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Foreign Trade Regimes, Employment, and Income Distribution

——Selected Developing Country Studies——

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Background and Purposes of the Project

In recent past, I have collaborated with several colleagues and graduate students at the University of Notre Dame on a research project concerning foreign trade regimes in developing countries. The project, set in the context of the recent debates on trade liberalization in developing countries, dealt with selected country cases concerning the choice of trade regime and its implications for domestic employment and income distribution. The categories of trade regime consist of export orientation, import-substitution orientation, and nontradable-sector expansion. This report presents a summary of those studies. The developing countries included in the completed set of studies consist of Mexico(Kim & Turrubiate, 1983 and 1984), Thailand(Kim & Pontaviporn, 1988), Brazil(Clements & Kim, 1989), Bangladesh (Kim & Tareq, 1991), Ghana(Armah, 1991). Each country study, based on an extended input-output or a social accounting matrix framework, focuses on the empirical links between employment, output and income distribution. Each country author modified the basic model, as shown in the paper, to take into account peculiarities of the particular country situation, or simply to conform to the availability of country data.

1. Statement of the Problem and Previous Studies

The orthodox argument linking trade and employment is based on Heckscher-Ohlin, Stolper-Samuelson's factor-proportions theory of trade. It postulates that trade patterns are determined by the country's factor endowments. Hence, exports will be intensive in the use of the country's abundant factor which in the case of developing countries is labor. Within this context of comparative advantage, trade will benefit the developing country's abundant factor, the workers. The earlier empirical studies(Tyler, 1979 ; Krueger, 1981 ; Balassa et. al, 1982 ; Sarma & Ram, 1989)concerning the alternative trade strategies focused on their respective implications for factor content and employment.

The factor-intensity argument for employment, despite its domination in the literature, has been challenged from the structuralist critiques that range from the static perspective[1] to the dynamic one[2]. Despite the continuing debate on this issue, most empirical studies have confirmed the superior employment-creating effects of export-oriented regime in comparison to import substitution policy[3].

The controversy concerning export-led industrialization surrounds its implications for the distribution of income by size. According to the orthodox view[4], employment and income distribution are closely linked : since labor in a developing country belongs to lower income classes, increases in labor's share in national income brought about by export expansion will likely result in an improved income distribution. This generalization about the size income distribution as a logical deduction from the functional distribution may not be valid, however. Specifically, three complications can be seen

in the relationship between choice of trade regimes and income distribution by size.

First of all, in order for the conventionally assumed relationship between employment and distribution to hold, it is necessary to postulate that an expansion of exports in labor-intensive products leads to an increase in labor's share in the economy (For proof, see Appendix A). If the wage share actually declines in the labor surplus economy, this worsens the size distribution of income (Minami and Ono, 1981)[5].

Secondly, if labor were all homogeneous and received a uniform wage rate, then labor's share in national income could only be raised by increased employment. But labor is not homogeneous, nor is the wage rate uniform. The consequences for the size distribution of income then depend not only on whether or not labor's share in national income is increased but also on how that share will be distributed among different income groups (Appendix A)[6]. More information on the distribution of earnings among different groups of labor would be needed before any definitive inference relating the functional distribution to the size distribution of income can be made. Moreover, the lower and middle income classes in developing countries often comprise self-employed family enterprises[7] in a small farm or an informal, urban economy. When a relatively large share of their incomes is derived from non-wage sources, the relationship between the functional and the size distribution is no longer obvious.

Thirdly, the conventional analysis tends to overlook the interindustry linkage effects. Labor intensity needs to be evaluated in the economy-wide context. The production of exportable goods may be labor-intensive in itself, but when the indirect linkage effects throughout the economy are considered, the net effect on the distribution of income is no longer self-evident[8]. In a similar vein, the link between production and income has not been articulated in the conventional, empirical work. Since different income classes have different propensities to spend, calculations of longer-term effects must take into account the Keynsian income-spending multiplier effects.

The orthodox view on trade and income distribution thus calls for empirical test. Previous studies concerning this have generally been suggestive; as already mentioned, they have been prejudiced against *IS* in that *EP* would be most employment-creating, and therefore would have equitable distributional consequences[9]. In this context, our analytical framework offers an improved, generalized procedure for simulating the impact; it incorporates income-induced multiplier effects and takes into account the full range of input import-substitution possibilities. Our analysis also deals with the implications of trade for poverty alleviation in developing countries.

2. The Basic Model and Data

The main sources of data are each country's input-output tables and household budget surveys or when available, social accounting matrices[10]. The country data have been obtained for different years. Household budget data or labor statistics in the case of Ghana were used to extract information on the functional sources of earnings by income groups. In addition, two countries ——Mexico and Brazil——had a separate intersectoral flow matrix, classified into final and intermediate component imports. The range in intermediate import substitution could thus be estimated only for these two countries.

The extended input-output model[11] reported here provides the structural framework of general equilibrium simulation. The model incorporates household budget surveys or the SAM as a data base to deal with the feedback relations among output, employment and income distribution. Each country author made

adjustments in the basic model to meet the needs of the specific country data. There are three innovative features of the basic model developed for country simulations : First, our model departs from the conventional linkage analysis in that household consumption demand is disaggregated by size income groups and introduced as an endogenous variable. This, in addition to the conventional interindustry linkages, allows for the income-consumption linkage generated indirectly through the final consumption demands by income recipients.

Secondly, the model, data permitting, can explicitly take account of possibilities of substitution of domestically produced inputs for imports. Both the Mexican and Brazilian papers demonstrates a wide range in the magnitude of policy impact. Thirdly, our framework is a contribution to the literature, as it lends itself to the calculations of distributional effects by combining the input-output tables and household budget data for each country. Where feasible, input output tables and distributive data are combined into a social accounting matrix (SAM). This served as a unified, database linking functional distribution with distribution by size to take into account the feedback effects of personal distribution on national income. The framework using the social accounting matrix is also described in this section.

We are aware of the linearity assumption of the input-output framework. When the expansion of output is constrained by the productive capacity in a large number of sectors, output increases would be reflected by price increases. For our purposes, we have, data permitting, calculated lower and upper limit estimates. However, for all five countries considered, each country author showed evidence of the idle capacity by substantial margins in the majority of industries. The assumption of constant cost for the relevant range of marginal increases in output does not seem too restrictive. Alternatively, this sort of model, as a consistent framework of relationships among output, employment, and income distribution, can serve for policy purposes. It indicates the sensitivity of the economy towards policy changes, thereby providing the directions in sectoral policy or in investment priority.

Keeping in mind that the dimension of the matrices represent the number of sectors unless otherwise stated, we start with the sectoral balance equation in the input-output system ; for each sector, domestic output X is the sum of intermediate goods demand AX and final demand F, minus imports.

(1) $X = AX + F - M$

where A is a matrix of technical input-output coefficients inclusive of imported inputs.

Imports consist of final imports, Mf, and complementary intermediate goods imports, $Am\ X$, which depend on the level of output. Final imports are made up of endogenous consumption goods imports which depend on the income of k number of income groups, Y, and exogenous final imports Mf^*.

(2) $M = Mf + Am\ X$
$= Af\ Y + Mf^* + Am\ X$

where Af is a matrix of import propensities by households whose element (n, k) shows the propensity to import the *nth* sector's output by the *kth* income group, and Am is a matrix of intermediate import coefficients.

Household consumption C is a function of household income Y :

(3) $C = C(Y) = Ac\ Y$

where Ac is a consumption matrix whose elements (i, k) shows the propensity to consume the *ith* sector output by the *kth* income group.

Income accruing to each income group, Y, is determined by the value added in each sector :

(4) $Y = Ay\ X = QWX$

where Ay is a matrix of distribution coefficients whose element (k, i) shows the

share of the *ith* sector's output (earnings) accruing to income group k. To estimate the Ay matrix[12], we extract from the country's input-output tables the value-added matrix, W, whose element (i, j) is the income accruing to the *ith* factor from a unit-output in the *jth* sector. We also obtain from each country's household budget survey a matrix Q that represents the functional income sources corresponding to each income class. The element (i, j) of Q, for instance, indicates the share of the *jth* functional income accruing to the *ith* income class. Ay is then the product of matrices Q and W.

Final demand F consists of the part exogenously given, C^*, and the part, C, endogenously determined by the level of income:

(5) $F = C + C^*$

Combining equations (1) to (5) and defining the domestic final demand $F^* = C^* - Mf^*$, we solve for sectral output:

(6) $X = \{I - A + Am - [Ac - Af]Ay\}^{-1} F^*$
$= H F^*$

The policy impacts are examined by alternately replacing the domestic final demand vector F^* with that representing an unit value of the bundle of goods representing alternative trade structure consisting of export promotion (EP), import substitution (IS), and nontradables (NT)[13]. The basket of exportables is calculated as the weighted average of the spending on exports, the weights used being the actual shares of the spending across sectoral outputs. Import substitution is taken as the process to replace imports with an equivalent amount of domestic production. Thus, the basket of import substitutes represents the weighted average of spending on imported goods that are in part produced domestically. The nontradable goods basket is defined to comprise the residuals of sectoral outputs that are not traded. Ideally, one should be able to distinguish sectors that could produce exports or import substitutes in the absence of market distortions and tariff and non-tariff barriers. Given the difficulty of this task, we used the observed commodity composition of trade to construct the trade structures[14].

Premultiplying matrix H in (6) by the distribution matrix Ay, we obtain

(7) $Y = Ay\, H\, F^*$

from which the Gini concentration ratio[15] associated with a given trade structure is computed[16].

Employment effects, E, can be assessed by introducting the particular vector L extracted from the value added matrix Ay whose elements represent the quantities of labor (in value or in manyears) required to produce a unit of each sectoral output:

(8) $E = L\, H\, F^*$

Equations (7) and (8) represent the formulae for calculating the employment and distributional effects of trade regimes. They lend themselves to the simulation of quantitative effects of changing the composition of F^*.

For purposes of illustration and ease of calculations, the preceding input-output system can be converted to the social accounting matrix framework by defining a new vector R consisting of r number of factor incomes, and an augmented matrix A^*:

$$A^* = \begin{array}{|c|c|c|} \hline I - A + Am & 0 & -(Ac - Af) \\ \hline -W & I & 0 \\ \hline -Ay & 0 & I \\ \hline \end{array}$$

where the augmented endogenous vector $V = (X\,;\, R\,;\, Y)$ has a dimension of $(n + r + k) \times 1$. The size income Y and the functional income L are the particular solution vectors we are interested in. The exogenous vector Z comprises F^* with three trade categories; i. e., $Z = (F^*, 0, 0)$ with $F^* = \{EP\,;\, IS\,;\, NT\}$. The SAM system is then given by $A^* V = Z$, and for the impacts of per unit demand changes in Z; we solve for

(9) $V = A^{*-1} Z$

The A^* matrix is derived from input-output tables, and is normally nonsingular and invertible. Thus a unique solution generally exists.

Figure 1 depicts the structure of the model. The feedback relationships among final demands, output, imports, employment, and income are indicated by the directions of the arrows.

Treatment of Intermediate Goods

Estimation of potential linkage effects requires measures of substitutability of domestically producted intermediate inputs for imported ones. Such an estimation is of course difficult since the extent of substitutability would depend on the cost and availability of replaceable imports. We determine here the upper and lower bounds for employment (or income) generation. The lower bound El is the case when required inputs are all met by imports ; in this case an expansion of final demand does not lead to additional employment opportunities by way of backward linkages. The upper bound Eu corresponds to the case when all required inputs are supplied by domestic producers ; in this case no linkage-related employment is lost through the import linkage.

The boundary cases of intermediate imports are then :

(10) Upper bound : $Am = 0$, $Eu = L\{I - A - (Ac - Af)Ay\}^{-1} F^*$

(11) Lower bound : $Am = A$, $El = L\{I - (Ac - Af)Ay\}^{-1} F^*$

The boundary cases are compared with the standard case—the inverted matrix H—when imports are assumed to satisfy intermediate goods demands at the same ratios determined by input-output technologies.

3. Comparison of the Results

Each country study summarizes the main findings, and draws from them policy implications for the country in question. The striking finding from our analyses, which is consistent with previous studies[17], is that export orientation, barring possibilities of adverse terms-of-trade effects, is most favorable to employment generation measured, in particular, in worker-years. The superiority of export regime is most conspicuous when export performance is compared to that of import substitution. Except in Mexico and Brazil, exports in other countries mainly consist of agricultural and agroindustrial products, and most of the jobs are created in those export-oriented agrarian sector. In contrast, import substitutes typically comprise industrial products, especially parts and components. Interestingly, the nontradable sector, where labor-intensive, small-scale farms or domestic-market oriented agrobusinesses dominate, turn out to be quite employment-creating : in Mexico employment effects are greater in NT sector (Table 1), and in Thailand they come closer to each other (Table 5).

The magnitude of employment effects greatly varies from country to country : EP generates jobs in man-years seven times more than IS in Ghana (Table 8) whereas employment created under EP in Mexico exceeds that under IS only by 20 percent (Table 1). In terms of magnitude per unit-demand, primary products exporters (Bangladesh, Thailand, and Ghana) are found to have considerably greater effects on employment than semi-industrial exporters (Mexico and Brazil). The linkage measures show a wide range of the impact not only among alternative trade strategies but also between direct and indirect effects. Our results also point out the importance of the effects of import substitution on the input side : for Mexico the maximum employment effect is about 7 times the minimum ; and for Brazil the maximum averages about 3 times (Tables 1 and 3). Thus, in order to estimate the impact accurately it would be important to take into account intersectoral flows of intermediate goods

Table 1 Mexico: Employment Effects of Unit Demand Expansion Under Alternative Trade Structures

	In value	In worker-years
EP		
a) Total average	.8089(.1723-1.055)*	487.5 (87.1-685.8)
b) Primary activities	.8812(.2003-1.074)	693.0(260.6-837.2)
c) Petroleum & derivatives	.6912(.1247- .9513)	360.0 (20.0-533.0)
d) Manufactures	.7212(.1520-1.048)	409.5 (49.2-674.1)
IS		
a) Total average	.6970(.1813- .9577)	415.0 (95.6-585.5)
b) Manufactures	.6967(.1928- .9778)	348.1 (41.2-529.8)
NT		
	.8358(.1723-1.055)	522.3(105.3-688.8)

* Figures in parentheses indicate the range of values determined by the boundaries of intermediate imports(equations 10 & 11).

Table 2 Mexico: Effects on Incomes of Lower-income Groups of Unit (million pesos) Spending on Alternative Trade Categories

Trade category	Absolute poor*	Poorest 20 percent
EP		
Total average	1.492(0.0661-3.297)**	0.353(0.0155-0.781)
Primary products	2.515(0.0781-5.400)	0.596(0.0185-1.278)
Crude oil & derivatives	0.999(0.0447-2.244)	0.236(0.0144-0.661)
Manufactured	1.220(0.0607-2.790)	0.289(0.0144-0.661)
IS		
Total average	1.110(0.0526-2.576)	0.267(0.0117-0.609)
Manufactured	0.921(0.0466-2.911)	0.217(0.0100-0.517)
NT		
Total average	1.343(0.0729-2.911)	0.318(0.0167-0.689)

* The population with per capita income falling below the government-defined poverty line. It accounted for about 40 percent.

** The range of values defined by the boundaries of intermediate goods imports.

imports, along with the multiplier process of income and spending.

If the relationship between trade and employment is intuitive and straight forward, the relationship between trade and income distribution is far less transparent. First, in terms of the income effects for the poor, *EP* is found to generate discernibly greater earnings per unit spending than *IS*, but the comparison between *EP* and *NT* reveals mixed results: for Ghana and Thailand the expansion of domestic markets (*NT*) would be more favorable to the poorer groups, and for Mexico and Bangladesh the impact on income comes close between the two regimes. Here, Mexican oil exports constitute a special case. Compared to other industries, they have regressive, distributional consequences, and are least favorable to the poorest(Table 2).

It must be pointed out that greater income effects do not necessarily translate into a better living standard for the poor. The results on Ghana show that although *EP* generates eight times as much employment in worker-years as *IS* and three times as *NT* (Table 8), employment in the export sector consists predominantly of low-paid, unskilled

Table 3 Brazil: Employment and Income Generation Per Unit (million cruzeiros) Demand Under Alternative Trade Structures

Trade structure	*EP*	*IS*	*NT*
Employment effect (worker-years)	26.03 (6.43-17.35)*	11.20 (4.27-12.28)	23.51 (10.56-24.77)
Income effect for the poor	.101 (.024-1.04)	.037 (.015-.40)	.79 (.35-.83)
Effect on Gini coefficient	.816 (.812-.823)	.893 (.892-.914)	.833 (.832-.839)

* Figure in parenthesis indicate the range of values defined by the boundaries for intermediate import substitution.

Table 4 Brazil: Size Income Distribution Under Alternative Trade Structures

Incomes Shares	Income Group *EP*	*IS*	*NT*
Less than 1/2 minimum wage (MW)	.007	.002	.003
1/2-1 MW	.031	.009	.018
1- 2 MW	.060	.028	.058
2- 3 MW	.034	.022	.042
3- 5 MW	.042	.032	.052
5-10 MW	.045	.038	.055
10 or greater	.781	.870	.771
Gini coefficient	.816	.893	.833

Table 5 Thailand: Trade Effects on Employment Creation by Sector
(Per Million Baht of Output)

(worker-years)

	EP		*IS*		*NT*	
	Amount	%	Amount	%	Amount	%
Agriculture	75.55	58.44	24.57	34.94	68.51	61.59
Mining and quarrying	32.07	24.81	28.70	40.81	12.50	11.24
Industry	8.11	6.28	5.66	8.05	10.02	9.01
Energy	9.96	7.70	8.70	12.37	13.26	11.92
Services	3.59	2.77	2.67	3.83	6.94	6.24
Total	129.28	100.00	70.32	100.00	111.23	100.00

Table 6 Thailand: Estimates of Capital Intensity by Trade Category
(Million baht per worker-year)

	EP	*IS*	*NT*
Total	0.0043	0.0145	0.0056
Unskilled	0.0046	0.0167	0.0060
Skilled	0.0596	0.1090	0.0496

Note: Unskilled labor consists of "own account" and "casual" workers, and skilled labor consists of "white-collar" and "blue-collar" workers.

jobs in cocoa production. As a result, the impact on per capita income for the poor is negligible under *EP* relative to the cases of *IS* or *NT* (Table 9). Similarly in the case of Bangladesh, it can be shown that the poor's average wage earnings or labor's share in the export sector actually declines by a shift toward an export-oriented regime. This is because the employment effect exceeds the income effect for the poorer income groups[18].

Another general result that emerges from the country studies is that the link between

Table 7 Thailand : Effects of Alternative Trade Structures on Value Added by Sector

(Million baht)

Sector	*EP*		*IS*		*NT*	
	Amount	%	Amount	%	Amount	%
Agriculture	0.753	63.81	0.253	33.37	0.696	52.33
Mining and quarrying	0.012	1.02	0.011	1.61	0.005	0.38
Industry	0.147	12.45	0.228	37.05	0.173	13.01
Energy	0.028	2.38	0.026	3.81	0.039	2.93
Services	0.240	20.34	0.165	24.16	0.417	31.35
Total	1.180	100.00	0.683	100.00	111.23	100.00

Table 8 Ghana : Trade and Employment (In worker years) By Skill Level

Skill Level	*EP*	%	*IS*	%	*NT*	%
Professional	6.4	0.6	9.2	6.4	96.22	18.25
Managerial	1.7	0.17	2.9	2.9	15.39	2.92
Clerical	11.5	1.18	17.7	12.3	54.33	10.3
Unskilled	953.1	97.9	113.2	79.1	361.05	68.5
Total	972.7		143		526.99	

Table 9 Ghana : Income Effects Per Unit Demand Under Alternative Trade Structures

Trade structure	*EP*	*IS*	*NT*
Total	1.465	.770	1.814
Rural	47.5%	52.5%	54.2%
Urban	52.5%	47.5%	45.7%
Per capita income of the poor	.105	.336	.260

employment and income distribution by size is tenuous, thus questioning the relationship between factor intensity and income distribution presumed in the neoclassical trade theory. In the case of Mexico, the long-term redistributive effects of trade regimes are found virtually neutral[19] : the indirect linkage as well as the intermediate substitution effects, which will determine the longer-term effects, seem to dominate over any differences in direct effects alone. The study questions the relevance of the Heckscher-Ohlin-Samuelson model when the impact of secondary linkages is considered. The case of Thailand shows that the benefits of export expansion tend to concentrate on low productivity activities. This creates a vicious cycle of low income and a worsened distribution of income. Although in the case of Brazil the *IS* regime is found to worsen the relative distribution, the differences in terms of Gini coefficients between *EP* and *NT* are hardly significant (Table 4). The case of Bangladesh, although its export activities generate far greater incomes for the poor, shows a distributional neutrality, as measured by Gini coefficients, of the choice of trade regime (Table 11). On a different note, Brazil's manufactured exports are shown to lead to income concentration in industry. The study on Ghana, which looks at the structural impact of trade regimes, similarly concludes that export-oriented strategy is likely to fail in the diversification of exports, thereby resulting in income concentration in industry.

Thus, the country studies conclude that trade policy-relative to other instruments-plays an insignificant role in affecting the distribution of income. For one thing, the case studies agree that improvements in the well-being of the poor and decreases in overall income inequality can be achieved by shifting the functional distribution of income in favor of unskilled labor[20]. Perhaps more

Table 10 Bangladesh: Trade Structures and Employment Effects

	Exportables		Import substitutes		Nontradables	
	(worker-years)	U_j	(worker-years)	U_j	(worker-years)	U_j
Case a	452.236	1.68	115.074	0.60	392.886	1.05
Case b	418.834	2.42	89.386	0.36	222.820	1.05
Case c	452.598	2.51	97.268	1.27	----------	

Notes: U_j: Rasmussen-type of normalized, total linkage measure (Cf. P. Rasmussen, *Studies in Intersectoral Studies* North Holland, 1957.)
Case a: the conventional case dealing with an economy-wide impact
Case b: the manufacturing sector
Case c: the group of manufacturing industries considered as relatively more efficient.

Table 11 Bangladesh: Poverty Alleviation and Distributional Effects Under Alternative Trade Structures

	Exportables		Import substitutes		Nontradables	
	(1)*	(2)**	(1)	(2)	(1)	(2)
Case a	.5798	0.62	.1894	0.61	.5690	0.62
Case b	.5507	0.62	.1627	0.61	.3826	0.61
Case c	.5912	0.62	.1787	0.60	----------	

Notes: *: Income gains to the poorest 43% of the population per unitary increase in demand for respective trade category.
**: Gini concentration coefficients.

importantly, the reduction in income inequality will require fundamental institutional changes in the structure of distribution itself.

4. Conclusion

The country studies conclude that the export-oriented strategy has considerably favorable impacts on domestic employment in developing countries. On the other hand, the mechanism of foreign trade alone does not exert a significant influence on the size distribution of income. The country studies reveal the limitations of foreign trade to serve as a vehicle to improve the country's income distribution. The distribution of income by size would be affected not only by trade policies influencing the sectoral composition of the economy but also by such factors as the size of the firm, weight of foreign capital, distortions in the product and factor markets, overvaluation of the exchange rate, sectoral differences in the effective protection, initial distribution of human and capital assets, or perhaps more importantly, struggle between labor and capital over the functional income share. Also, the international market conditions can ultimately affect the success or failure of trade strategy, making it difficult to foretell a chosen strategy's net impact. Thus in order to bring about changes in the distribution of income, one must look beyond trade policy, which may have to be accompanied by other institutional reforms to redistribute assets or other forms of redistributive policies[21].

Finally, the choice of what industries should be promoted for exports must take into account the longer-term implications for the economy's structural change. For these reasons, the results alleging the superiority of export promotion in employment generation must be interpreted with greater caution.

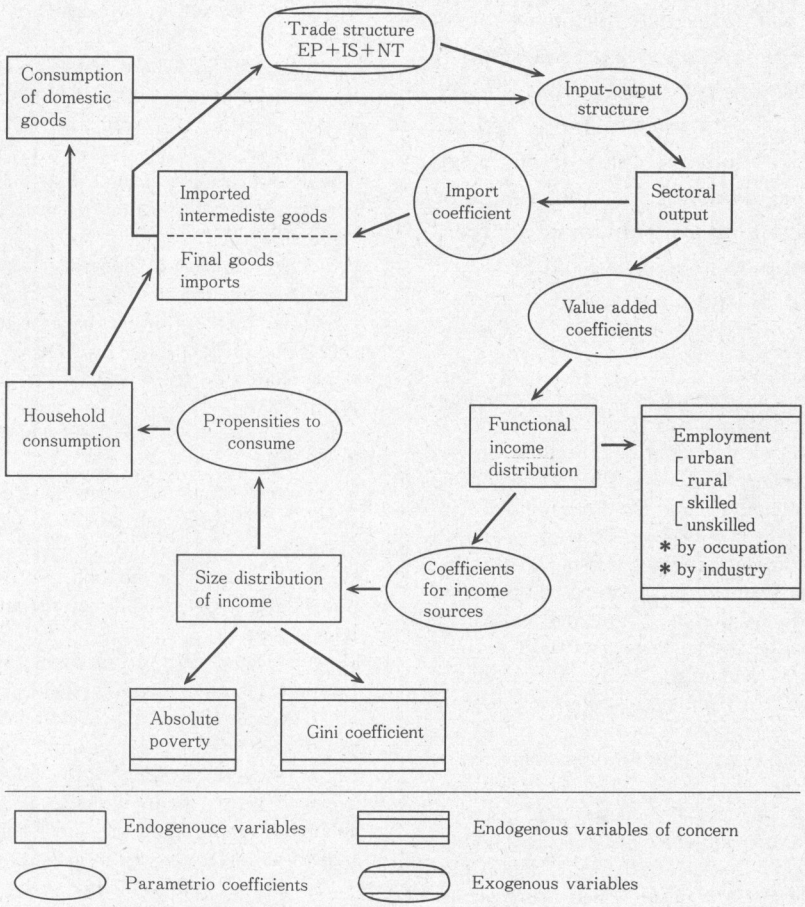
Appendix A. The relationship between the functional and the size distribution of income.

The income of the *ith* group by size Y_i, is derived from various functional sources of income:

$$Y_i = \sum_{j=1}^{k} r_{ij} F_{ij}$$

where r_{ij}=the unit rental income derived from the *jth* factor of production owned by the *ith* income group

Figure 1 Structure of the Model



F_{ij}=the amount of the *jth* factor of production owned by the *ith* income group.

If the rental values of the factors are assumed given and constant, the size distribution of income in the economy will be determined by the distribution of income-earning factors of production, which include both human and physical assets.

The relationship between functional and size income distributions is expressed in the following table for the case of two factors and two income classes; the sources of income consist of wages and nonwages, which are derived by poor and nonpoor groups.

	Wages	Nonwages	Group income total
Poor	W_p	R_p	Y_p
Non-poor	W_n	R_n	Y_n
Functional income total	W	R	Y

Define $w_p = W_p/W$ and $r_p = R_p/R$;
Then

$$\begin{vmatrix} w_p & r_p \\ 1-w_p & 1-r_p \end{vmatrix} \begin{vmatrix} W \\ R \end{vmatrix} = \begin{vmatrix} Y_p \\ Y_n \end{vmatrix}$$

from which, the ratio of the nonpoor to the poor income can be expressed as a function of the relative share of wages, $S = W/R$;

$$Y_n/Y_p = [(1-w_p)S+(1-r_p)]/(w_p S+r_p),$$

$$\text{and } d(Y_n/Y_p)/dS = (r_p-w_p)/(w_p S+r_p)^2 \gtreqless 0$$

$$\text{as } r_p \gtreqless w_p.$$

Hence, the income differences widen—or equivalently the size distribution becomes more unequal—as the wage share rises only if the poorer group—relative to that of the non-poor—derives its income more heavily from non-wage sources than from wage sources, or equivalently if the non-poor derives its income more from wage sources.

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Note

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1) For instance, a number of mainstream economists share Raul Prebisch's old concern with inelastic world demand for developing country exports. From the standpoint of structural rigidity, Behar (1988) points out the structure of labor markets in a developing country which are typically distorted or segmented. The shift to export-oriented policies will not automatically create more jobs.

2) According to R. Vernon's product cycle theory, in the late stages of product development the process of production becomes standardized, with capital and labor substituting for the skill content that was critical in the initial stages. Hence, factor intensity may cease to be a relevant concern because standardized procedures may give access to the developing countries to produce manufactured goods with capital intensity. More recently, the choice of exportable industries may be determined from the perspective of dynamic comparative advantage. Such factors as X-efficiency, interindustry linkages or externalities can be more important than the Ricardian notion of static comparative advantage. Thus, the export sector in a developing economy may not necessarily be a labor-intensive one. Krugman (1991) ; Leibenstein (1978) ; or Franz (1988).

3) For a summary of empirical studies, see Krueger (1988), and Lal & Rajapatirana (1987).

4) See for example, Stewart & Streeten (1971), Little, et. al. (1970), Meier (1980), and Balassa (1982).

5) The authors show that the wage share steadily declined in the initial (labor-surplus) stage of industrialization in Japan. The elasticity of factor substitution less than one is a critical condition. The deterioration in income distribution during this period can thus be related to the relative decline in wage share.

6) See the case of Bangladesh in Section 3.

7) See the case of Thailand in Section 3.

8) See the case of Mexico in section 3.

9) For international cross-sectional results on labor shares by trade regime, see Greenway and Nam (1988).

10) The study on Thailand is based on the SAM data.

11) Our model is extended from the earlier works of Paukert et. al. (1972), and Miyazawa (1976).

12) For some countries (i. e., Brazil), the Ay matrix can be obtained directly from the household budget data.

13) More generally, our simulation analysis can be applied to any specific group or groups of sectors and industries. In the case of Bangladesh, for example, three cases were considered : (a) the conventional analysis dealing with an economy wide impact ; (b) the manufacturing sector, and (c) the group of manufacturing industries which are known as relatively more efficient.

14) For a similar methodology, see Barrantes Hidalgo (1985).

15) For the derivation, see Fei, J. C. H., Ranis, G., and Kuo, S. W. Y. (1979).

16) The distributional consequences in this study are measured by the Gini coefficients. In our simulations, while the income shares of different income groups are allowed to vary with alternative trade structures, the population weights are assumed to be constant. This is a perfectly acceptable assumption in a static context. In a dynamic setting, however, with changes in income and in its distribution, the number of people in each income group may change with the resulting changes in the population weights. Our simulations deal with marginal changes in trade structures and the population weights are assumed to be unchanged in the short run analysis.

17) This conclusion coincides with that of the World Bank's 1987 *World Development Report* (Table 2-2).

18) Separate calculations show that the trade regime effects on labor's share in increased incomes for the poorest 43% of the population range from 22

percent under EP to 25 percent under NT(Kim & Tareq, 1991).

19) In separate calculations the values of the Gini coefficients for Mexico were found to lie in the range between .60 and .63(Kim & Turrubiate, 1984).

20) For example, Carmago(1984) attributes the improvement in size distribution during the period from 1974 to 1980 in Brazil to the government's less repressive wage policy.

21) For a fuller discussion on redistributive measures in Latin America, see David Felix(1989).

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