

Das, Deb Kusum

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Quantifying trade barriers: Has protection declined substantially in Indian manufacturing?

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WORKING PAPER NO. 105

**QUANTIFYING TRADE BARRIERS: HAS PROTECTION DECLINED
SUBSTANTIALLY IN INDIAN MANUFACTURING?**

DEB KUSUM DAS

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INDIAN COUNCIL FOR RESEARCH ON INTERNATIONAL ECONOMIC RELATIONS
Core-6A, 4th Floor, India Habitat Centre, Lodi Road, New Delhi-110 003

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Foreword

This paper on *Quantifying Trade Barriers: Has Protection Declined Substantially in Indian Manufacturing* forms a part of a larger study on *Productivity Growth and Trade Regimes: A study of Indian Manufacturing Industries in the 1980s and 1990s* being undertaken at ICRIER. This study is the first attempt at quantifying trade barriers at the level of disaggregate industry groups for Indian manufacturing for a period of 20 years starting from the 1980s. The paper seeks to carry out this exercise to examine whether protection has indeed declined in Indian manufacturing.

The study undertakes a quantification of trade barriers for Indian manufacturing industries by examining both the tariff and the non-tariff barriers. It documents the trade barriers for around 72 industries belonging to intermediate, capital and consumer goods sectors for period 1980-2000 and the phases of trade reforms therein. Our estimates suggest levels of effective rate of protection and percentage of imports subject to licensing declined during the nineties while import penetration rates show an increase only in the second half of the nineties. This suggests that there may be considerable lags between reduction of tariffs and non-tariff barriers and measurable impact on imports and on the economy

Dr. Arvind Virmani
Director & Chief Executive
ICRIER

June 2003

Quantifying Trade Barriers: Has Protection Declined Substantially in Indian Manufacturing?*

I Introduction**

The emphasis on trade policy reforms as an integral component of structural adjustment programs has intensified the ongoing debate about the benefits of liberalization of trade regimes. This in turn has raised questions about how to measure trade orientation (openness) of an industry. Openness is not directly observable, nor is there a generally accepted and unique measure derived from theory.

Indian industry has had a very restrictive trade regime from the late 1950s. Up to the 1970s the focus of trade policy was on regulating the utilization of foreign exchange through the use of quantitative restrictions. The industrial stagnation that marked the period from the mid-1960s to the late 70s led to rethinking on the role of trade-policy in India [Alexander (1977), Hussain (1984) and Narasimhan(1985)]. Thus the 1980s witnessed changes taking place in the trade regime with regard to imports of intermediate inputs and capital goods with many items of intermediate inputs and capital goods being brought under the open general licensing (OGL). The 1982-83 trade policy allowed imports to promote technological up-gradation and modernization of Indian industry. The reforms initiated in 1985 made an attempt to bring stability and continuity in the external sector by spelling out a three-year trade policy (1985-88). Reduction and rationalization of duty rates backed up the expansion of items under the OGL lists. A significant feature

* The study undertakes a quantification of trade barriers for Indian manufacturing industries by examining both the tariff and the non-tariff barriers. It documents the trade barriers for around 72 industries belonging to intermediate, capital and consumer goods sectors for period 1980-2000 and the phases of trade reforms therein. Our estimates suggest levels of effective rate of protection and percentage of imports subject to licensing declined only in the third and fourth phases of trade reforms. Import penetration rates show an improvement only in the fourth phase of trade Liberalization.

** This paper forms a part of a larger study on "Productivity Growth and Trade Regimes: A Study of Manufacturing Industries in the 1980s and 1990s" being undertaken at Indian Council for Research on International Economic Relations (ICRIER). An earlier version of the paper was presented at the South and Southeast Asia meet of the Econometric Society, Lahore, December 2002. I thank K.L.Krishna, S D. Tendulkar, B.N. Goldar, A Virmani, A. Bhattacharjea, M Pandey and Saqib Jafarey for helpful comments. I am grateful to Sasanka Sarmah for helping me map the trade and industry concordance. The usual disclaimers apply. Address for correspondence: debkusum@icrier.res.in

of the 1988-91 export-import policy was the provision for 'flexibility' in regard to the Replenishment (REP) license, which continues to be freely transferable. The major change in the trade policy of 1992-97 is a negative list of products banned due to health, defense and environmental concerns. Except for consumer goods, all most all items of capital and intermediate goods can be freely imported subject to tariffs. The removal of quantitative restrictions on imports was accompanied by a gradual lowering of customs duties in each of the budgets presented from 1991 onwards. A number of changes were also made to simplify the system- reduction in inter-product variations and rationalization of the tariff structure.

We can discern 4 distinct phases of India' s trade liberalization. The first phase saw the emergence of thinking about the need for change in trade policies as discussed above. The second phase starts with the Long Term Fiscal Policy proposing the removal of import licensing and simplification of the tariff structure and, importantly, the first instance of a 3-year trade policy. The third phase starts with the comprehensive trade policy changes in 1991-92. The final phase starts with the EXIM Policy of 1997-2002 that aims at simplified procedures and rationalized tariff rates.

This paper makes an attempt to quantify the trade barriers operating in Indian industry in order to understand whether protection levels actually decrease following trade liberalization. In particular, we compute several measures of trade liberalization covering both tariff and non-tariff barriers- effective rate of protection, import coverage ratios and import penetration rates under different phases of trade reforms. The plan of the paper is as follows. An overview of studies covering different aspects of protection in Indian manufacturing sector is presented in section 2. The various measures of trade barriers, particularly the tariff and non- tariff based measures of protection, are outlined in section 3. The next section discusses the empirical findings of our study. Section 5 concludes the paper.

II Protection in Indian Industry: An Overview

A major reason for the poor industrial performance with respect to growth and productivity can be attributed to the policy regime facing the manufacturing sector. In particular, protection from foreign competition and absence of a competitive domestic industrial environment has resulted in inefficient, high cost and low quality manufacturing industries. There are several studies documenting the protectionist regime facing the industrial sector of India. These can be grouped as: (1) studies exploring the structure of nominal tariffs, (2) studies trying to analyze the level and structure of inter-industry protection and (3) those that attempt to quantify the extent of non-tariff barriers in Indian industry. The overall scenario that emerges from these studies is that the protective environment created on one hand a large and diversified industrial base and on the other neglected considerations of comparative advantage.

Goldar, Narayana and Hasheem (1992) examine the pattern of tariff, statutory and realized during the 1980s at the level of broad groups and detailed product classes whereas Mehta (1999) documents the tariff rates for the 1990s by different sections and chapters of HS classification. The level and structure of inter-industry protection have been examined using both nominal tariffs and effective rates of protection [World Bank (1989), Aksoy (1991), Aksoy and Etori (1992), Goldar and Hasheem (1992), Gang and Pandey (1998) and Hasheem (2001)]. Despite attempts to liberalize India's import trade regime, the structure of import licensing has remained restrictive and complex. There have however been a few attempts to quantify non-tariff barriers according to the manufacturing sectors [Aksoy (1991), Mehta (1997), Pandey (1999) and Hasheem (2001)]. Table 1 highlights the studies that addressed a range of issues pertaining to the effects of the protectionist trade regime on industrial performance.

Evidence from the studies covering tariff as well as non-tariff barriers suggests that there has been a conscious effort to dismantle the import licensing regime via reductions in the number of products listed under banned/ restricted category. The effective tariff structure throughout the 1980s and part of 1990s has been very complex

due to the presence of various exemptions applicable on the basic duty rate. Further, the tariff rates have not only been high but have been covering almost all product categories in intermediate, capital and consumer goods sectors. Efforts have however been made in the 1990s to rationalize the structure of tariffs. Majority of the studies has estimated nominal as well as effective rate of protection. Most of the estimates of ERP are either based on tariff data or the collection rate¹. One particular study has attempted to use both published and realized tariff data for arriving at ERP estimates. The Corden measure of ERP is used very widely [Goldar and Hasheem (1992b), Gang and Pandey (1998), Mehta (1997) and Hasheem (2001)]. The popularity of the Corden's measure is reflective of the fact that it takes into account both the direct and indirect value added, while the Balassa measure accounts for only the direct value added². The extremely high tariffs apart from fulfilling the primary purpose of providing protection were aimed at generating revenue.

In the pre-90 period, India's policy regime for imports was complex and cumbersome. There were different categories of importers, several types of licenses and alternative ways of importing. This made the quantification of QRs very difficult.³ Majority of the studies computed either the frequency ratio or the import coverage ratio. These have been worked out for the whole -economy as well as manufacturing sub branches. Mehta (1997) and Pandey (1999) compute the NTB indices for the use-based sectors, whereas Aksoy (1991) and Hasheem (2001) provide estimates of share of imports according to licensing categories for broad manufacturing sub-sectors. A major limitation of these exercises is that all these studies pertain to select time points. The review of the

¹ It would be important to point out that the early generation studies [Panchamuki (1978) and Nambiar (1983)] did make an effort to measure ERP via price-based data. Further, studies by the World Bank (1989), Aksoy (1991) and Aksoy and Etori (1992) also provided estimates of ERP based on price comparison for a single year, resulting in the inability to undertake time-series evaluations.

² Other measures take into account both the exchange rate distortions and the direct price distortion. These measures are also known as sophisticated Corden's and Balassa method and the measure of real effective exchange rate of protection.

³ The major problems with quantification arise from, (1) the descriptions in different licensing lists varying in coverage from very specific to very general, (2) the classification of items in the import policy was not organized according to the HS codes used to report imports and exports and (3) customs does not record imports by licensing categories, so the magnitude of imports under different licensing category cannot be observed.

Table 1: Synoptic View of Recent Studies of Import Protection in Indian Manufacturing

Study	Objective	Coverage	Measures	Main Findings
World Bank (1989)	To study the level and structure of protection	Manufacturing Sub-sectors 1986-87	NRP and ERP based on Price Comparison	High levels of protection and inability to undertake process and product innovation
Aksoy (1991)	To quantify the structure of import licensing regime and analyze the structure of tariffs	Input-Output Sectors 1987-88	Nominal Tariff And Frequency Ratio	Licensing system does not provide any additional protection. Absolute levels of tariffs are high and high tariffs on capital goods
Aksoy & Etori (1992)	To estimate the structure of incentives and protection	Three sectors: Iron & Steel Petrochemicals Capital goods 1986-87 to 1988-89	Nominal Rate of Protection	High magnitude and variance of protection rates.
Goldar & Hasheem (1992)	To document the protection	Input-Output Sectors 1980-81; 1983-84; 1988-89.	NRP & ERP Using Corden measure	Increase in Protection across I-O sectors; input based sectors & trade based sectors between 1980-81 to 1988-89
Mehta (1997)	To quantify changes in trade protection	Manufacturing sectors 1989-90 1993-94 1995-96	NRP & ERP using Corden's Method. + Frequency Ratio	Significant decline in the level of protection; No QRs on more than 55% Tariff lines.
Gang & Pandey (1998)	To study the inter-industry structure of protection	Input-Output Sectors 1979-80 1984-85 1991-92 1996-97	NRP & ERP Balassa and Corden Method	Level of protection varies according to the notion of tariff rate used. ERP levels indicate positive protection for 32 manufacturing sectors
Pandey (1999)	To document NTB's in Indian manufacturing	Input- Output sectors 1994-95 1996-97 1997-98	Frequency Ratio; Tariff Equivalence of NTB	Incidence of NTB shows a decline. The tariff equivalence calculated gives an indication of what the tariff rates should be
Mehta (1999)	To document Tariff And Non-Tariff Barriers in the Indian Economy	Sections of And Chapters Of HS classification 1993-94 to 1998-99	Average Tariff Rate and Frequency Ratio	Significant decline in average tariff rates, though the dispersion of the tariff rates has not declined. Only 28% of product lines subject to NTB by 98-99
Hasheem (2001)	To examine the structure of tariffs and NTB's	Input-Output Sectors 1987-88 1992-93 1994-95 1997-98	NRP & ERP; Imports by licensing category	Steady decline in both NRP and ERP.level and pattern of protection is dependent on choice of tariff rates.

Source: World Bank (1989), Aksoy (1991), Aksoy and Etori (1992), Goldar and Hashim (1992), Mehta (1997), Gang and Pandey (1998), Pandey (1999) and Hasheem (2001).

empirical findings points towards substantial reduction in the NTB levels across manufacturing sectors in the 1990s as compared to 1980s.

We conclude that tariffs and quantitative restrictions were important instruments of trade policy and played a crucial role in providing protection to domestic industry throughout the 1980s and part of 90s. It is also widely held that the protective regime has been responsible for inefficiency in resource-use, which constrained the growth performance of Indian industries. These studies however did not explore the effect of the protection on industrial growth and efficiency⁴.

III Quantifying Trade Barriers: Methodology and Database

Trade interventions in developing countries are of two types: tariff and non-tariff barriers⁵. Import tariffs are simply indirect taxes, which apply on a discriminatory basis, to imports. They may be ad valorem or specific.⁶ The range of instruments that qualify as non-tariff barrier is diverse, with some being fiscal, some quantitative, some involving monitoring and so on. Moreover depending on how one defines NTB, the list could be still longer.⁷ Findings of Balassa (1982) and Krueger et al. (1981) confirm that the use of NTBs is more pervasive in developing countries than in developed countries. Section 3.1 outlines the method for computing the Corden measure of effective rate of protection. The various measures of non-tariff barriers are presented in section 3.2. The final subsection outlines a combined measure of both tariff and non-tariff restrictions.

⁴ Goldar and Ranganathan (1990) and Goldar and Hasheem (1994) examined the contribution of tariffs on industrial growth, factor remuneration and exports.

⁵ See Table 2.1 in Greenaway and Milner (1993) for the list of instruments under tariff and non-tariff measures

⁶ The ad-valorem import tax has the advantage of being index linked, whilst the specific import tax has the desirable feature of reducing opportunities for under invoicing and other illegal practices aimed at minimizing the tax liability. Further, some times particular tariff can be used as a quasi non-tariff barrier, for example when it applies on a seasonal basis or when it is linked to a quota.

⁷ From a documentary standpoint the diversity of NTB is a major problem. One cannot easily 'add together' the restrictive impact of deliberately complicated customs valuation procedures with that of price surveillance, or an import quota. Greenaway and Milner (1993) argue that it is in part for this reason that summary statistics are hard to come by. The situation is further complicated by the fact that many NTBs are quite deliberately opaque.

III.1 Measuring Effective Rate of Protection

Tariff schedules are inadequate guides to nominal protection when quantitative restrictions and not tariffs, are the binding instrument of trade policy⁸. Further, the nominal protection rate disregards the fact that the degree of protection conferred on an activity will depend not only on the any interventions which affect the price of the final good produced, but also by any interventions which affect the price paid for inputs into the production process. This major shortcoming can be over come by estimating the effective protection rate⁹. The concept of effective protection discussed in Meade (1951) has been extensively refined by Johnson (1960) and Corden (1966).

The effective rate of protection (ERP) based on Corden's formula is the percentage excess of domestic value-added, vis-à-vis world value-added, introduced because of tariff and other trade barriers.

$$ERP_j = (VA_j^* - VA_j) / VA_j \quad (1)$$

Where VA_j^* = value-added of the final product j at free trade prices and VA_j = value added of the final product j at tariff distorted prices.

This measures the distortion introduced due to tariff on the input prices as well as the final output prices, and therefore measures protection to domestic factors of production. The incentive structure of the domestic production process is described by

⁸ Given the significance of NTBs, the first issue to be addressed in connection with measuring the height of protection is to obtain direct price comparison. For the problems associated with obtaining price comparisons refer to Krueger (1984).

⁹ Krueger (1984) points out that in developing countries, number of reasons exists for believing that ERPs might not straightforwardly indicate protection to value added. First, factor prices often fail to reflect opportunity costs, due to the presence of subsidies to inputs of capital, labor market imperfections and minimum wage legislation. In the presence of inappropriate factor costs, the net direction of resource pulls will be influenced by both the height of protection and the degree of divergence from a well functioning market. Second, it was a frequent observation that few firms produce any single product resulting in exploitation of monopoly power in sheltered home market. Thus the extent of protection to value added as reflected in the ERP measure would overstate (to the extent of monopoly profits) and misstate (to the extent factors were implicitly subsidized) the additional domestic resources employed per unit of value added in the protected industries.

the return to primary factors of production and the measure of protection based on value added is able to capture it.

Given the assumptions¹⁰, we can define VA_j and VA_j^* as follows

$$VA_j = (1 - \sum a_{ij}) \quad (2)$$

$$VA_j^* = (1 + t_j) - \sum (1 + a_{ij}) \quad (3)$$

If (2) and (3) are substituted into (1) and rearranged we can write:

$$ERP_j = (T_j - \sum a_{ij} T_i) / (1 - \sum a_{ij}), \quad (4)$$

Where ERP_j is the effective rate of protection of the j^{th} activity (product), T_j is the nominal tariff rate for j^{th} activity, T_i ($i=1,2,\dots,n$) are the nominal tariff rates of the tradeable intermediate inputs used in the j^{th} activity. a_{ij} ($i=1,2,\dots,n$) are the cost shares of inputs in total value of production of the j^{th} activity. The cost shares are computed after valuing output and tradeable inputs at world prices. The data on costs of production are obtained from the input-output tables.¹¹ $\sum a_{ij}$ is the sum of the shares of intermediate inputs ($i \dots n$) in the final value of j and $\sum a_{ij} T_i$ is the weighted average of input tariffs on all intermediate inputs with weights according to input shares. The concept of effective protection is well behaved in that domestic and international value added are both positive.¹²

¹⁰ The following assumptions are used: (1) there are fixed physical input coefficients in the production of j , (2) the domestic price is equal to the border price plus tariffs, i.e. there are no tariff redundancies or non-tariff barriers. The assumptions of fixed technical coefficients implies that price distortions do not affect technology used and that there is no substitution between traded and non-traded inputs because of price distortions [Refer to Grubel (1971)]. The assumption of the domestic price being equal to border price plus tariffs usually does not hold for countries like India, which have extensive non-tariff barriers [Refer to Goldar and Hasheem (1992)]

¹¹ It was not possible to use the cost data for the three-digit industries, as detailed data were not available for all the years of the study. A mapping was established between the I-O sectors and ASI sectors, so as to enable the I-O coefficients to substitute for the input costs of the industries. Use has been made of 115 sector I-O tables (1983-84, 1989-90 and 1993-94) for the years 1980-81 to 1988-89, 1989-90 to 1994-95 and 1995-96 to 1999-00 respectively. This implicitly involves the assumptions that input-output coefficients remained the same during the period under study.

¹² In empirical work, both negative numerators and denominators have been observed.. Each gives rise to an estimated negative rate of effective protection, but the interpretation must be quite different. See Krueger (1984) for an economic interpretation of the negative numerator and denominator.

There are two ways of obtaining the free-trade input coefficients. First is to assume that a developed country [like USA, which has low levels of nominal tariffs] input coefficients could approximate the world input-output coefficient. The second is to assume that free trade prices are equal to the protected prices deflated by appropriate tariff rates. This gives the free trade coefficients as

$$a_{ij} = P_{ij} / P_j = [P^*_{ij} / (1+T_i)] / [P^*_j / (1+T_j)], \text{ where the } * \text{ refers to the domestic prices.}$$

$$\text{Thus, } a_{ij} = a^*_{ij} [(1+T_j) / (1+T_i)].$$

We compute the Corden measure of ERP for the sample industries numbering 72 in all, as well as the use-based classification- consumer goods, intermediate goods and capital goods sectors for the four phases of trade reforms [1980-81 to 1985-86, 1986-87 to 1990-91, 1991-91 to 1994-95 and 1995-96 to 1999-00].

The industry wise ERP's are calculated by mapping the different tariff codes with the three-digit ASI industries¹³. The tariff rates for various product categories (items in the tariff working-schedule under BTN or HS codes) have been derived from the Customs Tariff Working Schedule.¹⁴ For each product category, the effective rate of duty was arrived at taking into account quantifiable exemptions and was restricted to basic and auxiliary duties. The ERP for a three-digit industry was based on the computed NRP valued at international prices. These ERP estimates are not adjusted for any exchange rate overvaluations, but nonetheless are representative of the sorts of levels and heights of effective protection found in developing countries.

¹³ See Das (2001)

¹⁴ The customs tariff working-schedule was not available for some years of the study and hence the same information was collected from private sources such as Centax Publications and Cencus Publications.

III.2 Measuring Non Tariff Barriers

Non Tariff barriers [NTBs] dominate the trade regimes of most developing countries.¹⁵ NTBs consists of all barriers to trade that are not tariffs. It is even more general than that, since the term is often used to include trade interventions such as export subsidies that serve to stimulate rather than retard trade and therefore are not barriers to trade at all. It also includes well-known trade distorting policies such as import quotas and voluntary export restraints.¹⁶ The measures range from narrowly conceived ones affecting particular products, industries and countries to more general ones that are rooted in national, institutions and policies.¹⁷ Thus it may be difficult to devise accurate quantification of many of these NTB measures. Some of the barriers may be formal and are explicitly stated in official and governmental mandates¹⁸. It is important to mention that there is no single useful way of measuring the “size” of an NTB. NTBs require several parameters to characterize them fully. In this connection it is important to know the various characteristics of NTBs, even though that it may be difficult to capture them empirically.¹⁹ In order to quantify the particular occurrence of an NTB, it is important to

¹⁵ Deardorff (1987) offers some possible explanations as to why governments in developing countries prefer non-tariff barriers to tariffs. They are: (1) institutional constraints such as are built into GATT/WTO rules and into national constitutions that limit the use of tariffs, (2) the roles of firms and workers in influencing the policies, (3) considerations of reaction or retaliations against the policies of trading partners and (4) uncertainty about the ways in which different policies may perform. Deardorff favors the last of these explanations insofar as governments perceive that tariffs will not work effectively in reducing imports in an uncertain world and only an explicit quantitative restriction can be relied upon.

¹⁶ Deardorff and Stern (1999) state that NTBs also include a potentially unlimited plethora of policies, perhaps as yet not invented, that alter however indirectly the prices and quantities of trade. Therefore no typology of NTBs can possibly be complete.

¹⁷ See Deardorff and Stern (1999), chapter 2

¹⁸ There are also informal barriers arising from: (1) administrative procedures and unpublished government regulations and policies, (2) market structure and (3) political, social and cultural institutions. The impediments associated with informal barriers may be the result of a conscious effort by government to favor domestic over foreign interests, or these may be the byproducts of practices and policies that are rooted in domestic institutions. See Deardorff and Stern (1999)

¹⁹ (1) reduction in the quantity of imports, (2) the increase in price of imports, (3) the change in the elasticity of demand for imports, (4) the variability of NTBs, (5) the uncertainty of imports, (6) welfare costs and (7) resource costs of NTBs.[See Deardorff and Stern (1999)]

look at the specific details of the implementation of that NTB.²⁰ The specific details encompass direct information, which needs to be converted into useful form that can be understood and compared to other forms of trade interventions. There are however serious disadvantages to this direct approach especially as one is looking for a broad measure of NTBs²¹. Even though direct information about NTBs is likely to be very accurate, it does not necessarily provide for a good starting point for a general analysis.

Four different methods can be used for measuring NTBs. These are classified as: (1) *frequency-type measures* based upon inventory listings of observed NTBs that apply to a particular sector or categories of trade; (2) *price-comparison measures* calculated in terms of tariff equivalents or price relatives; (3) *quantity-impact measures* based upon econometric estimates of models of trade flows; and (4) measures of equivalent *nominal rates of assistance*.²² An issue that arises in common for all of these methods is how to aggregate the measurements once they have been obtained for disaggregated product categories. The own-country imports and own-country production levels are the weights used in the research but they have their quota of drawbacks²³. It is possible to construct a variety of measures that indicate the frequency of occurrence of NTBs. Such measures may be unweighted, or they may be weighted by imports or by production. The former is defined as frequency ratio and the latter as import coverage ratio.

²⁰ Quota usually permits an announced quantity of imports of a certain type, so that an analysis of quota should start with direct information pertaining to that quantity. A variable levy is defined in terms of a specified price of an imported good and that price provides the most direct information about what the levy entails.

²¹ (1)The direct approach only captures those NTBs that have been identified. If an industry makes use of a particular form of NTB, that an investigator does not take into account, then trade appears much free than it is actually. (2) Even for the NTBs that are included, it is extremely difficult to process the diverse direct information that is available on each NTB in a way that will be comparable across NTBs and thus allow them to be added-up to obtain a total measure of trade interference.. (3) If more than one NTB is present in given industry, it is conceivable that the presence of one reduces the effects of another, so that analysis of each of them separately may lead to an overstatement of their total effects. More generally, in evaluating overall levels of protection by NTBs, general equilibrium effects are bound to matter (such as the effects of barriers on one sector on trade in another and the effects of all together on exchange rates).

²² Deardorff and Stern (1999) discuss these measures along with specific NTB methods.

²³ The drawback with import weights is that most NTBs reduce imports to zero and do not show up in the aggregate, whereas in the case of own country production levels, protective NTBs stimulate domestic production above levels that would other wise obtain. It may be therefore worthwhile subject to availability of data to use world production levels or world trade as weights.

We calculated for purpose of quantifying non-tariff trade barriers, the import coverage ratio for the 72 three-digit industries and three use-based industry groups for the four phases of the trade reform as well as 1980-00²⁴.

The import coverage ratio is defined as:

$$C_j = \sum D_i M_i / \sum M_i, \quad (5)$$

Where D_i is as usual a dummy variable defined as:

$D_i = 1$, if the product is listed under R [banned/restricted, limited permissible, canalized]²⁵

$= 0$, if the product is listed under F [OGL list].

j stands for a particular industry and i represents a product line within that particular industry. D_i is a dummy variable, Each product category (4-digit HS codes) is given either a number 1 or 0 depending whether the product is affected by a NTB or not. We made the following simplifications, items were treated as affected by NTB if they fall under the category: restricted (R). R covers all of the restrictive lists (banned/restricted, limited permissible and canalized) and hence given a weight of 1. The items under OGL were treated as free (F) and consequently given a weight of 0. Though this has obvious limitations, yet one was constrained to making this simplification in order to build a

²⁴ To calculate measures of NTB for to the three-digit industries, we need to map the product wise information on import licensing status data to the three-digit industries, as the ASI does not provide any such information for the industries. For details and the procedure of mapping refer Das (2001).

²⁵ The data from 1993-94 onwards, was available at a much higher level of disaggregation and a 4-digit HS code was treated as R if all 6 & 8 HS digit codes were restricted and similarly as F if all sub codes were free. However in some cases, a 4-digit HS code was listed as R, if majority of the sub codes were R (same for F). In some cases a 4-digit code was also listed as RF (RCF) if an equal number of sub codes were split between R and F (R, F and C) and given a weight of .50 (.66). Since the detailed information for 1993-94 pertains to the trade policy document 1992-97, the years in the third phase only were classified according to this rule. For the fourth phase, we follow the trade policy document 1997-2002.

consistent series for the entire period 1980-2000.²⁶ M_i is the value of imports of the i th product category [4digit HS code] which is subject to NTBs [R in our study] and ΣM_i is the sum of the value of imports of all the product lines within the industry.

The measure has the virtue of simplicity, both in its computation and interpretation, but also has some limitations.²⁷ NTBs can also be gauged in terms of its impact on the domestic price in comparison to some reference price. Price comparisons have provided the basis for much of the general empirical work that has tried to quantify them and not just identify where they occur.²⁸

For computing these measures of NTB according to the three-digit industries, we need the following data: [1] information on the product lines within an industry subject to NTB and [2] import values for product lines. ASI does not provide information on industry according to product lines, thus necessitating a mapping of product lines [4-digit HS codes] to the respective three-digit industries.²⁹ The yearly import-export policy documents, published by the Ministry of Commerce, Government of India were utilized

²⁶ We have a single weighting scheme within NTBs, i.e. we provide a weight of 1 if the product is banned/restricted or limited permissible or canalized. Further, since majority of these categories was abolished after 1991-92, we were constrained to treat them all as one composite category called R in order to have a comparable series for the 1980s, when information is available separately on each licensing status. For the period post 1991-92, the only available information in this category is the banned status.

²⁷ First, NTBs are recorded as present or absent. Thus it does not matter if product x has “ n ” number of NTBs whilst product y has only one; both enter the ratio with equal weights. Second, it is implicitly assumed that all measures are equally restrictive. A quota on product a is treated in the same way as one on product b , even if the former applies to 10 percent of the market and the latter applies to 90 percent of the market. Thus although variations in the ratio through time can give some idea as to trends in the use of NTBs, they have to be treated cautiously. Third, both F_j and C_j does not provide any information on the possible deterrent effects that NTBs may have upon the pricing or quantity decisions of foreign exporters. Fourth, F_j and C_j ratios refer primarily to border measures and thus ignore the entire range of internal governmental measures and the restrictive actions of imperfectly competitive firms. Finally, these measures provide no information on the economic impact that NTBs have on prices, production, consumption and trade. Worse, they may be misleading in this regard, if a large number of relatively small or non-binding NTBs divert attention from a smaller number in other industries or countries that have more serious effects.

²⁸ See Greenaway and Milner (1993) for the tariff-equivalence analysis. Deardorff and Stern (1999) provide description for other techniques such as quantity-impact measures and special purpose methods for calculating NTBs.

²⁹ See Das (2001) for details regarding the mapping of product lines with ASI industry codes.

to determine the number of product categories subject to NTB. The import values at four-digit HS codes was obtained from the yearly issue of the Monthly Statistics of Foreign Trade, published by the Directorate General of Commercial Intelligence and Statistics (DGCIS), Ministry of Commerce, Government of India.

The calculation of import coverage ratio over a period of time allows us to quantify the change in NTBs over time by industries. Though coverage ratios are useful indicators of non-tariff barriers, they do not actually show the impact in terms of the price advantage domestic producers get nor do they give us any idea of its likely impact on industrial performance. Due to lack of suitable time-series data on domestic and international prices by industry groups, we are unable to compute tariff-equivalent indicator of NTB³⁰

III.3 Measuring Import Penetration Ratio

In the trade regime of India, where both QRs and tariffs played a dominant role, it is important to assess the combined impact of changes in both constituents of trade policy. Lowering of tariffs combined with shifting of products from restricted list to OGL should lead to an increase in the imports. The opposite results from a hike in tariffs and reverse shift in quantitative restrictions. We calculate the import penetration rate for three-digit industry as the ratio of industry imports to domestic availability. Domestic availability is defined as production plus imports minus exports. Aggregating the exports and imports of the product lines situated within a particular industry, we arrive at industry exports and imports.

$$\text{MPR}_j = \text{M}_j / (\text{P}_j + \text{M}_j - \text{X}_j), \quad (6)$$

j stands for the industry. P , M and X represent production, imports and exports. ASI does not provide values of export and import by industry groups for any level of

³⁰ Pandey (1999), computes the tariff-equivalence of the non-tariff barrier at the product level for the period of 1990s. A major limitation of the exercise is that, the products cover only the agriculture sector and no effort has been made to compute the same for industrial products, which are under QRs.

disaggregation. We generate industry wise export and import data by establishing a mapping between trade data (imports and exports) available at product levels and ASI three-digit industries.³¹ Value of the gross output is used, as information on physical production by industry groups is not available. The yearly data on import and export data is available in the Monthly Statistics of Foreign Trade whereas the production data is substituted by the gross output from ASI.

IV Empirical Measures of Protection

An attempt is made in the following sections to document the trends in some of the important indicators of trade liberalization for the manufacturing sectors during the four phases of trade reform from a sample of 72 three-digit industries. The effective rate of protection by three-digit industry groups and use-based industrial classifications are provided for the four phases of trade reforms as well as 1980-2000. As an indicator of the non-tariff barriers, the import coverage ratio is documented over time as well as across use-based industries. Finally, to assess the joint effects of both tariffs as well as non-tariff protection, we computed the import penetration ratio for the industry groups and use-based sectors.

Table 2 shows the frequency distribution of ERP and MCR. In the first phase, nearly 70 percent of the industries with a combined value added share of 45 percent has ERP in the range of 50 to 150 percent. Only two industry namely iron & steel and fabricated structural metal products have ERP more than 200 percent in the first phase. The second phase of trade reforms, culminating in the liberalization of imports along with a relaxation of investment controls in order to make cheaper and better quality inputs available to entrepreneurs however did not show-up in an increase in the number of industries in the ERP range below 50 percent. By 1991-92, we observe that around 80 percent of the industries are situated in the ERP range of 50 to 150 percent. The largest

³¹ The details of the mapping are given in Das (2001). The data for the period of early 1980s is however at the ITC (Revision-2) classification and from 1986-87 at the ITC (HS) codes. This further required us to establish mapping between the ITC (Revision-2) three-digit codes and ITC (HS) four-digit codes, so as to arrive at a uniform data series for the period 1980-81 to 1994-95. The mapped product categories were in turn mapped onto the ASI three-digit industries [See Table IV.6 in Das (2001)].

concentration of industries is however in the 50 to 100 percent range of ERP. Further, except for fabricated structural metal products, none of the industries have ERP in excess of 150 percent. In the fourth phase, around 80 percent of industries fall within the tariff range of 0-50 percent. Further, the ERP levels were less than 100 percent in all industries.

Table 2: Frequency Distribution of ERP and MCR under Four Trade Reform Phases

Measures of Trade Barriers (Range)	Phase-1 1980-85	Phase-2 1986-90	Phase-3 1991-95	Phase-4 1996-00
Effective Rate of Protection (%)	Number of Industries & [value-added Share]			
ERP<50	5[6.41]	1[0.80]	8[11.13]	33[50.85]
50 < ERP < 100	16[26.92]	15[24.96]	33[44.39]	12[18.65]
100< ERP < 150	16[18.24]	19[26.97]	3[12.19]	X
150< ERP < 200	7[4.40]	8[15.50]	1[1.11]	X
ERP>200	1[12.84]	2[2.53]	X	X
Total	45[71.8]	45[70.7]	45[68.8]	45[69.5]
Average ERP	115.1	125.9	80.2	40.4
Import Coverage Ratio (%)	Number of Industries & [value-added Share]			
Zero	6[0.86]	7[1.95]	21[20.99]	28[22.65]
1< MCR <25	0[0.00]	0[0.00]	19[18.58]	24[26.42]
25< MCR <50	0[0.00]	0[0.00]	5[2.99]	6[6.62]
50 < MCR <75	0[0.00]	5[6.94]	7[8.82]	5[2.90]
75 < MCR <100	0[0.00]	7[5.13]	8[3.58]	4[1.39]
MCR=100	66[71.00]	53[56.05]	12[13.86]	5[9.52]
Total	72[71.8]	72[70.7]	72[68.8]	72[69.5]
Average MCR	97.6	91.6	37.9	24.8

Note: 1. The combined value added shares for the phase of trade reforms are computed for the years 1980-81, 1985-86, 1990-91 and 1995-96
 2. For deriving the ERP estimates, the 72 three-digit industry groups were re-classified into 45 industry groups.

Source: Author's calculations based on (1) Customs Tariff Working Schedule, Central Excise and Customs, Government of India and (2) Export- Import Policy Documents, Ministry of Commerce, Government of India

The import coverage ratio shows that almost 92 percent of the industries have 100 percent import restriction in the period 1980-85. Observing the ranges of MCR, we find that the industries are either under OGL as evident from being situated in range of zero restriction or they are covered under 100 percent import restrictions. In the second phase,

we observe that 12 industries have around 50 to less than 100 percent imports subject to restrictions. A large majority of industries are still concentrated in the 100 percent restriction range. For the period 1991-95, we observe that around half the industries have import restrictions of less than 50 percent. By 1996-00, we find that 38 percent of the sample industries had zero import restrictions. There were only 5 industries with 100 percent import restrictions. In comparison, to the first two phases however the number of industries with 100 percent restrictions has declined sharply in the second and fourth phases of trade reforms.

The indicators of trade barriers for the three-use based sectors are presented in table 3 for the three phases of trade reforms. The sector wise appraisal shows some interesting results. The average ERP levels increased in the second phase of trade reforms before falling to low levels in the period 1991-95. This pattern holds true across all the use-based sectors and the all- industries. The coefficient of variation of ERP declined across all the three-use based sectors from the first to the third phase of trade reforms

The first and second phase of trade reforms do not show much change in the share of imports subject to restrictions for the intermediate goods sector. Capital and consumer goods based sectors however, show a decline in the second phase of reforms. In the third phase of reforms, the import coverage ratio for intermediate and capital goods sectors declined to 41 and 20 percent from a high of 98 and 77 percent in the previous phase of reforms. All the three use-based sectors showed further decline in the fourth phase, with the capital goods sector accounting for only 8 percent of import restrictions by the end of 1999-00. The standard deviation of MCR increased across most sectors from the first to the fourth phase.

Table 3: Indicators of Trade Barriers in Indian Manufacturing: Use-Based Classification

Industry Group	Phase-1 1980-85	Phase-2 1986-90	Phase-3 1991-95	Phase-4 1996-00	All Phases 1980-2000
Effective Rate of Protection (Percent)					
<u>Intermediate Goods</u>					
Average	147.03	149.18	87.58	40.13	112.36
S.D	75.79	64.85	24.15	9.11	44.27
C.V	52	43	28	23	39
<u>Capital Goods</u>					
Average	62.77	78.45	54.23	33.30	61.87
S.D	29.02	30.18	18.49	12.03	22.64
C.V	46	38	34	36	37
<u>Consumer Goods</u>					
Average	101.51	111.55	80.55	48.28	87.47
S.D	19.87	33.77	10.50	5.53	16.60
C.V	20	30	13	11	19
<u>All- Industries</u>					
Average	115.11	125.93	80.18	40.43	95.19
S.D	67.62	63.48	23.77	10.71	40.96
C.V	59	50	30	26	43
Import Coverage Ratio (Percent)					
<u>Intermediate Goods</u>					
Average	98.31	98.26	41.77	27.60	71.47
S.D	12.89	12.65	42.63	37.88	20.43
C.V	13	13	102	137	29
<u>Capital Goods</u>					
Average	95.11	77.21	20.47	8.15	54.37
S.D	21.56	26.94	25.36	16.96	16.69
C.V	23	35	124	208	31
<u>Consumer Goods</u>					
Average	98.69	87.85	45.69	33.43	68.77
S.D	11.35	21.64	39.23	38.53	20.89
C.V	12	25	86	115	30
<u>All- Industries</u>					
Average	97.59	91.64	37.97	24.82	67.11
S.D	15.33	20.45	39.88	35.84	20.93
C.V	16	22	105	144	31
Import Penetration Rates (Percent)					
<u>Intermediate Goods</u>					
Average	0.11	0.13	0.15	0.18	0.14
S.D	0.12	0.11	0.15	0.15	0.12
C.V	105	84	100	87	87
<u>Capital Goods</u>					
Average	0.12	0.12	0.12	0.19	0.14
S.D	0.15	0.12	0.11	0.15	0.13
C.V	143	64	69	170	97
<u>Consumer Goods</u>					
Average	0.04	0.04	0.04	0.10	0.05
S.D	0.06	0.03	0.03	0.10	0.04
C.V	143	64	69	170	74
<u>All- Industries</u>					
Average	0.10	0.11	0.12	0.16	0.12
S.D	0.12	0.11	0.13	0.16	0.12
C.V	119	97	112	98	98

Note: 1. Period averages are computed as a value-added share weighted average of the yearly figures.

2. For all industries, the ERP and MCR are averaged over 72 three-digit industries, where as for MPR, it is averaged over 60 three-digit industries.

Source: Author's calculations based on the (1) Customs Tariff Working Schedule, Central Excise and Customs, Government of India, (2) The Monthly Statistics of Foreign Trade, Ministry of Commerce, Government of India and (3) Export - Import Policy Documents, Ministry of Commerce, Government of India.

The pattern of the import penetration levels is devoid of any clear trends for the period 1980-00. There was hardly any noticeable change in the first three phases of trade reforms across the use-based sectors. We do find evidence of marginal improvements in the period 1996-00. The level of import penetration in both capital and intermediate goods sector has been higher than the consumer goods sector through out the phases of trade reform. The near zero level of import penetration in the consumer goods sector is in line with the import policy facing the products of this sector, where large restrictions are still in force. Finally, the tariff and non- tariff changes introduced in the trade policies from the early 1980s are not reflected in the trends in import penetration as evidenced from the levels for the three phases of trade reforms. This is probably reflective of a lagged impact of trade policy changes.

IV.1 Trends in Effective Rate of Protection

In this section, we present our estimates of ERP for 45 broad industry groups.³² classified into three use-based sectors, based on a simple average of tariff rates. We observe both across as well as within the groups, variations in the average tariff rates.³³ The estimates are constructed using the Corden methodology and documented for the phases of trade reform: (1980-85, 1986-90, 1991-95 and 1996-00). The ERP level across use-based sectors show fluctuations over time and across industries. The tariff rates were increased in the 1980s on considerations of revenue generation and adverse balance of payments situation and this is reflected in the ERP levels for most industries in the second phase of trade reforms. The period of 1990s is indicative of rapid declines in protection rates across most industry groups. Table 4 and figure 1 presents the trends according to the use-based sectors.

³² It was not possible to define an exact mapping between I-O sectors, tariff lines for each of the 72 three-digit industries, requiring us to re-classify some of these industries into broad industry groups as single I-O sectors corresponds to several three-digit industries. For example I-O sector 42 corresponds to the industry groups 230, 231, 234, 235, 236.

³³ The tariff data used for the estimation was available according to the BTN classification till 1985-86 and as a result the estimates of protection are not exactly comparable, though the difference does not seriously impair the comparability of protection estimates for different years.

The tables provide estimates for the effective rates of protection not adjusted for exchange rate overvaluation and hence measured protection accorded to domestic industries does not capture the exchange rate movements. Further, since major changes in the exchange rate system were going on during the reform period, our estimates of the 1990s need to be interpreted with caution. Nonetheless they are representative of the level and heights of effective protection found across industries in developing countries.

Within the intermediate goods sector, we see that most of the industries have ERP in the range of 50 to 150 percent. This holds across all the three sub-periods of the study. Thread & cordages, synthetic rubber & manmade fibers, paints & varnishes, iron & steel, structural metal products are some of the industry groups with high rates of ERP across the four phases. Only three industries namely fertilizer & pesticides, coke oven and other coal tar products record ERP levels of 50-60 percent for the phase 1980-85. There is an increase in the ERP level across all industries in the second phase. For the third period, all the intermediate goods industries show a decline in the level of ERP and the average is around 87 percent. Industry groups like, iron & steel, paints & varnishes etc and structural metal products still record ERP levels of over 100 percent. By the end of 1999-00, the average ERP levels declined to around 40 percent. The maximum decline amongst the industry groups was observed for paints & varnishes iron & steel and fabricated structural products.

Table 4: Effective Rate of Protection (percent) in Indian Manufacturing: Use-Based Classification

Code NIC-87	Three-Digit Classification Description	Gross Value Added Share 1980-81	Phase-1 1980-85	Phase-2 1986-90	Phase-3 1991-95	Phase-4 1996-00
Intermediate goods sector						
230,231,235	Cotton Textiles	11.62	109.77	125.38	68.38	42.93
262	Threads, Cordage etc	0.06	160.91	151.23	95.79	48.22
290	Tanning & Curing of Leather	0.36	117.73	123.15	78.86	52.42
300	Organic & Inorganic Chemical	3.54	95.85	115.90	85.79	38.94
301	Fertilizer & Pesticides	3.46	50.79	60.05	60.49	28.70
302+306	Synthetic Rub & Fibres	1.50	173.07	157.73	78.75	40.63
303	Paints, Varnishes etc	1.18	171.73	434.42	123.36	39.17
308,309	Explosives , Chemicals nec etc	1.14	97.30	116.33	81.09	37.49
310,312	Rubber Prods, Tyres & Tubes	1.64	123.74	146.70	88.69	53.73
313	Plastic Prods nec	0.72	150.71	166.34	97.18	42.85
314, 316	Petroleum Products	2.00	96.22	107.68	68.93	26.16
318, 319	Coke, Coal	0.68	56.68	76.56	62.68	34.73
330,331	Iron & Steel	11.51	225.23	195.01	109.73	51.69
332	Ferro Alloys	0.29	93.29	109.18	65.55	28.85
333,35,36,38	Copper, Aluminum, Zinc	0.94	87.51	109.59	69.32	34.85
340,341	Fabricated Structural Metals	1.33	428.65	314.76	181.96	50.56
343+349	Hand tools & Weights	0.18	86.02	106.68	71.60	37.39
Sectoral average		42.22	147.03	149.18	87.58	40.13
Capital goods sector						
350	Agr machinery, Parts & Equip	0.82	30.40	44.36	39.90	27.90
351,352,354	Min mach, Boilers, Oth Mach	2.77	51.85	61.98	39.06	25.85
353	Food & Textile Machinery	1.39	48.66	59.97	37.75	29.31
356, 359	Gen purpose Machinery	1.82	52.73	76.65	47.72	29.47
357	Machine Tools & Accs	0.86	33.27	64.33	41.69	24.60
358	Office & Computing Mach	0.13	101.15	98.24	73.74	39.25
360	Elect Industrial Machinery	3.51	83.15	64.26	46.47	26.45
361	Wires & Cables	1.26	51.53	134.31	89.79	66.50
362	Cells & Batteries	0.46	199.92	177.86	102.81	61.80
365,368,369	Apparatus, Valves, Machines	1.26	91.15	130.07	79.72	33.43
370	Ships & Boats	0.82	47.25	62.15	46.24	42.03
371, 372	Locomotive, Wagon, coaches	2.52	47.12	64.33	45.36	28.78
377, 379	Aircraft, Transport nec etc	0.32	85.69	112.16	85.60	53.85
Sectoral average		17.94	62.77	78.45	54.23	33.30
Consumer goods sector						
232, 233	Cotton Khadi & Handloom	0.06	109.36	126.85	70.95	42.99
234, 236	Power looms & Printed Cotton	0.49	109.77	125.38	68.38	42.93
260,265,267	Textiles	0.60	138.33	149.89	98.45	54.25
263	Blankets, Shawls, Rugs etc	0.10	102.52	91.80	63.30	44.66
268, 269	Water Proof Textiles & others	0.12	160.91	151.23	95.79	48.20
291	Leather Footwear	0.36	151.87	158.49	91.57	35.71
292,293,299	Leather Products	0.01	117.73	123.15	78.86	52.42
304	Drugs & Medicines	3.00	80.36	97.30	82.02	40.19
305	Perfum etc	0.01	133.40	234.25	98.63	56.95
311	Footwear- Rubber & Plastics	0.14	137.22	157.28	92.93	48.29
342, 346	Furniture & Wares of Metals	0.65	116.63	147.80	92.75	47.58
355, 363+64	AC/Refrgr, Lamps, Appliances	1.09	100.45	110.73	78.03	46.85
373+374	Vehicles, Cars & Products	3.93	94.17	96.57	71.96	49.03
375	Motor Cycles & Parts	0.52	119.51	93.52	75.00	52.43
376	Bicycles & Parts	0.29	121.76	50.99	61.58	53.18
Sectoral average		12.17	101.51	111.56	80.55	48.28

Note: The sectoral average for the phases is a value-added share weighted average of the yearly effective rate of protection
Source: Author's calculations based on the (1) Customs Tariff Working Schedule, Central Excise and Customs, Government of India and (2) Input-Output Transaction Table- 1983-84 and 1989-90, Central Statistical Organization, Government of India.

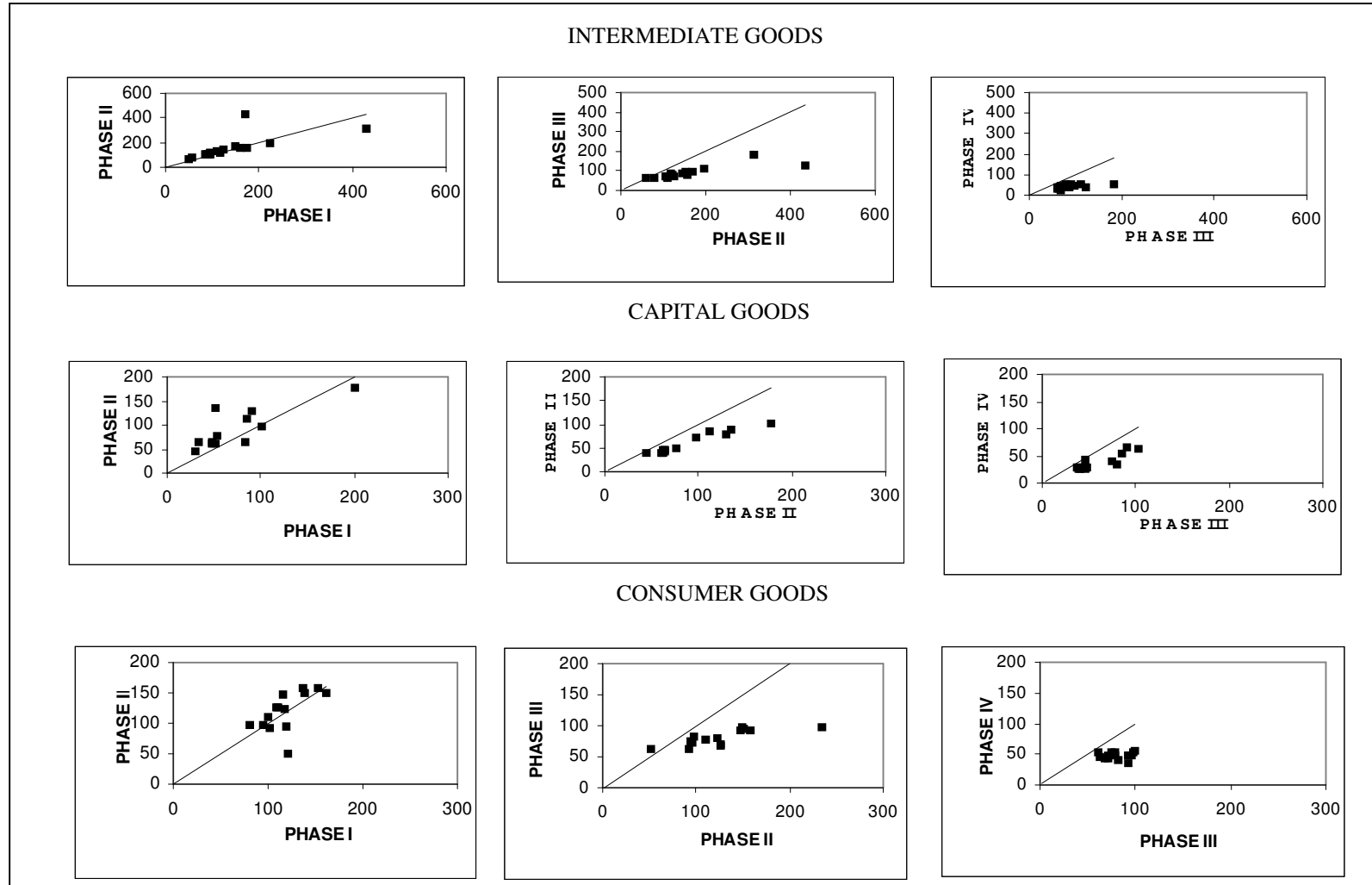
The capital goods sector has the lowest ERP levels amongst all the use-based sectors for all the phases. Majority of the industries record ERP levels of less than 100 percent across the four periods. Cells & batteries is the only industry group to register an ERP of over 100 percent for the first three phase. The electrical industrial machinery industry, with the largest value added share of 3.52 within the capital goods sector records an ERP level of 83, 64, 46 and 26 percent in the phases of trade reform. In the second phase, even though the tariff rates were hiked across all major products, the ERP levels for most industries remain in the low to moderate range of 50 to 75 percent. The 1990s brought about sharp reductions in the tariff rates for most industry groups, resultantly a fall in the ERP levels from 54 percent in the first half of 1990s to around 33 percent in the second half. In the second period of the 1990s, wires & cables, cells & batteries and aircraft building etc were the only industry group with ERP levels above 50 percent.

As with the other use-based sectors, the industries within the consumer goods sector also record sharp variations in protection levels. Drugs & medicines and motor vehicles are the only industries to record less than 100 percent ERP for the period 1980-85. Further, most of the industries belonging to the cotton textile, textile products and leather have very high ERP levels in the range of 100 to 175 percent. The second phase shows an increase in ERP levels across most industries, however four industries show a decline in the ERP levels namely, blankets, rugs & shawls etc, water-proof textiles, motor cycles & related products and bicycles & parts. In the third phase majority of the industries are concentrated in the range of 60-90 percent ERP. The fourth phase saw a decline in many industry groups from the levels achieved in the first half of 1990s. By the 1999-00, we find that average protection level had declined to below 50 percent from a high of 100 percent in 1980-81. Despite the lowering of tariff rates across most product lines, the consumer goods belonging to the textile, leather, rubber & plastic, metal products industry groups record relatively high levels of protection.

Figure1 and appendix chart1 shows the ERP levels for different phases of trade reforms and the decade of 1980s and 1990s for the use-based classifications. Comparing each phase of trade reforms with the previous phase shows that the ERP levels decline in most industries within each use-based sector. In the case of second phase, we however see that the level of ERP rises across industry groups. Observing the fourth phase of trade reforms as against the first half of the 1990s [third phase], we observe rapid declines in ERP levels across the three use-based sectors. For some industries [paints & varnishes (303), iron & steel (330,331), fabricated structural products (340) and cells & batteries (362)], the second half of 1990s saw major reductions in the ERP levels.

Observing the decades of 1980s and 1990s we find that the level of ERP declined across the three use-based sectors. In case of two industries belonging to the intermediate goods sector [paints and varnishes (303) and fabricated structural products (340)], the decline is sharp. The ERP level of most capital goods industries was low in the 1980s in comparison to the intermediate and consumer goods sectors. The 1990 saw further reduction in the ERP levels across all industries. The consumer goods industries, though for the early part of the 1990s still under licensing, yet show a decline in the ERP level in the 1990s. This holds across all the three digit industries belonging to this sector.

Figure 1 Indicators of Trade Liberalization: Effective Rate of Protection



IV.2 Trends in Non-Tariff Barriers

Non-tariff barriers operating through the import licensing system have long been the principal means of regulating imports and protecting domestic industries.³⁴ The complexity of the import regime makes it very difficult to quantify the impact and significance of the QRs.³⁵ We quantify the extent of non-tariff barriers by three-digit industries for the period 1980-81 to 1999-00 using the import coverage ratio.³⁶ The information available from the import-export policy documents in the eighties and early nineties was not at a very detailed level of product description, the summary measures constructed according to the industry groups therefore are at best an approximation into the extent of non-tariff barriers prevailing in the industrial sector. Table 5 and figure 2 depicts the trends in sector-wise import coverage ratio.

The percentage of imports subject to QRs in the intermediate goods sector was similar for the first and the second phases of trade reforms. At the level of the individual industries, there was hardly any change in the import coverage ratio. The products of the cotton textiles and leather sectors such as yarn and leather were however not subject to any import restrictions. In the second phase, some of the products belonging to the chemical n.e.c industries were freed from import restrictions and this resulted in a marginal reduction in the coverage ratio by around 6 percentage points.

³⁴ The import control mechanism in India was first introduced as a result of the foreign exchange crises of the 11 Plan (1956-61). From 1960-77 these controls were increasingly tightened and more complex. See World Bank (1989) and Aksoy (1991) for a detailed description of the import-licensing regime.

³⁵ Attempts have been made to estimate the share of imports subject to different licensing categories. Pursell (1988) has made rough estimates of imports under OGL for the 1980s, Aksoy (1991) presents share of imports in different licensing categories for 1986-87. Hasheem extends the Aksoy framework for the 1990s.

³⁶ It is possible to construct a variety of measures that indicate the frequency of occurrence of NTBs. Such measures may be unweighted, or they may be weighted by imports or by production. Further they may be classified according to various categories of NTBs. For details, see OECD (1995).

Table 5 Import Coverage Ratio (percent) in Indian Manufacturing: Use-Based Classification

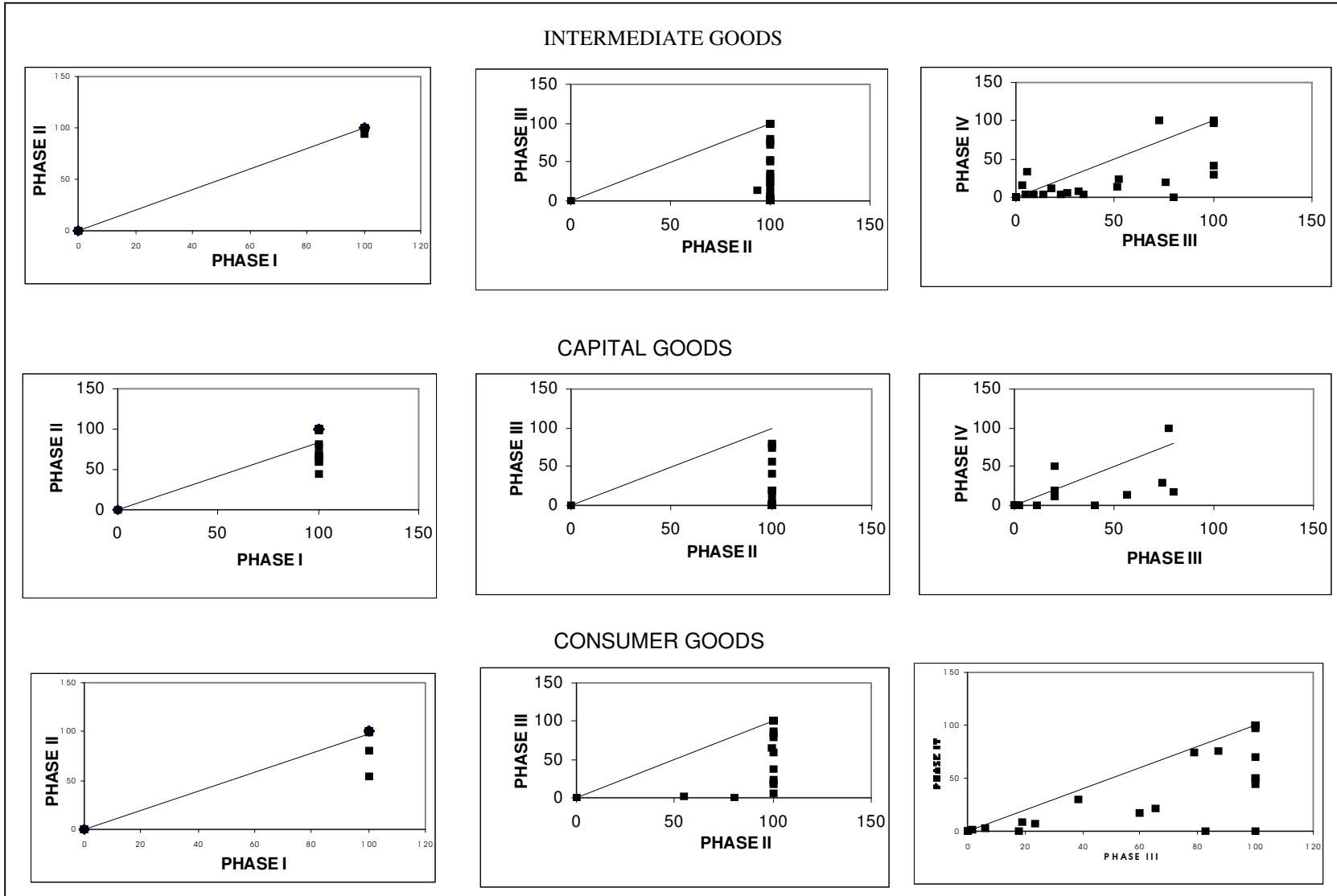
Code NIC-87	Three-Digit Classification Description	Gross Value Added Share 1980-81	Phase-1 1980-85	Phase-2 1986-90	Phase-3 1991-95	Phase-4 1996-00
Intermediate Goods Sector						
230	Cotton ginning, bailing & cleaning	0.35	0.00	0.00	0.00	0.00
231	Cotton spinning not in Mills	0.00	0.00	0.00	0.00	0.00
235	Cotton spinning in Mills	11.27	100.00	100.00	100.00	100.00
262	Threads, Cordage, Ropes etc	0.06	100.00	100.00	75.48	18.9
290	Tanning & Curing of Leather	0.36	0.00	0.00	0.00	0.00
300	Organic & Inorganic Chemicals	3.54	100.00	100.00	0.22	0.22
301	Fertilizer & Pesticides	3.46	100.00	100.00	100.00	40.70
302+306	Synthetic Rubber & Manmade Fibre	1.50	100.00	100.00	22.61	4.08
303	Paints, Varnishes etc	1.18	100.00	100.00	25.75	6.30
308	Explosives etc	0.22	100.00	100.00	100.00	96.50
309	Chemical Products nec	0.92	100.00	93.78	14.10	3.27
310	Tyres & Tubes	1.12	100.00	100.00	100.00	29.43
312	Rubber Products nec	0.54	100.00	100.00	18.11	11.46
313	Plastic Products nec	0.72	100.00	100.00	52.32	23.76
314	Refined Petroleum Products	1.60	100.00	100.00	72.43	100.00
316	Refined Petroleum Products nec	0.40	100.00	100.00	34.60	0.00
318	Coke Oven Products	0.51	100.00	100.00	0.00	0.00
319	Other Coal Tar Products	0.17	100.00	100.00	0.00	0.00
330	Iron and Steel in P/SF form	8.29	100.00	100.00	0.00	0.00
331	Iron And Steel in SF form	3.22	100.00	100.00	0.00	0.00
332	Ferro Alloys	0.29	100.00	100.00	0.00	0.00
333	Copper manufacturing	0.21	100.00	100.00	5.50	34.01
335	Aluminum manufacturing	0.43	100.00	100.00	8.89	3.17
336	Zinc Manufacturing	0.21	100.00	100.00	2.87	15.12
338+ 339	Metal scraps & Non Ferrous	0.09	100.00	100.00	4.65	3.82
340	Fab Structural Metal Prods	0.37	100.00	100.00	80.00	0.00
341	Fab Structural Metal nec	0.79	100.00	100.00	51.53	13.86
343+349	Hand-tools, Weights etc	0.18	100.00	100.00	31.84	7.62
	Sectoral average	42.22	98.31	98.26	41.77	27.60
Capital Goods Sector						
350	Agr machinery, Eqpts & Parts	0.82	100.00	100.00	20.14	11.99
351	Constr /Mining Machinery	0.68	100.00	68.74	2.17	0.00
352	Prime Movers & Boilers	1.32	100.00	100.00	40.04	0.23
353	Food & Textile Machinery	1.39	100.00	76.86	0.00	0.00
354	Other Machinery	0.77	100.00	68.24	0.00	0.00
356	General Purpose Machinery	1.48	100.00	60.00	0.00	0.00
357	Machine-Tools & Accessories	0.86	0.00	0.00	0.00	0.00
358	Office & Computing Machinery	0.13	100.00	100.00	1.66	0.22
359	Special Purpose Machinery	0.34	100.00	80.64	1.22	0.83
360	Electrical Industrial Machinery	3.51	100.00	65.57	11.69	0.00
361	Wires & Cables	1.26	100.00	100.00	80.00	16.86
362	Cells & Batteries	0.46	100.00	60.00	20.00	51.15
365+366	Radio & TV	0.98	100.00	97.25	56.51	14.59
368	Electronic Valves & Tubes	0.13	100.00	44.34	20.02	19.65
369	X-ray Machinery	0.15	100.00	63.11	0.00	0.00
370	Ships and Boats	0.82	100.00	100.00	74.35	29.51

371	Locomotives and Parts	1.16	100.00	100.00	0.00	0.00
372	Wagons and Coaches	1.36	100.00	100.00	0.00	0.00
377	Aircraft and related products	0.19	100.00	100.00	77.51	99.89
379	Transport Equipment nec	0.13	100.00	100.00	0.00	0.00
	Sectoral average	17.94	95.11	77.21	20.47	8.15
	Consumer Goods Sector					
232	W&F cotton Khadi	0.01	0.00	0.00	0.00	0.00
233	W&F of Cotton- Handloom	0.05	0.00	0.00	0.00	0.00
234	W&F of Cotton-Powerloom	0.10	0.00	0.00	0.00	0.00
236	Printing of Cotton Textiles	0.39	100.00	100.00	100.00	100.00
260	Knitted or Crocheted Textiles	0.18	100.00	100.00	99.96	97.38
263	Blankets, Shawl, Carpets & Rugs	0.10	100.00	100.00	100.00	69.49
265	Textile Garments & Accessories	0.41	100.00	100.00	78.57	74.30
267	Made-Up Textiles	0.01	100.00	100.00	59.64	16.45
268	Water-Proof Textiles	0.09	100.00	100.00	82.55	0.21
269	Textile Products nec	0.03	100.00	100.00	17.99	0.67
291	Leather Footwear	0.26	100.00	100.00	100.00	100.00
292	Apparel of Leather & Subs	0.01	100.00	100.00	100.00	100.00
293	Leather Products & Substitutes	0.00	100.00	100.00	100.00	100.00
299	Leather & Fur Products nec	0.00	100.00	100.00	38.42	30.31
304	Drugs & Medicines	3.00	100.00	58.56	1.46	2.12
305	Perfumes, Cosmetics & lotions	0.67	100.00	99.52	65.04	21.59
311	Rubber & Plastic Footwear	0.14	100.00	100.00	0.00	0.00
342	Furniture & Fixtures	0.34	100.00	100.00	19.06	8.28
346	Metal Kitchen Ware	0.31	100.00	100.00		
355	Refrigerators & Air conditioner	0.43	100.00	100.00	100.00	50.00
363+365	Lamps & Domestic Appliances	0.66	100.00	100.00	86.85	75.23
373+374	Motor Vehicles, cars & Products	3.93	100.00	100.00	23.67	6.61
375	Motor-cycles & Related Products	0.52	100.00	100.00	100	100
376	Bicycles & Parts	0.29	100.00	100.00	6.24	2.64
	Sectoral average	12.17	98.69	87.85	45.69	33.43

Note: The sectoral average for the phases is a value-added share weighted average of the yearly import coverage ratio

Source: Author's calculations based on the (1) Export - Import Policy Documents, Ministry of Commerce, Government of India and (2) The Monthly Statistics of Foreign Trade, Ministry of Commerce, Government of India.

Figure 1: Indicators of Trade Liberalization: Effective Rate of Protection



The intermediate goods industries witnessed major changes in the non-tariff barriers only during the third phase of trade reforms. These changes can be listed as [1] drastic- Industries where the import coverage ratio declined from 100 to zero percent, [2] moderate- import coverage ratio declined from 100 to around 30 percent and [4] low- percentage of products under import licensing still around 75 percent. Iron & steel, ferroalloys, copper, coal & coal tar, coke oven, industrial chemicals are the industries where the imports are no longer subject to any kind of licensing. Some of the industries continue to have 100 percent imports subject to licensing. The entire import of fertilizer is in the hands of public sector agencies in the form of canalization. Further, the industry has been subject to rigid price controls for several years. Both these aspects of the fertilizer industry have been dictated to a large extent due to its link with the agricultural sector. Further since 1992, the fertilizer prices of the phosphate and potassic variety have been de-controlled. Majorities of the products for the explosives, arms & ammunition industry are classified as hazardous items and imports streamlined via the public sector agencies. The structural metal industry consisting of products such as structures of iron/steel, grill & nets are also subject to strict import controls through out the period of study. Products such as inner tubes, rubber tyres also have 100 percent restrictions on imports. The average for the intermediate goods sector for the four phases of trade reform was around 90 percent in the eighties and about 33 percent in the first half of the nineties.

For the period 1980-85, 100 percent of the imports of the capital goods sectors was under import licensing. This is reflective of the trade policy stance towards the capital goods sector in the early eighties. The import policy for the capital goods sector consists of banned items and items under OGL, the imports of which is allowed only to actual users on the basis of essentiality certificates and indigenous clearance. Though the trade policy announced every year did highlight some new schemes for the capital goods sector, but most of the changes taking place were essentially shifts from one kind of licensing categories to another.

The second phase of trade reforms beginning with the 1985-86 trade policy changes did attempt to improve the quality of domestic production via technological up-

gradation. This was made possible by transferring to the OGL lists items of machinery and equipment for industrial as well as non-industrial uses. Construction & mining, machinery other than food & textiles, electrical industrial machinery, x-ray machines, are some of the three-digit industries, which records modest decline in the share of imports subject to controls. An electronic valve, tubes etc is the only industry with 50 percent of its imports under restrictions. Trade reforms initiated in 1991-92 saw large number of items of machinery and components falling within the capital goods sector being transferred to the OGL or free list. This was evident in the import coverage ratios for industries belonging to the two-digit groups 35-36. Around half of the twenty industries comprising the capital goods sector has less than 25 percent of the imports subject to import licensing. More notable is the industries belonging to the transport-equipment sector, where the percentage of products covered by QRs dropped to around 20 percent in the third phase from 100 percent NTB levels in the first two phases. Machine tools is the only industry within the capital goods sector to have no import licensing requirements for its products in any phase of trade reforms.

The consumer goods sector is characterized by restrictions on imports even after the policy changes in the 1990s. All items of consumer goods are banned from imports in the first two phases of trade reforms. The EXIM policy of 1992-93 however did allow imports of some items via special import license.³⁷ A notable exception being different categories of cotton [carded or combed, not carded or combed, waste, and sewing thread] falling under various three-digit groups of cotton textiles that were free from import restrictions throughout the period of the study. The second phase of reforms saw change in only drugs & pharmaceuticals industry. This is primarily due to the change in the import licensing status of certain essential raw materials, fine chemicals, vaccines, medicaments and pharmaceutical products.

Drugs & pharmaceuticals, rubber & plastic footwear along with the industries falling with cotton textile groups are the only industries, which have, zero percent of

³⁷ See Annexures V and VI for an illustrative list of items under consumer goods, in Mishra and Goldar (1996).

imports subject to restrictions in the third phase. This period also saw substantial reductions in the import coverage ratio for textile products NEC, leather products and metal furniture & fixtures industries. It is important to bear in mind when quantifying the QRs, that many consumer goods howsoever described, of industrial, agricultural, mineral or animal origin, whether in CKD/SKD condition or ready to assemble or in finished form are still listed as restricted items. Industries with an import coverage ratio of 100 in the third phase cover a wide range of products: varieties of cotton fabrics, other woven cotton fabrics, knitted or crocheted fabrics, knitted or crocheted finished products, carpets, rugs and floor coverings leather footwear, leather apparels, leather articles, metal products such as heating equipment, cutlery, ladles, skinners, stoves, cookers etc, airconditioners, refrigerators and motorcycles/ mopeds.

Figure 2 presents a phase wise comparison of the import coverage ratio. For intermediate goods industries, the first two phases of trade reforms do not show any change in the import coverage ratios. The third and the fourth phases saw drastic reductions in the percentage of imports subject to licensing and is evident in the comparison of the fourth phase with the third. Same holds true for the capital goods sector also, though some attempts at freeing of imports from non tariff barriers started in the mid 1980s. The consumer goods industries has around 33 percent of imports subject to licensing in the fourth phase. The decline in this sector has been slow in comparison with the other sectors. This is in line with the policy stance towards consumer goods import.

Appendix chart2 shows the pattern of import coverage ratio by industry groups for the decade of 1980s and 1990s. Observing all the three sectors, we find that for the 1980s, the import coverage ratio was almost 100 percent. The 1990s see a substantial decline for intermediate and capital goods industries. For consumer goods sector, though there is evidence of a decline in the 1990s, it is still relatively lower when compared to the other sectors.

IV.3 Trends in Import Penetration Rate

The import-export policy announced in April 1985 incorporating the recommendations of the Hussein committee favored a greater role for tariffs in regulating imports. Simultaneously there were changes taking place in the import-licensing regime necessitating the shifting of products from one category of licenses to another. The trade liberalization attempt initiated with the announcement of the trade policy changes in 1991-92 aimed at creating a globally competitive environment via reducing the degree of licensing and regulatory controls on foreign trade. A major focus of the new trade regime related to lowering the structure of import duties and quantitative restrictions on imports.³⁸ The lowering of tariffs and abolition of import controls are intended to bring about competition via imports in the manufacturing sectors. We document the import penetration rates for the industries in order to assess the joint impact of both tariff and non-tariff barriers on the manufacturing sector. The import penetration ratios are documented for 60 industries and three use-based sectors for the three phases of trade reform³⁹ as evident from table 6 and figure .3.

³⁸ The Trade Policy (1991-92) listed the following categories: (a) the prohibited items (tallow, fats, oils, lard, poultry, animal rennet and un-manufactured ivory) and (b) the restricted list. The restricted list further categorized items into (1) consumer goods, (2) security related items; (3) environment related items, (4) electronics and (5) Drugs and chemicals. Successive policy statements have further pruned the list. A phased reduction in the peak rate of customs duty was also undertaken in successive budget announcements. The customs duty on power projects and related machinery was brought down to 25 percent and the duty on fertilizer projects was reduced to zero by the end of 1994-95.

³⁹ The import penetration ratios were available for only 60 three-digit industries as an exact mapping could not be established for some of the three-digit industries.

Table 6: Import Penetration Rates (percent) in Indian Manufacturing: Use-Based classification

Code NIC-87	Three-Digit Classification Description	Gross Value Added Share 1980-81	Phase-1 1980-85	Phase-2 1986-90	Phase-3 1991-95	Phase-4 1996-00
Intermediate Goods Sector						
230	Cotton Ginning, Bailing & Cleaning	0.35	0.099	0.035	0.039	0.001
235	Cotton Spinning in Mills	11.3	0.000	0.000	0.002	0.003
262	Threads, Cordage, Ropes etc	0.06	0.007	0.007	0.023	-0.053
290	Tanning & Curing of Leather	0.36	0.004	0.027	0.140	0.096
300	Organic & Inorganic Chemicals	3.54	0.096	0.234	0.428	0.469
301	Fertilizer & Pesticides	3.46	0.156	0.087	0.111	0.089
302+306	Synthetic Rubber & ManmadeFibre	1.50	0.099	0.057	0.164	0.156
303	Paints, Varnishes etc	1.18	0.020	0.084	0.070	0.084
308	Explosives etc	0.22	0.017	0.008	0.013	0.004
309	Chemical Products nec	0.92	0.165		0.147	0.198
				0.171		
310	Tyres & Tubes	1.12	0.002	0.003	0.006	0.008
312	Rubber Products nec	0.54	0.242	0.194	0.196	0.191
313	Plastic Products nec	0.72	0.024	0.034	0.052	0.037
314	Refined Petroleum Products	0.40	0.465	0.262	0.399	0.455
318	Coke Oven Products	0.51	0.106	0.299	0.537	0.618
319	Other Coal Tar Products	0.17	0.267	0.130	0.113	0.492
330	Iron and Steel in P/SF form	8.29	0.007	0.112	0.085	0.149
331	Iron and Steel in SF form	3.22	0.056	0.301	0.253	0.154
332	Ferro Alloys	0.29	0.236	0.494	0.503	0.386
333	Copper manufacturing	0.21	0.419	0.460	0.485	0.408
335	Aluminum manufacturing	0.43	0.174	0.088	0.064	0.103
336	Zinc Manufacturing	0.21	0.329	0.271	0.116	0.224
338+339	Metal scraps & Non Ferrous	0.09	0.449	0.456	0.446	0.344
340	Fab Structural Metal Prods	0.37	0.205	0.011	0.005	0.009
341	Fab Structural Metal nec	0.79	0.006	0.010	0.019	0.030
343+349	Hand-tools, Weights etc	0.18	0.056	0.027	0.022	0.052
	Sectoral average	42.22	0.11	0.13	0.15	0.18
Capital Goods Sector						
350	Agr machinery, Eqpts & Parts	0.82	0.009	0.006	0.009	0.008
351	Constr /Mining Machinery	0.68	0.200	0.364	0.399	0.421
352	Prime Movers & Boilers	1.32	0.099	0.083	0.132	0.126
353	Food & Textile Machinery	1.39	0.119	0.112	0.235	0.270
354	Other Machinery	0.77	0.436	0.353	0.265	0.344
356	General Purpose Machinery	1.48	0.095	0.096	0.099	0.140
357	Machine-Tools & Accessories	0.86	0.465	0.284	0.254	0.404
359	Special Purpose Machinery	0.34	0.588	0.459	0.337	0.532
360	Electrical Industrial Machinery	3.51	0.008	0.038	0.047	0.061
361	Wires & Cables	1.26	0.026	0.052	0.061	0.073
362	Cells & Batteries	0.46	0.217	0.093	0.021	0.058
365+366	Radio & TV	0.98	0.111	0.102	0.080	0.202
368	Electronic Valves & Tubes	0.13	0.708	0.635	0.504	0.438
369	X-ray Machinery	0.15	0.076	0.170	0.214	0.301
370	Ships and Boats	0.82	0.100	0.344	0.124	0.351
371	Locomotives and Parts	1.16	0.103	0.119	0.078	0.161
372	Wagons and Coaches	1.36	0.059	0.014	0.024	0.069
377	Aircraft and Related products	0.19	0.631	0.412	0.493	0.550
	Sectoral average	17.94	0.12	0.12	0.12	0.19

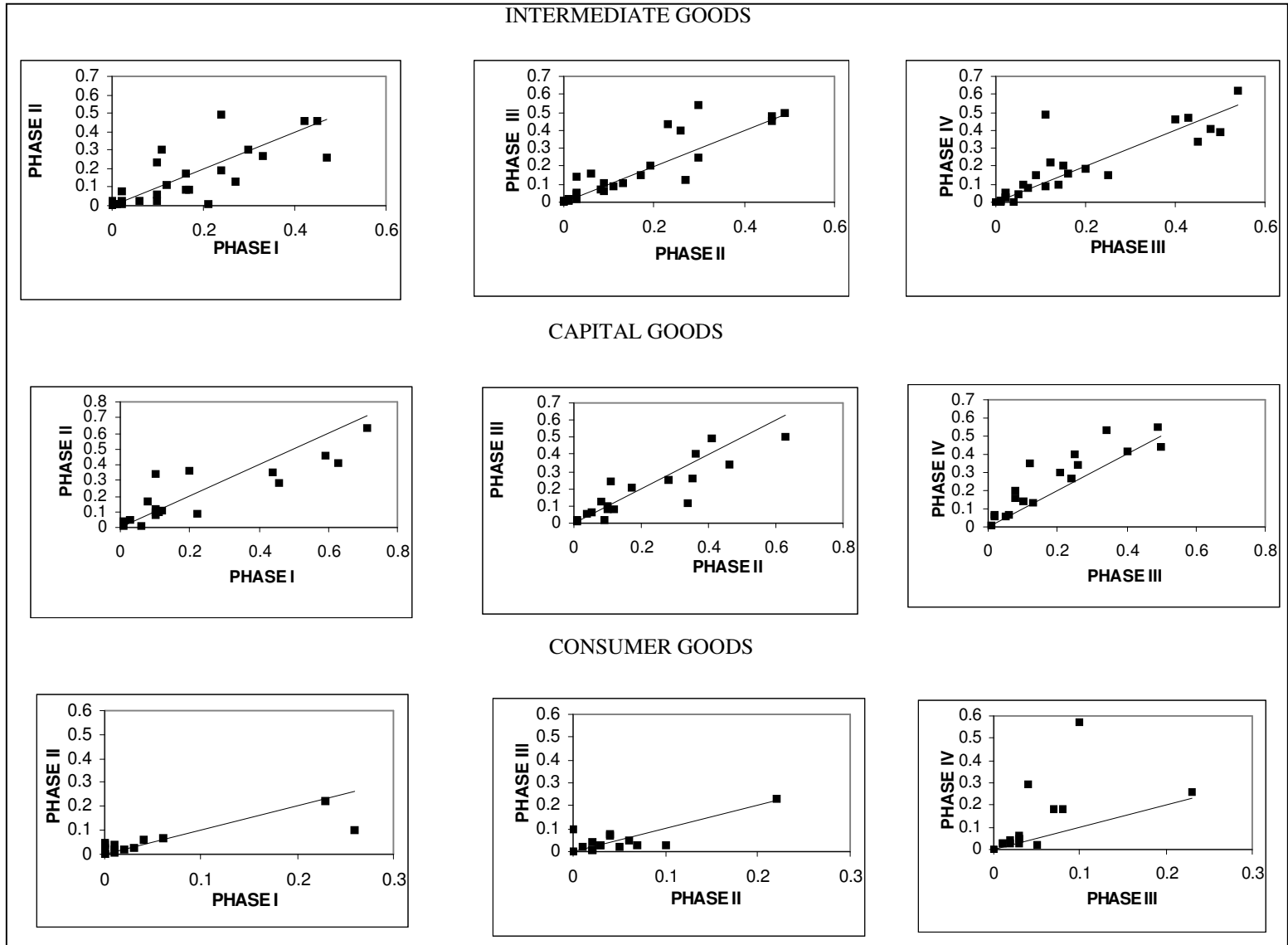
Consumer Goods Sector						
236	Printing of Cotton Textiles	0.39	0.002	0.025	0.035	0.048
260	Knitted or Crocheted Textiles	0.18	0.002	0.019	0.008	0.031
265	Textile Garments & Accessories	0.41	0.001	0.001	0.098	0.566
268	Water-Proof Textiles	0.09	0.013	0.017	0.044	0.291
269	Textile Products nec	0.03	0.230	0.223	0.231	0.260
291	Leather Footwear	0.26	0.003	0.001	0.000	0.000
304	Drugs & Medicines	3.00	0.044	0.064	0.048	0.017
305	Perfumes, Cosmetics & lotions	0.67	0.064	0.071	0.033	0.034
311	Rubber & Plastic Footwear	0.14	0.007	0.036	0.083	0.179
342	Furniture & Fixtures	0.34	0.002	0.042	0.068	0.183
346	Metal Kitchen Ware	0.31	0.000	0.001	0.001	0.003
355	Refrigerators & Air conditioner	0.43	0.258	0.105	0.028	0.064
363+365	Lamps & Domestic Appliances	0.66	0.011	0.015	0.018	0.035
373+374	Motor Vehicles, Cars & Products	3.93	0.034	0.032	0.032	0.054
375	Motor-Cycles & Related Products	0.52	0.015	0.016	0.005	0.027
376	Bicycles & Parts	0.29	0.002	0.047	0.025	0.031
	Sectoral average	12.17	0.04	0.04	0.04	0.10

Note: The sectoral average for the phases is a value-added share weighted average of the yearly import coverage ratio

Source: Author's calculations based on the (1) The Monthly Statistics of Foreign Trade, Ministry of Commerce, Government of India and (2) Annual Survey of Industries, Central Statistical Organization, Government of India.

Most of the three-digit industries belonging to the intermediate goods sector show low levels of import penetration rates for the first phase of trade reforms. Further less than half of the industries record almost zero import penetration. These industries belong to cotton textiles, textile products, leather, steel, rubber & plastics and petroleum sectors. In the second phase, we observe small improvements in the level of import penetration for some industries- organic & inorganic chemicals, chemical products NEC, copper and metal scraps & non-ferrous metals. The Ferro-alloys industry shows an improvement in the MPR from 23 percent in the first phase to around 50 percent in the second phase. Majority of the industries however records low to negligible levels of MPR. The average for the sector is around 13 percent and this shows a drop of 20 percent over the import penetration ratio for the period 1980-85. For the period 1991-95, we see that most industries record either zero or between 0-20 percent import penetration ratios. Organic & inorganic chemicals, synthetic & manmade fiber, refined petroleum products are some of the industries which show marginal improvements in the MPR levels. Ferro-alloys is the only industry with a import penetration level of over 50 percent in the second and third phase.

Figure 3 Indicator of Trade Liberalization: Import Penetration Ratio



The capital goods sector has seen gradual expansion in the OGL lists starting from the early 1980s, the industries however show low levels of import penetration in the first period. Special purpose machinery, electronic valves, tubes & components, aircraft & related products are some of the industries with an import penetration level of 0.50 and above. The machine tools industries has none of the products subject to any kind of import licensing yet the import penetration level is around 46 percent. The average for the second phase is around 22 percent. Two industries namely, construction & mining industries and ship & boat building show an improvement in the levels of import penetration ratios. In the rest of the industries, there is either a decline or no significant change. This is assumed significance given that changes in non-tariff barriers have been in the items of machinery and non-electrical machinery sector. The average level of import penetration declines in the third phase. This is also reflected in the trends across the industries. Machine tools industry registers a further decline in import penetration level as compared to the second phase. Most of the industries record very low import penetration levels.

The average import penetration rates for the consumer goods sector, is the lowest amongst the three use-based sectors across the three-trade reform phase. Further, given that consumer goods were banned from imports for most of the 1980s and first half of the 1990s, it is not surprising to find that majority of the industries are recording zero or negligible levels of import penetration rates. Only two industries textile products NEC and white goods like air-conditioners, refrigerators have MPR levels of around 25 percent, whereas motor vehicles and pharmaceuticals items have insignificant levels of import penetration. The second phase of trade reforms saw no change in the import policy towards items of this sector except for some products like medicines, sugar and oil seeds etc. Further, import of these items was essentially in the hands of the government through the public sector agencies or the state trading corporations. The average for the sector was almost zero. Textile Products n.e.c. is the only industry with an import penetration rate of around 0.22. The consumer goods in the 1990s is still a sector with nearly 100 percent restriction on imports. The export-import policy document [1992-97] lists majority of the items of consumer durables /non-durables as restricted and in only a

few cases can be imported against a special import license. Observing the third phase, we find that there is zero level of import penetration across the industries. Textile product remains the only industry with an import penetration level of around 20 percent in all three phases of trade reform.

The first three phases of trade reform do not show any noticeable changes in import penetration rates. The fourth phase however sees a marginal increase in the import penetration rates. This holds true across all use-based categories. Figure 3 shows the phase wise comparison of import penetration ratios. A look at the appendix chart 3, we observe that for the decades of 1980s and 1990s, only for some industries there is an improvement in the import penetration. By and large, the 1990s do not bring about substantial increases in import penetration.

The import penetration levels evident from the use-based sectors for the three phases of trade reforms is devoid of any clear trend. The lowering of tariffs and removal of QRs brought about by changes in trade policies from the early 1980s are not reflected in the trends in import penetration as evident from the first three phases of trade reforms. The puzzle of import penetration not increasing despite trade liberalization could be explained by the replacement of quantitative restrictions by tariff-based protection and /or the depreciation of real exchange rate.⁴⁰

V Conclusion

Despite attempts to liberalize the import trade regime in India, the structure of import licensing and tariff rates, throughout the 1980s and early part of 1990s remained restrictive and complicated. Previous research on trade orientation for Indian industries

⁴⁰ Bhagwati (1965) demonstrated that in the absence of perfect competition in the domestic market, tariff and quantitative restrictions are not equivalent and resultantly do not lead to the same level of imports. This argument holds for the Indian industries, as they by and large operate in imperfectly competitive markets. Further, under imperfect competition, the replacement of QRs by tariffs would allow imports to exert greater competitive pressure even if import penetration did not change significantly. In addition, the major thrust of the exchange rate policy in India was to have a depreciating currency in order to expand exports. Though the rupee was devalued in 1991, yet till 1992-93 there was however hardly any appreciation in both nominal and real effective exchange rates.

was confined to computing effective rates of protection for broad input-output sectors [Goldar and Hasheem (1992), Gang and Pandey (1998), Hasheem (2001)] due to the non-availability of information on import licensing according to industrial classification.⁴¹ Similarly attempts were made to quantify the non-tariff barriers for broad industry groups [Aksoy (1991), Mehta (1997) Hasheem (2001)]. Further, most of these studies calculated the indices of trade barriers only for selected time-points. The unavailability of trade statistics at the individual industry level required extensive mapping of trade and industry data sources and this leads to some unavoidable measurement errors. Finally the complexity of the trade regime for much of the 1980s and 1990s makes it very difficult to provide an accurate quantification of the protectionist regime.

We have documented the following measures- effective rate of protection, import coverage ratio and import penetration rates for around 72 three-digit industries divided into three-use based sectors for the four phases of trade reform. Observing the individual industries we find that the effective protection levels were the highest in the second phase of trade reforms. The 1990s saw a rapid decline in the levels of protection based on effective rates of protection. There was hardly any change in the percentage of products subject to import licensing in the first two phases of trade reforms. From a near 100 percent non-tariff barrier level, we see a decline to around 25 percent import restrictions by the end of 1990s. The import penetration rates do not exhibit any trend in the first three phases of trade reforms. In the second half of 1990s, we see a marginal improvement across industry groups.

The results for the use-based sectors are interesting. The ERP level is the highest for the intermediate goods sector. ERP has increased across all the three-sectors in the second phase of trade reforms. Within intermediate goods sector industries such as fabricated structural metal products and iron & steel have high levels of protection across all the phases. Capital goods sector has average ERP levels of less than 100 percent in each of the phases and this is true of most of the industries in this sector. Consumer goods

⁴¹ *The Annual Survey of Industries* does not provide any trade-related information at any level of diaaggregation.

industries on the other hand record a high level of ERP. The third phase of trade reforms sees a sharp fall in ERP levels across all the three-use based sectors. The decline in the fourth phase is even sharper across all use-based sectors.

The share of imports subject to import licensing show insignificant changes for the first two phases. Most of the industries have 100 percent of their imports covered by import licensing. Machine tools and Cotton textile industries are the only exceptions. Within intermediate goods, chemicals n.e.c is the only industry to show a fall in import coverage ratio. The removal of QRs in the 1980s was mostly concentrated in the items of machinery and this is reflected in the import coverage ratios for many capital goods industries in the second phase. The period 1991-95 however records significant changes in the import coverage ratio for many industries in the intermediate and capital goods sectors. There is a large decline in the averages for these sectors. In the fourth phase, we observe significant declines in all three use-based sectors including the consumer goods industries, which had 100 percent import restrictions in the first three phases of trade reforms. Drugs & medicines, is the only industry where relaxation of import restrictions started in the mid1980s.

The import penetration rates show that for most industries there was no change in the ratios. In the intermediate goods sector, there was some evidence of marginal improvement across the phases of trade reforms. For capital and consumer goods sector, the first three periods of trade liberalization show no change in the ratio of imports to domestic availability. The fourth phase however shows an improvement in import penetration rates across all the use-based sectors.

Our evidence when compared with the post reforms protection levels (average tariff rates of manufactures) of many developing countries [Indonesia (1999- 10.7%), Malaysia (1997- 7.5%) and Sri Lanka (1997- 19 %)] show that the protection level for Indian manufacturing at the end of four phase of trade liberalization still remains high.

Appendix

Table 1 *Sample Industries and Value added Shares: Three-digit Industrial Classification*

Code NIC87	Three-Digit Industries Description	1980-81	1985-86	1990-91	1995-96
23	Cotton Textile	16.83	10.31	9.54	4.03
230	Cotton Ginning, Bailing & Cleaning	0.35	0.37	0.28	0.33
231	Cotton Spinning other than Mills	0.00	0.00	0.02	0.01
232	W & F of Cotton Khadi	0.01	0.03	0.01	0.01
233	W & F of Cotton- Handloom	0.05	0.04	0.02	0.03
234	W & F of Cotton- Powerloom	0.10	0.10	0.08	0.15
235	Cotton Spin/Weav/Proc in Mills	11.27	6.36	5.87	3.27
236	Printing of Cotton Textiles	0.39	0.41	0.33	0.23
26	Textile Products	1.21	1.20	2.31	2.48
260	Knitted or Crochted Textiles	0.18	0.24	0.35	0.49
262	Threads, Cordage,Ropes,Twines etc	0.06	0.04	0.03	0.03
263	Blankets, Shawls, Carpets &Rugs	0.10	0.06	0.09	0.05
265	Textile Garments & Accessories	0.41	0.45	1.04	1.79
267	Made-Up Textiles	0.01	0.01	0.01	0.04
268	Water Proof Textile Fabrics	0.09	0.05	0.05	0.05
269	Textile Products, Nec	0.03	0.02	0.03	0.05
29	Leather and Leather Products	0.89	0.90	1.37	0.75
290	Tanning, Curing, Finishing of Leather	0.36	0.31	0.41	0.23
291	Leather Footwear	0.26	0.30	0.40	0.31
292	Apparel of Leather & Substitutes	0.01	0.02	0.08	0.08
293	Leather Products & Substitutes	0.00	0.01	0.04	0.12
299	Leather & Fur Products, Nec	0.00	0.00	0.01	0.01
30	Chemicals and Chemical Products	20.37	20.98	21.40	19.26
300	Organic & Inorganic Chemicals	3.54	3.61	3.03	2.58
301	Fertilizer & Pesticides	3.46	3.70	3.44	5.06
302+306	SyntheticRubber & Manmade Fibre	1.50	1.88	2.29	5.15
303	Paints, Varnishes & Products	1.18	0.84	1.10	1.04
304	Drugs & Medicines	3.00	3.03	2.79	3.24
305	Perfumes, Cosmetics & Lotions	0.67	0.60	1.12	0.87
307	Safety Matches	0.24	0.21	0.10	0.11
308	Explosives & Fireworks	0.22	0.25	0.19	0.19
309	Chemical Products, Nec	0.92	0.80	0.81	1.02
31	Rubber,Plastics,Petroleum etc	7.18	13.05	11.72	7.64
310	Tyres & Tubes	1.12	1.58	1.30	1.09
311	Rubber & Plastic Footwear	0.14	0.12	0.56	0.12
312	Rubber Products, Nec	0.54	0.50	0.44	0.40
313	Plastic Products, Nec	0.72	1.03	1.25	1.19
314	Refined Petroleum Products	1.60	5.57	4.02	4.21
316	Refined Petroleum Products, Nec	0.40	0.21	0.23	0.22
318	Coke-Oven Products	0.51	0.14	0.18	0.23
319	Other Coal/Tar Products	0.17	0.11	0.16	0.18
33	Basic Metals and Alloys	17.84	18.08	18.32	12.03
330	Iron & Steel in Primary/Semiprimary	8.29	8.81	9.40	7.22
331	Semi-finished Iron & Steel	3.22	2.87	1.34	1.56
332	Ferro-Alloys	0.29	0.27	0.22	0.37
333	Copper Manufacturing	0.21	0.11	0.23	0.12
334	Brass Manufacturing	0.16	0.12	0.07	0.07

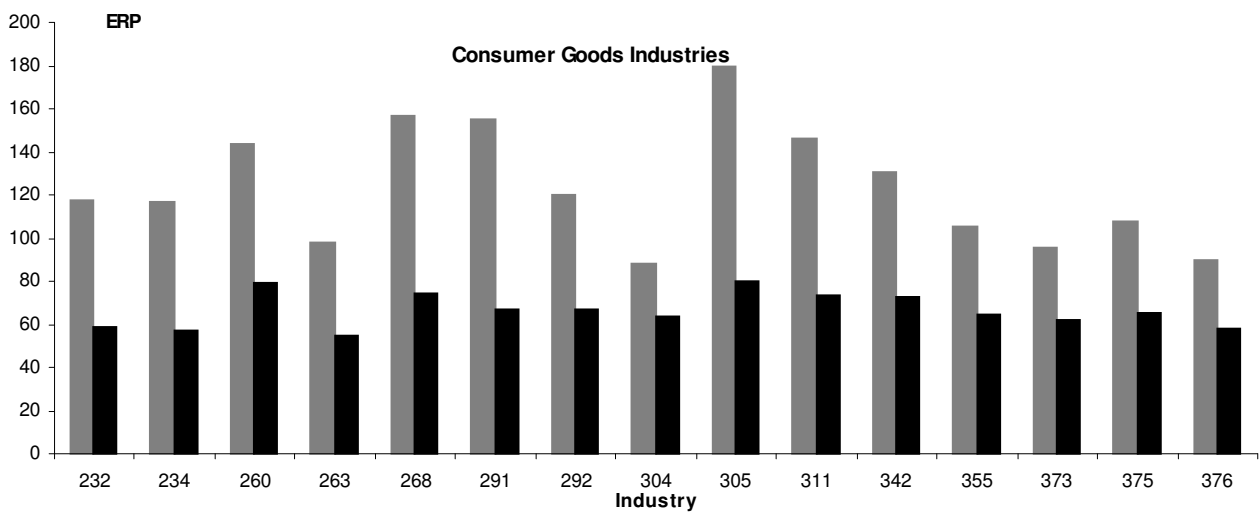
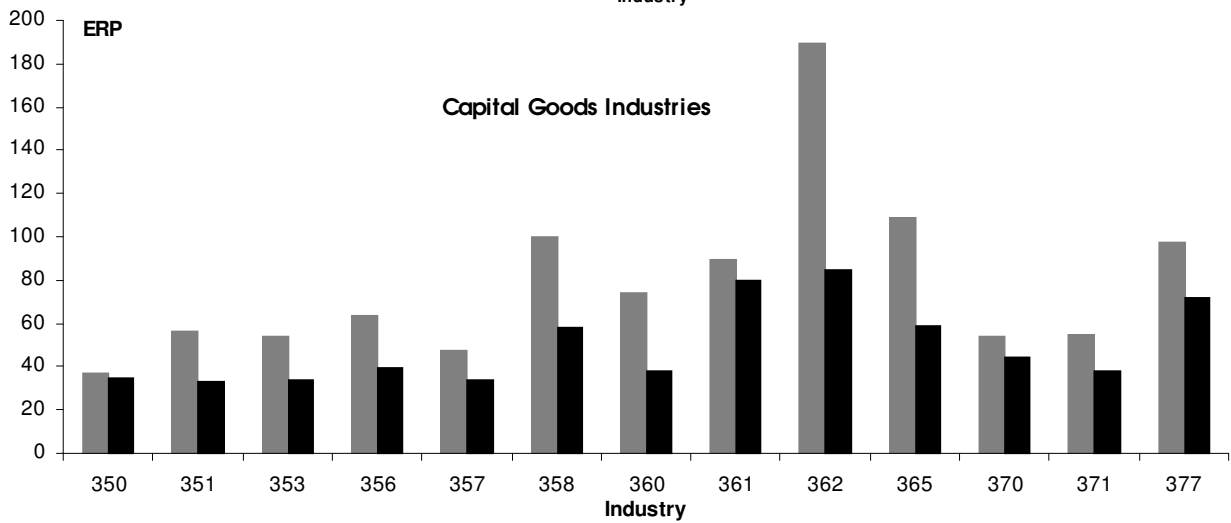
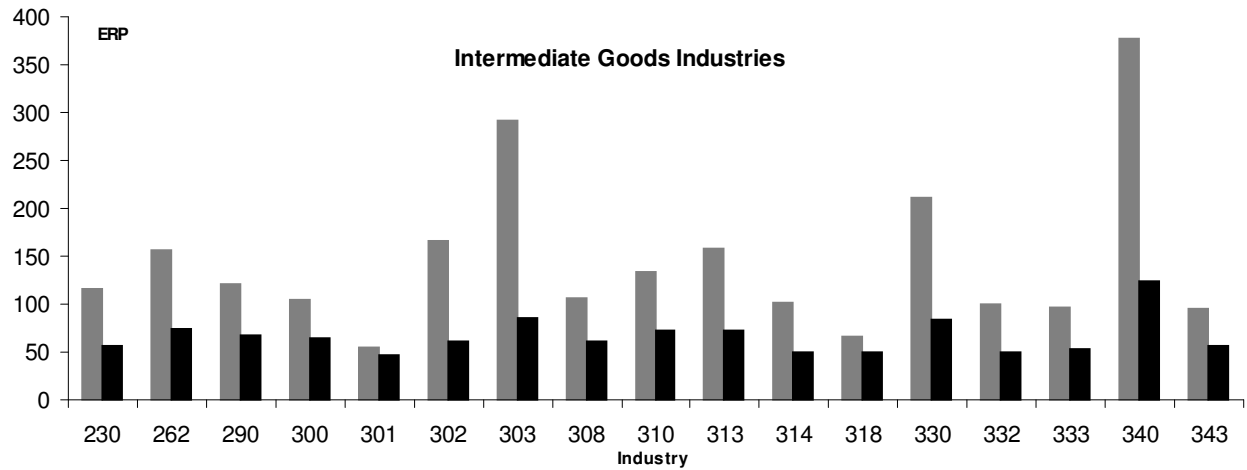
335	Aluminium Manufacturing	0.43	0.48	1.19	2.55
336	Zinc Manufacturing	0.21	0.10	0.18	0.12
338+339	Metal Scraps & Non Ferrous Metals	0.09	0.09	0.09	0.02
34	Metal Products	2.85	3.49	3.25	2.53
340	Fab Structural Metal Products	0.37	0.38	0.44	0.33
341	Fab Structural Metal Products, Nec	0.79	0.71	0.52	0.49
342	Furniture & Fixtures	0.34	0.30	0.03	0.04
343+349	HandTools, Weights ,Etc	0.18	0.78	0.70	0.43
344+345	Metal Prods & Stamping/Forging of metals	0.06	0.08	0.41	1.10
346	Metal Kitchen Ware	0.31	0.23	0.15	0.16
35	NonElectrical Machinery and Parts	11.35	12.46	10.02	6.95
350	Agr Machinery, Equipments & Parts	0.82	0.80	0.88	0.78
351	Constr/Mining Machines & Equipment	0.68	0.52	0.37	0.28
352	Prime Movers & Boilers	1.32	2.30	0.95	1.13
353	Food & Textile Machinery	1.39	0.93	0.91	0.97
355	Refrigerators & Air conditioners	0.77	0.75	0.69	0.33
354	Other machinery	0.43	0.41	0.61	0.62
356	General Purpose Machinery	1.48	1.52	1.55	1.54
357	Machine Tools, Parts & Accessories	0.86	1.10	0.60	0.61
358	Office & Computing Machines	0.13	0.16	0.08	0.05
359	Special Purpose Machinery	0.34	0.36	0.32	0.63
36	Electrical Machinery and Parts	9.88	9.00	10.87	6.97
360	Electrical Industrial Machinery	3.51	2.84	3.48	2.81
361	Wires & Cables	1.26	0.67	0.95	0.97
362	Cells & Batteries	0.46	0.38	0.35	0.57
363+364	Electric Lamps, Fans & Domestic Appliances	0.66	0.65	0.59	0.45
365+366	Radio & TV Apparatus	0.98	1.54	1.75	1.54
368	Electronic Valves & Tubes etc	0.13	0.17	0.27	0.41
369	X-Ray Machines & Electrical Equipment ,Nec	0.15	0.15	0.15	0.22
37	Transport Equipment and Parts	11.61	10.53	11.20	8.10
370	Ships & Boats	0.82	0.23	0.15	0.22
371	Locomotives & Parts	1.16	0.19	0.21	0.18
372	Wagons & Coaches	1.36	1.33	1.10	0.60
373+374	Motor Vehicles, Cars & Products	3.93	4.38	4.35	4.88
375	Motorcycle, Scooter & Products	0.52	0.85	1.28	1.50
376	Bicycles & Parts	0.29	0.26	0.40	0.31
377	Aircraft & Related Products	0.19	0.16	0.13	0.26
379	Transport Equipment, Nec	0.13	0.07	0.15	0.16
	All- Industries	72.33	71.05	69.51	70.75

Notes: 1. Value-added share represents share in total manufacturing gross value added

2. Sectors share is computed as the sum of individual industries share in sample manufacturing gross value-added

Source: Author's calculation based on the *Annual Survey of Industries*

Chart 1 Effective Rate of Protection in 1980s and 1990s: Use-based Sectors

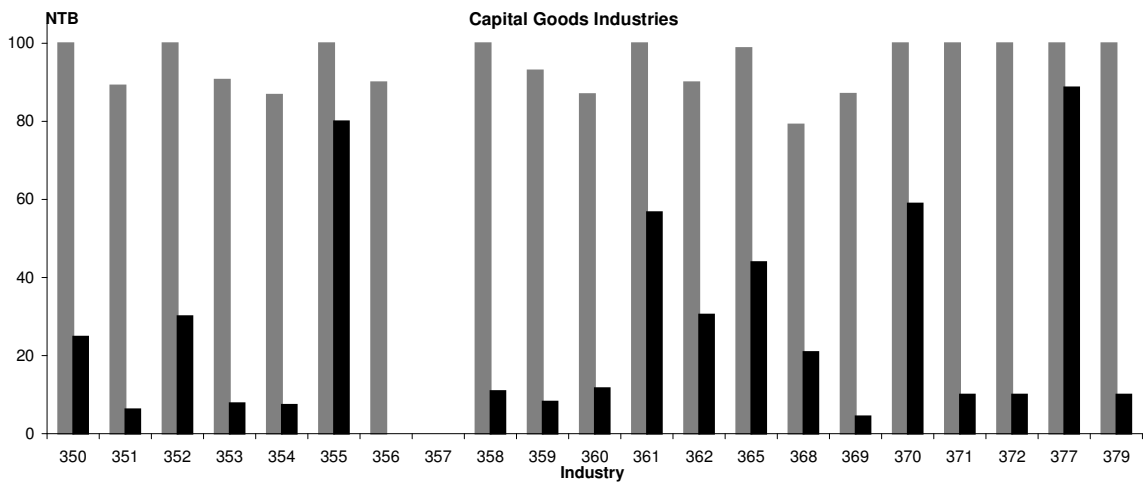
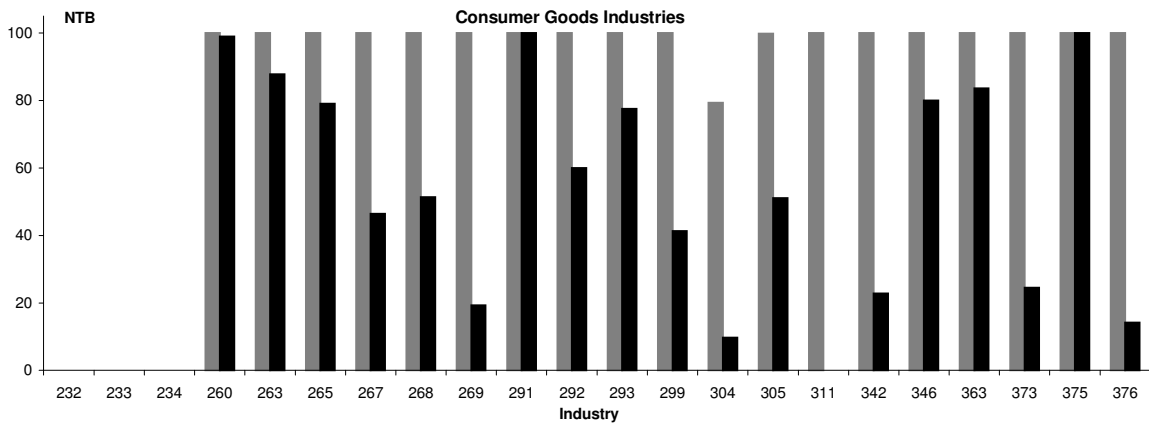
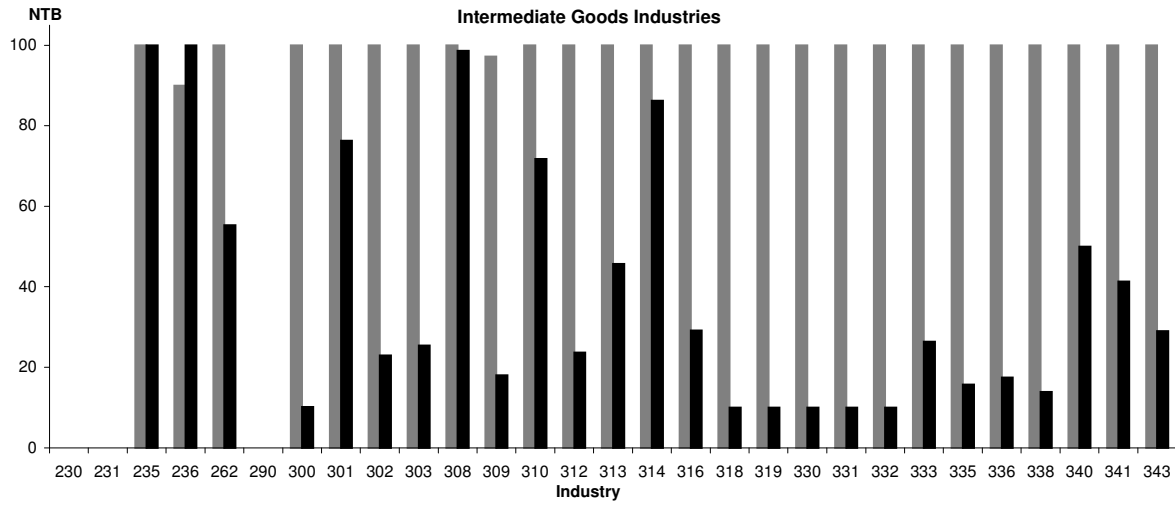


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1980-89

1990-99

Chart 2 Import Coverage Ratio in 1980s and 1990s: Use-based Sectors2

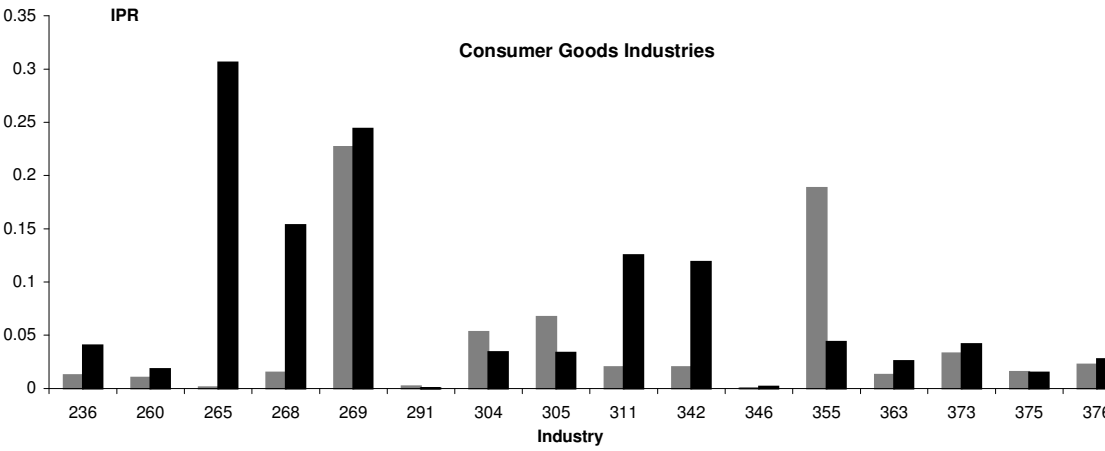
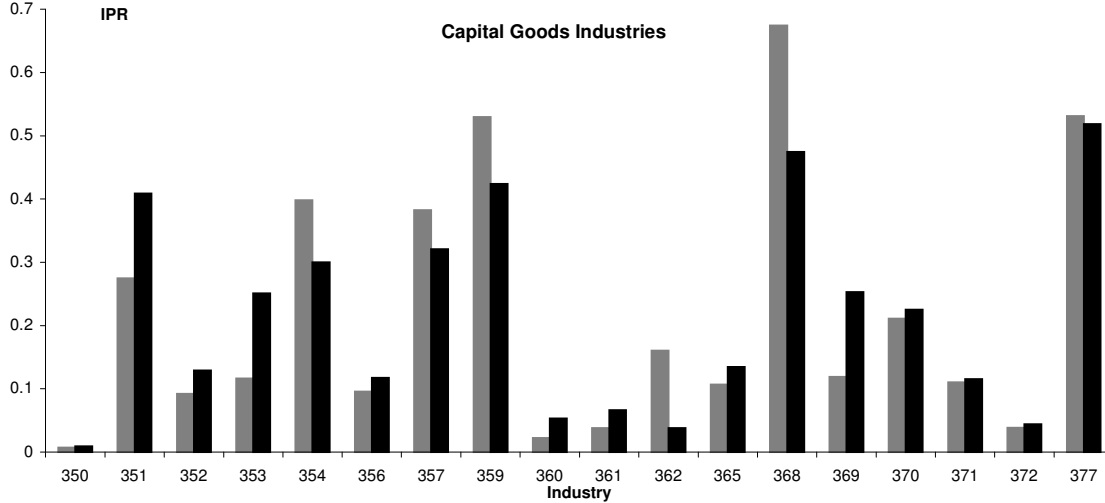
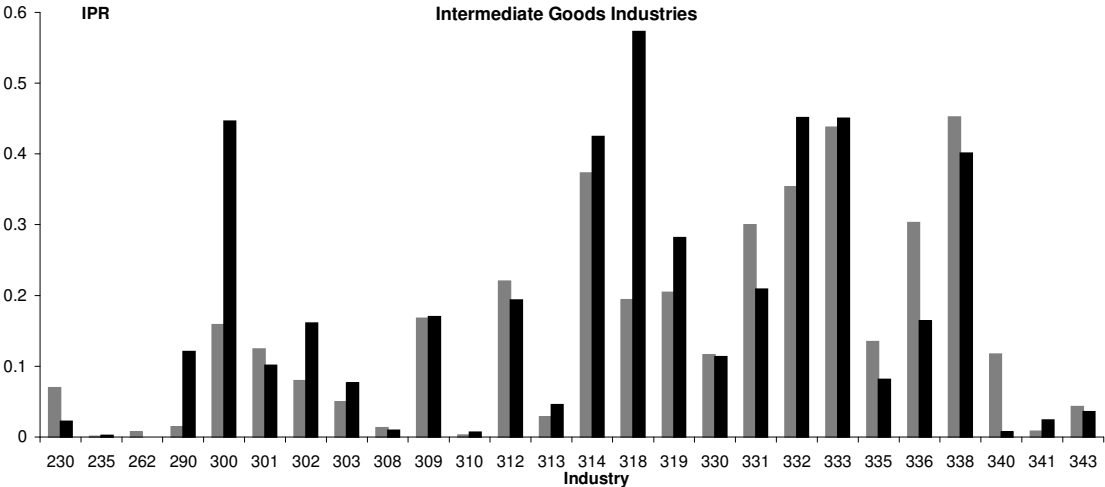


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1980-89

1990-99

Chart 3 Import Penetration Ratio in 1980s and 1990s: Use based Sectors



LEGEND **1980-89** **1990-99**

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