

Constant Market Share Analysis of the ASEAN Timber Trade

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ABSTRAK

Kertas ini menyelidik pertumbuhan eksport keluaran-keluaran kayu ASEAN semasa jangkamasa-jangkamasa kemelesetan dan pengembangan perdagangan keluaran-keluaran kayu dunia antara 1979 sehingga 1987. Analisis bahagian pasaran konstan diguna untuk mengukur prestasi pertumbuhan eksport keluaran-keluaran kayu ASEAN berbanding dengan pertumbuhan purata dunia bagi kesemua keluaran ini. Prestasi eksport keluaran-keluaran kayu ASEAN didapati dipengaruhi oleh suasana ekonomi dunia. Struktur eksport keluaran kayu ASEAN di segi diversifikasi komoditi dan pasaran yang lembab telah menghalang peningkatan selanjut bahagian pasaran eksport dunia untuk negara-negara ASEAN. Suatu penelitian langkah-langkah yang diambil oleh negara-negara ASEAN untuk meningkatkan kepelbagaian industri keluaran kayu dibincangkan.

ABSTRACT

This paper investigates the growth in exports of ASEAN wood products during sub-periods of recessive and active world trade patterns that were experienced between 1979 to 1987. The Constant Market Share Analysis was used to measure ASEAN export growth performance relative to average growth in world export of wood products. It was found that the ASEAN wood products export trade was susceptible to world economic conditions. The structure of ASEAN's wood products export in terms of the lack of commodity and market diversifications has further contributed to the lack in market share improvements. A review of some ASEAN policies at diversifying its wood product commodities are provided in the paper.

INTRODUCTION

Global export trade in the wood products that ASEAN participated in grew from US\$33,149 million to US\$48,358 million from 1979 to 1983. But the year to year global export growth trend was by no means uniform. The global export growth performance showed two general opposite trends which can be classified as a sub-period of declining export trade during 1979-83 and a revival sub-period during 1983-87.

ASEAN, being a small player in the global wood products trade, also experienced similar hiccups in export performance. Although its export of wood products rose from US\$4,957 million in 1979 to US\$6,370 million in 1987, its exports slipped 5% annually in the earlier sub-period but recovered and expanded at an annual rate of 15% during the latter sub-period. Despite the resurgence in exports, ASEAN share of world exports for wood products did not improve

during the last decade. In 1987 market share remained at 13% as in 1979 (Table 1).

To what extent the lack of improvement in the ASEAN share of this world trade can be attributed to a lack of product and market diversification or to other competitive factors remains to be seen. The ASEAN share in the wood products trade was unevenly distributed. Volume of exports of sawlogs, sawntimber and sleepers, and veneer and plywood was quite significant. As at 1987 ASEAN exported 21.2% of the total world exports for all the three product categories. The main contributors were mainly from Malaysia for sawlogs, and sawntimber and sleepers; and Indonesia for plywood. For the other processed wood products, ASEAN did not appear to be a dominant world supplier taking up only a meagre 3.1%. The main exporters for wooden millworks and furnitures mainly came from Singapore and Thailand.

TABLE 1
Asean market shares of world exports in
wood products

Wood products	SITC code	Asean market shares of world exports (%)		
		1979	1983	1987
Sawlog	247	44.61	39.72	31.02
Sawntimber and sleepers	248	10.34	11.40	11.40
Veneer and plywood	634	10.63	19.40	28.16
Wooden millworks	635	3.54	5.54	5.25
Furnitures	821	2.51	2.79	2.61
Total products		12.91	12.63	12.96

A distinct characteristic of Asean wood products export structure is its concentration on the unprocessed and primary processing level. In 1987, sawlog comprised 38.37% of its wood products export, sawntimber and sleepers 25.73% and veneer and plywood another 27.77%. Wooden millworks and furnitures together provided only 8.12%. ASEAN wood products commodity base have experienced a slight change in composition during the period from 1979 to 1987 (Table 2). The compositions of sawlogs, and sawntimber and sleepers have declined while those of veneer and plywood have risen. However the compositions for wooden millworks and furnitures have not indicated much improvement.

With respect to market destinations ASEAN exports of wood products have a high dependence on the demand of Asian countries for

TABLE 2
Composition of Asean wood products export

Wood products	SITC code	Asean export in percentage		
		1979	1983	1987
Sawlog	247	55.73	41.99	38.37
Sawntimber & sleepers	248	27.35	29.38	25.73
Veneer & plywood	634	11.01	18.53	27.77
Wooden millworks	635	1.77	3.37	3.40
Furnitures	821	4.13	6.73	4.72
Total products		100	100	100

unprocessed timber; but have a more diversified market clientele for the processed wood products. In 1987, 99.9% of ASEAN sawlog export trade was mainly imported by Japan, South Korea, Hong Kong and Taiwan. In sawntimber and sleepers, 32.5% went to the Asian countries and 59.0% were imported by Europe. While in veneer and plywood 47.4% went to the Asian countries with Europe taking up 20.9% and North America 29.9%. However, among the secondary and finished wood products such as furniture and other wooden millworks, North America and Europe were the dominant buyers. Asian countries imported only 16.2% and 16.0% respectively of ASEAN furniture and other wooden millworks exports. During the period from 1979 to 1987 the directions of total wood products trade from ASEAN did not seem to show much variation with the exception of exports to Japan. The distribution of ASEAN total export of wood products by country of destination is given in Table 3.

The object of this paper is to identify some of the factors that can influence the export trend of ASEAN wood products. Using the Constant Market Share (CMS) analysis, ASEAN growth in wood products export is compared to the general expansion in the world market size of the wood products trade and their differences are disaggregated into the following sources:

(a) structural characteristics of ASEAN wood products trade which can be disaggregated further into:

- (i) whether ASEAN exports wood-based commodities whose demands grow more strongly than the world average,
- (ii) whether ASEAN primarily exports to countries whose growth rates of wood products import are bigger than the world average,

and

(b) other competitiveness factors.

It is important to rationalise the choice of subperiods as different sub-periods may give different results. In addition, the model is also sensitive to the choice of commodities that represent the product group and of market destinations of export. Since this paper attempts to analyse the export performance in wood products of ASEAN, the choice of the sub-periods

TABLE 3
Composition of ASEAN wood products export according to countries of destination (%)

Country of destination	Share of total Asean export (in %)		
	1979	1983	1987
Australia	1.935	2.345	1.906
Austria	0.521	0.663	0.474
Belgium	1.887	1.820	1.905
Canada	0.645	0.908	1.009
Denmark	0.510	0.631	0.519
Egypt	0.018	0.000	0.026
Finland	0.000	0.007	0.010
France	4.320	2.829	3.473
German	4.991	5.947	4.546
Greece	0.101	0.050	0.000
Hong Kong	2.016	2.598	3.659
Ireland	0.163	0.000	0.016
Italy	3.437	2.373	2.377
Japan	38.937	45.713	48.659
Korea	16.412	0.006	5.464
Netherlands	4.839	5.519	4.636
Norway	0.286	0.331	0.329
Portugal	0.000	0.011	0.000
Saudi Arabia	0.000	0.140	0.176
Spain	0.486	0.353	0.438
Singapore	5.613	6.593	3.680
Sweden	0.236	0.308	0.241
Switzerland	0.235	0.245	0.235
U. Kingdom	5.799	7.942	5.785
U.S.A.	6.612	12.667	10.438
	100.000	100.000	100.000

Source: Yearbook of International Trade Statistics, United Nations (1979-1987).

was based on the trends in the region's export performance of the product groups. The first sub-period observes the recessionary phenomenon in most of the industrial countries where except, Japan, U.S.A., West Germany and U.K., experienced a slowdown in their growth rates of GNP during 1979-83, with some years showing negative rates. The second sub-period on the other hand, shows higher growth rates of GNP of these countries, followed by increased imports, including that of wood products from ASEAN. In this case, our choice of the above sub-periods did

not differ significantly if it was done on the basis of growth trends in major importing countries.

MODEL DEVELOPMENT

The CMS is widely used to evaluate export performance. Among studies which applied this model are Leamer and Stern (1970), Richardson (1971), Rigaux (1971), Sprott (1972), Bidun Farusi (1980), Bowen and Pelzman (1984) and Fatimah and Roslan (1989). The CMS works on the basis of comparing ASEAN actual export achievements with those of changes in hypothetical export values under the assumption of constant market shares in given markets. The difference between both values is associated with effects of the structural characteristics of the ASEAN wood products trade. This structural effect can be further disaggregated into effects of commodity composition and market destination, while the residuals are taken to represent the effect of other competitiveness factors in explaining the gain and loss in market shares. However, it should be noted that the CMS only disaggregates the contributions of growth in world market size and structural effects of diversification in commodity and market on the market share performance of a region. The model lumps other influential factors in the residual term which is often called the competitiveness factor. In so doing, this model would have to be complemented with other methods when the empirical importance of such residual factors is needed.

The differences in ASEAN actual export value growths over those of the hypothetical export growths under the assumption of constant market shares in given markets are calculated to observe the dependence of ASEAN wood products export on world trade in these products. Two levels of analysis are conducted to explain the outcomes of these observations. The first attributes the changes in export performance to structural and other competitiveness effects. In the second analysis the structural effects are further disaggregated into commodity and market destination effects. The formula used to disaggregate the above factors of export growth is as follows:

First Stage

$$(X^2 - X^1) - rX^1 = \sum_j (r_{ij} - r) X^1_{ij} \quad \text{Structural effect} \\ + \sum_j [X^2_{ij} - (1 + r_{ij}) X^1_{ij}] \quad \text{Competitiveness effect}$$

Second Stage

$$\begin{aligned}
 (X^2 - X^1) - rX^1 &= \sum_i (r^1_i - r) X^1_i && \text{Commodity composition effect} \\
 + \sum_{i,j} (r_{ij} - r) X^1_{ij} &&& \text{Market destination effect} \\
 + \sum_{i,j} [X^2_{ij} - (1 + r_{ij}) X^1_{ij}] &&& \text{Competitiveness effect}
 \end{aligned}$$

Whereby

$$\begin{aligned}
 \sum_j X_{ij} &= X_i \\
 \sum_i X_{ij} &= X_j \\
 \sum_{i,j} X_{ij} &= X
 \end{aligned}$$

and

- X = value of ASEAN export of all wood products.
- X_i = value of ASEAN export of wood product i.
- X_{ij} = value of ASEAN export of wood product i to market j.
- r = growth rate of world export of all wood products during the particular period.
- r_i = growth rate of world export of wood product i during the particular period.
- r_{ij} = growth rate of world export of wood product i to country j during the particular period.

Superscripts 1 and 2 indicate beginning and end of sub periods investigated.

Structural effect collects the influence of commodity composition as well as the influence of market destination on export changes

Competitiveness effect gives the difference between the actual export value and the hypothetical export value which would have resulted, if ASEAN market share had been kept constant for each commodity i within each market destination j. It measures the export value, which ASEAN has lost or gained through change of market share to competition from other exporters.

Commodity composition effect measures whether ASEAN exports mainly commodities whose demand grow faster or more slowly than the world average. It is positive if ASEAN exports commodities with growth rates higher than the world average and vice versa.

Market destination effect measures whether ASEAN exports mainly to countries with growth rates higher or lower than the world average. It is positive if ASEAN exports to countries with growth rates higher than the world average and vice versa.

DATA

Data were not available for every disaggregated commodity breakdown of the wood product free on board (F.O.B) export value. However, it was possible to obtain five classes of wood product

exports from the United Nation's Yearbook of International Trade Statistics, 1979 to 1987. These products include Standard International Trade Classifications' (SITC) commodity number 247 which is sawlog, SITC commodity number 248 (sawntimber and sleeper), SITC commodity number 634 (veneer, plywood and other panel products), SITC number 635 (wooden millworks) and SITC number 821 (furniture and fixtures).

RESULTS

During the recessive sub period of 1979-83 ASEAN experienced declining export earnings from wood products when the export value decreased by 5% per annum while during the 1983-87 sub period ASEAN experienced recovery in export demand which grew 15% per annum. These changes in export value can be accounted to the contraction and expansion in world trade of wood products. During the 1979-83 period, ASEAN export of wood products declined by US\$1,032.6 million. Had the region followed the decline in world's export of that product category, ASEAN export in 1983 would have fallen by 91.8 percent of the declined values. These changes imply that patterns in world trade in wood products considerably affect those of ASEAN.

Other factors have also contributed to the decrease in ASEAN exports besides the reduction in size of world trade. The affirmation of the above influence can easily be shown in the latter period of 1983-87 when the region's export of wood products turned round and recorded an increase of US\$2,544.1 million following the increase in world exports of these products (Table 4 and Figure 1). In fact, during this period, ASEAN achieved hypothetical export growths under the assumption of constant market shares in all export markets. At this juncture it may be too early to assume that ASEAN had recovered its competitive edge in the second period without first investigating the structure of ASEAN wood products export.

As indicated above, during the first period ASEAN lost its market share in 1979 but covered it in 1983, during the second period. The proportion of these uncompetitive (or competitive) edges attributable to the roles of commodity composition and market diversification, could shed some light on the importance of these factors to exports growth. In both sub-periods, these structural effects have retarded exports only

TABLE 4

Actual and hypothetical changes in ASEAN wood products export (US\$million)

Period	1979-83	1983-87
Changes in actual exports	-1,032.6	2,531.0
Changes in hypothetical exports under assumption of constant market share	-947.9	2,544.1

to be counteracted favorably by competitiveness factors that seemed to contribute to ASEAN export achievements.

The constant market share model ascribes the export growth during a particular period to commodity and market diversification and other residual factors that normally include productivity growth: favourable changes in exchange rates, taxation and subsidisation; stable price and lower resource costs; and improvement in efficiency of marketing and quality. In this paper we would argue that ASEAN export competitiveness would be enhanced if its inflation rate is lower and exchange rate is favourable vis-a-vis industrial countries.

Within ASEAN Malaysia, Singapore and Indonesia are the major exporters of wood products (Singapore's export constitutes re-export). Comparing the inflation rates in ASEAN with those of industrialised countries, it was

found that Singapore, Malaysia and Thailand's rates were lower while those of Indonesia and the Philippines were higher than the industrialised countries during both sub-periods. For instance, in the first sub-period Singapore, Malaysia and the Philippines experienced average inflation rates of 0.7%, 1.88% and 2.3% respectively and those of Indonesia and the Philippines were 8.8% and 5.7% respectively. The industrialised countries were on average experiencing an inflation rate of 4.2%. Taking inflation rates to indicate changes in resource costs in each of the Asean countries, it would imply that there was an improvement in the export competitiveness of some of the ASEAN countries vis-a-vis industrialised countries.

Similarly, looking at the exchange rates of ASEAN member countries during the two sub-periods, all the ASEAN currencies experienced depreciations in value. As the exchange rates are expressed as the amount of local currencies that can be exchanged for one US Dollar, the depreciation would make the region's export more competitive during the sub-periods.

In both sub-periods, commodity composition of ASEAN wood product exports had always undermined the region's export performance, curtailing its exports during times of downturn and boom in world exports of wood products (Table 5 and Figures 2 and 3). ASEAN exports were concentrated in wood products with growth

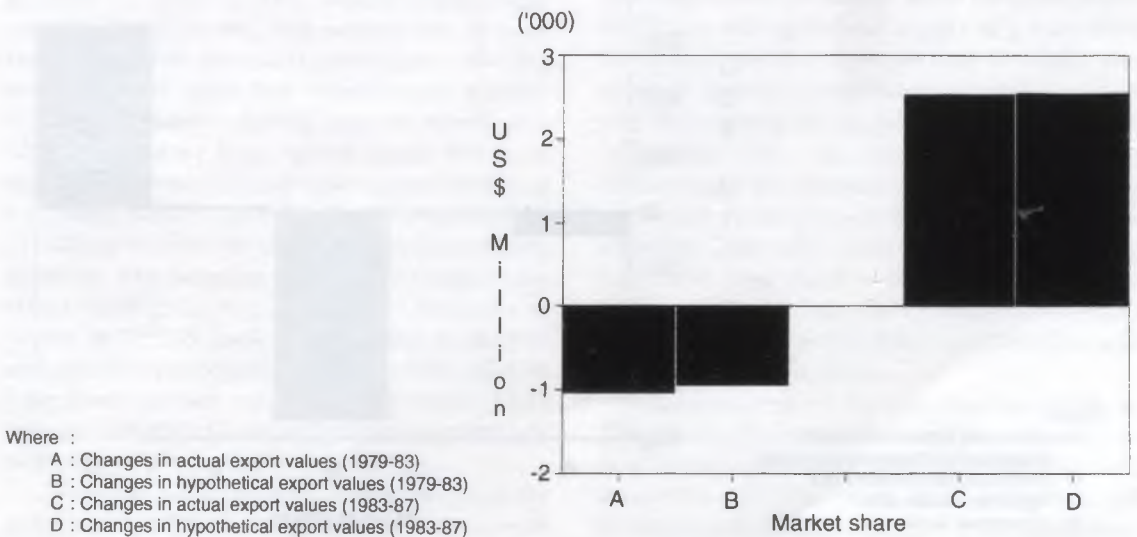


Figure 1: Comparison between changes in actual and hypothetical export values (US\$ million)

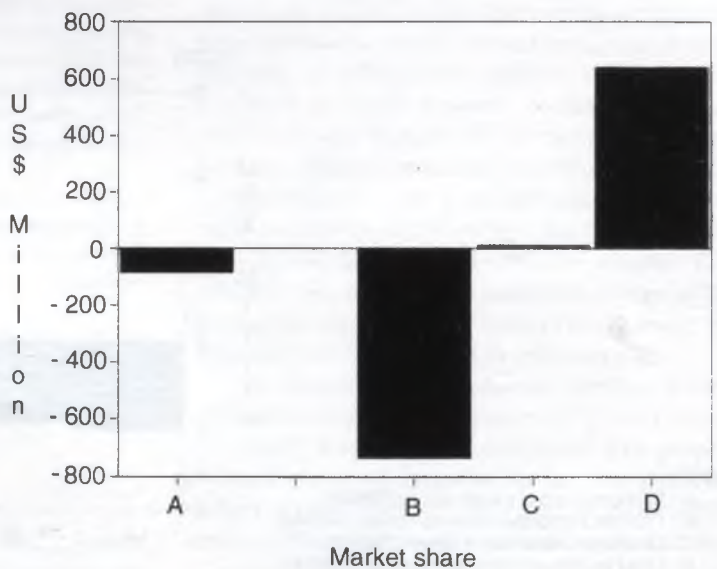
TABLE 5
Constant market share analysis of changes in ASEAN wood products export (US\$ million)

Period	1979-83	1983-87
Differences between changes in actual and hypothetical exports	-84.7	-13.1
<i>Sources for the above differences</i>		
a) Structural effect:	-724.9	-775.8
i) Commodity composition effect	-735.6	-539.5
ii) Market destination effect	10.7	-236.3
b) Competitiveness effect	640.2	762.7
	-84.7	-13.1

rates lower than those of the world. World trade in raw and primary processed wood products, in which ASEAN commodity compositions were more concentrated, was less rapid than that for the secondary and finished wood products. At the end of the 1979-83 sub-period ASEAN wood products exports comprised 42% of sawlogs with a declining rate in world export of 50%; 29% of sawntimber and sleeper with a declining rate in world export of 20%; and 19% of veneer and plywood which recorded a declining rate in world export of 28%. All these commodities experi-

enced declining rates greater, or at least equal, to those of the world wood products export of 20%. Wooden millworks and furnitures which registered better export performance comprised only 7% of ASEAN wood products export. Wooden millworks recorded a smaller decline in growth rate of 5% while furnitures registered a high growth rate of 16%. Despite the greater growth in export demand for these latter two wood products, the ASEAN wood commodity export composition was still concentrated in raw and primary processed wood commodities. Thus ASEAN was not able to capitalise on the world demand for these tertiary processed wood products.

Market destination effect of ASEAN wood products has a smaller influence on the region's exports of wood products, both in times of rising and falling world exports of wood products. However in certain markets, it has been a positive contributor to the ASEAN export growth. For instance, in sawntimber and sleeper trade, the United Kingdom experienced a lower decline in trade and ASEAN took this opportunity to increase exports to this destination. On the other hand, the Netherlands and France faced greater declines in trade and ASEAN reduced its exports to these markets. Similarly for the veneer and plywood trade, ASEAN increased its exports to Hong Kong, Singapore and the United States to take advantage of the better growth in trade



Where :
 A : Differences between changes in actual and hypothetical export values
 B : Commodity composition effect
 C : Market destination effect
 D : Competitive factor

Figure 2: Constant market share analysis of changes in ASEAN's wood products export (US\$ million), 1979-83

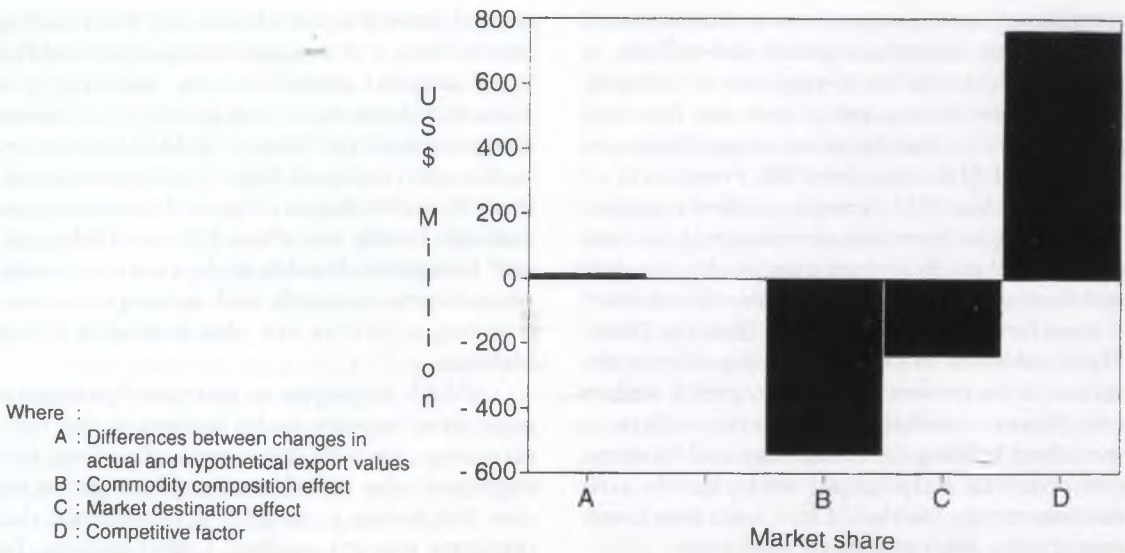


Figure 3: Constant market share analysis of changes in ASEAN's wood products export (US\$ million), 1983-87

relative to the average world trend. In the furniture trade, increased ASEAN exports were destined for the United States and the United Kingdom, two markets experiencing relatively higher growth in trade. However, in the sawlog trade, ASEAN was not able to shift its export destinations away from its traditional markets despite the higher decline in trade experienced by these countries relative to the world average.

DISCUSSION

ASEAN export performance followed closely the growth in size of the world trade. Our investigation indicates that market size of more finished wood products grew faster during normal world trade but experienced a lower decline in growth during exports downturn. ASEAN can brace itself against future threats of economic slowdown and take opportunities of booming world trade for wood products by investing further in downstream processing activities. The negative commodity composition effect during the two subperiods studied was caused by ASEAN trade concentration in the raw and primary processed products which tend to have lower growth rates in world trade. Thus recent ASEAN efforts at promoting further downstream processing are credible.

Various policies have been adopted by individual ASEAN countries with the intention of conserving their domestic resources and encouraging further investments in downstream

processing. In Peninsular Malaysia, a log export embargo was imposed in 1985 while the imposition of levies on the export of sawntimber and veneer made from several popular species, highly in demand by the domestic moulding and furniture industries, began in 1990. Lately in January 1993, a log export embargo was also imposed in Sabah. Similar actions were taken by other ASEAN countries. Thailand has banned logging from its natural forests whilst the Philippines has banned exports of sawntimber. Indonesia, apart from banning log exports, has also imposed high export taxes on sawntimber which has the equivalent impact of a ban. With the exception of Indonesia and Malaysia, the shortage of local raw material is casting a shadow over the wood product industries of the ASEAN countries. The situation is expected to deteriorate in the next five years. There is expected to be greater dependence on intra regional trade with these countries importing logs and sawntimber from Malaysia and Indonesia. In the long term, considerable efforts are required for natural forest rehabilitation and forest plantation projects.

Various forms of tax incentives are given by ASEAN countries to encourage investments in downstream processing industries (Angeles and Roszehan, 1990). With the exception of Indonesia, all ASEAN countries grant an income tax holiday ranging from three to ten years at the maximum. The basic tax relief period is extended

if registered manufacturers meet a minimum level of net foreign exchange earnings and conform to the prescribed number of employments created, size of investments, indigenous raw material utilization rates, and locational requirements. In the case of Malaysia, the 1986 Promotion of Investment Act (PIA) exempts qualified manufacturers from income tax, development tax and excess profit tax for 5 years from production date and these exemptions are extendible for a further 5 years for pioneer status firms (Kaziah, 1990). The wood-based industries that can qualify for the above tax incentives include integrated timber complexes, mouldings (in certain states), specialised building items, furniture and furniture components, pulp, paper and paperboard, medium density fibreboard and wafer board and several other processed wood-based items.

The above tax exemption incentives are beneficial if manufacturers make profits. Some wood product industries that incur expenditure on initial investments such as pulp and paper mills are likely to suffer losses, or to make little profit in the initial years. On the other hand, wood product industries which are profitable in the early years would benefit the most from these tax incentives. Thus the income tax holiday is more meaningful if the losses can be carried forward. With the exception of the Philippines, all ASEAN countries have made this provision.

Investment allowances are provided by the Philippines, Malaysia and Thailand for purposes of tax deductions. In the Philippines and Malaysia up to 100% of the cost of qualifying capital expenditure incurred within a prescribed period may be deducted from profits of qualified manufacturers. In the former, the allowances are conditional on the major infrastructure being undertaken in industrial promotional areas or in infrastructural-deficient areas. In Malaysia, this allowance is granted to manufacturers who have not been given pioneer status. A smaller investment allowance is provided by Singapore. To encourage reinvestments, a 40 to 50% allowance is granted to a manufacturer who incurs qualifying capital expenditure for the purpose of approved expansion.

Additional incentives are offered specifically geared to the promotion of exports. For instance, export-oriented manufacturers of wood-based products are given import duty exemption on all raw materials that are not available locally by all ASEAN countries. Malaysia and Singapore also

permit depreciation allowances on qualified investments. For new and expanding qualified wood product manufacturers, exemption or reduction from taxes and duties on imported equipments are provided by all ASEAN countries. In the case of imported spare parts, exemptions from taxes and duty on imported spare parts not available locally, are allowed by the Philippines and Indonesia. Double deductions on export promotions, research and development and training activities are also provided for in Malaysia.

ASEAN strategies to increase downstream processing appears to be moving in the right direction. Already there are indications that exports of value added wood products are on the rise. For instance, in 1989 it is reported that furniture exports reached US\$63 million, far exceeding the target initially set by the Malaysian government's Industrial Master Plan.

POLICY IMPLICATIONS AND CONCLUSION

The performance of ASEAN wood products export during the period 1979-87 was characterised by a period of slack demand followed by a recovery stage in the latter years ; this was in harmony with world trade patterns. This trade pattern is an indication that ASEAN wood products export is susceptible to world economic conditions. The structure of ASEAN wood products export has further contributed to its lack in market share improvements. Asean has little control over the world economy but to further improve its export trade it has to broaden its wood manufacturing base.

While diversification through downstream woodbased industrial development can increase the Asean share of the global wood product market share it has other beneficial implications. Further domestic processing of logs and sawntimber before export would also generate higher indirect output growth among other sectors in the economy due to the greater technological linkages with these sectors. Proportionally, the export of downstream wood products such as furniture and fixtures contributed more to direct and indirect output, employment, value added and tax revenues than to the export of logs and sawntimber. For instance in terms of output, Malaysian exports of furniture and fixtures generated indirect production in other sectors of the economy of about 90% more than its export value (Mohd

Shahwahid, 1992), while comparable figures for the export of logs and sawntimber were 30% and 60% of their export values respectively. Furthermore, the export of furniture and fixtures also generated high indirect value added which amounted to 120% more than the direct value added emanated from its exports. This indirect value added created was much more than that emanating from log and sawntimber exports. The same trend can be seen with respect to employment and tax revenues.

To broaden its manufacturing base by expanding downstream activities, the Asean countries would have to make structural changes in their wood product industries. Future trends in domestic consumption of logs, sawntimber and plywood for further processing are expected to change rapidly. From production and consumption estimates of these primary raw materials provided by Baharuddin (1989), a distinct increasing trend of future domestic consumption in the Asean countries is noted. Log exports from Asean countries are expected to decline from 17 million cubic metres in 1990 to 11 million cubic metres by 1995. It is also expected that 80 percent of sawntimber production will be domestically consumed, either for direct consumption or for further processing by 1995. This percentage is 7 percent more than that for 1990. For plywood, domestic consumption is expected to increase from 31 percent to 36 percent during the same period.

Greater investments in new plants and machinery would have to be made. Indonesia has made this happen for its plywood industry resulting in it being the number one world exporter. The equipment, operation and technological standards are on average comparable to those available in industrialized countries. However, apart from the plywood industry of Indonesia, a similar high standard in other Asean wood product industries is found only in isolated export oriented ventures in which multi-national companies are involved. Substantial lack of reinvestment over the past years has resulted in the use of inadequate and obsolete machinery in sawmills and in woodworking and furniture plants. Asean countries have planned to increase investments in downstream processing by attracting direct foreign investments, in particular from Taiwan, South Korea and Japan as well as by encouraging the involvement of a new generation of planning-conscious and management-

trained local entrepreneurs who are more willing to adopt new technologies (Turbang, 1989). The adoption of new technology is needed if quality products meeting international standards at competitive prices are to be made.

Greater efforts in manpower planning and training are also needed if Asean countries are to encourage greater downstream processing. A majority of wood-working and furniture factories in Asean countries consist of small manufacturing units and predominantly family oriented business concerns. A salient feature of these enterprises is the low level of technically trained workers. The limited formal training opportunities available do not help these enterprises. Most of the employees were trained on the job in an informal and often disorganised manner. The few larger manufacturing units which are export oriented ventures are in many cases owned by multinational companies. A limited few are owned by locals. These latter companies are more capable of providing more organised training facilities. In the expansion of the wood product industries, governments of Asean countries would have to provide more formal and comprehensive training opportunities to meet manpower needs. One example to follow is the Asean Timber Technology Centre which is involved in the dissemination and transfer of new wood-working technology.

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