

## ECONOMIC IMPACT OF MALAYSIAN TIMBER EXPORTS

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**MOHD. SHAHWAHID HAJI OTHMAN. 1992. Economic impact of Malaysian timber exports.** Input - output analysis is used in assessing the economic impact of Malaysian timber products exports. Relative to the size of export values, the exporting of sawn timber, veneer and plywood, moulding and joinery and furniture and fixtures contributed relatively higher direct and indirect output, employment, value added and commodity taxes than the exporting of logs, and paper and paper products. These findings suggest that further domestic processing of logs before exporting would generate high total direct and indirect output, value added, employment and government revenue to the economy due to their greater technological sectoral linkages.

**Key words:** Economic impact - output - value added - employment - commodity taxes - input-output analysis

**MOHD. SHAHWAHID HAJI OTHMAN. 1992. Kesan ekonomi terhadap eksport kayu-kayan Malaysia.** Analisa input-output telah digunakan untuk menaksir kesan ekonomi terhadap eksport keluaran kayu-kayan Malaysia. Relatif kepada saiz nilai eksport, pengeksportan kayu gergaji, papan lapis dan venir, kayu kumai, pemasangan, perabot dan perkakasan menyumbangkan output langsung dan tidak langsung pekerjaan, nilai ditambah dan cukai komoditi yang lebih tinggi berbanding dengan pengeksportan kayu balak, kertas dan keluaran kertas. Hasil penyelidikan ini menunjukkan bahawa pemerosesan lanjutan kayu balak secara domestik sebelum dieksport akan mendatangkan output langsung dan tidak langsung nilai ditambah, pekerjaan dan hasil yang lebih-tinggi, kepada ekonomi negara disebabkan oleh rangkaian sektor teknologi yang lebih tinggi.

### Introduction

The timber industry plays a vital role in the socio-economic development of the country. The industry provides significant foreign exchange earnings, value added, employment opportunities and state government revenue. Timber export earnings dramatically increased from RM4,760 million\* in 1986 to RM8,767 million in 1989. In fact the timber industry is only next to petroleum and gas as a leading exports earner in the primary commodity sector accounting for 13% of the country's total export earnings in 1989. In terms of employment, some 150,500 people were employed in the same year, of which 37% was generated in Peninsular Malaysia. The breakdown of these employment figures in the peninsula was 30% in logging, 40% in sawmilling, 23% in plywood and veneer milling, and the rest in moulding, furniture and other timber processing mills. During the same year, the government collected RM 1,794 million in revenue which comprised 82% from

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\* Note: RM = Ringgit Malaysia (Malaysian \$ )

royalty on timber extracted (including log export royalty), 13% from premium on timber concession and 3% from silviculture cess. The latter collection is to be used for forest replenishment activities. These foreign exchange earnings, employments and government revenues are considered direct contributions of the timber products industry to the economy.

Considering the important contribution of the timber industry, it is not surprising that the Malaysian government accorded the timber industry the status of a priority industry in the Industrial Master Plan with targets set on their export performance (Table 1). Export achievements in all the timber products exceeded the targets set. The most dramatic was the achievement of furniture and fixtures which almost exceeded the target by a factor of four.

**Table 1.** Industrial Master Plan targets and actual export achievements for selected timber products 1990 (RM million)

	Target exports	Actual exports
Logs	-	4,041.4
Sawntimber	1,371.8	3,071.0
Plywood, chipboard and veneer	495.2	1,079.7
Moulding and joinery	473.8	553.0
Furniture and fixtures	70.3	269.5
Paper and paper products	-	226.9

Source: *Maskayu* Volume 3/91, Malaysian Timber Industry Board, Kuala Lumpur

It is the objective of this paper to further highlight the importance of the industry not only in terms of direct socio-economic contributions as mentioned above but also in terms of indirect contributions to the Malaysian economy. Industries in an economy are interdependent since each industry delivers output to or demands inputs from one or more industries. The expansion of the timber industry not only generates demand for its inputs, but also induces the expansion of industries which use the commodities produced as inputs. The connection with supplier industries is called backward linkage while with that of purchasing industries is forward linkage. Together both these linkages can be termed as technological linkages. A holistic understanding of the economic impact of these timber products exports requires the evaluations of the indirect contributions of these timber industries through this technological linkage effect. One methodology that can be adopted for this purpose is the input-output model. The input-output model has become increasingly popular as an approach to measure economic impacts of any change in final demand including that of exports (Harmston 1983, Liu & Var 1983, Abdul Aziz 1985, Ruiz 1985, Summary 1987, ESCAP 1988, Mohd Shahwahid *et al.* 1991, Zakariah & Mohd Shahwahid 1991, Zakariah *et al.* 1991). This paper evaluates the economic impacts of the increase in timber products exports to the economy.

The input-output analysis has several relative merits over other alternative approaches such as econometrics. It can reveal the interrelationships of the

timber products sectors with the other sectors in the economy. It provides a statistically consistent and systematic approach to understanding the total effects of a change in the timber products exports on the whole economy whereby the direct and indirect economic effects of a change in export levels can be traced throughout the economy. Finally the input-output analysis enables a comparison of the export performance among the timber products industries, particularly in the areas of foreign exchange earning, income generation, government revenue and employment creation. Owing to the relative merits of input-output analysis, the United Nations Industrial and Development Organization (UNIDO) in cooperation with the Economic Planning Unit of Malaysia (EPU) have used this technique in the Industrial Master Plan revision exercise in 1991. However, in applying the input-output analysis, its limitation should be noted. A detailed input-output table for the entire economy requires considerable resources and expertise to construct and to update regularly. The latest input-output table available for Malaysia is for 1983 (Department of Statistics 1990). Although the table is almost a decade old, the coefficients obtained from the table can still provide an approximation of the structure of the economy. Another limitation with application of input-output analysis is the implicit assumption of linear technical production functions that any additional production will require inputs in the same proportion as existing production. In practice, these limitations can be allowed for by qualifying the findings and their interpretations subject to the above limitations (ESCAP 1988).

### Model

Input-output analysis is a method of studying quantitative interdependence between individual sectors. An illustrative 3-sector input-output model of an economy is shown in Figure 1. The entries in the table are all in money value terms.

		Purchasing sector (j)			Final demand	Gross output
		1	2	3		
Supplying sectors (i)	1	$x_{11}$	$x_{12}$	$x_{13}$	$f_1$	$X_1$
	2	$x_{21}$	$x_{22}$	$x_{23}$	$f_2$	$X_2$
	3	$x_{31}$	$x_{32}$	$x_{33}$	$f_3$	$X_3$
Value added		$V_1$	$V_2$	$V_3$	$V$	
Gross outlay		$X_1$	$X_2$	$X_3$	$F$	

Figure 1. A 3-sector input-output model

Along each row of a supplying sector  $i$ , its gross output is the sum of the demand for its output by all purchasing sectors and final demand (which comprises private and government consumption, gross capital formation and exports), whereas along each column of a purchasing sector  $j$ , its gross outlay is the sum of input purchases made from various supplying sectors and value added (wage and non-

wage). If these individual purchases by each sector  $j$  are divided by its gross outlay, we will get what are termed the direct input coefficients. These coefficients show the direct input requirements from each supplying sector  $i$  per unit of output of the purchasing sector  $j$ .

The linkage between final demand and total output may be expressed as:

$$(I - A)X = F \quad (1)$$

where  $X$  and  $F$  are column vectors of gross output and final demand respectively;  $I$  is an identity matrix and  $A$  is the matrix of direct input coefficients (Appendix I). Under the condition that matrix  $(I-A)$  has an inverse, the latter matrix may in turn be employed to express gross output as a function of final demand in the following manner:

$$X = (I - A)^{-1} F \quad (2)$$

The matrix  $(I-A)^{-1}$  is termed the Leontief inverse matrix and its elements constitute the coefficients measuring interdependence among sectors. The elements of the  $j^{\text{th}}$  column of this Leontief inverse matrix  $(I-A)^{-1}$  measure the total (that is, direct plus indirect) output of sector  $i$  required per unit of sector  $j$  output delivered to final demand.

The Leontief matrix in equation (2) represents the general solution to the input-output model. Given any vector representing final demand,  $F$ , the vector of sectoral output required to satisfy the increase in final demand, as well as the inter-sector requirements, is given by the matrix product  $(I-A)^{-1} F$ . The economic impact of the increase in timber products exports to the country's output can be examined by using equation (2).

The input-output table prepared by the Department of Statistics is a 60 by 60 sector matrix. In the input-output table, the forestry and timber products industries are classified into four sectors, namely logging, sawmill and other wood mills which comprise sawntimber, veneer, plywood, chipboard, moulding and joinery, furniture and fixtures, and paper and paper products. This paper intends to evaluate the economic impacts of log and timber products exports. Thus only export levels of the four sectors are considered in this analysis. Consequently, the  $F$  vector will have values in these four sectors only with the others filled with zeros. The value of the final demand vector brought about by the export levels would generate changes in direct and indirect output of every supplier sector. This increase in supplying sectors' output generates increments in the primary inputs employed such as value added (wage and non-wage) and also increases government revenues (commodity taxes). The input-output analysis is capable of measuring the increase in direct plus indirect primary input content of a unit of final demand for the timber output produced in the economy. By multiplying each primary input's per unit output coefficients across all sectors with the sectoral output generated from an increase in timber product exports, it is possible to deduce the direct and indirect impact of the timber industry on value added, employment, and government revenues (commodity taxes).

An important step towards the impact analysis is the transformation of the timber export values to be consistent with the input-output table framework. The structural matrix derived from the published transaction table is expressed in its basic value; while the timber exports are in their free-on-board (F.O.B.) values, the latter have to be reduced to their basic values by subtracting the trade and transport margins and commodity taxes. The proportions of these margins and taxes over that of the F.O.B. export values of the timber products are computed from input-output transaction table.

## Results and discussion

The results of the impact of timber products exports on sectoral output, value added, employment and government revenues are illustrated in Table 2. Although directly, the exports of timber products have no implications on the other sectors of the economy, when the full ramifications of the production and exporting process are realised all the sectors will be seen to derive some benefits. Accordingly, every individual sector has a part of its production devoted to supplying the inputs needed for production and marketing of the timber products. This production comes about directly as well as indirectly through the technological linkage of the timber products sectors with the rest of the sectors in the economy. For instance when furniture is exported, there is direct production in the furniture sector which indirectly requires production in the sectors supplying goods and services to the furniture industry which are used in production and marketing activities.

**Table 2.** Economic impact of timber products exports in 1990

	Logging	Sawmills and other wood mills	Furniture and fixtures	Paper and paperboard
Direct and indirect output (RM Million)	3259.90	7641.04	439.35	280.31
Indirect impact ratio*	[1.3]	[1.6]	[1.9]	[1.4]
Direct and indirect value added (RM Million)	2170.85	3027.62	168.69	119.92
Indirect impact ratio*	[1.2]	[2.5]	[2.2]	[1.5]
Direct and indirect employment	52,026	148,306	31,105	6,789
Indirect impact ratio*	[2.0]	[1.9]	[1.2]	[1.8]
Direct and indirect commodity taxes (RM Million)	53.33	657.53	19.40	5.74
Indirect impact ratio*	[1.3]	[1.89]	[1.64]	[1.3]

\* Ratios of direct and indirect output, value added, employment and commodity taxes to their respective direct value; RM is Malaysian ringgit

### Output

The direct and indirect impact of exports on output was most realised by sawmills and other wood mills with a value of RM7,641 million followed by logging (RM3,260 million), furniture and fixtures (RM439 million), and paper and paper products (RM280 million). The distribution of the direct and indirect impact of exports on output on various sectors in the economy is given in Table 3. In exporting logs, 80% of total direct and indirect output generated in the economy came from the logging sector itself. The impact was thinly spread over the rest of the sectors in the economy: petroleum products (4%), wholesale and retail trade (3%), mining, including crude petroleum (2%), transportation (2%), and hotel and restaurant (1%). The highly concentrated output generated indicates that the exporting of logs provides little technological linkages. In other words, very little indirect sectoral output was generated. This can be seen from the relatively low ratio of total direct and indirect output generated to direct exported output obtained for the logging sector in comparison to the other timber based sectors in the economy. This ratio indicates the extent of indirect output generated among sectors in the economy. Logging only generated indirect sectoral output of 30% of that of its initial export value.

**Table 3.** The sectoral distribution of the direct and indirect impact of exports on output

Sectors	Logging %	Sawmill and other woodmills %	Furniture and fixtures %	Paper & paper products %
Forest logging	80	20	7	-
Mining	2	1	1	1
Textile	-	-	1	-
Sawmills & wood mills	-	61	15	-
Furniture & fixtures	-	-	54	-
Paper & paper products	-	-	-	78
Chemical products	-	-	-	1
Petroleum products	4	3	2	1
Rubber products	-	-	1	-
Basic metal	-	-	1	-
Electricity	-	1	1	1
Wholesale & retail trade	3	3	4	6
Hotel & restaurant	1	-	-	1
Transportation	2	3	2	1
Business services	-	1	2	2
Other sectors	8	7	9	8
Total	100	100	100	100

(-) indicates less than 1% contribution

Sawntimber, veneer, plywood, chipboard, moulding and joinery exports generate 160% of direct and indirect output in the economy. Other than their own production covering 61%, outputs were generated from logging (20%), wholesale and retail trade (3%), petroleum products (3%), transportation sector

(3%) and 1% each from mining, electricity and business services. The other sectors receive minimal output impacts. Compared to logging, exports from this sector require substantial indirect output production from the rest of the sectors in the economy owing to greater widespread technological linkages.

Furniture exporting generated 190% of direct and indirect output in the economy. From all the four wood based sectors, furniture and fixtures provided greater spread in technological linkages. Other than their own production covering 54%, indirect outputs were generated from sawmills and other wood mills (15%), logging (7%), wholesale and retail trade (4%), petroleum products (2%), transportation sector (2%), business services (2%), and (1% each) from mining, textile, rubber products, basic metal and electricity. The output impact in the other sectors were minimal. The importance of three sectors is worthy of note; rubber products provide cushions while textiles are used for their covers and basic metals provide the springs, screws and metal jointers. Within the furniture and fixtures sector, the output generated was 3% more than the initial exports at basic value. This is possible since purchases from its ownself do occur such as sourcing of furniture parts from subcontracted firms and when unfinished furnitures are purchased for further finishing works before exporting. Thus it is not surprising that out of the 190% of total direct and indirect output generated, 103% came from their own production activities (*i.e.* 0.54 multiply 190%).

Paper and paper products exporting generated 140% of direct and indirect output in the economy. Other than their own production covering 78%, indirect outputs were generated from wholesale and retail trade (6%), business services (2%), and (1% each) from other chemical products, petroleum products, transportation, mining, hotel and electricity. The output impacts in the other sectors are minimal. Like logging, paper and paper products sector has low technological linkage effects on the rest of the economy. The exporting of paper and paper products did not generate much indirect production in logging and only to a certain extent in the chemical industries. This suggests that much of the raw materials such as wood pulp and chemicals were imported.

### *Value added*

Value added comprises the payment for factors of production for wages and salaries, rent and profits. When timber products are exported, two forms of value added are derived. The first is the value added from the direct production of each timber product exported and the second indirectly from the purchasing or utilising of the goods and services from other sectors which are needed in the exporting process. Thus when timber products are exported, value added is indirectly generated in these other sectors. Value added emanating directly and indirectly from timber product exports was highest in sawmills and other wood mills, and furniture and fixtures at 2.5 and 2.2 times the direct value added respectively. As expected direct and indirect value added generated by the logging sector was the lowest at 1.2 times the direct value added.

In the exporting of logs, 87% of the RM 2,171 million of value added generated came from the logging activities with only 3% from wholesale and retail trade, 1% from transport and business services and with minimum impacts from the rest of the sectors in the economy (Table 4).

In the exporting of sawntimber, veneer, plywood, chipboard and wood moulding and joinery, the direct and indirect impacts on value added have been distributed to a greater number of sectors. Forty-two percent of this value added generated came from its own production activities. The rest of the value added was distributed: 36% to logging, 5% to wholesale and retail trading, 3% to transport, 2% to mining particularly due to crude oil, 2% to business services and 1% each to electricity and dwellings for rental of building and factory, the rest of the sectors receiving little impacts.

**Table 4.** The sectoral distribution of the direct and indirect impact of exports on output

Sectors	Logging %	Sawmill and other woodmills %	Furniture and fixtures %	Paper and paper products %
Forest logging	87	36	13	-
Mining	-	2	2	1
Textile	-	-	1	-
Sawmills & wood mills	-	42	11	-
Furniture & fixtures	-	-	47	-
Paper & paper products	-	-	-	73
Chemical products	-	-	-	1
Rubber products	-	-	1	1
Electricity	-	1	2	1
Wholesale & retail trade	3	5	7	9
Transportation	1	3	2	1
Business services	1	2	3	3
Dwellings	-	1	2	3
Communications	-	-	-	1
Other sectors	8	8	9	6
Total	100	100	100	100

(-) indicates less than 1% contribution

Similarly, the exporting of furniture and fixtures generates relatively greater spread of direct and indirect value added among the sectors in the economy. Some 47% of this value added generated came from its own production activities. The rest of the value added is distributed: 11% to sawmilling and other wood mills, 13% to logging, 7% to wholesale and retail trading, 3% to business services, 2% each to mining, transport, dwellings and electricity, 1% each to rubber products and textile and the rest distributed among the other sectors in the economy.

The exporting of paper and paper products provided RM120 million of direct and indirect value added. As much as 73% of this total value added came from the paper and paper products sector's own production activities. The other significant sectors generating indirect value added was the wholesale and retail trade with 9% of the total, business services and dwellings each obtaining 3%, and mining, other



chemical products, electricity, rubber products, transport and communication receiving 1% each. The impact on value added in the other sectors is marginal.

The above results suggest that a relatively significant level of logging income has been generated indirectly via the exporting of downstream timber products that used domestic raw materials. However, the exporting of paper and paper products provided little logging income since much of its raw material requirements were imported. Overall, timber exports from sawmills and other wood mills, and furniture and fixtures generated the most indirect value added among timber industries.

### *Employment*

Employment created directly and indirectly from timber based product exports was highest in sawmills and other wood mills with a total of 148,306, followed by logging (52,026). In terms of proportions of total direct and indirect employment over direct employment, both these sectors have the highest ratios at 1.9 and 2.0 times respectively. The direct and indirect impact of furniture and fixtures exports on employment was 31,105 jobs but the ratio of total direct and indirect employment over direct employment was low at 1.2 times. This proportion was lower than that for the exports of paper and paper products even though the latter created only 6,789 direct and indirect employment opportunities. One explanation for this is related to the furniture and fixtures high direct employment creation which was 109 jobs per million ringgit of exports at basic value. The other timber sectors have relatively lower employment creation opportunities per unit million ringgit exports. For logging it was ten jobs, sawmills and other wood mills 18 and paper and paper products 20.

In exporting logs, 52% of total direct and indirect employment created in the economy came from the logging sector itself (Table 5). Indirect employment was created in wholesale and retail trade (20%), rubber plantation (8%) (possibly from the opening of forest land for its establishment activity), transportation and construction (both 5% each), and hotel and restaurants (3%). In exporting sawntimber, veneer, plywood, chipboard, moulding and joinery, 57% of total direct and indirect employment created emanated from their own industrial sector. Indirect employment was created in wholesale and retail trade (16%), logging (11%), transportation (6%), construction (3%), hotel and restaurant (1%) and electricity (1%). The exporting of furniture mostly created employment in its own sector of about 83% of the total direct and indirect employment. The wholesale and retail trade, and sawmilling and other wood processing obtained 6 and 4% employment impact respectively. The rest of the sectors in the economy received little indirect employment: rubber plantations (2%) which possibly supplies rubberwood logs (an important timber for export furniture manufacturing), logging (1%) and transport (1%). The impact on employment by the exporting of paper and paper products was mostly shared by the industry itself (63%), the wholesale and retail trade (25%), and transport (3%) with the rest marginally distributed over the rest of the economy.

Evidently logging and sawmills and other wood processing sectors generate substantial direct and indirect employment while furniture and fixtures which is labour intensive in manufacturing requires high direct employment. Almost invariably the above sectors are fairly labour-intensive. Concomitantly, they have pervasive technological linkages with the other sectors so that any general expansion in the latter will induce a relatively high level of production activity and employment.

### *Commodity taxes*

Commodity taxes refer to sales and excise taxes, surtaxes, import duties and other indirect taxes. It should be noted though that commodity taxes in the primary input row for each column of purchasing sector *j* only reflect the commodity taxes on inputs purchased by each sector *j*. Thus export taxes which are collected ex-mill

**Table 5.** The sectoral distribution of the direct and indirect impact of exports on employment

Sectors	Logging %	Sawmill and other woodmills %	Furniture and fixtures %	Paper and paper products %
Rubber plantation	8	-	2	-
Forest logging	52	11	1	-
Sawmills & wood mills	-	57	4	-
Furniture & fixtures	-	-	83	-
Paper & paper products	-	-	-	63
Electricity	-	1	-	-
Wholesale & retail trade	20	16	6	25
Hotel & restaurant	3	1	-	-
Transportation	5	6	1	3
Construction	5	3	-	-
Other sectors	7	5	3	9
Total	100	100	100	100

(-) indicates less than 1% contribution

by the government are not reflected in this impact analysis. Sawmills and other wood mills directly and indirectly generated the most commodity taxes. Although the logging sector has substantial output impact, its ability to generate indirect commodity taxes was relatively small.

Treating the commodity taxes as government revenue, it may be observed that around 78% of the direct and indirect taxes collected as a result of exporting logs was from the logging sector itself (Table 6). However, these taxes collected were only a small proportion (1.7%) of the basic value of logs exported. This low figure is due to the fact that the direct export royalties of approximately RM1,244 million or 31% of the total purchaser value were not included in the analysis. The rest of the commodity taxes collected were 7% from petroleum products, 3% each

from sawmilling and other wood mills (that supplied the wood materials used for building the logging cabins) and from the hotel sector, and 1% each from the motor vehicle industry, motor repairing, transport, and wholesale and retail trade. Evidently, the premium and royalty collections from logging activities comprised the main component in the direct and indirect government revenue emanating from the exporting of logs, while the service and other indirect taxes imposed on hotels and other service industries did not contribute very much.

In the exporting of sawntimber, veneer, plywood, moulding and joinery, 93% of direct and indirect government revenue in the form of commodity taxes is derived from its own sector. Logging only indirectly contributes 4% and the petroleum products only 1%. In the case of furniture and fixtures exports, 46% of the direct and indirect commodity taxes were collected from its own sector, 44% from sawmills and other wood mills, and 4% from logging. In the exporting of paper and paper products, 84% of the direct and indirect commodity taxes came from its own sector with the rest contributed by sawmilling and other wood mills, petroleum products, and wholesale and retail trade (all contributing 2% each), and 1% from other chemicals sector. Evidently, direct and indirect commodity taxes arising from timber product exports tend to be less distributed in the economy.

**Table 6.** The sectoral distribution of the direct and indirect impact of exports on commodity taxes

Sectors	Logging %	Sawmill and other woodmills %	Furniture and fixtures %	Paper and Paper products %
Forest logging	78	4	4	-
Sawmills & wood mills	3	93	44	2
Furniture & fixtures	-	-	46	-
Paper & paper products	-	-	-	84
Chemical products	-	-	-	1
Petroleum products	7	1	-	2
Motor vehicle industry	1	-	-	-
Motor repairing	1	-	-	-
Wholesale & retail trade	1	-	-	2
Hotel & restaurant	3	-	-	-
Transportation	1	-	-	-
Other sectors	5	2	6	9
Total	100	100	100	100

(-) indicates less than 1% contribution

### Conclusion and policy recommendations

In terms of proportions, the exporting of sawntimber, veneer, plywood, moulding and joinery and furniture and fixtures contributed greater direct and indirect output, employment, value added and commodity taxes than the exporting of logs and paper and paper products. In terms of output, the exporting of logs generated indirect production in other sectors of the economy of about 30% of exports at basic

value, while comparable figures for the exporting of sawntimber, veneer, plywood, moulding and joinery, and furniture and fixtures were respectively 60 and 90% of the export values. These findings reflect the fact that further domestic processing of logs before exporting would generate higher indirect output growth among other sectors in the economy due to its greater technological linkages with these sectors. Furthermore, these secondary and tertiary wood processing industries respectively generated indirect value added of 125 and 120% of the direct value added emanating from the exporting of these products. The indirect value added from these processing was much more than that emanating from log exporting. The same trend can be said with respect to employment and commodity taxes. The contributions of the paper and paper products were less than expected despite being a tertiary processing sector. This is explained by the sector's dependence on imported raw materials.

These findings support the government policy of encouraging greater secondary and tertiary processing of logs before exporting. The exporting of logs from East Malaysia should be gradually phased out so that more investment in sawmilling and other wood milling including furniture and fixtures is encouraged. In the peninsula, since the exporting of logs has been banned and export levies have been imposed on veneer and sawntimber, the encouragement of further investment in wood moulding and joinery, and furniture and fixtures appears to be in the right direction as these industries have wider technological linkages with the rest of the sectors in the economy. Thus greater indirect economic contributions can be generated in the form of increasing output, employment and income of the nation as a whole from the timber products industries.

Given these economic benefits that can be created, the government has provided several liberal investment incentive packages for investors (Kaziah 1990). The government has taken cognizance of the different development stages in the timber sector between East Malaysia and the peninsula. Tax incentives have been given to encourage sawmillers and plywood manufacturers to relocate to East Malaysia. Pioneer status which provides tax relief in the form of 70% exemption from statutory income of a company is being given to secondary manufacturing of logs, while in the peninsula tax incentives are more directed to manufacturing of tertiary timber products.

While recognising the prominence of the sawmilling and other wood mills, and furniture and fixtures sectors and thus pursuing their development, the needs of the paper and paper products sector and the logging sector should not be ignored. Although the logging sector generates smaller indirect economic impacts being a producer of logs and the primary supplier to the sawmilling, plywood and paper manufacturing industries, its economic efficiency must be enhanced.

The dependence on imported raw materials, particularly for pulp and chemicals in processing requires some attention. Import substitution of these raw materials, if viable, should be planned for in the long run to reduce outflow of foreign exchange. The ability to produce these raw materials locally would enable this sector to tap the backward linkage effects and realise the high potential indirect economic impacts.

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**Appendix I. Technical coefficients of logging and timber product industries**

Sectors	Logging	Sawmill and other woodmills	Furniture and fixtures	Paper and paper products
Agriculture	0.00000	0.00000	0.00064	0.00026
Forest logging	0.02905	0.45015	0.03780	0.00079
Crude petroleum	0.00000	0.00000	0.00000	0.00000
Other mining	0.00000	0.00000	0.00000	0.00000
Food preparation	0.00000	0.00017	0.00032	0.00079
Sawmills & wood mills	0.00144	0.09403	0.25016	0.00159
Wood & cork	0.00144	0.00077	0.00000	0.00026
Furniture & fixtures	0.00000	0.00006	0.00577	0.00000
Paper & paper product	0.00000	0.00039	0.00192	0.08044
Printing works	0.00043	0.00044	0.00128	0.00450
Chemical industries	0.00010	0.00242	0.00320	0.00291
Paint & varnish	0.00020	0.00066	0.00769	0.00053
Petroleum products	0.04590	0.02168	0.00480	0.01085
Agrobased manufacture	0.00010	0.00292	0.00512	0.00132
Non-metal products	0.00000	0.00149	0.00352	0.00106
Basic metal	0.00134	0.00077	0.01217	0.00053
Other metals	0.00069	0.00462	0.00705	0.00529
Machinery industries	0.00209	0.00149	0.00064	0.00053
Transport	0.00000	0.00039	0.00064	0.00026
Other manufactures	0.00566	0.01909	0.05830	0.02593
Electricity	0.00177	0.02542	0.01634	0.02540
Water	0.00098	0.00116	0.00128	0.00079
Construction	0.01089	0.00913	0.00288	0.00265
Trade	0.03170	0.00000	0.04580	0.09844
Hotel & restaurant	0.01407	0.00666	0.00641	0.00529
Land transportation	0.00671	0.03208	0.01057	0.00820
Water transportation	0.00546	0.00935	0.00000	0.00053
Insurance	0.00497	0.00710	0.00416	0.00318
Business services	0.00716	0.01436	0.01922	0.01350
Other services	0.01469	0.01937	0.02146	0.01614

Source: Department of Statistics 1990