm. Esti- mates	BBS Esti- mates	Plan Comm. Esti- mates
	Small (1)	Large (2)	Total (3)	(4)	(5)	(6)	(7)	(8)	(9)
<u>Shares</u>									
72-73	..	..	..	..	..	..	..	..	..
73-74	..	..	..	..	1.48	..	7.48	..	8.96
74-75	..	..	..	..	1.08	..	4.28	..	5.36
75-76	..	..	..	..	1.46	..	10.06	..	11.52
76-77	2.85	7.76	10.61	4.19	1.51	6.45	9.36	10.64	10.87
77-78	3.46	8.20	11.68	4.06	1.38	5.92	8.64	9.99	10.02
78-79	4.08	10.40	14.48	4.19	2.07	5.38	11.87	9.57	13.94
79-80	4.48	18.25	22.74	4.44	4.62	6.82	10.38	11.26	15.00
80-81	7.25	21.89	29.14	9.48	5.35	6.49	9.29	15.96	14.64
81-82	3.60	4.83	8.45	8.87	4.69	6.15	6.28	15.02	10.97
NIP 82-83	3.30	6.57	9.90	7.34	4.86	6.25	7.26	13.60	12.12
83-84	8.99	10.04	19.04	6.75	5.84	5.47	5.95	12.22	11.79
84-85	4.88	12.74	18.62	7.17	5.64	5.30	4.89	12.47	10.53
85-86	6.64	11.25	17.90	6.29	4.33	6.01	7.93	12.28	12.26
86-87	..	..	..	6.21	4.40	6.43	8.56	12.64	12.96
87-88	..	..	..	6.49	3.89	5.39	7.21	11.89	11.10
<u>Mean</u>									
79-82	5.11	15.00	20.11	7.60	4.89	6.49	8.65	14.08	13.54
83-86									
or	6.84	11.34	18.52	..	..	..	..	..	..
83-88	..	..	..	6.58	4.82	5.72	6.91	12.30	11.79
2/1	1.34	.76	.92	.87	.99	.88	.80	.87	.87

^aThe data are from national accounts or other standard sources, except investment by large and small industries which is from the DGI source. The latter series was computerized by HIID/Dhaka.

^bAs % of industrial GDP. The yearly aggregates of this table may differ somewhat from those of Table 3b, as the figures of this table were aggregated from micro data in the DI files in which the date when a sanction materialized is not always clearly discernible. Over two-three years, the values are about the same as in Table 3b, which contains the aggregation done by BOI. The DI records made available to us do not report "realized" investment, which was obtained from BOI in aggregate series only.

Table 3b:-Sanctioned and realized investment in manufacturing industries , BOI data, 1973-89

Year	Sanctioned Investment					Realized (Crore taka) Investment				
	Current prices	86/87 prices	3-year moving average	Share of GDP Percent	3-year moving average	Current prices	86/87 prices	3-year moving average	Share of GDP Percent	3-year moving average
1973-74	9	38	..	0.12	..	8	33	..	0.11	..
1974-75	15	38	103	0.12	0.30	12	32	84	0.10	0.24
1975-76	70	232	183	0.65	0.51	57	188	162	0.53	0.45
1976-77	81	278	355	0.77	0.95	78	266	237	0.74	0.54
1977-78	209	554	448	1.43	1.15	97	256	271	0.66	0.70
1978-79	218	511	655	1.26	1.63	124	290	311	0.72	0.77
1979-80	434	901	889	2.19	2.10	186	387	462	0.94	1.09
1980-81	668	1255	878	2.84	2.04	378	709	429	1.66	0.99
1981-82	288	480	766	1.09	1.71	114	190	351	0.43	0.79
1982-83:NIP	356	565	857	1.21	1.82	96	153	244	0.33	0.52
1983-84	1119	1525	887	3.16	1.85	286	389	225	0.81	0.47
1984-85	479	569	999	1.17	2.01	112	133	286	0.27	0.57
1985-86	804	903	981	1.72	1.87	299	335	312	0.64	0.59
1986-87	1469	1469	1090	2.73	2.02	468	468	374	0.87	0.70
1987-88	963	897	1256	1.62	2.29	344	320	401	0.58	0.73
1988-89	1640	1402	..	2.51	..	485	415	..	0.74	..
Mean										
Pre-NIP 3 years	463	878	845	2.04	1.95	226	429	414	0.99	0.96
Post-NIP 6 years	1079	1128	869	2.15	2.01	332	343	266	0.65	0.61

Source: Calculations from the data of BOI for sanctioned and realised investment. Mimeographed sheets, February, 1990.

The figures in absolute amounts are in crores of takas.

Table 3c.--Import of machinery and other capital equipment and spare parts and accessories, 1979-80 through 1987-88 (Absolute amount in taka million), deflated values in 1976-77 prices

Year	Machinery & Other Capital Equipment				Spare Parts		Total	
	In- curr- Prices (1)	Defl- ated (2)	Per cent of GDP (3)	3-Year Moving Ave. (4)	In- curr- Prices (5)	Curr. Prices (6)	Per cent of GDP (7)	3-Year Moving Ave. (8)
80-81	3722	2697	1.77	..	1892	5614	2.67	..
81-82	3660	2377	1.54	1.72	1406	5066	2.13	2.38
82-83	5200	2694	1.85	1.59	1364	6564	2.33	2.11
83-84	4760	2454	1.40	1.54	1600	6360	1.86	2.02
84-85	5630	2571	1.33	1.33	2002	7632	1.87	1.02
85-86	5727	2328	1.22	1.25	2345	8072	1.73	1.80
86-87	6178	2385	1.14	1.19	3524	9702	1.80	1.82
87-88	7083	2548	1.20	..	4257	11340	1.92	..
Mean								
Pre-NIP 2-years	..	2537	1.66	1.72	..	..	2.40	2.40
Post-NIP 5-years	..	2457	1.27	1.33	..	..	1.84	1.67

Source: BBS - Statistical Yearbook of Bangladesh. For recent-year data, see the 1989 issue, p. 318.

Table 3d.--Import of capital goods and other materials for capital goods (Absolute amount in taka million)

Year	Import by type of commodities						UPI of imports (1976-77) =100	Total			As % of GDP		
	Capital goods			Materials for Capital goods				Absolute	Constt.	Growth	Capital goods	Mater-ials	Total
	Absolute	Percent of total imports	Constt price	Absolute	Percent of total imports	Constt price							
1976-77							100						
1977-78							111						
1978-79							114						
1979-80	5459	17.9	4403	6207	20.3	5006	124	11667	9409		2.8	3.1	5.9
1980-81	10021	26.9	7262	5565	14.9	4033	138	15587	11295	20.0	4.3	2.4	6.6
1981-82	11791	30.4	7657	4579	11.8	2974	154	16370	10630	-5.9	4.5	1.7	6.2
1982-83	13238	29.3	6859	4455	9.8	2308	193	17693	9167	-13.8	4.5	1.5	6.0
1983-84	13538	26.6	6978	5068	10.0	2612	194	18605	9590	4.6	3.8	1.4	5.2
1984-85	8544	12.5	3901	11368	16.6	5191	219	19912	9092	-5.2	2.1	2.8	4.9
1985-86	7750	12.3	3150	11794	18.8	4794	246	19544	7945	-12.6	1.7	2.5	4.2
1986-87	9204	13.44	3554	14735	21.5	5689	259	23940	9243	16.3	1.7	2.7	4.4
1987-88	9689	10.6	3485	15801	17.2	5684	278	25490	9169	-0.8	1.6	2.7	4.3
1988-89													

45b

Source: BBS, Statistical Yearbook of Bangladesh. For recent data, see the issue for 1989, p.320. The data of

Table 3c pertain to "import of commodities by broad economic categories": (a) machinery and other capital equipment

and (b) spare parts and accessories. The aggregation of this table is by "imports by type of commodities ": (a) capital

goods and (b) materials for capital goods.

Table 4.--Rates of growth of output and employment in manufacturing

Year	Manuf. Output from National Accts as % of GDP				Manuf. CMI-Based			5/7 = Output per worker Takas 000's
	Old Series		New Series Rev. 1990		Out-put ^a	Per cent of GDP	Employ-ment 000's	
	Total (1)	Large (2)	Small (3)	Total (4)				
1968	9.0	..	..	..	NA	..	NA	..
1972-73	6.6	..	..	..	NA	..	NA	..
73-74	6.1	..	..	..	NA	..	NA	..
74-75	6.7	..	..	..	NA	..	NA	..
75-76	7.6	..	..	..	27	8.5	136	198
76-77	8.2	..	..	..	NA	..	173	..
77-78	7.2	..	..	..	NA	..	NA	..
78-79	7.1	..	..	..	NA	..	NA	..
79-80	9.9	..	..	..	38	10.0	217	175
80-81	9.8	5.32	5.39	10.71	36	9.1	221	163
81-82	9.7	5.27	5.39	10.66	39	9.9	229	170
82-83 NIP	9.7	5.10	5.44	10.54	35	8.4	232	151
83-84	8.8	4.90	4.85	9.75	41	9.5	233	181
84-85	8.3	5.20	4.59	9.79	41	9.4	251	163
85-86	8.1	5.00	4.31	9.31			258	
86-87	7.8	5.01	3.84	8.85	NA	..	NA	..
87-88	8.4	4.80	3.69	8.49	NA	..	NA	..
88-89	..	4.80	3.70	8.50P	..	..	..	..
Mean								
1.79-82 or	10.69	..	..	..	43	9.7	222	194
80-82	..	5.30	5.39	10.69	..	9.5	..	..
2.83-86 or	..	..	..	..	38	8.6	247	155 172
83-88 or	9.11	..	..	..	..	..	..	..
83-89	..	4.95	4.16	9.11	..	..	..	..
3. 2/1	0.85	0.93	0.77	0.85	.88	..	1.11	0.80
4. g in 1980s ^b	-2.05	-1.29	-4.70	-2.90	-2.5	..	2.9	-6.3

^aAbsolute output is in billions of 1985-86 prices.

^bThe symbol g stands for growth rate.

Table 5.--A few pertinent variables

GDP										
	1984-1985 Pri-ces (Millions of Takas)	Gro-wth Rate	Agric Gro-wth Rate	Per Cap. Inc. in 1984-1985 Pri-ces	Exp-orts as % of GDP	Imp-orts as % of GDP	Dome-stic Savi-ings as % of GDP	Tax Rev as % of GDP	Public Enterprises ^a (Millions of Current Takas) Surp-lus (+) Loss (-)	Effect on Govt. Finan- ce
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
72-73	232327	..	..	3080	6.13	8.4	.10	4.0	..	234
73-74	262270	12.9	10.4	3317	4.20	11.0	.40	4.3	..	224
74-75	269819	2.9	9.8	3512	2.49	8.8	-.46	4.3	..	316
75-76	299140	10.9	11.6	3579	17	13.6	-2.01	7.7	131	258
76-77	304837	1.9	-3.0	3564	6.33	13.2	3.75	7.3	..	234
77-78	326312	7.0	8.6	3739	4.90	12.4	2.17	6.1	..	809
78-79	341003	4.5	-1.4	3821	5.57	12.7	1.33	7.3	177	304
79-80	345635	1.4	0.1	3801	5.55	15.4	2.82	6.6	774	994
80-81	346984	6.1 ^c	5.3	3981	4.92	15.9	3.22	5.9	652	304
81-82	359681	3.7	0.9	3914	4.86	14.6	0.38	7.7	-452	2947
NIP 82-83	373320	3.8	4.6	4027	6.25	15.6	0.31	8.1	869	1122
83-84	393864	5.5	1.6	4069	5.75	14.5	1.11	6.2	415	735
84-85	409871	4.1	0.8	4070	6.28	16.3	2.28	8.0	-1480	456
85-86	426250	4.0	3.2	4161	5.87	14.1	2.96	6.8	-2224	1858
86-87	443329	4.0	0.3	4238	6.26	12.7	3.37	6.9	-928	455
87-88	454885	2.6	-1.0	4249	6.98	15.5	2.28	7.3	-1197	864
88-89	465947	2.4	..	..	..	..	..	..	-922	..
Means										
1.79-82	350766	..	..	3898	5.11	15.3	2.14	6.73	..	..
2.83-88	..	..	..	4157	6.23	14.6	2.40	7.04	..	..
83-89	432358	..	..	..	..	..	..	..	..	..
3. 2/1 ^b	3.8	..	..	1.29	1.22	0.96	1.12	1.05	..	..

^aIncludes BJMC, BTMC, BCIC, BSEC, BSFIC, and BFIDC public corporations. The burden on government budget is defined to include government debt converted into equity, government grants, and cash infusion. Source: (World Bank) (1988).

^bA calculation of growth rates from this ratio may be misleading. For rough estimates, note that this is a 5-year change 1980-81 (the mid-year for Line 1) to 1985-86 (the mid-year for Line 2).

^cDue to recent revision of national accounts by BBS from 1980-81 through 1988-89, the base shifts in 1980-81. The growth rate given here corresponds to the earlier estimates for pre-1981-82 estimates.

Source of GDP and components: BBS, revised estimates as of Jan 27, 1990. Per capita income is from Bangladesh Bank sources.

Table 6.--Percentage of industries that experienced TSP>1, by year, CFI, different groups

Sample	Industries that attained TSP>1 as percentages of total by year							
	75-76	79-80	80-81	81-82	82-83	83-84	Cumulated	84-85
Sample upto 1985-86								
Old (277 estabs in 1985-86)	70	23	41	40	50	59	..	52
New (1419 estabs in 1985-86)	..	54	57	52	42	62	..	52
Moribund (128 estabs in 1975-76)	55	59	42	38	44	50	..	63
All (1696 estabs in 1985-86)	65	55	46	53	56	58	..	47
Sample upto 1983-84								
"Old" 77 industries 393 estabs (%)	70	25	44	39	36	51	31	..
"New" 38 industries of 1974-75 (%)	..	45	46	44	44	59	40	..
658 estabs of 1981-82 (%)	..	..	..	47	45	..	..	..
331 estabs of 1982-83 (%)	..	..	..	..	44	53	..	..
Overall 110 industries (%)	55	40	46	39	39	62	36	..

~~Minor differences between the shorter sample upto 1983-84 and the longer sample upto 1985-86 arise due to the movement of establishments from "Old" to New, entry of new firms, and attrition due to the cleaning-up of the data during the final years.~~

Table 7a--Sectoral growth in Bangladesh compared to its neighboring countries in the 1980s

Period	Bangla- desh	India	Pakis- tan	Thai- land
<u>Agriculture</u>				
% annual rate of growth: 1982-1986	2.38	4.14	4.56	4.77
<u>Manufacturing</u>				
a. % annual rate of growth 1980-1987	3.61	8.3	8.9	6.0
b. Productivity: gross output per employee in 1986 with 1980=100	96	164	179	140
<u>Overall GDP</u>				
% annual rate of growth during the late 1980's	3.36 (83-84 to 88-89: 5 years)	5.26 (84-85 to 89-90: 5 years)	6.6 (80-87: 7 years)	9.3 (1986 to 1989: 3 years)

Table 7b.—Cross-country comparisons of labor productivity and labor earnings in manufacturing in 1986 with the index for 1980=100

	Index for 1986 with 1980 = 100	
	Output per Worker	Earnings per Worker
Bangladesh	96(116) ^{a,b}	79
India	164(95) ^a	132
Pakistan	179(51) ^a	154
Indonesia	186	176
Thailand	142	148
S. Korea	158	138
The Philippines	112	..
Egypt	155	117
Turkey	139	94
Singapore	126	165
USA	..	107
UK	..	121
Japan	..	111

^aThe figures in parentheses are for 1970.

Source: ESCAP as cited in the Bangladesh Observer May 12, 1990, Editorial.

^bNo significant progress since 1986.

Table 3.--Regression of EFF (= Coeff + ERR)²

=====
Cotton Textiles

Variables in the Equation

Variable	B	T
DPUB	.072027	1.417
KOVERN	.001252	1.614
LAGERAL	-1.632183	-1.453
SIZE	.258536	7.809
(CONSTANT)	1.575140	.700
R Sq. Adj	0.4952	
Observations	106	

END BLOCK NUMBER 1 TOLERANCE = 1.0e-04 LIMITS REACHED.

VARIABLE NOT IN THE EQUATION

VARIABLE	BETA IN	PARTIAL	MIN TOLER	T.SIG T
IMI1	1.000000	1.000000	-2.796E-17	. .
DGDP	-1.000000	-1.000000	-4.199994E-17	. .

Tea and Coffee Processing

VARIABLE	B	T
DPUB	.130677	1.439
DGDP	1.68786e-04	.987
N	6.68504E-04	3.605
KOVERN	.002168	1.596
LEGERAL	-1.492715	-3.862
(CONSTANT)	-.522720	-8.246
R Sq. Adj	0.0922	
Observations	295	

END BLOCK NUMBER 1 ALL REQUESTED VARIABLES ENTERED.

²The "coeff" is the time-invariant efficiency parameter from frontier production functions and the "ERR" is the error term from the same regressions based on combined time-series and cross-section data. Therefore, "EFF" has both time dimension and firm dimension.

Table 9.--TFP equations, 1974-75 through 1983-84, observation.
 unit: 4-digit industries; dep var: TFP^a

Expl- ana- tory Var.	Coefficient (t Value)						
	Overall	(1)	(2)	(3)	(4)	(5)	(6)
Const	-5.355 (-9.66)	-10.04 (-3.7)	-8.74 (-4.9)	-7.42 (-8.5)	-4.96 (-4.3)	-3.15 (-2.1)	-2.61 (-3.9)
D6	0.0859 (1.86)	..	..	..	..	..	..
ERA1	0.121 (2.48)	0.32 (1.0)	-0.13 (-0.9)	0.20 (2.1)	0.34 (2.7)	-0.10 (-0.8)	0.01 (0.03)
D1	-0.108 (-0.95)	..	..	..	..	..	..
GDP	8.900 (11.40)	15.26 (3.9)	13.55 (5.5)	11.61 (9.3)	8.30 (5.1)	5.90 (2.8)	5.25 (3.9)
D2	-0.072 (-1.19)	..	..	..	..	..	..
IMI1	-0.030 (-0.61)	-1.69 (-1.8)	0.13 (0.4)	0.27 (2.3)	-0.01 (-0.1)	-0.09 (-1.0)	-0.11 (-1.3)
D5	-0.040 (-0.77)	..	..	..	..	..	..
W/Q	-1.026 (-9.1)	-0.51 (-0.7)	-0.78 (-2.0)	-0.97 (-5.3)	-1.37 (-6.3)	-1.30 (-3.7)	-0.67 (-2.7)
DPUB	0.020 (0.31)	-0.14 (-0.5)	-0.25 (-0.6)	0.29 (1.7)	-0.08 (-0.3)	-0.05 (-0.3)	-0.04 (-0.7)
D3	-0.036 (-0.98)	..	..	..	..	..	..
DYR	-0.381 (7.00)	-0.57 (-1.8)	-0.48 (-2.8)	-0.48 (-5.5)	-0.34 (-3.0)	-0.15 (-1.1)	-0.26 (-2.6)
R ²	0.086	0.436	0.185	0.153	0.066	0.066	0.05
DF	2690	38	183	758	923	274	476

^aFor the definitions of variables, see Appendix A.

Table 10.--Micro investment functions. Unit of observation:
 establishment^a

Var.	Coefficients by 2-Digit Industries							
	Overall	31	32	33	34	37	38	39
Regression Coefficients								
DYR	.226	0.41	.513	-2.014	-2.190	-1.857	-0.225	0.377
IMII	.011	0.005	.024	-0.146	-0.213	-0.013	-0.011	0.014
ERAI	-4.506	0.049	-.040	..	0.628	-0.326	-0.01	-0.005
WEYQ	1.476	-9.355	5.988	-2.783	-10.558	-23.49	-5.596	2.181
VUL	-0.417	-.952	-.161	..	7.161	1.483	0.038	..
GDPI	-0.739	-2.855	-.582	..	1.554	-1.670	0.092	-0.487
Const	6.878	24.152	4.286	2.858	-32.00	17.853	0.710	3.359
R ²	0.093	0.123	0.135	0.385	0.019	0.377	0.054	0.084
DF	2898	576	1499	8	116	151	450	63
Corresponding t Values								
DYR	1.305	0.77	2.060	-1.294	-1.294	-2.88	-1.371	1.739
IMII	6.614	1.848	5.093	-2.492	-1.013	-1.892	-1.056	0.937
ERAI	-0.030	0.721	-1.323	..	1.677	-2.869	-0.472	-0.602
WEYQ	2.294	-2.181	8.739	-6.220	-0.781	-9.447	-4.903	2.888
VUL	-11.10	-5.477	-3.350	..	2.699	3.035	0.457	..
GDPI	-3.202	-4.135	-1.935	..	0.706	-1.75	0.398	-1.748
Const	4.369	5.213	2.164	1.149	-.619	2.639	0.420	1.769

^aLinear regression. Dep. Var = I.

Table 11.--Micro investment functions

Unit of observation: establishment. Dep. Var.: LnI

Variable	Coefficient (t value)					
Constant	.251 (2.66)	.551 (8.0)	1.572 (3.14)			
<u>Real Variables</u>						
ERA1	.001 (.29)	.007 (1.93)	.005 (1.08)			
W/Q	1.779 (6.54)	1.573 (5.63)	1.473 (5.63)			
VUL	-.010 (-.65)	-.039 (-3.17)	-.017 (-1.09)			
LnIMI1	.009 (1.00)	.014 (1.71)	-.001 (-.13)			
LnGDP	..		-.518 (-2.47)			
<u>Size Dummy(Ref Size=4)</u>						
S1	-3.742(-91.3)	-3.758(-92.3)	-3.7766(-93.89)			
S2	-2.073(-55.1)	-2.058(-55.0)	-2.079 (-54.94)			
S3	-1.06 (-24.38)	-1.037(-24.8)	-1.068 (-24.41)			
S5	1.272 (17.42)	1.224 (16.79)	1.244 (16.99)			
S6	2.214 (21.3)	2.171 (20.7)	2.208 (21.05)			
<u>Year Dummy (Ref Y=1983)</u>						
1960	.087 (1.91)	.053 (1.39)				
1961	.061 (1.32)	.045 (.99)				
1962	-.107 (-2.33)	-.094 (-2.11)				
1984	.005 (.09)	-.025 (-.51)				
<u>Industry Dummy (Ref Ind Code=35)</u>						
CD31	.207 (3.08)	..	.200 (3.04)			
CD32	.034 (.55)	..	.034 (.59)			
CD34	.240 (.89)	..	.134 (.48)			
CD37	.306 (3.80)	..	.243 (3.04)			
CD38	.072 (1.51)	..	.119 (1.97)			
CD39	.254 (2.72)	..	.156 (1.81)			
R ² Adj	.911	.909	.903			
DF	1501	1507	1504			

^aSize-Classes are based on investment values.

Table 12.—Aggregate investment function. Dep Var: Ln Total investment (I), EBS series^a

Variable	Regression					
	1	2	3	4	5	6
Constant	21.165 (1.94)	7.608 (2.06)	4.287 (1.50)	1.309 (.12)	2.4 (1.3)	10.459 (2.49)
Ln I _{t-1}	0.030 (0.08)	.256 (.70)	.059 (.06)	.678 (1.58)	0.35 (3.4)	
Ln ERA	-.853 (-.88)	.405 (.79)	.406 (.812)	.754 (.70)	-0.05 (-0.35)	0.135 (0.23)
Ln GDP _{t-1}	.0002 (1.31)	-.0001 (-1.14)	-.00004 (-.06)	-.0001 (-.49)	-.00002 (-0.2)	0.00001 (.12)
Ln Remittances	.272 (1.31)	.292 (1.94)	..	..	..	)
						) 0.316
Ln DFI Loans	.724 (1.70)	..	.885 (2.68)	..	..	) (4.03)
Ln Foreign aid	-2.272 (-1.51)	..	..	.445 (.27)	..	-0.527 (-.30)
R ² Adjusted	.7626	.6399	.7334	.4221	.7990	.3086
No. of observations	10	11	10	11	11	

^aThe investment series used here is total (private+public) investment as estimated by EBS. No other investment series acquires statistical significance practically for any coefficient. Separate regression for private investment series of EBS gave somewhat inferior fit. The observations are for 1975-76 through 1986-87. All variables are in constant prices.

Table 13.--Employment equation, reduced form with mostly demand variables

Independent Var.	Overall	Coefficient (t value)					
		Class-Size					
		(1)	(2)	(3)	(4)	(5)	(6)
Const	645.96 (8.5)	-3.17 (-1.4)	8.69 (5.9)	18.14 (11.1)	37.94 (9.4)	84.43 (10.3)	1217.91 (8.4)
DYR	-1.74 (-0.1)	-0.39 (-1.57)	0.08 (0.3)	0.53 (2.1)	-0.36 (-0.8)	-1.51 (-0.9)	-76.85 (-1.5)
Q	0.55 (28.5)	-0.02 (-0.3)	0.09 (2.9)	-0.02 (-1.5)	0.03 (4.3)	0.04 (4.2)	0.32 (8.8)
ERA1	-11.10 (-.6)	0.02 (0.7)	0.04 (1.3)	-0.09 (-2.3)	-0.01 (-0.1)	-0.70 (-3.2)	-21.31 (-4.3)
GDP	-6.31 (-6.3)	0.10 (3.0)	-0.03 (-1.4)	-0.04 (-1.6)	-0.12 (-2.1)	-0.17 (-1.4)	-9.36 (-2.8)
R ²	0.20	0.13	0.03	0.01	0.02	0.06	0.12
DF	3318	63	279	969	1172	453	648

The main data set: The CMI Merge File.

The mean values of the variables of the overall equation are given below:

	Mean	Std Dev
E	143.040	356.467
Q	64.420	269.590
GDP	72.013	6.166
ERA1	3.228	2.996
DYR	.451	.498

Table 14.--Qualitative assessment of the state of technology,
Bangladesh in relation to India, 1989

Technology Variable	Bangladesh	India
<u>Financial and fiscal support</u>		
a. Policies and incentive for promoting demand for indigenous tech	No special policy of incentives	Full support to development of indigenous tech to achieve self-reliance in tech
b. Promotion of indigenous-tech-based exports	No special provision	High-level committee on transfer tech
<u>Activities of tech-transfer centers</u>		
a. National agency involved in tech transfer	Specific agency is not available	National Research Development Corp
b. Main functions related to tech transfer	No organized center. Activities are implemented in a fragmented manner by diff. departments.	To invent tech, collect info, commercialize, demonstrate, train export tech, disseminate nationally
<u>Status of indigenous tech generation</u>		
a. National agency for indigenous tech Dev	Specific agency does not exist	Tech Utilization Div. of DSIR
b. Incentives for indigenous tech generation	No special measures	Tax exemption and soft loans
c. Main sectors concentration	Agriculture	Chemicals, electronics, eng. inds, ag.
d. Export of technology	Negligible	Textile and agrobased industry and chemicals
e. Main problems in generation tech	Lack of govt incentives and R&D	Information not available
<u>Capacity to commercialize and diffuse</u>		
a. Level of commercialization of R&D products	Except rice and wheat, result not satisfactory	Achieved considerable capacity for commercialization
b. Incentives to use local technology	No special policy or instrument available	Special policy and instruments available, financial incentives

Table 14--Contd.

Technology Variable	Bangladesh	India
c. Problems in commercialization and diffusion	Lack of proper selection of products/projects	Selection of tech/R&D projects based on assigned priorities
<u>Status of technology adaptation</u>		
a. Provision for risk	Not available	Financial support for dev of first prototype
b. Production and development of spare parts	Not available	Many agencies for prod & dev of spare parts for indigenous and imported technology

Source: UN, ESCAP [1989], Vol.III, Tables A3.38-47, chosen items.

Table 15.--Advanced efforts in selected areas of specialization in technology

Area of New Technology	Type and Stage of Involvement				Level of Attainment
	Not in the Plan	Planning Stage	Starting Stage (<5 yrs)	Operational (>5 yrs)	
Bangladesh					
Biotechnology					L
Micro-electronics					L
Super-conductors					L
Information Technology					L
Fine Chemicals					NA
New Materials					L
Renewable Energy					M
Remote Sensing					L
Space Technology					L
India					
Biotechnology			*		L
Micro-electronics			*		M
Super-conductors					L
Information Technology					M
Fine Chemicals				*	M
New Materials				*	M
Renewable Energy				*	M
Remote Sensing				*	M
Space Technology				*	H

Level of attainment: W = World Leader, H = High, M = Medium,

L = Low, N = None, NA = Data not available.

Source: U.N., ESCAP [1989]

Table 16.--Some basic statistics about the national capacity and environment of technology in Bangladesh and neighboring countries

Variable	Bangla- desh	India	Nepal	Thai- land	Korea
<u>Relevant macro variables</u>					
1. Population (Millions)	95	732	16	50	40
2. GDP (US\$ billion)	13.5	130	2.12	35	30
3. % GDP from agric.	50	31	62	17	13
4. Gross savings as % of GDP	2.27	22.8	..	20.7	..
5. % labor force in agric	75	70	93	71	36
<u>R&D, S&T variables</u>					
7. R&D in US\$ millions	66	1424	3.43	119	1433
8. R&D as % of GDP	0.44	0.79	0.15	0.29	1.53
9. S&T personnel per 1000 pop.	0.65	2.36	0.91	9.50	57.0
10. S&T personnel with doctorates or post graduate degrees/diploma	3.46	22.9	..	48	..
11. Indust R&D as % of total	0.83	17.8	..	3.3	..
12. Personnel in R&D (000's)	126	2329	14	479	2345
13. Per capita R&D (US\$)	0.65	1.94	0.03	2.3	35.2
14. R&D per R&D personnel (US\$)	527	511	242	249	618
15. Objective factor index of national tech climate ^a	0.42	0.44	0.41	0.46	0.54
16. Subjective factor index of national tech climate ^a	0.07	0.17	0.06	0.19	0.78

Source: UN, ESCAP, [1989]. The statistics pertain to 1985 or a period close to that year.

^aLines 15 and 16 computed by factor analysis.

Table 17.--A Glimpse of Productivity Effort in South Asia

Variable	Singapore	India	Bangladesh
Year Productivity Council/ Board/Organization instituted	1967	1958	1986
Professional Staff	255	200	32
Budget of Council/Board/ Organization (US\$ Millions)	6	2.5	.08
Population (Millions)	2.6	798	150
Per capita income (US\$)	7940	280	150

Source: First three lines of the first two columns from M. Henriques, ILO, Bangkok. Paper presented at the forum on Productivity in Bangladesh, October 24, 1989. The statistics pertain to 1987 or a period close to that year.

Table 18.--Causes of Industrial Disputes, Economic & Political

Year	Economic	% Share Economic	Political	% Share Political
1973	51	87.93	7	12.071
1977	15	68.18	7	31.82
1978	67	75.28	22	24.72
1979	75	78.13	21	21.88
1980	95	91.35	9	8.65
1981	75	93.75	5	6.25
1982	55	100.00	0	0.00
1983	2	12.50	14	87.50
1984	15	10.56	127	89.44
1985	18	18.95	77	81.05
1986	19	43.18	25	56.82
1987	1	5.56	17	94.44
1988	4	44.44	5	55.56

Source: The Labour Journal, various issues. Also unpublished data of the Labour Directorate.

ERAs: NATIONAL

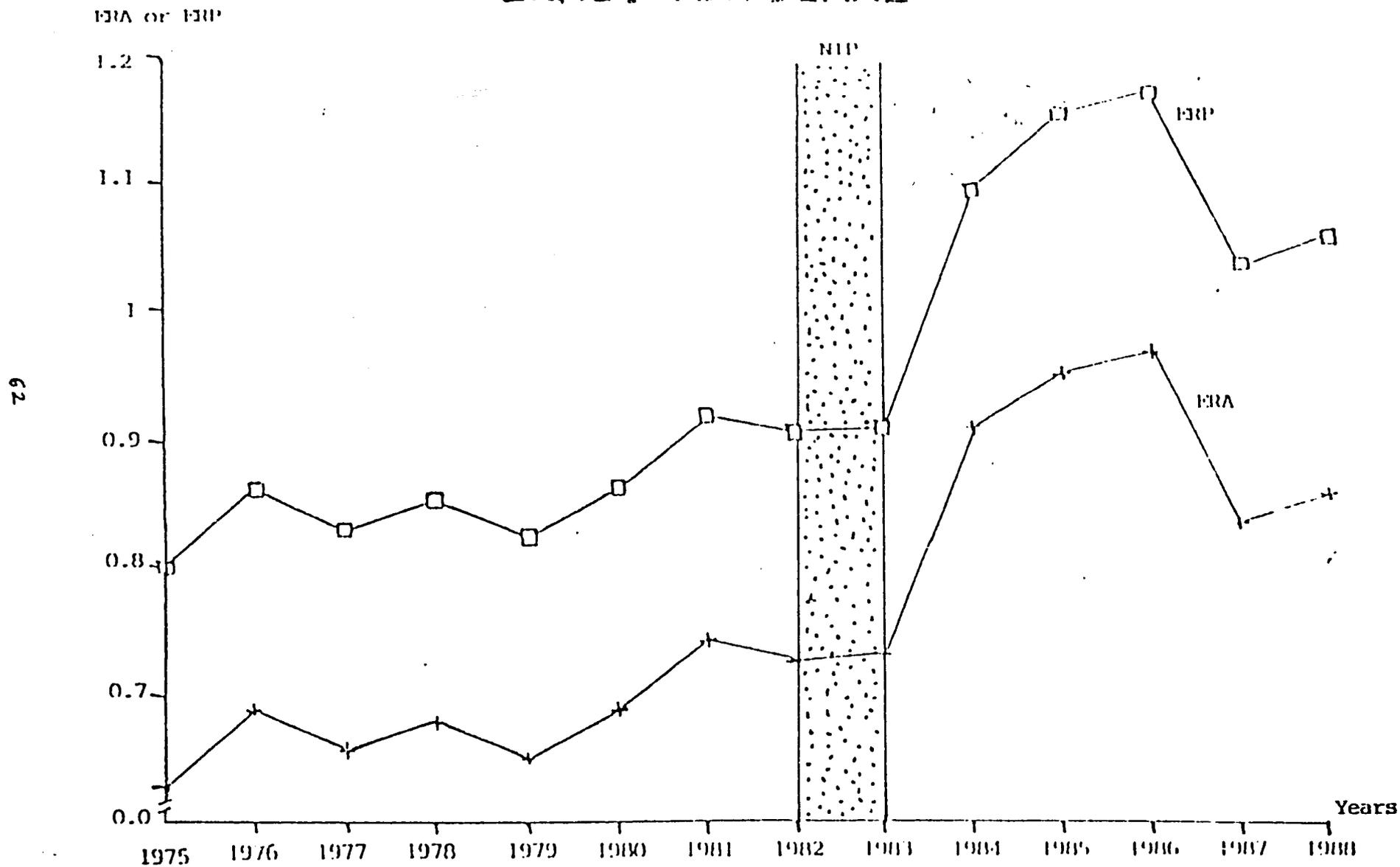


Fig. 1.--ERPs and ERAs for 21 manufacturing industries of the I O Table, 1974-75 through 1987-88.

Source: Table 1.

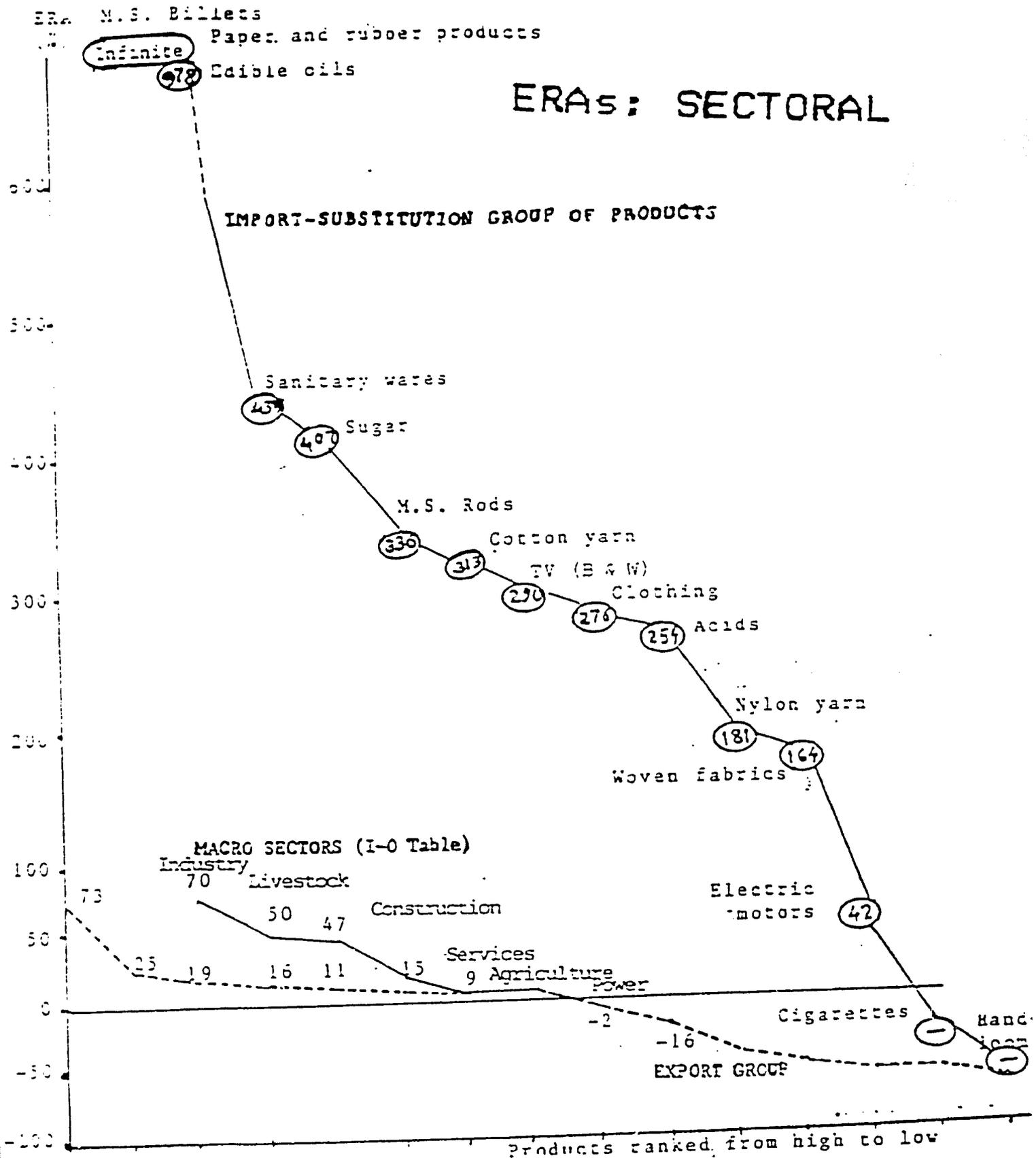


Fig. 2.—ERAs by macro sectors, import-substitution group, and export group of products, Bangladesh, 1989.³

³The export products of the fig. are noted below: Finished leather (73%), readymade garments (25%), cotton vests (19%), silk fabrics (16%), nylon socks (11%), glycerine (9%), PVC pipes (8%), ceramic tablewares (7%). The export products with negative ERA are PVC cables, raw jute, jute goods, fertilizer (N), jelly juice, and frozen fish (-16%). Source: Table 2. The sketch for negative values is not necessarily according to scale.

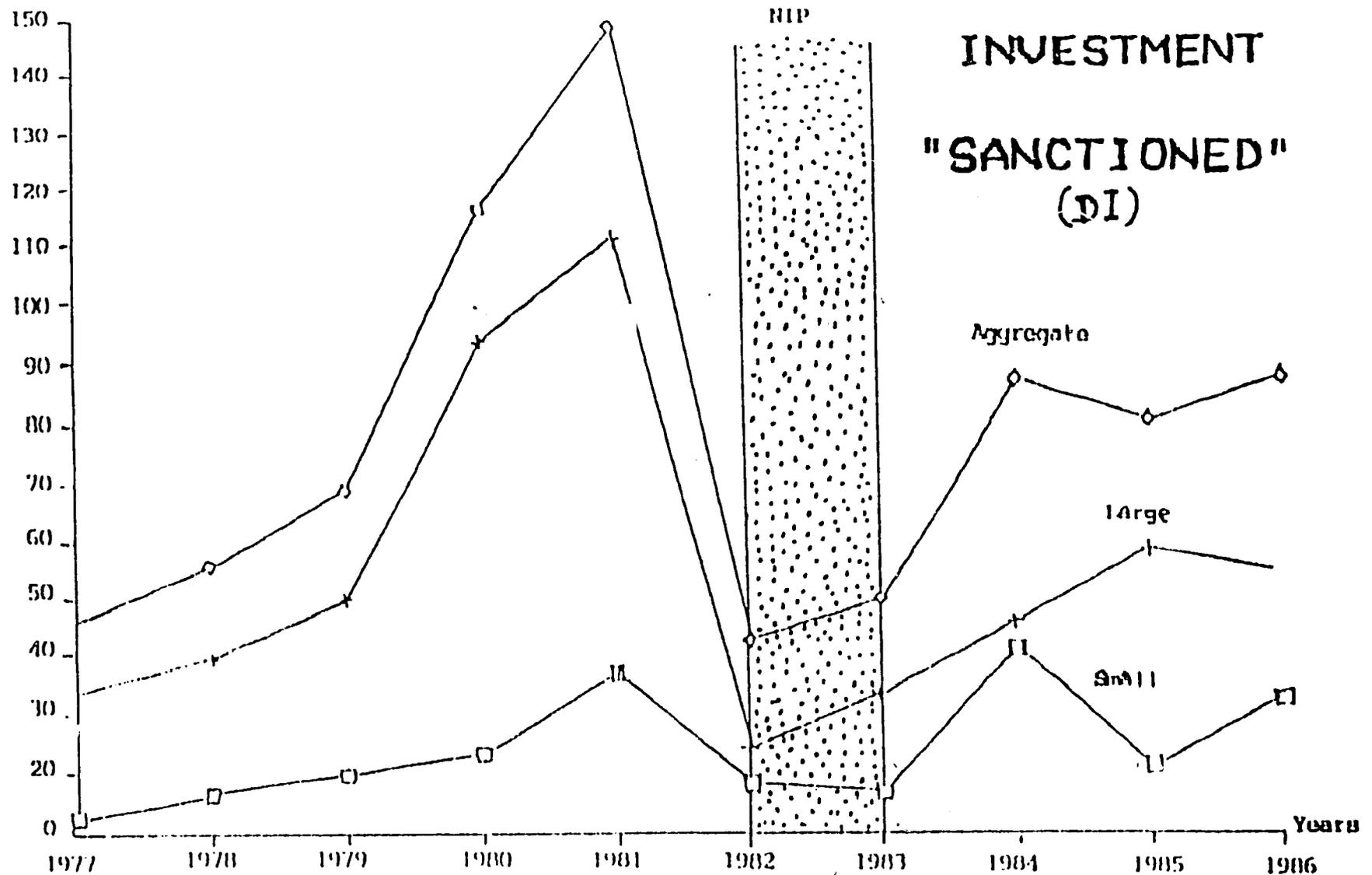


Fig. 3a. "Sanctioned" Investment, manufacturing industries, DI data (Million of takas in 1986-87 prices)

Note: Small industries < 15 million large industries.

The shaded band represents the year of a landmark policy reform when the New Industrial Policy was issued (June 1982). Within less than a year after that about 50 percent of the units of the premier industrial duo—jute and cotton textiles—were denationalized. Source: DI.

INVESTMENT

BBS and PLANNING COMMISSION DATA

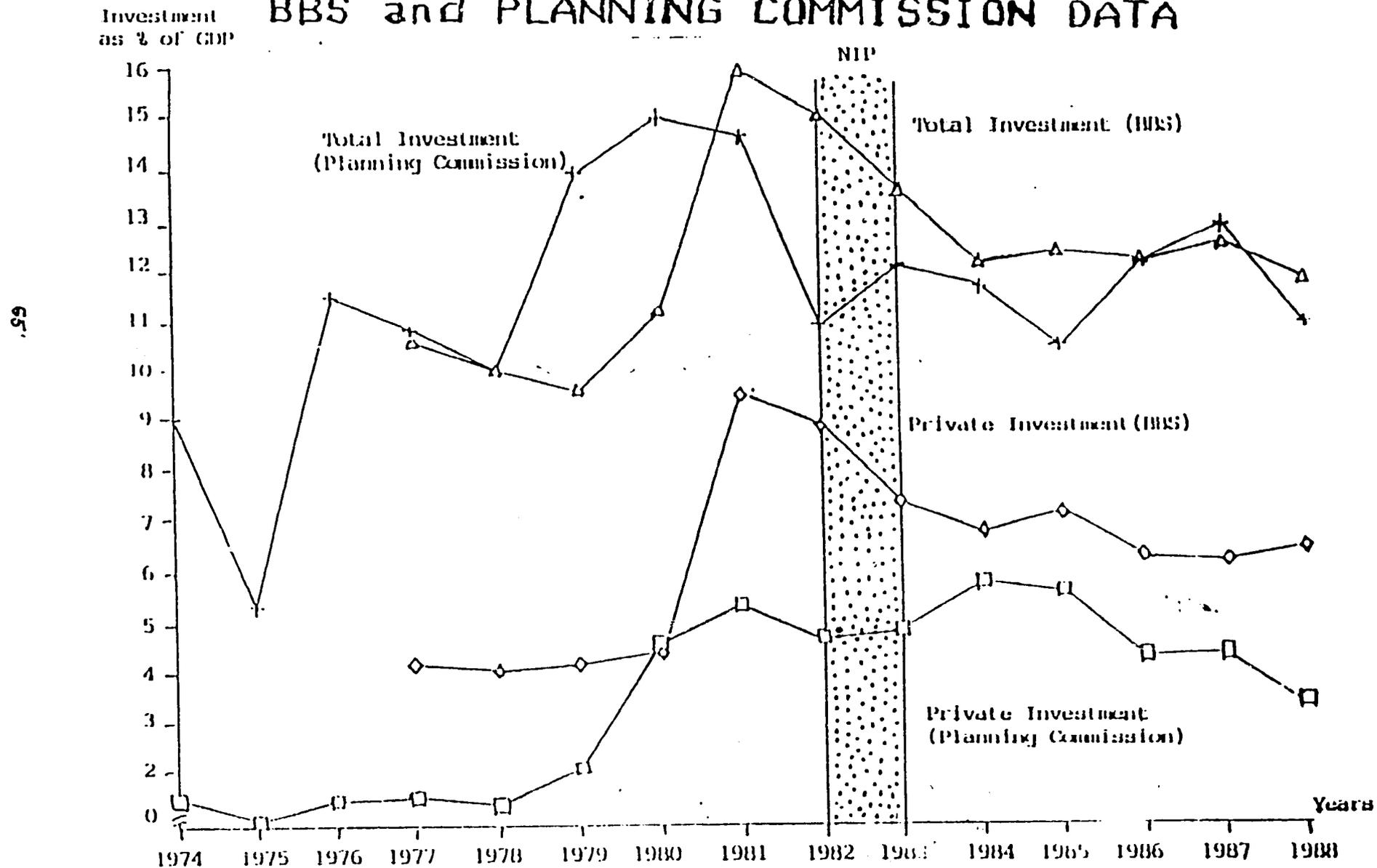


Fig. 3b.--Investment: private and public, as % of GDP (Planning Commission and BBS sources)
Source: Table 3a.

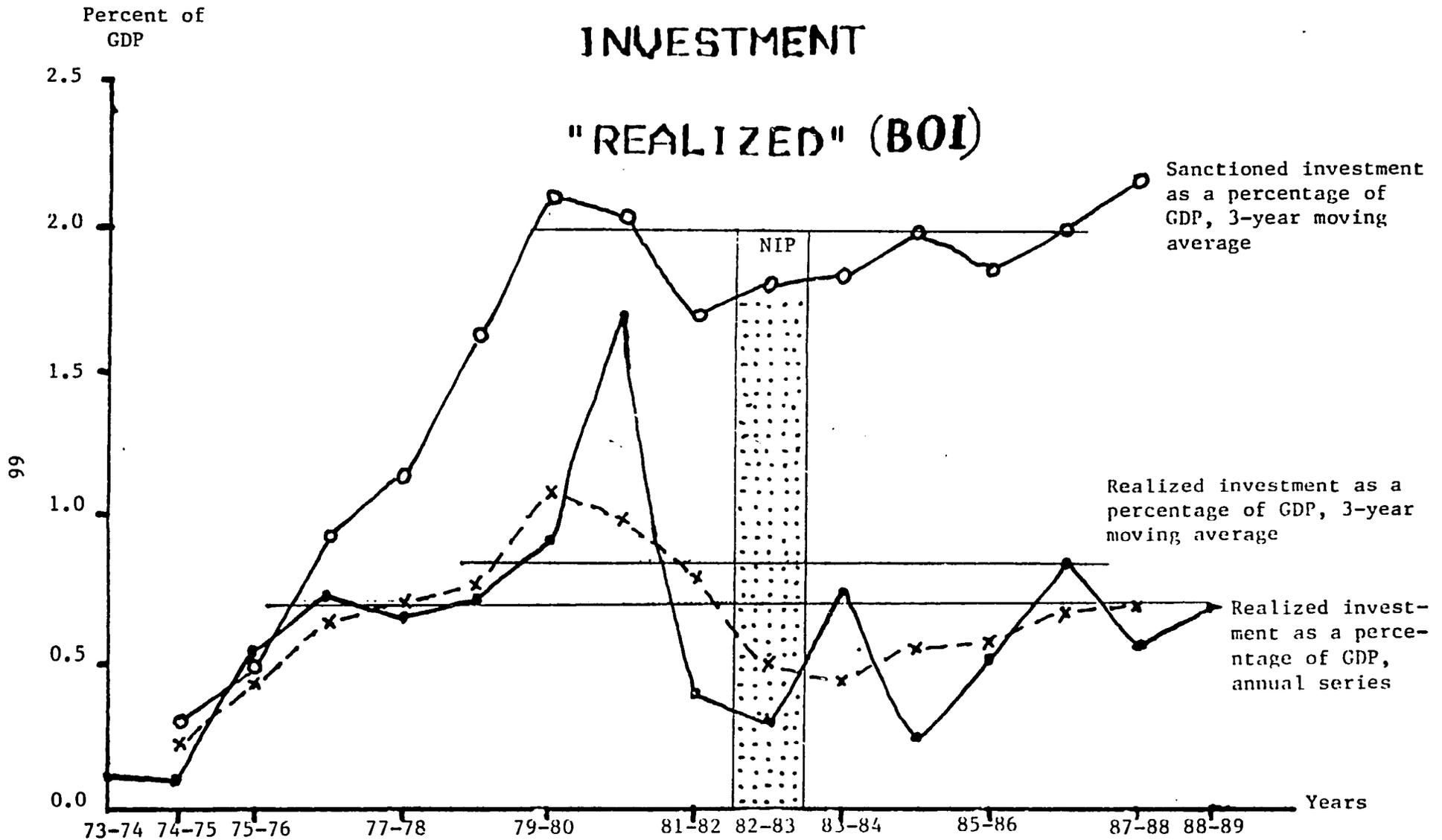


Fig. 3c.--Realized and sanctioned aggregate investment according to the BOI series

Source: Table 3b.

Percent of GDP (Absolute values in Takas billions)

IMPORT OF CAPITAL EQUIPMENT

Import of capital goods in billions of takas in 1976-77 prices

67

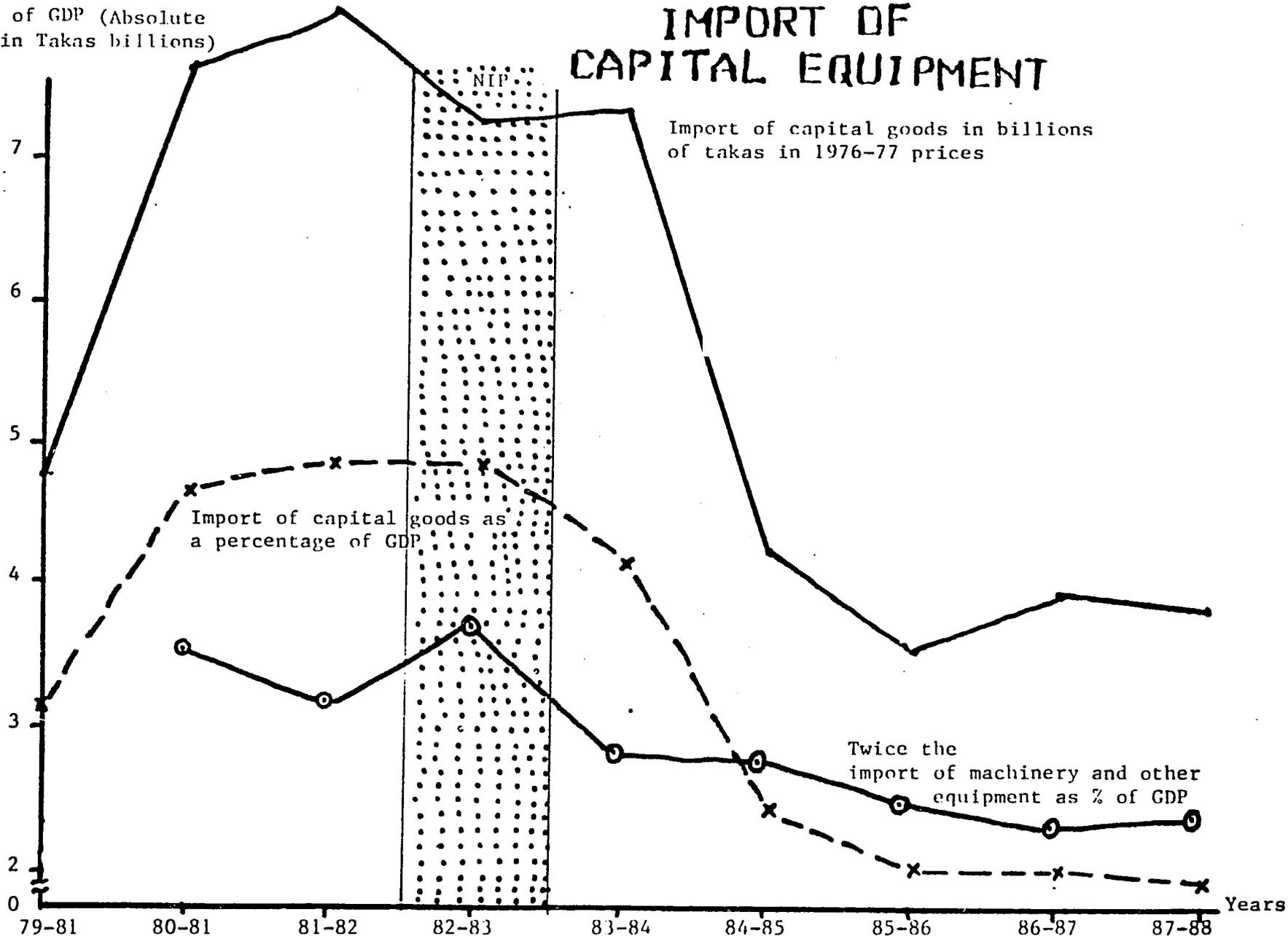


Fig. 3d.--Import of capital goods (and import of machinery and other capital equipment) in absolute takas and as a percentage of GDP. (Absolute amounts are in billions of takas and percentages were calculated from current-price series.)

Source: Table 3c and Table 3d.

As % of GDP

MANUFACTURING OUTPUT I

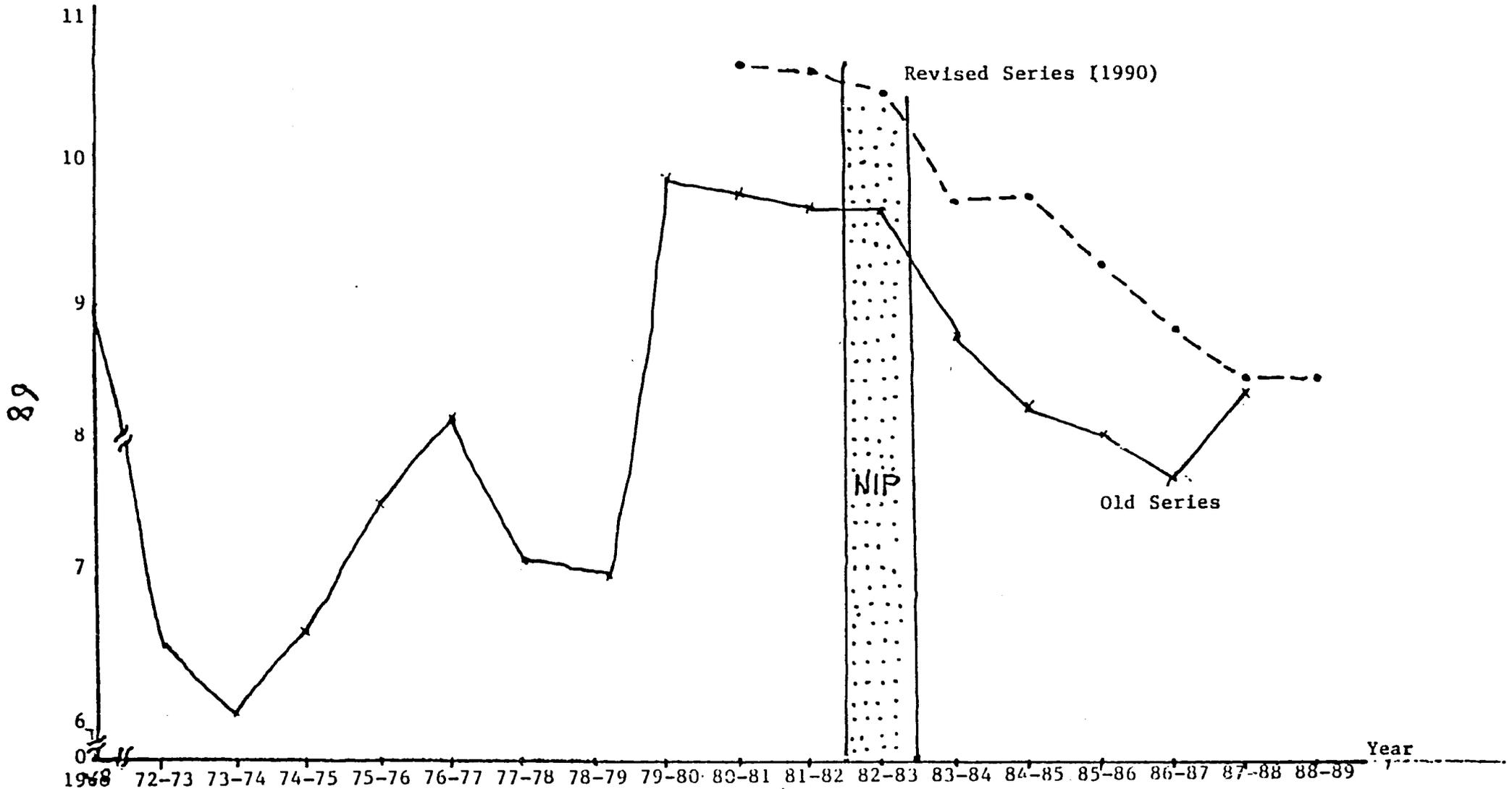


Fig. 3e.--Manufacturing output as a percentage of GDP, 1968 through 1987-88.

Source of data: Table 4; original source: BBS, National Accounts (Old Series: Pocket Book; Revised Series: mimeographed sheets from the National Accounts Department of the BBS).

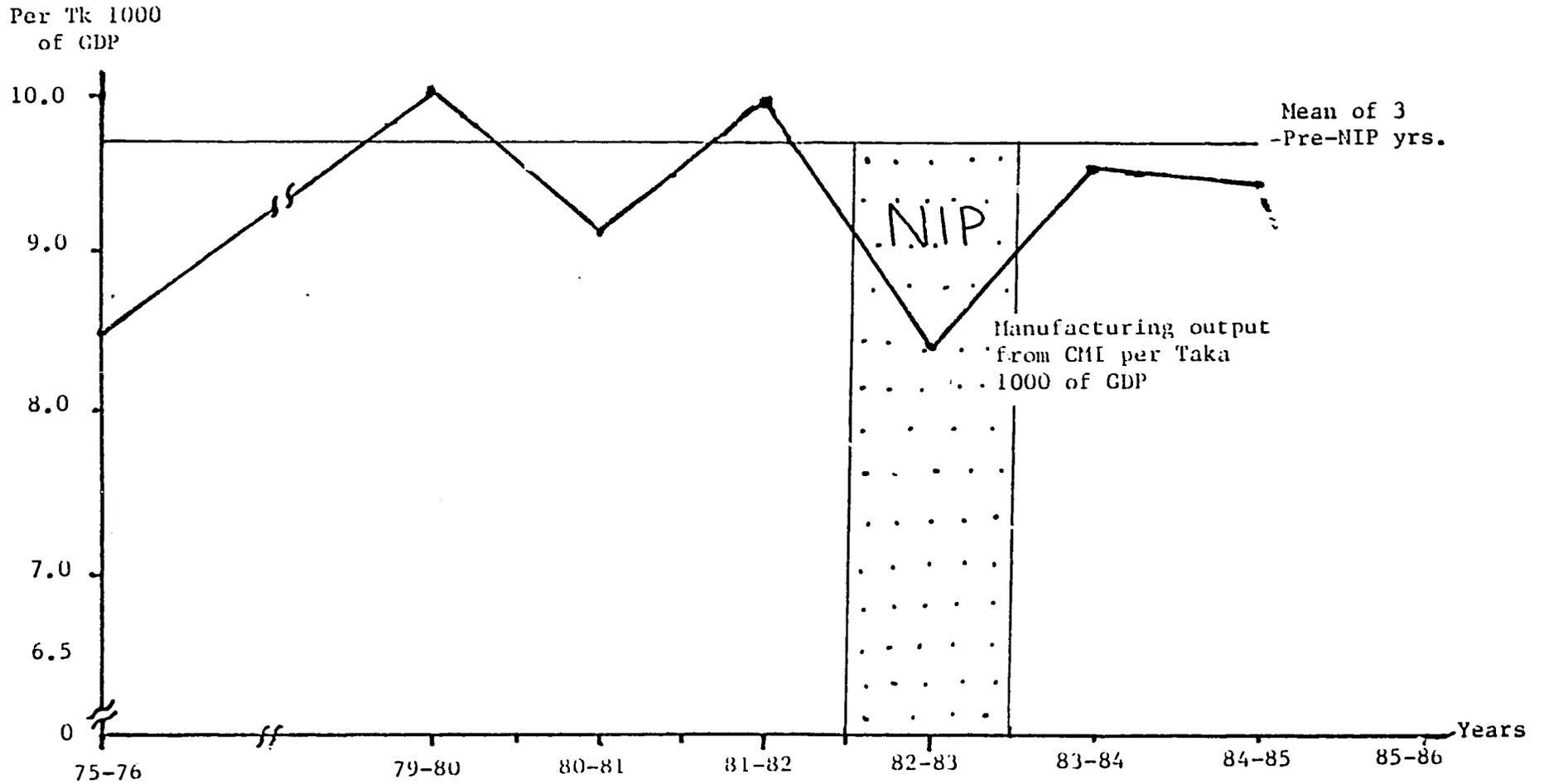


Fig. 3f.-- Manufacturing output from CMI sample per Taka 1000 of GDP, 1975-76, 1979-80 through 1985-86

Source: Table 4. Original source: CMI Merge File.

GDP and PER CAPITA INCOME

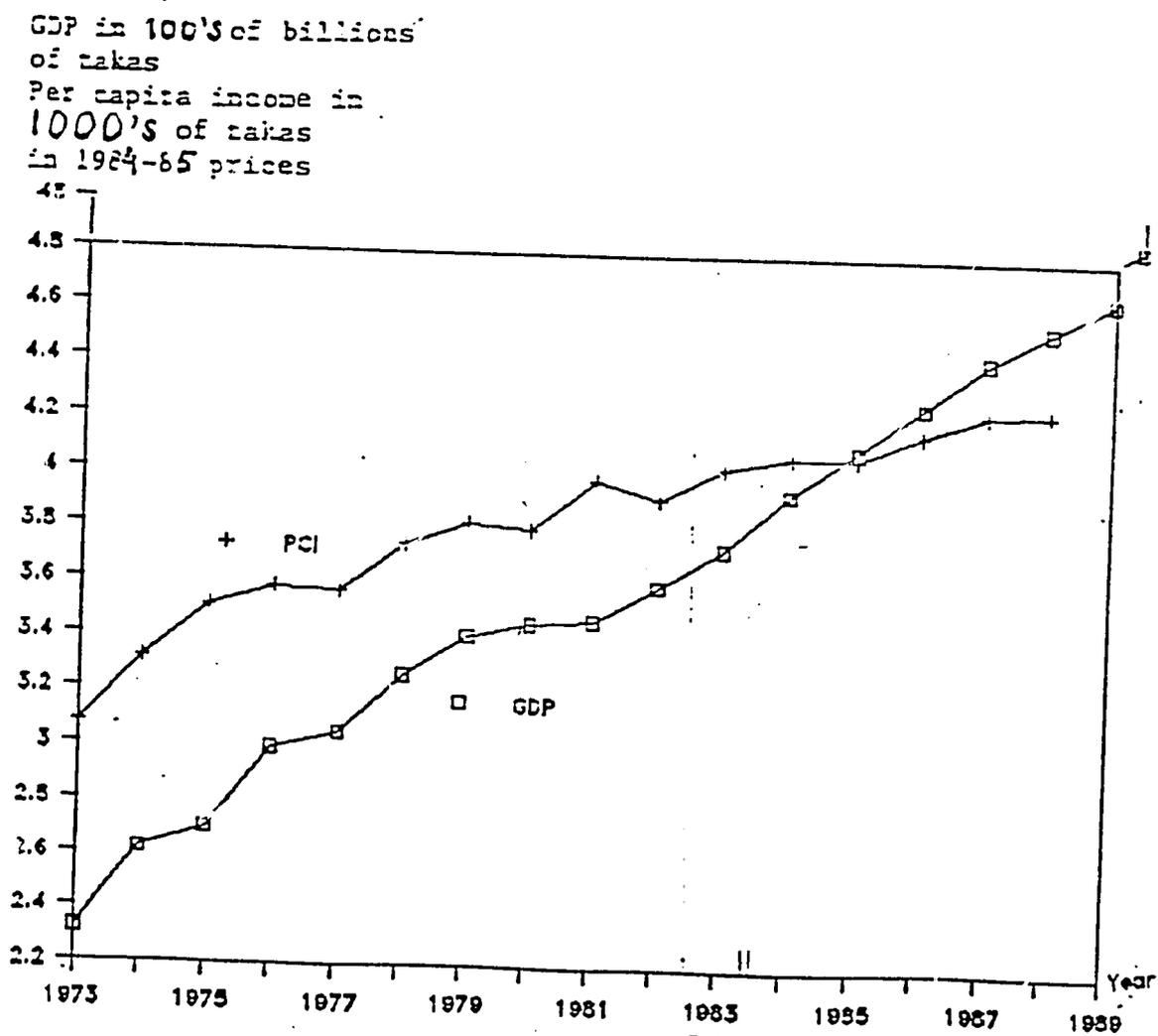


Fig. 3g.—GDP and per capita income, Bangladesh, 1973 (1972-73) through 1989 (1987-88). In 1984-85 Constant price

Source: Table 5.

Q/L

Takas Thousands Per
Worker in 1985-86
Prices (Q/L)

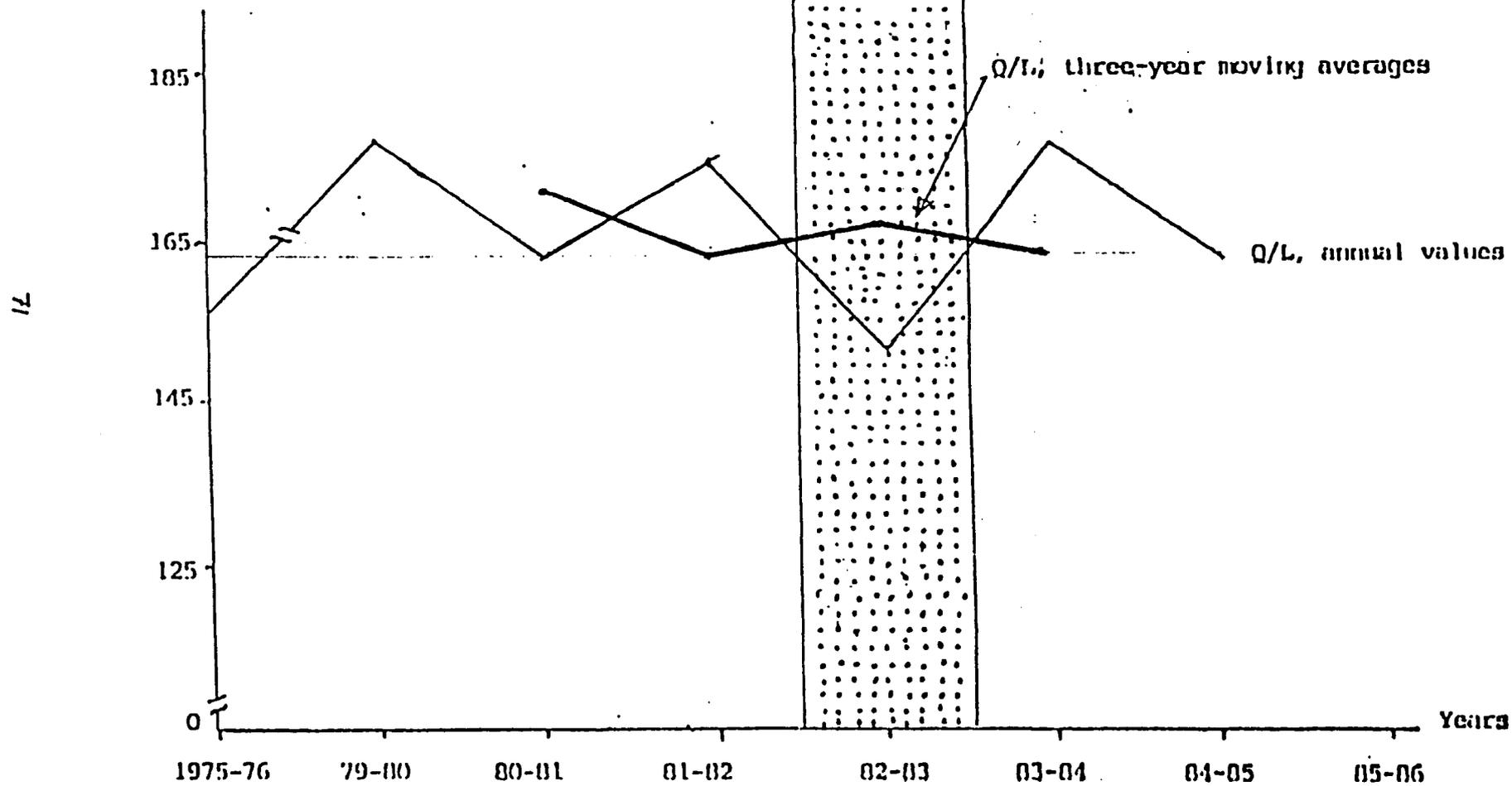


Fig.3h:--Output per worker, CMI data, 1975-76, 1979-80 through 1985-86.

Source: Table 4

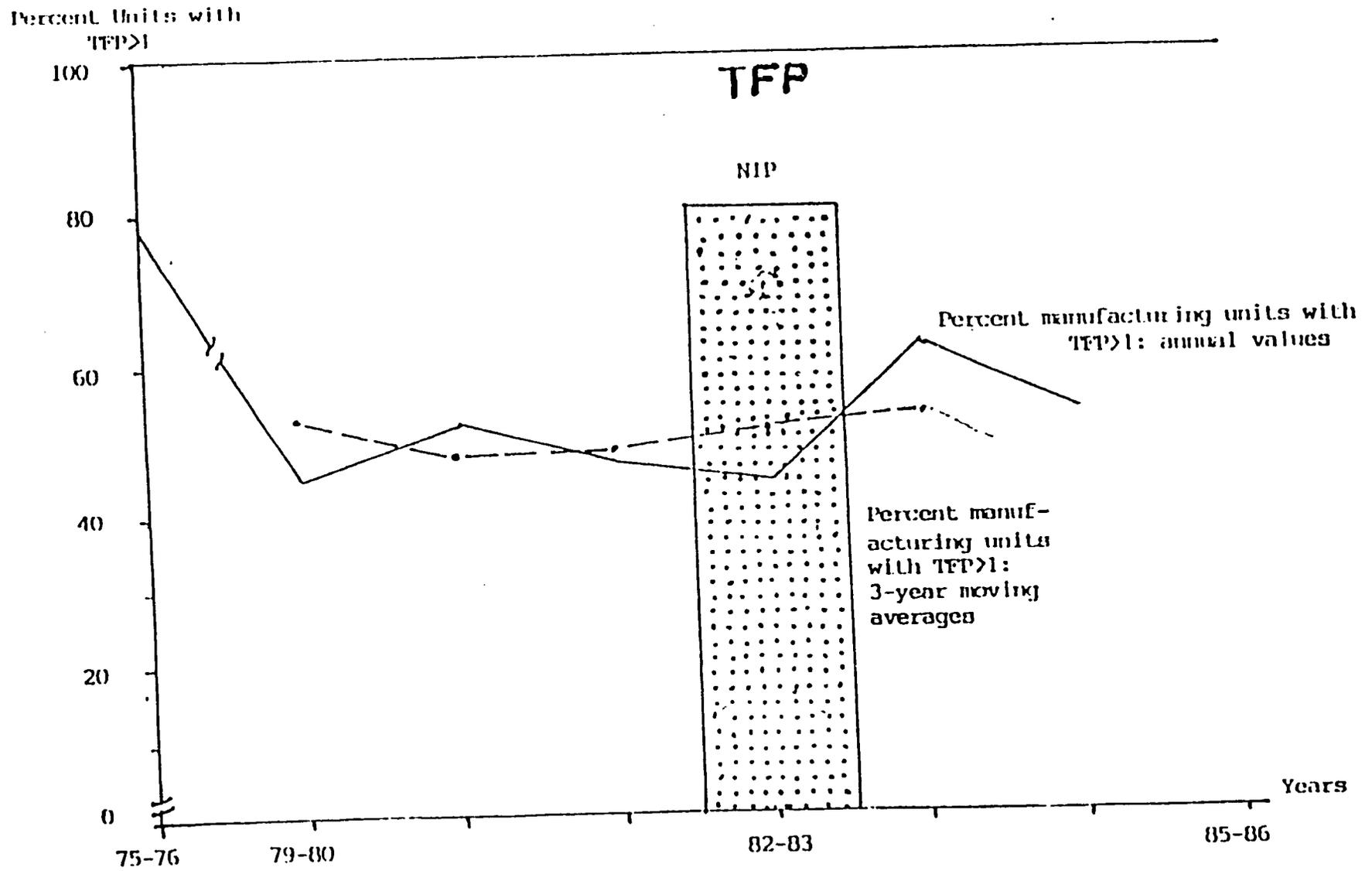


Fig. 31.--Percent manufacturing units which attained total factor productivity (TFP) greater than unity.^a

^aThe remainder experienced negative TFP.

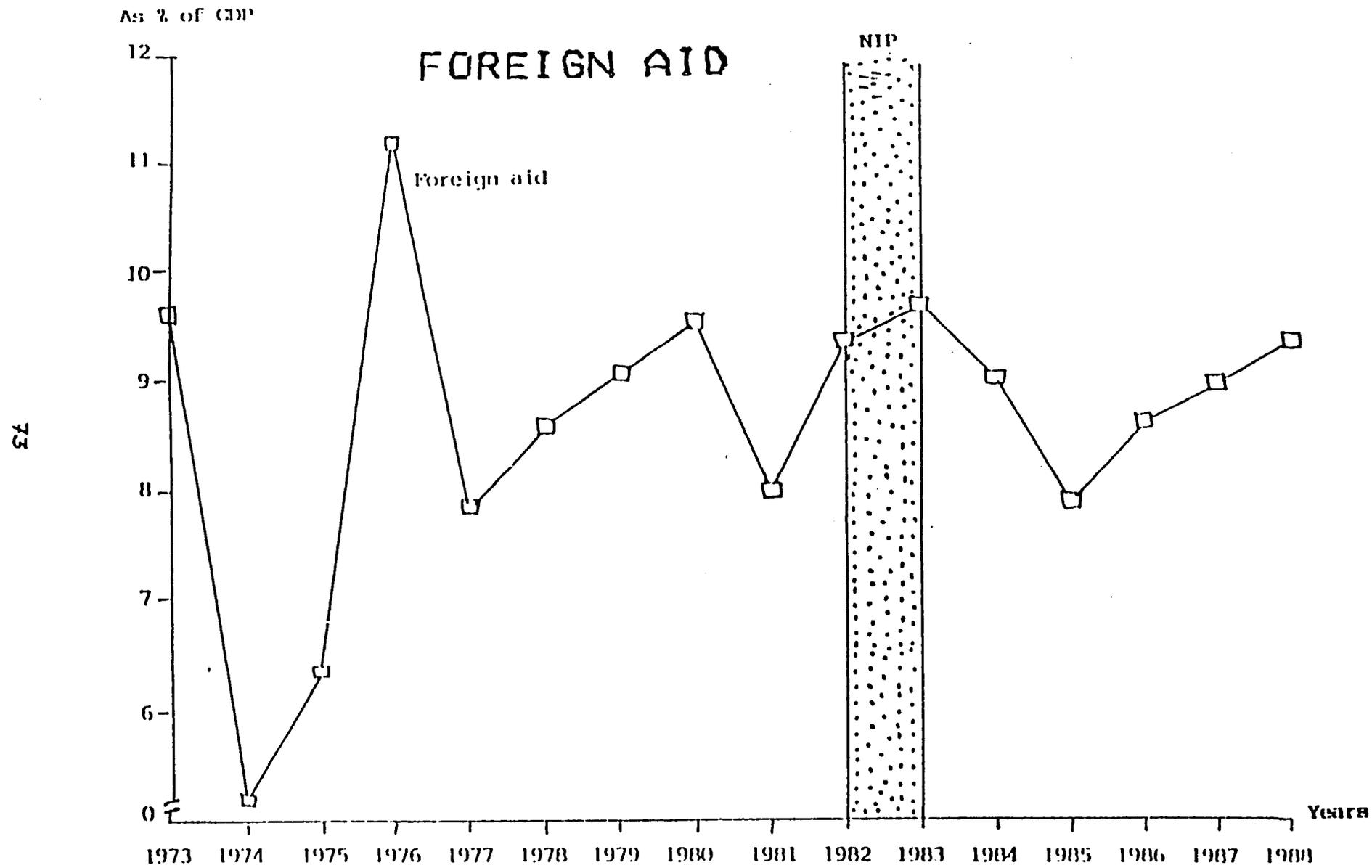


Fig. 4.--Foreign aid as a percentage of GDP, Bangladesh, 1972-73 through 1987-88.

Source: Bangladesh Bank.

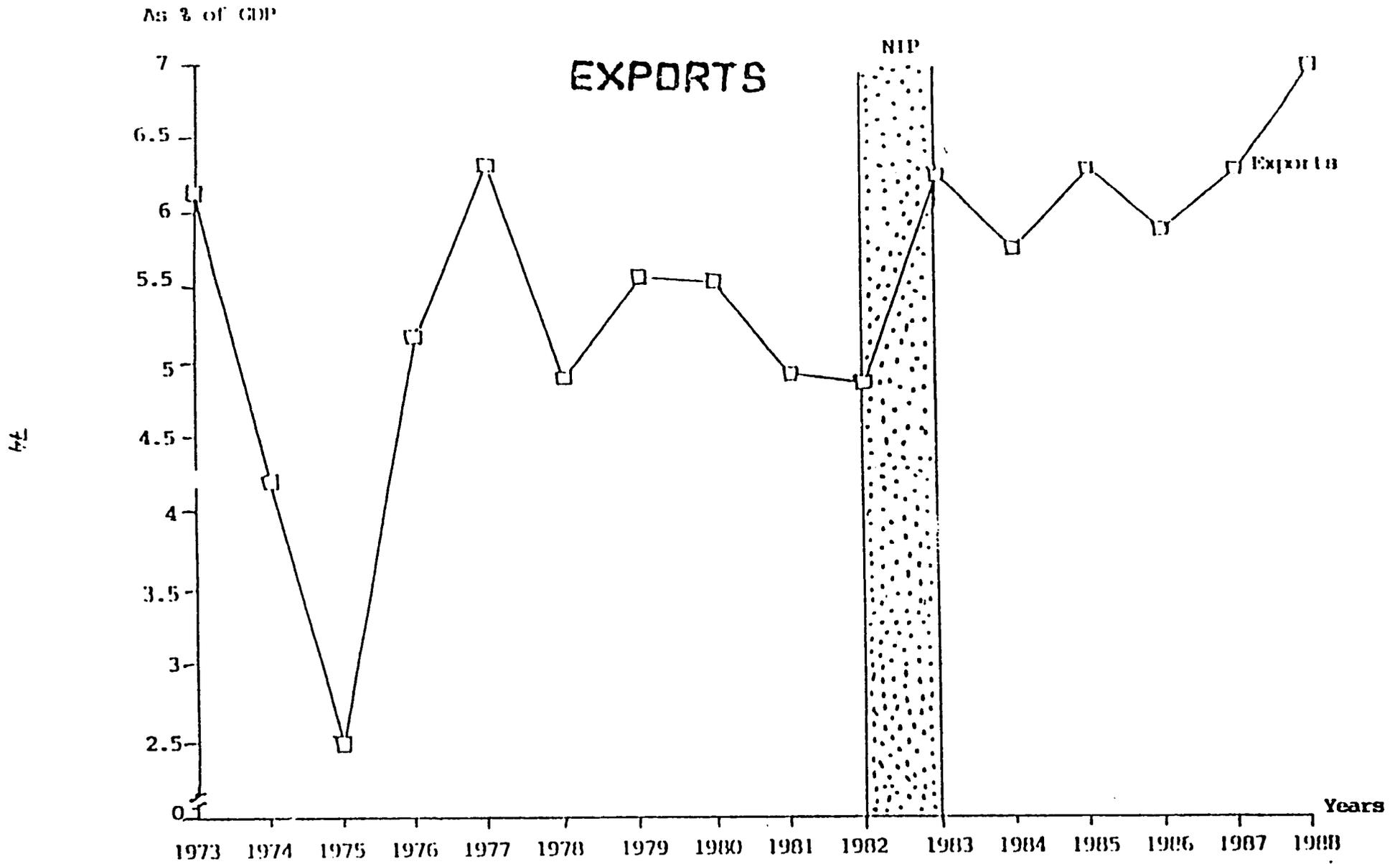


Fig. 5.--Exports as a percentage of GDP, Bangladesh, 1972-73 through 1987-88.

Source: Table 5.

APPENDIX A
INDUSTRIAL POLICIES OF BANGLADESH

The process of private investment promotion that started slowly in 1975, was sharply escalated in 1982 in what is known as New Industrial Policy (NIP82) and was rationalized in the revised Industrial Policy in 1986 (RIP86). The main existing incentives are summarized below according to 3 classes: (a) industrial development in general, (b) export promotion, and (c) support to small and cottage industries.

(a) Industry in general

i) Fiscal incentives

(1) To promote industrial development in the country, tax holiday has been allowed to the newly established industries for 5 years for developed areas, 7 years for less developed areas, 9 years for least developed areas, and 12 years for special economic zones.

(2) An assessee is entitled to accelerated depreciation at the rate of 80% of the actual cost of machinery or plant from the year the unit starts commercial production and at 20% for the following year if the industry is set up in a developed area. If the unit is set up in a less developed area the depreciation shall be 100%. Depreciation allowance can be carried forward to the next year and so on for succeeding years if the unit sustains losses.

(3) Normal depreciation on machinery and plant is allowed at 15%. In addition to this, an extra allowance up to a

minimum of 50% of normal depreciation for double-shift-working and 100% of normal depreciation for triple-shift-working may be allowed in proportion to the number of days during which double or triple shifts are worked.

(4) An investment allowance is allowed at the rate of 20% of the actual cost of the plant and machinery of an industrial undertaking which is entitled to accelerated depreciation in respect of the year in which the industrial undertaking starts commercial production, if the industrial undertaking is set up in a developed area. The investment allowance is allowed at the rate of 25% in place of 20% of the cost of the machinery and plant if the undertaking is set up in a less developed area. Investment allowance is also admissible in respect of inland passenger vessels and fishing trawlers.

(5) The facilities available for setting off of losses and carry forward of losses are also liberal whenever a tax payer sustains an business loss, it is permissible to carry it forward to the following year and set it off against profit in that year.

(6) Exemption from tax on capital gain arising from sale of buildings or lands if such gains are invested in the acquisition of capital asset i.e. land, machinery, plant, furniture etc. of industrial undertaking within a period of 2 years from the date of transfer.

(7) Capital gain arising from transfer of land or building invested towards equity of a new industrial company is exempted

from tax.

(8) Capital gain arising out a process of transformation of a firm into a company is exempted from tax if all capital gains are invested in the equity of the said company.

(9) Dividend or income received by an assessee other than a company is exempted from tax upto Tak 15,000.00 in a year irrespective of whether it is distributed by a public or private company.

(10) Exemption from payment of a tax on royalty, technical know-how and technical assistance fee is allowed.

(11) There is relief from double taxation in case of the foreign investors of the countries with whom Bangladesh has agreements to that effect.

(12) Exemption is allowed from taxes on interest accrued on foreign loans under certain conditions provided there is an agreement of avoidance of double taxation with concerned countries.

(13) Certain expenditures, namely, expenditure on foreign travel by the employees and their dependants once every two years, expenditure on the training of individual employee at home or abroad, expenditure on scientific research, etc., are allowed for deduction for the purpose of computation of income, profits, and gains from business liable to tax under the Income Tax Act.

(14) Concessional rates of import duty are allowed at 20% ad-valorem rate (no sales tax) for import of capital machinery for industries to be set up in developed area, 7-1/2% ad-valorem rate (no sales tax) in less developed area, and 2.5% ad-valorem rate

(no sales tax) in the least developed areas. Payment of 2.5% import duty on capital machinery is also allowed for export oriented industries (minimum of 70% exports), selected industries using 70% or more indigenous raw materials, and industries set up in BSCIC Estates--irrespective of locations.

(15) For less and least developed areas, 50% of the effective customs duty is allowed for payment in 2 half yearly equal instalments.

(16) A rebate of 25% in excise duty is allowed on the additional production for essential and selective industries if such manufacturing units produce more than 100% of their sanctioned capacity.

ii) Other Incentives:

(1) The period of repayment of both local and foreign currency loan is 12-15 years depending on the repaying capacity of projects.

(2) The repayment of foreign currency loan starts after 30 months of opening L/C or 18 months after unit goes into commercial production, whichever is later.

(3) The repayment of local currency loan becomes due after 24 months from the final disbursement or 18 months after the unit goes into production, whichever is later.

(4) Employment of foreign nationals in the enterprises where their services are essentially required is allowed with the approval of the appropriate authority.

(5) Supplier's Credit is allowed on approved terms by the

Hard Terms Loan Committee (HTLC) of the Ministry of Finance (Bangladesh Bank).

(6) Pay-As-You-Earn (PAYE) Schemes are approved on merit of the cases.

(7) Facilities of long term credit from DFIs are available.

(8) No limitation on percentage of Bangladesh capital in industry where foreign investment is approved.

(9) Tariff protection is provided to the deserving industries.

(10) Provision of liberal debt-equity ratio exists.

(b) Incentives to exports

(1) Credit facility may be available upto 90% of the value of the irrevocable letter of credit from any nationalized commercial banks for export.

(2) Income tax rebate is allowed ranging from 20% to 60% of tax attributable to export sales of nontraditional items.

(3) Exemption is allowed from the tax payable on the income, profits and gains of any industry set up in any Export Processing Zone for a period of 5 years beginning with the month in which commercial production commenced.

(4) Certain exemptions are considered for income tax payable on the salaries of foreign technicians.

(5) State recognition may be available in the form of awards and trophies for successful exporters, particularly of non-traditional items.

(6) Facilities under Export Credit Guarantee Scheme are available.

(7) For export-oriented industries, the rate of interest to be charged by the financing institutions is one percent less than that charged for the other industries located in developed areas.

(8) In deserving cases of export-oriented industries the government allocates cash foreign exchange from time to time for the import of capital machineries.

(9) A system of notional payment of import duty and sales tax for export industries exists.

(10) Promotion of export of non-traditional items is given greater emphasis. Efforts are made not only to discover such new items but also to devise a package program of incentives for the existing ones with a view to expanding efforts.

(c) Incentives to small
and cottage industries

As on previous occasions, small industry sector has been redefined to include any industrial undertaking engaged either in manufacturing process or service activity, within a total investment up to Tk 15 million and the investment in machinery and equipment not exceeding Tk 10 million excluding taxes and duties.

(1) The small sector will enjoy a tax holiday for the period of five years, seven years and nine years, if set up in developed areas, less developed areas, and least developed areas, respectively. The period of the holiday will be calculated from the month of the commencement of commercial production.

(2) The rate of import duty on machinery and equipments in

less and least developed areas and also in BSCIC Industrial Estates will be 2.5 percent ad valorem and no sales tax will be imposed.

(3) For small and cottage industries, irrespective of debt equity ratio and areas, the rate of interest will be 10 percent.

(4) All income arising from export of handicrafts shall be exempted from income tax.

(5) For the development of small and cottage industries, BSCIC will: organize training for the artisans for skill development as well as for improvement of management technique; conduct continued research and disseminate knowledge for achieving quality and higher productivity; undertake product development and disseminate the knowledge; supply new and improved designs; arrange necessary credit in conjunction with commercial banks; and assist in supply of raw materials and marketing of products.

(6) To assist in solving the marketing problem, emphasis has been given on marketing plans and study. The government will also formulate purchase policy in favor of the SCI sector to ensure marketing of SCI products.

The SCI sector will also enjoy the following special incentives and facilities:

(7) Financial institutions and commercial banks shall have a separate window for financing small and cottage industries;

(8) The financial institutions and banks should set apart a definite percentage of their resources for the development of SCI;

(9) Debt-equity ratio for SCI shall be 80:20 in order to provide support to small entrepreneurs;

(10) A Small Entrepreneur Credit Guarantee Scheme may be introduced under the joint sponsorship of BSCIC and Sadharan Bima Corporation;

(11) Banking system will arrange necessary fund for sick small industries and for supporting sub-contracting.

APPENDIX B

HIDDEN COSTS OF ERAS

A number of costs of regulated markets as against unregulated markets may be distinguished. The so-called Harberger triangles caused by numerous taxes/subsidies or quasi taxes/subsidies listed in Appendix A are well-known. Instances are: output and employment loss when costs of labor are raised above labor's free-market wage rate, lower value marginal product than social marginal cost of financial capital in those industries which are charged 9% to 10% rate of interest against the prevailing market rate of interest of least 14%, and so forth. Multiple Harberger triangles are created from both demand and supply side when a product is protected. In addition resources get transferred from investors and traders to smugglers and there is loss of public revenue as illustrated in Fig. 1. In this country, almost all manufacturing products are heavily protected under the import-substitution policy, which, despite recent attention to export promotion and trade liberalization, is still dominant. Some products are protected against foreign competition (for instance, m.s.rods), some against chosen domestic sectors--for instance, industry in relation to agriculture, mill products in relation to handloom products, import-substitution group of products against the export group of products, and so forth. All of these create efficiency

losses in multiple forms.

Take the case of protection from outside competition depicted in Fig. 7. In this figure, S_{w1} stands for supply at border prices, $S_{w1+tariff}$ for border price plus protective tariffs, S_{smugg1} for supply of smuggled quantities, and S_{d1+sub} for assisted domestic supply. In Bangladesh, smuggling is believed to become rampant once the ERA exceeds 40% or so. Here triangle gzs represents efficiency loss due to the loss of consumer's surplus; $ghvo$ an efficiency loss of replacing low-cost imports by high-cost domestic production; and the rectangle $hqs v$ smugglers' profits, shared probably between foreign and domestic smugglers, the police, the tariff inspector, and so forth.

If smugglers deposited their profits in local banks, entrepreneurs could borrow that money and invest. The loss may be minor. Unfortunately, smuggling takes place in black markets and funds may be deposited outside the country or reinvested in smuggling operations. Even that may not be all loss, because for smuggled-in goods there must be some smuggled-out goods, or exports, except when remittances or contraband funds are employed, e.g., through overinvoicing imports and underinvoicing exports. Being unregulated, that market could, indeed, be very competitive and consequently efficient. The problem, however, is that such imports and exports may be and invariably are low-priority products. Resources get malallocated. Government loses tax revenue. If domestic industrialists miscalculated the excess demand for their produce by not foreseeing or underestimating

smuggling and were misled to create capacity at x or y , they would be frustrated when excess capacity appears from b to c or b to d .

To the extent the protected industry is a monopoly, or imperfectly competitive it is under little pressure to introduce cost-reducing innovations to increase productivity. The country gets burdened with high-cost industries.

A worse scenario appears when an export product receives little ERA and its substitutes in the domestic market receive much, as is the case in Bangladesh (see Table 2). As a result, it is more profitable to sell that product in the domestic market than in the export market where prices are highly competitive and low. The sale of concessionally imported raw materials without manufacturing them for exports is another form of smuggling, believed to be a widespread practice in Bangladesh. Inefficiencies get cumulated.

In general, the state of arts is such, that a high-cost manufacturing industry with supply curve S_{d1} in Fig. 7 is assisted and artificially lowered to S_{d1+sub} through fiscal and financial assistance. At the price OP_1 set by the solid supply curve S_{smuggl} , domestic industry can scarcely earn normal profits, even with subsidized inputs along S_{d1+sub} domestic supply curve. In this case, the efficiency loss is measured by the shaded trapezium $ghij$ +cost of excess capacity bc at the initial-period prices.

Furthermore, the domestic monopoly protected from outside

competition is under no pressure to introduce innovations and lower its supply curve. To the contrary, as machines wear out and obsolescence sets in, the domestic supply curve may shift upward. Lack of surplus from the industry reduces entrepreneurs' capacity to spend money on R&D or other measures to increase productivity and reduce production costs. On the other side, in normal circumstances, productivity continues increasing continually in the outside world. A typical dynamic element is depicted by dotted supply curves in Fig. 7. Over time, the world supply curve shifts downwards as a result of relatively higher productivity growth, while Bangladesh's supply curve shifts upwards due to negative productivity growth. The efficiency loss is now given by the area $k m n r$ + cost of excess capacity $a c$. Note also that traders, facing a downward-shifting supply curve, temporarily earn $s t$ per unit of excess profit before their chase towards the new equilibrium at u starts. Domestic producers, encountering upward-shifting supply curve temporarily suffer from per unit losses of $v w$ before they contract output to adjust to the new equilibrium at lower product price OP_2 .

Contraband import is not the only source of social cost to the nation. Other substitutes to highly protected products play similar role, for example gur to sugar, wood to coal, and so on.

An irony of the assistance policy is that high-effective assistance causes industrial sickness. Once an industry becomes sick--and in Bangladesh about 50% of the industry is currently estimated to be sick--the demand for more assistance increases and official resistance to additional fiscal and financial assistance is weakened, causing further losses of economic growth and increased frustration to policymakers.

In brief, all these efficiency and output losses reduce the long-run rate of expansion of the industry concerned and have negative impact on the overall growth. The main contributor^{tc}_λ, if not the sole source, of these losses is high effective assistance. Policymakers naturally get puzzled by these results.

THEORY

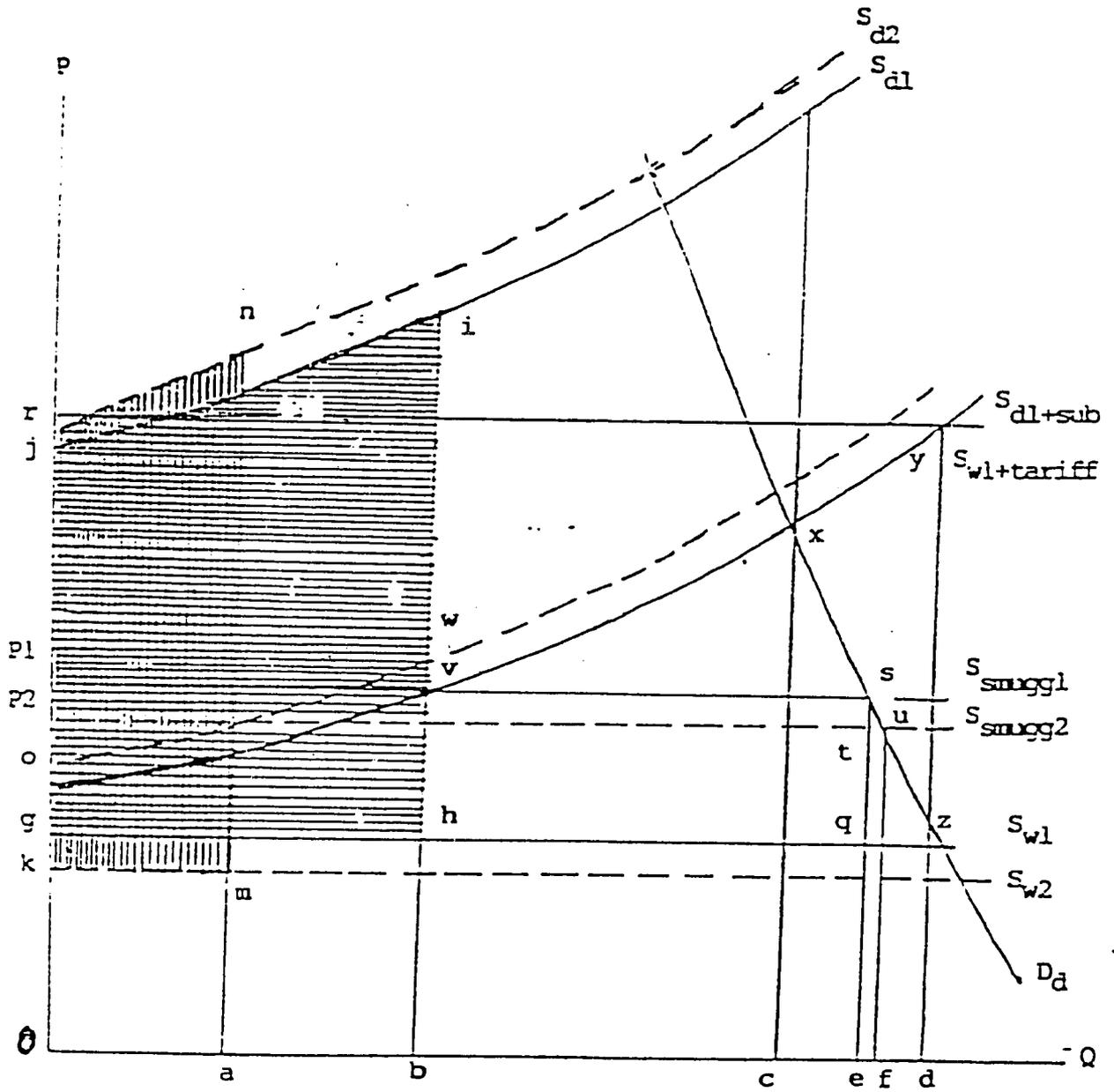


Fig.7.—Hidden costs of high ERAs.^a

^aThe definitions of various curves and economic costs are

Fig. 7 --Contd.

given below:

- S_{w1} = World supply in Period 1 before tariff
 $S_{w1-tariff}$ = World supply in Period 1 after tariff
 S_{smugg1} = Smugglers' supply in Period 1 after tariff
 S_{d1} = Domestic Supply in Period 1 before subsidy
 S_{d1-sub} = Domestic supply in Period 1 after subsidy
 D_1 = Domestic demand curve
 S_{w2} = World supply in Period 2 after world
productivity growth
 S_{smugg2} = Smugglers' supply in Period 2 after world
productivity growth
 S_{d2-sub} = Domestic supply in Period 2 after subsidy
and after decline in productivity

Domestic industry creates capacity O_d (overshoot) or O_c (potential equilibrium). Let us assume it is O_c .

Smugglers enter and by charging price OP_1 , they reduce demand for domestic product from O_c to O_b . The resulting social loss due to high ERA = $ghij$ + cost of excess capacity bc .

Period 2 after productivity changes

Smugglers' price comes down to OP_2 . Domestic demand increases to O_f . Domestic supply is reduced to O_a . Smugglers' profits are higher than before. The resulting social loss of ERA = $kmmr$ + cost of excess capacity ac .

APPENDIX C
TWIN THEOREMS OF
EFFICIENCY

Markets for private goods work best in competitive environment. The touchstone is economic efficiency. Defining efficiency in production as an organization in which no change in technology or technique of production or recombination of resources can produce more output value, the two well-known theorems of efficiency may be stated as:

- 1) Any competitive market equilibrium is efficient
- 2) Every efficient allocation is a market equilibrium

Corresponding to these efficiency theorems there are two welfare theorems:

- a) Every efficient allocation is a welfare maximum
- b) Every welfare maximum is an efficient allocation

Finally, recall the "zero-profit theorem", according to which, in the absence of a stream of technological changes or new superior resources, competition will reduce economic profits to zero. Each factor of production tends to receive its marginal product. That is efficiency and, according to a Theory of justice, also equity.

What went wrong with the private-good-producing public enterprises of the world was that they were removed from the competitive domain.

FOOTNOTES

*An earlier version of this study was discussed at a number of seminars, including the following: HIID/Dhaka, Aug 3, 1989; USAID/Dhaka, Aug 24 and Sept 3, 1989; Bangladesh Institutes of Development Studies, Sept 8, 1989; Center of Advanced Socioeconomic Research, University of Dhaka, Sept 11, 1989; World Bank/Dhaka, Sept 13, 1989; UNDP/Dhaka, Sept 18, 1989; Vanderbilt University, Oct. 2, 1989; Harvard Institute for International Development/Cambridge. Oct. 4, 1989; Planning Commission/Dhaka, Sept 11 and Nov 15, 1989; NPO/ILO/Dhaka, Oct 23, 1989; and Institute of Appropriate Technology, Nov 19, 1989; among others. Comments and suggestions made at these seminars have contributed to improvements in it. Space does not permit acknowledgement to all the commentators, but the following must be mentioned: Najmul Hossain, Ravi Aulakh, Prescilla Boughton, Malcolm Purvis, Robert Young, Mahbub Hossain, Zaid Bakht, Nuimuddin Chowdhury, Rehman Sobhan, D. Bhattacharya, Wahiddun Mahmud, Francis Van Gigch, Erling Dessau, Samuel Morley, Clive Bell, Lester Telser, Robert Lucas, Sherwin Rosen, Donald Snodgrass, Zvi Griliches, K. L. Krishna, Shaikh Magsood Ali, A.K. Khondker, Salahuddin Ahmed, Salim Jahan, A.K.Nujeri, Abdur Rab, Abdus Salam, M.A. Misir, Nawaz Sharif, Robert House, and Iqbal Mahmud. The research team for the study included: Najmul Hossain, Mainul Huq, K.K. Sanyal, Tania Hossain, and Nandini Abedin. The author alone is responsible for errors and weaknesses that remain.

¹The policies issued in the two major reforms of 1982 and 1986 are summarized in Appendix A.

²The data for TFP come from the CMI, described in Paper 1 of this issue.

³See M. U. Ahmed [1989, p.3] and Staff Correspondent, the Bangladesh Observer, Dec. 20, 1989, p.10.

⁴See Bangladesh Sugar and Food Industries Corporation [annual].

⁵An argument is advanced by the pro-assistance group that if sick industries are not sustained, new investors would be even more reluctant to take risk of investment in industry. The fact is that the acceptance of this sort of arguments has exacerbated industrial sickness, encouraged high defaults on debt repayment, lured inexperienced investors to jump into low-productivity ventures, reduced the challenge of competition, has multiplied high-cost industries, and has led to a high degree of investment mistakes. The policy choice is between the "survival of the fittest" in a deregulated market and the "sustenance of the weak" in a regulated market. The choice becomes clearer when it is realized that the former policy leads to the health of the industry, the latter to its sickness, and that the weak in this case is usually the politically powerful big guy and the fittest is invariably a pioneer captain of industry.

⁶The translog frontier production function are estimated in Paper 2 of this issue.

⁷For the critical role of competition, see a summary of the theory of efficiency in Appendix C.

⁸The problems being faced include the continuing dispute between the new private owners of denationalized industries and the public sector about the assumption of liabilities incurred by these industries since nationalization; default on installment payments (currently about 90 percent payments are overdue) by the buyers of public enterprises; difficulties that banks face due to low rates of recovery from new owners and having to wave some of their accumulated interest; problems that private owners face concerning foreign loans due to exchange rate changes. The 1915 contract laws according to which these transactions were made need to be modernized; similar problems relate to the 1960s law concerning the banking business; and similar legal and procedural matters. Some experts believe that private entrepreneurs were not yet experienced enough to manage large enterprises. They themselves had not cultivated the industrial culture of dealing with DFI credit, labor, public officials, and the like. Their debt default probably did a great damage to industrialization. Even during 1985-86 and 1986-87, when proper penalties and legal process was established for dealing with defaulters and when donors had set conditions for further loans, the recovery rate did not improve: it was 8% for BSB and 13% for BSRS (Rehman Sobhan and Einayak Sen [1989]).

⁹An excellent, feasible plan of action for making a breakthrough in industrial innovations has been prepared by Mahmud and Sharif [1989]. The logistics and organizational aspects of the program are further spelled out by House [1990].

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END