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WORKING PAPER NO. 140

**IMPACT OF TRADE LIBERALISATION IN MANUFACTURING
INDUSTRY IN INDIA IN THE 1980'S AND 1990'S**

Mihir Pandey

August, 2004



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Foreword

The objective of this study was four-fold: a) to document changes in India's trade policy using coverage ratios of non-tariff barriers and nominal and effective rates of protection during the 1980s and 1990s, b) to examine the structure of protection in Indian industry, c) to document the performance of registered manufacturing sector, and d) to explore the relationship between changes in trade policy and industry performance. The results show that protection to Indian industry declined during the period studied. The registered manufacturing sector showed impressive annual growth for both output and gross value added, especially for the consumer goods industries and the export promoting industries, confirming the finding of earlier studies for the 1980s. Employment growth, virtually stagnant during 1988–89 to 1996–97, picked up in the subsequent period. Labour productivity, and average wage, showed an increase during the first period, followed by a slowdown in its growth rate in the second sub-period. Both exports and imports grew slowly during 1980–81 to 1996–97, picking up in the subsequent period. Export intensity increased in the second sub-period for most industry groups, possibly because of the decrease in the inherent bias against exports that was a result of the earlier protective regime. Import penetration, on the other hand, showed first a decrease and then an increase, although there were differences among the industry groups. Evidence on price-cost margin was mixed.

Dr. Arvind Virmani
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August 2004

1. Introduction*

Liberalization has been a key ingredient of recent economic policies in India and elsewhere, based upon the notion that removing restrictions on domestic economic activity as well as on the trade relations with other countries has a beneficial impact on the economy. Earlier, India, like many other developing countries, based her industrialization and development strategies on the inward looking policy of import-substitution. The developing countries' experience of the 1950s and 1960s, however, suggested that countries that adopted outward looking export-oriented industrialization policies experienced higher growth rates than those countries that followed inward-looking import substitution policies. The most outstanding evidence for this has been the experience of the East-Asian countries that followed open policies since the 1960s. These countries achieved high trade ratios and experienced high rates of growth of industrial output and per capita incomes.¹ However, while it is true that these countries had high trade ratios, it is not clear to what extent high trade ratios are attributable to free-trade policies, or what the direction of causation is. Moreover, the high-growing Asian economies have other distinct attributes that may have contributed to their high growth rates.² Nevertheless, the relationship between the orientation of trade policies and the development / industrialization strategy is considered to be of key importance in economic policy formulation.

Trade policy in India has gone through many changes since independence. In particular, there has been a phase of inward looking import substitution strategy relying on high tariff and non-tariff barriers from the 1950s until around 1980. Since then, there has been a gradual shift in policy, changing into a full-fledged structural adjustment programme in the 1990s that saw the dismantling of the high trade barriers as well as

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¹ World Bank (1993). The countries include Hong Kong, South Korea, Taiwan, Singapore, Malaysia, Indonesia, and Thailand.

² These are high savings and investment rates and high education levels as a result of high investment in public education. See Krugman (1994)

changes in domestic industrial policies. It is in this context that this study has been undertaken to assess the impact of trade policy on the performance of Indian industry.

Explorations of the theoretical basis of the link between trade liberalization and economic growth does not lead to any conclusive results. In fact, there is no inevitability of openness leading to higher economic growth, or to any particular pattern of growth. The relationship between trade policy and economic growth and industry performance is therefore a matter of empirical verification. Empirical studies for different countries have also thrown up mixed results. While some studies point to a strong association between trade policy and growth, others find other factors as more important, and often little association between trade policy and growth. Studies for India also show mixed results. This study seeks to examine evidence on the relationship between trade policy and industry performance for India during the 1980s and 1990s, to assess whether changes in policy has significantly affected industry performance.

Previous studies on India have dealt with the growth experience, focusing on the deceleration of growth rates in the mid-1960s and the subsequent revival since 1980. Similarly there are a number of studies on the issue of productivity, with some explorations of the link between trade policy and productivity growth. The present study takes a more broad-based approach, extending the evidence on a number of industry performance variables for the 1980s and 1990s. Production, employment, labour productivity, average wage, profitability, price-cost margin, export intensity and import penetration are examined in conjunction with the change in trade policy. An important issue addressed is the quantification of trade policy variables. The current study focuses on coverage ratios of non-tariff barriers, nominal and effective rates of protection as measures of trade policy. Changes in trade policy in India during the 1980s and 1990s are documented using these measures, and the protective structure to Indian industry seen through these measures is analyzed. Industry performance is documented for the same period using ASI data. The study of trade-industry relationship posed some problems since trade and industry data are available under different classifications. In our study, the

unit of analysis is the 2-digit and 3-digit ASI classification, and trade variables are mapped to this classification using an appropriate concordance table.

Our study throws up a number of interesting results relating to the structure of protection and industry performance. Although there is evidence of some impact of trade policy on industry performance, our study does not find any conclusive links between the two.

Sample and Period of Analysis

Industry performance variables are constructed for 150 industry groups according to the 3-digit ASI classification that in turn is based upon the National Industrial Classification. These are aggregated to the 2-digit ASI classification and a use-based classification for easier presentation. Trade policy variables are also constructed in a similar manner. The list of 3-digit industries included in the study is given in the appendix.

The period of analysis is 1980-81 to 1996-97. This period is chosen to correspond with the period when changes in trade policy were taking place. There has been gradual trade liberalization since the early 1980s that slowly gained momentum especially in the 1990s. The liberalization process has been continuous, however. Three years are chosen within this period, 1980-81, 1988-89 and 1996-97. While 1980-81 signified the beginning of the turn-around in trade policy, 1988-89 was chosen so that it would capture the changes initiated in the mid-1980s. The end-year 1996-97 comes five years after the process of liberalization was accelerated in the early 1990s, and is chosen so as to capture any changes that may have taken place as a consequence.

Plan of the Study

The paper is organized as follows. The next section discusses the different measures of trade policy and documents the changes in trade policy through coverage ratios of non-tariff barriers and nominal and effective rates of protection. Section 3 documents the performance of the registered manufacturing sector in India during the 1980s and 1990s, focusing on production, labour productivity, employment, average wage, profitability, price-cost margin, export intensity and import penetration. Section 4 explores the relationship between changes in trade policy and performance of Indian industry during the 1980s and 1990s. We conclude with a summary of the main results and suggestions for future research.

2. Measuring Trade Policy

2.1 Introduction

Trade policy consists of a variety of instruments, often working towards multiple objectives, making it one of the most complex and least transparent among all economic policies. In India also trade policies are complex; coupled with equally complex and non-transparent industrial policies, guided by multiple objectives and administered by a system of licenses and controls, these policies have resulted in one of the most protective industrial structures in the world.³ Protection policies in India have taken three forms: tariff barriers that limit imports, non-tariff quantitative restrictions and outright prohibition of imports. Although it is important to quantify trade policy variables to assess its impact on economic and industrial performance, it consists of measures that are dissimilar and difficult to quantify. There is no one composite measure of trade policy.

³Gangopadhyay (1994)

2.2 Measures of Trade Orientation

Measures of trade orientation can be of four types: those that measure tariff barriers, those that measure non-tariff barriers, those that incorporate elements of both and measures of openness that can be used to make inferences about trade orientation. These measures can be based on directly observable data, or be estimated econometrically or even by subjective judgments. We discuss briefly each of these measures.

Direct price comparison and the coverage or frequency ratio of imports are used to measure non-tariff barriers. While the coverage ratio measures the percentage of imports covered by non-tariff barriers, frequency ratios measure the percent of product categories that are subject to non-tariff barriers. The latter, while based on the official import policy and easily computable, does not measure the effects of the barriers. Tariff barriers to trade are measured as either the nominal or effective rates of protection. The tariff used is either the published tariff rate or the collection rate, which is total import duty divided by the value of imports. The Effective Rate of Protection (ERP) is the percentage excess of domestic value added introduced because of tariff and other trade barriers and measures the distortions introduced due to both tariff and non-tariff barriers on the input prices as well as the final output prices. Two different methods are available to measure ERPs. One is tariff based, and assumes that tariffs are the only effective barriers to trade. The other is price based, and all factors that influence prices are taken into account. The latter is preferable, but is dependent upon the availability of both domestic and world prices. Nominal and effective rates of protection are popular measures of trade orientation, and have been used in many studies [Balassa (1966), Gang and Pandey (1998) and Nouroz (2001)].

The black market premium, measured as the premium that the exchange rate receives over the official exchange rate, is used in many studies, and is a result of restrictive policies. However, apart from trade policies, monetary and exchange rate policies also influence this premium. The Trade Restrictiveness Index [Anderson and

Neary (1992)] is an index constructed as a welfare equivalent average tariff. While it requires a good degree of information for its construction, it also assumes that tariffs are the only trade barriers. The Heritage Foundation Index of Trade Policy [Johnson and Sheehy (1996)] classifies countries into five categories according to their level of tariffs and other perceived distortions. While it serves as an index of trade orientation, it is not continuous and is subjective. The Index of Trade Liberalisation [Michely et. al. (1991), Edwards (1998)] and the World Development Report Outward Orientation Index [World Development Report (1987) and Edwards (1998)] are both subjective indexes based on country attributes. The Sachs-Warner Openness Index [Sachs and Warner (1995)] is an index based on tariffs, quotas coverage, black market premium, social organization and existence of export marketing boards. While this suffers from the criticism applicable to black market premium, it also appears that black market premium and social organizations drive the results. Finally, the Index of real exchange distortion and variability [Dollar (1992)] measures the country's price level relative to that of a benchmark country, which is then regressed on GDP and the square of GDP and time and region dummies to obtain predicted values. The ratio of actual to predicted values of the relative prices is the index of distortion. The coefficient of variation in this ratio is the index of variability. While this gives a complete ordering of countries, it is affected by, among other things, the export policy, monetary and exchange rate policies, transport costs and other geographical factors.

A discussion of measures of trade orientation thus reveals that there is no single measure that captures all aspects of restrictiveness, and that none of them is a perfect measure. While some of them are subjective, many others capture influences of factors other than that of the pure trade barrier. There is, therefore, some merit in using a measure that is simple, based on directly observable evidence, and that captures the nuance of trade barriers. The average tariff rate, and the measures of NRP and ERP fall into this category.

2.2.1 Non-Tariff Barriers

We use coverage ratios of imports to quantify non-tariff barriers. The coverage ratio is defined as the percentage of products within a category that is affected by an NTB.

Define $w_i = m_i / \sum m_i$ as the import weight, where m_i = gross imports.

Let $n_i = \begin{cases} 1 & \text{if there are NTB's} \\ 0 & \text{if there are no NTB's.} \end{cases}$

Then the NTB coverage ratio is defined as $\sum n_i w_i$.

As an alternate, the simple average of the coverage ratios is calculated. In this approach, each 8-digit tariff line is given a number according to the following scheme:

0% if no NTB applies to the tariff line (i.e. if no licensing is required)

100% if imports are canalised

100% if imports are subject to licensing

100% if imports are prohibited.

A simple average of all the tariff lines within a category gives the frequency of NTBs for that sector. If the trade policy is different within a tariff line then a simple average within that is used. The simple average across all categories gives the frequency of NTBs, i.e. the extent of NTBs.

2.2.2 Nominal Rate of Protection

The Nominal Rate of Protection (NRP) of a commodity is defined as the percentage excess of domestic price over world market price resulting from protective measures. If tariffs are the only source of protection, then the NRP is the tariff rate itself. There are at least three ways of measuring the nominal structure of tariffs. The first is the published tariff rate. Customs tariffs are published according to the trade classification. The effective tariff rate may, however, be different because of exemptions given through separate notifications. Thus, although the number of tariff rates may not be too many, the number of effective tariff rates may be numerous. Both of these tariff rates denote the ex-

ante tariff structure, and inform us about the formal protective structure adopted by the government. The third is the collection rate, or the realized tariff rate, and is the amount of import duty actually collected divided by the value of imports. This is the *ex-post* rate. Although the collection rate accounts for all the duty exemptions that the government permits, it also allows for the possibility of understating protection due to prohibitive tariffs or the economy being on the downward sloping portion of a Laffer curve. In general, the collected tariff rate is lower than the published tariff rate.

The present study calculates both the published tariff rate taking into account exemptions, and the collection rate. We calculate and present the following published and collection rates based on DGCIS data using appropriate concordance between the DGCIS and ASI sectors:

- published rates with exemptions, simple averages
- published rates with exemptions, import weighted averages
- collection rates, simple averages
- collection rates, import weighted averages

2.2.3 Effective Rate of Protection

The effective rate of protection (ERP) is defined as the percentage excess of domestic value-added, vis-à-vis world value added.

$$ERP_j = (VA_j^* - VA_j) / VA_j$$

where VA_j^* = value added at domestic prices, and

VA_j = value added in the absence of domestic tariffs.

The ERP can be re-written in terms of the tariff rates and the input-output coefficients as

$$ERP_j = (t_j - \sum_{i=1}^n a_{ij} t_i) / (1 - \sum_{i=1}^n a_{ij})$$

where a_{ij} is the free trade input coefficient per unit of output and t_i, t_j are the tariff on inputs and outputs. Effective rates of protection are thus an increasing function of output tariffs and a decreasing function of input tariffs.

We use the simple Corden measure of ERP for this study to calculate four series, based upon the four different tariff rates calculated earlier. The data required for ERP calculations are tariff rates and input-output coefficients. Tariff rates are calculated for the input-output sectors, and used with the input-output coefficients to calculate the ERPs. The ERP calculated for the input-output sectors are then mapped on to the ASI sectors.

2.3 Data Issues

Trade data in India is available according to the Indian Trade Classification [ITC (HS)] based on the Harmonised Commodity Description and Coding System. Earlier the data was based on the United Nations' Standard International Trade Classification (SITC). The changes in the classification of trade data are shown in Table 1. For the present study, trade data for 1980-81 and 1988-89 was available according to the Indian Trade Classification Rev 2 (ITC-R2), while that for 1996-97 was available according to the ITC (HS) classification. Trade, industry and the input-output sectors are made comparable using appropriate concordance tables.

Table 1: Classification of Trade Data

Years	UN Classification	Indian Classification	Structure
January 1957 to March 1965	Standard International Trade Classification (SITC)	Indian Trade Classification (ITC)	10 broad sections
April 1965 to March 1977	Standard International Trade Classification-Revised (SITC-R)	Revised Indian Trade Classification (RITC)	SITC-R 5 digits RITC 7 digits, subdivided into 184 groups
April 1977 to March 1987	SITC-Revision 2	Indian Trade Classification - Revision 2 (ITC-R2)	ITC-R2 7 digits, total number of commodities are 7088
April 1987 to December 1995 (February 1986 onwards for tariff)	Harmonised System (HS)	ITC (HS)	2-digit chapters (97) 4-digit HS headings (1253) 6-digit HS subheadings (5063) 8-digit commodity classification
January 1996 onwards	Revised HS	Revised ITC (HS)	As above, with changes in some sub-headings. 10,839 commodities at the 8-digit level

2.4 Empirical Results

2.4.1 Non-Tariff Barriers in India

Earlier studies⁴ reported a high incidence of NTBs, which declined in the later years.⁵ Our empirical result on coverage ratios for 1988-89 and 1996-97 is reported in Table 2. Coverage ratios of imports show that there has been a sharp decrease in the extent of non-tariff barriers between 1988-89 and 1996-97. The simple average for manufacturing industry decreased from 85.73 percent to 46.98 percent. Thus, even after five years of trade liberalization, imports of almost all the tariff lines were covered by restrictions and subject to import licensing, canalized or prohibited. This trend is reflected in the 2-digit classification as well. In 1988-89, six industry groups had coverage ratios that were greater than 90 percent, with the manufacture of beverages, tobacco, etc. and manufacture of cotton textiles showing full coverage by restrictions. The other textile industries, viz. manufacture of wool, silk and man-made fibre textiles, jute and other vegetable fibre textiles, and other textile products, along with manufacture of food products are included in this group. The industry with the least non-tariff barriers was

⁴ DeRosa (1986), Sen and Das (1992), Debroy (1997)

leather and leather products at 60.64 percent, while manufacture of basic chemicals and chemical products were the next lowest at 68.65 percent. The rest of the industry groups were between 70 and 90 percent.

Table 2: Non-Tariff Barriers in Indian Manufacturing Industry

Industry	Industry	1988-89	1996-97
20-21	Manufacture of Food Products	97.50	79.91
22	Manufacture Of beverages, Tobacco, etc.	100.00	87.50
23	Manufacture of Cotton Textiles	100.00	60.58
24	Manufacture of Wool, Silk and Man Made Fibre Textiles	95.34	50.67
25	Manufacture of Jute and Other Vegetable Fibre Textiles	98.60	67.09
26	Manufacture of Textile Products	96.50	85.90
27	Manufacture of Wood and wood products, furniture and fixtures	87.13	33.68
28	Manufacture of Paper, etc; Printing, etc.	77.62	50.63
29	Manufacture of Leather, etc.	60.64	54.71
30	Manufacture of Basic Chemicals and Chemical Products	68.65	39.71
31	Manufacture of Rubber, Plastic, Petroleum and Coal Products	84.04	36.04
32	Manufacture of non-metallic mineral products	80.27	64.47
34	Manufacture of metal products and parts	84.80	58.15
35-36	Manufacture of Machinery and Equipment	73.88	33.98
37	Manufacture of Transport Equipment	85.65	34.60
38	Other Manufacturing Industries	81.06	46.73
	Average for Manufacturing Industry	85.73	55.27
	Average for Economy	84.36	46.98

Source: Our Calculations

Notes: (1) Non-Tariff Barriers are measured by coverage ratios, and are in percent.

(2) The average for manufacturing industry is a simple average over the 2-digit sectors.

(3) The average for the economy is a simple average over the input-output sectors.

Table 3: Non-Tariff Barriers – Use Based Classification

Industry	1988-89	1996-97
Consumer Goods	88.57	65.12
Intermediate Goods	83.55	43.17
Capital Goods	78.07	33.84

Source: Our calculations

In contrast to this, by 1996-97, there is not a single industry group that has coverage ratio greater than 90 percent. Manufacture of beverages and tobacco are the most restricted at 87.50 percent, followed closely by manufacture of textile products at 85.90 percent and manufacture of food products at 79.91 percent. The other industry groups witnessed a sharp decrease in the extent of restrictions. Manufacture of machinery

⁵ Aksoy and Etori (1992), Nayyar and Sen (1994), Gulati and Pursell (1995), Pandey (1998), Nouroz

and equipment, manufacture of transport equipment, manufacture of wood and wood products, furniture etc., manufacture of rubber, plastic, petroleum and coal products, and manufacture of basic chemicals and chemical products showed the lowest coverage ratios, all below 40 percent. The remaining industries had coverage ratios that were between 50 percent and 65 percent. The used-based classification based upon the 3-digit classification (Table 3) shows that the coverage ratio was highest in the consumer goods industries, followed by the intermediate goods industries and then capital goods industries in both 1988-89 and 1996-97. It showed a decline for all the three industry groups during this period, with the highest decline in the capital goods industries.

The pattern of NTBs in the 3-digit ASI classification is reported in Table 4. There has been a marked shift in the pattern. While a majority of the sectors fell in the range above 76 percent in 1988-89, most of the sectors were in the range 51 to 76 percent in 1996-97. Moreover, while there was only one sector with a coverage ratio of less than 50 percent in 1988-89, 68 sectors fell into this category in 1996-97.

2.4.2 Structure of Tariff-Based Nominal Protection in India

There are numerous studies that have measured India's tariff-based nominal protection structure using both the published (*ex ante*) and the collection (*ex poste*) rates [Goldar and Saleem (1992), UNCTAD (1989), NCAER (1998)]. For the period 1980-81 to 1996-97, their main findings are as follows. There are no industries with zero tariff; the rates range from 40 percent to 115.43 for 1980-81 and 4 percent and 152 percent for 1989-90. The average tariff went up from 94 percent in 1980-81 to 127 percent in 1989-90, while the standard deviation increased from 24 percent to 31 percent. For 1996-97, the range is between 27 percent and 53.63 percent. The average is 42.63 percent and the standard deviation is 7.97 percent. Evidence on collection rates [Gang and Pandey (1998)] shows that although the range of tariffs has decreased over time, the average has gone up and then down.

(2001), and Das (2001, 2003)

In our study, the published tariff rate is measured by adding the basic and auxiliary duties, plus any specific duties. The effective duty is calculated taking note of the exemption notifications issued by the government. Because of practical difficulties, only those exemptions that is applicable to all commodities falling within a 6-digit tariff line

Table 4: Pattern of NTBs – 3 Digit Sectors

Range of NTBs	(Number of sectors)	
	1988-89	1996-97
100	36	8
76-99	98	28
51-75	43	71
26-50	1	32
1-25	0	26
0	0	10

Source: Table 2

are taken into account. The collection rate of import duty (the realized rate) is calculated by dividing the customs tariff revenue by the import value. Both the published and collection rates are calculated in two different ways: a simple average and an import weighted average. Tariff rates are calculated according to the input-output sectors to facilitate the calculation of effective rates of protection. The input-output sectors are matched with 4-digit tariff codes, and these are then averaged over the input-output sector. The average for the input-output sector is then matched to the 3-digit ASI sector.

Published tariff rates for 1980-81, 1988-89 and 1996-97 are reported in Table 5. The simple average for manufacturing industry as a whole was 93.40 in 1980-81. This rose to 129.37 percent in 1988-89, falling to 44.35 percent in 1996-97. The highest tariff in 1980-81 was on cotton textiles, wool, silk and other man-made fibre textiles, jute textiles and leather and leather products (around 115 percent), in basic chemicals and chemical products in 1988-89 (165.22 percent) and in beverages and tobacco in 1996-97 (77 percent). The lowest tariff was on paper and publishing in all three years (73, 84 and 25 percent respectively). As is evident, there has been an increase between 1980-81 and 1988-89, and then a substantial reduction in tariff rates for all industry groups during 1988-89 to 1996-97.

Import weighted published tariff rates show a substantial decrease between 1988-89 and 1996-97 for manufacturing industry as a whole and for each of the 2-digit industry groups separately. The import weighted average for manufacturing industry as a whole decreased from 124.6 percent in 1988-89 to 42.01 percent in 1996-97. In 1988-89, all the industry groups except for manufacture of paper, printing, etc. (35.41 percent) and manufacture of wool, silk, man-made fibre textiles (98.79 percent) and other manufacturing industries (98.72 percent) was over 100 percent. Manufacture of basic chemicals and chemical products, manufacture of metal products and parts and manufacture of beverages, tobacco, etc. had tariff rates over 150 percent. By 1996-97, most of them had decreased to below or close to 50 percent. The tariff rate for the manufacture of beverages, tobacco, etc. was the highest at 80.93 percent, while the manufacture of paper, printing, etc. was the lowest at 20.94 percent. As in the case of coverage ratios, the decrease is sharpest in the case of basic and capital goods industries.

Table 5: Published Tariff Rates

Industry	1980-81 Simple	1988-89 Simple	1996-97 Simple	1988-89 Weighted	1996-97 Weighted
Manufacture of Food Products	110.29	132.30	39.76	131.11	41.37
Manufacture Of beverages, Tobacco, etc.	112.28	150.00	77.00	150.00	80.93
Manufacture of Cotton Textiles	115.00	124.55	52.00	147.21	52.00
Manufacture of Wool, Silk and Man Made Fibre Textiles	115.00	117.41	51.44	98.79	48.66
Manufacture of Jute and Other Vegetable Fibre Textiles	115.00	135.14	51.96	116.39	51.80
Manufacture of Textile Products	115.53	145.80	52.55	117.10	51.56
Manufacture of Wood and wood products, furniture and fixtures	86.51	115.91	37.52	119.53	38.18
Manufacture of Paper, etc; Printing, etc.	73.60	84.09	25.26	35.41	20.94
Manufacture of Leather, etc.	115.00	132.50	43.25	118.92	33.15
Manufacture of Basic Chemicals and Chemical Products	81.44	165.22	40.96	184.99	36.64
Manufacture of Rubber, Plastic, Petroleum and Coal Products	82.33	129.10	39.28	130.99	31.39
Manufacture of non-metallic mineral products	75.36	134.14	50.26	110.40	48.82
Basic Metal and Alloy Industries	70.81	132.18	31.16	138.81	28.40
Manufacture of metal products and parts	79.18	142.36	36.07	156.71	32.31
Manufacture of Machinery and Equipment	74.83	119.30	38.42	129.73	33.65
Manufacture of Transport Equipment	86.43	111.14	42.21	133.55	44.31
Other Manufacturing Industries	79.18	128.14	44.80	98.72	40.08

Source: 1980-81 – Goldar and Saleem (1992); 1988-89 and 1996-97- our calculations based on DGCIS data.

Table 6: Nominal Rate of Protection (Published Rates) – Use Based Classification

	Simple		Weighted	
	1988-89	1996-97	1988-89	1996-97
Consumer Goods	130.29	47.68	120.66	46.77
Intermediate Goods	133.20	40.07	129.27	36.69
Capital Goods	111.37	38.58	126.94	35.04

Source: Our Calculations

The use-based classification (Table 6) shows that in 1988-89, intermediate goods had the highest nominal protection followed by consumer goods and then capital goods by the simple averaging method, while protection was higher for capital goods as compared to consumer goods by the import-weighted average method. By 1996-97, the highest protection by both methods was for the consumer goods industries, followed by intermediate and capital goods industries.

Collection rates of import duty are reported in Table 7 for three years, 1980-81, 1988-89 and 1996-97. DGCIS does not publish the 1988-89 customs revenue data separately for basic, auxiliary and additional duties. It is clear, however, that collection rates have declined over the period. The simple average for manufacturing industry in 1980-81 was 37.23 percent, falling to 33.83 percent in 1996-97. If the 1996-97 proportion were applied to the 1988-89 data, then the industry average excluding additional duty would be 54.5 percent, signifying an increase during the 1980's. The import-weighted average of collection rates inclusive of additional duty for manufacturing industry shows an increase from 41.89 percent in 1988-89 to 45.20 percent in 1996-97, although it decreases for the economy as a whole. By 1996-97, the collection rate excluding additional duty was close to 30 percent.

Table 7: Import Duty Collection Rates

		1980-81	1988-89	1996-97	1996-97	1988-89	1996-97	1996-97
					Excl. Addl.			Excl. Addl.
ASI Code	Description		<u>Simple</u>		<u>Weighted</u>			
20-21	Manufacture of Food Products	8.37	57.63	40.00	36.34	21.94	29.14	26.46
22	Manufacture Of beverages, Tobacco, etc.	9.85	2.38	110.16	99.13	2.38	60.62	55.11
23	Manufacture of Cotton Textiles	0.00	7.57	12.80	6.85	3.67	18.30	8.19
24	Manufacture of Wool, Silk and Man Made Fibre Textiles	1.88	41.27	51.14	45.56	34.16	40.96	36.69
25	Manufacture of Jute and Other Vegetable Fibre Textiles	0.00	101.39	31.56	19.73	22.31	41.19	24.32
26	Manufacture of Textile Products	0.00	45.30	38.95	25.63	10.58	42.09	27.40
27	Manufacture of Wood and wood products, furniture and fixtures	0.00	67.02	46.58	35.34	49.28	43.28	36.46
28	Manufacture of Paper, etc; Printing, etc.	21.78	79.48	36.04	30.37	10.60	17.42	15.74
29	Manufacture of Leather, etc.	0.00	18.60	12.58	8.18	4.55	11.47	11.17
30	Manufacture of Basic Chemicals and Chemical Products	78.93	92.49	60.45	35.90	99.46	38.92	23.52
31	Manufacture of Rubber, Plastic, Petroleum and Coal Products	129.77	150.14	54.77	35.74	50.24	67.97	50.92
32	Manufacture of non-metallic mineral products	45.75	110.47	46.87	30.66	67.84	55.76	41.35
33	Basic Metal and Alloy Industries	59.77	78.09	46.22	36.03	70.25	87.37	52.37
34	Manufacture of metal products and parts	58.09	102.00	65.01	53.41	51.20	35.98	30.99
35-36	Manufacture of Machinery and Equipment	89.66	104.50	52.05	30.90	77.01	62.93	23.14
37	Manufacture of Transport Equipment	70.91	134.20	40.67	24.13	112.46	73.98	31.34
38	Other Manufacturing Industries	58.09	70.28	37.76	21.16	24.25	40.95	16.23

Source: 1980-81 – Gang and Pandey (1998); 1988-89 and 1996-97 - our calculations based on DGCIS data.

Table 8: Nominal Rate of Protection (Collection Rates) – Use Based Classification

	Simple			Weighted	
	1980-81	1988-89	1996-97	1988-89	1996-97
Consumer Goods	25.18	57.00	45.67	24.49	39.25
Intermediate Goods	42.56	87.59	47.84	51.70	47.87
Capital Goods	80.53	116.73	46.79	94.40	67.61

Source: Our calculations

The use-based classification for the collection rates shows the highest protection for the capital goods industries in all years, followed by intermediate goods. Consumer goods industries had the lowest protection. The simple average method shows that protection increased in the first sub-period for all industry groups, and then decreased for all groups in the second sub-period. The weighted average method applied to the second sub-period shows a decrease for intermediate goods and capital goods, but an increase in the case of consumer goods.

2.4.3 Structure of Effective Protection in India

Earlier studies on the structure of effective protection have mostly used the Simple Corden measure. Panchamukhi (1978) studied the secondary sector for 1968-69 and found high levels of protection in most of the industries. Nambiar (1983) found a somewhat different picture, with some of the protection rates being quite low, and a number of them negative. The effective protection rates using direct price comparisons shows a still larger variation. Goldar and Saleem' s ERP measures for three different years shows high rates of protection in the manufacturing sector, as do the measures calculated by Gang and Pandey (1998). The latter's measure of ERP for 1996-97 shows a general decline from the 1991-92 levels. A comparison of all these measures suggests that the levels and patterns of protection are dependent largely upon the nature of the tariff rate on which these measures are based.

The effective rates of protection calculated in the current study are presented in Table 9. Effective rates of protection show a decline for all 2-digit industries considered in the sample during the same period. Effective Protection based on published tariff shows a substantial decrease between 1988-89 and 1996-97, for manufacturing industry

separately and for the economy as a whole. In 1988-89, the most protected sectors were food products, jute and other vegetable fibre textiles and basic chemicals and chemical products. The average ERP based on import-weighted published tariff rates for all manufacturing industry declines from 161.06 percent in 1988-89 to 52.87 in 1996-97. In 1988-89, the most protected sector was the manufacture of food products at 424.50 percent, followed by the manufacture of basic chemicals and chemical products at 264.70 percent. Other sectors that were highly protected included manufacture of beverages, tobacco, etc., manufacture of cotton textiles, manufacture of jute textiles, manufacture of leather, etc., basic metal and alloy industries and manufacture of metal products and parts, with protection rates varying from 171 percent to 190 percent. Most of the other industry groups also showed high effective protection, ranging from 89 percent to 137 percent. These included manufacture of wool, silk and man-made textiles, textile products, wood and wood products, manufacture of rubber, plastic, petroleum and coal products, non-metallic mineral products, manufacture of machinery and equipment, transport equipment and other manufacturing industries. There is only one industry that has low effective protection, manufacture of paper and paper products, and printing, etc. with 16.97 percent. By 1996-97, there are only two sectors that have ERPs greater than 100 percent. These are manufacture of food products (102.83 percent) and manufacture of beverages, tobacco etc. (128 percent). Apart from manufacture of paper and paper products, and printing, etc. that has an ERP of 16.97 percent, all other sectors have ERPs ranging from 30 percent to 65 percent.

Use-based classification of effective rates of protection according to published rates (Table 12) shows that according to the simple average method, protection was highest for consumer goods in both 1988-89 and 1996-97, followed by intermediate goods and then capital goods. ERP declined for all three in 1996-97, maintaining the ranking. According to the weighted average method ERP was highest for intermediate goods in 1988-89, followed by consumer goods and then capital goods. There was a decrease in all three by 1996-97, and the most protected sector was consumer goods, followed by intermediate goods and then capital goods. The evidence on ERP clearly

shows that during the 1990s, reform measures were not only focused on reducing tariff and non-tariff barriers, it also resulted in a reduction in effective rates of protection.

Effective protection based on collection rates, reported in Table 10, shows a different picture. The industry average shows an increasing trend over 1980-81 to 1996-97. One of the reasons for this is that a number of sectors were dis-protected in 1979-80. Looking at the direction of change in effective protection (Table 11), we see that in the case of simple averages, protection increased for a majority of the sectors between 1980-81 and 1988-89, while it decreased for more sectors between 1988-89 and 1996-97. In the case of weighted averages, however, there were more increases during 1988-89 to 1996-97. The use-based classification for effective protection based on collection rates (Table 13) shows that according to the simple average method, effective protection was highest for the capital goods industries in 1980-81, followed by intermediate goods and then consumer goods. Effective protection increased in 1988-89 for intermediate and capital goods and decreased in 1996-97, while it increased in both years for capital goods industries. By 1996-97, protection was highest for consumer goods, and lowest for capital goods. According to the weighted average method, both consumer goods and intermediate goods showed an increase in effective protection from 1988-89 to 1996-97, while capital goods showed a decrease. By this method, in 1996-97 intermediate goods had the highest effective protection and capital goods the lowest.

Table 9: Effective Protection Based on Published Rates

Industry Code	Industry	1988-89 Simple	1996-97 Simple	1988-89 Weighted	1996-97 Weighted
20-21	Manufacture of Food Products	262.85	60.51	424.25	102.83
22	Manufacture Of beverages, Tobacco, etc.	178.48	117.04	182.85	128.12
23	Manufacture of Cotton Textiles	144.17	65.03	177.44	60.95
24	Manufacture of Wool, Silk and Man Made Fibre Textiles	115.93	59.15	128.67	57.15
25	Manufacture of Jute and Other Vegetable Fibre Textiles	219.56	60.18	176.34	60.46
26	Manufacture of Textile Products	157.58	57.44	116.37	58.10
27	Manufacture of Wood and wood products, furniture and fixtures	130.61	42.95	128.33	35.72
28	Manufacture of Paper, etc; Printing, etc.	73.55	21.64	16.97	16.97
29	Manufacture of Leather, etc.	149.38	47.35	190.40	35.33
30	Manufacture of Basic Chemicals and Chemical Products	213.66	45.04	876.72	39.88
31	Manufacture of Rubber, Plastic, Petroleum and Coal Products	148.71	64.52	788.89	40.39
32	Manufacture of non-metallic mineral products	143.91	61.02	134.21	65.10
33	Basic Metal and Alloy Industries	153.73	33.30	171.94	29.97
34	Manufacture of metal products and parts	130.74	40.74	174.72	34.11
35-36	Manufacture of Machinery and Equipment	106.83	41.82	132.26	36.99
37	Manufacture of Transport Equipment	103.59	46.18	137.29	50.13
38	Other Manufacturing Industries	126.56	51.55	91.89	46.53

Source: Our Calculations

Table 10: Effective Protection Based on Collection Rates

		1980-81	1988-89	1996-97	1996-97	1988-89	1996-97	1996-97
					Excl. Addl.			Excl. Addl.
ASI Code	Description			Simple			Weighted	
20-21	Manufacture of Food Products	18.50	9.77	-111.56	176.24	150.65	71.66	59.18
22	Manufacture Of beverages, Tobacco, etc.	23.11	-18.07	-13.40	193.75	178.00	87.88	81.28
23	Manufacture of Cotton Textiles	-6.35	-0.40	-4.53	12.90	5.76	23.23	9.09
24	Manufacture of Wool, Silk and Man Made Fibre Textiles	-25.60	36.87	47.79	72.30	71.67	52.66	54.26
25	Manufacture of Jute and Other Vegetable Fibre Textiles	-5.22	305.35	31.35	32.80	20.97	48.06	28.49
26	Manufacture of Textile Products	-9.48	65.83	2.30	48.56	32.31	54.39	37.82
27	Manufacture of Wood and wood products, furniture and fixtures	-6.95	57.83	40.16	47.36	37.15	49.72	41.00
28	Manufacture of Paper, etc; Printing, etc.	31.15	80.22	1.59	33.10	31.24	16.47	17.34
29	Manufacture of Leather, etc.	-23.45	15.21	-7.62	6.36	3.31	7.23	8.94
30	Manufacture of Basic Chemicals and Chemical Products	118.98	124.96	255.91	100.12	48.54	54.88	28.05
31	Manufacture of Rubber, Plastic, Petroleum and Coal Products	-246.75	-731.67	66.81	100.76	54.55	340.26	203.33
32	Manufacture of non-metallic mineral products	196.04	162.09	-35.88	49.74	27.57	73.84	57.09
33	Basic Metal and Alloy Industries	130.16	79.50	90.22	57.49	47.36	189.81	99.87
34	Manufacture of metal products and parts	95.82	125.94	64.50	75.90	64.34	35.15	35.58
35-36	Manufacture of Machinery and Equipment	280.98	119.66	111.33	53.98	28.51	-55.21	23.10
37	Manufacture of Transport Equipment	-295.86	302.13	439.45	33.13	16.60	32.60	35.44
38	Other Manufacturing Industries	95.82	65.80	15.46	32.82	14.63	37.94	9.07

Source: Our Calculations

Table 11: Direction of Change in Effective Protection - Collection Rates

		1980-81 to 1988-89	1988-89 to 1996-97	1988-89 to 1996-97
ASI Code	Description	<u>Simple</u>	<u>Simple</u>	<u>Weighted</u>
20-21	Manufacture of Food Products	-	-	-
22	Manufacture Of beverages, Tobacco, etc.	-	+	-
23	Manufacture of Cotton Textiles	+	-	+
24	Manufacture of Wool, Silk and Man Made Fibre Textiles	+	+	-
25	Manufacture of Jute and Other Vegetable Fibre Textiles	+	-	+
26	Manufacture of Textile Products	+	-	+
27	Manufacture of Wood and wood products, furniture and fixtures	+	-	+
28	Manufacture of Paper, etc; Printing, etc.	+	-	-
29	Manufacture of Leather, etc.	+	-	+
30	Manufacture of Basic Chemicals and Chemical Products	+	+	+
31	Manufacture of Rubber, Plastic, Petroleum and Coal Products	-	+	+
32	Manufacture of non-metallic mineral products	-	-	+
33	Basic Metal and Alloy Industries	-	+	+
34	Manufacture of metal products and parts	+	-	-
35-36	Manufacture of Machinery and Equipment	-	-	-
37	Manufacture of Transport Equipment	+	+	+
38	Other Manufacturing Industries	-	-	+
		Increase 10	Increase 6	Increase 11
		Decrease 7	Decrease 11	Decrease 6

Source: Our Calculations

Note: Effective Protection has declined for all sectors by the published rates method.

Table 12: Effective Rate of Protection (Published Rates)**– Use Based Classification**

	Simple		Weighted	
	1988-89	1996-97	1988-89	1996-97
Consumer Goods	169.75	60.11	204.03	69.28
Intermediate Goods	155.25	48.41	342.18	41.45
Capital Goods	98.84	42.24	129.26	37.94

Source: Our calculations

Table 13: Effective Rate of Protection (Collection Rates)**– Use Based Classification**

	Simple			Weighted	
	1980-81	1988-89	1996-97	1988-89	1996-97
Consumer Goods	30.87	58.70	86.51	15.60	63.67
Intermediate Goods	21.45	122.31	64.44	58.54	96.29
Capital Goods	91.12	197.31	44.48	261.76	35.17

Source: Our calculations

2.5 Summary and Conclusions

Our estimates show that the level of protection varies according to the notion of tariff rate used. Both the NRP and ERP are in general lower than the ones based on the published tariff rate. The published tariff rate for industry as a whole increases from 1980-81 to 1988-89, and thereafter declines. The ranking of industries change over time; the highest tariff in 1980-81 was on cotton textiles, wool, silk and other man-made fibre textiles, jute textiles and leather and leather products (around 115 percent), in basic chemicals and chemical products in 1988-89 (165.22 percent) and in beverages and tobacco in 1996-97 (77 percent). The lowest tariff was on paper and publishing in all three years. A similar trend is seen in the case of import weighted published rates, with the sharpest decline seen in the case of intermediate and capital goods. Both the simple and import weighted collection rates show a decline during 1980-81 to 1988-89 as well.

Effective rates of protection based on published rates were high, but show a decrease during 1988-89 to 1996-97. For example, the average ERP based on import-weighted published tariff rates for all manufacturing industry declines from 161.06 percent in 1988-89 to 52.87 in 1996-97. ERP based on collection rates was also high, but

the direction of change was not as unambiguous as that based on published rates. A number of industry groups show an increase in protection levels between 1988-89 and 1996-97.

These results are similar to the findings of earlier studies on protection in India. Goldar and Saleem reported lower ERP' s using collection rates as compared to published rates. Das (2001) found a decrease in protection level during 1991-95, with intermediate and capital goods showing lower protection levels as compared to consumer goods.

In addition to protection measures, we calculated coverage ratios of non-tariff barriers for two years, 1988-89 and 1996-97. The coverage ratio for all industries was high of 85.73 percent in 1988-89, but declined to 46.98 percent in 1996-97. Within this, capital goods saw the maximum decrease, followed by intermediate goods. The coverage ratio for consumer goods continued to be 64 percent even in 1996-97.

Our work suffers from the usual limitations of all studies that attempt to measure trade policy measures. The coverage ratios are not complete measures of non-tariff barriers, and in particular, do not show the effect of import controls. The ERP estimates suffer from restrictive assumptions related to the use of input-output tables and the lack of appropriate price data. Moreover, it was not possible to take into account all duty exemptions – only those that applied to a six-digit tariff line were accounted for.

3. Performance of Indian Industry

3.1 Introduction

As is well known, growth of industrial output was high until 1964-65, followed by a deceleration until 1979-80, after which there was a revival in the growth rate of industrial output. Among others, Nagaraj (1989) examines the performance of Indian industry during the 1980s using the National Accounts Statistics and finds that the 1980s had higher growth rates of value added. This was true of a wide range of industries

accounting for two-fifths of the registered manufacturing output. Nagaraj (1990) finds further evidence in support of the growth of manufacturing output in the 1980s using ASI data. Net value added (NVA) of a majority of the manufacturing sector accounting for three-fifths of the number of industries recorded annual average growth rates of between 5 percent to 30 percent per annum. Within this, some industries including consumer durables grew at much higher rates than the machinery manufacturing industries. Bhargava and Joshi (1990) examine the growth rates of GDP at both the aggregate and disaggregate levels, considering alternatively both 1975-76 and 1980-81 as the break years. In the case of 1975-76 as the break year, there is a significant (although less than 1 percent) increase in unregistered manufacturing, while the increase in registered manufacturing is not significant. With 1980-81 as the break year, registered manufacturing shows a statistically significant increase in the annual growth rate from 4.7 percent during 1960-61 to 1980-81 to 9.8 percent during 1980-81 to 1986-87.

In this section we examine some performance variables for the registered manufacturing sector in India during 1980s and 1990s. The period chosen corresponds to the time when policy changes were initiated in the economy. We discuss issues relating to data and variables and trends in output, gross value added, output and value added per worker, employment and wages, export intensity, import penetration, profitability and price cost margin.

3.2 Data and Variables

Data for three years, 1980-81, 1988-89 and 1996-97, pertaining to the registered sector only are taken from the Annual Survey of Industries (ASI) for this study. The ASI follows the National Industrial Classification (NIC). According to this, each production unit is classified in an industry group on the basis of the value of the principal product manufactured by it. While data for the first two years are based upon the NIC-70 classification, that for the last year is based upon NIC-87. According to NIC-87, manufacturing industry is classified into 26 two-digit groups, which are further sub-

divided into 3-digit groups. The data for 1980-81 and 1988-89 are matched to the NIC-87 classification according to the concordance tables published by NIC.⁶

The coverage of the Annual Survey of Industries extends to all factories registered under the Factories Act. All registered factories are expected to file an annual return. A census of all factories employing 50 workers and above using power or 100 workers and above and not using power is conducted by the CSO every year. Sample surveys covering one-half of all factories employing between 10 and 50 workers using power or between 20 and 100 workers not using power are conducted every year. It appears, however, that more than 50 percent of the manufacturing establishments are not registered under the Factories Act, suggesting a gross under-reporting of factories. Moreover, the proportion of factories registered under the Act has seen a decline in recent years.⁷ The ASI publishes annual data at a disaggregated three-digit industry level for a number of variables. These include variables on capital (fixed and working), employment (workers, employees and total persons engaged), wages and emoluments, inputs consumed, value of output, depreciation, net value added, net and gross fixed capital formation, increase in stocks, gross capital formation and profits.

Variables for 17 two-digit industry groups (20 to 38) pertaining to manufacturing industry are reported.⁸ Variables are gross output, profitability, employment, wage, gross value added, output per worker, value added per worker, average work, imports, exports, import penetration and export intensity. Data for imports and exports are taken from the Directorate General of Commercial Intelligence and Statistics (DGCIS). Trade data is

⁶ There are two sources of data for industrial production. One is the index of industrial production (IIP) and the other is National Accounts Statistics that is based on ASI data. While the IIP is available at monthly intervals, the NAS is published annually, but with a longer time lag. The IIP is available for 18 two-digit industry groups, as well as five use-based, three input-based and two sector-based categories. The source of the data used for the index is voluntary reporting of monthly output by firms with equipment investment of over Rs. 20 lakh in 1980. Small-scale firms are included in those industry groups where they dominate. The IIP is revised every ten years or so. The index is, however, plagued by incomplete coverage, and does not cover the unregistered manufacturing sector at all. Moreover, with the ease of controls on output and investment since the early 1980s, non-reporting may have gone up.

⁷ See Nagaraj (1999) for other evidence of poor coverage as well as under-reporting of value added.

⁸ The excluded sectors are Repair of capital goods, Electricity, Gas and steam generation etc., Water works and supply, Non-conventional energy generation and distribution, Storage and warehousing services, and Repair services.

available according to the ITC (HS) classification. Since this is different than the NIC classification, a concordance between trade and industry data has been prepared and trade data matched to the NIC categories.

Suitable deflators have been used to deflate the time series data. The wholesale price index (base 1981-82 = 100) for different sectors has been used for this purpose.

3.3 Industry Performance: 1980s and 1990s

Data relating to registered units in the country are used to assess industry performance⁹. Registered manufacturing units account for approximately two-thirds of the GDP. During 1998-99, of the total percentage share of 15.6 per cent in the GDP by the manufacturing units, the registered manufacturing units had a share of 10.3 per cent.

3.3.1 Trends in the Growth and Structure of Output

Output of the registered manufacturing sector has recorded an impressive growth during 1980-81 to 1996-97. For all manufacturing industries, output grew at the rate of 9.69 percent per annum during 1980-81 to 1988-89, increasing to 10.46 percent per annum during 1988-89 to 1996-97. There has been an increase in output of all 2-digit industry groups except for the manufacture of jute and other vegetable fibre textiles. For industries that registered a positive growth, annual rates of growth have varied between 1% and 50% (Table 14). While the manufacture of wood and wood products, furniture and fixtures grew by less than 1%, three others, viz. beverages and tobacco, cotton textiles, and metal products and parts grew at a rate between 1% and 10%. The highest growing sectors were textile products, transport equipment and other manufacturing industries.

It appears that the high growth of the registered manufacturing sector during the 1980s has continued into the 1990s. In earlier studies of the 1980s, Nagaraj (1989) had

⁹ 'Registered units', refer to the units registered under sections 2m(i) and 2m(ii) of the Factories Act 1948 or under the Bidi and Cigar Workers (Condition of Employment) Act 1966 i.e. those employing 10 or more workers and using power and 20 or more workers but not using power.

found the growth rate of the registered manufacturing sector to be 10.4 percent per annum during 1980-81 to 1986-87, while Bhargava and Joshi (1990) had found growth rate of output to be 9.8 percent per annum during the same period.¹⁰ Nagaraj had compared growth in the post 1980 period with two earlier periods, the period of high growth from the mid-1950s to mid-1960s, and a period of stagnation between the mid-1960s to 1980-81. He found the growth in the 1980s to be 10.4 percent per annum, as compared to 7.6 percent per annum before the mid-1960s and 5.5 percent per annum between 1965-66 and 1980-81. Bhargava and Joshi's estimate of sectoral GDP suggests similar growth rates. During the 1960s and 1970s the annual growth rate of GDP originating in the industrial sector was a low 4.74 percent, while it was 9.87 percent during 1980-81 to 1988-89.

Table 14: Growth in Output of Registered Manufacturing Sector

		Annual Rates of Growth		
ASI code	Description	1980-81 to 1988-89	1988-89 to 1996-97	1980-81 to 1996-97
20-21	Manufacture of food products	10.62	7.52	12.26
22	Manufacture of beverages, tobacco, etc.	6.82	5.28	7.49
23	Manufacture of cotton textiles	2.50	5.66	4.64
24	Manufacture of wool, silk and man made fibre textiles	12.56	12.63	18.94
25	Manufacture of jute and other vegetable fibre textiles	-4.27	3.24	-1.07
26	Manufacture of textile products	9.83	19.66	22.47
27	Manufacture of wood and wood products, furniture and fixtures	5.33	-2.39	0.96
28	Manufacture of paper, etc; printing, etc.	4.96	11.44	10.46
29	Manufacture of leather, etc.	9.30	14.27	17.10
30	Manufacture of basic chemicals and chemical products (except products of petroleum and coal)	12.20	13.80	19.73
31	Manufacture of rubber, plastic, petroleum and coal products	11.17	12.30	17.23
32	Manufacture of non-metallic mineral products	15.63	7.22	15.94
33	Basic metal and alloy industries	8.50	6.97	10.11
34	Manufacture of metal products and parts	5.89	8.20	8.98
35-36	Manufacture of machinery and equipment	9.41	10.06	13.52
37	Manufacture of transport equipment	12.12	19.06	24.83
38	Other manufacturing industries	46.86	11.78	51.40
	All Manufacturing	9.69	10.46	14.13

Source: Annual Survey of Industry

¹⁰ Growth rate during 1960-61 to 1980-81 was found to be 4.7 percent per annum by Bhargava and Joshi. Our own study has not examined the pre-1980 period.

Table: 15 Growth of the Registered Manufacturing Sector – Comparative Results
(Percent p.a.)

Period	Years	Nagaraj (1989)	Bhargava and Joshi (1990)	Ours
I	Pre-1965-66	7.6	-	-
II	1965-66 to 1980-81	5.5	-	-
	1960-61 to 1980-81	-	4.74	-
III	1980-81 to 1986-87	10.4	9.87	-
	1980-81 to 1988-89	-	-	9.69
IV	1988-89 to 1996-97	-	-	10.46

Source: Nagaraj (1989), Bhargava and Joshi (1990) and our calculations.

There has been a change in the relative importance of different industries as well during this period. The share of industry groups like food products, cotton textiles, jute and other vegetable fibre textiles, and wood and wood products declined significantly, while that of textile products, basic chemicals and chemical products, transport equipment and other manufacturing industries increased.

Growth of Gross Value Added (GVA) during this period shows a similar trend (Table 16). During 1980-81 to 1988-89, the annual rate of growth was 9.85 percent, increasing to 12.17 percent during 1988-89 to 1996-97.¹¹ Jute and other vegetable fibre textiles show a negative growth, while cotton textiles, wood and wood products, furniture and fixtures, paper and paper products, and metal products and parts show low annual growth. The share of cotton textiles, jute and other vegetable fibre textiles, paper and paper products, and machinery and equipment in GVA decreased over the period, while that of textile products, basic chemicals and chemical products, rubber, plastic, petroleum and coal products, transport equipment and other manufacturing industries increased.

¹¹ Nagaraj (1990) had similar findings. While growth rate of the factory sector gross value added based on ASI data, deflated by WPI, was 8.3 percent per annum during 1980-81 to 1985-86, the gross value added at 1980-81 prices based on the NAS was 9.6 percent. Growth rate of GVA based on NAS data, deflated by WPI, was 10.7 percent per annum.

An examination of the growth of output and gross value added in the registered manufacturing sector according to a use-based classification at the three-digit level (Tables 17 and 18) shows that the consumer goods were the fastest growing throughout the period, as well as in the two sub-periods separately. It grew at just over 11 percent in

Table 16: Growth in Gross Value Added

		Annual Rates of Growth		
ASI code		1980-81 to 1988-89	1988-89 to 1996-97	1980-81 to 1996-97
20-21	Manufacture of food products	17.24	8.96	19.28
22	Manufacture of beverages, tobacco, etc.	12.26	7.70	13.75
23	Manufacture of cotton textiles	-0.75	4.76	1.86
24	Manufacture of wool, silk and man made fibre textiles	11.34	12.47	17.56
25	Manufacture of jute and other vegetable fibre textiles	-5.02	1.31	-2.12
26	Manufacture of textile products	19.32	25.90	42.63
27	Manufacture of wood and wood products, furniture and fixtures	4.60	1.56	3.37
28	Manufacture of paper, etc; printing, etc.	2.81	10.44	7.80
29	Manufacture of leather, etc.	9.78	18.15	21.06
30	Manufacture of basic chemicals and chemical products (except products of petroleum and coal)	12.64	19.30	25.73
31	Manufacture of rubber, plastic, petroleum and coal products	24.38	18.40	39.32
32	Manufacture of non-metallic mineral products	14.81	7.10	15.16
33	Basic metal and alloy industries	9.16	8.41	11.86
34	Manufacture of metal products and parts	6.98	7.35	9.22
35-36	Manufacture of machinery and equipment	8.78	8.45	11.59
37	Manufacture of transport equipment	7.86	20.35	20.51
38	Other manufacturing industries	44.19	8.45	41.25
	All Manufacturing	9.85	12.17	15.80

Source: Our calculations based on ASI data

Table 17: Growth of Output: Use-Based Classification

	1980-81 to 1988-89	1988-89 to 1996-97	1980-81 to 1996-97
Consumer Goods	11.61	11.28	16.68
Intermediate Goods	7.75	8.49	10.75
Capital Goods	9.01	9.64	12.80

Source: Our calculations

Table 18: Growth of Gross Value Added: Use-Based Classification

	1980-81 to 1988-89	1988-89 to 1996-97	1980-81 to 1996-97
Consumer Goods	13.67	13.61	42.18
Intermediate Goods	7.58	10.89	25.07
Capital Goods	6.99	8.85	20.79

Source: Our calculations

both the periods, although there was a mild deceleration in the second sub-period. Capital goods grew at slightly over 9 percent per annum in the two periods (with a mild acceleration in the second sub-period), while intermediate goods grew at 7.75 percent per annum during 1980-81 to 1988-89, increasing marginally to 8.49 percent per annum during 1988-89 to 1996-97. Gross value added showed a slightly different trend. While the annual growth rate was the highest for consumer goods industries, intermediate goods witnessed the next highest growth rate, followed by capital goods industries. Both intermediate goods and capital goods had a higher growth rate during the second period as compared to the first period. These growth rates are consistent with Ahluwalia (1991), and the high growth of the consumer goods industries can be attributed to the rise in incomes of the middle-income group during the 1980s that possibly fuelled an increase in consumer durables. Our analysis shows that this trend continued into the 1990s, and that the acceleration in growth rates in the 1980s was sustained in the 1990s.

We further examine the structure of manufacturing output according to the nature of manufacturing (Table 19). We use the OECD classification to classify industries into resource intensive, labour intensive, scale intensive and specialized supplier industries. Resource intensive industries include food and beverages, tobacco, wood products, petroleum refining, non-metallic mineral products and non-ferrous metals. Labour intensive industries include textiles, jute manufacturing, carpets, apparel and leather, metal products and other manufacturing industries. Scale intensive industries include paper and printing, chemicals excluding drugs, rubber and plastics, iron and steel, ship building, motor vehicles and other transport equipment and special supplier industries include electrical and non-electrical machinery, communications equipment and semiconductors.¹² According to this classification, labour intensive industries have diminished in importance during this period, although most of the change occurred during 1980-81 to 1988-89. The share of the resource intensive industries showed a marginal increase during the first half of the period, but thereafter shows a decrease.

¹² See Sharma (2000)

Scale intensive industries grew in importance throughout the period, accounting for 41% of the manufacturing output by 1996-97.

Table 19: Structure of Manufacturing Output

Classification	Percentage Share of Output		
	1980-81	1988-89	1996-97
Labour Intensive	20.3	17.8	17.4
Resource Intensive	33.8	34.2	29.1
Scale Intensive	33.1	35.4	41
Specialized Supplier Industries	12.8	12.7	12.5

Source: Our calculations based on ASI data

Liberalisation has thus helped the growth of the scale intensive industries such as chemicals, iron and steel, and transport equipment. Labour and resource intensive industries grew relatively less.

An examination of manufacturing output according to the nature of market orientation shows a substantial change over the period (Table 20). Industry groups for which imports form more than 10% of their output are classified as import competing, industries with more than 10% of output as exports are classified as export promoting, and the rest are classified as non-competing. Throughout 1980-81 to 1988-89, non-competing industries formed the bulk of the output. During this period, both nominal and effective protection was high, and a majority of imports were subject to licensing, thereby penalizing both imports and exports. During this period, the share of export promoting industries fell drastically, while that of the import competing industries increased. After 1988-89, the share of the export promoting industries shows an impressive growth. It is evident that outward oriented policy has diminished the importance of the non-competing industries that cater exclusively to the domestic market.

Table 20: Structure of Manufacturing Output According to Market Orientation

Trade Classification Index	Share of Output		
	1980-81	1988-89	1996-97
Export Promoting	19.5	3.1	24.8
Import Competing	36.6	51.1	52.1
Export Promoting / Import Competing	3.9	3.8	3.3
Non Competing	40.1	41.9	19.8

Source: Our calculations based on ASI data

3.3.2 Output and Value Added Per Worker

It is expected that an inward looking policy relying on tariff and non-tariff barriers will reduce efficiency by protecting the domestic producer from external competition. As well as restricting access to imported inputs and technologies. A change of policy should therefore lead to gain in economic efficiency, and should be reflected in increases in the productivity measures.¹³ Both the output per worker and value added per worker for the two digit industry classification between 1980-81 and 1996-97 show an increase for all industries except for the manufacture of rubber, plastic, petroleum and coal products. Four industry groups – beverages, tobacco etc, wool, silk and man-made fiber textiles, wood and wood products and metal products and parts – showed low changes in output per worker, but the others show impressive gains. Three industry groups show a decline in the post 1988-89 periods, compared to two in the first period. Value added per worker increased for all but two industry groups during the sixteen-year period. On the whole, labour productivity increased throughout the period, although there may have been a marginal slowing down in the second half of the period.

Output per worker for the use-based classification (Table 21) was the highest for intermediate goods industries, followed by capital goods industries in both 1980-81 and 1988-89. In 1996-97, however, capital goods industries had the highest output per worker, followed by intermediate goods industries. In all three years, consumer goods industries had the lowest output per worker. The growth rate of output per worker, however, was the highest for the consumer goods industries during sub-periods 1980-81 to 1988-89 and 1988-89 to 1996-97, although the growth rate fell by almost half in the latter sub-period, from 11.32 percent per annum in 1980-81 to 5.14 percent per annum in 1988-89. Capital goods industries grew at a steady rate of around 7 percent per annum in both sub-periods. Intermediate goods industries saw a substantial slowing down in the second sub-period, however, with the annual growth rate falling from 10.27 percent to 1.28 percent. The trend in GVA per worker is similar (Table 22).

¹³ A counter-argument to this is that opening the economy may discourage investment in technology improvement if domestic sales shrink, and therefore productivity may not increase. See Rodrik (1992)

Table 21: Growth in Output per Worker – Used Based Classification

(percent per annum)

Industry \ Year \diamond	1980-81 to 1988-89	1988-89 to 1996-97	1980-81 to 1996-97
Consumer Goods	11.32	5.14	10.56
Intermediate Goods	10.27	1.28	6.30
Capital Goods	7.79	7.41	9.91

*Source: Our calculations based on ASI data***Table 22: Growth in GVA per Worker – Used Based Classification**

(percent per annum)

Industry \ Year \diamond	1980-81 to 1988-89	1988-90 to 1996-97	1980-81 to 1996-97
Consumer Goods	13.36	6.88	13.80
Intermediate Goods	10.08	2.86	7.62
Capital Goods	5.88	6.70	7.87

Source: Our calculations based on ASI data

3.3.3 Employment and Wages

ASI data for manufacturing industry as a whole showed virtually no change in employment between 1980-81 and 1988-89, consistent with Ahluwalia (1991) who found a low negative rate of growth of employment (-0.7 percent per annum) during 1980-81 to 1985-86. There are some variations across industries, however. Five industry groups showed a decrease in employment, while eleven others showed an increase. Employment picked up after 1988-89, and all but one industry group (other manufacturing industries) showed an increase. For the period as a whole, textile products and rubber, plastic, petroleum and coal products had the highest employment growth, followed by leather, metal products and parts and other manufacturing industries. Rubber, plastic, petroleum and coal products appear to be an outlier, showing an extraordinarily high rate of growth. If we exclude that, then there was very little employment growth during this period as well.

The use-based classification (Table 23) shows low rates of growth in employment in both the consumer and capital goods industries during 1980-81 to 1988-89. During this period, employment in the intermediate goods industries grew at a negative rate. In the subsequent period, employment growth picked up for all industry groups, with the

highest rate of growth experienced in the intermediate goods industry (6.54 percent per annum), followed by consumer goods industries (4.35 percent per annum). Employment growth in the capital goods industries continued to be low at 1.40 percent per annum. Low growth of employment during the first period can partly be attributed to the nature of industrial growth, which was import and energy intensive with little potential for employment generation [Krishna (2001)].

Table 23: Growth in Employment – Use Based Classification
(percent per annum)

	1980-89	1988-97	1980-97
Consumer Goods	0.15	4.35	4.55
Intermediate Goods	-1.38	6.54	4.43
Capital Goods	0.75	1.40	2.23

Source: Our calculations based on ASI data

Table 24: Growth in Average Wages – Use Based Classification
(percent per annum)

Description	1980-89	1988-97	1980-97
Consumer Goods	8.66	1.87	5.91
Intermediate Goods	4.24	-1.76	0.94
Capital Goods	5.27	3.26	4.95

Source: Our calculations based on ASI data

Average wage across all manufacturing industry groups shows an increase between 1980-81 and 1988-89, but thereafter is stagnant. This overall trend is influenced by one outlier – rubber, plastic, petroleum and coal products – that showed a large decrease in average wage during 1988-89 to 1996-7. This was in turn caused by a large increase in employment. If we disregard this sector as well, then the average wage increases by 53 percent over the entire period. While the growth is 34 and 36% between 1980-81 and 1988-89, it is between 14 and 23% between 1988-89 and 1996-97. Industry groups that witnessed slow growth of average wage were beverages and tobacco, and jute and other vegetable fibers. The highest rise of average wages was seen in food products, basic chemicals and chemical products, machinery equipment, transport equipment and other manufacturing industries.

Average wage was the highest for capital goods industries in all three years; Average wage was second highest in the intermediate goods industries and lowest in the consumer goods industries in 1980-81 and 1988-89. In 1996-97, however, average wage in the intermediate goods industries was lower than that in the consumer goods industries. The rate of growth of average wage (Table 24) showed a decrease for all the three industry groups in the second sub-period, the decrease being most for consumer goods industries. Intermediate goods industries witnessed a negative rate of growth in the second sub-period.

3.3.4 Trade Orientation

Economic liberalization, especially trade policy liberalization, directly affects both export and import performance. Protective policies penalize a country's export because of at least two reasons. Due to reductions in competitive pressure, a certain degree of inefficiency is introduced in domestic production. This renders exports uncompetitive in the foreign market. Moreover, the lack of access to imported inputs also works against exporters, since the same is available to producers in other countries. Adopting an outward oriented trade policy results in reductions of biases against exporters, and we should expect an improvement in the export performance. This is, however, dependent upon an elastic export supply function: pressure of supply bottlenecks would continue to constrain export performance. Low export supply elasticity may be a result of infrastructure bottlenecks or shortage of specialized labour. The effect of trade liberalization on export performance is therefore ambiguous. The effect of trade liberalization on imports is also ambiguous. Import liberalization would result in a greater access to imported inputs and technologies. Also, increased competition would force domestic producers to adopt cost reducing steps, and should result in domestic industries becoming more competitive. If this happens, import penetration would decrease. If, however, domestic industries do not become competitive, and continue to be high cost industries, then import penetration may rise. Competitiveness of the import competing sector is the crucial factor in determining whether import penetration would rise or not.

Exports of all manufacturing industries grew by around 8 percent per annum during 1980-81 to 1988-89. A number of industry groups had negative growth during this period, however. This included food products, beverages, tobacco, etc, cotton textiles, wool, silk and man-made fiber textiles, jute and other vegetable fiber textiles, and transport equipment. 1988-89 to 1996-97 saw impressive growth rates of exports for the manufacturing sector. During this period, exports grew at a rate of more than 25 percent per annum, with only two industry groups registering negative growth (jute and other vegetable fiber textiles, and wood and wood products, furniture and fixtures).

Export performance of Indian industry is also measured by export intensity (Table 25). Export intensity, measured as the ratio of exports to output, remained virtually constant for all manufacturing industries between 1980-81 and 1989-90. Roughly half the two digit industry groups had falling export intensity during this time. There was a significant increase in overall export intensity in the subsequent period, with the export intensity rising from 0.071 to 0.123. Also, most of the individual industry groups witnessed increasing export intensity during this period. Only jute and other vegetable fiber textiles showed falling export intensity throughout the sixteen-year period.

Table 25: Export Intensity in Manufacturing Industry

Export Intensity		Values		
ASI code	Description	1980-81	1988-89	1996-97
20-21	Manufacture of food products	0.129	0.071	0.113
22	Manufacture of beverages, tobacco, etc.	0.048	0.024	0.039
23	Manufacture of cotton textiles	0.045	0.013	0.162
24	Manufacture of wool, silk and man made fibre textiles	0.067	0.020	0.043
25	Manufacture of jute and other vegetable fibre textiles	0.146	0.074	0.069
26	Manufacture of textile products	0.519	0.563	0.715
27	Manufacture of wood and wood products, furniture and fixtures	0.004	0.073	0.031
28	Manufacture of paper, etc; printing, etc.	0.006	0.006	0.017
29	Manufacture of leather, etc.	0.159	0.381	0.371
30	Manufacture of basic chemicals and chemical products (except products of petroleum and coal)	0.028	0.057	0.104
31	Manufacture of rubber, plastic, petroleum and coal products	0.015	0.031	0.059
32	Manufacture of non-metallic mineral products	0.277	0.487	0.502
33	Basic metal and alloy industries	0.003	0.017	0.064
34	Manufacture of metal products and parts	0.024	0.021	0.065
35-36	Manufacture of machinery and equipment	0.033	0.035	0.070
37	Manufacture of transport equipment	0.056	0.021	0.058
38	Other manufacturing industries	0.126	0.049	0.129
	All Manufacturing	0.069	0.071	0.123

Source: Our calculations based on ASI and DGCI&S data

Table 26: Import Penetration in Manufacturing Industry

ASI code	Description	1980-81	1988-89	1996-97
20-21	Manufacture of food products	0.071	0.030	0.035
22	Manufacture of beverages, tobacco, etc.	0.000	0.017	0.003
23	Manufacture of cotton textiles	0.005	0.005	0.002
24	Manufacture of wool, silk and man made fibre textiles	0.048	0.024	0.027
25	Manufacture of jute and other vegetable fibre textiles	0.034	0.016	0.017
26	Manufacture of textile products	0.008	0.020	0.097
27	Manufacture of wood and wood products, furniture and fixtures	0.001	0.067	0.033
28	Manufacture of paper, etc; printing, etc.	0.083	0.092	0.096
29	Manufacture of leather, etc.	0.001	0.017	0.028
30	Manufacture of basic chemicals and chemical products (except products of petroleum and coal)	0.045	0.149	0.166
31	Manufacture of rubber, plastic, petroleum and coal products	0.458	0.189	0.383
32	Manufacture of non-metallic mineral products	0.240	0.423	0.410
33	Basic metal and alloy industries	0.125	0.122	0.135
34	Manufacture of metal products and parts	0.009	0.012	0.028
35-36	Manufacture of machinery and equipment	0.116	0.123	0.183
37	Manufacture of transport equipment	0.096	0.042	0.088
38	Other manufacturing industries	0.355	0.064	0.051
	All Manufacturing	0.117	0.095	0.135

Source: Our calculations based on ASI and DGCI&S data

Our evidence suggests a clear change in the pattern of export intensity between the two periods, consistent with the hypothesis that outward oriented trade policies remove the bias against exports, making them more competitive. Imports also grew throughout this period, the annual rate of growth being much higher during 1988-89 to 1996-97 as compared to the earlier period. Import penetration, however, showed a slightly different trend (Table 26). There was a decline in import penetration from 0.117 in 1980-81 to 0.095 in 1988-89. Subsequently, there was an increase to 0.135 in 1996-97. Within this, twelve industry groups showed an increase and five groups showed some decrease.

It appears therefore that liberalization affected the export and import competing sectors differently. While the export sectors were becoming more competitive, the import competing sectors were not. Thus, while export intensity was increasing, import penetration was also increasing.

3.3.5 Profitability and Price Cost Margin

Manufacturing industry witnessed an increase in profitability during the period under consideration. While profitability grew at an annual rate of 10.3% from 1980-81 to 1988-89, the annual rate of growth more than doubled to 23.15% during 1988-89 to 1996-97. This trend was repeated in all industry groups in the use-based classification (Table 27). The highest profitability was in the consumer goods industries in the first sub-period, followed by the intermediate goods industries and then the capital goods industries where profitability was negative. Profitability increased in all industry groups in the second

Table 27: Growth in Profits – Used Based Classification

(percent per annum)

	1980-81 to 1988--89	1988-89 to 1996-97
Consumer Goods	18.70	26.20
Intermediate Goods	8.74	22.67
Capital Goods	-1.23	34.75

Source: Our calculations based on ASI data

period, with capital goods industries experiencing the highest growth, followed by intermediate goods industries and then the consumer goods industries.

The PCM calculated for the seventeen 2-digit industry groups shows that while the PCM declined for 7 groups during 1980-81 to 1988-89, it declined in only 1 group out of 17 between 1988-89 and 1996-97. During the latter period, the industry group that witnessed a decline in PCM was the manufacture of metal products and parts. Our numbers for PCM therefore suggests that industry performance was not improving, i.e. producers were not adopting competitive pricing. In terms of the use-based classification, both the consumer goods and intermediate goods industries showed an increase over the entire period (Table 28). In the case of the capital goods industries, however, there was a decrease in the PCM from 1980-81 to 1988-89, and then an increase in the subsequent period. Our evidence therefore points to a non-competitive pricing policy for all industry groups in both periods except for the capital goods industries from 1980-81 to 1988-89.

Table 28: Price Cost Margin – Use Based Classification

	1980-81	1988-89	1996-97
Consumer Goods	0.114	0.127	0.160
Intermediate Goods	0.128	0.139	0.174
Capital Goods	0.151	0.134	0.161

Source: Our calculations based on ASI data

3.4 Summary and Conclusions

We have examined the performance of the registered manufacturing sector of Indian industry during the 1980s and 1990s in this section, focusing on some key variables. Our findings confirm the accelerated rate of growth of output in the 1980s, as well as the extension of the high growth rates into the 1990s. The fastest growing industries in the 1980s and 1990s were the consumer goods industries, followed by the capital goods industries and then the intermediate goods industries. Available evidence also suggests that during the 1980s import competing industries gained in importance as compared to export-promoting industries, while in the 1990s the trend was opposite. Output and value added per worker also increased for most industry groups during the

1980s and 1990s, although there was some slowing down in the latter half of the period. The slowing down was more pronounced for intermediate goods industries. These trends were a direct consequence of the virtually no growth in employment in the first half of the period, and then a positive growth in the second half. Capital goods industries showed the least growth in employment. Also a result of employment trends was the growth in average wages during the first period, followed by a slowing down in the second period. As far as trade is concerned, both exports and imports grew slowly during 1980-81 to 1996-97, picking up in the subsequent period. Export intensity, which was virtually stagnant in the first sub-period increased in the second sub-period for most industry groups. Import penetration, on the other hand, showed first a decrease and then an increase, although there were differences among the industry groups. Finally, evidence on price-cost margin shows that there is no conclusive evidence to suggest that producers were adopting competitive pricing.

Our results for the 1980s are in conformity with that of previous studies. Specifically, the revival in output growth rates, especially pronounced in the consumer goods industries, and the stagnancy in employment is borne out by the evidence from the Annual Survey of Industry for the registered manufacturing sector. Interesting results for the 1990s are also brought out by our study. The acceleration in output growth rates continued into the 1990s, fuelled by the consumer goods industries, but not restricted to it. Employment growth picked up after a prolonged period of stagnancy. Export intensity and import penetration both increased during the 1990s, suggesting that while the relatively open policies during this period helped remove some biases against exports, it penalized the relatively inefficient import competing industries.

4. Trade Policies and Industry Performance

In this section we explore the link between trade orientation and industry performance in India during the 1980s and 1990s. Trade and industry performance variables for three years, two in the 1980s and one in the 1990s are examined.

4.1 Trade orientation and Growth of Output and Gross Value Added

The links between trade orientation and growth rates of output and value added are explored through two different exercises. In the first one, we compute the correlation coefficient between the annual rate of growth of output of the registered manufacturing sector and effective rate of protection (ERP), and in the second exercise we compute the correlation coefficient between the annual rate of growth of gross value added (GVA) and ERP.

Table 29: Correlation between Trade Variables and Output and Gross Value Added

	Output		GVA	
	1980-81 to 1988-89	1988-89 to 1996-97	1980-81 to 1988-89	1988-89 to 1996-97
NRP	0.19	0.07	0.24	0.08
ERP	0.01	0.16	-0.27	-0.01

Source: Our calculations

The correlation coefficients are reported in Table 29. The correlation between average NRP and average annual growth rate of output in the registered manufacturing sector during 1980-81 to 1988-89 is positive but not significant. It declines for the period 1988-89 to 1996-97. The trend is reversed in the case of ERP, although it is still not significant. The correlation rises from 0.01 in the first period to 0.16 in the second period. In the second exercise, the correlation between NRP and GVA was found to be positive but not significant, with a decline over time. The correlation coefficient between ERP and GVA is negative but not significant. Thus there is no significant relationship between protection and growth of industries in India during the 1980s and 1990s. This is similar to the results found by Goldar and Saleem (1994). Their examination of the correlation coefficient between (a) average ERP and growth rates of production derived from IIP, (b) between average ERP and growth rate of value added using ASI data, and (c) between the tariff rate and growth rate of production based on the Directorate General of Trade and Development (DGTD) found no significant positive correlation between the inter-industry patterns of ERP and growth rates. The lack of a significant positive relationship between protection and growth in India may be explained by the presence of other factors

that exert a stronger influence on the growth performance. In particular, during the period under study, economic planning working through industrial licensing as well as public sector investment influenced investment in industry.

The exercise was carried out further at the three-digit level for industries divided into importable, exportable, and non-competing to see whether protection affected the different sets of industries differently.¹⁴ The correlation between the rates of growth of output and ERP for exportables and importables separately are given in Tables 30 for two years, 1988-89 and 1996-97¹⁵. There is no clear trend for either group, and in general correlations are low. The correlation coefficients between the rates of growth of GVA and ERP are similar.

A further analysis of industries according to the use-based classification at the three-digit level threw up some interesting results. The correlation coefficients are reported in Table 31. During 1980-81 to 1988-89, there was a negative or almost no relation between ERP levels and annual growth rate of output for the consumer goods and the intermediate goods industries. The correlation coefficient between rate of growth of output and ERP levels in 1980-81 was -0.20 for the consumer goods industries and -0.02 for the intermediate goods industries. For the capital goods industries, however, there was a positive relationship, with a correlation coefficient of 0.23 . The correlation coefficient between growth rate of output during 1980-81 and 1988-89 and the ERP level in 1988-89 was even higher at 0.30 . The correlation coefficient between average ERP level in the two sub-periods and annual growth rate of output during 1980-81 to 1988-89 showed a similar trend. During the next sub-period, 1988-89 to 1996-97, the magnitudes of the

¹⁴ This division is done through the Trade Classification Index (TCI) defined as net imports as a ratio of domestic availability, $TCI = (\text{imports} - \text{exports}) / (\text{production} + \text{imports} - \text{exports})$. According to this, the exportable sectors are those for which $TCI < 0$, importables are those for which $0 \leq TCI \leq 0.8$, and the non-competing sectors are those with $TCI \geq 0.8$. The numbers of industry groups in each category fluctuate from year to year.

¹⁵ Correlations for non-competing sectors are not presented since there are only three sectors for this group.

Table 30: Correlation Between ERP and Growth of Output

	ERP 1980-81		ERP 1988-89	
	Importables	Exportables	Importables	Exportables
	1988-89 Classification			
1980-81 to 1988-89	0.01	-0.02	0.05	0.16
1988-89 to 1996-97	-0.04	-0.02	0.02	0.04
	1996-97 Classification			
1980-81 to 1988-89	-0.02	0.00	0.11	-0.11
1988-89 to 1996-97	-0.07	0.05	0.00	0.10

Source: Our calculations

Table 31: Correlation Between Growth Rate of Output and GVA and ERP for Exportables (1980-81 classification)

	ERP 1980-81	ERP 1988-89	ERP 1996-97
Output 1980-89	-0.29	0.16	0.01
Output 1988-97	0.06	-0.10	-0.17
Output 1980-97	0.13	0.06	-0.17
GVA 1980-89	-0.20	-0.15	-0.14
GVA 1988-97	-0.44	-0.16	-0.11
GVA 1980-97	-0.59	-0.15	-0.13

Source: Our calculations

correlation coefficients are much smaller. Thus, there seems to be a positive association between protection and growth in the case of the capital goods industries during 1980-81 to 1988-89, but not in the subsequent period. Correlation coefficients between ERP and rate of growth of GVA are similar to that of output, but in the case of the capital goods industries, the positive association extends to the second sub-period as well.

4.2 Protection, Labour Productivity and Average Wage

The correlation between changes in effective rate of protection and changes in output per worker was positive but low for the period as a whole. Within this, however, the correlation coefficient was 0.41 during 1980-81 to 1988-89, and 0.05 for 1988-89 to 1996-97. Thus, in the first sub-period, there is some evidence of a positive association between change in protection and change in labour productivity. An examination of the average ERP and labour productivity levels shows a high negative correlation in both 1980-81 and 1988-89. The correlation coefficient between average ERP level during the first sub-period and output per worker was -0.78 in 1980-81 and -0.75 in 1988-89, while

the correlation coefficient between average ERP level in the second sub-period and output per worker was -0.55 in 1988-89. For 1996-97, however, the correlation was positive (0.31). It appears then that during the 1980s at least protection led to inefficiencies in Indian industry. The pattern observed for labour productivity was reflected to some extent in average wages as well suggesting that gains in labour productivity during this period resulted in rising wages in industry. As far as the level of wages is concerned, there appears to be a positive but not very significant relationship between the level of ERP and level of average wage. A further analysis of industries at the three-digit level according to the use-based classification (Tables 32 and 33) shows that while there is no correlation between the level of ERP and output per worker for the consumer goods industry, it is negative and high for the intermediate goods industry, -0.56 for 1980-81 and -0.75 for 1988-89. This fell down to -0.13 in 1996-97. The capital goods industry had a correlation coefficient of 0.30 , 0.30 and 0.28 for 1980-81, 1988-89 and 1996-97 respectively. Thus, while there is no overall trend for the relationship between protection and labour productivity, there does appear to be a high negative association for the intermediate goods industry in the 1980s.

4.3 Protection and Price-Cost Margin

The correlation coefficient between ERP and PCM for three-digit industries was 0.12 in 1980-81, -0.06 in 1988-89 and 0.15 in 1996-97, i.e. there is very little evidence of a significant relationship. An examination of the use-based classification at the three-digit level also does not show any clear pattern (See Table 34).

**Table 32: Correlation Between ERP and Output per Worker
– Use Based Classification**

	<i>Industry</i>	<i>Correlation</i>
1980-81	Consumer	-0.03
	Intermediate	-0.56
	Capital	0.30
1988-89	Consumer	0.01
	Intermediate	-0.75
	Capital	0.30
1996-97	Consumer	-0.11
	Intermediate	-0.13
	Capital	0.28

Source: Our calculations

**Table 33: Correlation Between Change in ERP and
Rate of Growth of Output per Worker – Use Based Classification**

	<i>Industry</i>	<i>Correlation</i>
1980-81 to 1988-89	Consumer	-0.01
	Intermediate	0.18
	Capital	0.14
1988-89 to 1996-97	Consumer	0.21
	Intermediate	-0.07
	Capital	0.53

Source: Our calculations

**Table 34: Correlation Coefficients Between ERP and PCM
(Use Based Classification)**

1980-81	Consumer	0.15
	Intermediate	0.30
	Capital	-0.04
1988-89	Consumer	-0.04
	Intermediate	-0.10
	Capital	0.00
1996-97	Consumer	0.21
	Intermediate	0.17
	Capital	-0.01

Source: Our calculations

4.4 Protection, Export Intensity and Import Penetration

The export performance of manufacturing industry during 1980-81 to 1988-89 was mixed, with a number of industry groups experiencing negative growth. During 1988-89 to 1996-97, however, export performance improved vastly, and only two sectors had a negative growth. There was also a significant increase in the export intensity during

the second period. Most industry groups saw increasing export intensities, as compared to the constant or falling export intensities in the earlier period. Preliminary evidence suggests a clear change in the pattern of export intensity between the two periods, consistent with the hypothesis that outward oriented trade policies remove the bias against exports, making them more competitive. However, the correlation coefficient between change in ERP and change in export intensity was -0.02 during 1980-81 to 1988-89, and 0.68 during 1988-89 to 1996-97. While the correlation coefficient between the average level of ERP during 1980-81 to 1988-89 and export intensities in 1980-81 and 1988-89 was 0.15 and 0.13 respectively, the correlation coefficient between average ERP during 1988-89 to 1996-97 and export intensities in 1988-89 and 1996-97 was -0.05 and -0.06 respectively. The link between effective protection and export intensities therefore does not appear very strong.

Imports also grew throughout this period, the annual rate of growth being much higher during 1988-89 to 1996-97 as compared to the earlier period. Import penetration, however, showed a slightly different trend. There was a decline in import penetration from 0.117 in 1980-81 to 0.095 in 1988-89. Subsequently, there was an increase to 0.135 in 1996-97. Within this, twelve industry groups showed an increase and five groups showed some decrease. The correlation coefficient between change in ERP and change in import penetration was 0.16 during 1980-81 to 1988-89 and -0.12 during 1988-89 to 1996-97. During the period as a whole, the correlation coefficient was 0.25.

An examination of the changes in protection and import penetration for eighty-seven three-digit industry groups for which complete data was available shows that in the first sub-period, 1980-81 to 1988-89, decreases in effective protection resulted in increases in import penetration in the case of 29 industry groups. Ten industry groups had both a high reduction in ERP and a high increase in import penetration, mostly consumer goods and intermediate goods. These include tobacco products, footwear made of vulcanised rubber and plastic, veneer sheets, plywood, etc., structural wooden goods, coal products, spirits, wine and liquor. Heavy motor vehicles, fertilizers and pesticides, etc. had low import penetration despite a big reduction in effective protection. Industries with

medium reduction in protection and high import penetration are electrical industrial machinery and cotton textiles - spinning, weaving, bleaching and dyeing. Locomotives, etc. had medium import penetration, while electronic equipment and construction and mining machinery had low import penetration. Industry groups with low reduction in protection but high reduction in import penetration were tanning etc. Of leather, and non-metallic mineral products. Sports and athletic goods had a medium reduction in import penetration and iron and steel and metal scraps and other non-ferrous metals had low import penetration. A number of industries also saw decreases in import penetration despite reductions in effective protection, or increases in import penetration despite increases in effective protection.

In the second sub-period, the number of industry groups with decreases in protection and increases in import penetration had shot up to 52. Sectors with high reduction in ERP and high increases in import penetration were raw leaf tobacco, cotton textiles (spinning, weaving, bleaching and dyeing), threads, blankets, shawls, carpets, garments and accessories and processing and blending of tea and coffee. Leather products had medium import penetration, while electrical industrial machinery, tobacco products and refined petroleum products had low increases in import penetration. Industries with medium reductions in protection and high increases in import penetration included transport equipment, jewelry, furniture and fixtures made of metal, leather footwear and wearing apparel, industrial machinery for food and textile industry. A number of other intermediate and capital goods had medium to low growth in import penetration. Finally, of industries with low reductions in protection, footwear of rubber and plastic had high import penetration; veneer sheets, plywood, etc. and metal products had medium import penetration; and tyre-tubes, office machinery, fertilizers and pesticides and chemicals had low import penetration. While thirteen industry groups had a decrease in both ERP and import penetration, two industry groups had both rising protection and rising import penetration.

Examination of the pattern of effective protection and import penetration reveals therefore that more industries had increases in import penetration, coupled with falling effective protection.

4.5 Summary and Conclusions

We examined trade and industry data for both the two-digit and three-digit classification for the 1980s and 1990s to ascertain if changes in trade policy had any impact on industry performance. Effective rate of protection based on collection rates was used as the trade policy variable to see the effect on growth of output, labour productivity, employment, wages, price cost margin, export intensity and import penetration. Our study found no significant relationship between protection and growth of industries in India during the 1980s and 1990s. Within this, there was low correlation between ERP and growth rates of output and gross value added for the consumer and intermediate goods, and positive but not so high correlation in the case of capital goods.

Sectors that had high protection levels had in general low labour productivity (especially the intermediate goods), but there does not appear to be conclusive association between change in protection and change in labour productivity. The relationship between ERP and average wage is similar to that of ERP and labour productivity. While there is a low positive relationship between the levels of ERP and price cost margin for two years, that between change in ERP and change in PCM is slightly higher, suggesting that falling protection levels may have led to more competitive pricing.

Further examination revealed that while the number of industry groups classified as importable and exportable remained constant during 1980-81 to 1988-89, there was an increase in the number of exportable sectors during 1988-89 to 1996-97, with a corresponding decrease in the number of importable sectors. Moreover, the export intensity increased for most sectors during 1988-89 to 1996-97 compared with little change in the earlier period. However, the correlation between change in protection and change in export intensity turns out to be positive. Import penetration decreased and then increased over the period under study, with a low positive association between changes in the two variables. At the three-digit level of classification, although the evidence is

mixed, there is a number of industry groups that had falling protection levels associated with increasing import penetration.

Our empirical results therefore show that although there are links between trade policy and industry performance, they are weak. There have been other factors that have been equally or more important in determining the growth performance of Indian industry.

5. Summary and Conclusion

The impact of trade policy liberalization was explored in the preceding sections. The relationship between trade policy and growth and industry performance has been the subject of debate, and has formed the basis of a number of empirical studies. Openness affects growth in a number of ways. For example, openness affects growth through externalities as a result of increased growth, or through increased capacity utilization due to increased imports of capital goods, or through scale economies. On the other hand, as Dani Rodrik has argued, if exporters adopt a satisficing behavior, then openness may not result in increased technical efficiency and/or growth. Others have also questioned the theoretical basis of openness and technical efficiency, increased capacity utilization or externalities. Empirical studies also show mixed results partly because it is difficult to filter out the effects of domestic policy on growth and partly because of imperfect measures of trade policy.

With this background, the objective of the present study was four-fold: to document changes in trade policy in India using coverage ratios of non-tariff barriers and nominal and effective rates of protection during the 1980s and 1990s, to examine the structure of protection in Indian industry, to document the performance of registered manufacturing sector, and to explore the relationship between changes in trade policy and industry performance.

Our examination of trade policy measures showed that there is no single measure that captures all the change in trade policy. However, coverage ratios of non-tariff barriers and nominal and effective rates of protection capture the levels of protection that is given to industry through trade policy, and we use these variables in our study. Coverage ratios of non-tariff barriers showed a declining trend between 1988-89 and 1996-97, with the decrease being more in the case of capital goods and intermediate goods, and less in the case of consumer goods.

We estimate four measures of nominal and effective protection – simple and import-weighted NRP using published and collection rates of tariff, and simple and import-weighted ERP based on the published and collection rates. Our estimates show that the level of protection varies according to the notion of tariff rate used. Both the NRP and ERP are in general lower than the ones based on the published tariff rate. The published tariff rate for industry as a whole increases from 1980-81 to 1988-89, and thereafter declines. A similar trend is seen in the case of import weighted published rates, with the sharpest decline seen in the case of intermediate and capital goods. Both the simple and import weighted collection rates show a decline during 1980-81 to 1988-89 as well. Effective rates of protection based on published rates are high, but show a decrease during 1988-89 to 1996-97. ERP based on collection rates was also high, but the direction of change was not as unambiguous as that based on published rates, with a number of industry groups showing an increase in protection levels between 1988-89 and 1996-97.

We saw that differences in protection arrived at by different measures arose largely because of the method of construction. For the construction of NRP based on published rates, it was not possible to take into account all the exemptions, and therefore the nominal tariff rate overstated the extent of nominal protection. The ERP measure based on published rates therefore also overstates the effective protection. On the other hand, while the collection rate of import duty reflects all the duty exemptions, high tariff rates result in low or zero collection.

The performance of the registered manufacturing sector of Indian industry was documented with the examination of several variables – production, employment, labour productivity, average wage, profitability, price-cost margin export intensity and import penetration. Evidence for the 1980s and 1990s showed impressive annual growth for both output and gross value added, confirming the finding of earlier studies for the 1980s. Consumer goods industries were the fastest growing during the entire period. Scale intensive industries grew more as compared to the labour intensive and resource intensive industries, and the share of the export promoting industries grew during the later half of the period. Employment growth, however, was virtually stagnant during 1980-81 to 1988-89, but picked up in the subsequent period. Labour productivity, and average wage, on the other hand showed an increase during the first period, followed by a slowdown in its growth rate in the second sub-period. Both exports and imports grew slowly during 1980-81 to 1996-97, picking up in the subsequent period. Export intensity, stagnant in the first sub-period, increased in the second sub-period for most industry groups. This may be because of the decrease in the inherent bias against exports that occurs under protective policy. Import penetration, on the other hand, showed first a decrease and then an increase, although there were differences among the industry groups. Evidence on price-cost margin was mixed, showing that producers were not in general adopting competitive pricing.

Our examination of trade and industry data for the two-digit and three-digit classification for the 1980s and 1990s found no significant relationship between protection and growth of industries in India during the 1980s and 1990s. Within this, there was low correlation between ERP and growth rates of output and gross value added for the consumer and intermediate goods, and positive but not so high correlation in the case of capital goods. Among the other variables, labour productivity was low in sectors that had high protection levels, especially in the case of intermediate goods, but there was no conclusive relationship between change in protection and change in labour productivity. The relationship between ERP and average wage is positive but low, suggesting that high protection leads to high average wage to some extent. However, change in ERP was negatively associated with change in wage in the first sub-period, and

positively associated with a change in wage in the second sub-period. The correlation between the levels of ERP and price cost margin is positive but low for two years, while that between change in ERP and change in PCM is slightly higher, suggesting that falling protection levels may have led to more competitive pricing. An examination of industry groups according to their market orientation showed that while the number of importable and exportable sectors remained constant during 1980-81 to 1988-89, there was an increase in the number of exportable sectors and a decrease in the number of importable sectors during 1988-89 to 1996-97. While export intensity increased for a number of sectors during this period, so did import penetration, suggesting some re-alignment according to comparative advantage during the 1990s. However, there is no conclusive evidence on this aspect.

The empirical results show that although there are links between trade policy and industry performance, they are weak. This may be due to a number of reasons. First, in India, the flow of investment was influenced by numerous government controls, including industrial licensing, until 1994. The flow of resources was also conditioned by public sector investment during this period. Overall, the flow of resources was not governed by economic factors. Thus, even if protection through trade policy warranted resource re-allocation, it may not have been possible because of government control over investment. On the other hand, the increase in tariff rates in the 1980s was accompanied by high rates of growth of output, suggesting that high tariff rates may have helped import competing industries grow. However, decreases in tariff in the 1990s were also accompanied by high growth rates. This suggests that very different factors were responsible for the growth experience in the 1980s and 1990s, and the link with trade policy is therefore weak.

Another reason for the weak relationship between trade policies and industry performance is the lack of a comprehensive trade policy measure. Trade policy consists of several elements that cannot be captured in one measure of protection. Besides, there are different ways by which protection can be measured, and the structure of protection

and the ranking of industries vary according to the measure used. This is a major limitation of the present study.

Extension of the study to cover the entire 1990s into the twenty-first century may reveal a closer relationship between trade policy and industry performance. One reason for this is the decrease in importance of public investment and the dismantling of the industrial licensing system, and the resultant resource flow according to economic factors. Careful construction of a composite trade policy index, as well as an industry performance index, and the use of rigorous econometric technique will add to our understanding of the relationship between trade policy and industry performance.

Appendix

Table A.1: List of Industries in the study

ASI Code	Industry	3-Digit Sectors
20-21	Manufacture of Food Products	200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215
22	Manufacture Of beverages, Tobacco, etc.	220, 221, 222, 223, 224, 225, 226, 227, 228, 229
23	Manufacture of Cotton Textiles	230, 231, 232, 233, 234, 235, 236
24	Manufacture of Wool, Silk and Man Made Fibre Textiles	240, 241, 242, 243, 246, 247, 248
25	Manufacture of Jute and Other Vegetable Fibre Textiles	250, 254
26	Manufacture of Textile Products	260, 262, 263, 264, 265, 266., 267, 268, 269
27	Manufacture of Wood and wood products, furnitures and fixtures	270, 271, 272, 273, 274, 275, 276, 279
28	Manufacture of Paper, etc; Printing, etc.	280, 281, 282, 283, 284, 285, 286, 287, 288, 289
29	Manufacture of Leather, etc.	290, 291, 292, 293, 299
30	Manufacture of Basic Chemicals and Chemical Products	300, 301, 302, 303, 304, 306, 307, 308, 309
31	Manufacture of Rubber, Plastic, etc.	311, 312, 313, 314, 316, 318, 319
32	Manufacture of non-metallic mineral products	320, 321, 322, 323, 324, 325, 326, 327, 329
33	Basic Metal and Alloy Industries	330, 331, 332, 333, 334, 335, 336, 338, 339
34	Manufacture of metal products and parts	340, 342, 343, 344, 345, 346, 349
35-36	Manufacture of Machinery and Equipment	350, 351, 352, 353, 354, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 368, 369
37	Manufacture of Transport Equipment	370, 371, 372, 373, 374, 375, 376, 377, 378, 379
38	Other Manufacturing Industries	380, 381, 382, 383, 385, 386, 387

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