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THE EFFECTIVE PROTECTION OF JAPANESE MANUFACTURING INDUSTRIES

by

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CHAPTER I

THE THEORY AND MEASUREMENT OF EFFECTIVE PROTECTION

The Meaning of "Effective Protection"

Purpose

The concept of "Effective Protection" is an attempt to solve an old intellectual problem: how to evaluate the "levels" of tariffs in a way which reflects their actual restrictive and/or protective effects. It has long been clear that the stated, or "nominal" tariff rates do not necessarily do this. Some economists have concluded that the task is an impossible one. Jacob Viner once stated flatly that "there is no way in which the 'height' of a tariff as an index of its restrictive effect can be even approximately measured, or for that matter, even defined with any degree of significant precision."[1] More recently, William Travis has commented on the effective protection concept in a spirit very similar to Viner's remark.[2]

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[1] The Customs Union Issue (New York: Carnegie Endowment for International Peace, 1950), pp. 66-67, quoted in Bela Balassa, "Tariff Protection in Industrial Countries: An Evaluation," Journal of Political Economy, LXXIII (December, 1965), 573.

[2] William P. Travis, "The Effective Rate of Protection and the Question of Labor Protection in the United States," Journal of Political Economy, LXXVI (May-June, 1968), 443-61.

It is clearly true that the degree of protection of a domestic industry depends on many technical and market conditions as well as the tariffs. Nothing short of a detailed study of all of these conditions in each industry will really answer the question as to the effect of tariffs. Nevertheless, the "effective protection" measure has aroused considerable interest in recent years. This reflects the need felt for even a very rough measure of the relative effects of tariffs in different industries, which is better than nominal tariffs.

History of the Concept

The notion of the "effective level of protection" was first used by Clarence L. Barber in 1955 in a discussion of tariff protection as it affects Canadian industries.[1] Barber pointed to the empirical facts of a large volume of international trade in intermediate goods, and international specialization in particular processes, such as automobile assembly in Canada. These contradict the conventional assumption of trade theorists that countries specialize only in particular final goods, always producing the entire chains of direct and indirect inputs into their production. Barber criticized as

[1]Clarence L. Barber, "Canadian Tariff Policy," Canadian Journal of Economics and Political Science, XXI (November, 1955), 513-30.

misleading discussions of tariff policy which are phrased in terms of nominal tariffs. He **proposed his** "effective" rate which relates to the value added in a productive activity instead of the price of the final good. It is thus the differential effect of the tariff on a final good, after consideration of the tariffs on those used in its own production, relative to the value added in the final-productive process, which is a true measure of "protection" of a domestic activity. The "rate" of effective protection is therefore defined as the percentage increase in value-added earnings per unit of output, which is brought about under certain assumptions by the tariff structure. The assumptions are such as to produce that the domestic price of every traded good is equal to its world price plus the tariff on its importation, and the "rate of effective protection," therefore is:

$$f_j = \frac{V' - V}{V} = \frac{p_j[(1+t_j) - \sum_i (1+t_i)a_{ij}] - p_j[1 - \sum_i a_{ij}]}{p_j[1 - \sum_i a_{ij}]}$$

$$= \frac{t_j - \sum_i (t_i a_{ij})}{1 - \sum_i a_{ij}}$$

where primed values refer to the situation under protection, unprimed to that under free trade, and

V = value added per unit of production

t_j = the nominal tariff as a percentage of p_j, the price of the jth good

a_{ij} = the value of inputs of the ith good used per dollar of value of output of good j.

Most of the general theory relating to this concept of "effective protection" was developed in several articles by Johnson and Corden after 1964.[1] A number of variations on the above definition which have emerged in the literature relating to the measurement of effective protection are discussed in a following section.

Assumptions

Barber's "effective protective rate" exactly describes the percentage change in value-added earnings only under a number of limiting assumptions. These describe an admittedly limited "world" of strict application of the effective protection definition:

(1) It is assumed that (a) foreign supply of all importables is

[1]Harry G. Johnson, "Tariffs and Economic Development: Some Theoretical Issues," Journal of Development Studies, I (October, 1964), 3-20; idem, and Peter Kenen, Trade and Development, Etudes et Travaux, No. 4, Graduate Institute of International Studies, Geneva, 1965; W. M. Corden, "The Structure of a Tariff System and the Effective Protective Rate," Journal of Political Economy, LXXIV (June, 1966), 221-37.

infinitely elastic, while (b) the domestic market is sufficiently monopolized and (c) domestic demand sufficiently inelastic, that the domestic price of each of these goods can be taken to equal the world price plus customs duties imposed on it.[1]

(2) All goods classified as "intermediate inputs" in production must be assumed to be importable, or, if not importable (i.e., either exported or nontraded goods,) in infinitely elastic domestic supply.

With respect to non-traded inputs, W. M. Corden has suggested an alternative definition of effective protection which includes these in "value added," i.e., value added by the domestic economy as a whole.[2] Under such a definition, supply of non-traded inputs is not taken to be infinitely elastic. These are rather supposed to share the protection of the tariff, which is protection, not of primary factors alone, but of all non-traded inputs in production. These two definitions of value added are discussed further below.

(3) It must be assumed that tariffs are indeed protective, that is, that no quotas or other non-tariff restrictions supersede them, and ...

[1] Assumptions (b) and (c) are actually a joint condition, defining a critical degree of elasticity in the relevant demand schedule. This is the schedule facing the individual domestic producer in the absence of foreign competition. (See the discussion below, on pp. 21ff., of the monopoly case, especially diagrams 1-3 and 1-4 and the accompanying explanation.)

[2] Corden, "Structure of a Tariff System," pp. 226-8.

(4) that all goods are still imported when tariffs are imposed, so that domestic price necessarily equals world price plus tariff. (5) Finally, it is assumed that the tariff does not lead to any substitution between importable intermediate and primary factors or among intermediate inputs in production.

The assumptions just stated are necessary to all of the effective protection models which treat explicit tariffs. In one study, that by Lewis and Guisinger, an "implicit-tariff" measure of protection has been used instead, specified as the difference between the c.i.f. import price and the price in the domestic market.[1] In such a model it is not necessary to assume that all import restrictions are of tariff form, that foreign supply is infinitely elastic or that protected goods are still imported.

Since it cannot truly be expected that all of these conditions always hold, it is probably best to regard the Effective Protective Rate (EPR) as a characteristic of the tariff structure, indicating its potential effects under these limiting conditions. Its relationship to actual "protection" of industries is still closer than that of

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[1] Stephen R. Lewis, Jr. and Stephen E. Guisinger, "Measuring Protection in a Developing Country: The Case of Pakistan," Journal of Political Economy, LXXVI (November-December, 1968), 1170-98.

nominal tariffs, which are the descriptive measure used in most tariff discussions.

Theoretical Issues

"Comparative-Static" versus "Schedule-Shift" Definition of Effective Protection: The Role of Scale and Substitution Effects

In his 1966 article W. M. Corden described the EPR as indicating "the direction in which resources will be pulled by the tariff structure."[1] What EPR measures, in other words, is the shift in the derived demand for primary factors brought about in each industry by tariffs.

However, there has been a recurrent suggestion, in the literature of effective protection, that the "effective rate" measured ought really to be a comparative-static concept, the difference between value-added earnings per unit in full equilibrium as adjusted to free trade, and value-added under protected conditions. Corden referred to such an interpretation, and rejected it, in his 1966 article. More recently, Anderson and Naya have explored the significance of the difference between two possible definitions of effective protection, referring to "the change in value added per unit (i) before or (ii)

[1] "Structure of a Tariff System," p. 234.

after any resources move in response to the institution of protection."[1] Tan also concerns himself with the difference between "general equilibrium" and "partial equilibrium" interpretations of effective protection.[2] While few authors have advocated defining effective protection in the comparative-static sense mentioned above, some remarks have been made about it which are implicitly based on such a definition. (See, for example, the comments on Travis below on pp. 28ff.) It is necessary, therefore, to emphasize that this is not the definition of effective protection which serves the analytic purposes at hand. Such a definition would be no "index of [the] restrictive effect," nor of the protective effect, of tariff structures, as will become clear in the discussion below.

The difference between the two interpretations of EPR is illustrated by Diagram 1-1. The Schedule D_pD_p there represents derived demand for the primary factors engaged in final-value-adding activity. The unit in which such a schedule is defined must consist of some composite "bundle" of domestic primary factors. The original Marshallian

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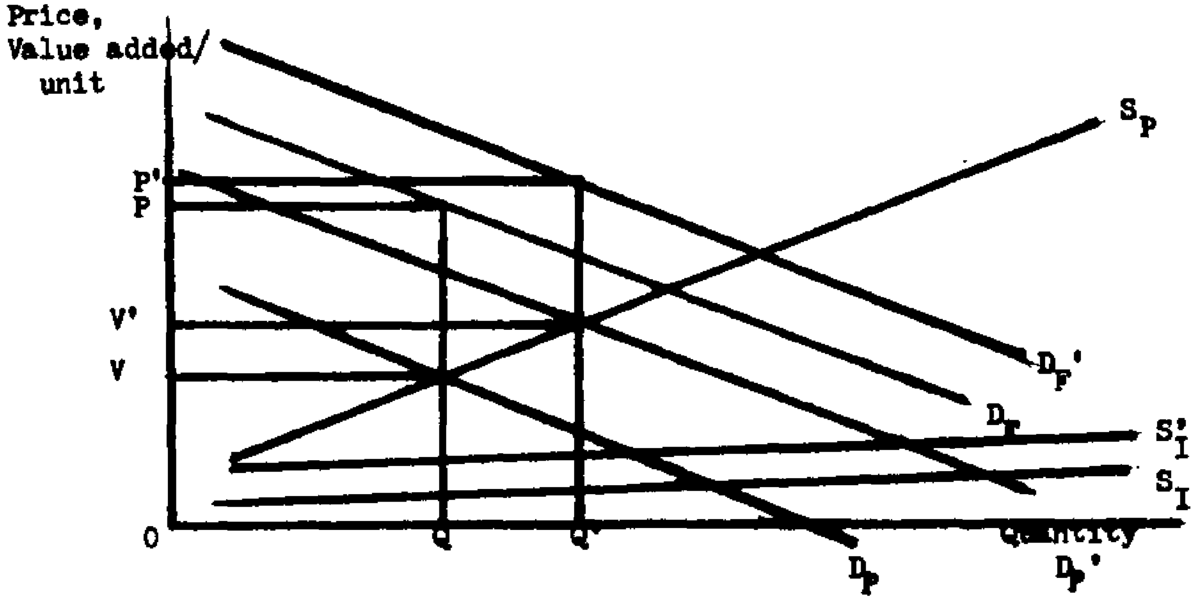
[1] James Anderson and Seiji Naya, "Substitution and Two Concepts of Effective Rate of Protection," American Economic Review, LIX (September, 1969), 607-12.

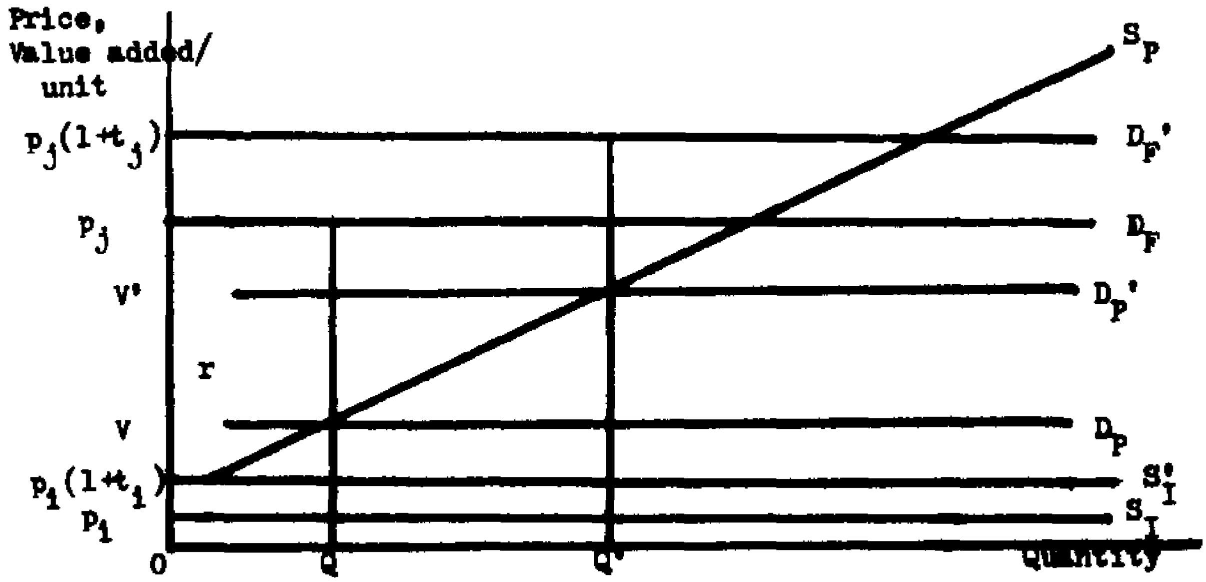
[2] Augustine Hui-Heng Tan, "Differential Protection, Economic Indices, and Optimal Trade Policies" (unpublished Ph.D. dissertation, Stanford University, 1968), pp. 147ff.

Diagram 1-1: Derived Demand for Primary Factors under Free Trade and Protection



[Schedules under protection are represented by primed values. D_F and D_P are demand for the final good and primary inputs, respectively. S_I is the supply schedule of the intermediate good. Its height, P_I, times the input ratio q_{ij} gives the a_{ij} value coefficient. The vertical distance between D_F and D_P at any point is equal to $P_F(Q) - P_I q_{ij}(Q, P_I, P_P)$, which with fixed coefficients is equal to $P_F(Q) - P_I \bar{q}_{ij}$.]

Diagram 1-2: Derived Demand, with Infinitely Elastic Supply of Imports



derived demand schedule was defined on the conditions that (a) the demand schedule for the final good is given; (b) supply of all other inputs in its production is competitive - i. e. all such factors can be considered to be "on" their supply schedules, and (c) each of the other factors is required in fixed quantity per unit of output.[1] With respect to (c), Marshall treated the case of variations in these input proportions as a function of scale in a footnote. There is no theoretical reason that variations in response to differences in relative factor cost could not also be incorporated in the diagrammed relationship, except that its simplicity would be lost.

The shift in this derived demand schedule produced by the imposition of tariffs is a combination of (a) the rise in demand for the final good, due to the increase in the price of imported substitutes, and (b) the effect on cost of the increase in supply-price, to the using industry, of importable intermediates. The effect (b), if there are no possibilities for substitution of primary for imtermediate factors, or among the latter, will be simply an increase in outlay on each intermediate proportionate to the increase in its price. If there are substitution possibilities, however, it will be

[1]Alfred Marshall, Principles of Economics (9th (Variorium) ed.; New York: Macmillan, 1961), pp. 381ff and 852-3.

less than this, as the new derived demand schedule, $D_p'D_p'$, must be a complete recalculation in this case, reflecting the changes in optimal factor proportions as well as in prices.

The "level of effective protection" in Diagram 1-1 is represented by the shift of D_pD_p, the derived demand schedule, equal to the constant value, r, per unit (since the illustration has been drawn in terms of specific, rather than ad valorem, duties). This is different from the change in value added per unit in full post-tariff equilibrium, which is given by OV'-OV. The latter, "comparative-static," definition of the effective protective rate, would tell little about what, or how extensive, adjustments may have been induced in this industry. An industry which shows no increase in value added per unit may have expanded tremendously in domestic production, for example. A conclusion that this industry is less "protected" than another characterized by inelastic supply would certainly be incorrect. It can also tell nothing about the income-distributive effect of tariff protection through factor earnings, as no EPR measure can, since all primary factors' earnings are included in "value added." As distinguished from distribution among primary factors, a matter of considerable interest, the changes in the industry-distribution of income earned has little theoretical importance. The "effective protective rate," defined as the shift in the derived demand schedule, does not tell how much of the effect of protection will be reflected in quantity produced, and how much in earnings, of domestic production activity. It need not do so, any more than the "height" alone of the textbook excise indicates the final price-change in the absence of information regarding the elasticities of both demand and supply. (The problem here is closely analogous with that of measuring substitution elasticities using observed prices, treated by Stern and Zupnick.[1])

The proposed "schedule-shift" definition of the effective tariff rate is consistent with ordinary usage, as can be seen by examining the case of an industry which uses no purchased inputs in production. In this case the price of the final output is entirely comprised of value added, and the effective and nominal tariff rates must be the same - t_j. This is not, however, equal to the difference between p' and p, the post-tariff and pre-tariff equilibrium prices of output. The "effect" of the tariff on domestic demand is rather reflected in the shift of D_f to D_f', by the proportion t_j.

In the models used in effective protection studies, the problem

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[1]Robert M. Stern and Elliot Zupnick, "The Theory and Measurement of Elasticity of Substitution in International Trade," Kyklos, XV (1962), fasc. 3, 580-91.

is much simpler than that of Diagram 1-1. These are always models in which the domestic prices of all tradables, whether final or intermediate goods, are determined by infinitely elastic foreign supply at the world price plus tariff. The derived demand schedules for primary inputs, therefore, are infinitely elastic and not downward sloping, except for the possible influence of scale effects. Value added per unit of output, $V_j' = (1 - \sum_i a_{ij})p_j$ (see Diagram 1-2), is thus determined for each industry, given world prices and the tariff structure. It does not depend on the interaction of supply and demand for "bundles" of primary factors. The elasticity of supply can affect only the equilibrium level of activity, and not the "price" of value added per unit of output in an industry. (This is distinct from the problem of the wages of particular primary factors, which do depend on the elasticity of supply-response to the upward shift in their individual derived-demand schedules.) Thus when Corden, and also Anderson and Naya, refer to the concept of change in value added "before" as opposed to "after resources move" in response to the imposition of tariffs, the only matter (other than scale-effects, whose implications are discussed below) with which they can be concerned is the effect of substitution among inputs in production on the derived demand schedule. This is the difference between the shift which occurs if physical input coefficients are assumed to be unchanged, and the larger (if upward, or smaller downward) shift taking place when substitution of primary for intermediate factors, or among the latter, is induced by the imposition of tariffs.

It has been argued above that a meaningful measure of the effect of tariffs should describe the upward shift in derived demand for primary factors resulting from protection, but not the effects of movements along this schedule as industry-output expands. Thus the effects of economies or diseconomies of scale in production should not be included, since these involve a movement along the derived-demand schedule and their extent will depend in part on the supply-response of primary factors to their increased demand. There is no reason, however, for excluding substitution-effects, since these affect the upward shift, at given output level, in derived demand for the bundle of primary factors.

Corden suggests that EPR is properly measured as the change in value-added earnings in a "short run," in which (a) all domestic prices adjust to the changes in prices of imported goods, but (b) no substitutions of inputs for one another take place.[1] This does not seem the best measure, however, if the intent is, in Corden's own

[1] "Structure of a Tariff System," p. 234.

words, to show "the direction in which resources will be pulled" - *i. e.*, as between industries. The fact that substitutions among inputs are required in a given activity, in order for it to take best advantage of the new price relations, ought not to count against it in this calculus. It will surely exert more "pull" on resources than another industry whose output and intermediates rise equally in price but which is technologically unable to carry out any such substitutions.

An "ideal" measure of effective protection is therefore the change in value added "after" input substitutions, but "before" changes in output level, take place, rather than the definition favored by Corden which excludes both. It should be recognized that the question is an idle one, in the sense that the substitution effects cannot be measured in the absence of a knowledge of the production functions involved. All empirical studies have had to either employ Corden's "short-run" definition of effective protection or, as is a perhaps more straightforward justification of the same procedure, assume intermediate-input coefficients to be technologically fixed. It is important, however, that practitioners be aware of the bias of these measures as estimates of the true level of protection where input substitution does occur, and for this it is necessary to define the latter.

The Problem of Substitution-Bias in Measuring EPR

The Problem

The bias due to the no-substitution assumption of Effective Protection models has received more attention in the literature than any other. This question has probably been overemphasized, in view of the long list of empirically questionable assumptions listed above. It must be remembered that the only factor substitutions which affect the derived demand for primary factors as a group are those between primary (that is, labor and capital) factors and tradable purchased inputs, or among the latter. Substitution among primary inputs is not involved in the problem of measuring effective protective rates.

More important, however, than the matter of its relative importance, is that the nature of the substitution effect has been misunderstood. The belief has been widespread that EPR's usually tend to be overstated because of the assumption of no substitution. In fact, as will be seen below, the bias where it exists is always toward underestimation of the true EPR.

In his 1966 article already cited several times, W. M. Corden analyzed the effect of substitution bias on EPR under the common condition of escalated tariff schedules.[1] Briefly, his approach was to examine the effect of a rise in the ratio of output price to intermediate-goods prices ("tariff escalation"), given the Classical profit-maximization condition that the value of marginal product for each input must equal its price. Thus, if $MPP_i x P = P_i$ for each input i, the "substitution-effect" of tariffs would be in favor of intermediate goods - that is, must lead to a rise in their physical input-output ratios - wherever tariff schedules are escalated. Corden's conclusion, accepted in most of the effective protection literature to date, was therefore that estimates of the EPR which exclude this substitution effect by assuming fixed physical proportions are overstated wherever tariff structures are escalated.

Anderson and Naya have recently applied reasoning similar to Corden's, and explored its implications in a specific model of production.[2] They obtained the same basic result, as well as new ones, applying the same logic with a CES production constraint involving two inputs, one primary and one intermediate.

However, these conclusions are not valid for the Anderson-Naya

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[1]"Structure of a Tariff System," pp. 233-5.

[2]"Substitution and Two Concepts of Effective Rate of Protection."

model because of the linear homogeneity of their CES production constraint, which makes the $P_i = MPP_i x P$ condition inapplicable. A correct analysis will be seen to yield different results than theirs for the CES case.

The substitution problem is analyzed below on the basis of explicit assumptions about the domestic industry. The models presented are of admittedly limited application. This, however, reflects the limited range of situations in which the EPR is a precise measure of the protection afforded domestic industries. It is shown, first, that the purely competitive model of the domestic industry cannot be used in this context, since it conflicts with fundamental assumptions of effective protection analysis. This has been stated in the list of assumptions above (page 4ff) but it has not always been clear in discussions of effective protection. (For an example, it is not clear what Balassa and Schydlowsky mean by their statement that effective protection assumes "competitive factor and product markets."[1])

The models used below involve domestic profit-maximizing monopoly, which is compatible with the effective protection concept under certain

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[1]Bela Balassa and Daniel M. Schydlowsky, "Effective Tariffs, Domestic Cost of Foreign Exchange, and the Equilibrium Exchange Rate," Journal of Political Economy, LXXVI (May - June, 1968), 355.

demand conditions. It will be shown that a result similar to Corden's can be derived in this model, but only under technical conditions of diminishing returns to plant-scale. The overstatement of EPR in this case, moreover, would properly be described as due to "scale-effects" rather than "substitution effects" of tariffs, and it may be questioned whether these "scale effects" actually belong in the EPR measure as usually interpreted. The "substitution effect" of tariffs taken alone, as will become clear, is always a source of understatement of the EPR measured with fixed proportions.

Inconsistency of the Anderson-Naya Model

Anderson and Naya introduce the CES as "the production function" of the domestic industry. They do not distinguish between plant-and industry-level constraints, so it must be taken to describe both. They use the $MPP_i xP = P_i$ condition to derive the relationship between two definitions of the effective protective rate, one including and the other excluding tariff-induced variation in input-proportions. Stating that it follows from "marginal productivity factor pricing," the authors give $a_{ij} = h_{ij}^{s}(\frac{p_i}{p_j})^{1-s}$ as the solution for the ith value-of-input coefficient.[1] The derivation would seem to be:

[1] "Substitution and Two Concepts of Effective Rate of Protection," p. 608.

Let Q_j represent output level, and Q_{ij} and L_{oj} the input levels of the intermediate and primary factors, respectively; q_{ij} and l_{oj} are the unit input quantities, $q_{ij} = Q_{ij}/Q_j$ and $l_{oj} = L_{oj}/Q_j$, and p_j, p_i and w represent the unit prices of output, intermediate good and primary input, respectively. The production constraint can be written:

$Q_j = F[Q_{ij}, L_{oj}] = [\alpha_i Q_{ij}^{-\beta} + \alpha_o L_{oj}^{-\beta}]^{-1/\beta}$, with $s = 1/1+\beta$ the elasticity of substitution between intermediate and primary factors. The marginal productivities are $F_i = \alpha_i q_{ij}^{-(1+\beta)}$ and $F_o = \alpha_o l_{oj}^{-(1+\beta)}$. The Classical equilibrium condition becomes $\frac{p_i}{p_j} = \alpha_i [\frac{Q_j}{Q_{ij}}]^{1+\beta}$, which gives $q_{ij} = \alpha_i^{s} (\frac{p_i}{p_j})^{-s}$, and $a_{ij} = \alpha_i^{s} (\frac{p_i}{p_j})^{1-s}$.

Using this expression, the authors proceed to write the formula for the EPR including substitution adjustments: $r_j = \frac{(1+t_j)(1-a_{ij}') - (1-a_{ij})}{1 - a_{ij}}$ and show how it compares under varying conditions with the alternative formula excluding substitution, the one commonly used in estimation: $z_j = \frac{t_j - t_i a_{ij}}{1-a_{ij}}$. (Primed values are, as above, used to refer to the protected situation, and unprimed to free trade.)

Yet the condition $MPP_i x P = P_i$ cannot be used in conjunction with a linearly homogeneous production function like the CES. For we know that with a horizontal price line facing the firm and constant returns to scale, marginal cost is not brought into equality with price for the firm (plant size remaining, therefore, indeterminate.)[1] This being the case, optimal factor proportions are determined independently of scale by the cost-minimization condition. Thus the correct condition from which to derive the input ratios is the equality $p_i/w = F_i/F_o$. With the two-factor CES, this gives $\frac{p_i}{w} = \frac{\alpha_i}{\alpha_o}\left(\frac{Q_{ij}}{L_{oj}}\right)^{-(1+\beta)}$, yielding $\frac{q_{ij}}{l_{oj}} = \left(\frac{\alpha_i}{\alpha_o}\right)^{s}\left(\frac{p_i}{w}\right)^{-s}$, and $\frac{a_{ij}}{a_{oj}} = \left(\frac{\alpha_i}{\alpha_o}\right)^{s}\left(\frac{p_i}{w}\right)^{1-s}$. This last expresion must be used in place of the equality given by Anderson and Naya.

Incompatibility of Classical and Effective Protection Models

All effective protection analyses clearly presuppose some imperfection of domestic competition, since they assume that domestic producers "price up" to the domestic price of imports. Classical assumptions of atomistic competition and free entry would imply a price equal to minimum average cost for domestic producers, if domestic production occurs at all. It is the distinctive characteristic of effective protection models, on the other hand, that the domestic

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[1] Paul A. Samuelson, Foundations of Economic Analysis (New York: Atheneum, 1965), p. 78; James M. Henderson and Richard E. Quandt, Microeconomic Theory: A Mathematical Approach (New York: McGraw-Hill, 1958), p. 65.

price is taken to be determined externally, that is at (exogenous) world price plus tariff. It is clear that the two conditions could hold simultaneously only by coincidence, and hence that the effective protection model cannot be combined with one of domestic pure competition.

<u>Effect of Substitution on EPR: CES Production Function</u>

A domestic monopolist maximizing profits will under certain conditions price up to the domestic price of imports as required by effective protection models. The conditions are that domestic demand is sufficiently inelastic that he has no point on his marginal revenue curve, to the "bent" demand curve derived by subtracting imports from total domestic demand (see Diagram 1-3), where MR = MC, a constant. The following is an analysis of the substitution effect of tariffs for this simple model which, although limited, is at least possible. Contrary to the conclusions of Anderson and Naya, the EPR estimated using the fixed-coefficie s assumption turns out to be always an underestimate of the "true" measure, if that is defined to include substitution effects:

The profit-maximization problem can be written in Langrangean form as: Maximize $L = p_jQ_j - p_iQ_{ij} - wL_{oj} - \lambda(Q_j - F[Q_{ij}, L_{oj}])$

form as: Maximize $L = p_jQ_j - p_iQ_{ij} - wL_{oj} - \lambda(Q_j - F[Q_{ij}, L_{oj}])$

$q_{ij} = (\frac{p_i}{\lambda\alpha_i})^{-s}$ and $l_{oj} = (\frac{w}{\lambda\alpha_o})^{-s}$. The (constant) value of λ, or marginal cost,[1] can be found by substitution back into the production function giving $\lambda = (\alpha_i{}^s p_i{}^{1-s} + \alpha_o{}^s w^{1-s})^{\frac{1}{1-s}}$, from which the optimal physical input ratio is $q_{ij} = p_i{}^{-s}\alpha_i{}^s(\alpha_i{}^s p_i{}^{1-s} + \alpha_o{}^s w^{1-s})^{\frac{1}{1-s}}$, and the value-of-input ratio is $a_{ij} = \frac{p_i{}^{1-s}}{p_j} \alpha_i{}^s(\alpha_i{}^s p_i{}^{1-s} + \alpha_o{}^s w^{1-s})^{\frac{s}{1-s}}$.

This is the ratio under free trade circumstances. The ratio under protection then is $a'_{ij} = \frac{p_i{}^{1-s}(1+t_i)^{1-s}}{p_j(1+t_j)} \alpha_i{}^s[\alpha_i{}^s(p_i(1+t_i))^{1-s} + \alpha_o{}^s w^{1-s}]^{\frac{s}{1-s}}$. The estimate of the latter, when free trade coefficients and the fixed-proportions assumption are used, is $\hat{a}'_{ij} = \frac{p_i{}^{1-s}(1+t_i)}{p_j(1+t_j)} \alpha_i{}^s[\alpha_i{}^s p_i{}^{1-s} + \alpha_o{}^s w^{1-s}]^{\frac{s}{1-s}}$. The ratio of the two is $\frac{\hat{a}'_{ij}}{a'_{ij}} = (1+t_i)^s(\frac{\lambda}{\lambda'})^s = (1+t_i)^s[\frac{p_i{}^{1-s}\alpha_i{}^s + w^{1-s}\alpha_o{}^s}{(p_i(1+t_i))^{1-s}\alpha_i{}^s + w^{1-s}\alpha_o{}^s}]^{\frac{s}{1-s}}$. From this ratio it is clear that there is a tendency to overstatement of a'_{ij} by $\hat{a}'_{ij}$ in the proportion $(1+t_i)^s$, because of the fact that the latter does not allow for the downward adjustment in the q_{ij}/l_{oj} ratio. There is also some tendency to understatement of a'_{ij} in that the estimated $\hat{a}'_{ij}$ does not allow for the overall rise in marginal cost per unit, due to the rise in some (intermediate) factor prices. This understatement is by the multiple $(\frac{\lambda}{\lambda'})^s$. It can be shown that the former tendency always outweighs the latter, and that, therefore, the

[1]Samuelson, Foundations, pp. 65ff.

Diagram 1-3: Conditions for Effective Protection Model
Case of Domestic Monopolist with Constant Returns to Scale

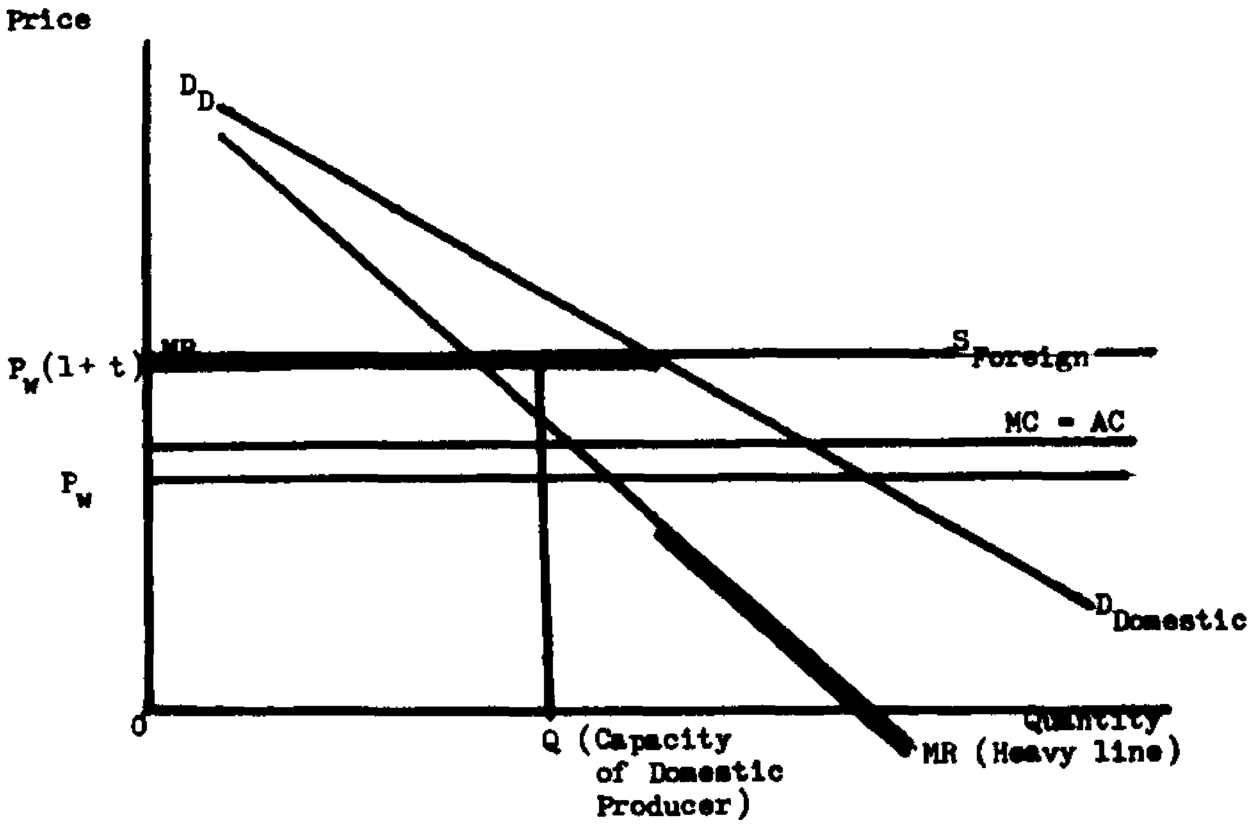
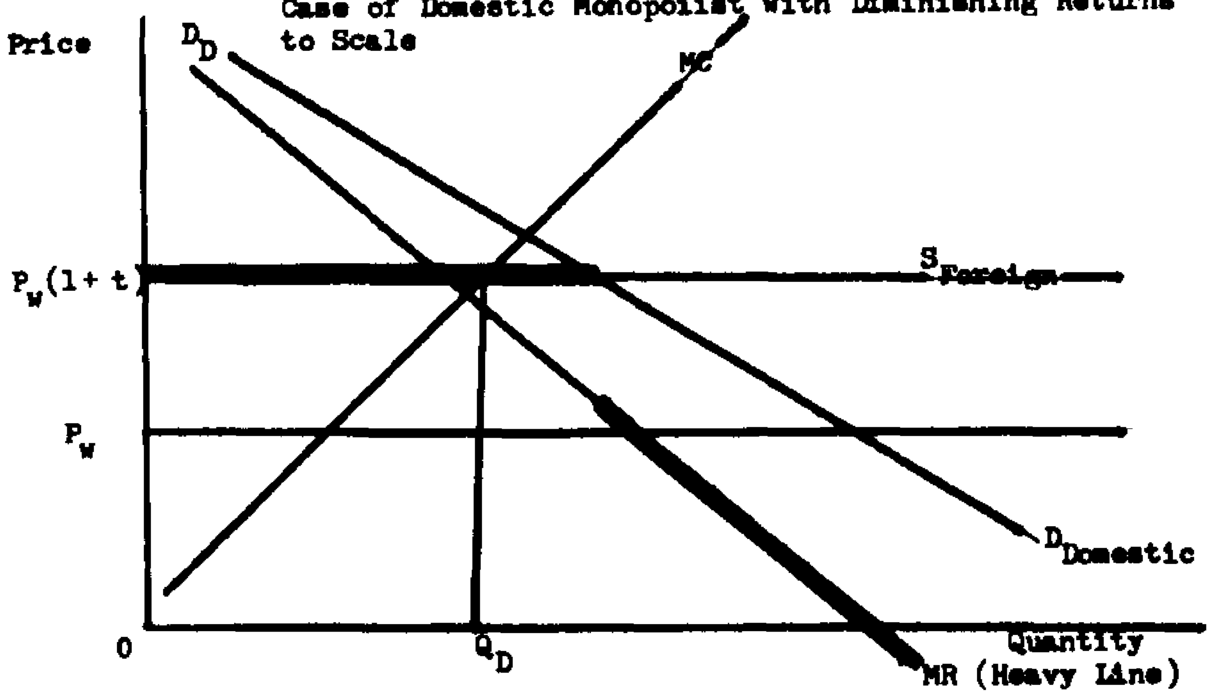


Diagram 1-4: Conditions for Effective Protection Model
Case of Domestic Monopolist with Diminishing Returns to Scale



estimate $\hat{a}_{ij}'$ always overstates the value a_{ij}':

Simplifying, let $1+t_i = x$, where $x \geq 1$ by the definitions, $\tau_i^s p_i^{1-s} = a$, where $a > 0$ by the definitions, $\alpha_o^s w^{1-s} = b$, where $b > 0$ by the definitions. Also by definition, $s \geq 0$. The problem is thus to show that $x^s \geq \left(\frac{ax^{1-s} + b}{a + b}\right)^{\frac{s}{1-s}}$.

(i) If $s = 0$, the problem is of course trivial; there is no difference between a_{ij}' and $\hat{a}_{ij}'$ in this case.

(ii) If $0 < s < 1$:

$\frac{s}{1-s} > 0$ so if $\left(\frac{ax^{1-s} + b}{a + b}\right) < x^{1-s}$ then $\left(\frac{ax^{1-s} + b}{a + b}\right)^{\frac{s}{1-s}} < x^s$.

Writing $\frac{ax^{1-s} + b}{a + b} = x^{1-s} + \left(\frac{b}{a+b}\right)(1-x^{1-s})$, $x^{1-s} \geq 1$ as $x \geq 1$ and $1-s > 0$. Hence $1-x^{1-s} \leq 0$, and since $b > 0$, $a > 0$, this implies

$\frac{ax^{1-s} + b}{a + b} \leq x^{1-s}$ Q.E.D.

(iii) If $s = 1$, the problem is trivial: $1 \leq x$ by definition.

(iv) If $s > 1$:

$\frac{s}{1-s} < 0$, so if $\frac{ax^{1-s} + b}{a + b} > x^{1-s}$, then $\left(\frac{ax^{1-s} + b}{a + b}\right)^{\frac{s}{1-s}} < x^s$.

$x^{1-s} \leq 1$, since $x \geq 1$, $s > 1$. Therefore, $(1-x^{1-s}) \geq 0$ and

$x^{1-s} + \left(\frac{b}{a+b}\right)(1-x^{1-s}) \geq x^{1-s}$ Q.E.D.

The above deals with a formulation of the effective rate in terms of free trade a_{ij} coefficients: that is, the a_{ij}' coefficients relating to the protected situation are estimated from these using the assumption of fixed physical proportions. Similar reasoning would show the same bias toward understatement in the EPR formula (g_j or b_j, in the Anderson-Naya terminology,) which takes protected coefficients, a_{ij}', as observed and the free trade a_{ij} as estimated. The estimated free trade value-added ratios are in this case always too high, and therefore the EPR, $f_j = \frac{V_j' - V_j}{V_j}$, too low, due to the fact that a_{ij} is understated. This result, and the effect on each of three formulations of the EPR of this bias in $\hat{a}_{ij}$, are given in Appendix I.

Effect of Substitution on EPR: Diminishing Returns to Scale

We obtain a result similar to Corden's in the case of a domestic monopolist producing with diminishing returns to scale. Such a monopolist would under certain conditions take his price as the domestic price of the imported product, or the world price plus domestic tariffs. These conditions are: that the world price is given for him, and that his marginal cost reaches the level P_w + tariff at an output level short of the total quantity demanded at that price, i. e., with imports still taking place. (See Diagram 1-4.) In this case, all of the physical input ratios may rise with tariff imposition, reflecting diminishing returns as the domestic output level increases. Profit maximization requires that marginal factor cost be equated with marginal revenue product for each factor. The prices of both output and intermediate inputs are externally determined, so the equations are $p_i = F_i p_j$ and $MC_o = F_o p_j$, where MC_o represents the marginal cost to the producer of hiring additional units of primary factors. Both input ratios may rise if effective protection is high, but this rise will depend in part on the elasticity of supply of primary factors to the industry. This is the reason for questioning whether the scale effect should be incorporated in the EPR concept. If the EPR is intended to quantify the shift in derived demand for primary factors in each industry brought about by tariffs, then any measure of it should be independent of the supply schedules of those primary factors. A measure containing scale effects clearly is not.

The effect of input substitution alone can be obtained by applying the condition of cost minimization for given output level. This is that the ratio of marginal products of any two factors must equal that of their prices: $MPP_i/MPP_k = p_i/p_k$. This implies that the substitution effect in question must always be against intermediate goods in general, since some of them rise in price while the prices of primary factors are not directly affected by tariffs. The bias inherent in measuring effective protective rates on the assumption of fixed coefficients, when the latter is not actually the case, is therefore a downward bias. The degree of protection is always understated in the sense that an industry is less "harmed" by tariffs on its importable inputs, if substitution is possible, than it would be if it had no ways of substituting primary factors for them. (Symbolically, the EPR formula including substitution effects,

$$r_j = \frac{(1+t_j)(1-a_{ij}') - (1-a_{ij})}{1 - a_{ij}} = \frac{(1+t_j) - (1+t_i)a_{ij}(\frac{q_{ij}'}{q_{ij}})}{1 - a_{ij}} - 1.$$

Assuming that q_{ij}'/q_{ij} equals unity, when it actually is less than unity, clearly reduces the estimated rate of protection.)

Effect of Substitution on EPR: The Cobb-Douglas Case

The above discussion is also relevant to William Travis' remarks on the substitution effect in the Cobb-Douglas case.[1] He states that when s = 1, the effective tariff rate and the nominal tariff must always be the same, since the a_{ij} "share" coefficients are unchanged under protection, whereas measured EPR will be higher if tariffs are escalated. That is to say, the "true" EPR $= \frac{(1+t_j)p_j(1-a_{ij}')}{p_j(1-a_{ij})} - 1 = t_j$ if $a_{ij}' = a_{ij}$, while the estimate, EPR* $= \frac{(1+t_j)p_j(1-a_{ij}\left[\frac{1+t_i}{1+t_j}\right])}{p_j(1-a_{ij})} - 1 = \frac{t_j - t_i a_{ij}}{1-a_{ij}}$.

This is true in the sense that if there are diminishing returns to scale in production, value added per unit in full equilibrium will not have changed by more than t_j% in this Cobb-Douglas case. (Actually, in a different context within the same article, Travis states that he

[1]"Effective Rate of Protection," p. 446.

does not consider rising average cost a common technical condition.[1])

It is still true, however, that the EPR, if it is defined to include substitution but not scale effects, is understated in the Cobb-Douglas as in all other cases when estimated by assuming fixed coefficients. The substitution effect would be found, as in the CES case, by solving the profit-maximization problem for given scale: The Lagrangean in this case is:

Maximize $L = p_j Q_j - wL_{oj} - p_i Q_{ij} - \lambda[Q_j - AL_{oj}{}^{\alpha} Q_{ij}{}^{\beta}]$. This gives:

$\frac{q_{ij}'}{q_{ij}} = (\frac{1}{1+t_i})^{\frac{\alpha}{\alpha+\beta}}$. This is less than unity with positive tariffs, hence

$a_{ij}' = \frac{p_i(1+t_i)}{p_j(1+t_j)} q_{ij}' = \frac{(1+t_i)^{1-\alpha/\alpha+\beta}}{(1+t_j)} (a_{ij})$, which must be less than a_{ij} if $t_i \leq t_j$, so that the "true" EPR is greater than t_j in this case, contrary to Travis' conclusion.

Biases Due to Other Assumptions

As already said, the assumption of no substitution is not the only potential source of bias in measuring effective protection, and may not even be the most important. It may therefore be worth mentioning some of these other problems in summary fashion:

The level of nominal tariff protection is measured with an upward bias when foreign supply-elasticity is less than infinite, and also when

[1]"Effective Rate of Protection," p. 452.

the tariff is fully protective in the sense that domestic producers supply at lower prices than $p_w(1+t)$ and imports are completely shut out. The degree of nominal "protection" is understated (and the "level of tariff protection" meaningless) where quotas or other nontariff measures restrict imports to less than what the tariff alone would imply. Overstatement or understatement of nominal tariffs implies a bias in the same direction (though not the same, nor proportional, magnitude) in effective tariff rates where final goods are concerned, and of opposite direction where intermediates are concerned. Where non-traded inputs are included in the list of intermediates, the assumption of infinite supply elasticity, if not realistic, involves an understatement (i.e., to zero) of the rise in their prices to domestic industries, and hence an overstatement of effective protection.

The Measurement of Effective Protective Rates: A Review of the Literature

The following is a review based on nine studies, each of which includes the measurement of "Effective Protective Rates" for some country or countries. While these do not include all the calculations that have been done, they exhaust most of the important possibilities for statistical approach. The studies, and the countries involved, are:

Bela Balassa - United States, European Economic Community, United Kingdom, Sweden, and Japan

Giorgio Basevi - United States

Herbert Grubel and Harry Johnson - Individual E.E.C. Countries

Korean Development Association - Korea

Clark Leith - Taiwan

Stephen Lewis and Stephen Guisinger - Pakistan

James R. Melvin and Bruce W. Wilkinson - Canada

John H. Power - Philippines

Ronald Soligo and Joseph I. Stern - Pakistan[1]

Alternative Empirical Formulas

Free-trade versus "protected" input-output ratios

All of the empirical studies use the assumption of fixed proportions in production or, as is equivalent, a definition of the Effective

[1] Bela Balassa, "Tariff Protection in Industrial Countries: An Evaluation," Journal of Political Economy, LXXIII (December, 1965), 573-94; Giorgio Basevi, "The United States Tariff Structure: Estimates of Effective Rates of Protection of United States Industries and Industrial Labor," Review of Economics and Statistics, XLVIII (May, 1966), 147-60; Herbert G. Grubel and Harry G. Johnson, "Nominal Tariffs, Indirect Taxes and Effective Rates of Protection: The Common Market Countries, 1959," Economic Journal, LXXVII (December, 1967), 761-76; Korean Development Association, Effective Protective Rates of Korean Industries (Seoul: Korean Development Association, 1967); Clark J. Leith, "Substitution and Supply Elasticities in Calculating the Effective Protective Rate," Quarterly Journal of Economics, LXXXII (November, 1968), 588-601; Stephen R. Lewis, Jr. and Stephen E. Guisinger, "Measuring Protection in a Developing Country: The Case of Pakistan," Journal of Political Economy, LXXVI (November-December, 1968), 1170-98; James R. Melvin and Bruce W. Wilkinson, Effective Protection in the Canadian Economy, Economic Council of Canada Special Study No. 9 (Ottawa: The Queen's Printer, 1968); John H. Power, "Import Substitution as an Industrialization Strategy," Philippine Economic Journal, V (Second Semester, 1966), 167-204; Ronald Soligo and Joseph J. Stern, "Tariff Protection, Import Substitution and Investment Efficiency," Pakistan Development Review, V (Summer, 1965), 249-70.

Protective Rate as the change in value added "before" input substitutions or other adjustments, except those in the prices of tradable goods. The principal point of difference is in the use of input coefficients as observed under protection, or of some approximation of "free trade" coefficients. Balassa is the only author to employ the latter approach; all others use the former.

The Balassa model

In terms of "free-trade" coefficients, a_{ij}, (letting primed values, again, refer to the protected situation), the rate of effective protection of the jth activity is

$$\frac{V_j - V_j'}{V_j} = \frac{p_j(1+t_j) - \Sigma_i(1+t_i)p_i q_{ij} - (p_j - \Sigma_i p_i q_{ij})}{p_j - \Sigma_i p_i q_{ij}} = \frac{t_j - \Sigma_i t_i a_{ij}}{1 - \Sigma_i a_{ij}}$$

The free trade coefficients, a_{ij}, were approximated in Balassa's study with the ratios observed in Belgium and the Netherlands, since these two countries' industries enjoy a rather low level of tariff protection. Balassa and Schydlowsky assert that the fact that the free trade a_{ij} coefficients are observed, rather than, as in the other studies, deduced from the a_{ij}' coefficients under protection, frees the model of the assumption that no substitution is induced by tariffs.[1] This can be so only if the rate is construed as the change in value

[1] "Effective Tariffs," p. 355.

added "before" such substitution takes place. Even in this interpretation, Balassa's use of identical free-trade a_{ij} coefficients for all countries cannot be based on any substitutable production functions except the n-factor Cobb-Douglas.[1] This is not a large gain in generality, and for most purposes it can be said that Balassa's effective protective rate depends on the assumption of fixed physical input coefficients like the others.

The use of Belgian and Dutch coefficients to approximate the universal free-trade situation can be questioned on a number of grounds. First, although protection in these two countries is relatively slight, it is not necessarily negligible. Measured in terms of effective rates, even with the anti-protective effect of the excise structure included, protective rates were found by Grubel and Johnson to exceed 10% in 10 of the 29 industries covered in Belgium, and in 11 of the 29 in The Netherlands.[2] Also, as pointed out by Travis, the tariffs of other nations affect domestic prices even in a nation imposing no tariffs itself.[3] The assumption of common production functions in measured factors may also be questioned, particularly for Japan in this group.

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[1]"Tariff Protection in Industrial Countries," p. 578.

[2]"Common Market Countries," p. 766.

[3]Effective Rate of Protection," p. 488.

Probably of greatest importance in this connection are international differences in the commodity composition of industries as defined by S.I.T.C. categories. Balassa regards its non-reflection of such differences as an advantage of his method of estimating the a_{ij} coefficients. This is also consistent with his method of calculating nominal tariffs, using world trade volumes as weights. It corresponds to a concept of the effective rate as measuring the protection of an "industry" grouping as defined in a general, international, sense. The alternative is a definition in terms of an "industry" _qua_ the particular set of activities within the relevant S.I.T.C. now going on in a given country. Balassa's definitions would aim at estimating the degree to which - for an example - Swedish tariffs protect "steel" production, "steel" meaning the entire gamut of steel qualities and products. Alternative definitions are phrased in terms of protection of "the Swedish steel industry," which would consist mainly of special types of high-quality steel products. While either of these approaches is acceptable on a theoretical level, and Balassa's may be superior for purposes of international tariff comparison, the problem of statistical indentification of the Balassa concept seems much greater than that of the alternative. Balassa's model demands that a_{ij} coefficients not reflect any national peculiarities in commodity composition of industries.

This really requires, not the coefficients of any given low-tariff country, but rather some average or total of the "world" input-output coefficients.

Formulas using "protected" coefficients

All of the other studies employ the input-output tables of each particular country in arriving at its effective protective rates. On the assumption, explicit in all these studies, that physical input-output ratios for intermediates are invariant under the price-changes induced by the tariff structure, the protected coefficient a_{ij} = $\frac{p_i'}{p_j'}(q_{ij}) = a_{ij}\frac{(1+t_i)}{(1+t_j)}$. The EPR, $f_j = \frac{V_j' - V_j}{V_j} = \frac{V_j'}{V_j} - 1$. $V_j = \frac{p_j'}{(1+t_j)} - \sum_i \frac{p_i'}{(1+t_i)} q_{ij}$. Thus, $f_j = \frac{(1 - \Sigma a_{ij}')}{\frac{1}{1+t_j} - \sum_i \frac{1}{1+t_i}(a_{ij}')} - 1$. In some cases, the formula is written in value-per-unit terms, i.e.: $f_j = \frac{V_j'}{\frac{S_j'}{1+t_j} - \sum_i \frac{M_{ij}'}{1+t_i}} - 1$. Here S' represents the protected price of the final good, M_{ij}' the expenditures per unit of output of the jth good on the ith input, and so on. This is simply the result of multiplying all terms in the above expression by the output price, S_j', or p_j'.

Treatment of negative a_{ij} - estimates

Another difference of some importance is the formulation of Soligo and Stern, which has been adopted by a number of practitioners. They calculated the effective rate as the change in value-added divided by protected value added, instead of by the hypothetical free-trade value added. This formulation corresponds to a definition of the EPR as an answer to the question: "What percentage of value added earnings per unit are due to the tariff in a given industry - and would thus be lost if all tariffs were removed?" This is to be distinguished from the question: "By what percentage is value added per unit allowed to increase, by virtue of the tariff structure, over what it would be with a free-trade regime?", which figures in almost all of the theoretical discussions of effective protection, though not all of its applications. This $u_j = \frac{V'_j - V_j}{V'_j}$ definition of Soligo and Stern is consistent with the "Paasche index-number" approach to the tariff-averaging problem, which is advocated below on statistical grounds for cases in which the statistics used come from observation of the post-tariff "protected" state.

The u_j formula also has the advantage of retaining its meaning when the computed free-trade value added turns out to be negative. In such cases u_j is greater than unity. $u_j = \frac{V'_j - V_j}{V'_j}$ is an increasing function of t_j and a decreasing function of all t_i's $(i \neq j)$, through the range of possible values. With the conventional measure, the rate $f_j = \frac{V'_j - V_j}{V_j}$ rises as a function of t_j (and falls as a function of each t_i) only up to the point at which $V_j = 0$, where it becomes infinite, and then assumes negative values, for $V_j < 0$, which decline in absolute value as t_j rises further. The rate f_j thus loses its economic meaning in this range, since it becomes negative when "protection" must actually be said to be increased. Such negative f_j rates are distinguished from cases of "true" negative protection, in which the numerator is negative and the denominator positive. In such cases V_j exceeds V'_j because the effect of tariffs on inputs outweighs that on the final good.

Grubel and Johnson, using the f_j formulation, obtained no negative denominators, so this problem does not arise in their study. The same appears to be true of the Melvin-Wilkinson results for Canada. Basevi considered the "nonsense" negative rates he calculated for some industries to reflect the inaccuracy of the no-substitution assumption, and hence discarded these results as meaningless. Soligo and Stern, on the other hand, use the estimates of u_j which exceed unity (23 out of 48) as a basis for criticizing the Pakistani development plans, asserting that these demonstrate allocative inefficiency due to undiscriminating emphasis on import-substitution. Of the other authors, Power, Lewis and Guisinger and the Korean group all use the u_j measure, though all also report the f_j rates as well, since it is simply derived therefrom, in order to make comparisons. They do not regard the result as invalidated if V_j is found to be negative, implying that the activity could produce no value added without protection. U_j, of course, contains no information not also given by f_j, and vice-versa, as both are related in the simple arithmetic identity: $u/1-u = f$. The difference is only in the range in which one can be written and the other cannot.

The assertion of Basevi, and also Ellsworth[1], that negative V_j estimates must be discarded as absurd merits discussion. It is unquestionable that the assumptions of the effective protection model need to be well examined before results are accepted. However, the use of $V_j = 0$ as a cut-off point seems an artificial criterion for deciding whether results based on these assumptions are to be rejected or accepted. The unprotected value added may be considerably underestimated without becoming negative. And it may, as several authors have observed, be less than zero for reasons other than bias, and thus not necessarily an illegitimate finding. While this may be an argument against Soligo and Stern's singling out of only such cases as of particular significance in demonstrating inefficiency, it is not an argument for discarding them

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[1] P.T. Ellsworth, "Import Substitution in Pakistan: Some Comments," Pakistan Development Review, VI (Autumn, 1966), 394-407.

entirely.

More important, it is not true, as Basevi asserts, that negative value-added estimates for the hypothetical free trade situation can be attributed to the assumption of nonsubstitutability. It has been shown that the substitution effect leads to larger a_{ij} coefficients, and a lower value-added ratio, than is estimated when fixed physical proportions are assumed, since the prices of intermediates are lowered relative to those of primary factors by the removal of tariffs. The bias due to assuming no substitution between primary and intermediate inputs is a downward bias, and not an upward bias as Basevi supposes. Basevi's reference to a bias toward overstatement of EPR can only be based on reasoning similar to Corden's described above, and therefore actually refers to the omission of the effects, not of substitution, but of diminishing returns to scale. The only situation in which the negative V_j estimate can be explained away by variable proportions is one in which removal of protection would induce a contraction in plant scale which increases the marginal products of intermediate inputs. The possibility of substitution between intermediate and primary inputs would of itself tend to yield larger a_{ij} coefficients and a V_j (at given scale) still lower than that estimated with fixed proportions, since relatively more of the tradable input would surely be used under free trade than under protection.

EPR including effects of both tariffs and excises

Grubel and Johnson in their two articles have emphasized the importance of including excise taxes, subsidies and other internal regulations affecting production, along with customs duties, in evaluating the structure of "protection" of domestic industries.[1] In their study of the Common Market countries, they calculated both effective tariff protective rates and an EPR including excises also. They used the 65 x 65 standardized Input-Output tables for these countries published in 1965. These are unusual in including a vector reporting indirect tax payments (other than customs duties, and net of subsidies received) by each industry.

The "total" EPR formula used by Grubel and Johnson is

$$f_j = \frac{S_j - \sum_i M_{ij}}{\frac{S_j}{(1+t_j)(1+e_j)} - \sum_i \frac{M_{ij}}{(1+t_i)(1+e_i)}} - 1,$$ where e_j is net excise payments as a percentage of output value minus these payments.[2] Customs duties and excise taxes are thus treated in exactly parallel fashion. The EPR so obtained is in some cases higher, and in some

[1] Herbert G. Grubel and Harry G. Johnson, "Nominal Tariff Rates and the United States Valuation Practices: Two Case Studies," Review of Economics and Statistics, XLIX (May, 1967), 138-42; Idem, "Common Market Countries."

[2] "Common Market Countries," p. 764.

cases lower than that which reflects tariff effects alone.

The implication of the Grubel and Johnson formula is that excises applied to industries from which a producer buys inputs reduce the value added he earns, while an excise on his own product increases his value added earnings, in both cases by the amount of the excise. They assert that this is achieved, in the Common Market countries, by border tax adjustments which impose excise taxes on the after-tariff value of imports. These are designed so that domestic and imported products carry the same excise-tax burden.[1]

Two questions need to be answered here: First, even if the output price rises by the excise, does it make sense to regard this increase in unit value added - i. e., including the part collected by the government - in the domestic industry as "protection?" Such a usage may be appropriate for some purposes. However, the term "protection" of industries is most often used to refer to policies which induce greater domestic production or profits, and the effect of an excise is not protective in this sense.

If this reasoning is correct, one implication is that the levying of excise taxes on himself or other producers can never increase the

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[1]"Common Market Countries," p. 763.

protection afforded any domestic producer. The effect of indirect taxes on EPR is entirely negative. (All of these statements must be reversed, of course, in the case of a net subsidy.)

Second, is the assumption that each price rises by the amount of the excise consistent with the similar assumption concerning tariffs? It is, in the case of an excise tax structure like that described for the E.E.C. countries, in which identical excises (or subsidies) are applied to the imported substitutes for each good as on its domestic production. However, even in this case, it is not clear that the information in the Input-Output Table used by Grubel and Johnson corresponds to the assumptions embodied in their formula. In fact, the "tariff" vector of the table reports the sum of both customs and other, including excise, collections in one statistic. The "indirect tax and subsidy" vector includes levies on domestic production alone. Nevertheless they measured the tariff rate in each sector as the former, border collections, figure divided by value of imports, and the excise rate by dividing domestic indirect tax collections by output value. They recognize this discrepancy, but consider it to be minor enough not to mar the meaning of the results. This seems to conflict, however, with the emphasis which they place elsewhere on the importance of excise taxes.

In countries where border taxes are not necessarily designed to equate the excise-tax burden on competing domestic and imported products, the Grubel and Johnson assumption regarding the effects of excises and subsidies does not seem appropriate. An excise paid by domestic producer will necessarily lead to an equal increase in price only under conditions of perfect competition, which are not compatible with the effective protection model. From Diagrams 1-3 and 1-4, it is clear that the market conditions required to produce the stated response to tariffs make it impossible that indirect taxes could affect domestic prices at all. Their only effect on value added as seen by the producer is thus the reduction in his earnings due to the taxes levied on his own activity. Excises (or subsidies) applied to domestic producers of his inputs will not affect the producer.

A more generally appropriate definition of EPR including excises may therefore be proposed. It is $f_j = \frac{S_j - \sum_i M_{ij} - E_j}{\frac{S_j}{1+t_j} - \sum_i \frac{M_{ij}}{1+t_i}} - 1$, where E_j stands for the net value of indirect taxes collected from the producing sector, j. The value added that would be earned in a world "free" of both tariffs and excise or subsidy payments is found by, in addition to the adjustment of all prices for the effects of tariff removal, addition of any amounts paid in indirect taxes and substraction of any subsidies received by the domestic industry. This treatment is consistent with the discussion by W. M. Corden of the effects on EPR of production and consumption taxes.[1]

The "marginal" tariff-effect

The main aim of the Grubel and Johnson study is to measure the "effective protection" afforded by the combination of tariff and domestic excise structure of each economy, as opposed to effective tariff protection alone. However, even with respect to the latter question, they apply a different method from other authors. Their formula for the "marginal" effect of the tariff structure is:

$$f_j = \frac{\frac{S_j}{1+e_j} - \sum_i \frac{M_{ij}}{1+e_i}}{\frac{S_j}{(1+e_j)(1+t_j)} - \sum_i \frac{M_{ij}}{(1+e_i)(1+t_i)}} - 1,$$ instead of the usual formula,

$$f_j = \frac{S_j - \sum_i M_{ij}}{\frac{S_j}{1+t_j} - \sum_i \frac{M_{ij}}{1+t_i}} - 1.$$[2] V_j^t may be used to represent value added per unit of the jth activity when the tariff structure, but not the excise structure, is in effect, $V_j^{t,e}$ the situation when both exist, and so on. Then the Grubel and Johnson formula (if their assumption regarding response to excise imposition is correct) measures $g_j = \frac{V_j^t - V_j}{V_j}$, while the usual formula measures $f_j = \frac{V_j^{t,e} - V_j^e}{V_j^e}$. These are two different

[1] "Structure of a Tariff System," pp. 223-4.

[2] "Common Market Countries," p.770.

definitions of the "marginal" effect of tariffs, but both seem equally valid on conceptual grounds. Moreover, where the Common Market type of border tax policy is not in effect, the usual formula actually measures the $g_j = \frac{V_j^t - V_j}{V_j}$ form favored by Grubel and Johnson, since it does not subtract excise payments actually paid in calculating "protected" value added.

The Measurement of Nominal Tariffs

The selection of weights

In general, the information regarding input-output ratios is for a broader industry classification than the BTN commodity categories for which tariff rates are enumerated. Effective rate calculations therefore involve averaging of individual tariff rates in order to obtain "the" nominal tariff rate for a given industry. The question thus arises as to the appropriate average to use, that is, of how to weight the individual tariffs in the calculation.

Since the definition of EPR is the percentage change in value added per unit in domestic import-competitive industries, the ideal weights might be considered to be domestic output of individual commodities observed under free trade. This would be appropriate in a "Laspeyres" type of average, with the average degree of effective protection being the effective tariff on each commodity times its proportion in total value added in the "base" - i.e. free trade - period. These weights are, of course, unknown. The corresponding "Paasche" type of average is less conventional, since it is usual to think of the free trade situation as the norm. It has, however, the advantage of being calculable, since the appropriate weights are the proportions of value added as observed under protection. An additional important consideration is that the latter weighting procedure would be consistent with that implicit in the use of the observed - i.e., "protected" - input-output structure.

The difference between these two approaches is analogous to that between Laspeyres and Paasche price indices: each answers a different question. The Laspeyres average gives the effect of imposing the present tariff system on a free-trade situation, abstracting from adjustments in activity levels. The Paasche average tells the change in value added that would be suffered by an industry, again "before" any adjustment of output levels, if existing tariffs were removed in the present economy. If no adjustments in activity levels took place, the two would be the same. Otherwise, if the former question is the one whose answer is sought, the latter will give an upward-biased answer, and vice-versa.

Balassa in his study used an approximation of "world trade values" (actually combined imports of the five areas covered) as the weights for obtaining nominal tariffs.[1] This is consistent with his approach to the selection of input-output ratios. Both are an attempt to approximate the domestic free-trade situation as the basis for his definition of protection, which is of the Laspeyres variety. As with the input-output statistics, however, there are serious difficulties in this approach. Particularly in the case of Japan, differences in tastes, income level and resource endowments make it unlikely that the trade of these rich Western nations - itself different from their total production under free trade - would approximate the composition of her domestic production in free trade.

The only study to actually use domestic production weights is that of the Korean Development Association. Most of the others use total tariff collections in each category, divided by the value of imports, as their measure of the nominal tariff. The reason for using collections, which is equivalent to weighting individual tariffs by import volumes, is its relative convenience, since tariff revenues are an accurately reported statistic. All admit that this measure is downward biased as an approximation to the definitions given above, since import volumes are negatively correlated with nominal tariff levels. That this bias is no

[1] "Tariff Protection in Industrial Countries."

negligible matter can be seen from the data compiled by the ECLA, comparing import-weighted with unweighted averages of tariffs on broad groups of commodities for a number of Latin American countries.[1] In Argentina, Brazil and Chile, the countries for which the most complete information is available, the former is more than twice the latter for the average of all BTN categories, while the ratio varies greatly among industries.

The unweighted average is unbiased in the sense that the value of any of the weighted averages approaches it as a limit, as the number of individual commodities being aggregated approaches infinity and the proportion represented by each becomes miniscule. The comparison of Macario's Tables 1 and 2 suggest that the simple average may in fact be more unbiased than the revenue-weighted average for broad commodity groups, since they are generally higher than the latter, which are known to be underestimates.[2] However, this does not seem strong ground for selecting the measure in treating individual industries, since the number of commodities within an industry may not be very large in many cases, and certainly one or a few will often carry considerable relative weight.

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[1]Santiago Macario, "Protectionism and Industrialization in Latin America," United Nations Economic Commission for Latin America Economic Bulletin for Latin America, IX (March, 1964), 69-70.

[2]"Protectionism and Industrialization," pp. 69-70.

Also, the rates on related commodities within an industry may not be determined independently of one another. The unweighted average is likely to show wide variance as an estimator, and a closer examination of tariff-determination procedures might reveal sources of bias as well. Leith's calculations for Taiwan are interesting in this connection, and not favorable to the case for unweighted averages: not only do they differ widely from the revenue-measured tariffs, but most are lower than the latter. Since the revenue-ratios are known to be downward biased, this suggests that the unweighted averages may be even further off in these cases.

Basevi's nominal rates are a combination of average tariff on imports with some data on domestic shipments. In the more complete calculation for 1958, only the former is used. In the 1954 EPR's the tariff-revenue measure is used when it is over 10%, but adjusted upward using the data on shipments when it gives a rate of less than this. Some tariffs are also adjusted for the influence of domestic subsidies or quotas. The data is taken from Vaccara's 1960 study, Employment and Output in Protected Manufacturing Industries, and presumably the nature of the statistical sources played a role in determining the procedure.

A serious difficulty in all of these procedures is the lack of correspondence with the input-output structure used. In most cases, as described, the nominal tariff rate used is in effect that for the industry's imports, while the input structure is that of the domestic industry as a whole. While this is a difference "only" of weighting procedure, it undoubtedly clouds the meaning of the result. As was suggested above, this is an important argument in favor of selecting the "Paasche" type of effective protection measure, using actual domestic production values as weights in the construction of nominal tariff rates together with the domestic input-output structure, which incorporates the same set of weights.

The difference between "t_i" and "t_j" averages

Some countries' input-output tables contain separate categories of import goods identified as "non-competitive imports," indicating that the industry in question does not exist domestically. The tariffs levied on such imports, if they are truly "non-competitive," have no protective effect but they do affect the earnings of domestic using industries. The Korean group, in recognition of this difference, apply different averaging procedures to the nominal tariffs calculated as for an output (i.e., to "t_j"), and as for the same category regarded as an input ("t_i"). They use production weights for the former but import weights for the latter. This seems an overcorrection of the "t_i", however. The natural procedure would seem to be to include non-competitive imports and their duties as one of the categories averaged into the (domestic-production-weighted) "t_i," while excluding them when the same industry's average rate is calculated as "t_j."

Treatment of exports

Clark Leith has suggested and applied an adjustment for export volumes in arriving at industry-wide nominal rates. Reasoning that exported goods are sold at world prices, not receiving any benefit of the tariff, he treats them as effectively taxed at the rate $f_j = -\frac{\sum_i t_i a_{ij}}{v_j}$. This is a procedure which Corden also suggested in his 1966 article, for the case in which exports enjoy no subsidy or rebate of tariffs on imported inputs. Where the latter occur, of course, any special treatment of exports because of their non-enjoyment of protection should properly be accompanied by upward adjustments for them.

In Leith's treatment, the average price under protection for the industry is not $p_j' = p_j(1+t_j)$, but $p_j' = p_j(d_j'(1+t_j) + (1-d_j'))$, where d_j' refers to the proportion of output sold domestically. The level of the industry tariff is thus $t_j^* = d_j' t_j$, if t_j is the average tariff that would be obtained by usual procedures, not adjusting for exports. This treatment of exports makes most sense if t_j is an average weighted by domestic output, which it is not in Leith's study. The following discussion, however, is based on such a definition of t_j. The adjustment should, if possible, be made for each commodity category to which individual tariffs are applied, since the commodity composition of the industry's exports may not be representative. The nominal rate would then be calculated as $t_j^* = \sum_k d'_{jk} t_{jk}$, for k commodity classifications within an industry.

The meaning of this adjustment may require some clarification. The "Export-adjusted" EPR differsfrom the ordinary EPR in that the part of output which is exported is counted as sold at the world price, not benefiting from domestic tariffs. It is thus an average rate of increase in value added for the total output of the industry, with the effects of tariffs on exported and domestically marketed goods weighted by relative value. Its interpretation differs somewhat, depending on whether it is assumed that the same, or different, goods are exported and imported within the single industry. In either case, the ordinary EPR is still significant as a measure of the benefit enjoyed by domestic producers on their domestic sales.

The existence of both imports and exports in the same industry may in most cases be taken to reflect product mix. The industry in this case may be considered to produce two goods, an importable and an export good. It must be assumed that both have approximately the same input structure. The ordinary EPR then measures protection offered domestic producers of the importable good. The export good may, however, be sold domestically as well, and at the world price. Insofar as this is true, the export adjustment is insufficient - that is, the resulting average rate for the entire industry is too high - as it weights all domestically sold output as protected. The export-adjusted EPR thus in this case defines an upper limit for the average rate of protection for the industry.

In some cases the same good may be import-competitive and also be exported. Here the problem is the textbook one of price discrimination by a monopolist.[1] If the demand schedule he faces in the domestic market is sufficiently inelastic, the domestic producer will both export and sell in the domestic market at tariff-protected prices. This situation is represented in Diagram 1-5. (Where domestic demand elasticity for the individual producer is higher, as in Diagram 1-6, he will undersell the competitive imports and these will be shut out. Here the phenomenon in question, of exports and imports of the same commodity, will not be observed.)

The export-adjusted EPR in this second case accurately measures the

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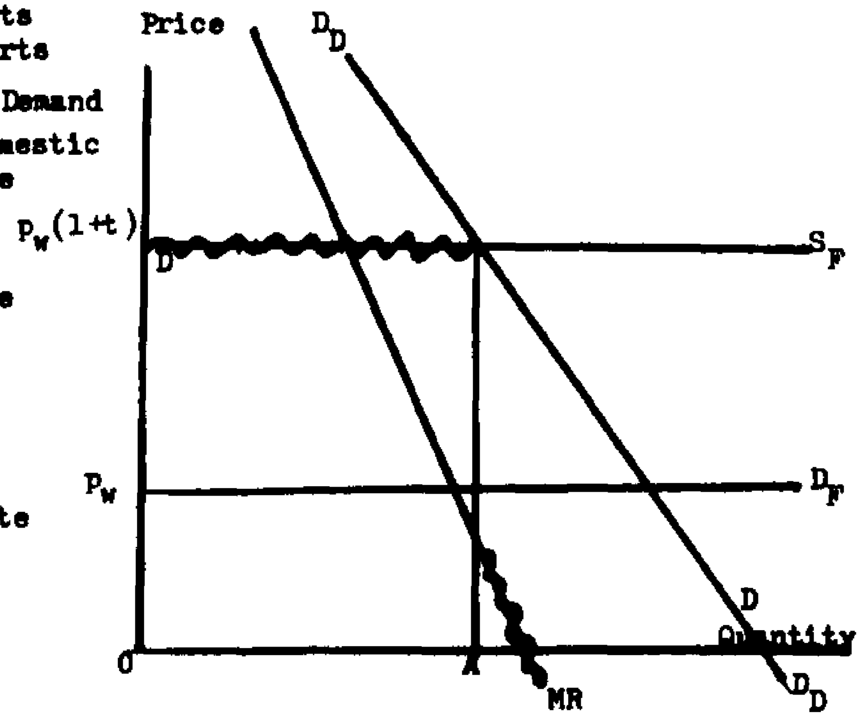
[1] George Stigler, The Theory of Price (Revised Edition; New York: Macmillan, 1952), pp. 214ff.

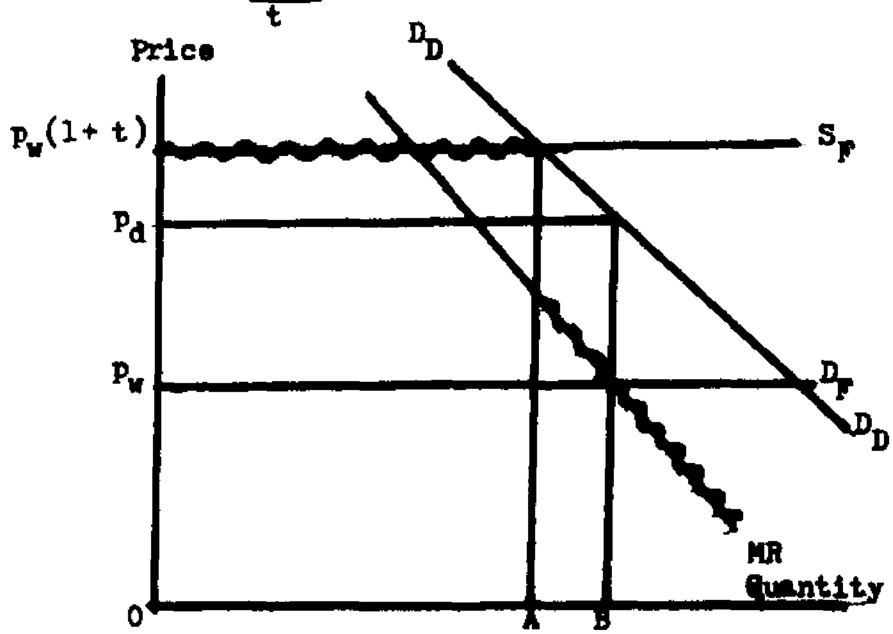
Diagram 1-5: Domestic Price of an Exportable
Case (i): Domestic Demand Elasticity, $\pi < \frac{1+t}{t}$ at OA

S_F = Supply of Imports
D_F = Demand for Exports
D_D = Total Domestic Demand
D = Demand facing Domestic Producers in the Domestic Market (barbed)
MR = Marginal Revenue in the Domestic Market (barbed)
p_w = World price
p_d = Domestic price
t = import tariff rate



[There is no point, on the domestic demand schedule facing domestic suppliers, at which MR = p_w, the MR in the foreign market. They will not sell at a lower MR domestically, but restrict domestic sales to OA, where MR = p_d = $p_w(1+t)$.]

Diagram 1-6: Domestic Price of an Exportable
Case (ii): $\pi < \frac{1+t}{t}$ at OA



[Marginal revenue = p_w at OB in the domestic market; domestic price is at p_d (< $p_w(1+t)$), and imports are shut out.]

average effect of tariffs, on value added earned on sales in both markets. However, the fact that the same good is exported would in this case underline, rather than diminish, the significance of protection in the domestic market. The latter is, as in the case of product mix, represented on the usual assumptions by the ordinary Effective Protective Rate for the industry.

If the export-adjustment is applied at the industry level, the effective protective rate formula becomes

$f_j = \frac{d_j t_j - \sum_i a_{ij} t_i}{1 - \sum_i a_{ij}}$ and, when expressed in terms of the observed, "protected" input ratios, $f_j = \frac{V'_j}{\frac{S'_j}{1+d'_j t_j} - \sum_i \frac{M'_{ij}}{1+t_i}} - 1 = \frac{v'_j}{\frac{1}{1+d'_j t_j} - \sum_i \frac{a'_{ij}}{1+t_i}}$.

(This is not Leith's formula, which is:

$\frac{V'_j}{\frac{d'_j}{1+t_j} + (1-d'_j) - \sum_i \frac{a'_{ij}}{1+t_i}} - 1$. This says that the price of domestically sold goods falls, on removal of tariffs, to $\frac{1}{1+t}(p')$, while that of exports stays at p'. But p' is the average price under protection, and not that at which exports are sold in either situation.)

"Implicit" Tariffs

The Lewis and Guisinger calculations represent a significant departure in that they are based on direct price comparisons, or "implicit exchange-rates," instead of the explicit legal tariffs of all other formulations. It has been said above that this frees the effective protection model of several of its assumptions. It is advocated by Lewis and Guisinger on two main grounds: One is that it does not count the unutilized portion of explicit tariffs where domestic industry has reduced prices sufficiently to eliminate all imports. This may occur, for example, when the tariff dates back to an earlier period before the establishment of a domestic industry. The other is that it reflects the widespread quantitative restrictions employed by Pakistan to limit imports and ration scarce foreign exchange, as well as import duties. The latter appears to be of greater importance in the Pakistani case, since the implicit rates obtained by Lewis and Guisinger are generally higher than the explicit tariffs. Most of the EPR's based on implicit tariffs are also much higher than those obtained in an alternative calculation using only explicit tariffs. The difference is not uniform in all industries, however, and the industry-rank correlation between EPR calculated using explicit tariffs, and those based on direct price comparison, is only 0.36. The rank correlation between the two tariff measures themselves is 0.35.

The implicit-tariff approach, while desirable on theoretical grounds, is of formidable statistical difficulty, since it involves compiling the appropriate price comparisons of foreign (c.i.f.) with domestic import-competing goods. In the Pakistani case, this problem alone had been the subject of earlier researches by Pal, whose results were employed by Lewis and Guisinger. Even so, only 32 industries could be treated, and problems of quality-difference in the goods whose prices were compared are admitted to exist in some of these. Lewis and Guisinger's results, particularly the low industry-rank correlation cited above, do, however, show that it matters considerably whether nontariff protective measures are treated or not, and may be sufficient ground for excluding EPR calculations of the usual kind in countries where these are important.

Treatment of Non-traded Sectors

Corden has argued that the effective protection concept, since it refers to protection of the domestic economy as a whole, ought to be measured as the change induced in value-added earnings of all domestic inputs which are internationally immobile and not of primary factors alone.[1] Most students of effective protection have, without arguing the theoretical question, counted such nontraded sectors as intermediate inputs enjoying zero tariff protection. This necessitates assuming the domestic industries involved to be characterized by infinitely elastic supply, while the Corden approach does not. Where this is not true, as Corden shows in an example, the conventional approach will give the wrong answer, and Corden's the right answer, to the question of how resources move among

[1]"Structure of a Tariff System," pp. 226-28.

industries in response to the tariff. The choice depends in part on the purpose for which the rates are to be used. Basevi, who was primarily interested in the protection of labor rather than the effects on the output levels of industries, perhaps naturally chose the alternative approach. The results differ significantly, both in levels and industry-rankings of EPR's obtained, according to the calculations of Lewis and Guisinger for Pakistan, which included rates based on both treatments of nontraded inputs.

Coverage and Level of Aggregation

While there are no theoretical disagreements involved, differences among the effective protection studies reviewed in coverage, and particularly level of aggregation, are of great importance. All restrict themselves to tariffs applied to manufactured goods. The existence in most countries of complex systems of protection of agriculture, involving differing use of quota, subsidy, price-support and other non-tariff measures, makes evaluation - and certainly comparison - of effective rates of tariff protection alone impossible.

There is no question that the significance of EPR calculations increases with the degree of disaggregation of industries treated, since it becomes more reasonable to speak of "the" tariff and "the" input-output structure, the narrower the classification of an industry. Of the studies so far, only three achieve a considerable degree of refinement in this respect: Basevi's calculations for the United States are based on the 296 4-digit manufacturing industries from the Standardard Industrial Classification, of which calculations could be reported for 280. The Korean group used that country's 270-industry input-output classifications, reporting rates for 218. The Canadian study by Melvin and Wilkinson reports on 133 of 154 industries in the Census of Manufactures for 1963. The other studies are all considerably more aggregated: Grubel and Johnson use the 65-sector I-O statistics of the EEC, and all others contain even fewer industries. Balassa's widely quoted comparative study was for a 36-industry classification covering all manufactures except food-processing.

Applications of the EPR Measurements: A Review of the Findings

The "Level" of Tariffs

Average heights of tariffs

The simplest inference to be drawn from the empirical studies cited above is that the level of protection actually enjoyed by most manufacturing industries is significantly higher than indicated by nominal tariffs alone. In this respect, it can be said that all of the studies have produced the same result: rates of effective tariff protection are generally higher than the nominal duties levied on final goods.

Among the industrialized economies studied, the ratio of effective to nominal protective rates, averaged for all industries, is almost uniformly between 1.5 and 2.0, as can be seen in Table 1-1. The results of the different studies are not entirely comparable, as a result of differences in method. However, the results cited in Table 1-1 are from generally similar studies. All use the conventional definition of "value added" by primary factors rather than the Corden concept. The tariff structures of the underdeveloped countries also tend to be escalated. However, generalization is difficult because of fundamental differences in approach. In the case of Pakistan, Soligo and Stern criticize the high degree of escalation in the tariffs, while Lewis and Guisinger appear to have found lower EPR's than nominal rates, on the average, with both explicit and implicit tariff rates. This difference may be partially due to Lewis and Guisinger's inclusion of non-tradables in value added, producing EPR's 60% to 90% lower than the alternative definition, according to the authors, and is also probably due in part to differences in industry coverage.

This is quite possibly the most important conclusion to come out of the study of effective protection. It contradicts what had become a widely held opinion: that tariffs, at least among developed nations, are now so low as to be of little importance as barriers inhibiting international trade and specialization. It is apparent from the levels of the effective

Table 1-1

Results of EPR Studies: Average f_j/t_j Ratios[a]

	Country	$\bar{f}/\bar{t}$	
From Balassa:	Sweden	1.85	
	Japan	1.82	
	United Kingdom	1.79	
	United States	1.72	
	Common Market	1.56	
From Melvin and Wilkinson:	Canada	1.65	
From Basevi:	United States	1.47 1.45	(Two estimates, using different assumed t rates for "other" input category)
From Grubel and Johnson[b]	France	1.71	
	The Netherlands	1.66	
	Belgium	1.56	
	Italy	1.62	
	Germany	1.19	
	Average, E.E.C.	1.79	

[a]The ratio of the simple average of EPR's (f_j) in all industries, to the simple average of all nominal tariff rates (t_j).

[b]Rates of effective tariff protection alone, excluding excises.

Sources: Melvin and Wilkinson, Effective Protection in the Canadian Economy, p. 32; Basevi, "United States Tariff Structure," p. 156; Grubel and Johnson, "Common Market Countries," p. 767.

rate estimates for all countries that tariff restrictions are indeed important, and particularly so those on consumable manufactures.

Travis has argued that these higher-than-nominal effective protection levels can be attributed to the tendency to overstatement due to the non-substitutability assumption.[1] However, it has been argued that this particular bias is not an upward bias but a downward one. Consequently, the inference that "levels" of protection are higher than nominal tariffs show is not invalidated, but strengthened, if there is any possibility of substitution in production between intermediate and primary factors or among the former.

Variance of protective levels among industries

The effective rates also vary more among industries, in each country, than do nominal tariffs. While most of the EPR's exceed the tariff on output, some are less than the latter because of high duties on inputs, and a few industries turn out in each case to enjoy negative protection, that is, to be taxed by the tariff structure. In Basevi's calculations for the United States, the standard deviation of the effective rates for different industries was significantly greater in both absolute and relative terms than that of the nominal rates, and this is also true in other countries. (See Table 1-2.)

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[1]"Effective Rate of Protection," p.446ff.

Table 1-2

Results of EPR Studies: Means, Standard Deviations, and Coefficients of Variation for Industry - level t_j and f_j

United States, 1958:

	"Calculation One"[a] (n = 279)			"Calculation Two"[a] (n = 281)		
	$\bar{x}$	s	$s/\bar{x}$	$\bar{x}$	s	$s/\bar{x}$
Nominal rates						
t (unweighted)	.1403	.0718	.512	.1413	.0725	.513
t (weighted)	.1124	.0686	.610	.1136	.0696	.613
Effective rates						
f (unweighted)	.2454	.1709	.696	.2077	.1596	.768
f (weighted)	.1998	.1481	.741	.1685	.1392	.826

Canada, 1963:	"Calculation One"[b]			"Calculation Two"[b]		
	$\bar{x}$	s	$s/\bar{x}$	$\bar{x}$	s	$s/\bar{x}$
Nominal rates						
t (unweighted)	.160	.080	.500			
t (weighted)	.131	.080	.610			
Effective rates						
f (unweighted)	.364	.235	.890	.306	.252	.823
f (weighted)	.210	.194	.923	.244	.205	.840

[a] Applying assumed tariff rates of 10% and 7%, respectively, to "other inputs."

[b] Using 11.3% and 5%, respectively, as the tariff rate applied to "unspecified inputs."

Sources: Basevi, "United States Tariff Structure," p. 156, Table 5; Melvin and Wilkinson, Effective Protection in the Canadian Economy, p. 29, Table 2; Balassa, "Tariff Protection in Industrial Countries," p. 588, Table 4.

Table 1-2 (Continued)

Selected Countries, 1962:

Average weighted by combined imports of the five areas:

		$\bar{x}$	s	$s/\bar{x}$
United States:	t	.116	.069	.59
	f	.200	.166	.83
United Kingdom:	t	.155	.062	.40
	f	.278	.121	.44
Common Market:	t	.119	.036	.30
	f	.186	.115	.62
Sweden:	t	.068	.046	.67
	f	.125	.106	.85
Japan:	t	.162	.076	.47
	f	.295	.156	.53

Industry rankings by level of protection

It is clear, in the results of all the studies, that the use of EPR in place of nominal tariffs affects not only the assessment of the overall level of protection, but also the relative status of different industries. In Korea, for example, the commodity with the highest nominal tariff (cigarettes), ranks 32nd among the 218 industries treated by the K.D.A. in terms of its EPR. Raw silk, the sector with the highest effective rate, is 54th in a ranking by nominal tariff.[1] In Canada, the rank correlation between nominal and effective rates is .86 on one calculation, .83 on another.[2] Correlations have not been calculated for other countries, but changes in ranking are significant in all of them.

Country rankings by level of protection

Balassa, on the basis of his results, states that "In terms of effective tariffs, the United States and Sweden appear to be more protective than nominal duties would indicate, while the opposite conclusion holds for the U. K., the E.E.C., and especially Japan."[3] However, this interpretation, which is based on a counting of the number

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[1]Korean Development Association, Effective Protective Rates of Korean Industries, p. 15.

[2]Melvin and Wilkinson, Effective Protection in the Canadian Economy, p. 32.

[3]"Tariff Protection in Industrial Countries," p. 583.

of changes in country-rank (i.e., of individual industries) in each direction, must be taken as rather tentative, at least for Japan. Examination of the average ratio of effective to nominal rates given above in Table 1-1 shows the Japanese tariffs to be more escalated even than the American, and this has the opposite implication.

Changes in Tariff Levels: The Kennedy Round

The Melvin and Wilkinson study of the Canadian tariff includes the calculation, for 32 selected industries, of the "effective" changes in tariff levels which were negotiated as part of the Kennedy Round.[1] The results are interesting: All of the nominal rates were reduced, except for three which were unchanged. But, for 13 industries (or 10, in an alternative calculation), covering 40.6% (31.3%) of the value of output in the group, effective rates actually rose slightly. Thus, at best, the Kennedy Round appears to have had little impact on the Canadian tariff structure. It must of course be supposed that the industries selected were representative, as they were intended to be.

Grubel and Johnson use their results to project the potential effect on the level of effective rates in each country of hypothetical across-the-board tariff reductions.[2] This is also aimed at evaluating the

[1] Effective Protection in the Canadian Economy, pp. 33-44.

[2] "Common Market Countries," pp. 770-75.

effects of changes like the Kennedy Round. The principal conclusion emerging is that there is a great deal of difference, among the EEC countries, in the degree of sensitivity to such changes. It seems likely that if these countries' tariff structures differ significantly in this respect, other countries will be even more variously affected, so that individual analysis is required for each case.

The Effect of Tariffs

The Balassa model of trade-effects

In his 1965 article, Balassa developed a model for analyzing the effect of tariffs, or their removal, on trade, using simplifying assumptions that (1) cross-elasticities of demand and supply are negligible and (2) primary resources used in industries producing import substitutes are available at constant cost.[1] The basic equation for dM_i, change in imports of the ith commodity, is:

$dM_i = -\delta_i C_i t_i - \gamma_i P_i z_i + \sum_j a_{ij} \gamma_j P_j z_j$, where C_i denotes free-trade domestic consumption of the ith good, P_i free-trade production of the ith good, M_i free-trade imports of the ith good, and δ_i is the elasticity of domestic demand for the ith good, γ_i the elasticity of supply of value added to the ith domestic industry, t_i the nominal tariff and z_i the

[1] "Tariff Protection in Industrial Countries," pp. 587ff.

effective protective rate for the ith industry.

A number of studies, by Balassa and others, have used this model in order to make rough projections of the impact on various countries of either a hypothetical removal of all tariffs or specific tariff-reductions such as those negotiated in connection with the Kennedy Round.[1] The calculation of effective protective rates for all industries in each country is clearly one of the prerequisites for an effort of this kind, since the response of domestic production, unlike that of consumption, depends on the effective protection of an industry and not its nominal tariff.

The "cost" of protection

Harry Johnson has shown that quantitative evaluation of the welfare effects of tariffs also involves the EPR concept.[2] His simplified model of the "cost of protection" is at least theoretically another possible application of the effective rate calculations. As with the Balassa trade-impact model, difficult-to-acquire information regarding demand and supply

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[1] Bela Balassa, "The Impact of the Industrial Countries' Tariff Structure on Their Imports of Manufactures from Less-Developed Areas," Economica, XXXIV (November, 1967), 372-83; idem, Trade Liberalization among Industrial Countries: Objectives and Alternatives (New York: McGraw-Hill, 1967); idem, and others, Studies in Trade Liberalization: Problems and Prospects for the Industrial Countries (Baltimore: Johns Hopkins University Press, 1967).

[2] "The Cost of Protection and the Scientific Tariff," Journal of Political Economy, LXVIII (August, 1960), 327-45.

elasticities is required in addition to effective tariffs.

Interaction of Tariffs with Development or Growth Policy

Use of EPR to measure protection makes possible a more accurate appraisal of the effect of a country's tariff structure on domestic industry, as well as the effect on its trade. Corden, for example, has suggested that a re-examination of the history of tariffs may reveal more consistency than do nominal rates with the common "infant-industry" rationalization.[1] He suggests one model of tariff-determination which illustrates the importance of the EPR concept in such discussions. In this model, protection is first accorded the finished product only, giving it a high effective rate relative to its nominal tariff, and then extended "backward" in steps, to semifinished manufactured inputs, intermediates, and so on. This happens as the economy becomes ready to develop the "backward-linked" productive processes. In terms of nominal tariffs, this would appear as a steady rise in the level of protection. However, each of the processes, starting with the most highly fabricated, is in fact "losing" its protective tariff in an effective sense as it outgrows "infant industry" status and begins to pay duties on its inputs.

Effect of developed countries' tariffs on underdeveloped areas

[1] "Structure of a Tariff System,"

Effective tariff calculations have provided one of the bases for complaints by representatives of the underdeveloped areas concerning trade policy in industrialized countries. The latter have been criticized for levying, "disguised" behind low nominal tariff levels, what are actually high effective rates of protection on those types of manufactured goods in which the underdeveloped areas would otherwise be able to find comparative advantage. Thus it is argued by Johnson and Balassa, among others, that underdeveloped areas are particularly harmed by the "escalated" tariff structures of the wealthy nations, which bias the commodity composition of all trade toward raw materials, intermediates and capital goods and against manufactured consumer goods. These prevent poor nations, it is said, from carrying out a policy of industrialization involving specialization for trade in appropriate light manufactures. Balassa's initial calculations support this view in that the degree of "disguised" effective protection (that is, the ratios of f_j to t_j) appeared greatest in cases of textile fabrics, hosiery, leather, chemical materials, steel ingots, and non-ferrous metals, all of which Balassa argues are "actual or potential exports of the less-developed countries" due to their relative technological simplicity.[1] The high

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[1] "Tariff Protection in Industrial Countries," p. 579.

levels of effective protection of textiles are singled out as of particular importance because of the technical (and historical) reasons for considering this a likely first manufacturing export industry for many developing countries. In the Economica article, in addition to projecting trade impacts, Balassa uses the original calculations of EPR in industrial countries to show that the averages of these rates, weighted by exports to them from underdeveloped countries, are higher than those on their imports in general. The average effective rate for all imports of the five areas was 19.1%, as compared with 32.8% for their imports from the underdeveloped areas.[1]

Domestic resource-allocation effects of the tariff

Underdeveloped areas

Some of the studies have used effective tariff calculations to criticize the distortive effects of tariff and other economic policies on investment- and resource-allocation. Macario, though he does not calculate EPR's, writing on the Latin American countries, and Power, on the Philippines, both describe a process of tariff-determination primarily dictated by periodic balance-of-payments crises. This is said to result in escalated structures heavily favoring consumer goods, and sometimes most particularly those deemed "non-essential," over investment and intermediate

[1] "Impact of Industrial Countries' Tariff Structure on Less-Developed Areas."

goods. Soligo and Stern criticize the Pakistani tariff for similar distortive effects on investment allocation. They argue, using their EPR calculations, that consumption goods are favored over investment and intermediate goods to the degree that several, comprising a large part of manufacturing activity in Pakistan, would earn no value added at all under a free-trade regime. Lewis and Guisinger found the discrimination against intermediate and capital goods to be less pronounced when total "implicit," as opposed to explicit tariff, protection is considered. However, there appears to be agreement that this aspect of tariff policy is extremely important in developing countries, and that a clear understanding of the role played by tariffs, based on the EPR concept, is essential.[1]

Developed areas

The allocative effects of the tariff are also important in developed countries, and it was in fact to this subject that Barber addressed himself when he first introduced the nation of effective tariffs. The Vernon Report in Australia was the first official attempt to use it in this way, albeit to a limited degree.[2] Among the most interesting

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[1]Macario, "Protectionism and Industrialization;" Power, "Import Substitution;" Soligo and Stern, "Tariff Protection;" Lewis and Guisinger, "Measuring Protection."

[2]W.M. Corden, "Protection," Economic Record, XLII (March, 1966), 129-48.

applications in this realm have been those to the problems of particular industries, as for example Johnson's study of the Canadian automobile industry.[1]

Balassa found considerable similarity, at the two-digit industry level, in the tariff structures of the European countries. The correlations of the 36 industry-rankings in pairs of countries ranged between .65 and .85 for Sweden, the U. K. and the E.E.C., were somewhat less between the U. S. and other countries (.481, .512, .506 correlations with the U. K., E.E.C. and Sweden, respectively) and least of all between Japan and the Western countries treated. The rank correlation between the U. S. and Japan was .395.[2] These differences are likely to be still greater on a more detailed basis. Thus, while some generalizations can be based on the universal tendency to escalation of tariffs, most of the interesting statements are to be made on an individual-country basis. Each of the studies contains some treatment of these implications.

Tariff Determination and The Protection of Labor

The concept of effective protection refers to protection of factors which are internationally immobile and therefore in less-than-infinitely

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[1] Harry G. Johnson, "The Bladen Plan for Increased Protection of the Canadian Automotive Industry," Canadian Journal of Economics and Political Science, XXIX (May, 1963), 212-38.

[2] "Tariff Protection in Industrial Countries," p. 586.

elastic supply. If it is supposed that some of the primary factors are, in fact, internationally mobile and in infinitely elastic supply, then it is possible to speak of the "effective protection" of the remaining factors taken alone. Basevi has attempted such a treatment of American labor, using the assumption that the supply of capital, as well as that of all non-traded intermediates, is infinitely elastic and its importation duty-free in the United States.[1] He calculates, accordingly, a second "Effective Rate of Protection of Labor," e_j, for all industries, by the formula: $e_j = \frac{L_j'}{\frac{S_j'}{1+t_j} - \sum_i \frac{M_{ij}'}{1+t_i} - K_j'} - 1$, where K_j' stands for the value of capital services used per unit of output in the protected state, L_j' the value added per unit by labor alone, or $V_j' - K_j'$, and the other symbols for the same magnitudes as used above. The resulting e_j rates average $4\frac{1}{2}$ to 5 times the heights of the corresponding nominal tariffs.

Basevi applies these and his other results in a re-examination of three hypotheses previously tested by Beatrice Vaccara in her 1960 study, Employment and Output in Protected Manufacturing Industries. She had attempted to show that the U.S. tariff protects labor-intensive industries more heavily than others, but the conclusions were based on an examination of nominal, rather than effective, tariff protection of industries. The

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[1] "United States Tariff Structure."

three hypotheses from Vaccara which Basevi tested were:

(a) that protection is positively related to "labor intensity," meaning number of laborers employed as a ratio to value of output (actually the inverse of a conventional "labor-productivity" measure),

(b) that protection is related to "labor cost" per unit of output, or the labor share in each industry, and

(c) that among import-competing industries, the more heavily protected are the generally declining industries. In this case, for a set of industries exhibiting an appropriate minimum level of imports, annual changes in both employment and output were used to represent the rate of "decline."

Basevi's tests consisted of regressing, against each of the variables mentioned, the rates t, f, and e of nominal, effective and labor protection, respectively. With respect to hypothesis (c), he obtained poor, that is, insignificant, results from all of these. In the cases of (a) and (b), alternative specifications of the labor-protection hypothesis, he found a significant positive relationship between labor intensity and nominal protection of industries, as had Vaccara. However, the total effective protective rates, f, showed no significant relationship with either labor variable. The rate of labor protection, e, was significantly, but negatively, related to both labor variables in the

1954 statistics.

Even if the assumption of infinitely elastic supply of capital is accepted, it is questionable whether the regressions involving "e" are a correct specification of Vaccara's hypothesis. If we say that the U. S. tariff protects labor-intensive industries, it is most likely due to an effort to protect labor more or less equally in all industries. Such a policy would imply noncorrelation between labor intensity and the rate of protection of labor itself, and not that a laborer in a labor-intensive industry would be more heavily protected that one in another industry. A positive correlation between total effective protection and labor intensity would required to bring this about. (Travis has remarked on this problem in a similar manner to what is said here.[1])

Whatever the meaning of the test involving e, that involving f does appear to show that, if the makers of U.S. tariff policy are attempting to protect labor by applying higher nominal rates to labor-intensive industries, they are not succeeding in terms of true, effective protection.

This finding also reflects on Travis' attempt to explain the Leontief paradox by reference to the labor-intensive bias of the United States

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[1]"Effective Rate of Protection," p. 459.

tariff.[1] Assuming infinite foreign elasticities, the effects of the tariff on U.S. exports and imports are made up of (a) negative effects on domestic consumption and (b) encouragement of domestic production at the expense of imports. The former, since they depend on nominal tariffs, would be expected to be biased toward less importation and more exportation of labor-intensive goods, according to the finding of Vaccara and Basevi. The latter, however, would have no such bias, since they relate to effective and not nominal tariff protection. Thus the power of U.S. tariffs to explain the composition of U.S. trade is considerably weakened by Basevi's result.

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[1] William P. Travis, The Theory of Trade and Protection, Harvard Economic Studies, Volume 121 (Cambridge: Harvard University Press, 1964).

CHAPTER II

EFFECTIVE PROTECTIVE RATES FOR JAPANESE MANUFACTURING INDUSTRIES

Previous Studies of Effective Protection in Japan

Japan is one of the industrialized nations covered in Balassa's study of effective protective rates, which has been described in Chapter I. The computations were for 36 manufacturing sectors in 1962.[1]

Ippei Yamazawa and Fukutarō Watanabe have more recently published estimates of Effective Protective Rates for Japanese industries. The two studies differ somewhat, but both are based on the 156-sector Input-Output Table for 1960.[2]

Yamazawa's 1967 study covers 67 manufacturing sectors for 1963. Only those in the metal and metal-products, machinery, chemicals, paper and textile-related categories were included. The Input-Output Table used was the Extended Table for Analysis of Heavy Chemicals Industries,

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[1] "Tariff Protection in Industrial Countries."

[2] Ippei Yamazawa, "Kanzei Kōzō to Sangyō Hogo" ("Tariff Structure and the Protection of Industry,"), Sekai Keizai Hyōron, XI (1967), 55-62; Fukutarō Watanabe, "Kanzei Seisaku to Shotoku Bunpai" ("Tariff Policy and Income Distribution,"), Gakushūin Daigaku Keizai Ronshū, V (1968), 11-75; idem, "Nihon no Kanzei Kōzō" ("Customs Duty Structure in Japan,") Sekai Keizai Hyōron, XIII (January, 1969), 22-29.

published by the Japan Institute for Research in Industrial Structure. This table is for 1961 but the input-output ratios are taken from the 1960 156-sector Input-Output Table of MITI and the other cooperating agencies. The classification differs from that of the latter only in that some of the textile industries have been reclassified into those based on natural fibers and those on synthetic materials, which increases the total number of sectors to 174.

Tariff rates were computed for each industry by taking the simple average of the rates on included commodities, as published in the Japan Tariff Association's Customs Tariff of Japan volume dated April 1, 1962. Yamazawa employed the Corden concept of "value added by the domestic economy" rather than the conventional definition used by Basevi and others. (See the discussion above, pages 57 and following.)

A summary of Yamazawa's results, for major industry groups, is given below:[1]

	Tariff Rate (t_j)		EPR (f_j)	
	Average	Standard Deviation	Average	Standard Deviation
All Industries	0.182	0.066	0.278	0.183
Metals and Metal Products	0.156	0.043	0.286	0.156
Machinery	0.196	0.059	0.228	0.138

[1]"Kanzei Kōzō," p. 59.

	Tariff Rate (t_j)		EPR (f_j)	
	Average	Standard Deviation	Average	Standard Deviation
Chemicals	0.175	0.079	0.223	0.154
Paper and Paper Products	0.112	0.044	0.167	0.110
Natural Textiles	0.183	0.075	0.458	0.223
Synthetic Textiles	0.215	0.052	0.280	0.168

Watanabe's study utilizes the 156-sector Input-Output Table for 1963. This is an updating of the 1960 table, with all the input-output ratios based on the earlier year. Like Yamazawa, Watanabe uses the simple average of the official tariff rates as the nominal tariff rate for each industry. These come from the 1963 tariff manual published by the Japan Tariff Association. However, Watanabe does not include purchases from nontraded sectors in his definition of "value added" in each industry. His computations are thus comparable with those of Basevi and other students of tariffs in industrial nations. The average rate of protection in his study is 36.7%. A higher average is to be expected from the difference in definitions used. However, Watanabe's study also includes a number of sectors, both manufacturing and nonmanufacturing, which Yamazawa omits. This makes meaningful comparison impossible.

Purpose of New Effective Rate Calculations

The studies of Yamazawa and Watanabe described above provide some insights as to the levels and industry distribution of Japanese Effective

Protective Rates. A more extensive study, based on the new 1965 Input-Output Table, was thought worthwhile for two main reasons:

One of these was the belief that EPR results become meaningful only when the industries used are reasonably disaggregated. Emphasis was placed in Chapter I (pp.58-9) on the importance of using a single tariff rate and a single input-output structure for each industry in the EPR formula. The inaccuracy introduced by these assumptions can be expected to increase greatly with aggregation. The detailed input-output statistics used in the present study are based on a breakdown into 341 5-digit row, or output, industries and 467 6-digit column, or input, industries. The computations are thus considerably more refined than those of Yamazawa and Watanabe, based on the 156-sector Input-Output Table, and those of Balassa, which used the 56-sector table.

Secondly, it was desired to compare the results obtained using a number of different formulations of the EPR concept, each of which is appropriate for different analytical purposes. Thus, twenty different "effective protective rates" are reported for each industry in the Tables of this Chapter. Perhaps the most important variation is the incorporation of the effects of production taxes and subsidies in a "total" rate of effective protection due to both tariff and excise policies. The Japanese Input-Output Table is probably unique in providing the necessary information on this subject for detailed industries.

The expectation that a more extensive study of Effective Protection in Japan would be fruitful was borne out by the results, as will be seen in Chapter III. With respect to disaggregation, both the high variance among the protective levels found in different industries (see discussion, pp. 186 ff.) and the patterns of distribution among industry groups are different from the results of earlier, less detailed studies. The pattern revealed by "total" EPR, also, is significantly different from the distribution of the "ordinary" measure.

Explanation of the Calculations of EPR for Detailed Industries in 1965

Source of Data

All of the information used in the calculations reported below comes from the Basic Data Volume (Kihon Keisū Hen) of the 1965 Input-Output Table for Japan, dated March, 1969.[1] This is the only published source of the original disaggregated statistics used in compiling all of the input-output tables - i.e. the 156-sector and 56-sector tables.

Tariff rates, as well as the input-output structure itself, were found using information contained in the Input-Output Table. It was

[1] Japan, Administrative Management Agency and Other Agencies, Shōwa Yonjūnen Sangyō Renkan Hyō: Kihon Keisū Hen ("1965 Inter-industry Relations Table: Basic Data Volume") (Tokyo, Administrative Management Agency, 1969).

argued in Chapter I that the most desirable method of evaluating "the" tariff rate in each industry would be to weight published tariff rates by domestic output of each commodity within it. However, the theoretical and statistical considerations mentioned in that discussion turn out in this case to be entirely outweighed by a single statistical problem: that of differences in the industrial classification systems utilized in different statistical sources. It would be necessary to match the BTN commodity categories, for which tariff rates are established (or S.I.T.C. groupings, also given in the tariff code), with the industrial classification of the Input-Output Table. This is a problem which Japanese economists using the input-output statistics have not yet been able to solve at the 5-digit level of disaggregation, used in the present study. The matching is not such a formidable problem at the more aggregative level used by Yamazawa and Watanabe because of the relatively high degree of standardization of both S.I.T.C. and S.I.C. classifications. The latter is in the main the basis of the Input-Output industry classifications. At the 5-digit (in the Input-Output code) level, however, even the matching of the Input-Output with the Japanese Standard Industrial Classification code itself was only recently the subject of a highly imperfect "tentative" report by the Economic Planning Agency.

For this reason it was necessary to rely on the tariff collections and import volume statistics included within the Input-Output Table itself. It is hoped that the relatively high level of disaggregation makes the downward bias in the nominal tariff rates computed from these data less severe than it would otherwise be.

Information used in these calculations, and the notation applied below, includes:

S_j = Value of output of each 5-digit industry for which computation of Effective Protective Rates was performed (manufacturing industries producing commodities, of which there were 220).

M_{ij} = Value of inputs purchased by each 5-digit industry, j, from every 6-digit industry, i. i, therefore, goes from 1 to 467.

Two tables of M_{ij} values are reported in the Table, one expressed in "producer's prices," and the other in "purchasers' prices." The latter includes transportation costs, and retail and wholesale sellers' margins, as part of the outlay on individual intermediate goods. The former reports the totals of these separately in the list of purchased inputs, that is as purchases of "transportation," "retailing" and "wholesaling."

Producers' prices instead of purchasers' prices were used here. This means that the benefit of the tariff on an import-competitive intermediate is taken to be enjoyed by the industry producing it, and not shared with its retailers, wholesalers or transporters. It also means that the latter are counted among the "non-traded" service sectors which may, under certain definitions of EPR, share the benefit of a tariff imposed on the product of the using industry. (See discussion below, pp. 92-3 Alternative Concepts of Value Added.)

Tariff collections: Total value of tariffs collected on imported commodities competitive with the product of each 5-digit and each 6-digit sector.

Value of Imports: Total value of commodities competitive with each 5-digit and each 6-digit sector's output, imported into Japan, at C.I.F. prices.

The Japanese Input-Output Table for 1960 and 1965, unlike those of earlier years, does not distinguish "competitive" and "noncompetitive" imports. Hence the adjustments made by the Korean group (see discussion above, pages 50 and following) could not be applied.

The import figure used is the value designated as "Imports on Ordinary Trade Account," and excludes the amount given as "Imports on Special Trade Account" in the tables. The former covers imports passing customs inspection in Japan, while the latter includes goods and services purchased abroad by Japanese travellers, ships and planes - i. e., those classified as Japanese residents who consume foreign goods and services outside of Japan. The latter, unlike the former, are not imported by trading companies and are not subject to tariff.[1]

Value of Exports: Total value of commodities exported by each 6-digit industry, at F.O.B. prices. The same distinction between "ordinary" and "special" accounts exists in the case of exports as with imports. As in the former case, only "ordinary" transactions are considered relevant. This corresponds to an assumption, in the calculation of the export-adjusted rates of Table 2-2, that goods sold to foreign residents, ships, planes, et cetera in Japan are priced competitively with Japanese goods and not at the world price.

Indirect Taxes: The value of indirect taxes, except customs duties, is reported for each 5-digit industry, and comprises "the taxes and other government charges except customs duties which are levied upon resident producers in respect of their production activity and are treated as a production cost in assessing their income under

[1]It appears that there may be some exceptions to this general rule, as the category "Unclassified goods and services" (900000), of whose imports only 0.4% are designated as "ordinary account" imports, is recorded as having paid ¥ 1,778 million in customs duties, more than 5 times the imports on "ordinary" account, which amounted to ¥ 304 million. Presumably some of these tariffs were paid on "special" account imports, which comprised ¥ 81,206 million in value. (For this reason, it was necessary to approximate the tariff rate for this "unclassified" sector with the average in all 6-digit sectors rather than using the computed rate.) It seems, however, that the assumption that the rule is true is more reasonable than any other assumption that could be used in computing the nominal tariff rates. The number of industries in which a significant volume of "special" imports occur is, in any case, small.

the Income Tax Law."[1]

Subsidies: The value of subsidies granted by the government to enterprises is given for each 5-digit industry.

Notation and Definitions[2]

Basic Rates Calculated from the above Data, and used in the Computations, are:

1. t_j = the nominal tariff rate for each 5-digit, (and t_i = the nominal tariff rate for each 6-digit industry,) = the value of customs duties collected divided by the value of "ordinary" account imports at C.I.F. prices, in each sector. These rates are given in Table 2-6. Those for the 5-digit commodity-producing manufacturing industries are also included in each of the Tables 2-1 through 2-5, for comparison with the Effective Protective Rates given for each of these industries.

2. d_j = the proportion of each industry's output which is sold domestically (equivalent to 1 minus the export-ratio) = S_j, total output, minus Value of Exports ("Ordinary" Account) divided by S_j, for each

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[1]Japan, Administrative Management Agency, Office of Statistical Standards, Outline of the 1965 Input-Output Table of Japan (Tokyo: Administrative Management Agency, 1969), pp. 32-33.

[2]In the succeeding pages, the prime notation applied in Chapter I to statistics describing the observed, *i. e.* protected, state is not used. It will be understood that all input-output and price statistics referred to are the actual data for the Japanese economy in 1965.

5-digit industry. Value of Exports is the total for the 6-digit industries comprising the particular 5-digit industry in each case. d_j is used in the calculations of Table 2-2: "EPR Adjusted for Exports."

3. e_j = the net rate of indirect taxation for each industry, = the value of Indirect Taxes minus the value of Subsidies reported for the industry, divided by S_j, or output, minus [Indirect Taxes - Subsidies]. Indirect Taxes and Subsidies are reported only for 5-digit industries, so where e_i, the excise rate for 6-digit input industries, is used the assumption is made that the average rate for the 5-digit industry applies to all 6-digit subsectors thereof. e_i is used only in the calculations of Tables 2-5 and 2-6, based on the formulas proposed by Grubel and Johnson. (e_j, for 5-digit industries, is reported in Tables 2-4, 2-5 and 2-6 alongside the EPR calculations for descriptive purposes.)

Calculating Formulas

"Ordinary" Effective Protective Rate (Table 2-1)

The "ordinary" EPR measures the percentage increase, in value added per unit of output which is earned in the domestic industry, resulting from the tariff structure. The assumption on which these, as all, EPR calculations are based is that the domestic price of each domestic industry's product, like that of the imported product, is higher by the amount of the tariff than it would be under free trade. The formula defining the "Ordinary" EPR is $f_j = \frac{S_j - \sum_i M_{ij}}{\frac{S_j}{1+t_j} - \sum_i \frac{M_{ij}}{1+t_i}} - 1.$ This is the standard form of the Effective Protective Rate, whose derivation was discussed on page 35 above.

Effective Protective Rate, Adjusted for Exports (Table 2-2)

The EPR Adjusted for Exports measures the percentage increase in value added per unit attributable to the tariff structure, including an adjustment downward for the fact that goods sold abroad do not benefit from the tariff imposed on the output commodity. The theoretical basis for this adjustment, suggested by W. M. Corden and used by Clark Leith, is discussed in Chapter I, pp. 51ff. The formula defining the EPR Adjusted for Exports is $f_j = \frac{S_j - \sum_i M_{ij}}{\frac{S_j}{1+d_j t_j} - \sum_i \frac{M_{ij}}{1+t_i}} - 1.$

Effective Protective Rate Including Effects of Excise and Subsidy Payments Affecting Each Industry (Table 2-3)

The EPR Including Excises and Subsidies measures the percentage increase in value-added attributable to the combination of tariffs and indirect taxes and subsidies affecting the industry. Since the domestic producer is assumed to have sufficient monopoly power, within the domestic industry, that he prices up to the domestic price of imports, it is also necessary to suppose that he does not alter the price of his product in response to the imposition of production taxes on or payment of subsidies to his enterprise. Thus the value added that would be earned in a world "free" of both tariffs and excise or subsidy payments is calculated by, in addition to the adjustment of all prices for the effects of tariff-removal, addition of any amounts paid in indirect taxes and subtraction of any subsidies being received by the domestic industry. (See discussion above, pp. 40ff.) The formula defining the EPR including effects of indirect taxes and subsidies is $f_j =$

$$\frac{S_j - \sum_i M_{ij} - \text{Excises}_j + \text{Subsidies}_j}{\frac{S_j}{1+t_j} - \sum_i \frac{M_{ij}}{1+t_i}} - 1.$$

<u>Effective Protective Rate Including the Effects of the Excise Structure, Grubel and Johnson Formula (Table 2-4)</u>

Grubel and Johnson propose a definition of EPR including the effects of both tariff structure and excise structure. It assumes that all domestic producers increase their selling prices by the amount per unit of any indirect tax payments, and reduce them by the amount of any subsidy. Computations based on their formula are reported here, although its appropriateness has been questioned, in Chapter I above (pp. 41 ff.), particularly for countries other than the Common Market group which Grubel and Johnson examined. The definition, corresponding to their equation (9), is[1]

[1]"Common Market Countries," p. 764.

$$f_j = \frac{\frac{S_j}{(1+e_j)} - \sum_i \frac{M_{ij}}{(1+e_i)}}{\frac{S_j}{(1+t_j)(1+e_j)} - \sum_i \frac{M_{ij}}{(1+t_i)(1+e_i)}} - 1.$$

Effective Tariff Protective Rate, Adjusted for the Effects of the Excise Structure, Grubel and Johnson Fromula (Table 2-5)

In the same 1967 article, Grubel and Johnson propose a definition of the "marginal" effect of the tariff structure on value added in each industry. This is based on the same assumptions concerning domestic producers' response to excise and subsidy imposition as their excise-adjusted EPR formula just discussed, and is subject to criticism on the same grounds. It has also been argued, in Chapter I, that there is no theoretical reason for preferring this type of measure of the "marginal" effect due to the tariff structure over the simpler concept measured by "ordinary" EPR. The formula, corresponding to their equation (12) is[1]

$$f_j = \frac{\frac{S_j}{(1+e_j)} - \sum_i \frac{M_{ij}}{(1+e_i)}}{\frac{S_j}{(1+t_j)(1+e_j)} - \sum_i \frac{M_{ij}}{(1+t_i)(1+e_i)}} - 1.$$

Alternative Concepts of Value Added

Each of the tables contains two columns, "A" and "B", giving computations based on two alternative definitions of value added in the domestic industries. Definition "A" is the conventional concept of value added by the industry in question, corresponding to value of output less

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[1]"Common Market Countries," p. 770.

all purchases of inputs of goods and services from other industries. Definition "B" is the one proposed by Corden as being more appropriate to the effective protection measurement. It includes in "value added" for each industry the value of all inputs purchased from sectors whose products or services are not traded internationally. It is, thus, not a measure of value added "by" the producing industry, but one of value added by the domestic economy as a whole in the production of that industry's output. The two definitions, and their uses, are discussed in Chapter I, pp. 57ff.

EPR Rates "f_j" and "u_j"

In all of the tables, the EPR is given in two forms for each of the two value-added definitions. One of these, f_j, is the change in value-added in question, as a percentage of the hypothetical free-trade value added per unit. The other, u_j, is the change in value added as a percentage of the observed value added under protection. The characteristics of these two rates are discussed above in Chapter I (pp. 35ff). $f_j = \frac{V_j' - V_j}{V_j}$, where primed values refer to protection, unprimed to free trade, and V_j is value added per unit of output in the jth industry. This is a more familiar concept in theoretical discussions of protection, but the other measure, $u_j = \frac{V_j' - V_j}{V_j'}$, possesses a number of statistical advantages which are discussed in the section referred to above. One of these is that f_j is negative where the putative V_j computed for free trade is negative, whereas this is a case in which "effective protection" is considered to be extremely strong, and not negative. This never happens with u_j, whose denominator is V_j' and cannot be negative.

On the other hand, it has to be remembered when reading the rates u_j that these are not perfectly comparable with the conventional nominal tariff-rates measure reported in the tables, since these rates ("t_j") are based on the world price, or free-trade price, as denominator. Thus if t_j, the nominal tariff rate, is 25% in a particular industry, while u_j is also 25%, this does not mean that the industry's inputs are subject to the same tariff rate on the average as its output, so that its effective protection is no higher than its nominal tariff rate. Instead, the u_j rate of 25% must be compared with $t_j/1+t_j = 20\%$, the proportion of the (protected) output price which can be attributed to the nominal tariff, levied on the basis of the world price, of 25%. u_j, that is, measures the percentage of value added which is attributable to the tariff, instead of its percentage excess over the free-trade value added, and is strictly comparable with $t_j/1+t_j$, while f_j is to be compared with t_j.

TABLE 2-1

"ORDINARY" EFFECTIVE PROTECTIVE RATE

	t_j	A f_j	A u_j	B f_j	B u_j
Slaughtering and meat preparation	.0244	0.4752	0.3221	0.2409	0.1941
Canned meat products	.2456	-3.5088	1.3985	3.0855	0.7552
Meat products	.1105	0.0239	0.0234	0.0181	0.0178
Lard (refined)	.1266	4.5542	0.8199	0.6841	0.4062
Milk and dairy products	.1261	0.7455	0.4271	0.3884	0.2797
Canned vegetables and fruits	.1219	0.0644	0.0605	0.0414	0.0397
Other vegetables and fruit products	.1922	1.0835	0.5200	0.5979	0.3742
Canned sea foods	.1340	0.3267	0.2462	0.2147	0.1767
Processed sea foods (non-storable)	.0000	-0.1732	-0.2095	-0.1349	-0.1560
Processed sea foods (storable)	.1478	0.3596	0.2644	0.2543	0.2027
Fish and shellfish	.0734	-0.2828	-0.3943	-0.1527	-0.1802
Salted, dried and smoked fish products	.1609	0.3871	0.2790	0.2604	0.2066
Polished rice and other grains	.0000	0.0041	0.0041	0.0245	0.0239
Flour manufacturing	.0664	2.0036	0.6670	0.2879	0.2235
Bread and confectionery	.1614	0.4467	0.3087	0.2922	0.2261
Sugar manufacturing	.9146	11.9215	0.9226	2.1371	0.6812
Cooking oils and their products	.0909	3.0467	0.7528	0.5199	0.3421

TABLE 2-1 (Continued)

		A		B	
	t_j	f_j	u_j	f_j	u_j
Condiments	.1679	0.5102	0.3379	0.2881	0.2236
Noodles	.2368	0.9436	0.4855	0.5067	0.3363
Starches	.0252	0.1201	0.1072	0.0754	0.0701
Potato starch jelly and glucose	.2500	-1.5463	2.8304	13.9457	0.9330
Edible salt	.0000	-0.0365	-0.0379	-0.0322	-0.0332
Ice	.0000	-0.0054	-0.0054	-0.0039	-0.0039
Finished tea and coffee	.2678	0.9782	0.4944	0.5999	0.3749
Other food preparations	.2038	0.4488	0.3097	0.3602	0.2648
Prepared feeds	.0128	-0.1016	-0.1131	-0.0499	-0.0526
Brewed sake	.0000	-0.0145	-0.0147	-0.0128	-0.0130
Synthetic sake	.0000	-0.0303	-0.0313	-0.0270	-0.0278
Beer	.4098	0.6534	0.3951	0.5517	0.3555
Ethyl alcohol	.0000	-0.2644	-0.3594	-0.2122	-0.2694
Ethyl alcohol for liquor manufacturing	.0000	-0.3184	-0.4673	-0.2554	-0.3430
Other liquors	.6319	1.4507	0.5919	0.9198	0.4791
Soft drinks	.0933	0.0905	0.0830	0.0681	0.0637
Tobacco products	.0005	-0.0079	-0.0080	-0.0075	-0.0076
Raw silk and spun silk yarn	.0905	0.4880	0.3279	0.3366	0.2518
Cotton yarn	.0062	-0.0101	-0.0102	-0.0065	-0.0066
Woolen yarn	.0068	-0.0108	-0.0109	-0.0070	-0.0071
Hemp yarn	.5000	-10.5591	1.1046	2.9078	0.7441

TABLE 2-1 (Continued)

		A		B	
	t_j	f_j	u_j	f_j	u_j
Rayon yarn	.5000	-7.9497	1.1438	2.7273	0.7317
Synthetic fiber yarns	.2500	2.1242	0.6799	0.9175	0.4784
Silk fabric	.1921	1.2213	0.5498	0.6526	0.3949
Rayon fabric	.1935	0.2947	0.2276	0.1719	0.1466
Cotton fabric	.0959	0.6045	0.3767	0.3904	0.2807
Narrow cotton fabric	.2080	1.0063	0.5015	0.5130	0.3390
Spun rayon fabric	.1527	-0.1126	-0.1269	-0.0791	-0.0859
Synthetic fiber fabrics	.1791	1.1144	0.5270	0.5495	0.3546
Woolen fabric	.2258	4.1194	0.8046	1.3804	0.5799
Hemp fabric	.1230	-0.3425	-0.5210	-0.2713	-0.3724
Yarn and fabric dyeing and finishing	.0000	-0.0913	-0.1005	-0.0610	-0.0650
Knitted fabric	.2760	1.6931	0.6286	0.7133	0.4163
Rope and fish net	.0609	0.0127	0.0125	0.0085	0.0084
Straw products	.0721	0.1219	0.1087	0.1123	0.1009
Rush products	.0000	-0.1523	-0.1796	-0.1151	-0.1301
Cotton and Carpeting	.3026	8.6907	0.8968	1.5258	0.6040
Other fiber products	.1375	0.2343	0.1898	0.1337	0.1179
Wooden footwear	.0000	-0.2211	-0.2839	-0.1175	-0.1331
Leather footwear	.2826	1.1454	0.5338	0.4358	0.3035
Other footwear except rubber footwear	.1515	0.3038	0.2330	0.1362	0.1199
Wearing apparel	.2687	1.2578	0.5570	0.4308	0.3011

TABLE 2-1 (Continued)

		A		B	
	t_j	f_j	u_j	f_j	u_j
Ready-made household textile goods	.2349	0.8262	0.4524	0.3717	0.2709
Other ready-made textile products	.3110	1.4287	0.5882	0.6140	0.3804
Lumber	.0012	-0.0052	-0.0052	-0.0035	-0.0035
Plywood	.0687	0.1684	0.1441	0.1027	0.0931
Chips	.0000	-0.0188	-0.0192	-0.0137	-0.0139
Wooden products	.1521	0.5275	0.3453	0.3251	0.2353
Wooden furniture and fixtures	.2265	0.6626	0.3985	0.3719	0.2711
Metal furniture and fixtures	.1362	0.2301	0.1870	0.1429	0.1251
Dissolving pulp	.0248	0.0244	0.0238	0.0170	0.0167
Paper pulp	.0430	0.1209	0.1079	0.0657	0.0616
Western-type paper	.1266	0.5304	0.3465	0.2874	0.2232
Paperboard	.0943	0.4273	0.2993	0.1658	0.1422
Japanese-type paper	.1509	0.4087	0.2901	0.2561	0.2038
Fiberboard	[illegible]	0.6997	0.4116	0.3531	[illegible]
Converted paper	.1814	0.9639	0.4908	0.3743	0.2724
Paper containers	.1318	0.2329	0.1889	0.1373	0.1208
Other paper articles	.1496	0.3836	0.2772	0.2507	0.2004
Newspapers	.0000	-0.0726	-0.0783	-0.0556	-0.0589
Other printing and publishing	.0041	-0.0622	-0.0663	-0.0498	-0.0524
Leather, and fur products (except apparel)	.1251	1.1752	0.5402	0.7594	0.4316

TABLE 2-1 (Continued)

		A		B	
	t_j	f_j	u_j	f_j	u_j
Leather products (except apparel)	.2487	0.9556	0.4886	0.4139	0.2927
Rubber products	.1147	0.2334	0.1892	0.1529	0.1326
Rubber footwear	.1739	0.3589	0.2641	0.2299	0.1869
Ammonia	.0000	-0.0403	-0.0420	-0.0212	-0.0216
Sulphuric acid	.0000	-0.0412	-0.0430	-0.0137	-0.0139
Carbide	.1666	1.9580	0.6619	0.2578	0.2049
Soda industrial chemicals	.3486	3.1644	0.7598	0.5596	0.3588
Tar chemicals (except petrochemicals)	.0778	0.1616	0.1391	0.1140	0.1023
Cyclic intermediates (except petrochemicals)	.1643	0.4107	0.2911	0.2484	0.1989
Methanol derivatives	.2000	0.9899	0.4974	0.4663	0.3180
Acetylene derivatives	.1954	1.3035	0.5658	0.5270	0.3451
Plasticizers	.0000	-0.2662	-0.3627	-0.1556	-0.1843
Fermentation chemicals (except petrochemicals)	.0000	-0.7381	-2.8195	-0.4748	-0.9043
Oil and fat industrial chemicals	.1758	1.5469	0.6073	0.5284	0.3457
Petrochemicals (except synthetic resin)	.0349	-0.0374	-0.0388	-0.0245	-0.0251
Synthetic dyestuffs	.2076	0.0934	0.0854	0.0935	0.0855
Powders	.0500	0.0472	0.0450	0.0313	0.0303
Explosives	.0000	-0.0385	-0.0401	-0.0310	-0.0320
Artificial silk	.2800	7.2928	0.8794	0.9475	0.4865
Rayon	.1428	1.3655	0.5772	0.4216	0.2965

TABLE 2-1 (Continued)

		A		B	
	t_j	f_j	u_j	f_j	u_j
Synthetic resins for fiber	.0405	-0.0736	-0.0795	-0.0439	-0.0459
Vinylon	.0000	-0.1729	-0.2090	-0.1273	-0.1458
Nylon	.2310	1.1417	0.5330	0.4868	0.3274
Acrylonitril	.0000	-0.0659	-0.0706	-0.0485	-0.0510
Ester	.5000	2.2065	0.6881	0.9190	0.4789
Other synthetic fiber materials	.1585	0.3764	0.2735	0.1974	0.1648
Thermo-setting plastic	.1994	0.7326	0.4228	0.3768	0.2736
Vinyl chloride	.1676	0.4127	0.2921	0.2176	0.1787
Petroleum plastic	.1984	0.5270	0.3451	0.3135	0.2387
Other plastics	.1987	0.5551	0.3569	0.3110	0.2372
Ammonium fertilizers	.0000	-0.0714	-0.0769	-0.0419	-0.0438
Phosphate fertilizers	.0000	-0.0839	-0.0916	-0.0343	-0.0355
Calcium cyanamide	.0000	-0.2657	-0.3619	-0.2027	-0.2543
Other chemical fertilizers	.0000	-0.0696	-0.0748	-0.0400	-0.0417
Inorganic industrial chemicals	.0861	0.1793	0.1520	0.1123	0.1009
High-pressure gas	.1133	0.1734	0.1477	0.1089	0.0982
Pyroxylin and celluloide	.2000	0.6419	0.3909	0.3147	0.2394
Cellophane	.1965	0.7674	0.4341	0.4388	0.3050
Other basic industrial chemicals	.0462	-0.0128	-0.0130	-0.0091	-0.0092
Vegetable oils and fats	.0377	-0.1270	-0.1455	-0.0610	-0.0650
Animal oils and fats	.0378	0.0839	0.0774	0.0525	0.0499

TABLE 2-1 (Continued)

		A		B	
	t_j	f_j	u_j	f_j	u_j
Fish oils and fish scrap	.0003	-0.2223	-0.2859	-0.1809	-0.2208
Paints, varnishes and lacquers	.0570	-0.0264	-0.0271	-0.0182	-0.0185
Medicinal preparations	.1804	0.3507	0.2596	0.2104	0.1738
Soap and surface active agents	.2004	0.8592	0.4621	0.3414	0.2545
Toilet preparations and dentifrices	.4071	1.9160	0.6570	0.6919	0.4089
Printing ink	.2037	0.7157	0.4171	0.3631	0.2664
Agricultural chemicals	.2003	0.6488	0.3935	0.3332	0.2499
Matches	.0000	-0.0378	-0.0393	-0.0307	-0.0317
Other final chemical products	.1375	0.3154	0.2398	0.1952	0.1633
Petroleum refinery products	.0890	0.0699	0.0653	0.0639	0.0601
Coal dry distillation products	.0131	0.0690	0.0645	0.0269	0.0262
Briquettes	.0000	-0.0424	-0.0443	-0.0184	-0.0187
Miscellaneous anti-septicized materials	.0476	0.2385	0.1926	0.0995	0.0905
Fire-clay goods	.1218	0.1875	0.1579	0.1396	0.1225
Other structural clay products	.0864	0.1263	0.1121	0.0943	0.0861
Plate and sheet glass	.1906	0.2925	0.2263	0.2072	0.1716
Other glass and glass products	.1606	0.3497	0.2591	0.1829	0.1546
Pottery, china and earthenware	.1326	0.2328	0.1888	0.1562	0.1351

TABLE 2-1 (Continued)

		A		B	
	t_j	f_j	u_j	f_j	u_j
Cement	.1047	0.2389	0.1928	0.1237	0.1101
Carbon products	.1058	0.2095	0.1732	0.1199	0.1070
Abrasives	.1799	0.2965	0.2287	0.2217	0.1814
Asbestos products	.0984	0.3798	0.2752	0.1502	0.1305
Cement products	.0192	-0.0265	-0.0272	-0.0194	-0.0198
Other non-metallic mineral products	.0987	0.1979	0.1652	0.1253	0.1113
Pig iron	.0168	0.1145	0.1027	0.0630	0.0593
Ferro-alloys	.0596	0.1716	0.1465	0.0738	0.0687
Steel ingots	.0135	-0.0999	-0.1110	-0.0246	-0.0252
Hot-rolled steel	.1263	2.7699	0.7347	1.1753	0.5402
Steel pipe and tubing	.1235	0.5557	0.3572	0.2377	0.1920
Cold-finished and plated steel	.1449	1.1316	0.5308	0.3644	0.2671
Forged steel	.0000	-0.0278	-0.0286	-0.0196	-0.0200
Cast steel	.0000	-0.0121	-0.0123	-0.0098	-0.0099
Cast iron pipe and tubing	.0000	-0.0161	-0.0164	-0.0134	-0.0136
Cast and forged materials for machinery (ferrous)	.0790	0.2120	0.1749	0.1179	0.1054
Copper	.0693	1.0416	0.5102	0.3486	0.2585
Lead	.0004	-0.0642	-0.0686	-0.0345	-0.0357
Zinc	.0012	-0.0084	-0.0084	-0.0046	-0.0047
Aluminum	.0431	0.0962	0.0878	0.0426	0.0409

TABLE 2-1 (Continued)

		A		B	
	t_j	f_j	u_j	f_j	u_j
Other nonferrous metals	.0047	0.0025	0.0025	0.0016	0.0016
Rolled copper	.0657	0.1816	0.1536	0.0970	0.0884
Rolled aluminum	.1740	0.8671	0.4644	0.4738	0.3215
Cast and forged materials for machinery (nonferrous)	.0932	0.1873	0.1578	0.1355	0.1193
Other basic nonferrous metal products	.1042	0.6937	0.4095	0.3523	0.2605
Steel-frame structures	.0753	0.0826	0.0763	0.0632	0.0595
Other structural metal products	.1151	0.1638	0.1407	0.1177	0.1053
Metal products for home use	.1698	0.3954	0.2833	0.2612	0.2071
Metal tools	.1666	0.2918	0.2259	0.2014	0.1676
Firearms	.0000	-0.1166	-0.1320	-0.0900	-0.0989
Other metal products	.1303	0.1698	0.1452	0.1399	0.1227
Prime movers	.0570	0.0447	0.0428	0.0304	0.0295
Machine tools	.0808	0.1025	0.0929	0.0796	0.0737
Metal-working machinery	.0826	0.1203	0.1073	0.0944	0.0862
Agricultural machinery	.1783	0.6357	0.3886	0.3380	0.2526
Mining and construction machinery	.1159	0.1878	0.1581	0.1334	0.1177
Chemical equipment	.0995	0.1735	0.1478	0.1134	0.1019
Textile machinery	.1294	0.2072	0.1716	0.1523	0.1321

TABLE 2-1 (Continued)

		A		B	
	t_i	f_i	u_i	f_i	u_i
Special industrial machinery	.1391	0.2397	0.1934	0.1783	0.1513
Industrial vehicles	.2166	0.9937	0.4984	0.5422	0.3516
Other industrial machinery	.1027	0.1801	0.1526	0.1160	0.1039
General industrial machinery and equipment	.0732	0.0937	0.0857	0.0690	0.0646
Office machinery	.1441	0.2297	0.1868	0.1685	0.1442
Sewing machines	.1472	0.2013	0.1676	0.1455	0.1270
Refrigerators and washing machines	.0935	0.0787	0.0727	0.0587	0.0554
General machine parts	.1078	0.1387	0.1218	0.1106	0.0996
Generators	.1044	0.2155	0.1773	0.1371	0.1206
Transmission and distribution apparatus	.0761	0.0742	0.0691	0.0511	0.0487
Motors	.0544	0.0565	0.0535	0.0376	0.0362
Other heavy industrial machinery	.1075	0.1457	0.1272	0.0832	0.0768
Electric bulbs	.1311	0.2317	0.1881	0.1407	0.1234
Household electrical appliances	.1891	0.5220	0.3429	0.2835	0.2208
Miscellaneous light electrical appliances	.1042	0.1692	0.1447	0.1143	0.1026
Electronic tubes and apparatus	.1193	0.1853	0.1563	0.1256	0.1116
Telecommunications equipment and related products	.0313	0.0140	0.0138	0.0107	0.0105

TABLE 2-1 (Continued)

		A		B	
	t_j	f_j	u_j	f_j	u_j
Electric measuring instruments	.0903	0.1032	0.0935	0.0781	0.0724
Electric wire and cable	.0357	-0.0162	-0.0164	-0.0122	-0.0123
Steel ships	.0037	-0.1350	-0.1560	-0.0946	-0.1045
Wooden ships	.0102	-0.0006	-0.0006	-0.0005	-0.0005
Railroad equipment	.0859	0.1266	0.1123	0.0844	0.0778
Railroad equipment for industrial use	.0000	-0.1550	-0.1835	-0.1036	-0.1156
Motor vehicles	.3564	1.2039	0.5462	0.6939	0.4096
Three-wheeled cycles	.3636	3.0986	0.7560	0.8901	0.4709
Motorcycles	.1351	0.2479	0.1987	0.1610	0.1387
Bicycles and rear cars	.1920	0.4570	0.3136	0.2762	0.2164
Aircraft	.0001	-0.0469	-0.0492	-0.0394	-0.0411
Other transport equipment	.1224	0.2821	0.2200	0.1388	0.1218
Scientific instruments	.0687	0.0722	0.0674	0.0478	0.0456
Measuring instruments	.0874	0.1034	0.0937	0.0813	0.0752
Medical instruments	.1546	0.2139	0.1762	0.1611	0.1388
Sanitary goods	.2142	2.9217	0.7450	0.8088	0.4471
Cameras	.2092	0.3466	0.2574	0.2350	0.1903
Other photographic and optical instruments	.1747	0.2887	0.2240	0.1922	0.1612
Photographic sensitive materials	.2750	1.1063	0.5252	0.3946	0.2829
Watches and clocks	.2326	0.3758	0.2731	0.2738	0.2149

TABLE 2-1 (Continued)

		A		B	
	t_j	f_j	u_j	f_j	u_j
Toys and sporting and athletic goods (except rubber goods)	.2026	0.4600	0.3151	0.2741	0.2151
Musical instruments	.1706	0.3393	0.2533	0.2408	0.1941
Plastic products	.2655	0.6839	0.4061	0.4057	0.2886
Writing goods	.1932	0.3922	0.2817	0.2631	0.2083
Small personal effects	.1515	0.5427	0.3518	0.2698	0.2125
Other industrial products	.1074	0.1554	0.1345	0.0889	0.0817
Motion picture supply	.2478	0.4268	0.2991	0.2597	0.2061

TABLE 2-2

EFFECTIVE PROTECTIVE RATES ADJUSTED FOR EXPORTS

		A		B		
	t_j	f_j	u_j	f_j	u_j	d_j
Slaughtering and meat preparation	.0244	0.4679	0.3187	0.2378	0.1921	.9905
Canned meat products	.2456	-0.1421	-0.1657	-0.0821	-0.0895	.4679
Meat products	.1105	0.0203	0.0199	0.0154	0.0152	.9929
Lard (refined)	.1266	4.3688	0.8137	0.6755	0.4031	.9940
Milk and dairy products	.1261	0.7403	0.4254	0.3863	0.2786	.9965
Canned vegetables and fruits	.1219	-0.0718	-0.0773	-0.0483	-0.0507	.8384
Other vegetables and fruit products	.1922	1.0630	0.5152	0.5892	0.3707	.9924
Canned sea foods	.1340	-0.0024	-0.0024	-0.0017	-0.0017	.6054
Processed sea foods (non-storable)	.0000	-0.1732	-0.2095	-0.1349	-0.1560	1.0000
Processed sea foods (storable)	.1478	0.3279	0.2469	0.2335	0.1893	.9612
Fish and shellfish	.0734	-0.3242	-0.4799	-0.1798	-0.2193	.9233
Salted, dried and smoked fish products	.1609	0.3749	0.2727	0.2530	0.2019	.9862
Polished rice and other grains	.0000	0.0041	0.0041	0.0245	0.0239	.9999
Flour manufacturing	.0664	2.0010	0.6667	0.2877	0.2234	.9996
Bread and confectionery	.1614	0.4440	0.3074	0.2906	0.2252	.9966
Sugar manufacturing	.9146	11.7858	0.9217	2.1311	0.6806	.9992

TABLE 2-2 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	d_j
Cooking oils and their products	.0909	2.9525	0.7469	0.5138	0.3394	.9965
Condiments	.1679	0.4922	0.3298	0.2792	0.2183	.9806
Noodles	.2368	0.9397	0.4844	0.5051	0.3356	.9982
Starches	.0252	0.1200	0.1071	0.0754	0.0701	.9995
Potato starch jelly and glucose	.2500	-1.5475	2.8262	13.6476	0.9317	.9983
Edible salt	.0000	-0.0365	-0.0379	-0.0322	-0.0332	.9998
Ice	.0000	-0.0054	-0.0054	-0.0039	-0.0039	1.0000
Finished tea and coffee	.2678	0.9442	0.4856	0.5830	0.3682	.9814
Other food preparations	.2038	0.4460	0.3084	0.3581	0.2636	0.9956
Prepared feeds	.0128	-0.1019	-0.1135	-0.0501	-0.0528	.9966
Brewed _sake_	.0000	-0.0145	-0.0147	-0.0128	-0.0130	.9994
Synthetic _sake_	.0000	-0.0303	-0.0313	-0.0270	-0.0278	.9999
Beer	.4098	0.6525	0.3948	0.5510	0.3552	.9989
Ethyl alcohol	.0000	-0.2644	-0.3594	-0.2122	-0.2694	.9984
Ethyl alcohol for liquor manufacturing	.0000	-0.3184	-0.4673	-0.2554	-0.3430	.9999
Other liquors	.6319	1.4427	0.5906	0.9158	0.4780	.9965
Soft drinks	.0933	0.0894	0.0821	0.0673	0.0631	.9950
Tobacco products	.0005	-0.0079	-0.0080	-0.0075	-0.0076	.9999
Raw silk and spun silk yarn	.0905	0.4477	0.3092	0.3114	0.2374	.9410
Cotton yarn	.0062	-0.0109	-0.0110	-0.0071	-0.0071	.9679

TABLE 2-2 (Continued)

		A		B		
	t_i	f_i	u_i	f_i	u_i	d_i
Woolen yarn	.0068	-0.0138	-0.0140	-0.0090	-0.0091	.9047
Hemp yarn	.5000	-11.4489	1.0957	2.8183	0.7381	.9887
Rayon yarn	.5000	-10.8680	1.1013	2.3839	0.7044	.9556
Synthetic fiber yarns	.2500	1.7793	0.6402	0.8199	0.4505	.9445
Silk fabric	.1921	0.9568	0.4889	0.5413	0.3512	.9120
Rayon fabric	.1935	0.0424	0.0406	0.0269	0.0262	.7167
Cotton fabric	.0959	0.3451	0.2566	0.2364	0.1912	.6936
Narrow cotton fabric	.2080	0.6577	0.3967	0.3665	0.2682	.8213
Spun rayon fabric	.1527	-0.2486	-0.3309	-0.1831	-0.2241	.6943
Synthetic fiber fabrics	.1791	0.5638	0.3605	0.3203	0.2426	.7866
Woolen fabric	.2258	2.6179	0.7236	1.0898	0.5214	.8871
Hemp fabric	.1230	-0.3632	-0.5703	-0.2896	-0.4077	.8998
Yarn and fabric dyeing and finishing	.0000	-0.0913	-0.1005	-0.0610	-0.0650	1.0000
Knitted fabric	.2760	1.3436	0.5733	0.6121	0.3796	.9098
Rope and fish net	.0609	-0.0229	-0.0235	-0.0155	-0.0158	.7848
Straw products	.0721	0.1184	0.1058	0.1090	0.0983	.9760
Rush products	.0000	-0.1523	-0.1796	-0.1151	-0.1301	.9788
Cotton and carpeting	.3026	3.9654	0.7986	1.1642	0.5379	.8856
Other fiber products	.1375	0.1470	0.1282	0.0865	0.0796	.8409
Wooden footwear	.0000	-0.2211	-0.2839	-0.1175	-0.1331	.9930

TABLE 2-2 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	d_j
Leather footwear	.2826	1.0241	0.5059	0.4038	0.2876	.9620
Other footwear (except rubber footwear)	.1515	0.0082	0.0081	0.0042	0.0041	.6311
Wearing apparel	.2687	0.8768	0.4671	0.3387	0.2525	.8829
Ready-made household textile goods	.2349	0.4308	0.3010	0.2200	0.1803	.8039
Other ready-made textile products	.3110	1.1449	0.5337	0.5271	0.3452	.9144
Lumber	.0012	-0.0052	-0.0053	-0.0036	-0.0036	.9890
Plywood	.0687	0.1279	0.1134	0.0791	0.0733	.8825
Chips	.0000	-0.0188	-0.0192	-0.0137	-0.0139	.9999
Wooden products	.1521	0.4887	0.3283	0.3041	0.2332	.9501
Wooden furniture and fixtures	.2265	0.6532	0.3951	0.3675	0.2687	.9917
Metal furniture and fixtures	.1362	0.2237	0.1828	0.1392	0.1222	.9855
Dissolving pulp	.0248	0.0244	0.0238	0.0170	0.0167	1.0000
Paper pulp	.0430	0.1206	0.1076	0.0655	0.0615	.9983
Western-type paper	.1266	0.4910	0.3293	0.2693	0.2121	.9579
Paperboard	.0943	0.4088	0.2902	0.1599	0.1379	.9763
Japanese-type paper	.1509	0.4049	0.2882	0.2539	0.2025	.9937
Fiberboard	.2000	0.6949	0.4100	0.3810	0.2759	.9960
Converted paper	.1814	0.9360	0.4834	0.3667	0.2683	.9890
Paper containers	.1318	0.2283	0.1859	0.1349	0.1188	.9942

TABLE 2-2 (Continued)

		A		B		
	t_i	f_i	u_i	f_i	u_i	d_i
Other paper articles	.1496	0.3629	0.2662	0.2384	0.1925	.9671
Newspapers	.0000	-0.0726	-0.0783	-0.0556	-0.0589	.9999
Other printing and publishing	.0041	-0.0623	-0.0664	-0.0499	-0.0525	.9909
Leather, and fur products (except apparel)	.1851	1.1261	0.5296	0.7335	0.4231	.9794
Leather products (except apparel)	.2487	0.5878	0.3702	0.2850	0.2217	.8429
Rubler products	.1147	0.1752	0.1490	0.1166	0.1044	.8632
Rubber footwear	.1739	0.2111	0.1743	0.1408	0.1234	.7388
Ammonia	.0000	-0.0403	-0.0420	-0.0212	-0.0216	.9872
Sulphuric acid	.0000	-0.0412	-0.0430	-0.0137	-0.0139	.9994
Carbide	.1666	1.9329	0.6590	0.2564	0.2040	.9951
Soda industrial chemicals	.3486	2.8306	0.7389	0.5259	0.3489	.9665
Tar chemicals (except petro-chemicals)	.0778	0.1373	0.1207	0.0975	0.0888	.9098
Cyclic intermediates (except petro-chemicals)	.1643	0.3410	0.2543	0.2103	0.1737	.8927
Methanol derivatives	.2000	0.8976	0.4730	0.4334	0.3023	.9486
Acetylene derivatives	.1954	1.3035	0.5658	0.5270	0.3451	1.0000
Plasticizers	.0000	-0.2662	-0.3627	-0.1556	-0.1843	.9783
Fermentation chemicals (except petrochemicals)	.0000	-0.7381	-2.8195	-0.4748	-0.9043	1.0000

TABLE 2-2 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	d_j
Oil and fat industrial chemicals	.1758	1.5049	0.6007	0.5197	0.3420	.9909
Petrochemicals (except synthetic resin)	.0349	-0.0423	-0.0442	-0.0278	-0.0286	.9521
Synthetic dye-stuffs	.2076	0.0935	0.0855	0.0936	0.0856	.8980
Powders	.0500	0.0364	0.0351	0.0242	0.0236	.9000
Explosives	.0000	-0.0385	-0.0401	-0.0310	-0.0320	1.0000
Artificial silk	.2800	3.4765	0.7766	0.7533	0.4296	.8650
Rayon	.1428	0.7506	0.4287	0.2825	0.2202	.7606
Synthetic resins for fiber	.0405	-0.0833	-0.0909	-0.0499	-0.0526	.9462
Vinylon	.0000	-0.1729	-0.2090	-0.1273	-0.1458	.9765
Nylon	.2310	0.7097	0.4151	0.3422	0.2549	.7666
Acrylonitril	.0000	-0.0659	-0.0706	-0.0485	-0.0510	.8589
Ester	.5000	1.7450	0.6357	0.7934	0.4424	.8992
Other synthetic fiber materials	.1585	0.1330	0.1174	0.0761	0.0707	.6507
Thermo-setting plastic	.1994	0.6829	0.4057	0.3562	0.2626	.9669
Vinyl chloride	.1676	0.3019	0.2319	0.1653	0.1418	.8828
Petroleum plastic	.1984	0.4531	0.3118	0.2749	0.2156	.9137
Other plastics	.1987	0.3733	0.2718	0.2205	0.1806	.8510
Ammonium fertilizers	.0000	-0.0714	-0.0769	-0.0419	-0.0438	.5994
Phosphate fertilizers	.0000	-0.0839	-0.0916	-0.0343	-0.0355	.9246

TABLE 2-2 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	d_j
Calcium cyanamide	.0000	-2.2657	-0.3619	-0.2027	-0.2543	.8987
Other chemical fertilizers	.0000	-0.0696	-0.0748	-0.0400	-0.0417	.9251
Inorganic industrial chemicals	.0861	0.1509	0.1311	0.0954	0.0871	.9137
High-pressure gas	.1133	0.1731	0.1476	0.1088	0.0981	.9990
Pyroxylin and celluloids	.2000	0.5172	0.3409	0.2638	0.2087	.9051
Cellophane	.1965	0.6955	0.4102	0.4048	0.2881	.9422
Other basic industrial chemicals	.0462	-0.0169	-0.0172	-0.0120	-0.0121	.9644
Vegetable oils and fats	.0377	-0.1308	-0.1505	-0.0630	-0.0672	.9878
Animal oils and fats	.0378	0.0293	0.0284	0.0187	0.0183	.6895
Fish oils and fish scrap	.0003	-0.2224	-0.2860	-0.1809	-0.2209	.9441
Paints, varnishes and lacquers	.0570	-0.0292	-0.0301	-0.0201	-0.0206	.9838
Medicinal preparations	.1804	0.3383	0.2528	0.2036	0.1692	.9781
Soap and surface active agents	.2004	0.8264	0.4524	0.3318	0.2491	.9844
Toilet preparations and dentifrices	.4071	1.8560	0.6498	0.6792	0.4044	.9870
Printing ink	.2037	0.6842	0.4062	0.3503	0.2594	.9801
Agricultural chemicals	.2003	0.5334	0.3478	0.2836	0.2209	.9167
Matches	.0000	-0.0378	-0.0393	-0.0307	-0.0317	.9708

TABLE 2-2 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	d_j
Other final chemical products	.1375	0.0527	0.0501	0.0353	0.0341	.4921
Petroleum refinery products	.0890	0.0684	0.0640	0.0625	0.0588	.9909
Coal dry distillation products	.0131	0.0688	0.0643	0.0268	0.0261	.9982
Briquettes	.0000	-0.0424	-0.0443	-0.0184	-0.0187	.9999
Miscellaneous anti-septicized materials	.0476	0.2380	0.1922	0.0993	0.0903	.9989
Fire-clay goods	.1218	0.1798	0.1524	0.1340	0.1182	.9684
Other structural clay products	.0864	0.1252	0.1113	0.0935	0.0855	.9936
Plate and sheet glass	.1906	0.2630	0.2082	0.1875	0.1579	.9336
Other glass and glass products	.1606	0.3117	0.2376	0.1653	0.1418	.9273
Pottery, china and earthenware	.1326	0.1244	0.1107	0.0860	0.0791	.6392
Cement	.1047	0.2238	0.1828	0.1166	0.1044	.9586
Carbon products	.1058	0.1595	0.1375	0.0929	0.0850	.8033
Abrasives	.1799	0.2890	0.2242	0.2164	0.1779	.9827
Asbestos products	.0984	0.3580	0.2636	0.1429	0.1250	.9622
Cement products	.0192	-0.0265	-0.0273	-0.0195	-0.0199	.9985
Other non-metallic mineral products	.0987	0.1968	0.1644	0.1246	0.1108	.9955
Pig iron	.0168	0.1144	0.1027	0.0630	0.0593	.9994
Ferro-alloys	.0596	0.1610	0.1387	0.0696	0.0651	.9587

TABLE 2-2 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	d_j
Steel ingots	.0135	-0.1002	-0.1114	-0.0247	-0.0253	.9989
Hot-rolled steel	.1263	1.4975	0.5996	0.7886	0.4409	.8241
Steel pipe and tubing	.1235	0.1166	0.1044	0.0595	0.0561	.6764
Cold-finished and plated steel	.1449	0.4229	0.2972	0.1758	0.1495	.7983
Forged steel	.0000	-0.0278	-0.0286	-0.0196	-0.0200	1.0000
Cast steel	.0000	-0.0121	-0.0123	-0.0098	-0.0099	1.0000
Cast iron pipe and tubing	.0000	-0.0161	-0.0164	-0.0134	-0.0136	.9857
Cast and forged materials for machinery (ferrous)	.0790	0.2043	0.1697	0.1139	0.1023	.9774
Copper	.0693	1.0257	0.5063	0.3451	0.2565	.9927
Lead	.0004	-0.0643	-0.0687	-0.0345	-0.0358	.9585
Zinc	.0012	-0.0094	-0.0095	-0.0052	-0.0052	.8618
Aluminum	.0431	0.0814	0.0753	0.0363	0.0350	.9146
Other nonferrous metals	.0047	0.0006	0.0006	0.0004	0.0004	.8813
Rolled copper	.0657	0.1355	0.1193	0.0737	0.0687	.9010
Rolled aluminum	.1740	0.7498	0.4285	0.4217	0.2966	.9267
Cast and forged materials for machinery (nonferrous)	.0932	0.1871	0.1576	0.1354	0.1192	.9994
Other basic nonferrous metal products	.1042	0.6397	0.3901	0.3300	0.2481	.9512

TABLE 2-2 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	d_j
Steel-frame structures	.0753	0.0736	0.0686	0.0564	0.0534	.9529
Other structural metal products	.1151	0.1431	0.1252	0.1034	0.0937	.9258
Metal products for home use	.1698	0.2893	0.2244	0.1962	0.1640	.8283
Metal tools	.1666	0.1765	0.1500	0.1253	0.1113	.7469
Firearms	.0000	-0.1166	-0.1320	-0.0900	-0.0989	.9602
Other metal products	.1303	0.1585	0.1368	0.1308	0.1156	.9549
Prime movers	.0570	0.0348	0.0336	0.0237	0.0231	.9371
Machine tools	.0808	0.0894	0.0821	0.0697	0.0651	.9205
Metal-working machinery	.0826	0.1066	0.0964	0.0839	0.0774	.9237
Agricultural machinery	.1783	0.6065	0.3775	0.3252	0.2454	.9782
Mining and construction machinery	.1159	0.1415	0.1239	0.1017	0.0923	.8693
Chemical equipment	.0995	0.1460	0.1274	0.0962	0.0878	.9174
Textile machinery	.1294	0.1351	0.1190	0.1009	0.0916	.7955
Special industrial machinery	.1391	0.2116	0.1746	0.1583	0.1367	.9313
Industrial vehicles	.2166	0.8912	0.4712	0.4979	0.3324	.9507
Other industrial machinery	.1027	0.1377	0.1210	0.0898	0.0824	.8896
General industrial machinery and equipment	.0732	0.0814	0.0753	0.0601	0.0567	.9426

TABLE 2-2 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	d_j
Office machinery	.1441	0.1656	0.1421	0.1232	0.1097	.8304
Sewing machines	.1472	0.0338	0.0327	0.0254	0.0248	.6188
Refrigerators and washing machines	.0935	0.0725	0.0676	0.0541	0.0514	.9741
General machine parts	.1078	0.1209	0.1079	0.0968	0.0882	.9159
Generators	.1044	0.1400	0.1228	0.0912	0.0835	.8027
Transmission and distribution apparatus	.0761	0.0570	0.0539	0.0395	0.0380	.9176
Motors	.0544	0.0494	0.0471	0.0329	0.0318	.9558
Other heavy industrial machinery	.1075	0.0891	0.0818	0.0520	0.0494	.8697
Electric bulbs	.1311	0.1718	0.1466	0.1064	0.0962	.8604
Household electrical appliances	.1891	0.2503	0.2002	0.1480	0.1289	.7047
Miscellaneous light electrical appliances	.1042	0.1344	0.1184	0.0917	0.0840	.8979
Electronic tubes and apparatus	.1193	0.1566	0.1354	0.1070	0.0966	.9125
Telecommunications equipment and related products	.0313	0.0102	0.0101	0.0078	0.0077	.9535
Electric measuring instruments	.0903	0.0818	0.0756	0.0622	0.0586	.8959
Electric wire and cable	.0357	-0.0225	-0.0230	-0.0170	-0.0173	.9401
Steel ships	.0037	-0.1413	-0.1646	-0.0993	-0.1102	.3810
Wooden ships	.0102	-0.0060	-0.0060	-0.0047	-0.0048	.7519

TABLE 2-2 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	d_j
Railroad equipment	.0859	0.0992	0.0902	0.0667	0.0625	.9086
Railroad equipment for industrial use	.0000	-0.1550	-0.1835	-0.1036	-0.1156	.7962
Motor vehicles	.3564	1.0192	0.5047	0.6091	0.3785	.9393
Three-wheeled cycles	.3636	2.8914	0.7430	0.8616	0.4628	.9841
Motorcycles	.1351	0.1142	0.1025	0.0770	0.0715	.7632
Bicycles and rear cars	.1920	0.3279	0.2469	0.2053	0.1703	.8511
Aircraft	.0001	-0.0469	-0.0492	-0.0395	-0.0411	.9285
Other transport equipment	.1224	0.2732	0.2145	0.1348	0.1188	.9888
Scientific instruments	.0687	0.0686	0.0642	0.0454	0.0435	.9768
Measuring instruments	.0874	0.0859	0.0791	0.0678	0.0635	.8983
Medical instruments	.1546	0.1657	0.1421	0.1260	0.1119	.8482
Sanitary goods	.2142	2.7561	0.7337	0.7870	0.4404	.9850
Cameras	.2092	0.1914	0.1606	0.1347	0.1187	.7145
Other photographic and optical instruments	.1747	0.0544	0.0516	0.0385	0.0371	.4520
Photographic sensitive materials	.2750	1.0155	0.5038	0.3725	0.2714	.9573
Watches and clocks	.2328	0.3129	0.2383	0.2309	0.1875	.9102
Toys and sporting and athletic goods (except rubber goods)	.2026	0.1425	0.1247	0.0930	0.0851	.5634

TABLE 2-2 (Continued)

	A			B		
	t_j	f_j	u_j	f_j	u_j	d_j
Musical instruments	.1706	0.2761	0.2164	0.1987	0.1658	.8651
Plastic products	.2655	0.5732	0.3643	0.3493	0.2589	.9191
Writing goods	.1932	0.3191	0.2419	0.2178	0.1788	.8850
Small personal effects	.1515	0.2501	0.2001	0.1375	0.1208	.6779
Other industrial products	.1074	0.1383	0.1215	0.0796	0.0738	.9421
Motion picture supply	.2478	0.4175	0.2945	0.2548	0.2030	.9843

TABLE 2-3

EPR INCLUDING EFFECTS OF EXCISE AND SUBSIDY PAYMENTS AFFECTING EACH 5-DIGIT INDUSTRY

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Slaughtering and meat preparation	.0244	0.4243	0.2979	0.2151	0.1770	0.0022
Canned meat products	.2456	-3.4870	1.4020	3.0663	0.7540	0.0005
Meat products	.1105	-0.0039	-0.0039	-0.0029	-0.0029	0.0050
Lard (refined)	.1266	3.6193	0.7835	0.5437	0.3522	0.0163
Milk and dairy products	.1261	0.7280	0.4213	0.3793	0.2750	0.0019
Canned vegetables and fruits	.1219	0.0512	0.0487	0.0328	0.0318	0.0014
Other vegetable and fruit products	.1922	0.9167	0.4782	0.5059	0.3359	0.0175
Canned sea foods	.1340	0.3041	0.2332	0.1999	0.1666	0.0029
Non-storable processed sea foods	.0000	-0.1806	-0.2204	-0.1407	-0.1637	0.0024
Storable processed sea foods	.1478	0.3410	0.2543	0.2412	0.1943	0.0034
Refrigerated fish and shellfish	.0734	-0.2518	-0.3365	-0.1451	-0.1698	0.0010
Salted, dried and smoked fish products	.1609	0.3793	0.2750	0.2552	0.2033	0.0014
Grain cleaning	.0000	-1.3000	4.3324	-7.7086	1.1490	-0.1005
Flour manufacturing	.0664	1.8223	0.6456	0.2618	0.2075	0.0047
Bread and confectionery	.1614	0.4313	0.3013	0.2822	0.2201	0.0033
Sugar manufacturing	.9146	4.5471	0.8197	0.8151	0.4490	0.1434

TABLE 2-3 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Cooking oils and their products	.0909	2.6927	0.7292	0.4595	0.3148	0.0039
Condiments	.1679	0.4229	0.2972	0.2387	0.1927	0.0173
Noodles	.2368	0.8904	0.4710	0.4782	0.3235	0.0072
Starches	.0252	0.1127	0.1013	0.0708	0.0661	0.0011
Glutinous potato starch jelly and glucose	.2500	-0.5017	2.9929	13.5439	0.9312	0.0053
Edible salt	.0000	-0.0378	-0.0393	-0.0333	-0.0344	0.0004
Ice	.0000	-0.0495	-0.0521	-0.0354	-0.0367	0.0313
Finished tea and coffee	.2678	0.9466	0.4862	0.5805	0.3673	0.0056
Other food preparations	.2038	0.4351	0.3032	0.3492	0.2588	0.0042
Prepared feeds	.0128	-0.0474	-0.0497	-0.0233	-0.0238	-0.0056
Brewed _sake_	.0000	-0.6484	-1.8448	-0.5730	-1.3421	0.6699
Synthetic _sake_	.0000	-0.5918	-1.4501	-0.5277	-1.1173	0.5457
Beer	.4098	-0.7633	-3.2262	-0.6446	-1.8137	1.4295
Ethyl alcohol	.0000	-0.3433	-0.5228	-0.2755	-0.3804	0.0483
Ethyl alcohol for liquor manufacturing	.0000	-0.3336	-0.5007	-0.2676	-0.3653	0.0051
Other liquors	.6319	0.0896	0.0822	0.0568	0.0538	0.5230
Soft drinks	.0933	-0.1922	-0.2380	-0.1447	-0.1692	0.1243
Tobacco products	.0005	-0.8440	-5.4110	-0.8025	-4.0634	1.5435
Raw silk and spun silk yarn	.0905	0.3535	0.2612	0.2439	0.1960	0.0222
Cotton yarn	.0062	-0.0429	-0.0449	-0.0279	-0.0288	0.0079

TABLE 2-3 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Woolen yarn	.0068	-0.0424	-0.0443	-0.0277	-0.0285	0.0066
Hemp yarn	.5000	-10.2346	1.1082	2.8185	0.7381	0.0096
Rayon yarn	.5000	-7.5221	1.1533	2.5805	0.7207	0.0146
Synthetic fiber yarns	.2500	2.0690	0.6741	0.8936	0.4719	0.0040
Silk fabric	.1921	1.1556	0.5361	0.6176	0.3818	0.0058
Rayon fabric	.1935	0.2436	0.1959	0.1421	0.1244	0.0085
Cotton fabric	.0959	0.5578	0.3580	0.3602	0.2648	0.0061
Narrow cotton fabric	.2080	0.9429	0.4853	0.4807	0.3246	0.0079
Spun rayon fabric	.1527	-0.1475	-0.1730	-0.1037	-0.1157	0.0071
Synthetic fiber fabrics	.1791	1.0283	0.5069	0.5070	0.3364	0.0070
Woolen fabric	.2258	3.9225	0.7968	1.3144	0.5679	0.0082
Hemp fabric	.1230	-0.3576	-0.5568	-0.2833	-0.3954	0.0046
Yarn and fabric dyeing and finishing	.0000	-0.1127	-0.1271	-0.0753	-0.0814	0.0102
Knitted fabric	.2760	1.6201	0.6183	0.6826	0.4056	0.0076
Rope and fish net	.0609	-0.0008	-0.0008	-0.0005	-0.0005	0.0043
Straw products	.0721	0.1219	0.1087	0.1123	0.1009	0.0000
Rush products	.0000	-0.1523	-0.1796	-0.1151	-0.1301	0.0000
Cotton and carpets	.3026	8.3243	0.8927	1.4614	0.5937	0.0081
Other fiber products	.1375	0.1908	0.1602	0.1089	0.0982	0.0099
Wooden footwear	.0000	-0.2594	-0.3504	-0.1379	-0.1599	0.0083
Leather footwear	.2826	1.0803	0.5193	0.4110	0.2913	0.0071
Other footwear (except rubber)	.1515	0.2619	0.2076	0.1174	0.1051	0.0063

TABLE 2-3 (Continued)

	A			B		
	t_j	f_j	u_j	f_j	u_j	e_j
Wearing apparel	.2687	1.2099	0.5475	0.4145	0.2930	0.0047
Ready-made textile good for home use	.2349	0.7661	0.4337	0.3446	0.2563	0.0068
Other ready-made textile goods	.3110	1.3452	0.5736	0.5781	0.3663	0.0100
Lumber	.0012	-0.0334	-0.0346	-0.0228	-0.0233	0.0051
Plywood	.0687	0.1116	0.1004	0.0681	0.0637	0.0113
Chips	.0000	-0.0657	-0.0704	-0.0479	-0.0504	0.0139
Wooden products	.1521	0.4132	0.2923	0.2546	0.2029	0.0259
Wooden furniture and fixtures	.2265	0.6301	0.3865	0.3537	0.2612	0.0071
Metal furniture and fixtures	.1362	0.2055	0.1705	0.1277	0.1132	0.0072
Dissolving pulp	.0248	-0.0060	-0.0061	-0.0042	-0.0042	0.0109
Paper pulp	.0430	0.0804	0.0744	0.0437	0.0418	0.0098
Western-type paper	.1266	0.4741	0.3216	0.2570	0.2044	0.0090
Paperboard	.0943	0.3487	0.2585	0.1353	0.1192	0.0113
Japanese-type paper	.1509	0.3672	0.2686	0.2300	0.1870	0.0109
Fiberboard	.2000	0.6750	0.4030	0.3696	0.2699	0.0048
Converted paper	.1814	0.8637	0.4634	0.3354	0.2511	0.0099
Paper containers	.1318	0.1704	0.1455	0.1005	0.0913	0.0100
Other paper articles	.1496	0.3435	0.2556	0.2245	0.1833	0.0099
Newspapers	.0000	-0.0876	-0.0961	-0.0671	-0.0720	0.0076
Other printing and publishing	.0041	-0.0762	-0.0825	-0.0610	-0.0650	0.0075

TABLE 2-3 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Leather, and fur products (except apparel)	.1851	1.1123	0.5265	0.7188	0.4182	0.0074
Leather products (except apparel)	.2487	0.8961	0.4726	0.3881	0.2796	0.0066
Rubber products	.1147	0.1985	0.1656	0.1300	0.1150	0.0091
Rubber footwear	.1739	0.3321	0.2493	0.2127	0.1754	0.0075
Ammonia	.0000	-0.0457	-0.0479	-0.0240	-0.0246	0.0021
Sulphuric acid	.0000	-0.0635	-0.0678	-0.0212	-0.0217	0.0034
Carbide	.1666	1.8982	0.6549	0.2499	0.1999	0.0041
Soda industrial chemicals	.3486	2.0639	0.6736	0.5079	0.3368	0.0054
Tar chemicals (except petrochemicals)	.0778	0.1506	0.1309	0.1062	0.0960	0.0031
Cyclic intermediates (except petrochemicals)	.1643	0.3980	0.2847	0.2407	0.1940	0.0032
Methanol derivatives	.2000	0.9683	0.4919	0.4561	0.3132	0.0032
Acetylene derivatives	.1954	1.2690	0.5592	0.5131	0.3391	0.0028
Plasticizers	.0000	-0.2832	-0.3951	-0.1655	-0.1984	0.0031
Fermentation chemicals (except petrochemicals)	.0000	-0.7535	-3.0582	-0.4848	-0.9410	0.0063
Oil and fat industrial chemicals	.1758	1.5000	0.6000	0.5124	0.3388	0.0032
Petrochemicals (except synthetic resin)	.0349	-0.0132	-0.0134	-0.0087	-0.0088	-0.0072
Synthetic dyestuffs	.2076	0.0934	0.0854	0.0935	0.0855	0.0032

TABLE 2-3 (Continued)

	A			B		
	t_j	f_j	u_j	f_j	u_j	e_j
Powders	.0500	0.0254	0.0247	0.0168	0.0165	0.0096
Explosives	.0000	-0.1499	-0.1764	-0.1208	-0.1375	0.0432
Artificial silk	.2800	6.9981	0.8749	0.9092	0.4762	0.0082
Rayon	.1428	1.2607	0.5576	0.3892	0.2801	0.0081
Synthetic resins for fiber	.0405	-0.1054	-0.1179	-0.0629	-0.0671	0.0060
Vinylon	.0000	-0.1940	-0.2407	-0.1428	-0.1666	0.0089
Nylon	.2310	1.0870	0.5208	0.4635	0.3167	0.0081
Acrylonitril	.0000	-0.0817	-0.0890	-0.0602	-0.0640	0.0080
Ester	.5000	2.1482	0.6823	0.8947	0.4722	0.0081
Other synthetic fiber materials	.1585	0.3394	0.2534	0.1780	0.1511	0.0075
Thermo-setting plastic	.1994	0.6940	0.4096	0.3569	0.2630	0.0060
Vinyl chloride	.1676	0.3776	0.2741	0.1991	0.1660	0.0060
Petroleum plastic	.1984	0.5020	0.3342	0.2986	0.2299	0.0059
Other plastics	.1987	0.5167	0.3407	0.2895	0.2245	0.0061
Ammonium fertilizers	.0000	-0.0912	-0.1003	-0.0535	-0.0566	0.0039
Phosphate fertilizers	.0000	-0.1086	-0.1219	-0.0444	-0.0465	0.0034
Calcium cyanamide	.0000	-0.2754	-0.3801	-0.2101	-0.2660	0.0033
Other chemical fertilizers	.0000	-0.0820	-0.0894	-0.0472	-0.0495	0.0024
Inorganic industrial chemicals	.0861	0.1690	0.1446	0.1058	0.0957	0.0026
High-pressure gas	.1133	0.1590	0.1372	0.0999	0.0908	0.0063

TABLE 2-3 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Pyroxylin and celluloide	.2000	0.6027	0.3760	0.2955	0.2281	0.0064
Cellophane	.1965	0.6627	0.3985	0.3790	0.2748	0.0201
Other basic industrial chemicals	.0462	-0.0136	-0.0138	-0.0096	-0.0097	0.0002
Vegetable oils and fats	.0377	-0.1677	-0.2015	-0.0806	-0.0876	0.0040
Animal oils and fats	.0378	0.0289	0.0280	0.0181	0.0177	0.0115
Fish oils and fish scrap	.0003	-0.2430	-0.3211	-0.1977	-0.2464	0.0055
Paints, varnishes and lacquers	.0570	-0.0493	-0.0518	-0.0339	-0.0351	0.0065
Medicinal preparations	.1804	0.3265	0.2461	0.1958	0.1637	0.0074
Soap and surface active agents	.2004	0.7985	0.4440	0.3172	0.2408	0.0073
Toilet preparations and dentifrices	.4071	1.5622	0.6097	0.5642	0.3607	0.0471
Printing ink	.2037	0.6896	0.4081	0.3499	0.2592	0.0039
Agricultural chemicals	.2003	0.6250	0.3846	0.3210	0.2430	0.0037
Matches	.0000	-0.0897	-0.0986	-0.0729	-0.0786	0.0279
Other final chemical products	.1375	0.2576	0.2048	0.1594	0.1375	0.0135
Petroleum refinery products (including grease and lubricating oils)	.0890	-0.5483	-1.2140	-0.5013	-1.0054	0.4210
Coal dry distillation products	.0131	0.0442	0.0424	0.0172	0.0169	0.0028
Briquettes	.0000	-0.0714	-0.0769	-0.0310	-0.0320	0.0058

TABLE 2-3 (Continued)

A

	t_i	f_i	u_i	f_i	u_i	e_i
Miscellaneous anti-septicized materials	.0476	0.1794	0.1521	0.0748	0.0696	0.0064
Fire-clay goods	.1218	0.1834	0.1549	0.1365	0.1201	0.0019
Other structural clay products	.0864	0.1190	0.1064	0.0888	0.0816	0.0035
Plate and sheet glass	.1906	0.2242	0.1831	0.1588	0.1370	0.0270
Other glass and glass products	.1606	0.3287	0.2474	0.1720	0.1467	0.0063
Pottery, china and earthenware	.1326	0.2213	0.1812	0.1455	0.1293	0.0046
Cement	.1047	0.2033	0.1689	0.1052	0.0952	0.0103
Carbon products	.1058	0.1683	0.1440	0.0963	0.0878	0.0168
Abrasives	.1799	0.2922	0.2261	0.2184	0.1793	0.0016
Asbestos products	.0984	0.3558	0.2624	0.1407	0.1233	0.0046
Cement products	.0192	-0.0362	-0.0376	-0.0266	-0.0273	0.0042
Other non-metal mineral products	.0987	0.1803	0.1528	0.1142	0.1025	0.0070
Pig iron	.0168	0.0817	0.0755	0.0450	0.0430	0.0034
Ferro-alloys	.0596	0.1554	0.1345	0.0668	0.0627	0.0038
Steel ingots	.0135	-0.1898	-0.2343	-0.0468	-0.0491	0.0036
Hot-rolled steel	.1263	2.6581	0.7266	1.1278	0.5300	0.0039
Steel pipe and tubing	.1235	0.5022	0.3343	0.2149	0.1768	0.0044
Cold-finished and plated steel	.1449	1.0397	0.5097	0.3348	0.2508	0.0042
Forged steel	.0000	-0.0413	-0.0431	-0.0291	-0.0300	0.0057
Cast steel	.0000	-0.0230	-0.0235	-0.0186	-0.0190	0.0064
Cast iron pipe and tubing	.0000	-0.0298	-0.0307	-0.0247	-0.0254	0.0071
Cast and forged materials for machinery (ferrous)	.0770	0.2072	0.1716	0.1152	0.1033	0.0011
Copper	.0693	0.8994	0.4735	0.3010	0.2314	0.0080
Lead	.0004	-0.0930	-0.1025	-0.0500	-0.0526	0.0050
Zinc	.0012	-0.0369	-0.0383	-0.0206	-0.0210	0.0050

TABLE 2-3 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Aluminum	.0431	0.0661	0.0620	0.0293	0.0284	0.0075
Other nonferrous metals	.0047	-0.0485	-0.0509	-0.0314	-0.0324	0.0152
Rolled copper	.0657	0.1665	0.1427	0.0890	0.0817	0.0021
Rolled aluminum	.1740	0.8481	0.4589	0.4634	0.3167	0.0026
Cast and forged materials for machinery (nonferrous)	.0932	0.1825	0.1543	0.1320	0.1166	0.0011
Other basic nonferrous metal products	.1042	0.6660	0.3997	0.3382	0.2527	0.0035
Steel frame structures	.0753	0.0811	0.0750	0.0621	0.0584	0.0005
Other structural metal products	.1151	0.1510	0.1312	0.1086	0.0979	0.0049
Metal products for home use	.1698	0.3436	0.2557	0.2270	0.1850	0.0139
Metal tools	.1666	0.2788	0.2180	0.1925	0.1614	0.0042
Firearms	.0000	-0.2558	-0.3438	-0.1974	-0.2460	0.0437
Other metal products	.1303	0.1576	0.1361	0.1298	0.1149	0.0058
Prime movers	.0570	0.0291	0.0283	0.0198	0.0194	0.0052
Machine tools	.0808	0.0929	0.0850	0.0722	0.0673	0.0044
Metal-working machinery	.0826	0.1103	0.0994	0.0866	0.0797	0.0043
Agricultural machinery	.1783	0.6074	0.3779	0.3229	0.2441	0.0043
Mining and construction machinery	.1159	0.1735	0.1478	0.1232	0.1097	0.0043
Chemical equipment	.0995	0.1583	0.1366	0.1035	0.0938	0.0043

TABLE 2-3 (Continued)

	A			B		
	t_j	f_j	u_j	f_j	u_j	e_j
Textile machinery	.1294	0.2053	0.1703	0.1509	0.1311	0.0006
Special industrial machinery	.1391	0.2306	0.1874	0.1715	0.1464	0.0029
Industrial vehicles	.2166	0.9836	0.4958	0.5367	0.3492	0.0013
Other industrial machinery	.1027	0.1623	0.1396	0.1045	0.0946	0.0045
General industrial machinery and equipment	.0732	0.0802	0.0743	0.0591	0.0558	0.0043
Office machinery	.1441	0.2192	0.1798	0.1608	0.1385	0.0036
Sewing machines	.1472	0.1867	0.1573	0.1350	0.1189	0.0040
Refrigerators and washing machines	.0935	-0.2685	-0.3672	-0.2002	-0.2503	0.1401
General machine parts	.1078	0.1253	0.1113	0.1000	0.0909	0.0063
Generators	.1044	0.1929	0.1617	0.1228	0.1093	0.0058
Transmission and distribution apparatus	.0761	0.0537	0.0510	0.0370	0.0357	0.0068
Motors	.0544	0.0385	0.0371	0.0256	0.0250	0.0057
Other heavy industrial electrical machinery	.1075	0.1457	0.1272	0.0832	0.0768	0.0000
Electric bulbs	.1311	0.2248	0.1835	0.1366	0.1201	0.0019
Household electrical appliances	.1891	0.2275	0.1853	0.1235	0.1099	0.0594
Miscellaneous light electrical appliances	.1042	0.1692	0.1447	0.1143	0.1026	0.0000

TABLE 2-3 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Electronic tubes and electron application apparatus	.1193	0.1806	0.1530	0.1224	0.1090	0.0016
Telecommunications equipment and related products	.0313	0.0003	0.0003	0.0002	0.0002	0.0049
Electric measuring instruments	.0903	-0.0630	-0.0673	-0.0477	-0.0501	0.0719
Electric wire and cable	.0357	-0.0279	-0.0287	-0.0209	-0.0214	0.0036
Steel ships	.0037	-0.1432	-0.1672	-0.1004	-0.1116	0.0025
Wooden ships	.0102	-0.0904	-0.0994	-0.0714	-0.0769	0.0430
Railroad equipment	.0859	0.0925	0.0847	0.0617	0.0581	0.0092
Railroad equipment for industrial use	.0000	-0.1829	-0.2238	-0.1223	-0.1393	0.0079
Motor vehicles	.3564	1.0519	0.5126	0.6063	0.3774	0.0202
Three-wheeled cycles	.3636	2.7992	0.7367	0.8041	0.4457	0.0178
Motorcycles	.1351	0.1658	0.1422	0.1077	0.0972	0.0177
Bicycles and rear cars	.1920	0.4142	0.2929	0.2503	0.2002	0.0091
Aircraft	.0001	-0.0820	-0.0894	-0.0690	-0.0741	0.0151
Other transport equipment	.1224	0.2248	0.1835	0.1106	0.0995	0.0089
Scientific instruments	.0687	0.0254	0.0247	0.0168	0.0165	0.0195
Measuring instruments	.0874	0.0663	0.0621	0.0521	0.0495	0.0178
Medical instruments	.1546	0.1681	0.1439	0.1266	0.1124	0.0203
Sanitary goods	.2142	2.8348	0.7392	0.7847	0.4397	0.0043
Cameras	.2092	0.1281	0.1135	0.0868	0.0799	0.0776

TABLE 2-3 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Other photographic and optical instruments	.1747	0.2830	0.2205	0.1884	0.1585	0.0019
Photographic sensitive materials	.2750	0.6812	0.4052	0.2430	0.1955	0.0737
Watches and clocks	.2328	0.2578	0.2050	0.1879	0.1581	0.0356
Toys and sporting and athletic goods (except rubber)	.2026	0.3642	0.2669	0.2169	0.1783	0.0232
Musical instruments	.1706	-0.0271	-0.0279	-0.0193	-0.0196	0.1452
Plastic products	.2655	0.6543	0.3955	0.3881	0.2796	0.0057
Writing goods	.1932	0.3478	0.2580	0.2333	0.1891	0.0129
Small personal effects	.1515	0.4905	0.3291	0.2439	0.1961	0.0086
Other industrial products	.1074	0.1194	0.1067	0.0683	0.0640	0.0123
Motion picture supply	.2478	0.1466	0.1278	0.0919	0.0841	0.1201

TABLE 2-4

EFFECTIVE PROTECTIVE RATES INCLUDING EFFECTS OF EXCISES AND SUBSIDIES

(GRUBEL AND JOHNSON FORMULA)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Slaughtering and meat preparation	.0244	0.5342	0.3482	0.2916	0.2257	.0022
Canned meat products	.2456	-5.1458	1.2412	2.1892	0.6864	.0005
Meat products	.1105	0.0158	0.0156	0.0186	0.0182	.0050
Lard (refined)	.1266	5.3571	0.8426	0.7632	0.4328	.0163
Milk and dairy products	.1261	0.6161	0.3812	0.3509	0.2597	.0019
Canned vegetables and fruits	.1219	-0.1095	-0.1230	-0.0647	-0.0692	.0014
Other vegetable and fruit products	.1922	0.4771	0.3230	0.3187	0.2416	.0175
Canned sea foods	.1340	0.2702	0.2127	0.1915	0.1607	.0029
Processed sea foods (non-storable)	.0000	-0.1946	-0.2417	-0.1462	-0.1712	.0024
Processed sea foods (storable)	.1478	0.2624	0.2079	0.2009	0.1673	.0034
Fish and shellfish	.0734	-0.3251	-0.4818	-0.1645	-0.1969	.0010
Salted, dried and smoked fish products	.1609	0.3147	0.2394	0.2301	0.1870	.0014
Polished rice and other grains	.0000	-3.1634	1.4622	-1.1365	8.3214	-.1005
Flour manufacturing	.0664	1.5578	0.6090	0.2938	0.2271	.0047
Bread and confectionery	.1614	0.2882	0.2237	0.2107	0.1740	.0033
Sugar manufacturing	.9146	-38.8214	1.0264	3.2727	0.7659	.1434

TABLE 2-4 (Continued)

	A			B		
	t_j	f_j	u_j	f_j	u_j	e_j
Cooking oils and their products	.0909	2.0823	0.6755	0.4825	0.3254	.0039
Condiments	.1679	0.5345	0.3483	0.3165	0.2404	.0173
Noodles	.2368	0.8725	0.4659	0.5010	0.3338	.0072
Starches	.0252	0.0254	0.0247	0.0342	0.0331	.0011
Potato starch jelly and glucose	.2500	-1.5989	2.6697	9.0427	0.9004	.0053
Edible salt	.0000	-0.1557	-0.1844	-0.1364	-0.1579	.0004
Ice	.0000	0.0008	0.0008	0.0249	0.0243	.0313
Finished tea and coffee	.2678	0.9246	0.4804	0.5921	0.3719	.0056
Other food preparations	.2038	0.4190	0.2953	0.3469	0.2575	.0042
Prepared feeds	.0128	-0.2205	-0.2928	-0.1025	-0.1142	-.0056
Brewed <u>sake</u>	.0000	1.1689	0.6181	1.2158	0.5486	.6699
Synthetic <u>sake</u>	.0000	1.1402	0.5327	0.9100	0.4764	.5457
Beer	.4098	250.0248	0.9960	8.9612	0.8996	1.4295
Ethyl alcohol	.0000	-0.2467	-0.3276	-0.1911	-0.2362	.0483
Ethyl alcohol for liquor manufacturing	.0000	-0.3498	-0.5380	-0.2788	-0.3866	.0051
Other liquors	.6319	11.0513	0.9170	2.9354	0.7459	.5230
Soft drinks	.0933	0.3844	0.2776	0.2824	0.2202	.1243
Tobacco products	.0005	4.6811	0.8239	3.6433	0.7846	1.5435
Raw silk and spun silk yarn	.0905	0.5977	0.3741	0.4150	0.2933	.0222
Cotton yarn	.0062	-0.0390	-0.0406	-0.0063	-0.0063	.0079
Woolen yarn	.0068	0.0108	0.0107	0.0213	0.0209	.0066

TABLE 2-4 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	o_j
Hemp yarn	.5000	-21.1400	1.0496	2.5538	0.7186	.0096
Rayon yarn	.5000	-8.1545	1.1397	2.8966	0.7433	.0146
Synthetic fiber yarns	.2500	1.9404	0.6599	0.9013	0.4740	.0040
Silk fabric	.1921	0.9836	0.4958	0.5743	0.3647	.0058
Rayon fabric	.1935	0.2758	0.2161	0.1799	0.1525	.0085
Cotton fabric	.0959	0.5633	0.3603	0.3044	0.2776	.0061
Narrow cotton fabric	.2080	0.9601	0.4898	0.5148	0.3398	.0079
Spun rayon fabric	.1527	-0.1298	-0.1492	-0.0831	-0.0907	.0071
Synthetic fiber fabrics	.1791	1.0648	0.5156	0.5540	0.3565	.0070
Woolen fabric	.2258	4.0047	0.8001	1.4100	0.5850	.0082
Hemp fabric	.1230	-0.3526	-0.5448	-0.2733	-0.3762	.0046
Yarn and fabric dyeing and finishing	.0000	-0.0980	-0.1087	-0.0569	-0.0603	.0102
Knitted fabric	.2760	1.6307	0.6198	0.7222	0.4193	.0076
Rope and fish net	.0609	-0.0037	-0.0037	0.0097	0.0096	.0043
Straw products	.0721	0.1062	0.0960	0.1006	0.0914	.0000
Rush products	.0000	-0.1834	-0.2245	-0.1340	-0.1547	.0000
Cotton and carpeting	.3026	7.4205	0.8812	1.5229	0.6036	.0081
Other fiber products	.1375	0.2312	0.1878	0.1452	0.1267	.0099
Wooden footwear	.0000	-0.2438	-0.3225	-0.1170	-0.1325	.0083
Leather footwear	.2826	1.0309	0.5076	0.4398	0.3054	.0071
Other footwear (except rubber footwear)	.1515	0.2574	0.2047	0.1401	0.1229	.0063

TABLE 2-4 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Wearing apparel	.2687	1.1173	0.5277	0.4273	0.2994	.0047
Ready-made household textile goods	.2349	0.7691	0.4347	0.3764	0.2735	.0068
Other ready-made textile products	.3110	1.4066	0.5844	0.6353	0.3884	.0100
Lumber	.0012	-0.0613	-0.0653	-0.0287	-0.0296	.0051
Plywood	.0687	0.1468	0.1280	0.1080	0.0975	.0113
Chips	.0000	-0.0249	-0.0255	-0.0057	-0.0057	.0139
Wooden products	.1521	0.6238	0.3841	0.3938	0.2825	.0259
Wooden furniture and fixtures	.2265	0.6312	0.3869	0.3777	0.2741	.0071
Metal furniture and fixtures	.1362	0.2153	0.1771	0.1493	0.1299	.0072
Dissolving pulp	.0248	0.0105	0.0104	0.0173	0.0170	.0109
Paper pulp	.0430	0.0695	0.0649	0.0645	0.0606	.0098
Western-type paper	.1266	0.4579	0.3141	0.2827	0.2204	.0090
Paperboard	.0943	0.3329	0.2498	0.1693	0.1448	.0113
Japanese-type paper	.1509	0.3794	0.2750	0.2593	0.2059	.0109
Fiberboard	.2000	0.6471	0.3928	0.3738	0.2721	.0048
Converted paper	.1814	0.8825	0.4688	0.3751	0.2727	.0099
Paper containers	.1318	0.2242	0.1831	0.1458	0.1273	.0100
Other paper articles	.1496	0.3835	0.2772	0.2616	0.2073	.0099
Newspapers	.0000	-0.0708	-0.0763	-0.0492	-0.0518	.0076
Other printing and publishing	.0041	-0.0602	-0.0640	-0.0436	-0.0456	.0075

TABLE 2-4 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Leather, and fur products (except apparel)	.1851	1.1686	0.5388	0.7825	0.4390	.0074
Leather products (except apparel)	.2487	0.8844	0.4693	0.4180	0.2952	.0066
Rubber products	.1147	0.2219	0.1816	0.1608	0.1385	.0091
Rubber footwear	.1739	0.3399	0.2536	0.2341	0.1896	.0075
Ammonia	.0000	-0.1101	-0.1237	-0.0301	-0.0311	.0021
Sulphuric acid	.0000	-0.1944	-0.2413	-0.0549	-0.0581	.0034
Carbide	.1666	0.8626	0.4631	0.2544	0.2028	.0041
Soda industrial chemicals	.3486	1.7014	0.6298	0.4917	0.3296	.0054
Tar chemicals (except petrochemicals)	.0778	0.1322	0.1168	0.1039	0.0941	.0031
Cyclic intermediates (except petrochemicals)	.1643	0.3514	0.2600	0.2340	0.1896	.0032
Methanol derivatives	.2000	0.8317	0.4540	0.4345	0.3029	.0032
Acetylene derivatives	.1954	1.1150	0.5272	0.5014	0.3339	.0028
Plasticizers	.0000	-0.2825	-0.3938	-0.1533	-0.1811	.0031
Fermentation chemicals (except petrochemicals)	.0000	-0.7684	-3.3180	-0.5108	-1.0441	.0063
Oil and fat industrial chemicals	.1758	1.1598	0.5370	0.4742	0.3216	.0032
Petrochemicals (except synthetic resin)	.0349	-0.1843	-0.2259	-0.1182	-0.1341	-.0072
Synthetic dyestuffs	.2076	0.0970	0.0884	0.0971	0.0885	.0032
Powders	.0500	0.0305	0.0296	0.0286	0.0278	.0096

TABLE 2-4 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Explosives	.0000	0.0258	0.0251	0.0270	0.0263	.0432
Artificial silk	.2800	5.2990	0.8412	0.9371	0.4837	.0082
Rayon	.1428	1.0771	0.5185	0.3949	0.2831	.0081
Synthetic resins for fiber	.0405	-0.1118	-0.1259	-0.0545	-0.0576	.0060
Vinylon	.0000	-0.1854	-0.2276	-0.1306	-0.1503	.0089
Nylon	.2310	0.9131	0.4773	0.4439	0.3074	.0081
Acrylonitril	.0000	-0.0889	-0.0976	-0.0565	-0.0599	.0080
Ester	.5000	1.8798	0.6527	0.8716	0.4657	.0081
Other synthetic fiber materials	.1585	0.2732	0.2146	0.1684	0.1441	.0075
Thermo-setting plastic	.1994	0.6694	0.4009	0.3735	0.2719	.0060
Vinyl chloride	.1676	0.3027	0.2323	0.1841	0.1555	.0060
Petroleum plastic	.1984	0.5049	0.3355	0.3194	0.2421	.0059
Other plastics	.1987	0.4594	0.3147	0.2851	0.2218	.0061
Ammonium fertilizers	.0000	-0.1402	-0.1631	-0.0734	-0.0793	.0039
Phosphate fertilizers	.0000	-0.1825	-0.2233	-0.0598	-0.0637	.0034
Calcium cyanamide	.0000	-0.2779	-0.3849	-0.2059	-0.2593	.0033
Other chemical fertilizers	.0000	-0.1018	-0.1133	-0.0483	-0.0508	.0024
Inorganic industrial chemicals	.0861	0.1097	0.0988	0.0840	0.0774	.0026
High-pressure gas	.1133	0.1085	0.0979	0.0907	0.0832	.0063
Pyroxylin and celluloide	.2000	0.5229	0.3433	0.2864	0.2226	.0064

TABLE 2-4 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Cellophane	.1965	0.8337	0.4546	0.4937	0.3305	.0201
Other basic industrial chemicals	.0462	-0.0629	-0.0672	-0.0358	-0.0371	.0002
Vegetable oils and fats	.0377	-0.1513	-0.1783	-0.0578	-0.0613	.0040
Animal oils and fats	.0378	0.0583	0.0551	0.0563	0.0533	.0115
Fish oils and fish scrap	.0003	-0.2639	-0.3586	-0.2108	-0.2672	.0055
Paints, varnishes and lacquers	.0570	-0.0515	-0.0543	-0.0245	-0.0252	.0065
Medicinal preparations	.1804	0.3070	0.2349	0.1979	0.1652	.0074
Soap and surface active agents	.2004	0.7654	0.4335	0.3360	0.2515	.0073
Toilet preparations and dentifrices	.4071	2.3299	0.6996	0.8026	0.4452	.0471
Printing ink	.2037	0.5244	0.3440	0.3028	0.2324	.0039
Agricultural chemicals	.2003	0.5363	0.3490	0.3080	0.2355	.0037
Matches	.0000	-0.0076	-0.0077	0.0000	0.0000	.0279
Other final chemical products	.1375	0.3022	0.2321	0.2044	0.1697	.0135
Petroleum refinery products	.0890	1.3331	0.5713	0.1171	0.5276	.4210
Coal dry distillation products	.0131	-0.0013	-0.0013	0.0196	0.0192	.0028
Briquettes	.0000	-0.0754	-0.0816	-0.0151	-0.0154	.0058
Miscellaneous antisepticized materials	.0476	0.0836	0.0771	0.0552	0.0523	.0064

TABLE 2-4 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Fire-clay goods	.1218	0.1229	0.1094	0.1021	0.0926	.0019
Other structural clay products	.0864	0.0855	0.0787	0.0740	0.0689	.0035
Plate and sheet glass	.1906	0.2023	0.2262	0.2194	0.1799	.0270
Other glass and glass products	.1606	0.2587	0.2055	0.1582	0.1366	.0063
Pottery, china and earthenware	.1326	0.1879	0.1581	0.1368	0.1219	.0046
Cement	.1047	0.0749	0.0697	0.0686	0.0642	.0103
Carbon products	.1058	0.1794	0.1521	0.1386	0.1217	.0168
Abrasives	.1799	0.2751	0.2157	0.2149	0.1769	.0016
Asbestos products	.0984	0.2617	0.2074	0.1326	0.1171	.0046
Cement products	.0192	-0.0575	-0.0610	-0.0346	-0.0358	.0042
Other non-metallic mineral products	.0987	0.1623	0.1396	0.1195	0.1068	.0070
Pig iron	.0168	0.0180	0.0176	0.0344	0.0332	.0034
Ferro-alloys	.0596	0.0605	0.0571	0.0707	0.0661	.0038
Steel ingots	.0135	-0.2229	-0.2868	-0.0267	-0.0274	.0036
Hot-rolled steel	.1263	2.3988	0.7057	1.1342	0.5314	.0039
Steel pipe and tubing	.1235	0.4420	0.3065	0.2314	0.1879	.0044
Cold-finished and plated steel	.1449	0.9493	0.4869	0.3537	0.2613	.0042
Forged steel	.0000	-0.0558	-0.0591	-0.0271	-0.0278	.0057
Cast steel	.0000	-0.0143	-0.0145	-0.0059	-0.0060	.0064
Cast iron pipe and tubing	.0000	-0.0170	-0.0173	-0.0100	-0.0101	.0071

TABLE 2-4 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Cast and forged materials for machinery (ferrous)	.0790	0.1553	0.1344	0.1044	0.0945	.0011
Copper	.0693	0.9955	0.4988	0.3801	0.2754	.0080
Lead	.0004	-0.1256	-0.1437	-0.0511	-0.0539	.0050
Zinc	.0012	-0.0964	-0.1067	-0.0378	-0.0392	.0050
Aluminum	.0431	-0.0033	-0.0033	0.0406	0.0390	.0075
Other nonferrous metals	.0047	-0.0009	-0.0009	0.0151	0.0149	.0152
Rolled copper	.0657	0.1114	0.1002	0.0828	0.0765	.0021
Rolled aluminum	.1740	0.7290	0.4216	0.4387	0.3049	.0026
Cast and forged materials for machinery (nonferrous)	.0932	0.1393	0.1223	0.1128	0.1014	.0011
Other basic nonferrous metal products	.1042	0.5687	0.3625	0.3264	0.2460	.0035
Steel-frame structure	.0753	0.0674	0.0632	0.0602	0.0567	.0005
Other structural metal products	.1151	0.1446	0.1263	0.1149	0.1030	.0049
Metal products for home use	.1698	0.4119	0.2917	0.2845	0.2215	.0139
Metal tools	.1666	0.2498	0.1999	0.1857	0.1566	.0042
Firearms	.0000	-0.0206	-0.0211	-0.0090	-0.0091	.0437
Other metal products	.1303	0.1653	0.1418	0.1438	0.1257	.0058
Prime movers	.0570	0.0323	0.0313	0.0355	0.0343	.0052
Machine tools	.0808	0.0907	0.0831	0.0776	0.0720	.0044

TABLE 2-4 (Continued)

	A			B		
	t_j	f_j	u_j	f_j	u_j	e_j
Metal-working machinery	.0826	0.1097	0.0989	0.0937	0.0856	.0043
Agricultural machinery	.1783	0.5997	0.3748	0.3416	0.2546	.0043
Mining and construction machinery	.1159	0.1770	0.1503	0.1364	0.1200	.0043
Chemical equipment	.0995	0.1467	0.1279	0.1078	0.0973	.0043
Textile machinery	.1294	0.1880	0.1583	0.1474	0.1284	.0006
Special industrial machinery	.1391	0.2259	0.1843	0.1778	0.1509	.0029
Industrial vehicles	.2166	0.9056	0.4752	0.5250	0.3442	.0013
Other industrial machinery	.1027	0.1430	0.1251	0.1034	0.0937	.0045
General industrial machinery and equipment	.0732	0.0822	0.0760	0.0693	0.0648	.0043
Office machinery	.1441	0.2200	0.1803	0.1701	0.1454	.0036
Sewing machines	.1472	0.1929	0.1617	0.1471	0.1282	.0040
Refrigerators and washing machines	.0935	0.5433	0.3520	0.3772	0.2739	.1401
General machine parts	.1078	0.1347	0.1187	0.1147	0.1028	.0063
Generators	.1044	0.1935	0.1621	0.1352	0.1191	.0058
Transmission and distribution apparatus	.0761	0.0592	0.0559	0.0498	0.0474	.0068
Motors	.0544	0.0397	0.0381	0.0356	0.0343	.0057
Other heavy industrial machinery	.1075	0.1062	0.0960	0.0739	0.0688	.0000
Electric bulbs	.1311	0.1807	0.1531	0.1264	0.1122	.0019

TABLE 2-4 (Continued)

		A		B		
	t_i	f_i	u_i	f_i	u_i	e_i
Household electrical appliances	.1891	0.8911	0.4712	0.4552	0.3128	.0594
Miscellaneous light electrical appliances	.1042	0.1376	0.1209	0.1045	0.0946	.0000
Electronic tubes and apparatus	.1193	0.1590	0.1371	0.1192	0.1065	.0016
Telecommunications equipment and related products	.0313	0.0075	0.0074	0.0134	0.0133	.0049
Electric measuring instruments	.0903	0.2586	0.2055	0.1979	0.1652	.0719
Electric wire and cable	.0357	-0.0348	-0.0361	-0.0180	-0.0183	.0036
Steel ships	.0037	-0.1537	-0.1816	-0.0979	-0.1086	.0025
Wooden ships	.0102	0.0751	0.0699	0.0673	0.0631	.0430
Railroad equipment	.0859	0.1134	0.1018	0.0899	0.0825	.0092
Railroad equipment for industrial use	.0000	-0.1611	-0.1920	-0.0993	-0.1102	.0079
Motor vehicles	.3564	1.2818	0.5617	0.7547	0.4301	.0202
Three-wheeled cycles	.3636	3.2297	0.7635	0.9523	0.4877	.0178
Motorcycles	.1351	0.2742	0.2152	0.1902	0.1598	.0177
Bicycles and rear cars	.1920	0.4481	0.3094	0.2876	0.2233	.0091
Aircraft	.0001	-0.0383	-0.0398	-0.0282	-0.0290	.0151
Other transport equipment	.1224	0.2724	0.2141	0.1501	0.1305	.0089
Scientific instruments	.0687	0.0983	0.0895	0.0713	0.0665	.0195

TABLE 2-4 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Measuring instruments	.0874	0.1257	0.1116	0.1048	0.0949	.0178
Medical instruments	.1546	0.2338	0.1895	0.1822	0.1541	.0203
Sanitary goods	.2142	2.4353	0.7089	0.7789	0.4378	.0043
Cameras	.2092	0.5508	0.3552	0.3678	0.2689	.0776
Other photographic and optical instruments	.1747	0.2698	0.2125	0.1903	0.1598	.0019
Photographic sensitive materials	.2750	1.8031	0.6438	0.5561	0.3574	.0737
Watches and clocks	.2328	0.4490	0.3098	0.3339	0.2503	.0356
Toys and sporting and athletic goods (except rubber goods)	.2026	0.5024	0.3344	0.3143	0.2391	.0232
Musical instruments	.1706	0.8751	0.4667	0.5735	0.3645	.1452
Plastic products	.2655	0.6295	0.3863	0.3973	0.2843	.0057
Writing goods	.1932	0.3981	0.2847	0.2787	0.2179	.0129
Small personal effects	.1515	0.5345	0.3483	0.2830	0.2206	.0086
Other industrial products	.1074	0.1540	0.1335	0.0982	0.0894	.0123
Motion picture supply	.2478	0.7257	0.4205	0.4333	0.3023	.1201

TABLE 2-5

"MARGINAL" EFFECTIVE TARIFF PROTECTIVE RATES

(GRUBEL AND JOHNSON FORMULA)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Slaughtering and meat preparation	.0244	0.4941	0.3307	0.2507	0.2004	.0022
Canned meat products	.2456	-5.8258	1.2072	2.4201	0.7076	.0005
Meat products	.1105	0.0241	0.0235	0.0184	0.0180	.0050
Lard (refined)	.1266	5.1196	0.8365	0.7035	0.4129	.0163
Milk and dairy products	.1261	0.6919	0.4089	0.3789	0.2747	.0019
Canned vegetables and fruits	.1219	0.0655	0.0615	0.0452	0.0432	.0014
Other vegetables and fruit products	.1922	0.7551	0.4302	0.4850	0.3266	.0175
Canned sea foods	.1340	0.3142	0.2391	0.2116	0.1746	.0029
Processed sea foods (non-storable)	.0000	-0.1672	-0.2007	-0.1319	-0.1520	.0024
Processed sea foods (storable)	.1478	0.3348	0.2508	0.2441	0.1962	.0034
Fish and shellfish	.0734	-0.2627	-0.3563	-0.1486	-0.1746	.0010
Salted, dried and smoked fish products	.1609	0.3697	0.2699	0.2561	0.2039	.0014
Polished rice and other grains	.0000	-0.0083	-0.0084	-0.0030	-0.0030	-.1005
Flour manufacturing	.0664	1.7016	0.6298	0.2884	0.2238	.0047
Bread and confectionery	.1614	0.3986	0.2850	0.2744	0.2153	.0033
Sugar manufacturing	.9146	-30.4424	1.0339	2.5393	0.7174	.1434
Cooking oils and their products	.0909	2.3216	0.6989	0.5074	0.3366	.0039

TABLE 2-5 (Continued)

	A			B		
	t_j	f_j	u_j	f_j	u_j	e_j
Condiments	.1679	0.5105	0.3379	0.2898	0.2247	.0173
Noodles	.2368	0.9048	0.4750	0.5024	0.3344	.0072
Starches	.0252	0.1111	0.1000	0.0733	0.0683	.0011
Potato starch jelly and glucose	.2500	-1.6932	2.4425	9.3601	0.9034	.0053
Edible salt	.0000	-0.0305	-0.0315	-0.0273	-0.0281	.0004
Ice	.0000	-0.0048	-0.0048	-0.0035	-0.0035	.0313
Finished tea and coffee	.2678	0.9476	0.4865	0.5944	0.3728	.0056
Other food preparations	.2038	0.4395	0.3053	0.3567	0.2629	.0042
Prepared feeds	.0128	-0.0812	-0.0884	-0.0435	-0.0455	-.0056
Brewed *sake*	.0000	-0.0377	-0.0392	-0.0281	-0.0289	.6699
Synthetic *sake*	.0000	-0.0657	-0.0703	-0.0521	-0.0549	.5457
Beer	.4098	36.7907	0.9735	1.3135	0.5677	1.4295
Ethyl alcohol	.0000	-0.2362	-0.3094	-0.1901	-0.2348	.0483
Ethyl alcohol for liquor manufacturing	.0000	-0.2714	-0.3726	-0.2210	-0.2837	.0051
Other liquors	.6319	4.5634	0.8202	1.2061	0.5467	.5230
Soft drinks	.0933	0.0858	0.0790	0.0610	0.0575	.1243
Tobacco products	.0005	-0.0475	-0.0499	-0.0369	-0.0383	1.5435
Raw silk and spun silk yarn	.0905	0.5136	0.3393	0.3493	0.2588	.0222
Cotton yarn	.0062	-0.0094	-0.0095	-0.0063	-0.0064	.0079
Woolen yarn	.0068	-0.0103	-0.0104	-0.0068	-0.0068	.0066
Hemp yarn	.5000	-22.1117	1.0473	2.6283	0.7243	.0096

TABLE 2-5 (Continued)

	A			B		
	t_j	f_j	u_j	f_j	u_j	e_j
Rayon yarn	.5000	-8.0556	1.1417	2.8065	0.7372	.0146
Synthetic fiber yarns	.2500	1.9942	0.6660	0.9075	0.4757	.0040
Silk fabric	.1921	1.0921	0.5220	0.6225	0.3837	.0058
Rayon fabric	.1935	0.2880	0.2236	0.1716	0.1465	.0085
Cotton fabric	.0959	0.5860	0.3695	0.3867	0.2789	.0061
Narrow cotton fabric	.2080	0.9774	0.4942	0.5106	0.3380	.0079
Spun rayon fabric	.1527	-0.1038	-0.1159	-0.0741	-0.0880	.0071
Synthetic fiber fabrics	.1791	1.0824	0.5198	0.5482	0.3540	.0070
Woolen fabric	.2258	3.9947	0.7997	1.3863	0.5809	.0082
Hemp fabric	.1230	-0.3321	-0.4973	-0.2665	-0.3633	.0046

TABLE 2-5 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Yarn and fabric dyeing and finishing	.0000	-0.0890	-0.0977	-0.0601	-0.0640	.0102
Knitted fabric	.2760	1.6426	0.6215	0.7121	0.4159	.0076
Rope and fish net	.0609	0.0131	0.0129	0.0089	0.0088	.0043
Straw products	.0721	0.1208	0.1078	0.1116	0.1004	.0000
Rush products	.0000	-0.1451	-0.1697	-0.1114	-0.1254	.0000
Cotton and carpeting	.3026	7.4950	0.8882	1.5127	0.6020	.0081
Other fiber products	.1375	0.2317	0.1881	0.1338	0.1180	.0099
Wooden footwear	.0000	-0.2114	-0.2681	-0.1158	-0.1310	.0083
Leather footwear	.2826	1.0784	0.5188	0.4346	0.3029	.0071
Other footwear (except rubber footwear)	.1515	0.2926	0.2263	0.1365	0.1201	.0063
Wearing apparel	.2687	1.1773	0.5407	0.4290	0.3002	.0047
Ready-made household textile goods	.2349	0.7962	0.4432	0.3710	0.2706	.0068
Other ready-made textile products	.3110	1.4009	0.5835	0.6156	0.3810	.0100
Lumber	.0012	-0.0030	-0.0030	-0.0021	-0.0021	.0051
Plywood	.0687	0.1641	0.1409	0.1024	0.0929	.0113
Chips	.0000	-0.0158	-0.0160	-0.0117	-0.0118	.0139
Wooden products	.1521	0.5460	0.3531	0.3329	0.2497	.0259
Wooden furniture and fixtures	.2265	0.6462	0.3925	0.3712	0.2707	.0071
Metal furniture and fixtures	.1362	0.2260	0.1843	0.1429	0.1251	.0072
Dissolving pulp	.0248	0.0253	0.0247	0.0179	0.0176	.0109
Paper pulp	.0430	0.1158	0.1038	0.0659	0.0618	.0098

TABLE 2-5 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Western-type paper	.1266	0.5030	0.3347	0.2851	0.2218	.0090
Paperboard	.0943	0.3971	0.2842	0.1655	0.1420	.0113
Japanese-type paper	.1509	0.3974	0.2844	0.2549	0.2931	.0109
Fiberboard	.2000	0.6762	0.4034	0.3795	0.2751	.0048
Converted paper	.1814	0.9174	0.4784	0.3719	0.2711	.0099
Paper containers	.1318	0.2297	0.1868	0.1374	0.1208	.0100
Other paper articles	.1496	0.3803	0.2755	0.2507	0.2005	.0099
Newspapers	.0000	-0.0720	-0.0776	-0.0554	-0.0586	.0076
Other printing and publishing	.0041	-0.0617	-0.0658	-0.0497	-0.0523	.0075
Leather, and fur products (except apparel)	.1851	1.1649	0.5380	0.7650	0.4334	.0074
Leather products (except apparel)	.2487	0.9158	0.4780	0.4131	0.2923	.0066
Rubber products	.1147	0.2300	0.1870	0.1870	0.1531	.0091
Rubber footwear	.1739	0.3521	0.2604	0.2295	0.1867	.0075
Ammonia	.0000	-0.0351	-0.0364	-0.0197	-0.0201	.0021
Sulphuric acid	.0000	-0.0291	-0.0300	-0.0111	-0.0112	.0034
Carbide	.1666	1.2310	0.5517	0.2567	0.2042	.0041
Soda industrial chemicals	.3486	2.0516	0.6723	0.5350	0.3485	.0054
Tar chemicals (except petrochemicals)	.0778	0.1588	0.1370	0.1139	0.1022	.0031
Cyclic intermediates (except petrochemicals)	.1643	0.3946	0.2829	0.2462	0.1975	.0032

TABLE 2-5 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Methanol derivatives	.2000	0.9140	0.4775	0.4576	0.3139	.0032
Acetylene derivatives	.1954	1.1981	0.5450	0.5187	0.3415	.0028
Plasticizers	.0000	-0.2580	-0.3478	-0.1547	-0.1830	.0031
Fermentation chemicals (except petrochemicals)	.0000	-0.5692	-1.3217	-0.3857	-0.6279	.0063
Oil and fat industrial chemicals	.1758	1.3167	0.5683	0.5116	0.3384	.0032
Petrochemicals (except synthetic resin)	.0349	-0.0196	-0.0200	-0.0137	-0.0139	-.0072
Synthetic dyestuffs	.2076	0.0934	0.0854	0.0935	0.0855	.0032
Powders	.0500	0.0479	0.0457	0.0322	0.0312	.0096
Explosives	.0000	-0.0404	-0.0421	-0.0324	-0.0335	.0432
Artificial silk	.2800	5.5051	0.8462	0.9366	0.4836	.0082
Rayon	.1428	1.1983	0.5451	0.4134	0.2925	.0081
Synthetic resins for fiber	.0405	-0.0674	-0.0723	-0.0415	-0.0433	.0060
Vinylon	.0000	-0.1670	-0.2005	-0.1244	-0.1420	.0089
Nylon	.2310	1.0203	0.5050	0.4730	0.3211	.0081
Acrylonitril	.0000	-0.0615	-0.0655	-0.0460	-0.0482	.0080
Ester	.5000	1.9736	0.6637	0.8927	0.4716	.0081
Other synthetic fiber materials	.1585	0.3516	0.2601	0.1945	0.1628	.0075
Thermo-setting plastic	.1994	0.7035	0.4129	0.3746	0.2725	.0060
Vinyl chloride	.1676	0.3842	0.2775	0.2136	0.1760	.0060

TABLE 2-5 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Petroleum plastic	.1984	0.5168	0.3407	0.3134	0.2386	.0059
Other plastics	.1987	0.5213	0.3426	0.3051	0.2337	.0061
Ammonium fertilizers	.0000	-0.0603	-0.0642	-0.0370	-0.0384	.0039
Phosphate fertilizers	.0000	-0.0695	-0.0747	-0.0310	-0.0320	.0034
Calcium cyanamide	.0000	-0.2594	-0.3503	-0.2005	-0.2507	.0033
Other chemical fertilizers	.0000	-0.0655	-0.0701	-0.0387	-0.0402	.0024
Inorganic industrial chemicals	.0861	0.1722	0.1469	0.1117	0.1005	.0026
High-pressure gas	.1133	0.1661	0.1424	0.1087	0.0980	.0063
Pyroxylin and celluloide	.2000	0.5978	0.3741	0.3092	0.2362	.0064
Cellophane	.1965	0.7794	0.4380	0.4460	0.3084	.0201
Other basic industrial chemicals	.0462	-0.0021	-0.0021	-0.0015	-0.0015	.0002
Vegetable oils and fats	.0377	-0.1195	-0.1357	-0.0592	-0.0630	.0040
Animal oils and fats	.0378	0.0836	0.0771	0.0538	0.0510	.0115
Fish oils and fish scrap	.0003	-0.2035	-0.2555	-0.1685	-0.2027	.0055
Paints, varnishes and lacquers	.0570	-0.0228	-0.0234	-0.0160	-0.0163	.0065
Medicinal preparations	.1804	0.3395	0.2534	0.2082	0.1723	.0074
Soap and surface active agents	.2004	0.8127	0.4483	0.3387	0.2530	.0073
Toilet preparations and dentifrices	.4071	2.0811	0.6754	0.7012	0.4121	.0471

TABLE 2-5 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Printing ink	.2037	0.6422	0.3910	0.3505	0.2595	.0039
Agricultural chemicals	.2003	0.6063	0.3774	0.3278	0.2469	.0037
Matches	.0000	-0.0375	-0.0390	-0.0305	-0.0315	.0279
Other final chemical products	.1375	0.3092	0.2362	0.1948	0.1630	.0135
Petroleum refinery products	.0890	0.0483	0.0461	0.0403	0.0387	.4210
Coal dry distillation products	.0131	0.0665	0.0624	0.0275	0.0268	.0028
Briquettes	.0000	-0.0394	-0.0410	-0.0178	-0.0181	.0058
Miscellaneous antisepticized materials	.0476	0.2166	0.1780	0.0991	0.0902	.0064
Fire-clay goods	.1218	0.1823	0.1542	0.1388	0.1219	.0019
Other structural clay products	.0864	0.1241	0.1104	0.0943	0.0862	.0035
Plate and sheet glass	.1906	0.2868	0.2229	0.2052	0.1703	.0270
Other glass and glass products	.1606	0.3287	0.2474	0.1806	0.1529	.0063
Pottery, china and earthenware	.1326	0.2261	0.1844	0.1550	0.1342	.0046
Cement	.1047	0.2176	0.1787	0.1235	0.1099	.0103
Carbon products	.1058	0.2013	0.1675	0.1201	0.1072	.0168
Abrasives	.1799	0.2918	0.2259	0.2206	0.1807	.0016
Asbestos products	.0984	0.3478	0.2580	0.1481	0.1290	.0046
Cement products	.0192	-0.0231	-0.0236	-0.0172	-0.0175	.0042
Other non-metallic mineral products	.0987	0.1921	0.1612	0.1248	0.1109	.0070

TABLE 2-5 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Pig iron	.0168	0.1085	0.0979	0.0636	0.0598	.0034
Ferro-alloys	.0596	0.1553	0.1344	0.0736	0.0685	.0038
Steel ingots	.0135	-0.0821	-0.0894	-0.0234	-0.0239	.0036
Hot-rolled steel	.1263	2.4932	0.7137	1.1512	0.5351	.0039
Steel pipe and tubing	.1235	0.5152	0.3400	0.2366	0.1913	.0044
Cold-finished and plated steel	.1449	1.0341	0.5083	0.3613	0.2654	.0042
Forged steel	.0000	-0.0247	-0.0254	-0.0178	-0.0181	.0057
Cast steel	.0000	-0.0116	-0.0117	-0.0095	-0.0096	.0064
Cast iron pipe and tubing	.0000	-0.0153	-0.0155	-0.0128	-0.0129	.0071
Cast and forged materials for machinery (ferrous)	.0790	0.2040	0.1694	0.1176	0.1052	.0011
Copper	.0693	1.0105	0.5026	0.3541	0.2615	.0080
Lead	.0004	-0.0596	-0.0634	-0.0337	-0.0349	.0050
Zinc	.0012	-0.0073	-0.0073	-0.0043	-0.0043	.0050
Aluminum	.0431	0.0888	0.0816	0.0432	0.0414	.0075
Other nonferrous metals	.0047	0.0027	0.0027	0.0018	0.0018	.0152
Rolled copper	.0657	0.1725	0.1471	0.0968	0.0882	.0021
Rolled aluminum	.1740	0.8041	0.4457	0.4632	0.3165	.0026
Cast and forged materials for machinery (nonferrous)	.0932	0.1821	0.1540	0.1345	0.1186	.0011
Other basic nonferrous metal products	.1042	0.6409	0.3905	0.3447	0.2563	.0035

TABLE 2-5 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Steel-frame structures	.0753	0.0818	0.0756	0.0633	0.0595	.0005
Other structural metal products	.1151	0.1614	0.1390	0.1177	0.1053	.0049
Metal products for home use	.1698	0.3943	0.2828	0.2622	0.2077	.0139
Metal tools	.1666	0.2837	0.2210	0.1997	0.1665	.0042
Firearms	.0000	-0.1281	-0.1470	-0.0971	-0.1076	.0437
Other metal products	.1303	0.1685	0.1442	0.1398	0.1227	.0058
Prime movers	.0570	0.0440	0.0421	0.0304	0.0295	.0052
Machine tools	.0808	0.1018	0.0924	0.0798	0.0739	.0044
Metal-working machinery	.0826	0.1192	0.1065	0.0944	0.0862	.0043
Agricultural machinery	.1783	0.6193	0.3824	0.3376	0.2524	.0043
Mining and construction machinery	.1159	0.1856	0.1565	0.1334	0.1177	.0043
Chemical equipment	.0995	0.1703	0.1455	0.1134	0.1018	.0043
Textile machinery	.1294	0.2045	0.1697	0.1521	0.1320	.0006
Special industrial machinery	.1391	0.2369	0.1915	0.1781	0.1512	.0029
Industrial vehicles	.2166	0.9506	0.4873	0.5366	0.3492	.0013
Other industrial machinery	.1027	0.1761	0.1497	0.1157	0.1037	.0045
General industrial machinery and equipment	.0732	0.0929	0.0850	0.0692	0.0647	.0043
Office machinery	.1441	0.2274	0.1853	0.1684	0.1441	.0036

TABLE 2-5 (Continued)

		A		B		
	t_j	f_j	u_j	f_j	u_j	e_j
Sewing machines	.1472	0.1997	0.1664	0.1456	0.1271	.0040
Refrigerators and washing machines	.0935	0.0715	0.0667	0.0484	0.0462	.1401
General machine parts	.1078	0.1376	0.1210	0.1106	0.0996	.0063
Generators	.1044	0.2116	0.1746	0.1369	0.1204	.0058
Transmission and distribution apparatus	.0761	0.0738	0.0687	0.0515	0.0490	.0068
Motors	.0544	0.0567	0.0537	0.0382	0.0368	.0057
Other heavy industrial machinery	.1075	0.1426	0.1248	0.0836	0.0771	.0000
Electric bulbs	.1311	0.2244	0.1832	0.1404	0.1231	.0019
Household electric appliances	.1891	0.5964	0.3736	0.2956	0.2281	.0594
Miscellaneous light electrical appliances	.1042	0.1659	0.1423	0.1142	0.1025	.0000
Electronic tubes and apparatus	.1193	0.1820	0.1540	0.1254	0.1115	.0016
Telecommunications equipment and related products	.0313	0.0142	0.0140	0.0109	0.0107	.0049
Electric measuring instruments	.0903	0.1044	0.0945	0.0769	0.0714	.0719
Electric wire and cable	.0357	-0.0146	-0.0148	-0.0111	-0.0112	.0036
Steel ships	.0037	-0.1309	-0.1506	-0.0934	-0.1030	.0025
Wooden ships	.0102	-0.0010	-0.0010	-0.0008	-0.0008	.0430
Railroad equipment	.0859	0.1247	0.1108	0.0845	0.0779	.0092

TABLE 2-5 (Continued)

		A		B		
	t_i	f_i	u_i	f_i	u_i	e_i
Railroad equipment for industrial use	.0000	-0.1521	-0.1794	-0.1029	-0.1147	.0079
Motor vehicles	.3564	1.2191	0.5493	0.7031	0.4128	.0202
Three-wheeled cycles	.3636	3.1370	0.7582	0.9019	0.4742	.0178
Motorcycles	.1351	0.2477	0.1985	0.1615	0.1390	.0177
Bicycles and rear cars	.1920	0.4501	0.3104	0.2761	0.2164	.0091
Aircraft	.0001	-0.0467	-0.0490	-0.0394	-0.0410	.0151
Other transport equipment	.1224	0.2773	0.2171	0.1388	0.1219	.0089
Scientific instruments	.0687	0.0720	0.0671	0.0475	0.0454	.0195
Measuring instruments	.0874	0.1031	0.0935	0.0812	0.0751	.0178
Medical instruments	.1546	0.2133	0.1758	0.1610	0.1386	.0203
Sanitary goods	.2142	2.5510	0.7183	0.7928	0.4422	.0043
Cameras	.2092	0.3643	0.2670	0.2375	0.1919	.0776
Other photographic and optical instruments	.1747	0.2845	0.2215	0.1919	0.1610	.0019
Photographic sensitive materials	.2750	1.3588	0.5760	0.4056	0.2885	.0737
Watches and clocks	.2328	0.3800	0.2753	0.2753	0.2158	.0356
Toys and sporting and athletic goods (except rubber goods)	.2026	0.4608	0.3154	0.2751	0.2158	.0232
Musical instruments	.1706	0.4030	0.2872	0.2591	0.2058	.1452
Plastic products	.2655	0.6608	0.3978	0.4026	0.2870	.0057
Writing goods	.1932	0.3890	0.2801	0.2630	0.3082	.0129

TABLE 2-5 (Continued)

	A			B		
	t_j	f_j	u_j	f_j	u_j	e_j
Small personal effects	.1515	0.5356	0.3488	0.2705	0.2129	.0086
Other industrial products	.1074	0.1538	0.1333	0.0889	0.0816	.0123
Motion picture supply	.2478	0.4559	0.3131	0.2610	0.2070	.1201

TABLE 2-6

NOMINAL TARIFF RATES FOR 5-DIGIT AND 6-DIGIT INDUSTRIES

5-digit code	6-digit code	Description	$\bar{t}$	t
01111		Rice	0.0000	
	011111	Rice		0.0000
	011112	Rice straw		0.0000
01112		Barley, wheat and other major grains	0.0000	
	011121	Barley (domestic)[1]		0.0000
	011122	Barley (imported)		0.0000
	011123	Naked barley		0.0000
	011124	Wheat (domestic)[1]		0.0000
	011125	Wheat (imported)		0.0000
	011129	Other grains		0.0258
01121		Potato	0.0000	
	011211	Sweet potato		0.0000
	011212	White potato		0.0000
01122		Miscellaneous cereals	0.0119	
	011221	Corn (imported)		0.0116
	011229	Other cereals		0.0313
01123		Pulses	0.0794	
	011231	Soybean (domestic)[1]		0.0786
	011232	Soybean (imported)		0.0786
	011239	Other pulses		0.0843
01124	011240	Vegetables	0.0928	
01130		Fruits	0.5652	
	011301	Citrus fruits		0.1116
	011302	Apples		0.0000
	011309	Other fruits		0.6124
01141		Oilseeds	0.0239	
	011411	Rapeseed		0.1191
	011419	Other oilseeds		0.0096
01142	011420	Field crops for sugar	0.0000	
01143		Field crops for flavorings (beverage)	0.0808	
	011431	Coffee and cocoa beans		0.0842
	011439	Other		0.0498
01149		Other cultivated food products	0.0303	
	011491	Animal feeds		0.0000
	011492	Seasonings		0.0175
	011499	Other		0.1535

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	f	t
01151	011510	Field crops for matting	0.0000	
01152		Field crops for textile production	0.0000	
	011521	Cotton		0.0000
	011522	Other		0.0000
01153	011530	Leaf tobacco	0.0000	
01159		Other non-food cultivated products	0.0022	
	011591	Seeds and seedlings		0.0132
	011592	Natural fertilizers		0.0000
	011593	Natural rubber		0.0000
	011599	Other		0.0295
01161		Dairy farming	0.0000	
	011611	Milk production		0.0000
	011612	Calf raising (for slaughter)		0.0000
	011619	Other dairy products		0.0000
01162		Poultry farming	0.0067	
	011621	Eggs		0.2413
	011622	Meat		0.0000
	011629	Other poultry products		0.0000
01163		Hog raising	0.0000	
	011631	Hogs		0.0000
	011639	Hog products		0.0000
01164		Cattle raising (for slaughter)	0.0000	
	011641	Cattle		0.0000
	011649	Other meat cattle products		0.0000
01169		Other livestock breeding, except for fiber	0.0069	
	011691	Meat production		0.0000
	011699	Other livestock products		0.0211
01170		Livestock breeding for fiber	0.0000	
	011701	All except wool		0.0000
	011702	Wool		0.0000
01180		Sericulture	0.0000	
	011801	Silk cocoon cultivation		0.0000
	011802	Sericulture by-products		0.0000
01200	012000	Agricultural services	0.0000	
02111	021110	Forestry	0.0000	

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
02112	021120	Uncultivated forest materials	0.0163	
02120		Charcoal and firewood	0.0000	
	021201	Charcoal		0.0000
	021202	Firewood		0.0000
02200		Logs	0.0000	
	022001	Logs (domestic)[1]		0.0000
	022002	Logs (imported)		0.0000
03000	030000	Game	0.1111	
04101	041010	Coastal-water fishing	0.0544	
04102	041020	Ocean and off-shore-water fishing	0.1157	
04103	041030	Shallow coastal water culture	0.0033	
04200	042000	Whaling	0.0014	
04301	043010	Inland-water fishing	0.0000	
04302	043020	Inland-water culture	0.0794	
11010		Coal	0.0000	
	110101	Coking coal (domestic)[1]		0.0000
	110102	Coking coat (imported)		0.0000
	110103	Coal for general use		0.0000
	110104	Anthracite (domestic)[1]		0.0000
	110105	Anthracite (imported)		0.0000
11020	110200	Lignite	0.0000	
12100		Iron ore	0.0000	
	121001	Iron ore (domestic)[1]		0.0000
	121002	Iron ore (imported)		0.0000
	121003	Iron sand		0.0000
12201	122010	Copper ore	0.0000	
12202	122020	Lead ore	0.0000	
12203	122030	Zinc ore	0.0000	
12209	122090	Other nonferrous metal ores	0.0000	
13010		Crude petroleum	0.1237	
	130101	Crude petroleum (domestic)[1]		0.1237

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
	130102	Crude petroleum (imported)		0.1237
13020	130200	Natural gas	0.0000	
14001	140010	Limestone	0.0000	
14002	140020	Gravel and building stone	0.0000	
14003	140030	Materials for ceramics	0.0086	
19100		Crude salt	0.0000	
	191001	Crude salt (domestic)[1]		0.0000
	191002	Crude salt (imported)		0.0000
19901	199010	Sulphur ore	0.0995	
19902	199020	Sulfide ore	0.0000	
19909	199090	Other non-metal ores	0.0294	
20110		Slaughtering and meat preparation	0.0244	
	201101	Quarters		0.1549
	201102	Hides and skins		0.0080
	201103	Slaughtering by-products		0.0029
	201104	Poultry meat		0.2000
	201105	Poultry killing by-products		0.0110
20121	201210	Canned meat products	0.2456	
20122	201220	Meat products	0.1105	
20123	201230	Lard (refined)	0.1266	
20200		Dairy products	0.1261	
	202001	Drinking milk		0.0000
	202002	Other dairy products		0.1261
20301	203010	Canned fruits and vegetables	0.1219	
20309	203090	Other vegetable and fruit products	0.1922	
20401	204010	Canned sea foods	0.1340	
20402	204020	Processed sea foods, nonstorable	0.0000	
20403	204030	Processed sea foods, storable	0.1478	
20404	204040	Refrigerated fish and shellfish	0.0734	
20405	204050	Salted, dried, and smoked fish products	0.1609	

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
20501		Grain cleaning	0.0000	
	205011	Cleaned rice (domestic)[1]		0.0000
	205012	Cleaned rice (imported)		0.0000
	205019	Other cleaned grains		0.0303
20502		Flour manufacturing	0.0664	
	205021	Wheat flour		0.1079
	205029	Other flours		0.0038
20600		Bread and confectionery	0.1614	
	206001	Bread		0.2500
	206002	Confectionery		0.1613
20700		Sugar manufacturing	0.9146	
	207001	Refined sugar (domestic materials)		0.0000
	207002	Refined sugar (imported materials)		0.0004
	207003	By-products of sugar manufacture		0.9472
20911		Cooking oils and their by-products	0.0909	
	209111	Rapeseed cooking oil		0.0000
	209112	Soybean cooking oil		0.0000
	209119	Other cooking oils and their pdts.		0.0909
20912	209120	Condiments	0.1679	
20913	209130	Noodles	0.2368	
20914		Starches	0.0252	
	209141	Potato starch		0.0000
	209142	Other starches and less		0.0252
20915	209150	Glutinous potato starch jelly and glucose	0.2500	
20916	209160	Edible salt	0.0000	
20917	209170	Ice	0.0000	
20918	209180	Finished tea and coffee	0.2678	
20919	209190	Other food preparations	0.2038	
20920	209200	Prepared feeds	0.0128	
21101	211010	Brewed sake	0.0000	
21102	211020	Synthetic sake	0.0000	

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
21103	211030	Beer	0.4098	
21104	211040	Ethyl alcohol	0.0000	
21105	211050	Ethyl alcohol for liquor manufacturing	0.0000	
21109	211090	Other liquors	0.6319	
21400	214000	Soft drinks	0.0933	
22000	220000	Tobacco products	0.0005	
23010		Raw silk and spun silk yarn	0.0905	
	230101	Raw silk and related products		0.0832
	230102	Spun silk yarn		0.1490
23020	230200	Cotton yarn	0.0062	
23030	230300	Wool yarn	0.0068	
23040	230400	Hemp yarn	0.5000	
23050	230500	Rayon yarn	0.5000	
23060		Synthetic fiber yarns	0.2500	
	230601	Vinylon yarn		0.0000
	230602	Nylon yarn		0.0000
	230603	Acrilonitrilic fiber yarn		0.0000
	230604	Ester fiber yarn		0.0000
	230609	Other synthetic fiber yarns		0.2500
23111	231110	Silk fabric	0.1921	
23112	231120	Rayon fabric	0.1935	
23121	231210	Cotton fabric	0.0959	
23122	231220	Narrow cotton fabric	0.2080	
23123	231230	Spun rayon fabric	0.1527	
23130	231300	Synthetic fiber fabric	0.1791	
23140		Wool fabric	0.2258	
	231401	Woolen textiles		0.2274
	231402	Woolen felt		0.1463
23150	231500	Linen fabric	0.1230	

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
23160	231600	Yarn and fabric dyeing	0.0000	
23200	232000	Knitted fabric	0.2760	
23300	233000	Rope and fish net	0.0609	
23901	239010	Straw products	0.0721	
23902	239020	Rush products	0.0000	
23903	239030	Cotton and carpeting	0.3026	
23909	239090	Other fiber products	0.1375	
24101	241010	Wooden footwear	0.0000	
24102	241020	Leather footwear	0.2826	
24103	241030	Other footwear, except rubber	0.1515	
24109	241090	Footwear repair	0.0000	
24300	243000	Wearing apparel	0.2687	
24401	244010	Ready-made household textile products	0.2349	
24409	244090	Other ready-made textile products	0.3110	
25101	251010	Lumber	0.0012	
25102	251020	Plywood	0.0687	
25103	251030	Chips	0.0000	
25200	252000	Wood products	0.1521	
26001	260010	Wooden furniture and fixtures	0.2265	
26002	260020	Metal furniture and fixtures	0.1362	
26009	260090	Furniture repair	0.0000	
27111	271110	Dissolving pulp	0.0248	
27112	271120	Paper pulp	0.0430	
27121	271210	Western-type paper	0.1266	
27122	271220	Paperboard	0.0943	

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
27123	271230	Japanese-type paper	0.1509	
27124	271240	Fiberboard	0.2000	
27201	272010	Converted paper	0.1814	
27202	272020	Paper containers	0.1318	
27203	272030	Other paper articles	0.1496	
28001	280010	Newspapers	0.0000	
28009	280090	Other printing and publishing	0.0041	
29100	291000	Leather, and fur products (except apparel)	0.1851	
29300	293000	Leather products (except apparel)	0.2487	
30001		Rubber products	0.1147	
	300011	Tires and tubes		0.0769
	300019	Other rubber products		0.1208
30002	300020	Rubber footwear	0.1739	
31111	311110	Ammonia	0.0000	
31112	311120	Sulphuric acid	0.0000	
31113	311130	Carbide	0.1666	
31114		Soda industrial chemicals	0.3486	
	311141	Soda ask		0.3600
	311142	Caustic soda		0.0000
	311143	Liquid chlorine		0.0000
	311144	Hydrochloric acid		0.0000
	311145	High bleaching powder		0.0000
	311146	Bleaching powder		0.0000
	311149	Other soda industrial chemicals		0.2222
31121		Tar chemicals	0.0778	
	311211	Pure benzol		0.0630
	311212	90% benzol		0.0000
	311213	Pure toluol		0.0931
	311214	Creosote oil		0.0000
	311215	Pitch		0.0000
	311216	Cracked phenol		0.0000
	311217	Refined naphthalene		0.0000

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
	311219	Other tar chemicals		0.0806
31122		Cyclic intermediates (except petrochemicals)	0.1643	
	311221	Synthetic phenol		0.0000
	311222	Aniline		0.1891
	311223	Phthalic anhydride		0.0386
	311229	Other cyclic intermediates		0.1659
31123		Methanol derivatives	0.2000	
	311231	Refined methanol		0.0000
	311232	Formalin		0.0000
	311239	Other methanol derivatives		0.2000
31124		Acetylene derivatives	0.1954	
	311241	Synthetic acetic acid		0.0000
	311249	Other acetylene derivatives		0.1954
31125	311250	Plasticizers	0.0000	
31126		Fermentation chemicals (except petrochemicals)	0.0000	
	311261	Acetone (fermentation)		0.0000
	311262	Butanol (fermentation)		0.0000
31127		Oil and fat industrial chemicals	0.1758	
	311271	Refined glycerine		0.1800
	311279	Other oil and fat industrial chemicals		0.1736
31128		Petrochemicals (except synthetic resin)	0.0349	
	311281	Pure benzol (petroleum)		0.0000
	311282	Pure toluol (petroleum)		0.0000
	311283	Phthalic anhydride (petroleum)		0.0000
	311284	Acetone (petroleum)		0.3232
	311285	Butanol (petroleum)		0.0000
	311286	Synthetic rubber		0.0007
	311289	Other petrolchemicals (except synthetic resin)		0.0915
31130		Synthetic dyestuffs	0.2076	
	311301	Direct dye		0.2316
	311302	Acid dye		0.2453
	311309	Other synthetic dyestuffs		0.1946
31141		Powders	0.0500	
	311411	Powders for industrial use		0.0769
	311419	Powders for other uses		0.0447

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
31142	311420	Explosives	0.0000	
31151	311510	Artificial silk	0.2800	
31152	311520	Rayon	0.1428	
31161		Synthetic resins for fiber	0.0405	
	311611	Cellulose acetate		0.0000
	311612	Vinyl acetate		0.0000
	311613	Polyvinyl alcohol		0.1818
	311619	Other synthetic resins for fiber		0.0367
31162	311620	Vinylon	0.0000	
31163	311630	Nylon	0.2310	
31164	311640	Acrylonitril	0.0000	
31165	311650	Ester	0.5000	
31169	311690	Other synthetic fiber materials	0.1585	
31171	311710	Thermo-setting plastic	0.1994	
31172	311720	Vinyl chloride	0.1676	
31173	311730	Petroleum plastic	0.1984	
31179	311790	Other plastics	0.1987	
31181		Ammonium fertilizers	0.0000	
	311811	Ammonium sulfate		0.0000
	311812	Urea		0.0000
	311813	Ammonium chloride		0.0000
	311814	Ammonium nitrate		0.0000
	311815	Highly synthetic fertilizer		0.0000
31182		Phosphate fertilizers	0.0000	
	311821	Calcium super-phosphate		0.0000
	311822	Fused phosphate		0.0000
	311829	Other phosphate fertilizers		0.0000
31183	311830	Calcium cyanamide	0.0000	
31189	311890	Other chemical fertilizers	0.0000	
31191		Inorganic industrial chemicals	0.0861	
	311911	Carbon bisulfide		0.0000

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
	311912	Zinc oxide		0.1250
	311913	Titanium oxide		0.1509
	311914	Carbon black		0.2004
	311919	Other inorganic industrial chemicals		0.0780
31192	311920	High-pressure gas	0.1133	
31193		Pyroxylin and celluloide	0.2000	
	311931	Pyroxylin		0.2004
	311932	Celluloide		0.1964
31194	311940	Cellophane	0.1965	
31199	311990	Other basic industrial chemicals	0.0462	
31201	312010	Vegetable oils and fats	0.0377	
31202	312020	Animal oils and fats	0.0378	
31203	312030	Fish oils and fish scrap	0.0003	
31300	313000	Paints, varnishes and lacquers	0.0570	
31910	319100	Medicinal preparations	0.1804	
31921		Soap and surface active agents	0.2004	
	319211	Soap		0.2592
	319212	Surface active agents		0.1957
31922	319220	Toilet preparations and dentifrices	0.4071	
31923	319230	Printing ink	0.2037	
31924	319240	Agricultural chemicals	0.2003	
31925	319250	Matches	0.0000	
31929	319290	Other final chemical products	0.1375	
32100		Petroleum refinery products	0.0890	
	321001	Gasoline		0.1778
	321002	Jet fuel		0.0000
	321003	Kerosene		0.0866
	321004	Light oil		0.0256
	321005	Heavy oil A		0.0254
	321006	Heavy oil B		0.0883
	321007	Heavy oil C		0.1082
	321009	Other petroleum refinery products		0.0954

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
32911		Coal dry distillation products	0.0131	
	329111	Coke		0.0000
	329119	Other		0.0491
32912	329120	Briquettes	0.0000	
32920	329200	Miscellaneous antisepticized materials	0.0476	
33101		Fire-clay goods	0.1218	
	331011	Fire brick		0.1127
	331019	Other fire-clay goods		0.1476
33109	331090	Other structural clay products	0.0864	
33201	332010	Plate and sheet glass	0.1906	
33202	332020	Other glass and glass products	0.1606	
33300	333000	Pottery, china and earthenware	0.1326	
33400	334000	Cement	0.1047	
33901	339010	Carbon products	0.1058	
33902	339020	Abrasives	0.1799	
33903	339030	Asbestos products	0.0984	
33904	339040	Cement products	0.0192	
33909	339090	Other non-metal mineral products	0.0987	
34110	341100	Pig iron	0.0168	
34120	341200	Iron scrap	0.0005	
34130	341300	Ferro-alloys	0.0596	
34140	341400	Steel ingots	0.0135	
34150		Hot-rolled steel	0.1263	
	341501	Hot-rolled steel (ordinary steel)		0.0897
	341502	Hot-rolled steel (special steel)		0.1345
34160		Steel pipe and tubing	0.1235	
	341601	Steel pipe and tubing (ordinary steel)		0.0949
	341602	Steel pipe and tubing (special steel)		0.1397

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
34170		Cold-finished and plated steels	0.1449	
	341701	Cold-finished steel		0.1428
	341702	Plated steel		0.1459
34181	341810	Forged steel	0.0000	
34182	341820	Cast steel	0.0000	
34183	341830	Cast iron pipe and tubing	0.0000	
34184	341840	Cast and forged materials for machinery (ferrous)	0.0790	
34211		Copper	0.0693	
	342111	Electrolytic copper		0.0693
34212		Lead	0.0004	
	342121	Lead		0.0004
	342122	Regenerated lead		0.0000
34213		Zinc	0.0012	
	342131	Zinc		0.0012
	342132	Regenerated zinc		0.0000
34214		Aluminum	0.0431	
	342141	Aluminum		0.0354
	342142	Regenerated aluminum		0.1273
34215	342150	Nonferrous metal scrap	0.0454	
34219	342190	Other nonferrous metals	0.0047	
34220	342200	Rolled copper	0.0657	
34230	342300	Rolled aluminum	0.1740	
34291	342910	Cast and forged materials for machinery (nonferrous)	0.0932	
34299	342990	Other basic nonferrous metal products	0.1042	
35011	350110	Steel-frame structures	0.0753	
35012	350120	Other structural metal products	0.1151	
35021	350210	Metal products for home use	0.1698	
35022	350220	Metal tools	0.1666	

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
35023	350230	Firearms	0.0000	
35024	350240	Other metal products	0.1303	
35029	350290	Repair of metal products	0.0000	
36011	360110	Prime movers	0.0570	
36019	360190	Repair of prime movers	0.0000	
36021	360210	Machine tools	0.0808	
36022	360220	Metalworking machinery	0.0826	
36029	360290	Repair of metalworking machinery and machine tools	0.0000	
36031	360310	Agricultural machinery	0.1783	
36032	360320	Mining and construction machinery	0.1159	
36033	360330	Chemical equipment	0.0995	
36034	360340	Textile machinery	0.1294	
36035	360350	Special industrial machinery	0.1391	
36036	360360	Industrial vehicles	0.2166	
36037	360370	Other industrial machinery	0.1027	
36039	360390	Repair of machinery in class 3603	0.0000	
36041	360410	General industrial machinery and equipment	0.0732	
36049	360490	Repair of same	0.0000	
36051	360510	Office machinery	0.1441	
36059	360590	Office machinery repair	0.0000	
36061	360610	Sewing machines	0.1472	
36062	360620	Refrigerators and washing machines	0.0935	
36069	360690	Repair of machinery in group 3606	0.0000	

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
36070	360700	General machine parts	0.1078	
37011	370110	Generators	0.1044	
37012	370120	Transmission and distribution apparatus	0.0761	
37013	370130	Motors	0.0544	
37014	370140	Other heavy industrial electrical machinery	0.1075	
37019	370190	Repair of machinery in class 3701	0.0000	
37021	370210	Electric bulbs	0.1311	
37022	370220	Household electrical appliances	0.1891	
37029	370290	Repair of household appliances	0.0000	
37031	370310	Miscellaneous light electrical appliances	0.1042	
37032	370320	Electronic tubes and electron application apparatus	0.1193	
37033	370330	Telecommunications equipment and related products	0.0313	
37034	370340	Electric measuring instruments	0.0903	
37035		Electric wire and cable	0.0357	
	370351	Electric wire		0.0351
	370352	Electric cable		0.0960
37039	370390	Repair of products in class 3703	0.0000	
38101	381010	Steel ships	0.0037	
38102	381020	Wooden ships	0.0102	
38109	381090	Ship repair	0.0000	
38201	382010	Railroad equipment	0.0859	
38202	382020	Railroad equipment for industrial use	0.0000	
38209	382090	Repair of railroad equipment	0.0000	

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	E	t
38300	383000	Motor vehicles	0.3564	
38400	384000	Repair of motor vehicles	0.0000	
38501	385010	Three-wheeled cycles	0.3636	
38502	385020	Motor cycles	0.1351	
38503	385030	Bicycles and rear cars	0.1920	
38509	385090	Repair of cycles	0.0000	
38600	386000	Aircraft	0.0001	
38901	389010	Other transport equipment	0.1224	
38909	389090	Repair of miscellaneous transport equipment	0.0000	
39101	391010	Scientific instruments	0.0687	
39102	391020	Measuring instruments	0.0874	
39103	391030	Medical instruments	0.1546	
39104	391040	Sanitary goods	0.2142	
39109	391090	Repair of instruments in class 3910	0.0000	
39201	392010	Cameras	0.2092	
39202	392020	Other photographic and optical instruments	0.1747	
39203	392030	Photographic sensitive materials	0.2750	
39209	392090	Repair of photographic and optical instruments	0.0000	
39301	393010	Watches and clocks	0.2328	
39309	393090	Watch and clock repair	0.0000	
39901	399010	Toys and sporting and athletic goods (excluding rubber goods)	0.2026	
39902	399020	Musical instruments	0.1706	

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	$\underline{t}$
39903	399030	Plastic products	0.2655	
39904	399040	Writing goods	0.1932	
39905	399050	Small personal effects	0.1515	
39906	399060	Other industrial products	0.1074	
39909	399090	Musical instrument repair	0.0000	
40011	400110	New residential construction (wooden)	0.0000	
40012	400120	New residential construction (other)	0.0000	
40021	400210	New non-residential construction (wood)	0.0000	
40022	400220	New non-residential construction (other)	0.0000	
40030	400300	Repair of buildings	0.0000	
40041	400410	Public utility construction, except items below	0.0000	
40042	400420	Public utility construction: agricultural, forest road, forestry conservation, and natural disaster restoration construction	0.0000	
40090	400900	Other construction	0.0000	
51101	511010	Electric power	0.0000	
51102	511020	Privately generated power	0.0000	
51200	512000	Gas supply and distribution	0.0000	
52001	520010	Water supply	0.0000	
52002	520020	Sewage disposal	0.0000	
52003	520030	Other sanitary services	0.0000	
61100	611000	Wholesale trade	0.0000	
61200	612000	Retail trade	0.0000	
62000	620000	Financial business	0.0000	

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
63001	630010	Life insurance	0.0000	
63002	630020	Casualty insurance	0.0000	
64011	640110	Real estate agencies	0.0000	
64012	640120	Real estate renting	0.0000	
64020	640200	House renting	0.0000	
71100		National railway transportation	0.0000	
	711001	Passenger transportation		0.0000
	711002	Freight transportation		0.0000
71210		Local railway and tramway transport	0.0000	
	712101	Passenger transportation		0.0000
	712102	Freight transportation		0.0000
71220	712200	Road passenger transportation	0.0000	
71410	714100	Road freight transportation	0.0000	
71420	714200	Road transport facility services	0.0000	
71500	715000	Ocean transport	0.0000	
71601		Coastal and inland water transportation	0.0000	
	716011	Passenger transportation		0.0000
	716012	Freight transportation		0.0000
71602	716020	Coastal and inland water transport facility services	0.0000	
71700	717000	Air transport	0.0000	
71900	719000	Other transport services	0.0000	
72000	720000	Storage facility services	0.0000	
73001	730010	Telegraph and telephone service	0.0000	
73002	730020	Postal service	0.0000	
81000	810000	Government services	0.0000	
82100	821000	Educational services	0.0000	
82200	822000	Health services	0.0000	

TABLE 2-6 (Continued)

5-digit code	6-digit code	Description	$\bar{t}$	t
82900	829000	Other community services	0.0000	
83001	830010	Advertising agencies	0.0000	
83009	830090	Other business services	0.0000	
84001	840010	Broadcasting	0.0000	
84002	840020	Motion picture supply	0.2478	
84009	840090	Other recreation services	0.0000	
85010	850100	Eating and drinking places	0.0000	
85090	850900	Other personal services	0.0000	
86000	860000	Office supplies	0.0000	
87000	870000	Packaging materials	0.0000	
90000	900000	Activities not adequately described	0.0861[2]	

[1] Where imports of a commodity are separately reported, the rate of tariff collections on the imported good are taken as the rate also applying to the domestic industry.

[2] The simple average rate of tariff collections on all goods and services. (See discussion above, page 86, footnote 1.)

TABLE 2-7

AVERAGE AND STANDARD
DEVIATION: NOMINAL TARIFF RATE

Average	Standard Deviation	Weighted Average	Standard Deviation
0.1278	0.1186	0.1271	0.1213

Subgroup Averages (Weighted)

	Consumer Goods		Producer Goods			
Overall	Food Products	Other	Textiles	Chemicals	Machinery	Other
0.1271	0.1232	0.1947	0.1510	0.1341	0.0879	0.0815

TABLE 2-8

AVERAGE AND STANDARD
DEVIATION: NET EXCISE RATE

Average	Standard Deviation	Weighted Average	Standard Deviation
0.0345	0.1582	0.0642	0.2495

Subgroup Averages (Weighted)

	Consumer Goods		Producer Goods			
Overall	Food Products	Other	Textiles	Chemicals	Machinery	Other
0.0642	0.2536	0.0199	0.0078	0.0038	0.0056	0.0466

TABLE 2-9

AVERAGE AND STANDARD DEVIATION:
"ORDINARY" EFFECTIVE PROTECTIVE RATE

	A		B	
	f_j	u_j	f_j	u_j
Average	0.4477	0.2206	0.3086	0.1429
Standard Deviation	1.6129	0.3955	1.0191	0.2030
Weighted Average	0.5843	0.2390	0.2810	0.1625
Standard Deviation	1.3285	0.2779	0.5990	0.1768
Subgroup Averages (Weighted)				
Overall	0.5843	0.2390	0.2810	0.1625
CONSUMER GOODS				
Food Products	0.7343	0.2196	0.3422	0.1475
Other	0.5830	0.2973	0.3004	0.2021
PRODUCER GOODS				
Textiles	0.9127	0.3777	0.5358	0.2630
Chemicals	0.7715	0.2386	0.2233	0.1421
Machinery	0.1333	0.1078	0.0906	0.0788
Other	0.5560	0.2162	0.2488	0.1480

TABLE 2-10

AVERAGE AND STANDARD DEVIATION:
EPR ADJUSTED FOR EXPORTS

	A		B	
	f_j	u_j	f_j	u_j
Average	0.3243	0.1800	0.2557	0.1179
Standard Deviation	1.5239	0.3822	0.9741	0.1941
Weighted Average	0.4242	0.2027	0.2298	0.1388
Standard Deviation	1.1912	0.2575	0.5577	0.1626
Subgroup Averages (Weighted)				
Overall	0.4242	0.2027	0.2298	0.1388
CONSUMER GOODS				
Food Products	0.7235	0.2100	0.3303	0.1418
Other	0.4614	0.2508	0.2467	0.1710
PRODUCER GOODS				
Textiles	0.4012	0.3076	0.4154	0.2144
Chemicals	0.5587	0.2103	0.1887	0.1249
Machinery	0.1111	0.0912	0.0758	0.0667
Other	0.3331	0.1735	0.1794	0.1214

TABLE 2-11

AVERAGE AND STANDARD DEVIATION:
EPR INCLUDING EXCISES AND SUBSIDIES

	A		B	
	f_j	u_j	f_j	u_j
Average	0.3264	0.1465	0.2165	0.0800
Standard Deviation	1.3807	0.6951	1.1281	0.4049
Weighted Average	0.3880	0.1841	-0.0638	0.0532
Standard Deviation	1.0947	1.1545	1.5495	0.6430
Subgroup Averages (Weighted)				
Overall	0.3880	0.1841	-0.0638	0.0532
CONSUMER GOODS				
Food Products	-0.0073	0.2682	-1.4342	-0.2101
Other	0.4902	0.2547	0.2482	0.1693
PRODUCER GOODS				
Textiles	0.8530	0.3570	0.4987	0.2460
Chemicals	0.6916	0.2253	0.2101	0.1347
Machinery	0.1167	0.0938	0.0788	0.0683
Other	0.4440	0.0614	0.1708	0.0289

TABLE 2-12

AVERAGE AND STANDARD DEVIATION:
EPR INCLUDING EXCISES AND SUBSIDIES:
GRUBEL AND JOHNSON FORM

	A		B	
	f_j	u_j	f_j	u_j
Average	1.3033	0.2184	0.3621	0.1942
Standard Deviation	17.1312	0.4296	0.9885	0.5936
Weighted Average	2.7354	0.3077	0.4314	0.4812
Standard Deviation	24.8992	0.3785	1.1181	1.4805
Subgroup Averages (Weighted)				
Overall	2.7354	0.3077	0.4314	0.4812
CONSUMER GOODS				
Food Products	13.4439	0.6359	1.0044	1.9261
Other	0.6290	0.3109	0.3389	0.2214
PRODUCER GOODS				
Textiles	0.7528	0.3663	0.5415	0.2658
Chemicals	0.5226	0.1644	0.1919	0.1153
Machinery	0.1209	0.0981	0.0925	0.0803
Other	0.5799	0.2193	0.3423	0.1880

TABLE 2-13

AVERAGE AND STANDARD DEVIATION:
"MARGINAL" TARIFF EPR:
GRUBEL AND JOHNSON FORM

	A		B	
	f_j	u_j	f_j	u_j
Average	0.3315	0.2248	0.2893	0.1449
Standard Deviation	3.7478	0.3374	0.7470	0.1967
Weighted Average	0.6665	0.2406	0.2824	0.1627
Standard Deviation	4.4131	0.2801	0.5033	0.1815
Subgroup Averages (Weighted)				
Overall	0.6665	0.2406	0.2824	0.1627
CONSUMER GOODS				
Food Products	1.4241	0.2446	0.3580	0.1515
Other	0.5853	0.2982	0.3026	0.2030
PRODUCER GOODS				
Textiles	0.7647	0.3731	0.5341	0.2627
Chemicals	0.6237	0.2292	0.2209	0.1425
Machinery	0.1314	0.1067	0.0907	0.0789
Other	0.5097	0.2102	0.2346	0.1455

CHAPTER III

TARIFF PROTECTION IN JAPAN: AN ANALYSIS OF THE RESULTS

The "Level" of Japanese Tariffs

Comparisons of Averages

Table 3-1 on page 182 summarizes some of the results from the tables in Chapter II. The Effective Protective Rates referred to in Table 3-1 are all based on the conventional value-added definition (definition "A" in Tables 2-1 through 2-5) rather than the Corden definition, and are expressed as a percentage of value-added per unit under free trade ("f_j" rates). They may, therefore, be compared with the Effective Protective Rates which have been calculated for other industrialized nations, since all of these are based on similar definitions of EPR.

As in the other countries studied, the level of effective protection of manufacturing industries in Japan is higher than the level of nominal tariffs. The Japanese tariff structure, in fact, appears to be much more "escalated" in this sense than that of any industrialized nation so far examined. Table 1-1 above (p. 61) shows the average ratio of Effective Protective Rate to nominal

Table 3-1

SUMMARY OF TARIFF, EXCISE AND EFFECTIVE PROTECTIVE RATE CALCULATIONS FOR JAPAN, 1965

	Simple Average	Standard Deviation	Weighted Average	Standard Deviation
Tariff Rate	0.13	0.12	0.13	0.12
Excise Rate	0.03	0.16	0.06	0.25
Effective Protective Rates[1]				
(1) "Ordinary" EPR	0.45	1.61	0.58	1.33
(2) EPR Adjusted for Exports	0.32	1.52	0.42	1.19
(3) "Total" EPR, Including Effects of Indirect Taxes and Subsidies	0.33	1.38	0.39	1.09
(4) Total EPR, Grubel and Johnson formula	1.30	17.13	2.74	24.90
(5) EPR due to Tariffs Alone, Grubel and Johnson formula	0.33	3.75	0.67	4.41

[1]All rates are based on free-trade value added per unit ("f_j" rates) and on the conventional definition of value added by the producing industries (definition "A").

tariff rate (unweighted averages) found in ten other industrialized areas by four different Effective Protection studies. These all range between 1.5 and 2.0, whereas the corresponding ratio in Japan is well above this range: $\bar{f}/\bar{t} = 3.46$.

The high EPR/tariff ratio in Japan is mainly due to relatively high levels of EPR rather than low tariffs. The averages in Table 3-1 can be compared with similar computations for the United States and Canada, given below:[1]

		Simple Average	Standard Deviation	Weighted Average	Standard Deviation
United States, 1958	Tariff	0.14	0.07	0.11	0.07
	EPR	0.25	0.17	0.20	0.15
Canada, 1963	Tariff	0.16	0.08	0.13	0.08
	EPR	0.26	0.21	0.24	0.19

From this comparison it appears that tariff rates on manufacturing industries were about the same in the three countries, although it must be remembered that the American and Canadian studies refer to earlier years, 1958 in the U. S. case and 1963 in

[1] Basevi, "United States Tariff Structure," p. 156, Table 5; Melvin and Wilkinson, Effective Protection in the Canadian Economy, p. 29, Table 2.

the Canadian. (The latter study also used published rates rather than collections to measure t_j, and may therefore be less downward baised than the other two.) The effective rates, on the other hand, are strikingly higher in Japan than in the U. S. or Canada - 58% as compared with 20% and 24%, respectively - in spite of the differences in time period covered.

It should perhaps be mentioned that the average EPR and the $\bar{f}/\bar{t}$ ratio in Table 3-1 are also higher than those found in previous research on Japan. However, none of these differences seem significant when differences of coverage and method are taken into account.

Balassa's average EPR for Japan in 1962 was 29.5%, and the escalation ratio ($\bar{f}/\bar{t}$) 1.82.[1] But Balassa's computation differed in almost all details from the present one, and, in addition, he excluded the food-processing sectors in his 36-sector breakdown of manufacturing industries. These have relatively high rates of effective protection according to the results here.

Watanabe reported a simple average EPR, for 1963, of 36.7%, which is 2.16 times the average tariff rate in his study.[2] This may

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[1] "Tariff Protection in Industrial Countries," p. 588, Table 4.

[2] "Nihon no Kanzei Kōzō," p. 51.

be compared with a simple average of 44.8% from the present study, from Table 2-9 above. This 8-percentage-point difference is probably explained by the fact that Watanabe's study includes primary along with manufacturing industries. The former tend to have very low EPR's according to his results.

Yamazawa found a simple average EPR of 27.8% in the industries he examined, using the Corden definition of value added.[1] This figure is comparable with the "definition B" average of 30.9% from the present results. Again, the difference of 3 percentage points does not seem significant relative to the approximate nature of the EPR calculation, particularly since there is considerable difference in coverage here, too.

Though much higher than those in other industrialized countries, the rates reported here for Japanese industry are still considerably lower than those found in underdeveloped areas so far. The study of Korean industries by the Korean Development Association is comparable in level of industry detail and approach to this one. The simple average Effective Protective Rate (u_j rates, based on protected value added, and using the Corden definition of value added by the domestic

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[1]"Kanzei Kōzō," p. 59.

economy) was 57%. This compares with a u_j average (definition "B") of only 14% in Japan from Table 2-9 above. More or less comparable EPR's computed by Lewis and Guisinger for Pakistan were even higher than those in Korea: 58% or 89%, depending on assumptions made about a large class of "unclassified" inputs.[1]

Dispersion

Even more striking than the average level of protection is the high degree of dispersion among industries in Japan. Fifty-three of the 220 rates in Table 3-2, below, are negative, indicating that almost 25% of the industries covered are actually taxed rather than protected by the tariff structure. This is an unusually high proportion. In Canada, for example, only 7 of 133 industries treated showed negative protection, a ratio of approximately 5%.[2] This high proportion of negatively affected industries, combined with an unusually high overall average EPR, is one indication of the varied effect which the Japanese tariff structure has on different industries.

This high dispersion is also apparent in comparisons based on the standard deviation of EPR among industries. In all countries studied, the variance of effective protective rates has been found to be

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[1] Effective Protective Rates of Korean Industries, p. 18.

[2] Melvin and Wilkinson, Effective Protection in the Canadian Economy, p. 30.

significantly higher than that of nominal tariff rates. However, the coefficient of variation is 2.29 in Japan (weighted standard deviation divided by weighted average EPR) and this is much higher than in the U. S. and Canada. The coefficient of variation for U. S. industries was .95 or .83, in Basevi's two sets of calculations, and .92 or .84 in Canada. (See Table 1-2, page 63 above.) Balassa also reports coefficients of variation among industries in each country treated, the highest of these being .85 in Sweden.[1]

The high dispersion of EPR's in Japan may be due in part to relatively various tariff rates. The coefficient of variation among industries of t_j is .92, as compared with .61 in both the United States and Canada. However, the variance of the EPR's is so high that differences in tariff structure, or possibly industry structure, must also be called upon to explain it.

It is interesting that the variance of EPR for 5-digit industries is also greater than that found in more aggregative studies of Japanese industry: Balassa's coefficient of variation for Japan was .53, while Yamazawa reported a coefficient of variation of .658.[2]

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[1]"Tariff Protection in Industrial Countries," p. 588.

[2]Balassa, "Tariff Protection in Industrial Countries," p. 588; Yamazawa, "Kanzei Kōzō," p. 59.

(The coefficient of variation comparable with Yamazawa's figure, from Table 2-7 above, is 2.13.) Both of these also cover a narrower range of manufacturing activities than the present computations for 1965. However the type of industries covered does not explain the difference in relative dispersion, since the Yamazawa study is much more restricted than Balassa's in this respect. Rather, it appears that differences within broad industry groups, even those of the 156-sector breakdown of Japanese industries, are highly significant. These results confirm the argument in Chapter I that disaggregation is important in evaluating tariff structures.

Conclusions

From these comparisons it appears that the level of tariff protection in Japan is intermediate between those found in Western industrialized countries and those in underdeveloped areas. Certainly it can be concluded that tariffs in Japan are high enough to be an inportant barrier to trade. This simple observation merits emphasis because the contrary opinion is widely held. Discussions of the Japanese trade-liberalization problem by both economists and policy-makers have up to now virtually ignored tariffs, concentrating exclusively on import quotas, restrictions on financial flows, and other nontariff measures. Kojima's article in the Economic Record is typical in this respect: This article, entitled "Japan's Trade Policy", written by one of the foremost analysts of Japan's international trade, does not contain a single reference to the subject of tariffs.[1] While nontariff restrictions are of unquestionably great importance, they are not, as many appear to believe, a reason for considering that tariff protection is unimportant. This may have been a legitimate attitude in the period before the early 1960's, when quotas were applied to the majority of goods. But in the years since 1964, as will be seen below, many industries which are not protected by quantitative import restrictions have enjoyed very high levels of effective protection.

The comparisons above also indicated that the effect of the Japanese tariff structure varies greatly among industries. Thus, even if tariff reduction is to be expected in coming years, it may have widely varying impact on Japanese manufacturing industries. It is therefore necessary to examine the protective structure industry by industry, and this is attempted below.

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[1]Kiyoshi Kojima, "Japan's Trade Policy," Economic Record, XLI (March, 1965), 54-77.

The Industry Distribution of Protection

Effective Tariffs and Nontariff Restrictions by Industry

Table 3-2 gives the 220 manufacturing industries, ranked by their Effective Protective Rates. "t_j" in this table represents customs duties divided by value of imports in each category. The Effective Protective Rate "f_j" is the increase in unit value added due to tariffs, as a percentage of the value added that would be earned under free trade circumstances. "u_j" is the percentage of observed, i. e. protected, value-added per unit which is due to tariffs, or $f_j/1+f_j$. The rates in Table 3-2 are based on the "value-added-by-the domestic-economy" concept proposed by W.M. Corden. (See the discussion of definitions "A" and "B" in Chapter II above.) Effective protection is thus measured on the assumption that it is shared by all non-traded inputs, and not enjoyed by the primary factors used in the producing industry alone. Under this definition it is not assumed that all non-traded sectors are characterized by infinitely elastic supply schedules. The rates resulting with the definition are significantly lower than those discussed above, which were computed using the conventional definition of value added by the producing industry.

Industries which were affected by non-tariff restrictions on competitive imports in 1965 are marked in Table 3-2 with asterisks. Parentheses around the asterisk indicate that the quota restrictions have been removed since 1965. This enumeration is not complete, because it is not always possible to identify the industrial category to which particular commodities in the BTN or SITC list belong. Only commodities in the official "unliberalized" list are included - that is, those for which import quotas are applied at the commodity level.[1]

Of the 49 industries identified as affected by import quotas, 20 are food-processing industries using primarily agricultural inputs. Thus a substantial majority of the 32 agricultural processing sectors appearing in the list of manufacturing industries are protected by non-tariff barriers, and the Effective Tariff Protective Rates computed for these sectors must be read with this in mind. An example is found in the cases of polished grains (mainly rice and wheat), salt, and tobacco products (sectors #162, 174, and 192). It is clear that

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[1]The list is taken from the Japan Tariff Association's Bōeki Nenkan ("Foreign Trade Yearbook") (Tokyo: Japan Tariff Association, 1965 and 1969). A brief explanation of the "Import Quota" versus "Automatic Licensing" categories is given in Leon Hollerman, Japan's Dependence on the World Economy: The Approach Toward Economic Liberalization (Princeton: Princeton University Press, 1967), pp. 233-6.

their near-zero (tariff) EPR's do not measure total protection of domestic producers, as domestic and international trading of these commodities is handled by government monopolies which carry out protective policy by determining prices and quantities of domestic and import transactions.

On the other hand, many of the food-processing industries also are affected by import quotas on the primary agricultural products which they use as inputs. This may result in a counter-tendency, for the tariff EPR to exaggerate the protection of the final processed goods. Finally, these sectors are subject to relatively high rates of indirect taxation: their average net excise rate is 25% as compared with a 6% average for all manufacturing industries. This latter influence can be accommodated by incorporating the effect of excises in the Effective Protective Rate formula, and the results of doing this are discussed below. The effects of quotas on inputs and outputs are not so tractable, however, and the EPR's in these sectors should probably be used with particular care as a result.

A number of the "Unliberalized" industries produce machinery, particularly heavy machinery of various kinds. The shipbuilding and aircraft industries are protected in this manner, as in most industrial nations, and their zero and negative tariff-protection rates are probably therefore insignificant. Import restrictions on such items as firearms and gunpowder may not be regarded as "protective" in view of the restrictions also placed on their domestic sale and ownership. (Excise taxes also affect these two sectors negatively, reducing the measured f_j to -26% and +3%, respectively.) A number of quota-protected industries, on the other hand, also have high Effective Tariff Protective Rates. A prominent example is automobile production (#17).

Table 3-2

5-DIGIT MANUFACTURING INDUSTRIES
RANKED BY EPR, 1965[1]

EPR Rank	Description	t_i	f_i	u_i
*1	Potato starch and glucose	0.25	13.95	0.93
2	Canned meat products	0.25	3.09	0.76
3	Hemp yarn	0.50	2.91	0.74
4	Rayon yarn	0.50	2.73	0.73
*5	Sugar manufacturing	0.91	2.14	0.68
6	Cotton carding and carpeting	0.30	1.53	0.60
*7	Woolen fabric	0.23	1.38	0.58
8	Hot-rolled steel	0.13	1.18	0.54
9	Artificial silk	0.28	0.95	0.49
*10	Miscellaneous alcoholic beverages	0.63	0.92	0.48
11	Ester fabric	0.50	0.92	0.48
12	Synthetic fiber yarns	0.25	0.92	0.48
13	Three-wheeled cycles	0.36	0.89	0.47
14	Sanitary goods	0.21	0.81	0.45
*15	Leather, and fur products (except apparel)	0.19	0.76	0.43
16	Knitted fabric	0.28	0.71	0.42

[1]The rates reported here are based on the "value added by the domestic economy" concept proposed by W. M. Corden (see discussion of definitions "A" and "B" in Chapter II.)

Table 3-2 (Continued)

EPR Rank	Description	t_i	f_i	u_i
*17	Motor vehicles	0.36	0.69	0.41
(*)18	Toilet preparations and dentrifrices	0.41	0.69	0.41
19	Lard (refined)	0.13	0.68	0.41
20	Silk fabric	0.19	0.65	0.39
21	Ready-made textile goods, other than apparel and household goods	0.31	0.61	0.38
*22	Finished tea and coffee	0.27	0.60	0.37
23	Miscellaneous vegetable and fruit products	0.19	0.60	0.37
24	Soda industrial chemicals	0.35	0.56	0.36
25	Beer	0.41	0.55	0.36
26	Synthetic fiber fabrics	0.18	0.55	0.35
27	Industrial vehicles	0.22	0.54	0.35
28	Oil and fat industrial chemicals	0.18	0.53	0.35
29	Acetylene-derived chemicals	0.20	0.53	0.35
30	Cooking oils and their products	0.09	0.52	0.34
31	Narrow cotton fabric	0.21	0.51	0.34
*32	Noodles	0.24	0.51	0.34
33	Nylon	0.23	0.49	0.33
34	Rolled aluminum	0.17	0.47	0.32
35	Methanol-derived chemicals	0.20	0.47	0.32
36	Cellophane	0.20	0.44	0.31
37	Leather footwear	0.28	0.44	0.30

Table 3-2 (Continued)

EPR Rank	Description	t_j	f_j	u_j
38	Wearing apparel	0.27	0.43	0.30
39	Rayon	0.14	0.42	0.30
40	Leather products (except apparel)	0.25	0.41	0.29
41	Plastic products	0.27	0.41	0.29
*42	Photographic sensitive materials	0.28	0.39	0.28
43	Cotton fabric	0.10	0.39	0.28
*44	Milk and dairy products	0.13	0.39	0.28
45	Fiberboard	0.20	0.38	0.28
46	Thermo-setting plastic	0.20	0.38	0.27
47	Converted paper	0.18	0.37	0.27
48	Wooden furniture and fixtures	0.23	0.37	0.27
49	Ready-made textile goods for home use	0.23	0.37	0.27
(*)50	Cold-finished and plated steel	0.14	0.36	0.27
51	Printing ink	0.20	0.36	0.27
52	Miscellaneous food preparations	0.20	0.36	0.26
53	Miscellaneous basic non-ferrous metal products	0.10	0.35	0.26
54	Copper	0.07	0.35	0.26
55	Soap and surface active agents	0.20	0.34	0.25
56	Agricultural machinery	0.18	0.34	0.25
57	Raw silk and spun silk yarn	0.09	0.34	0.25
58	Agricultural chemicals	0.20	0.33	0.25

Table 3-2 (Continued)

EPR Rank	Description	t_i	f_i	u_i
59	Wooden products	0.15	0.33	0.25
60	Pyroxylin and celluloide	0.20	0.31	0.24
61	Petroleum plastic	0.20	0.31	0.24
62	Miscellaneous plastics	0.20	0.31	0.24
*63	Bread and confectionery	0.16	0.29	0.23
*64	Condiments	0.17	0.29	0.22
65	Flour manufacturing	0.07	0.29	0.22
66	Western-type paper	0.13	0.29	0.22
67	Household electric appliances	0.19	0.28	0.22
68	Bicycles and rear cars	0.19	0.28	0.22
69	Toys and sporting goods (except rubber)	0.20	0.27	0.22
70	Watches and clocks	0.23	0.27	0.21
71	Small personal effects	0.15	0.27	0.21
72	Writing goods	0.19	0.26	0.21
73	Household metal products	0.17	0.26	0.21
*74	Salted, dried and smoked fish products	0.16	0.26	0.21
75	Motion picture supply	0.25	0.26	0.21
76	Carbide	0.17	0.26	0.20
77	Japanese-type paper	0.15	0.26	0.20
78	Storable processed sea foods	0.15	0.25	0.20
79	Miscellaneous paper articles	0.15	0.25	0.20
80	Cyclic intermediate chemicals (except petro-chemicals)	0.16	0.25	0.20

Table 3-2 (Continued)

EPR Rank	Description	t_j	f_j	u_j
81	Slaughtering and meat preparation	0.02	0.24	0.19
82	Musical instruments	0.17	0.24	0.19
83	Steel pipe and tubing	0.12	0.24	0.19
84	Cameras	0.21	0.24	0.19
85	Rubber footwear	0.17	0.23	0.19
86	Abrasives	0.18	0.22	0.18
87	Vinyl chloride	0.17	0.22	0.18
*88	Canned sea foods	0.13	0.21	0.18
*89	Medicinal preparations	0.18	0.21	0.17
(*)90	Plate and sheet glass	0.19	0.21	0.17
91	Metal tools	0.17	0.20	0.17
92	Miscellaneous synthetic fiber materials	0.16	0.20	0.16
93	Miscellaneous final chemical products	0.14	0.20	0.16
94	Miscellaneous photographic and optical instruments	0.17	0.19	0.16
(*)95	Miscellaneous glass products	0.16	0.18	0.15
96	Special industrial machinery	0.14	0.18	0.15
97	Rayon fabric	0.19	0.17	0.15
*98	Office machinery	0.14	0.17	0.14
99	Paperboard	0.09	0.17	0.14
100	Medical instruments	0.15	0.16	0.14
101	Motorcycles	0.14	0.16	0.14

Table 3-2 (Continued)

EPR Rank	Description	t_j	f_j	u_j
102	Pottery, china and earthenware	0.13	0.16	0.14
103	Rubber products	0.11	0.15	0.13
104	Textile machinery	0.13	0.15	0.13
105	Asbestos products	0.10	0.15	0.13
106	Sewing machines	0.15	0.15	0.13
107	Metal furniture and fixtures	0.14	0.14	0.13
108	Electric bulbs	0.13	0.14	0.12
109	Miscellaneous metal products	0.13	0.14	0.12
110	Fire-clay goods	0.12	0.14	0.12
111	Miscellaneous transport equipment	0.12	0.14	0.12
112	Paper containers	0.13	0.14	0.12
*113	Generators	0.10	0.14	0.12
114	Miscellaneous footwear	0.15	0.14	0.12
115	Cast and forged nonferrous materials for machinery	0.09	0.14	0.12
116	Miscellaneous fiber products	0.14	0.13	0.12
*117	Mining and construction machinery	0.12	0.13	0.12
118	Electronic tubes and electron application apparatus	0.12	0.13	0.11
119	Miscellaneous non-metallic mineral products	0.10	0.13	0.11
120	Cement	0.10	0.12	0.11
121	Carbon products	0.11	0.12	0.11
122	Cast and forged ferrous materials for machinery	0.08	0.12	0.11

Table 3-2 (Continued)

EPR Rank	Description	t_j	f_j	u_j
123	Miscellaneous structural metal products	0.12	0.12	0.11
124	Miscellaneous industrial machinery	0.10	0.12	0.10
125	Miscellaneous light electrical appliances	0.10	0.11	0.10
126	Tar chemicals (except petro-chemicals)	0.08	0.11	0.10
127	Chemical equipment	0.10	0.11	0.10
128	Straw products	0.07	0.11	0.10
129	Inorganic industrial chemicals	0.09	0.11	0.10
130	General machine parts	0.11	0.11	0.10
131	High-pressure gas	0.11	0.11	0.10
132	Plywood	0.07	0.10	0.09
133	Miscellaneous antisepticized materials	0.05	0.10	0.09
134	Rolled copper	0.07	0.10	0.09
135	Metal working machinery	0.08	0.09	0.09
136	Miscellaneous structural clay products	0.09	0.09	0.09
137	Synthetic dyestuffs	0.21	0.09	0.09
138	Miscellaneous industrial products	0.11	0.09	0.08
139	Railroad equipment	0.09	0.08	0.08
140	Miscellaneous heavy industrial electric machinery	0.11	0.08	0.08
(*)141	Measuring instruments	0.09	0.08	0.08

Table 3-2 (Continued)

EPR Rank	Description	t_i	f_i	u_i
*142	Machine tools	0.08	0.08	0.07
143	Electric measuring instruments	0.09	0.08	0.07
*144	Starches	0.03	0.08	0.07
145	Ferro-alloys	0.06	0.07	0.07
146	General industrial machinery and equipment	0.07	0.07	0.06
*147	Soft drinks	0.09	0.07	0.06
148	Paper pulp	0.04	0.07	0.06
*149	Petroleum refinery products (including grease and lubricating oil)	0.09	0.06	0.06
150	Steel-frame structures	0.08	0.06	0.06
151	Pig iron	0.02	0.06	0.06
(*)152	Refrigerators and washing machines	0.09	0.06	0.06
*153	Animal oils and fats	0.04	0.05	0.05
*154	Transmission and distribution apparatus	0.08	0.05	0.05
155	Scientific instruments	0.07	0.05	0.05
156	Aluminum	0.04	0.04	0.04
*157	Canned vegetables and fruits	0.12	0.04	0.04
158	Motors	0.05	0.04	0.04
*159	Powders (explosive)	0.05	0.03	0.03
*160	Prime movers	0.06	0.03	0.03
*161	Coal dry distillation products	0.01	0.03	0.03
*162	Grain cleaning	0.00	0.02	0.02

Table 3-2 (Continued)

EPR Rank	Description	t_j	f_j	u_j
*163	Meat products	0.11	0.02	0.02
164	Dissolving pulp	0.02	0.02	0.02
*165	Telecommunications equipment and related products	0.03	0.01	0.01
166	Rope and fish net	0.06	0.01	0.01
167	Miscellaneous nonferrous metals	0.00	0.00	0.00
*168	Wooden ships	0.01	0.00	0.00
169	Lumber	0.00	0.00	0.00
170	Ice	0.00	0.00	0.00
171	Zinc	0.01	0.00	0.00
172	Cotton yarn	0.01	-0.01	-0.01
173	Woolen yarn	0.01	-0.01	-0.01
*174	Tobacco products	0.00	-0.01	-0.01
175	Miscellaneous basic industrial chemicals	0.05	-0.01	-0.01
176	Cast steel	0.00	-0.01	-0.01
177	Electric wire and cable	0.04	-0.01	-0.01
178	Brewed <u>sake</u>	0.00	-0.01	-0.01
179	Cast iron pipe and tubing	0.00	-0.01	-0.01
180	Chips	0.00	-0.01	-0.01
181	Sulphuric acid	0.00	-0.01	-0.01
182	Paints, varnishes and lacquers	0.06	-0.02	-0.02
*183	Briquettes	0.00	-0.02	-0.02
184	Cement products	0.02	-0.02	-0.02

Table 3-2 (Continued)

EPR Rank	Description	t_j	f_j	u_j
185	Forged steel	0.00	-0.02	-0.02
186	Ammonia	0.00	-0.02	-0.02
187	Petrochemicals (except synthetic resin)	0.03	-0.02	-0.03
(*)188	Steel ingots	0.01	-0.02	-0.03
189	Synthetic sake	0.00	-0.03	-0.03
190	Matches	0.00	-0.03	-0.03
*191	Explosives	0.00	-0.03	-0.03
*192	Edible salt	0.00	-0.03	-0.03
193	Phosphate fertilizers	0.00	-0.03	-0.04
194	Lead	0.00	-0.03	-0.04
*195	Aircraft	0.00	-0.04	-0.04
196	Miscellaneous chemical fertilizers	0.00	-0.04	-0.04
197	Ammonium fertilizers	0.00	-0.04	-0.04
198	Synthetic resins for fiber	0.00	-0.04	-0.05
199	Acrylonitril	0.00	-0.05	-0.05
200	Miscellaneous printing and publishing	0.00	-0.05	-0.05
201	Prepared feeds for livestock	0.01	-0.05	-0.05
202	Newspapers	0.00	-0.06	-0.06
203	Yarn and fabric dyeing and finishing (entrusted processing only)	0.00	-0.06	-0.07
*204	Vegetable oils and fats	0.04	-0.06	-0.07

Table 3-2 (Continued)

EPR Rank	Description	t_j	f_j	u_j
205	Spun rayon fabric	0.15	-0.08	-0.09
*206	Firearms	0.00	-0.09	-0.10
*207	Steel ships	0.00	-0.09	-0.10
208	Railroad equipment for industrial use	0.00	-0.10	-0.12
209	Rush products	0.00	-0.12	-0.13
210	Wooden footwear	0.00	-0.12	-0.13
211	Vinylon	0.00	-0.13	-0.15
212	Nonstorable processed sea foods	0.00	-0.13	-0.16
*213	Refrigerated fish and shellfish	0.07	-0.15	-0.18
214	Plasticizers	0.00	-0.16	-0.18
215	Fish oils and fish scrap	0.00	-0.18	-0.22
216	Calcium cyanamide	0.00	-0.20	-0.25
217	Ethyl alcohol	0.00	-0.21	-0.27
218	Ethyl alcohol for liquor manufacturing	0.00	-0.26	-0.34
219	Hemp fabric	0.12	-0.27	-0.37
220	Fermentation chemicals (except petrochemicals)	0.00	-0.47	-0.90

Comparisons of Industry Groups

The following subgroup averages (weighted by output) from Table 2-8 show some characteristics of the industry distribution of protection:

	Tariff Rate	Effective Protective Rate	Proportion of Manufacturing Output in 1965
Consumer Goods			
Food Products	0.12	0.73	0.17
Other	0.19	0.58	0.25
Producer Goods			
Textile Materials	0.15	0.91	0.08
Chemicals	0.13	0.77	0.05
Machinery	0.09	0.13	0.12
Other	0.08	0.56	0.31
Overall Average	0.13	0.58	1.00

These rates are based on free-trade value added ("f_j" rates) and the conventional definition of value added by primary factors (definition "A".)

The contrasts among sectors are much sharper than is revealed by examination of nominal tariff rates. Their relative ranking in terms of Effective Protection is also different from an ordering based on tariff rates. Textile-producing sectors are the most protected, with an average EPR of 91%, and industrial machinery the least protected with 13% EPR. The Chemicals industries also enjoy more than average tariff protection. This is true of the food-processing sectors as well, although it has been stressed above that there are particular difficulties in using these latter rates to measure total protection.

Discrimination Against Producer Goods

Most countries appear to afford higher levels of protection to manufactured consumer goods than they do to manufactured producer goods. This is also true in Japan: The average EPR in the former group is about 64%, as compared with 54% for the latter. This discrimination in favor of consumer goods seems relatively mild in Japan as compared with other countries, however. In the United States, for example, among the manufacturing industries reported on by Basevi, manufactured producer goods were protected at an average rate of 18.2%, compared with 41.0% for consumer goods.[1] Even more striking discrimination against manufactured intermediate and capital goods was found by Soligo and Stern in their study of Pakistani tariffs and by Power, in the Philippines.[2] These authors criticize the policy makers of those two countries for allowing the tariff structure to

[1] "United States Tariff Structure," p. 155 Table 4

[2] Soligo and Stern, "Tariff Protection"; Power, "Import Substitution."

encourage import-substitution exclusively in consumer-goods sectors, while encouraging excessive use of imported producer goods. From the above figures it seems that Japanese policy makers have avoided this mistake, being conscious of the need to encourage import-substitution in producer-goods sectors as well. In fact, the importance of these sectors is difficult to ignore in Japan. Consumer goods comprised only 20% of Japanese imports in 1968, 17% being food imports. Imports of industrial raw materials and semimanufactures were 70% of the total, and capital equipment another 10%. It is in fact in the area of raw materials and semi-manufactures that the most significant reductions in import-requirements have been observed during the 1960's.[1]

"Protected" Export Industries

It is noticeable in Table 3-2 that a number of prominent Japanese exports appear high in the list of protected industries. In fact, 54, or almost half, of the industries in the top half of the distribution exported 5% or more of their production in 1965. This may reflect the very rapid changes which have occurred in Japanese industry since 1961, when the tariff structure was last thoroughly revised. Thus the high levels of protection afforded some industries

[1] Organization for Economic Cooperation and Development, OECD Economic Surveys: Japan, p. 23.

which are demonstrably able to compete in export markets may indicate correct identification, in an earlier year, of the "infant" sectors with growth potential, rather than a tariff policy which consciously allows protection of internationally competitive industries. The implications for the future are, of course, not less important even if this is true.

The high EPR's of most of the textile-producing sectors have already been noted; most of these also export significant proportions of output, those at the very top of the ranking in Table 3-2 being no exception. Apparel and leather products are also exported in significant quantities. In the food category, canned meats (EPR = 309%) producers export more than half of their output; canned seafood (EPR = 21%) exports are 39% of output. Steel products are another example; the hot-rolled steel (118%), cold-finished and plated steel (36%) and steel pipe and tubing (24%) industries exported 18%, 20% and 32%, respectively, in 1965. Similar remarks would apply to rolled aluminum and some of the other non-ferrous metal products. Automobiles are protected at a rate of 69% and also subject to import quota. (It might also be mentioned that aircraft manufactures and shipbuilders, both exporters, benefit from quotas though not from tariff protection.) Other examples are: plastic products, appliances, bicycles, toys and sporting goods, watches and clocks, "small personal effects," writing goods, musical instruments, cameras and motorcycles.

In some of these cases the existence of both exports and imports in the same industry reflects product mix, whereas in others the same goods are exported and protected against imports. Examples of the latter phenomenon exist in automobiles, motorcycles, cameras, watches and doubtless other categories as well. It was argued in Chapter I (pp. 51 ff.) that in both cases the ordinary EPR still measures, on the usual assumptions, the protection of domestic producers in their domestic markets. Thus, where the same good is both exported and protected domestically, i.e. allowed higher value-added earnings per unit than are earned in export markets, the usual justifications for protection are clearly lacking. Tariff protection of export-competitive industries is in fact contrary to declared Japanese policy. (See the discussion below.)

However, it must be asked whether "the usual assumptions" do apply in these industries. EPR, it will be remembered, measures "potential" protection under limiting conditions of domestic demand inelasticity and lack of competition. It does not follow that this protection is always fully utilized. Theoretical conditions were outlined in Chapter I (pp. 53ff.) under which a domestic monopolist, following a static profit-maximizing price discrimination policy, would sell abroad at the world price (p_w) and domestically at $p_w(1+t)$. In most of the industries cited, though, it would seem that domestic competition and/or demand elasticity are too great for this to happen. It is often said that Japanese automobiles are sold domestically at a higher price than they are sold abroad. It is unlikely that the differential is equal to the 36% tariff on automobile imports, however. Such goods as watches and cameras, for which domestic demand facing individual producers is probably highly elastic, are almost certainly sold in Japan for little more than their F.O.B. export prices. Competition among textile producers is also probably too intense, in general, for such a result. In the case of intermediate goods such as steel products, it is difficult to know whether or not the full benefit of (12% to 14%) tariffs is enjoyed. Opportunities for price discrimination may be relatively great in such cases.

In sum, it seems reasonable to suppose that most of the "protected" exportable goods are sold domestically at much less than

$p_w(1+t)$. Part of the reason, then, for high EPR's computed for such products is redundant tariffs levied on them. Most of these may be industries which did not export in great quantities before the 1960's, but have surely since outgrown their "infant" industry status even in the eyes of Japanese policy-makers. If these producers are in fact underselling imports now, it can be expected that the tariffs on their products will be among the first to be reduced if pressure continues to be exerted on Japan for trade liberalization measures. Such reductions would, of course, be purely nominal, and have no effect on trade.

The Effect of Japanese Tariffs on Underdeveloped Areas

The charge has been made that tariffs in developed areas are structured so as to discriminate particularly against the efforts of less developed countries to expand production and exports of relatively unsophisticated processed goods. It is argued that they encourage instead exclusive specialization for trade in raw materials and other primary products. Nominal tariff rates, it is said, do not reveal this discrimination as clearly as do Effective Protective Rates.

Balassa found this to be true in Japan as in other industrial nations.[1] The average rate of nominal tariffs levied on all manufactured goods imports was 16.2% in 1962, according to his figures, while that on Japanese imports from underdeveloped areas is 18.0%. EPR's, weighted by imports from all areas, averaged 29.5%, but when weighted by imports from LDC's the average rate of effective protection was 36.7%. Thus the tariffs on underdeveloped countries' exports are both higher and more affected by the escalated structure than those on other imports.

Examination of the detailed rates strengthens this impression. This is quite probably due to reluctance to allow the more "underdeveloped" of Japan's manufacturing industries to suffer from import competition. However, Japan has frequently expressed the intention of opening her domestic markets to more exports from LDC's, particularly those in South East Asia. As the following review of some of these industries will show, changes in this aspect of her tariff structure could play an important part in this effort.

Textile manufactures of various kinds are one of the most likely potential areas for LDC export expansion. Japan's own history is one

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[1] "Impact of the Industrial Countries' Tariff Structure on Less-Developed Areas."

of the most spectacular demonstrations of this. It has already been remarked that most of these have very high Effective Protective Rates. Their average is 54% (using the Corden-definition of EPR as in Table 3-2), well above the 28% overall average and that of any other subsector in Table 2-8. Of course textiles are also important exports of the Japanese economy, and it is not to be expected that tariff reduction would enable South East Asian countries to export to Japan in competition with these. However, in textiles as in other fields, there are a variety of products included within each of the industry-categories listed in Table 3-2, and many of these are actual or potential exports for LDC's. As one example, India and other South East Asian countries have in recent years begun to substitute exports of cotton fabrics for those of cotton yarn and raw cotton, important Japanese imports in earlier periods. The Japanese tariff structure clearly does not encourage this development: All of the final cotton products have EPR's well above the average. Carded cotton and cotton carpeting rank 6th in Table 3-2, with EPR of 153%; narrow cotton fabric is 31st, with EPR = 51%, and other cotton fabric 43rd, EPR = 39%. These high rates are owing in part to the absense of protection of cotton yarn (t = 1%; EPR = -1%) and raw cotton, which is imported duty-free.

Balassa pointed to "semi-finished products that require little technological sophistication for their manufacture" as the most promising area of LDC specialization.[1] It has already been remarked that semi-manufactures are an area in which import-reduction has proceeded most successfully in Japan. Non-textile products which Balassa indentifies as important to underdeveloped countries are hosiery, leather, chemical materials, steel ingots and non-ferrous metals. Chemicals are relatively high on the list of protected items: Leather and non-apparel fur products rank 15th, with EPR = 76%, and are also subject to quota. Leather footwear is 37th, with EPR = 41%. Leather-related industries (and also slaughtering and meat-preparation) are the traditional province of the Eta, or outcaste, class in Japan and the need to protect the economic welfare of this small but important interest group may be one reason for particularly high levels of tariff protection here. Hosiery is not separately identified, but apparel in general is 38th in level of effective protection (43%). Steel ingots, unlike the sophisticated

[1] "Tariff Protection in Industrial Countries," p. 579.

steel products, receive no tariff protection (EPR = -2%) but they are protected by quota. Many of the non-ferrous metals products are unprotected, although Rolled aluminum (#34), Miscellaneous non-ferrous metal products (#53), and Copper (#54) are relatively highly protected. Other non-food manufactures which would seem to be potential LDC exports include cycles, wood products and toys, all highly protected.

In the area of food products, also, Japanese tariffs are in many cases structured so as to discourage processing for export, as opposed to exportation of the raw agricultural products, to her markets. Canned meats (#2) and Canned sea foods (#88) have already been mentioned because some of them are also exported. Other meat and sea food products (#74, 78 and 81) also rank fairly high and some also enjoy quotas. Canned fruits and vegetables (a growing export industry for Taiwan, for instance) are protected by quota; Other vegetable and fruit products (#23) enjoy average EPR of 60%. Sugar (#5), Dairy products (#44) and Finished tea and coffee (#22) are also important, and all subject to quota. Oilseeds are an important and rapidly growing import in Japan, but domestic production of their oils and products (#30) is encouraged at the expense of imports, with an EPR of 52%. Tobacco is extensively imported, but imports of tobacco products are virtually excluded by the policies of the Tobacco Monopoly. (These do not suffer from any discouragement of domestic consumption, however, since this is not part of official policy in Japan.) Prepared feeds (EPR = -5%) are a significant exception, and one from which the Burmese economy has benefited as exports to Japan were multiplied over the past two decades. This, of course, is part of the Japanese policy of encouraging the development of the domestic livestock industry. Other examples undoubtedly exist, but these should suffice to indicate the importance of Japanese tariffs on manufactures to less developed countries.

Effective Protective Rates Adjusted for Exports

The following figures from Tables 2-9 and 2-10 allow comparison of Export-adjusted EPR with the ordinary rates for broad industry groups. (These are weighted averages of "f_j" rates, on both definitions "A" and "B".) The difference is quite significant in those sectors, such as textiles, which export large proportions of their output:

	"Ordinary" EPR "A"	"Ordinary" EPR "B"	Export-adjusted EPR "A"	Export-adjusted EPR "B"
Consumer Goods				
Food Products	0.73	0.34	0.72	0.33
Other	0.58	0.30	0.46	0.25
Producer Goods				
Textile materials	0.91	0.54	0.40	0.42
Chemicals	0.77	0.22	0.56	0.19
Machinery	0.13	0.09	0.11	0.08
Other	0.56	0.25	0.33	0.18
Overall Average	0.58	0.28	0.42	0.23

The meaning of this export-adjustment was discussed at some length in Chapter I above (pp. 51ff.). The "Export-adjusted" EPR differs from the Ordinary EPR in that the part of output which is exported is counted as sold at the world price, not benefiting from domestic tariffs. It is thus an average rate of increase in value added for the total output of the 5-digit industry, with the effects of tariffs on exported and domestically marketed goods weighted by relative value. It was stated in Chapter I that the interpretation differs, depending on whether it is assumed that the same, or different, goods are exported and imported within the single industry. The conclusion was that in the former case the adjusted EPR is an exact measure of the average EPR (assuming, of course, that all the usual assumptions hold) whereas in the latter it tends to overstate it. In either case, the Ordinary Effective Protective Rate is, on the usual assumptions, still the correct measure of the benefit enjoyed by domestic producers on their domestic sales.

The phenomenon of tariff-protected sectors which also export has been discussed above. It was suggested that most of these do not price up to the domestic price of imports, i.e., that there is "water" in the tariffs on their final goods. Insofar as this is the case, the export-adjusted rates are a better measure - though still an overstatement - of protection actually utilized by Japanese industries than are the "Ordinary" EPR's. The latter, as stated before, measure "potential" protection under limiting, monopolistic, conditions. Where this is so, it can also be expected that the Japanese authorities will readily remove the tariffs on those exportable goods if pressure for such "liberalization" gestures continues.

"Total" Effective Protection Including Production Taxes and Subsidies

The Japanese Input-Output Table is unusual in providing information regarding indirect tax payments and subsidies of 5-digit industries. It is therefore interesting to see the effect of incorporating production taxes and subsidies in the EPR calculations. These "Total"

Effective Protective Rates give the percentage by which value added earnings exceed the value that would be earned if both tariffs and indirect tax (and subsidy) systems were abolished. They measure this, of course, on the usual Effective Protection model assumptions and abstracting from any changes in the output levels of individual domestic industries affected by tariffs and other taxes.

The "total" EPR is clearly an improvement over the "ordinary" rate as a measure of the total effect of government policies on domestic industries - although explicit tariffs, taxes and subsidies are still far from exhausting all of the ways that governments tax and protect industries. On the other hand, the "Ordinary" Effective Protective rate may come closer to measuring the degree of encouragement of domestic production relative to imports. The "total" EPR would answer this question only if it could be assumed that foreign competitors for the domestic market are subject to no production taxes in their own countries. It seems more reasonable to assume that roughly similar excise structures exist in other economies than to suppose that none exist. On the average, net excise rates in Europe, at least, seem to be higher than in Japan: Grubel and Johnson report a simple average of 4.6% for manufacturing industries, excluding food-processing, in the Common Market countries.[1] The simple average, including the food-processing industries, whose net excise rates are very high, was 3.4% in Japan.

It is clear from Table 3-1 that the excise-adjustment is highly significant. Average rates from Tables 2-9 and 2-11 for broad industry subgroups are given below. (These are weighted averages of "f_j" rates, definitions "A" and "B".)

	Excise Rate	"Ordinary" EPR "A"	"Ordinary" EPR "B"	"Total" EPR "A"	"Total" EPR "B"
Consumer Goods					
Food Products	0.25	0.73	0.34	-0.01	-1.43
Other	0.02	0.58	0.30	0.49	0.25
Producer Goods					
Textile materials	0.01	0.91	0.54	0.85	0.50
Chemicals	0.00	0.77	0.22	0.69	0.21
Machinery	0.01	0.13	0.09	0.12	0.08
Other	0.05	0.56	0.25	0.44	0.17
Overall Average	0.06	0.58	0.28	0.39	-0.06

The degree of change due to excise adjustments is perhaps surprising in view of the low rates of net taxation involved: 165 of the 220 industries have net excise rates of less than 1%. Their simple

[1]"Common Market Countries," p. 767, Table 1.

average is only about 3%, but when weighted by output the average is twice as high, reflecting relatively high rates on more important industries. These excise rates, like the tariff rates given above, are expressed as a proportion of total value of output. Unit tax payments which are small in proportion to total price may, of course, substantially reduce unit value-added earnings, if the latter are themselves a small part of price.

The most noticeable change is that food products are taxed, rather than protected, by the combination of tariffs and production taxes. The latter average 25% in these sectors, as compared with the 6% overall average. Chemicals move up in the ranks when the "total protection" criterion is used, since they are least affected by indirect taxes. Producer goods in general, in fact, actually enjoy greater "total" protection than do consumer goods, because the indirect tax levies are concentrated on the latter. The overall (weighted) averages in these two groups are 45% and 29%, respectively ("f_j" rates, definition "A").

Only three industries enjoyed net subsidies in 1965. In these cases alone, "total" protection exceeds the effective tariff protective rate above. The largest subsidy was the 10% subsidy paid to "grain cleaning," mainly rice-polishing, activity. Total protection is more than 100% ("u_j" basis) in this sector, instead of negative. This reflects the fact that, when subsidies are not counted, value added earned was actually negative in 1965. Polished grains are also, as mentioned before, subject to import quota.

Prepared feeds also received a net subsidy, of about 0.6%; their negative EPR is raised by this from -5% to -2%. The other industry enjoying a small subsidy (0.7%) is petrochemicals.

The sake, beer and liquor industries all have very high rates of indirect taxation (e_j ranging from 52% to a high of 143%, in the case of beer) and their "total" Effective Protective rates are negative except for "Miscellaneous liquors" (+9%). This is also true of the Petroleum refinery products category, whose total EPR is -50% (f_j base, definition "B"). Among the other products which are relatively heavily taxed are musical instruments (15%), refrigerators and washers (14%), motion pictures (12%), cameras (8%), film (7%), electric gauges (7%), household electrical applicances (5%), cosmetics and toothpastes (4%), and wood-built ships (4%). Excises on explosives and firearms (both 4%) have already been mentioned. There are some exceptions, but most of these goods show positive total effective protection in spite of these tax levies.

Tariff Determination and The Protection of Labor

Official Statement of Recent Tariff Policy in Japan

The last basic reform of the Japanese tariff occurred in June, 1961, when the Brussels Tariff Nomenclature was adopted for the first time and a new set of tariff rates adopted. The report of the Tariff Deliberation Council at that time stated four fundamental principles of tariff determination:[1]

1. The rate of taxation of primary products is as low as possible, and rises gradually with degree of fabrication.

2. Tariffs on producer goods are low, and on consumer goods, high.

3. Rates are high on industries with prospects of future growth, especially new industries. On the other hand, tariffs on the raw materials of these industries are low, as part of the policy of promoting their growth.

4. Tariffs are low in developed industries, such as those which export, with respect to both products and raw materials.

[1] Japan Tariff Association, Boeki Nenkan ("Foreign Trade Yearbook") (Tokyo: Japan Tariff Association, 1961), pp. 126-7, quoted in Yamazawa, "Kanzei Kōzō," p. 55.

Some of these characteristics have already been commented upon in the examination of the tariff structure as it appeared in 1965. Principle (1.) is clearly followed: it is this characteristic, the escalation of rates with degree of fabrication, which results in the EPR's of final goods industries being so much higher than their nominal tariffs. The degree of this escalation, as measured by the ratio of average EPR to average tariff rate, is higher in Japan than in any other industrialized country, as has been noted.

With respect to (2.), effective protection of manufactured consumer goods is higher than that of manufactured (as opposed to primary) producer goods. The differential is only about 10 percentage points, less than that in other countries with which comparison can be made.

The significance of principle (4.) is not entirely clear, since the policy of low tariff rates on the raw materials used by these industries can, if these are low enough, produce a high effective protective rates in spite of low rates on the final products. It has been remarked that a number of industries which export in significant proportions did have high rates of Effective Tariff Protection in 1965. Many of these industries may have been classed in the category described in principle (3.) in the early 1960's. In such cases their high EPR's represent "outgrown" tariff protection, and the final tariffs may not in fact be reflected any longer in domestic prices of the final goods.

There is no mention, in the above-quoted statement, of any policy of protecting traditional or labor-intensive industries. It has been observed, though, that many of these sectors are highly protected, even though they are not generally thought of as "growth" industries.

Regression Analysis of Tariff Determination in Japan

Informal examination of the results of Chapter II has suggested several hypotheses regarding tariff determination in Japan. Some of these are similar to, and others different from, the policy principles expressed by the Tariff Deliberation Council. An objective test of some of these hypotheses can be performed using regression analysis, and the results of such a test are reported below. These regressions are only a preliminary exploration of the subject of tariff determination in Japan, since they are limited to the cross-sectional information available in the 1960 and 1965 Input-Output Tables, the same source on which all of the Effective Protective Rate computations of Chapter II were based. Nevertheless, some interesting conclusions can be drawn on a tentative basis, and a number of suggestions for further study emerge from these initial tests.

A simple, single-equation model of tariff determination has been employed, although simultaneity admittedly exists in all of the relationships proposed: All of the variables mentioned below, as possibly entering into the determination of tariffs on individual industries, are also themselves affected by tariff protection. It is primarily in order to bring about such effects, in fact, that governments are moved to impose protective tariffs. It is, nevertheless, possible to draw some tentative conclusions from these single-equation regression experiments.

The variables used in the analysis, and the hypotheses they are intended to test, are outlined below:

Dependent variables

Regressions were performed to explain the determination of both nominal tariff rates (t_j) and effective protective rates (u_j), for individual 5-digit industries. Three different forms of EPR were included: the "Ordinary" Effective Protective Rate, the EPR Adjusted for Exports, and the "Total" EPR including effects of Production Taxes and Subsidies. Only "u_j" Effective Protective Rates were used in order to avoid the meaningless reversals of sign, and, therefore, of relative height, which occur in the case of "f_j" rates. (See the discussions above, on pp 35ff. and pp. 92ff.) In each case both the EPR based on the conventional definition of value added (definition "A") and the EPR based on Corden's value-added concept ("B") were separately fit. Thus seven alternative dependent variables were used in the equations. Their definitions are in all cases as described in Chapter II.

The contrast between regressions of nominal tariff rates and those involving effective protective rates was intended to reveal any discrepancies between the policies followed in determining nominal rates, and their actual consequences in terms of effective protection. Patterns of excise and subsidy determination are generally different from those of tariff determination, so that comparison of regressions involving "Ordinary" and "Total" EPR may reveal significant contrasts. Though the "Ordinary" EPR is the most consistent measure of potential, and perhaps intended, protection of industries, the above discussion suggested that the export-adjusted EPR may correspond more closely to protection actually enjoyed in 1965. Similarly, both value added definitions were tried in case any differences might be revealed in the results with these different measures of EPR, each of which has a different theoretical significance.

Independent variables

Rate of growth of output

Percentage increase in value of output between 1960 and 1965, as reported in those two years' Input-Output Tables, was the statistic used to measure growth in different industries. According to official policy, emerging industries thought to have growth potential were to be most protected. Tariff protection, in turn, would be expected to exert a positive effect on growth in individual industries (although exceptions to this rule may undoubtedly exist). Examination of Table 3-2 suggested that there is also a systematic tendency to protect certain types of declining industries. If this were true, it would tend to mitigate, or even reverse, the positive relationship between industry growth and protective rates that would otherwise be expected.

Export ratio

Value of exports in 1965, as a percentage of total domestic production, was used to represent comparative export strength of industries. According to the Tariff Deliberation Council statement, this variable would be negatively related to tariff protection at the time of determination. However, as the protected, "infant" industries have begun to realize the growth expected of them, many have also become strong exporters. Informal study of Table 3-2 suggests the hypothesis already stated, that exports and protection may not be negatively related as of 1965, and may even be positively correlated.

Import ratio

Value of 1965 imports, as a proportion of total domestic consumption, was also introduced as a variable which might contribute to the determination of tariffs. Protective tariffs presumably are imposed only on those goods for which there is significant import demand. On the other hand tariff protection tends to discourage importation. Which of these factors would outweigh the other depends on a variety of characteristics of the protected manufactures.

Industry size

Two alternative size measures were introduced in different attempted fits: Value of output in 1965, in millions of yen, and number of laborers employed (permanent, non-managerial employees only) in 1965. There is no particular theoretical reason to suppose that the "size" of an industry, which may in fact be a meaningless statistic reflecting mainly aggregation procedures, is related to its protection. The variable was introduced out of fear, rather than hope, that it would turn out significant as a result of some statistical characteristic associated with the aggregativeness of calculations.

Labor productivity, labor-intensity and wage rates

In order to test the hypothesis that there is a policy of "protecting labor" implicit in the Japanese tariff structure, three different labor-related variables were introduced:

1. "Labor Productivity" was measured as the ratio of 1965 value of output to 1965 employment. The employment figure is the same one referred to above, i.e. excludes managerial and "temporary" or otherwise non-"regular" employees. The latter exclusion is a serious one, since the laborers not included in the rolls of "regular," permanent employees are in some industries a very large - and very regular - part of the work force. This is a deficiency which is common to most Japanese labor data, however, and that given in the 1965 Input-Output Table is no exception.

2. A rough measure of "labor Intensity" of production, the ratio of the wage bill (for the same group of laborers referred to above) to

total value added, was also tried.

3. The average wage rate in 1965 within each industry, in thousands of yen per worker annually, was the third explanatory "labor" variable proposed.

These three variables were expected to be closely related to one another. They were introduced as alternative statistical representatives of the characteristics typifying the more "traditional" sectors within Japanese manufacturing industry. These industries are usually described as using low-wage labor, and as highly labor-intensive with low average productivity of labor. These characteristics may also be associated with low rates of growth, as the changes taking place in the Japanese economy have led to shortages of labor and rising wage rates. Thus the "labor protection" hypothesis may be phrased in a number of alternative forms, and to some extent overlaps the "declining industry" hypothesis.

All of the statistical measures mentioned above are of course highly imperfect, and for this reason as well it was thought advisable to try alternative statistical specifications of the hypothesis: that the tariff protects low-wage, labor-intensive, low-productivity and/or declining industries. These data, like the others used in this study, were all taken from the 1960 and 1965 Input-Output Tables. Because the wage information is not available for all of the 5-digit manufacturing industries, the regression analysis was limited to 184 of the 220 industries reported on in the tables of Chapter II. Almost all of the 35 excluded sectors are food-processing industries, so that the sample of 184 is still quite representative of the non-food-processing manufacturing industries. The list is given in Appendix II.

That the expected relationships among the labor variables, and of these with the growth rate variable, are displayed in this sample of industries can be confirmed using correlation analysis. Coefficients of partial correlation among the four measures, in the 184 industries of the regression sample, are:[1]

Average wage rate with labor intensity:	-0.367 (4.8)
Average wage rate with labor productivity:	0.546 (8.7)
Labor intensity with labor productivity:	-0.579 (9.4)
Growth rate with average wage rate:	-0.121 (1.6)
Growth rate with labor intensity:	-0.191 (2.5)

[1]These partial coefficients of correlation are also net of the effects of four other variables: EPR (export-adjusted), Value of output, Export ratio and Import ratio.

Growth rate with labor productivity: -0.044 (0.2)

The number given in parentheses after each partial correlation coefficient is the corresponding t-value (degrees of freedom = 176) for a test of significant difference from zero.

This sample thus does reveal the expected patterns: Labor-intensive industries tend to be low-average-productivity and low-wage industries. Labor intensive industries also tend to show lower growth rates than others, although no significant relationship is revealed between average wage rates or labor productivity and growth.

Regression Results and Conclusions

None of the variables, other than the "labor" variables, contributes significantly to the explanation of industry-level tariff rates or any of the effective protective rates. In the case of the percentage growth variable, this negative result lends support to the hypothesis, suggested above, that a policy exists of protecting certain declining industries. Such a systematic tendency seems the most likely explanation for the absence of a strong positive relationship between post-1960 growth and protective rates, which would otherwise result from the stated policy of protecting new and growing industries and be reinforced by its effects.

With respect to exports, also, the results indicate that, whatever the intentions of tariff-policy makers, protection is not systematically confined to nonexporting sectors as of 1965. This may reflect the success of tariff-makers in earlier years, in identifying and protecting industries with growth potential.

Among the "labor" variables, the average wage rate is significantly and negatively related to every one of the seven protective rates. A tendency is thus demonstrated toward protection of industries using relatively low-wage labor. This tendency is apparent in the determination of nominal tariff rates and also in the pattern of effective tariff protection, whether measured in the "ordinary" manner or with adjustment for exports. It is evidenced also with respect to "total" protection, including the primarily negative effects of production taxes and subsidies on different industries.

When labor-intensity and labor productivity are introduced in addition to the wage rate, the productivity measure is insignificant in all equations, while labor-intensity shows a negative relationship with protection in two cases: the "Ordinary" EPR and the EPR Adjusted for Exports. Nominal tariffs and "total" effective protection are not significantly related to either of these independent variables.

The estimated regressions explaining each dependent variable are given below. An F test, with a five percent level of significance, was used to determine whether individual independent variables can be considered to contribute to the explanation of the variation of each measure of protection. For each dependent variable, the equation reported is the one which results when only "significant" independent variables are included.

Here "T" represents the nominal tariff rate as a percentage of price. "U" is the EPR, the percentage of value added per unit which is due to protection. "W" stands for the average wage rate in the industry, in thousands of yen per year for each laborer, and "L" is the labor-intensity ratio, wages paid divided by value added. Standard errors are given in parentheses below each coefficient:

Nominal tariff rate:

$$T = 0.2052 - \underset{(0.0000)^{*}}{0.0001}\,W \qquad R^2 = 0.0345$$

*t = 2.55 (182 degrees of freedom)

"Ordinary" Effective Protective Rate:

Definition "A"

$$U = 0.6922 - \underset{(0.0002)}{0.0006}\,W - \underset{(0.2054)}{0.4516}\,L \qquad R^2 = 0.0539$$

Definition "B"

$$U = 0.2803 - \underset{(0.0001)}{0.0003\,W} - \underset{(0.0725)}{0.2046\,L} \qquad R^2 = 0.0418$$

Export-Adjusted Effective Protective Rate:

Definition "A"

$$U = 0.6503 - \underset{(0.0002)}{0.0005\,W} - \underset{(0.1991)}{0.5198\,L} \qquad R^2 = 0.0540$$

Definition "B"

$$U = 0.3879 - \underset{(0.0001)}{0.0003\,W} - \underset{(0.1064)}{0.2722\,L} \qquad R^2 = 0.0603$$

"Total" Effective Protective Rate, Including Production Taxes and Subsidies:

Definition "A"

$$U = 0.5278 - \underset{(0.0003)}{0.0008\,W} \qquad R^2 = 0.0358$$

Definition "B"

$$U = 0.3607 - \underset{(0.0002)}{0.0006\,W} \qquad R^2 = 0.0295$$

The negative relation, in two cases, between labor-intensity and protection, is the opposite of the expected one. It is not due to a tendency for tariffs to be low on labor-intensive products, since no such tendency exists. It must therefore be explained by characteristics of industry-structure. For example, if there were a tendency for labor-intensive industries to have high value-added ratios it would perhaps explain this result, since the latter are negatively related to EPR. The fact that it does not appear in the case of "total" EPR must reflect a tendency, among the non-food-processing manufacturing industries, for production taxes to be less important (and, therefore, "total" protection greater) in industries with relatively high labor share.

These results are somewhat different from the patterns Basevi found in the United States tariff structure.[1] (See Chapter I, pp. 73 ff.) He attempted to relate nominal and effective protective rates to growth rates and labor intensity. In his study of the United States, as in the present results for Japan, no relationship was found between growth, measured in terms of either output or employment, and nominal or effective protection. Basevi's "labor-intensity" measures, on the other hand, were both positively related to nominal tariff rates, but unrelated to EPR. Neither of his measures is the same as the "labor intensity" statistic used above. One is the inverse of what here is termed "labor productivity" -

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[1]"Tariff Protection in Industrial Countries," p. 586.

employment divided by the value of output. The other is labor cost, divided by value of output rather than by value added. These differences may explain the different result regarding "labor intensity," together with the fact that wage rates were not included in Basevi's regressions.

Basevi's results thus show a tendency for tariffs to protect labor intensive, low-productivity industries in the United States, while the present study of Japan shows a propensity to protect low-wage industries there. These may be different statistical measures capturing the same underlying phenomenon, since high labor-intensity and low average productivity are probably associated with low wages across industries in both economies. Whether or not this is so, the American "labor-protective" policy, reflected in the determination of nominal tariff rates, does not result in "effective" protection of labor if that is measured by the EPR. In Japan, on the other hand, the policy of protecting low-wage industries is "effectively" carried out in this sense.

APPENDIX 1

THE BIAS IN ESTIMATES OF a_{ij} AND EPR, WHEN FIXED INPUT PROPORTIONS ARE ASSUMED

Bias in a_{ij}, When Estimated From a_{ij}', with CES Production

From page 23, $a_{ij} = \frac{p_i^{1-s}}{p_j} \alpha_i^s (\alpha_i^s p_i^{1-s} + \alpha_o^s w^{1-s})^{\frac{s}{1-s}}$, and

$$a_{ij}' = \frac{p_i^{1-s}}{p_j} \frac{(1+t_i)^{1-s}}{(1+t_j)} \alpha_i^s (\alpha_i^s (p_i(1+t_i))^{1-s} + \alpha_o^s w^{1-s})^{\frac{s}{1-s}} .$$

$$\hat{a}_{ij} = a_{ij}' \frac{(1+t_j)}{(1+t_i)}, \text{ so } \frac{\hat{a}_{ij}}{a_{ij}} = (1+t_i)^{-s} \left[\frac{\alpha_i^s (p_i(1+t_i))^{1-s} + \alpha_o w^{1-s}}{\alpha_i^s p_i^{1-s} + \alpha_o^s w^{1-s}} \right]^{\frac{s}{1-s}}$$

$= 1/\frac{\hat{a}_{ij}'}{a_{ij}'}$ of the above discussion (page 23). Thus the estimated free-trade a_{ij} is understated in exactly the proportion that the estimated protected a_{ij}' is overstated in the Balassa-type model. This means that V_j is overstated, and the degree of protection understated, as reasoned above for the general case.

Effect of Bias in $\hat{a}_{ij}$ or $\hat{a}_{ij}$ on Three Empirical EPR Formulas

Estimation Using Free-Trade a_{ij} (the "Balassa Model")

$$f_j = \frac{V_j' - V_j}{V_j} = \frac{p_j'(1-a_{ij}') - p_j(1-a_{ij})}{p_j(1-a_{ij})} = \frac{(1+t_j)(1-a_{ij}') - (1-a_{ij})}{1-a_{ij}}$$

$$\hat{f}_j = \frac{(1+t_j)(1-\hat{a}_{ij}') - (1-a_{ij})}{1-a_{ij}}$$

$$\hat{a}_{ij}' > a_{ij}', \text{ so } \hat{f}_j < f_j . \quad \frac{\delta \hat{f}_j}{\delta \hat{a}_{ij}} = \frac{-(1+t_j)}{V_j} .$$

Estimation Using Protected $\hat{a}_{ij}$

$$\hat{f}_j = \frac{(1+t_j)(1-a_{ij}') - (1-\hat{a}_{ij})}{1-\hat{a}_{ij}} = \frac{(1+t_j)(1-a_{ij}')}{1-\hat{a}_{ij}} - 1 .$$

$$\hat{a}_{ij} < a_{ij} \text{ , so } \hat{f}_j < f_j . \quad \frac{\delta \hat{f}_j}{\delta \hat{a}_{ij}} = \frac{(1+t_j)v_j'}{\hat{v}_j^2} .$$

Percentage Change Measured from Protection

$$u_j = \frac{V_j' - V_j}{V_j'} = \frac{p_j(1+t_j)(1-a_{ij}') - p_j(1-a_{ij})}{p_j(1+t_j)(1-a_{ij}')} = 1 - \frac{1-a_{ij}}{(1+t_j)(1-a_{ij}')} .$$

$$\hat{u}_j = 1 - \frac{1-\hat{a}_{ij}}{(1+t_j)(1-a_{ij}')} .$$

$$\hat{a}_{ij} < a_{ij} \text{ , so } \hat{u}_j < u_j . \quad \frac{\delta \hat{u}_j}{\delta \hat{a}_{ij}} = \frac{1}{(1+t_j)v_j'} .$$

APPENDIX II

LIST OF INDUSTRIES INCLUDED IN REGRESSIONS

Number	I-O Code	Description
1	20110	Slaughtering and Meat Preparation
2	20200	Milk and Dairy Products
3	20600	Bread and Confectionery
4	20700	Sugar Manufacturing
5	20920	Prepared Animal Feeds
6	21400	Soft Drinks
7	22000	Tobacco Products
8	23010	Raw Silk and Spun Silk Yarn
9	23020	Cotton Yarn
10	23030	Woolen Yarn
11	23040	Hemp Yarn
12	23050	Rayon Yarn
13	23060	Synthetic Fiber Yarns
14	23111	Silk Fabric
15	23112	Rayon Fabric
16	23121	Cotton Fabric
17	23122	Narrow Cotton Fabric
18	23123	Spun Rayon Fabric
19	23130	Synthetic Fiber Fabrics
20	23140	Woolen Fabric
21	23150	Hemp Fabric
22	23160	Yarn and Fabric Dyeing and Finishing
23	23200	Knitted Fabric
24	23300	Rope and Fish Net
25	24300	Wearing Apparel
26	24401	Ready-made Household Textile Products
27	24409	Other Ready-made Textile Products
28	25101	Lumber
29	25102	Plywood
30	25103	Chips
31	25200	Wooden Products
32	26001	Wooden Furniture and Fixtures
33	26002	Metal Furniture and Fixtures
34	27111	Dissolving Pulp
35	27112	Paper Pulp
36	27121	Western-style Paper
37	27122	Paperboard
38	27123	Japanese-type Paper
39	27124	Fiberboard
40	27201	Converted Paper
41	27202	Paper Containers
42	27203	Other Paper Articles
43	28001	Newspapers
44	28009	Other Printing and Publishing

Number	I-O Code	Description
45	29100	Leather and Fur Products (except apparel)
46	29300	Leather Products (except apparel)
47	30001	Rubber Products
48	30002	Rubber Footwear
49	31111	Ammonia
50	31112	Sulphuric Acid
51	31113	Carbide
52	31114	Soda Industrial Chemicals
53	31121	Tar Chemicals (except Petrochemicals)
54	31122	Cyclic Intermediates (except Petrochemicals)
55	31123	Methanol Derivatives
56	31124	Acetylene Derivatives
57	31125	Plasticizers
58	31126	Fermentation Chemicals
59	31127	Oil and Fat Industrial Chemicals
60	31128	Petrochemicals (except Synthetic Resin)
61	31130	Synthetic Dyestuffs
62	31141	Powders
63	31142	Explosives
64	31151	Artificial Silk
65	31152	Rayon
66	31161	Synthetic Resins for Fiber
67	31162	Vinylon
68	31163	Nylon
69	31164	Acrylonitril
70	31165	Ester
71	31169	Other Synthetic Fiber Materials
72	31171	Thermo-setting Plastic
73	31172	Vinyl Chloride
74	31173	Petroleum Plastic
75	31179	Other Plastics
76	31181	Ammonium Manures
77	31182	Phosphate Manures
78	31183	Calcium Cyanamide
79	31189	Other Chemical Fertilizers
80	31191	Inorganic Industrial Chemicals
81	31192	High-pressure Gas
82	31193	Pyroxylin and Celluloide
83	31194	Cellophane
84	31199	Other Basic Industrial Chemicals
85	31201	Vegetable Oils and Fats
86	31203	Fish Oils and Fish Scrap
87	31300	Paints, Varnishes and Lacquers
88	31910	Medicinal Preparations
89	31921	Soap and Surface Active Agents
90	31922	Toilet Preparations and Dentifrices
91	31923	Printing Ink
92	31924	Agricultural Chemicals
93	31925	Matches

Number	I-O Code	Description
94	31929	Other Final Chemical Products
95	32100	Petroleum Refinery Products
96	32911	Coal Dry Distillation Products
97	32912	Briquettes
98	32920	Miscellaneous Antisepticized Materials
99	33101	Fire-clay Goods
100	33109	Other Structural Clay Products
101	33201	Plate and Sheet Glass
102	33202	Other Glass and Glass Products
103	33300	Pottery, China and Earthenware
104	33400	Cement
105	33901	Carbon Products
106	33902	Abrasives
107	33903	Asbestos Products
108	33904	Cement Products
109	33909	Other Non-metal Mineral Products
110	34110	Pig Iron
111	34130	Ferro-Alloys
112	34140	Steel Ingots
113	34150	Hot-rolled Steel
114	34160	Steel Pipe and Tubing
115	34170	Cold-Finished and Plated Steels
116	34181	Forged Steel
117	34182	Cast Steel
118	34183	Cast Iron Pipe and Tubing
119	34184	Cast and Forged Materials for Machinery (Ferrous)
120	34211	Copper
121	34212	Lead
122	34213	Zinc
123	34214	Aluminum
124	34219	Other Non-ferrous Metals
125	34220	Rolled Copper
126	34230	Rolled Aluminum
127	34291	Cast and Forged Materials for Machinery (Non-ferrous)
128	34299	Other Basic Non-ferrous Metal Products
129	35011	Steel-Frame Structures
130	35012	Other Structural Metal Products
131	35021	Metal Products for Home Use
132	35022	Metal Tools
133	35023	Firearms
134	35024	Other Metal Products
135	36011	Prime Movers
136	36021	Machine Tools
137	36022	Metalworking Machinery
138	36031	Agricultural Machinery
139	36032	Mining and Construction Machinery
140	36033	Chemical Equipment
141	36034	Textile Machinery
142	36035	Special Industrial Machinery
143	36036	Industrial Vehicles

Number	I-O Code	Description
144	36037	Other Industrial Machinery
145	36041	General Industrial Machinery and Equipments
146	36051	Office Machinery
147	36061	Sewing Machines
148	36062	Refrigerator and Washing Machines
149	36070	General Machine Parts
150	37011	Generators
151	37012	Transmission and Distribution Apparatus
152	37013	Motors
153	37014	Other Heavy Industrial Electrical Machinery
154	37021	Electric Bulbs
155	37022	Household Electrical Appliances
156	37031	Miscellaneous Light Electrical Appliances
157	37032	Electronic Tubes and Electron Application Apparatus
158	37033	Telecommunications Equipment and Related Products
159	37034	Electric Measuring Instruments
160	37035	Electric Wire and Cable
161	38101	Steel Ships
162	38102	Wooden Ships
163	38201	Railroad Equipment
164	38202	Railroad Equipment for Industrial Use
165	38300	Motor Vehicles
166	38501	Tricycles
167	38502	Motorcycles
168	38503	Bicycles and Rear Cars
169	38600	Aircraft
170	38901	Other Transport Equipment
171	39101	Scientific Instruments
172	39102	Measuring Instruments
173	39103	Medical Instruments
174	39104	Sanitary Goods
175	39201	Cameras
176	39202	Other Photographic and Optical Instruments
177	39203	Photographic Sensitive Materials
178	39301	Watches and Clocks
179	39901	Toys and Sporting and Athletic Goods (except rubber)
180	39902	Musical Instruments
181	39903	Plastic Products
182	39904	Writing Goods
183	39905	Small Personal Effects
184	39906	Other Industrial Products

Manufacturing Industries not Included in Regressions

20121	Canned Meat Products
20122	Meat Products
20123	Lard (refined)
20301	Canned Vegetables and Fruits

I-O Code	Description
20309	Other Vegetable and Fruit Products
20401	Canned Sea Foods
20402	Processed Sea Foods (nonstorable)
20403	Processed Sea Foods (storable)
20404	Fish and Shellfish
20405	Salted, Dried and Smoked Fish Products
20501	Grain Cleaning
20502	Flour Manufacturing
20911	Cooking Oils and their Products
20912	Condiments
20913	Noodles
20914	Starches
20915	Glutinous Potato Starch Jelly and Glucose
20916	Edible Salt
20917	Ice
20918	Finished Tea and Coffee
20919	Other Food Preparations
21101	Brewed Sake
21102	Synthetic Sake
21103	Beer
21104	Ethyl Alcohol
21105	Ethyl Alcohol for Liquor Manufacturing
21109	Other Liquors
23901	Straw Products
23902	Rush Products
23903	Cotton and Carpeting
23909	Other Fiber Products
24101	Wooden Footwear
24102	Leather Footwear
24103	Other Footwear (except rubber)
31202	Animal Oils and Fats

APPENDIX III

SUPPLEMENTARY REGRESSIONS

Regressions in Sample of 120 Industries

Purpose

An additional set of regressions was performed with a smaller sample of 120 of the original 220 manufacturing industries treated. The purpose of these additional regressions was to discover if export growth contributes significantly to the explanation of tariff and effective protective rates. Information concerning 1960 export volume was available from the 1960 Input-Output Table for only 120 of the 184 industries included in the original regression analysis. Consequently the sample in the estimations reported below is not fully representative of Japanese manufacturing industry, and the results are not necessarily comparable with those reported in Chapter III. In addition to the agricultural processing industries excluded from the set of 184, 64 others could not be used in the supplementary regressions. Those excluded were preponderantly textile, chemicals and metal-related industries, as can be seen from the lists given below, at the end of this Appendix.

New Variables

Two new explanatory variables were introduced:

Percentage growth in exports

The statistic used was the increase in value of exports between 1960 and 1965, as a proportion of 1965 export value. 1965 exports, rather than 1960 exports, were used as the base so as to be able to include industries reporting exports in 1965 but not in 1960. The reasoning behind introducing this explanatory variable was that tariffs may be designed to protect particularly those industries thought to have potential for export-growth, as distinguished from growth in total output.

Change in export ratio

The arithmetic difference between the ratio of value of exports to total output (the "Export Ratio" in the previous regressions) in the two years, 1965 and 1960, was also introduced. This independent variable was indended to reflect the growth in the importance of exports within each industry.

Results

The export-growth variables were introduced, separately, along with the two independent variables, Average Wage Rate and Labor Share Ratio, which were significantly related to protection according to the results previously obtained. The resulting estimated equations are given below. Here, as above, "T" stands for the industry tariff rate, "U" for the EPR

(u_j form), "W" for the average wage in the industry in thousands of yen per man annually, and "L" for the labor-share ratio, wages divided by value added in each industry. "GRX" represents the percentage growth of exports over the five years, and "DXR" the change in the export ratio.

Tariff Rate

$$T = 0.2150 - \underset{(0.0000)^*}{0.0002}\, W \qquad R^2 = 0.0659$$

*t = 2.88 (118 degree of freedom)

"Ordinary" Effective Protective Rate

Definition "A":

$$U = 0.4037 - \underset{(0.0001)}{0.0004}\, W \qquad R^2 = 0.0555$$

Definition "B":

$$U = 0.2727 - \underset{(0.0001)}{0.0003}\, W \qquad R^2 = 0.0597$$

Export-Adjusted Effective Protective Rate

Definition "A":

$$U = 0.3279 - \underset{(0.0001)}{0.0003}\, W \qquad R^2 = 0.0391$$

Definition "B":

$$U = 0.2195 - \underset{(0.0001)}{0.0002}\, W \qquad R^2 = 0.0409$$

"Total" Effective Protective Rate

Definition "A":

$$U = -0.3388 + \underset{(0.4236)}{1.1065}\, L + \underset{(0.0011)}{0.0028}\, GRX \qquad R^2 = 0.1154$$

Definition "B":

$$U = -0.2840 + \underset{(0.3095)}{0.8576}\, L + \underset{(0.0008)}{0.0021}\, GRX \qquad R^2 = 0.1220$$

The results are negative, except in the case of the "total" EPR including excises. Average wage rate is the only variable which contributes significantly to the explanation of tariff and ordinary or export-adjusted effective protective rates, the association being negative as in the larger sample used in Chapter III. In the case of the excise-adjusted EPR, it is high labor "intensity," or labor-share ratio, which appears most clearly related to protection. The two are, of course, correlated with one another as noted in Chapter III (page 232 above). This difference in the results for excise-adjusted EPR seems to reflect the tendency toward higher indirect tax levies on industries with lower labor shares, a tendency which was also noted in the larger sample of 184 industries (page 237 above). The fact that "L" does not appear in the equations determining ordinary and export-adjusted EPR, as it did in the 184-industry sample, must be due to the change in the industries covered.

A significant, positive relationship is revealed between "total" protection and export growth rates. Since this is not due to any dependence of tariff or Effective (Tariff) Protective Rates on export growth, it must indicate a tendency for indirect tax levies to fall less heavily on the industries among the 120 which have experienced more rapid export growth.

Separate Regressions for High-Growth and Low-Growth Industries

Purpose

The 120-industry sample was subsequently divided into two sixtyindustry samples, one of industries which grew less than 100% between 1960 and 1965, and the other of industries whose output more than doubled in that period. Regressions involving all of the independent variables of Chapter III, as well as the export-growth measures, were then attempted in step-wise fashion. The intention was to see if different patterns of tariff determination prevail in the low-growth and high-growth industry groups.

Results

The equations resulting from the two sets of regressions are given below. In addition to the notation given above, "Q" is used to stand for industry size, as defined on page 229 above, "X/Q" for the export ratio (page 228), "M/Q" for the import ratio (page 229), "Q/L" for average labor productivity (page 230), and "G" for industry growth in the period 1960-1965, as defined on page 228 above.

Regressions across the 60 industries with less than 100% Growth, 1960-1965

Tariff Rate

$$T = 0.1989 - 0.0002\ W \qquad R^2 = 0.0961$$
$$(0.0000)^*$$
$$^*t = 2.48$$

"Ordinary" Effective Protective Rate

Definition "A":

$$U = 0.4097 - 0.0007\ W + 0.0272\ Q/L \qquad R^2 = 0.1341$$
$$(0.0002) \quad (0.0120)$$

Definition "B":

$$U = 0.2639 - 0.0003\ W \qquad R^2 = 0.0836$$
$$(0.0001)$$

Export-Adjusted Effective Protective Rate

Definition "A":

$$U = 0.1764 - 0.7914\ DXR \qquad R^2 = 0.1040$$
$$(0.3049)$$

Definition "B":

$$U = 0.1208 - 0.5387\ DXR \qquad R^2 = 0.1065$$
$$(0.2048)$$

"Total" Effective Protective Rate

Definition "A":

$$U = -0.8075 - 0.0000\ Q + 2.3450\ L \qquad R^2 = 0.2117$$
$$(0.0000)^* \quad (0.7504)$$

* The relationship is statistically significant at the 5% level, although too weak to be interesting: in standard units, $b = -0.2579$ and $s_b = 0.1166$, which means that a difference of about 8 billion <u>yen</u> ($22 million) is required to produce a one-percentage-point difference in U.

Definition "B":

$$U = -0.6279 - 0.0000\ Q + 1.7926\ L \qquad R^2 = 0.2264$$
$$(0.0000)^* \quad (0.5522)$$

* In standard units, $b = -0.2692$ and $s_b = 0.1166$.

Regressions across the 60 industries with more than 100% growth, 1960-1965

Tariff Rate

$$T = 0.1561 - \underset{(0.1582)}{0.3025}\, M/Q \qquad R^2 = 0.0592$$

"Ordinary" Effective Protective Rate

Definition "A":

$$U = 0.2745 - \underset{(0.3622)}{0.8223}\, M/Q \qquad R^2 = 0.0816$$

Definition "B":

$$U = 0.1826 - \underset{(0.2361)}{0.5669}\, M/Q \qquad R^2 = 0.0903$$

Export-Adjusted Effective Protective Rate

Definition "A":

$$U = 0.2380 - \underset{(0.3434)}{0.8130}\, M/Q \qquad R^2 = 0.0881$$

Definition "B":

$$U = 0.1576 - \underset{(0.3434)}{0.5585}\, M/Q \qquad R^2 = 0.1002$$

"Total" Effective Protective Rate

Definition "A":

$$U = 0.4094 - \underset{(0.3904)}{0.9256}\, M/Q - \underset{(0.0488)}{0.1048}\, G \qquad R^2 = 0.1375$$

Definition "B":

$$U = 0.1492 - \underset{(0.2574)}{0.5513}\, M/Q \qquad R^2 = 0.0732$$

<u>Implications of the results</u>

The tendency toward protection of industries using lower-wage labor appears, from these supplementary regressions, to be significant only among the slower-growing industries of the sample of 120. Aside from this, however, separate treatment does not reveal much in the way of new patterns of economic significance. The only exception to this is that, in the sample of high-growth industries, total or excise-adjusted protection does show a negative association with industry growth. This indicates a tendency, within this group of industries, for excises to affect the fastest-growing industries most severely.

The appearance of DXR, the change in the export-ratio, in the regression explaining export-adjusted EPR among slower-growing industries, must be due in the main to the negative contribution of the 1965 export-ratio to the computation of this measure, since no such relationship appears in the case of tariff rates or ordinary effective protective rates. Among high-growth industries, the only variable significantly related to all measures of protection is the import ratio. This is of little interest in itself, since it is negative, and hence presumably reflects the negative effect of tariff protection on imports rather than any characteristic of tariff policy.

Industries Included in Supplementary Regressions

Industries whose output grew less than 100% between 1960 and 1965

Number	Description
3	Bread and Confectionery
7	Tobacco Products
17	Narrow Cotton Fabric
24	Rope and Fish Net
26	Ready-made Household Textile Products
31	Wooden Products
34	Dissolving Pulp
35	Paper Pulp
36	Western-Style Paper
38	Japanese-Type Paper
43	Newspapers
45	Leather and Fur Products (except apparel)
48	Rubber Footwear
79	Miscellaneous Chemical Fertilizers
81	High-Pressure Gas
83	Cellophane
84	Miscellaneous Basic Industrial Chemicals
87	Paints, Varnishes and Lacquers
91	Printing Ink
93	Matches
94	Miscellaneous Final Chemical Products
97	Briquettes
98	Miscellaneous Antisepticized Materials
100	Miscellaneous Structural Clay Products
101	Plate and Sheet Glass
105	Carbon Products
106	Abrasives
109	Miscellaneous Non-metal Mineral Products
115	Cold-finished and Plated Steels
119	Cast and Forged Materials for Machinery (ferrous)
124	Miscellaneous Non-ferrous Metals
127	Cast and Forged Materials for Machinery (non-ferrous)
128	Miscellaneous Basic Non-ferrous Metal Products
132	Metal Tools
135	Prime Movers
136	Machine Tools
137	Metalworking Machinery
138	Agricultural Machinery
140	Chemical Equipment
141	Textile Machinery
142	Special Industrial Machinery
145	General Industrial Machinery and Equipment
147	Sewing Machines
148	Refrigerators and Washing Machines

Number	Description
149	General Machine Parts
150	Generators
151	Transmission and Distribution Apparatus
152	Motors
153	Other Heavy Industrial Electrical Machinery
154	Electric Bulbs
155	Household Electrical Appliances
156	Miscellaneous Light Electrical Appliances
157	Electronic Tubes and Electron Application Apparatus
161	Steel Ships
162	Wooden Ships
164	Railroad Equipment for Industrial Use
166	Tricycles
167	Motorcycles
168	Bicycles and Rear Cars
172	Measuring Instruments

Industries whose output grew more than 100% between 1960 and 1965

1	Slaughtering and Meat Preparation
2	Milk and Dairy Products
5	Prepared Animal Feeds
6	Soft Drinks
23	Knitted Fabric
25	Wearing Apparel
27	Miscellaneous Ready-made Textile Products
30	Chips
32	Wooden Furniture and Fixtures
33	Metal Furniture and Fixtures
37	Paperboard
39	Fiberboard
40	Converted Paper
41	Paper Containers
42	Miscellaneous Paper Articles
44	Miscellaneous Printing and Publishing
46	Leather Products (except apparel)
63	Explosives
71	Miscellaneous Synthetic Fiber Materials
72	Thermo-setting Plastic
74	Petroleum Plastic
75	Miscellaneous Plastics
85	Vegetable Oils and Fats
86	Fish Oils and Fish Scrap
88	Medicinal Preparations
90	Toilet Preparations and Dentifrices
92	Agricultural Chemicals
102	Miscellaneous Glass and Glass Products
103	Pottery, China and Earthenware
107	Asbestos Products

Number	Description
[illegible]	Cement Products
[illegible]	Cast Iron Pipe and Tubing
[illegible]	Steel-Frame Structures
[illegible]	Miscellaneous Structural Metal Products
	Metal Products for Home Use
[illegible]	Firearms
[illegible]	Miscellaneous Metal Products
[illegible]	[illegible] and [illegible] Machinery
[illegible]	Industrial Vehicles
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	Railroad Equipment
1[illegible]5	Motor Vehicles
169	Aircraft
17[illegible]	Miscellaneous Transport Equipment
17[illegible]	Scientific Instruments
1[illegible]	Medical Instruments
174	Sanitary Goods
[illegible]	Cameras
1[illegible]	Other Photographic and Optical Instruments
1[illegible]	Photographic Sensitive Materials
1[illegible]	Watches and Clocks
1[illegible]	Toys and Sporting and Athletic Goods (except rubber)
[illegible]	Musical Instruments
1[illegible]1	Plastic Products
182	Writing Goods
183	Small Personal Effects
1[illegible]	Other Industrial Products

Industries for which [illegible] data unavailable

Number	Description
[illegible]	[illegible]
	[illegible]
[illegible]	[illegible] Yarn
[illegible]	Woolen Yarn
11	Hemp Yarn
12	Rayon Yarn
13	Synthetic Fiber Yarns
14	Silk Fabric
15	Rayon Fabric
1[illegible]	Cotton Fabric
[illegible]	Spun Rayon Fabric
1[illegible]	Synthetic Fiber Fabrics
[illegible]	Woolen Fabric
[illegible]	Hemp Fabric
[illegible]	Yarn and Fabric Dyeing and Finishing
[illegible]	Lumber

Number	Description
29	Plywood
47	Rubber Products
49	Ammonia
50	Sulphuric Acid
51	Carbide
52	Soda Industrial Chemicals
53	Tar Chemicals (except petrochemicals)
54	Cyclic Intermediates (except petrochemicals)
55	Methanol Derivatives
56	Acetylene Derivatives
57	Plasticizers
58	Fermentation Chemicals
59	Oil and Fat Industrial Chemicals
60	Petrochemicals (except synthetic resin)
61	Synthetic Dyestuffs
62	Powders
64	Artificial Silk
65	Rayon
66	Synthetic Resins for Film
67	Vinylon
68	Nylon
69	Acrylonitril
70	Ester
73	Vinyl Chloride
74	Ammonium Fertilizers
77	Phosphate Fertilizers
78	Calcium Cyanamide
80	Inorganic Industrial Chemicals
82	Pyroxylin and Celluloide
89	Soap and Surface Active Agents
95	Petroleum Refinery Products
96	Coal Dry Distillation Products
99	Fire-clay Goods
104	Cement
110	Pig Iron
111	Ferro-alloys
112	Steel Ingots
113	Hot-rolled Steel
114	Steel Pipe and Tubing
116	Forged Steel
117	Cast Steel
120	Copper
121	Lead
122	Zinc
123	Aluminum
12[illegible]	Rolled Copper
12[illegible]	Rolled Aluminum
1[illegible]0	Electric Wire and Cable

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