

**ASEAN TRADE:
THE RELATIVE REVEALED COMPARATIVE ADVANTAGE OF ASEAN
MANUFACTURED EXPORTS 1996-2000**

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ABSTRACT

This study examines the manufacturing export specialization and competitiveness of the ASEAN-5 countries by using the relative Revealed Comparative Advantage Approach (RCA) from the year 1996-2000 at SITC 3-digit level. The Revealed Comparative Advantage Index is then ranked and compared between the 5 ASEAN countries to identify the association of the export specialization patterns among the ASEAN members. Based on the 25 top RCA ranking, the results show that Thailand export specialization pattern and competitiveness are more concentrated towards division 61,65 and 66. In Indonesia, division 63, 64 and 65 are prominent with division 63 leading with a higher RCA. Philippines is highly concentrated in division 8. The study also shows that diversity occurs between the three ASEAN countries even though all of them are equally natural resource and unskilled labor intensive. Malaysia and Singapore provide a different picture as both exhibits more comparative advantage in section 7 and 8. However at a disaggregated level (3 digit SITC level) each country has its own export comparative advantage. The results of SRC confirm the disagreement of export specialization between the ASEAN countries. In conclusion, factor endowments, level of industrialization, pattern of Foreign Direct Investment, policies governing market access, and other factors may have played a greater role in differential comparative advantage. Hence, ASEAN countries could benefit from the differential if cooperation is achieved.

INTRODUCTION

The Association of Southeast Asian Nations (ASEAN-10) share of world merchandise exports has increased subsequently over the years. According to World Trade Organization (WTO) in year 2000, the share of merchandise exports increased to 6.9% (89.89 billion dollar) compared with the year of 1990 which was 4.3% (26.31 billion dollar). Among the emerging ASEAN members contributing to export growth are Singapore, Malaysia, Thailand, Indonesia and Philippines who have been among the leading merchandise exporters in Asia since late 1980s.

In addition due to the cheap outlay, production cost and change of investment strategy ASEAN economies have managed to attract more foreign direct investment. Even it has been noted that process of industrial restructuring in Japan and NICs have migrated some activities through foreign direct investment channels to the ASEAN member countries. ASEAN's top five export markets are the United States, the European Union, Japan, China (including Hong Kong) and South Korea.

Since the ASEAN economies depend on the external sectors one would like to analyze the emergence of the export structure and compare the strength of the individual economies. One would also like to examine the competitiveness and export specialization realizing that trade is the life-blood of the ASEAN countries. Moreover, sustaining high export growth in the world market needs one to identify the more productive exportable activities that are growing rapidly on world market. In addition, identifying revealed comparative advantage also proves to be useful in promoting cooperation and intra-ASEAN trade. For the above purposes, the study is concerned with the trade structure of the ASEAN economies.

In this study, the relative revealed comparative advantage (RCA) is been used to examine the export specialization of the ASEAN economies from the year 1996-2000. The relative revealed comparative advantage has been one of the most frequently used indicators for measuring international specialization. Although the approach suffers from a number of drawbacks (discussed in the methodology), it has proved to be useful in describing the specialization of a nation and their competitiveness, which indeed is regarded as important for the policymakers.

OBJECTIVES OF THE STUDY

This study investigated the pattern and trend of the manufacturing export advantages among ASEAN-5 countries using the relative revealed comparative advantage (RCA) approach based on the Standard International Trade Classification (SITC) product categories. An attempt was made to compare the trade trends among the 5 ASEAN nations. In specific, the objectives of the study are as follows:

1. To identify the leading manufacturing products among ASEAN-5
2. To investigate the similarity and differences of export specialization pattern among the ASEAN-5
3. To assess the degree of association in the manufacturing export specialization among ASEAN-5

SIGNIFICANCE OF THE STUDY

Knowing that all five ASEAN members rely so heavily on export to develop their economy, comparing the trade pattern will be an important aspect to study. Policymakers could take advantage of the findings and outline policies that would further improve the industries, which have succeeded in maintaining the comparative advantage. The results of the study should also significantly contribute in promoting cooperation between ASEAN members by indicating the degree of diversity in manufacturing export comparative advantage.

METHODOLOGY OF THE STUDY

Research on international trade uses a wide range of statistical tools from the simplest to the most complex econometric techniques with the availability of detailed data. The revealed comparative advantage index (RCAI) is one of the most widely used measures of trade competitiveness and measures the extent of international trade specialization in different products. The Revealed Comparative Advantage Index (RCAI) by Bela Balassa (1965) is well known and there are many studies undertaken using this approach.

i) Revealed Comparative Advantage

A number of indicators of RCA are available to measure the export specialization. To accomplish the objectives of the study, the relative revealed comparative export advantage approach was used to analyze the comparative advantage of a country's product exports in the world exports. The approach used information, which is revealed from post trade situations. In this study we used the approach, which follows the improved version of the relative revealed comparative advantage (RCAX) by Vollrath (1991). The RCAX of country j for product i ($RCAX^i_j$), can be written as

$$RCAX = \left[X_{ij} / \left(\sum_i X_{ij} \right) - X_{ij} \right] / \left[\left\{ \left(\sum_j X_{ij} \right) - X_{ij} \right\} / \left\{ \left(\sum_j \sum_i X_{ij} \right) - \left(\sum_j X_{ij} \right) \right\} - \left\{ \left(\sum_i X_{ij} \right) - X_{ij} \right\} \right]$$

Where

X_{ij} = Export value of product i by country j

$\sum_i X_{ij}$ = Total export of country j

$\sum_j X_{ij}$ = Total world exports of product i

$\sum_j \sum_i X_{ij}$ = Total world export

Country exports data used in this study were based on the United Nations COMTRADE database from the year 1996 to 2000. Due to the unavailability of data, the year 2001 and 2002 was not included. All product groups were defined according to the Standard International Trade Classification (SITC) and the following manufacturing export groupings were used in this report: Manufactures (SITC sections 5, 6, 7, 8 minus division 68 and group 891).

Although the RCA proves to be useful but there are a number of drawbacks that calls for a need for caution interpretation of the results obtained. The RCA can be distorted by government policies and other intervention in the market. This is true especially in the agricultural sectors that are usually prone to government intervention because of the price instability.

ii) Spearman's Rank Correlation of RCAX

Based on the RCAX, the major manufacturing export products were ranked and compared between countries. To assess the strength of relationship of the export specialization between countries the study used Spearman's Rank Correlation (SRC) Coefficients of RCAX. The SRC of RCAX in this study compared the ranked data associated between the ASEAN member countries. By computing a correlation coefficient we could determine the extent to which two sets of ranking are similar or different. The result is also useful to analyze the trend of trade among the countries. The Spearman's Rank Correlation is given by:

$$r_{sp} = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

Where

*d*² is the difference between any pair of RCAI ranks

RESULTS AND ANALYSIS

A number of observations can be made based on the relative revealed comparative advantage (Refer Appendix 1 and 2) among ASEAN-5 countries.

Thailand, Indonesia & Philippines

In Thailand, the RCAX trends (Refer Appendix 1) at SITC 3 digit confirmed the dominance of the following division of product.

- ❑ Division 61 (leather manufacturers), 65 (Textile) and 66 (Mineral manufactures) (61 being at the higher range of RCA). In addition, the following division had maintained their comparative advantage through 1996-2000 (Refer Appendix 1)
- ❑ Thailand's export comparative advantage were more towards natural resource intensive and unskilled labor intensive*

In comparison, Indonesia's export comparative advantages were in division 63 (Cork and wood manufactures) with higher ranking among the top 25 products, 64 (Paper) (especially 641 Paper/Paperboard) and 65 (Textile). Indonesia shows that SITC 562 (Manufactured Fertilizers) as

* To classify the factor intensive industries the study adopts Krause's SITC classification

a top ranking between 5-6 among the 25 top products between 1996-2000. Another important product is the SITC 85 (Footwear) and 84 (Clothing). In section 5 (Chemical), Indonesia shows a better prospect than Thailand.

Philippines exhibit the dominance of SITC section 8 (Refer Appendix 1) with division 842 ranked in the range of 6 – 8 from 1996-2000 based on the overall RCAX among 157 manufactured export products. A drastic change occurred in SITC 562 (Manufactured Fertilizers) position, which has dropped from rank 12 in 1996 to 25 in 2000. As a whole, Philippines were more competitive in unskilled labor-intensive products.

Malaysia and Singapore

Through the year 1996-2000, SITC section 7 have emerged as the leading product for Malaysia especially division 76 (Telecommunication) grouping 761 (Television Receivers), 762 (Radio Broadcast) (Refer Appendix 2) maintaining the comparative advantage from 1996-2000 and 763 (Sound/TV Recorders). In division 84, one of the leading export products maintaining comparative advantage is group 848 Headgear/Non-Text Clothing). Apart from this group, 621 (Materials of rubber) has maintained its comparative advantage. Although some of the section 5 products are classified under the top 25 product but their ranking were at the lower end and overtime it shows a decline in comparative advantage. Overall the results confirm that Malaysia comparative advantages were in electronic, telecommunication, clothing, wood and rubber manufacturing.

As for Singapore the comparative advantage were more prevalent in products such as photographic equipment (Division 88 especially 882 – Photographic Supplies) and division 75 (Office equipments) and 76 (Telecommunication). Singapore showed similar comparative advantage with Malaysia, which is based on technology and skilled labor-intensive industries.

Comparison Analysis

Although Thailand and Indonesia showed comparative advantage in Section 6 but detailed disaggregated pattern of RCAX reveals that the concentration of export specialization were in different product where Thailand being dominated by leather manufacturing (SITC 61) and Indonesia in Cork & Wood (SITC 63).

Both countries were similar as their comparative advantages were based on natural and unskilled labor intensive. Another prominent differences were of Section 7 where Indonesia has relatively low ranking of Section 7 in comparison to Thailand that accounts for higher ranks in division 77 (Electrical Machinery) and 75 (Office Machines)

Although ASEAN-3 (Thailand, Indonesia and Philippines) comparative advantage were in natural and unskilled industries but evidence suggested that competitiveness were more diversified as each country had different dominant SITC division. These suggest that there were not a homogeneous group with regards to factor endowments, level of industrialization and development.

One important point to be noted was from the Classical Trade Theory perspective, which suggested that improvement in trade can be achieved if there was a difference in comparative advantage between countries. A better cooperation among ASEAN countries may benefit and the implementation of AFTA could be one of the first steps towards improvement in export performance as significant increase in intra-ASEAN trade is possible bearing that each country has their own export comparative advantage. However, a more detailed study will be required to see the true effect of AFTA, which is not the concern of this study.

Similarities and Differences in ASEAN Export Specialization

For comparison purpose, the study also reports the Spearman Rank Coefficient between two pairs of countries RCAX in 1996 and 2000. The value of SRC can range from -1 to $+1$. The value of $+1$ indicates there is a perfect association in export specialization between ASEAN countries. Likewise value of -1 would indicate perfect disagreement of RCAX ranking and zero being no relationship between both countries.

A strong correlation coefficient was identified between Singapore and other ASEAN countries. In 1996 the results suggest that manufacturing export specialization between Singapore and other ASEAN countries at SITC 3-digit level were least similar. Thailand (-0.534) and Indonesia (-0.603) indicated high differences in manufacturing export specialization compare to Singapore. The results also showed fairly moderate differences in export specialization between Singapore and Malaysia (-0.290) and Philippines (-0.336). (Refer Appendix 3a)

An interesting observation is Indonesia (+0.209) and Philippines (+0.257) showed similarity in manufacturing export specialization to that of Thailand in 1996. (Refer Appendix 3a). Between Malaysia and other ASEAN members, a great majority of RCA ranking does not show significant correlation coefficient except Singapore. In 2000, the trend still persist but shows some decline in differences especially for Indonesia (-0.594), Philippines (-0.253) and Malaysia (-0.121) to Singapore's manufacturing export specialization pattern. (Refer Appendix 3b)

CONCLUSION

This paper provides evidence suggesting the existence of export diversity in manufacturing export comparative advantage between ASEAN 5 at the SITC 3 digit level. ASEAN members can take this as an opportunity to increase cooperation rather than extending their competition in the manufacturing sectors. To complement the study, further research is needed in the area of intra-ASEAN trade. In addition, incorporating the other new ASEAN members could also supplement the study. Furthermore, studies can also be extended by focusing on the source of export variations among the ASEAN members.

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Appendix 1: Top 25 SITC 3 Digit Product 1996-2000 (Indonesia, Thailand & Philippines)

	SITC Code	Indonesia	Thailand	Philippines
1996	5	512,514,522,532,554,562,	573,582,592,	523,562,593,
	6	625,634,635,641,642,651,652,653,658,665,671,673,692,696,697	611,612,613,625,656,657,659,661,666,667,697,	633,655,656,658,666,
	7	-	722,741,751,775,782,785,	711,773,776,784,
	8	821,841,842,851,	812,831,851,873,897,	811,831,841,842,843,844,845,846,871,881,883,894,899,
1997	5	513,514,522,532,562,	573,592,	562,579,593,
	6	625,634,635,641,642,651,652,653,653,656,658,671,672,673,691	611,612,613,625,652,656,657,658,659,661,666,667,675,697,	655,656,658,666,
	7	783,791,	722,741,775,782,	711,735,773,776,784,
	8	841,842,851,897	812,831,851,873,894,	831,841,842,843,844,845,846,871,881,883,894,896,899
1998	5	513,514,522,531,532,551,562,574,	572,573,592,	562,579,593,
	6	625,634,635,641,642,651,652,653,671,673,676,	611,612,613,625,652,654,656,657,658,659,661,666,667,675,697,	655,658,666
	7	783,791,	722,741,775,782,	711,731,735,772,773,776,783,784.
	8	841,842,851,897,	812,831,873,	821,831,841,842,843,844,845,846,883,894,899.
1999	5	532,554,562,563,	572,573,592,	562,593.00
	6	613,633,634,635,641,642,651,652,653,658,659,662,665,671,673,692,	611,612,613,625,654,656,657,659,661,666,667,675,697,	658,666.00

	7	783,	722,741,775,781,782,	711,714,735,752,772, 773,776,784,793.
	8	821,841,842,851,	812,831,894,997	812,831,841,842,843, 844,845,846,871,883, 894,899.
2000	5	514,522,562,573,	572,573,592,	562,593
	6	625,633,634,635,641, 642,651,652,653,656, 658,665,671,677,696	611,612,613,625,659, 661,663,666,667,672, 673,675,697,	635,654,658,666.00
	7	791,	722,741,775,781,782,	725,735,752,772,773, 776,783,784.
	8	812,821,841,842,851,	812,831,883,897	812,831,841,842,843, 844,845,846,885,894, 899.

Based on author's calculation

The products are ranked based on their sections

Only the top 25 ranked products included

Further details of their RCAX value can be obtained from the author

Appendix 2: Top 25 SITC 3 Digit Product 1996-2000 (Malaysia & Singapore)

	SITC Code	Malaysia	Singapore
1996	5	512,572,579,583,591, 598.	511,515,516,524,525, 541,553,597,
	6	613,621,662,663,671, 672,678,693,694.	675,677,695,
	7	712,721,727,761,762, 763,781,791 & 792.	714,718,723,726,733, 742,745,748,752,774, 783
	8	848	882,892,896,
1997	5	512,554,572,583,598	511,515,516,524,525, 541,551,597,
	6	613,621,633,634,662, 663,671,678,693,694.	677,695,
	7	727,761,762,763,781, 786,792,	714,718,723,724, 726,728,742,745, 748,752,774
	8	821,848,881	871,882,892,896,
1998	5	512,579,583,598,	515,516,524,525,541, 553,597,
	6	621,662,663,671,672 679,691,693,694,	633,695,
	7	712,727,733,761,762 763,781,786,792,	718,723,724,728,742, 745,746,752,774,
	8	821,848,881,	871,872,874,882,892, 896,898
1999	5	512,523,579,598	514,515,516,524,525, 533,541,597,
	6	621,634,671,672,674, 678,693	695,
	7	714,721,759,761,762, 763,781,786,791,792	718,723,724,726,728, 742,746,749,752,774,
	8	811,821,848,881	871,874,882,892,896, 898
2000	5	512,523,579,598,	515,516,524,525,533 541,583,597,
	6	621,634,662,674,678,	695,
	7	711,714,718,721,726, 727,759,752,761,763, 764,783,	723,724,728,733,742, 746,749,792,793,
	8	821,848,873,881	871,872,874,882,892, 895,898,

Based on author's calculation
The products are ranked based on their sections

Only the top 25 ranked products included
Further details of their RCAX value can be obtained from the author

Appendix 3a : Spearman Rank Correlation Coefficients of RCA in 1996

		THAI	INDO	PHIL	MAL	SING
THAI	Correlation Coefficient	1.000	.209**	.110	-.142	-.534**
	Sig. (2-tailed)	.	.009	.170	.075	.000
INDO	Correlation Coefficient	.209**	1.000	.257**	.011	-.603**
	Sig. (2-tailed)	.009	.	.001	.893	.000
PHIL	Correlation Coefficient	.110	.257**	1.000	-.009	-.336**
	Sig. (2-tailed)	.170	.001	.	.907	.000
MAL	Correlation Coefficient	-.142	.011	-.009	1.000	-.290**
	Sig. (2-tailed)	.075	.893	.907	.	.000
SING	Correlation Coefficient	-.534**	-.603**	-.336**	-.290**	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	.

** Correlation is significant at the .01 level.

Appendix 3b : Spearman Rank Correlation Coefficients of RCA in 2000

		THAI	INDO	PHIL	MAL	SING
THAI	Correlation Coefficient	1.000	.114	.062	-.212**	-.576**
	Sig. (2-tailed)	.	.156	.438	.008	.000
INDO	Correlation Coefficient	.114	1.000	.140	-.098	-.594**
	Sig. (2-tailed)	.156	.	.081	.223	.000
PHIL	Correlation Coefficient	.062	.140	1.000	.004	-.253**
	Sig. (2-tailed)	.438	.081	.	.964	.001
MAL	Correlation Coefficient	-.212**	-.098	.004	1.000	-.121
	Sig. (2-tailed)	.008	.223	.964	.	.132
SING	Correlation Coefficient	-.576**	-.594**	-.253**	-.121	1.000
	Sig. (2-tailed)	.000	.000	.001	.132	.

** Correlation is significant at the .01 level.

Note: The SRC coefficients are computed using paired RCAX for 157 industries.
Source: Author's calculation based on COMTRADE database