The Developing Economies, XXVII-1 (March 1989)

INTERNATIONAL TRADE, EMPLOYMENT, AND INCOME: THE CASE OF THAILAND

KWAN S. KIM
P. VORASOPONTAVIPORN

I. INTRODUCTION

RECENT arguments supporting an outward-looking strategy for developing countries are well known and need not be repeated here.[1] In particular, a developing country's export push can be a strategy to increase the income of its most abundant factor—labor—, thereby reducing unemployment and poverty:[2] Developing country exports are normally labor intensive, and most of the poor are workers; thus, an income shift toward labor should lead to a more even distribution of income. In contrast, an import-substitution-oriented strategy is considered less effective in creating employment and in alleviating poverty because production in import-substitution (IS) industries is less labor intensive than the country's factor endowments dictate.[3]

This paper attempts to quantitatively simulate the implications of alternative trade structures[4] for employment and incomes, in particular, the incomes of the poor in Thailand. In a largely open economy as Thailand's is, choice of a foreign trade regime has important effects on levels of employment and income, and the distribution of income. Studies by Akrasanee [1], Patamasiriwat [11], and Tambunlertchai et al. [17] show that for Thailand, manufactured goods exports, especially those that are non-natural-resource based, are conducive to the creation of employment. The studies, however, deal mainly with manufacturing and need to be extensively analyzed further because they fail to take into account the inter-industry linkage effects of non-manufacturing sectors. No empirical measures on the distributional consequences of foreign trade have been attempted for Thailand.

This paper thus focuses on the structure of earnings associated with the alternative trade strategy by ascertaining who owns the factors of production that would be distinctly rewarded by a shift in trade structure. The paper's second section surveys Thailand's trade policies and structural changes from a historical

An earlier version of this paper was presented at a World Academy of Development and Cooperation seminar, University of Maryland in 1987. The authors benefitted from valuable comments of an anonymous referee but are responsible for any remaining errors.

[1] For a comprehensive empirical study on the developmental role of trade, see [6] [7].

[2] For instance, see [4] [5] [10] [19].

[3] See [8] [2]. For the distributional effects of protection under import substitution, see [16].

[4] By trade structure is meant the commodity composition of foreign trade.

perspective. This is followed by the model in Section III and then Section IV describes the sources of data. Section V reports the main findings of our analysis, followed by highlights of policy implications drawn from the study.

It is worth pointing out that the conventional, neoclassical theory of income distribution conceives the central problem as being in the determination of levels of employment and remuneration of the factors of production, which are usually grouped into labor and capital. This theory is, in general, inadequate for explaining poverty in a developing country, where the majority of the poor are self-employed and do not always enter the wage economy. As will be shown later, Thai wage-earners must be considered as belonging to the middle-income classes; the division along a line of functional income distribution between wages and profits appears to have little to do with the issue of distribution equity.

II. THE EVOLUTION OF TRADE REGIME AND STRUCTURE

Thailand experienced impressive economic growth during 1960–80. Real GDP grew at an average annual 7 per cent with the rate of growth in per capita income averaging 3.8 per cent [18]. The overriding feature of Thailand's high growth period was rapid industrialization: industry's share of GDP rising from 18 per cent in 1960 to 29.4 per cent in 1980 and agriculture's share steadily declining from 40.5 per cent to 25.2 per cent.

Thailand's successful industrialization has, however, failed to affect in any significant measure the vast majority of Thais who still live in agricultural communities. It appears to have actually, widened the disparity in income, especially the gap between small farmers and urban dwellers, and between Bangkok and the poorer regions, such as the northeast.

Recent government trade policy has increasingly turned toward export promotion. In this context, relation between trade, employment, and incomes for the poor are emerging as important policy issues, as Thailand, in comparison to other developing countries, maintains a fairly open trade system with relatively low tariffs and few quantitative import restrictions. Foreign trade's share of GDP has been high; for instance, during 1974–78, the export and import shares of GDP were 21 per cent and 26 per cent, respectively, in comparison to 12 and 14 per cent averages for all developing countries.

From a historical perspective, two distinct trade regime periods can be discerned during the high growth of 1960–80. First, the structure of incentives up to the mid-1970s encouraged import substitution, particularly in nondurable consumer goods. Growth in manufacturing was primarily based on production geared toward the domestic market. By the mid-1970s, however, the domestic market for import-competing goods was saturated. The government began to shift its policy in favor of the export sector by reducing the policy bias against exports. World markets for developing country exports were also favorable during this period. As a result, Thailand's exports—especially in manufactured goods—expanded rapidly, with export earnings rising to nearly a billion dollars by 1978 and accounting for about a quarter of the country's total exports.

TABLE I

COMMODITY COMPOSITION OF EXPORTS

(Billion baht)

	1977		1981	
	Amount	%	Amount	%
Agricultural products:	36.68	51.47	72.12	47.14
Rice	13.43	18.85	26.50	17.32
Tapioca	6.12	8.59	16.54	10.81
Maize	3.35	4.70	8.24	5.38
Rubber	7.71	10.82	10.67	6.97
Shrimp	1.17	1.64	2.11	1.38
Others	4.90	6.87	8.06	5.26
Industrial products:	21.77	30.55	50.04	32.70
Food processing	4.54	6.37	9.57	6.25
Metal products	7.44	10.44	9.10	5.95
Textiles	4.41	6.19	12.18	7.96
Others	5.38	7.55	19.19	12.54
Miscellaneous items	12.81	17.98	30.85	20.16
Total	71.26	100.00	153.00	100.00

Source: Bank of Thailand, *Annual Economic Report,* various issues.

TABLE II

COMMODITY COMPOSITION OF IMPORTS

	Amount in Billion Baht			Percentage Composition		
	1951	1970	1981	1951	1970	1981
Consumer goods	2.15	5.23	22.90	59.07	19.36	10.58
Capital goods	0.92	9.37	56.66	25.27	34.69	26.17
Intermediate goods and raw materials	0.57	6.73	53.48	15.66	24.92	24.70
Fuels and lubricants	—	2.33	65.10	—	8.63	30.07
Other imports	—	3.35	18.36	—	12.40	8.48
Total	3.64	27.01	216.50	100.00	100.00	100.00

Sources: For 1951, United Nations, *Statistical Yearbook, 1961* (Bangkok: Economic Commission for Asia and the Far East, 1961); for 1970 and 1981, Bank of Thailand, *Monthly Bulletin,* 1979 editions, and Bank of Thailand, *Annual Economic Report, 1981* (Bangkok, 1982).

Thailand's commodity composition of trade has roughly reflected the changing structure of the economy. In exports, agricultural products have been predominant; their share of total exports has, however, been declining; it fell, for instance, from 51.5 per cent in 1977 to 47.1 per cent in 1981, while the share of industrial goods exports rose to 32.7 per cent during the period (Table I). Agricultural exports are highly concentrated in a few products. Currently, more than 60 per cent

of export revenues come from eight products: rice, rubber, maize, tapioca, fresh prawns, tin, sugar, and textiles.

Merchandise imports in the 1950s were mainly consumer goods, which were 60 per cent of total imports in 1951 (Table II). With the push for industrialization in the 1960s, capital and intermediate goods imports, including raw materials, began to rise in importance. At the same time, the advances in import substitution of consumer goods, rapidly reduced their share of total imports so that by 1981 26.2 per cent of all imports was in capital goods, 10.6 per cent was in consumer goods, and 24.7 per cent was in intermediate products.

III. THE MODEL

The empirical framework used in this study is an open input-output system that is an extension of earlier works by Pyatt et al. [15], Paukert et al. [12], Miyazawa [9], and Kim and Turrubiate [3]. Departing from the conventional input-output model, final consumption demand will be treated here as an endogenous variable that depends on the pattern of income distribution. Our model, specifically, takes into account different propensities to consume by different income groups. This is important since the likely result of assumptions of exogenous consumption is an underestimation of the true impact of inter-industry linkage effects.

The earlier model by Kim and Turrubiate treated consumption in aggregate terms by relating the economy's consumption spending to national income. The present model is more detailed and algebraically more complex, as it disaggregates the matrices of both final domestic and import demands by different income groups. Another extension is treatment of socioeconomic groups. Economic classes are defined not only by income levels but also by other attributes, such as skill level and type of work. Our interest in this model is to obtain a more comprehensive picture of the working poor in Thailand.

Keeping in mind, unless otherwise stated, that the dimension of the notations denotes the number of sectors in the economy, we start with the basic accounting identity that for each sector, the total output supply that consists of gross output X, and total imports M, is equal to the total demand comprising intermediate demand AX, consumption spending C, and other exogeneous final demand F:

$$X+M=AX+C+F, \tag{1}$$

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

Consumption (C) depends on income (Y);

$$C=A_c \cdot Y, \tag{2}$$

where A_c is a matrix of marginal propensities to consume classified by n number of sectors[5] and r number of income groups. Y is a column vector of r order whose

[5] The coefficients of A_c are estimated from a linear regression equation that includes the intercept, and should be interpreted as "marginal." Nevertheless, presuming a low-income elasticity of food consumption (Engel's law), our estimates are likely to upwardly bias the effects of change in the agricultural sector in an expanding economy. The authors owe their thanks to a referee for this observation.

elements represent the corresponding group's household income.

Income accruing to each group is related to the level and composition of sectoral outputs:

$$Y = A_y \cdot X, \tag{3}$$

where A_y is a matrix of value-added coefficients whose element (r, j) indicates the value added accruing to income group r from the activities of industry j.

Total imports consist of intermediate uses (M_i), imports for consumption (M_c), and imports for other final uses (M_f).

$$M = M_i + M_c + M_f. \tag{4}$$

M_f that includes non-private sector consumption and investment goods imports is assumed to be exogenously determined; and M_i and M_c are assumed to depend on output X and income Y as:

$$M_i = A_m \cdot X, \tag{5}$$

$$M_c = A_{mc} \cdot Y, \tag{6}$$

where A_m is a matrix of intermediate import coefficients, and A_{mc} a matrix of consumption-import coefficients.

Combining equations (1) to (6) and solving for X, we obtain

$$X = (I - A - A_c \cdot A_y - A_m - A_{mc} \cdot A_y)^{-1} (F - M_f),$$

or for short,

$$X = H \cdot (F - M_f), \tag{7}$$

where our modified Leontief matrix H combines both the income-consumption multiplier and inter-industry linkage effects.

The quantities of labor L, classified into r income groups, that are required to produce goods that will satisfy a given vector of final demands is then given by

$$L = A^* \cdot H \cdot (F - M_f), \tag{8}$$

where A^* is a matrix of labor requirements whose rows represent the employment coefficients in different industries that correspond to each income group.

Now, equation (3), which determines the income Y accruing to each income group, can be rewritten as

$$Y = A_y \cdot H \cdot (F - M_f). \tag{9}$$

This equation simulates the effects on the size distribution of income when there is a change in domestic final demand, $F - M_f$, which includes demand for such alternate trade categories as export, import-competing, and non-tradable goods.

Categories of commodities that may be identified as "exportables," "importables," or "non-tradables" have yet to be defined. The procedure adopted here is to observe the composition of expenditures on any trade category across sectoral outputs. For instance, a million baht worth of the exportables basket is obtained as a weighted average of the spending on exports. The weighing is done by the

observed commodity composition of that trade category. The basket of importables is similarly calculated as weighted averages of imported commodities that are in part produced domestically. Non-tradable goods then include other residual activities.

For purposes of analysis, we may simplify the expression of final demand as

$$F-M_f=TQ, \tag{10}$$

where T is an "$n\times t$" matrix whose element shows the share of sector i in trade category t[6] and Q is a vector of instrumental variables which in our case consists of the levels, respectively, of exportables, import-substitutable, and non-tradable goods. The impact of alternative trade structures can, for instance, be compared by assuming a "one million baht" increase in the Q vector for three trade categories identified here as export promotion (EP), import substitution (IS), and non-tradables (NT).

IV. THE DATA

The data used in this study mainly come from *A Social Accounting Matrix for Thailand 1975*.[7] The social accounting matrix (SAM) provides a snapshot of the principal flow in an economy at any point in time. Structured around an input-output table, it presents data on economic activities by different agents in the economy.[8]

The SAM for Thailand was constructed as an accounting framework for a multi-sector, sequential equilibrium model (named "SIAM2 for Thailand"). SIAM2 has 567 accounts presented in 37 matrices. At present, SAM is the most complete economic data system in Thailand and as such, is widely used for policy formulation and planning. For the purposes of our study, however, each vector and matrix used here has been reconstructed using the following additional sources of data: (1) *National Accounts of Thailand, 1979,* (2) *The Basic Input-Output of Thailand, 1975,* (3) *The Labor Force Survey,* 1975–80, and (4) fiscal data from the Ministry of Finance.

In this study, the production account has been aggregated into six sectors: agriculture, mining and quarrying, industry, energy, construction, and services.[9] Each of sectors is further subdivided into seventeen activities. There were some problems in directly applying the original data to our model. For instance, the household incomes in the SAM included factor payments, transfers from the government and other households, and payments from companies as well as from

[6] The row sum for each trade category in the "T" matrix is equal to one.

[7] Published by the National Economic and Social Development Board, Thailand and the World Bank (Bangkok, 1983). For a more detailed description, see Piyasvasti Amranand and W. Grais, "SIAM2 for Thailand," Working Paper by the National Economic and Social Development Board, Thailand and the World Bank (Bangkok, 1983). The 1975 SAM data are the latest series that can be used consistently with other household survey data. It must be noted that there have been no recent, drastic structural changes in the Thai economy to affect the qualitative results of this study.

[8] For detailed accounts of the SAM, see [14] [13].

[9] The data used in this study will be made available upon request.

TABLE III

EMPLOYMENT EFFECTS BY TYPE OF WORK OF UNIT-EXPANSION IN ALTERNATIVE TRADE CATEGORIES

	Percentage of Workers	Per Worker Earnings (1,000 Bath)	Employment Effects (Man-Years)		
			EP	IS	NT
Own account	75.09	7.553	109.305	53.900	90.470
			(84.55)	(76.65)	(81.33)
White collar	3.35	35.068	0.170	0.141	0.250
			(0.13)	(0.20)	(0.21)
Blue collar	13.30	19.008	9.224	9.217	11.850
			(7.13)	(13.11)	(10.65)
Casual	8.26	8.632	10.581	7.062	8.670
			(8.19)	(10.04)	(7.79)
Total	100.00		129.280	70.32	111.240
			(100.00)	(100.00)	(100.00)

Note: Figures in parentheses are percentages.

abroad. The matrix that represents household incomes in this study includes only "factor payments" and "company transfers to households." This simplification is necessary because the figures for "other sources of income" in the SAM, which in any event account for a trivial 0.63 per cent of the total household income, have not been disaggregated by the classification scheme in our analysis. This ommission is not likely to affect the results of the study.

V. EMPIRICAL FINDINGS

This section gives estimates of the impact of alternative trade structures on labor absorption, factor intensity, and incomes of different socioeconomic groups in Thailand.

A. *Employment Effects*

Table III shows estimates of man-years of labor that are directly and indirectly required to increase output by one million baht[10] in each trade category. It is significant that the level of employment created in each export sector (129.3 man-years) and non-tradable sector (111.2 man-years) is about twice that generated in the import-substituting sector (70.3 man-years). The large employment effect in export production can be explained by the substantial indirect labor requirements in resource-based industries which dominate Thailand's export sector.[11]

[10] Alternative estimates of labor required per unit of value added yield essentially similar results as reported in Tables III and IV.

[11] Earlier studies on Thailand [1] [11] [17] failed to delineate the inter-sectoral linkage effects originating in agriculture, since they were confined to the effects on manufacturing industries alone.

TABLE IV

TRADE STRUCTURE EFFECTS ON SKILLED AND UNSKILLED EMPLOYMENT
(PER MILLION BAHT INCREASE IN OUTPUT)

	EP		IS		NT	
	Man-Years	%	Man-Years	%	Man-Years	%
Skilled	9.39	7.26	9.36	13.31	12.10	10.88
Unskilled	119.89	92.74	60.96	86.69	99.14	89.12
Total	129.28	100.00	70.32	100.00	111.24	100.00

To better understand the link between employment and income distribution, it will be useful to examine the employment effects at disaggregated levels of the work force. First, Table III shows the employment effect by types of work. In Thailand, about three quarters of the work force can be considered "own-account" (OA) workers, with the remaining split into "casual," "blue-collar," and "white-collar" workers. Occupational examples of OA workers are self-employed fishermen and hunters; operators of small-scale farms in an extended family system; and small-scale, urban self-employed workers. As shown in the table, the average income in Thailand of OA workers, and "casual" workers, is about a quarter of the highest income group—the white-collar workers. There is evidence to suggest that self-employed workers often avoid large-scale projects, even though they may be more profitable than small-scale ventures.[12] In Thailand, business is normally conducted at the family-unit level and involves only a few family-related associates. There is a tendency to shun large-scale projects that outsiders participate in.

It can be readily seen from the table that the export sector employs the largest share of OA workers in the trade categories: About 85 per cent of new jobs created under EP go to the OA group, compared with 77 per cent under IS. In a similar vein, Table IV shows that EP is also superior in creating jobs for Thailand's most abundant factor, unskilled workers. In contrast, the skill content requirement is most severe under IS. Tables III and IV thus present mutually consistent findings, since in Thailand the OA workers, along with the casual ones, can for practical purposes be considered unskilled. These workers are predominant in the informal sector where skill requirements are far less stringent than in the formal, urban economy. These results confirm the predictions of the Heckscher-Ohlin theory that a country exports products, which use the country's most abundant factor with relative intensity. The most abundant factor in Thailand is obviously the unskilled, self-employed worker who is officially classified as an "own-account" laborer.

Table V further compares the effects on employment by sector. One noteworthy result of the disaggregation is that it shows agriculture as the generator of the

[12] For instance, manufacturing establishments employing less than ten workers account for over three quarter of all firms and nearly one-fifth of employment in manufacturing in Thailand. See the World Bank, "Thailand: Industrial Development Strategy in Thailand," Background Paper No. 2059-TH (Washington, D.C., 1980).

TABLE V

TRADE EFFECTS ON EMPLOYMENT CREATION BY SECTOR
(PER MILLION BAHT OF OUTPUT)

(Man-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 VI

ESTIMATES OF CAPITAL INTENSITY BY TRADE CATEGORY

(Million baht per man-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 is "own account" and "casual" workers, and skilled labor is "white-collar" and "blue-collar" workers.

largest number of jobs in all trade categories. Under an expansion of both EP and NT activities, new jobs created in agriculture are about 60 per cent of the total. Even under IS, a third of employment creation is in agriculture. This reflects the Thai economy's structural characteristic of an agricultural sector that is relatively labor intensive, and is generally well integrated into the economy. In particular, agriculture's substantial employment creation even under IS can be explained by the fact that Thailand's export of manufactured goods is based on raw-material-oriented production that essentially relies on domestic provision of agricultural input. Indeed, a previous study found a substantial backward linkage effect for Thailand resource-based as well as non-tradable industries.[13]

Next to agriculture, the "mining and quarrying" sector that produces tin, tungsten, fluorite, antimony, and manganese is the most important source of new jobs under IS, and the second largest source under EP. This sector is considered to be fairly labor intensive in Thailand and, at the same time, provides relatively well-paying jobs. As for the industrial sector, EP and NT activities again are shown to be superior to IS activities in creating employment, although in terms of the percentage employed, IS has a larger linkage effects. This confirms the earlier view of several Thai authors that an outward-looking strategy, even in the

[13] See [17].

TABLE VII

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	1.330	100.00

context of the industrial sector alone, creates more employment than the inward-looking alternative.

Finally, another useful comparison can be made in regard to the capital intensity that is associated with alternative trade structures (Table VI). Here, capital intensity is measured as the value of capital assets divided by the number of man-years per sector, which results in import industries being the most capital-intensive, and then non-tradable and export industries, a result that is consistent with the earlier results on ranking of employment effects. Moreover, IS industries appear to employ less unskilled than export industries and more skilled labor than non-tradable industries, which is also consistent with the Heckscher-Ohlin theory.

B. *The Consequences for Distribution*

Table VII shows results on income by different sector. One noteworthy result is that the expansion of either exportable or non-tradable activities generates, on average, earnings about twice those earned under IS. Especially, agricultural income earnings under EP are about thrice those of industry. This contrasts with the industrial sector in which IS activities generate 1.5 times as much factor income as EP activities. This sectoral difference has significant implications for distribution: since farm workers are much poorer than urban industrial workers,[14] the policy shift from IS to EP will probably reduce the urban-rural income gap.

Marked differences in distributional effects are also evident when types of work are compared. Table VIII shows that incomes accruing to OA workers under the expansion of either EP or NT activities are more than twice those generated under IS, while a far larger share of income under IS goes to the relatively better paid, blue-collar group. It is well to note that OA workers are the lowest-paid income group, accounting for a predominant share (64 per cent) of the agricultural as well as the NT sector labor force. Thus, expansion of either the NT sector or the agricultural sector—or for that matter, the export sector since agricultural products are the country's major export item—should improve

[14] The SAM data show that workers in agriculture, who represent 65 per cent of the total Thai population, earn only 36.8 per cent of the total income.

TABLE VIII

COMPARISONS OF INCOME EARNINGS BY TYPES OF WORK UNDER ALTERNATIVE TRADE STRUCTURES

(Million baht)

	EP		IS		NI	
	Amount	%	Amount	%	Amount	%
Own account	0.80	67.04	0.30	45.39	0.77	57.89
Blue collar	0.22	18.81	0.28	40.12	0.31	23.31
White collar	0.06	5.42	0.05	7.76	0.14	10.53
Casual	0.10	8.73	0.05	6.73	0.11	8.27
Total	1.18	100.00	0.68	100.00	1.33	100.00

the economic position of lower-income groups better than an expansion of IS activities.

It is interesting that Thailand employment creation does not closely correlate with factor income; the relationship differs from sector to sector. For instance, although IS activities create a large number of jobs for low paid, OA workers (77 per cent), the group's earned income accounts for only 29 per cent of the total. On the other hand, the higher-paid, blue-collar workers receive close to 40 per cent of increased earnings, although they account for a mere 13 per cent of newly created jobs under IS. The service sector similarly receives the second largest share of income spillover from EP, but the impact on employment is rather low. The number of jobs created under EP accounts for a sheer 2.8 per cent, while service workers receive up to 20.3 per cent of increased inocmes. This is because most new jobs created under EP go to blue-collar workers. The opposite is true for the mining and quarrying sector. Here, IS activities are far superior to other trade categories in creating new jobs. Nevertheless, increases in share of incomes generated are rather small; our calculations reveal that EP, IS, and NT activities account for 24.8 per cent, 40.8 per cent, and 11.2 per cent of new jobs, respectively, but the corresponding figures for income share are only 1.0 per cent, 1.6 per cent, and 0.4 per cent. Thus, the distributional impact appears sensitive not only to the selection of trade strategy but also to types of industrial activities.

VI. SUMMARY AND CONCLUSIONS

Comparisons of alternative trade strategies show that the IS strategy scores badly on all accounts of impact on employment, income, and capital intensity: it is least employment-creating, least income-generating, and most capital-intensive. The EP strategy, on the other hand, yields the best results in generating new jobs and in saving the use of capital, although the strategy oriented toward non-tradable industries yields slightly more favorable results in generating value added. It is significant to observe that the employment and income effects of EP are almost twice those of IS. Thus, our simulation suggests that a structural change in Thailand from IS to EP orientation would double the increase in employment and

incomes.[15] Furthermore, an outward-looking orientation assures better utilization of capital.[16]

There are, however, a few points that must be noted in considering an export-oriented strategy for Thailand. First, as already mentioned, export activities create large quantities of essentially low-productivity employment; they do not contribute to expansion of employment in high-productivity sectors. Thus, the average living standard of the poor is not likely to be immediately raised by expanding export activities alone. Moreover, possibilities of export expansion depend on world market conditions. One need then to take into account in the analysis future prospects for developing country exports in the world market. Finally, one must keep in mind that our findings are based on an input-output model simulation, which is static and, therefore, appropriate more as a short-run analysis. In the long run, the values of input-output coefficients are likely to change as economic structure changes, and likewise, primary as well as secondary goods exports as a share of the total will change with per capita income. There are also other aspects of much broader issues concerning the country's industrialization and structural changes in the selection of a trade strategy. Obviously, proper caution is necessary in interpreting the results of this study for a long-run analysis.

[15] These results somewhat contrast with those in Kim and Turrubiate's study [3] on Mexico. There, expansion of exportables slightly improves the distribution of income, but only when direct, intersectoral linkage effects are taken into account. The income distribution remains virtually unaffected by alternative trade structures when total inter-industry effects are considered.

[16] In the sense that the capital-output ratio remains much lower in the export sector than in the import-substitution sector.

REFERENCES

1. AKRASANEE, N. "Trade Strategy for Employment Growth in Thailand," in *Trade and Employment in Developing Countries,* Vol. 1, *Individual Studies,* ed. A. O. Krueger (Chicago and London: University of Chicago Press, 1981).
2. BRUTON, H. J. *Employment, Productivity and Income Distribution* (Williamstown, Mass.: Center for Development Economics, Williams College, 1972).
3. KIM, K. S., and TURRUBIATE, G. "Structures of Foreign Trade and Income Distribution: the Case of Mexico," *Journal of Development Economics,* Vol. 16, No. 4 (December 1984).
4. KRUEGER, A. O. "Alternative Trade Strategies, Growth and Employment," in *Trade and Employment in Asia and the Pacific,* ed. N. Arkrasanee, S. Naya, and V. Vichit-Vadakan (Manila: Council for Asian Manpower Studies, 1977).
5. ———. "Trade Policy as an Input to Development," *American Economic Review,* Vol. 70, No. 2 (May 1980).
6. KRUEGER, *A. O.,* et al. (ed.) *Trade and Employment in Developing Countries,* Vol. 1, *Individual Studies* (Chicago and London: University of Chicago Press, 1981).
7. ———. *Trade and Employment in Developing Countries,* Vol. 2, *Factor Supply and Substitution* (Chicago and London: University of Chicago Press, 1982).
8. LITTLE, I.; SCITOVSKY, T.; and SCOTT, M. *Industry and Trade in Some Developing Countries* (Baltimore: Johns Hopkins University Press, 1971).

9. MIYAZAWA, K. *Input-Output Analysis and the Structure of Income Distribution* (New York and Berlin: Spring Verlag, 1976).
10. MOHAMMAD, S. "Trade, Growth and Income Redistribution," *Journal of Development Economics,* Vol. 9, No. 1 (August 1981).
11. PATAMASIRIWAT, D. "Industrial and Employment," Thai University Research Association, Research Report No. 7 (Bangkok, 1981).
12. PAUKERT, P.; SKOLKA, J.; and MATON, J. "Redistribution of Income, Patterns of Consumption, and Employment: A Case Study for the Philippines's," in *Advances in Input-Output Analysis,* ed. K. Polenske and J. Skolka (Cambridge, Mass.: Ballinger Publishing Co., 1974).
13. PYATT, G., and ROE, A. *Social Accounting for Developing Planning: with Special Reference to Sri Lanka* (Cambridge: Cambridge University Press, 1977).
14. PYATT, G., and THORBECKE, E. *Planning Techniques for a Better Future* (Geneva: ILO, 1976).
15. PYATT, G., et al. "A Methodology for Development Planning Applied to Iran," mimeographed, ILO mission report, Warwick, February 1972.
16. SCHULTZ, T. P. "Effective Protection of the Distribution of Personal Income by Sector in Colombia,' in *Trade and Employment in Developing Countries,* Vol. 1, *Individual Studies,* ed. A. O. Krueger (Chicago and London: University of Chicago Press, 1981).
17. TAMBUNLERTCHAI, S., et al. "Manufactured Exports and Employment in Thailand (Part I)," Report of Council for Asian Manpower Studise Project, Manila, 1981.
18. Thailand, National Economic and Social Development Board. *National Income of Thailand, 1981 Edition* (Bangkok, 1982).
19. WATANABE, S. "Exports and Employment: the Case of the Republic of Korea," *International Labour Review,* Vol. 106, No. 6 (December 1972).

APPENDIX TABLE

SELECTED MATRIX DATA

A. A Matrix of Consumption Coefficients (A_c)

Row	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7
1	0.518869	0.928250	1.00282	0.877041	0.244199	0.187758	0.365383
2	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
3	0.102071	0.197276	0.19841	0.223043	0.068497	0.063186	0.074081
4	0.002189	0.005924	0.00464	0.004773	0.001405	0.001152	0.001850
5	0.208694	0.360152	0.46680	0.652168	0.191095	0.175565	0.171981
6	0.000474	0.000556	0.00089	0.001152	0.000337	0.000369	0.000306
7	0.179820	0.302776	0.37358	0.431306	0.116788	0.152085	0.118030
8	0.030136	0.070598	0.07495	0.131998	0.024974	0.048469	0.020426
9	0.019888	0.033414	0.03826	0.062940	0.013995	0.011984	0.016725
10	0.000000	0.000000	0.00000	0.000000	0.000000	0.000000	0.000000
11	0.009417	0.015768	0.01812	0.029805	0.006626	0.005672	0.007919
12	0.010226	0.017035	0.02356	0.047688	0.013828	0.012184	0.010053
13	0.003895	0.005366	0.00754	0.020455	0.004545	0.006324	0.003361
14	0.032730	0.078896	0.08184	0.147348	0.027235	0.054111	0.022405
15	0.103080	0.159216	0.26495	0.584115	0.222009	0.220537	0.094591
16	0.042478	0.057591	0.08048	0.112608	0.033894	0.037436	0.027808

B. Income Coefficient Matrix (A_y)

Row	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
1	0.347358	0.000000	0.000000	0.0000000	0.0000000	0.0000000
2	0.000000	0.112293	0.000000	0.0000000	0.0000000	0.0000000
3	0.000000	0.000000	0.144698	0.0000000	0.0141035	0.0000000
4	0.000000	0.000000	0.000000	0.0000000	0.0000000	0.0000000
5	0.000000	0.000000	0.000000	0.0952023	0.0581162	0.0385474
6	0.000000	0.000000	0.000000	0.0090835	0.0022633	0.0020288
7	0.034007	0.055462	0.032485	0.0241936	0.0049942	0.0000000

Row	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12
1	0.000000	0.000000	0.000000	0	0.0000000	0.000000
2	0.000000	0.000000	0.000000	0	0.0000000	0.000000
3	0.007927	0.000000	0.000000	0	0.0000000	0.000000
4	0.079089	0.000000	0.319056	0	0.0000000	0.000000
5	0.121386	0.185953	0.000000	0	0.0141559	0.108155
6	0.006576	0.005684	0.000000	0	0.0579327	0.031186
7	0.012530	0.000000	0.014889	0	0.0000000	0.000000

Row	Column 13	Column 14	Column 15	Column 16
1	0.000000	0.000000	0.000000	0.000000
2	0.000000	0.000000	0.000000	0.000000
3	0.000000	0.000000	0.000000	0.000000
4	0.000000	0.249236	0.123375	0.000000
5	0.106596	0.400766	0.190340	0.237671
6	0.003609	0.028646	0.070500	0.448395
7	0.017886	0.018519	0.051635	0.000000

APPENDIX TABLE (Continued)

C. T Matrix

Row	Column 1 (EP)	Column 2 (SI)	Column 3 (NT)
1	0.534240	0.003645	0.276675
2	0.075212	0.000024	0.000000
3	0.010136	0.001614	0.062903
4	0.069622	0.007675	0.000000
5	0.056994	0.002926	0.148915
6	0.000113	0.002537	0.000000
7	0.140675	0.062686	0.084944
8	0.019249	0.800161	0.000000
9	0.000463	0.000000	0.013453
10	0.000000	0.061417	0.000000
11	0.005451	0.005201	0.003285
12	0.000000	0.000000	0.010573
13	0.000000	0.000000	0.127885
14	0.049676	0.014100	0.026979
15	0.038170	0.037917	0.119198
16	0.000000	0.000097	0.125190

Notes: 1. For definitions of rows and columns, see Section III.
2. The list of sectors in order are: crops, rubber, other agricultural products, mining and quarrying, food processing, fertilizers, light industry, heavy industry, energy and extraction 1, energy and extraction 2, energy transformation 1, energy transformation 2, construction, transportation and communications, trade, market services, and nonmarket services.
3. The list of income groups in order are: crop farmers, rubber farmers, fishermen and hunters, own-account businesses, formal-sector blue-collar workers, formal-sector white-collar workers, and informal-sector and casual workers.