International Fragmentation in Textile and Apparel Production

- A Case Study of ASEAN and Thailand

Isabelle Ahlström

Camilla Stålros

Abstract

This study evaluates the international production fragmentation and the specialization of the textile and apparel sector in the ASEAN countries. Moreover, it examines Thailand's participation in textile and apparel supply-chains with the aim of finding prospects for more value-added production. The finding of the study is that production fragmentation only exists to a small extent in the ASEAN countries' trade with the world and that a higher degree of fragmentation cannot be connected to the relative increase of exports in the countries. This is explained by the fact that most ASEAN countries are middle-income countries, which have attempted production at different stages in the value-added chain but have not yet left the most labor-intensive production. Instead, the export results seem to depend on the comparative advantages in production. The development of a regional supply-chain is hindered by the ASEAN countries being too similar in their textile and apparel production structure and hence have to find their own ways of remaining competitive. The decreasing performance of the textile and apparel sector in Thailand pressures for an upgrading of the production. Thai large-scale apparel manufacturers rely to a high degree on exports to the quota markets. However, the structure of the domestic textile sector is unbalanced and the prospects for supplying full-package services and developing OBM are low. High import duties have protected the ineffective textile sector, which has contributed to the decreased competitiveness of apparel producing SMEs. The measures taken by the government, such as the 'Bangkok Fashion Center' and the initiation of a certification program, will most likely only have limited effects on the upgrading of the apparel sector in Thailand. The lowering of import duties would give apparel producing SMEs an incentive to gain market skills and an understanding for foreign contractors' demands.

Acknowledgements

List of Abbreviations

AFTA	ASEAN Free Trade Area
ASEAN	Association of South East Asian Nations
ASEAN-5	Indonesia, Malaysia, the Philippines, Singapore and Thailand
ASEAN-6	Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand
ATC	Agreement on Textile and Clothing
CEPT	Common Effective Preferential Tariff
EU	European Union
FTA	Free Trade Area
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GSP	Generalized System of Preferences
H.S.	Harmonized Commodity Description and Coding System
IIGT	Intra-industry-group trade
IIT	Intra-industry trade
IPT	Intra-product trade
ISIC	International Standard of Industrial Classification
IST	Intra-sector trade
MFA	Multi Fiber Arrangement
MIIT	Marginal intra-industry trade
MNT	Marginal net trade
MRCA	Marginal revealed comparative advantage
NIE	Newly Industrialized Economies
OBM	Original Brand name Manufacturing
OEM	Original Equipment Manufacturing
PTA	Preferential Trading Arrangement
R&D	Research and Development
RCA	Revealed comparative advantage
ROO	Rules of Origin
THTI	Thai Textile Institute
U.S.	United States

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1 Introduction

The textile and apparel sector is characterized by increasing international production fragmentation. The production of textiles and apparel is viewed as a value-added chain with several stages of production from the processing of raw materials to the assembly of apparel. Different stages of the production process are located in different countries and regions, creating supply-chains across the globe. Each stage of production is characterized by the need for different factor-intensities, technological aspects and supporting services. The chain of production is derived from the demand in developed countries and gives opportunities for the developing countries to specialize in a small part of the value-added chain according to their comparative advantage.

Protected from competition through quotas, many developing countries have developed large export sectors and attracted foreign direct investments in sectors where they might not otherwise have been competitive. International liberalization means that more developing countries can participate to a larger extent in the fragmented chain of production and that the price competition becomes harsher in labor-intensive production. For some countries upgrading of their production is inevitable in order to maintain competitiveness in the textile and apparel sector.

The purpose of this study is to evaluate international production fragmentation and specialization of the textile and apparel sector in the ASEAN countries. Further, our purpose is to analyze the participation of Thailand in textile and apparel supply-chains in order to find prospects for more value-added production.

Specialization and international production fragmentation are analyzed through trade statistics and with the application of certain measures, both static and dynamic, applied at different stages of the production process and at different levels of aggregation for the years 1994/1996 to 2000/2002. Moreover, the measures help to evaluate the prospects for more value-added production. Specialization is estimated by the measure of revealed comparative advantage and inter- and intra-industry trade at different stages of the production process. Intra-sector trade estimates the balanced trade in the textile and apparel sector in which intra-industry trade estimates the simultaneous imports and exports of essentially similar products, and intra-product trade estimates the extent of international fragmentation, i.e. the trade between industry-groups

with different factor-intensities. Intra-industry-group trade estimates the exchange of products within the same industry-group that is not of intra-industry type of trade and gives an indication of trade in non-perfect substitutes. To be able to perceive the dynamic effects of fragmentation, measures of marginal revealed comparative advantage, marginal intra-industry trade and marginal net trade are employed.

The original member countries Indonesia, Malaysia, Philippines, Singapore, and Thailand established the Association of South East Asian Nations (ASEAN) in 1967. In 1984 the sixth member, Brunei, joined the five initiating countries in the association, and together they are referred to as the ASEAN-6 countries. Today ASEAN includes 10 member countries.[1] We will, however, due to the lack of available data, only conduct our study on the ASEAN-6 countries.[2]

The study is organized as follows: In chapter 2, the liberalization scheme of the textile and apparel sector is briefly reviewed and related to regional and multilateral regulations. Chapter 3 presents the theoretical framework concerning international production fragmentation and effects on trade of preferential trading arrangements and the application of rules of origin. Chapter 4 contains relevant data, classifications and measures. In chapter 5, the trade and importance of the textile and apparel sector in ASEAN are evaluated, followed by a review of the ASEAN countries' trade patterns with the world in the textile and apparel sector with focus on comparative advantages and international production fragmentation. This is followed by an evaluation of the prospects for the development of a regional supply-chain in the ASEAN Free Trade Area (AFTA). Thereafter, in chapter 6, industrial upgrading is related to international fragmentation of trade in one of the dominating ASEAN exporters of textile and apparel: Thailand. The impact of international fragmentation and specialization on Thai trade with major trading partners in the textile and apparel sector is analyzed. The analysis is followed by a discussion of the prospect for more value-added production. Chapter 7 ends the thesis with some concluding remarks concerning the results of the analysis.

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[1] Vietnam joined the association in 1995 followed by Laos in 1997, Myanmar in 1997 and Cambodia in 1999. Approximately 500 millions of people live in the region with an average GDP per capita of 1,250 US Dollar (ASEAN Secretariat, About ASEAN 09-07-2005). However, the difference in per capita income is large and it renges from very high income per capita (Singapore) to very low income per capita (Cambodia, Laos and Myanmar).
[2] We choose to not use statistics gathered from different databases.

2 Liberalization Scheme of Textiles and Apparel

In this chapter the regional and global liberalization schemes of the textile and apparel sector are briefly reviewed. First, the ASEAN measures, with the implementation of AFTA, external trade relations and rules of origin (ROO), for trade liberalization are considered. Second, the multilateral liberalization of the textile and apparel sector through the abolishment of the Multi Fiber Arrangement (MFA) is reviewed.

2.1 Trade Liberalization in ASEAN

The ASEAN countries have adopted different trade strategies over the years. In 1965, Singapore was the first country to adopt an export-oriented strategy, followed by Malaysia, the Philippines and Thailand in the late 1960s and Indonesia as late as in the early 1980s (Minns 2001:31-32).

With the establishment of ASEAN in 1967, the initiating member countries Indonesia, Malaysia, the Philippines, Singapore and Thailand harmonized their policies of foreign trade even though the differences among the member states were vast. In 2003 there were still substantial differences in openness among the countries. As seen in Table 2.1, Singapore continues to be the leading advocate for openness followed by Malaysia and Brunei. Thailand, the Philippines and Indonesia lag behind, indicating the applications of a more restrictive trade policy.

In 1992 the ASEAN countries strengthened the economic integration with the creation of a Free Trade Area (FTA), AFTA, which was to be completely implemented by 2008. The aims were to further the industrial development within AFTA, to attract foreign direct investment (FDI) and to encourage intra-regional trade (Yue 1998:218). The intra-regional collaboration was to be strengthened among the members, so that instead of competing with each other, the entire region would compete on the international market.

Table 2.1 GDP, GDP per capita and Openness for ASEAN-6 countries for year 2003

Country	GDP Million US$	GDP Per Capita US$	Openness Exp/GDP*
Middle-income countries[3]			
Indonesia	208,625	973	0.27
Malaysia	103,737	4,198	0.90**
Philippines	79,270	973	0.44
Thailand	143,303	2,291	0.46
High-income countries[3]			
Brunei	4,715	12,971	0.57
Singapore	91,355	20,987	1.37**

Source: Compiled and calculated from statistics provided by ASEAN Secretariat, ASEAN Statistics 01-11-2005
* In calculations of Openness, exports for year 2002 are employed.
** Malaysia and Singapore are working as entrepôts.

The Common Effective Preferential Tariff (CEPT) scheme was the program that administered the liberalization of traded goods.[4] The textile and apparel products were included in the Normal Track, which was originally to be finished by 2008 but in 1995 that was rescheduled to 2003. All products on the Inclusion List were supposed to have zero taxes or not higher than 5 per cent and all the non-tariff barriers were to be abolished by the end of 2003. In 1998 the leaders of the countries decided to expand the number of included products and that 90 per cent of the tariff lines would fulfill the 0-5 per cent tariff rule by the year 2000 (ASEAN Secretariat, 6th ASEAN Summit Statement on Bold Measures 21-10-2005).[5]

Within AFTA, products that comply with the ROO enter free from import duties. The ROO within ASEAN are generally set at 40 per cent cumulative content for a product in order to be considered as originating from any ASEAN member state (ASEAN Secretariat, Agreement on the Common Effective Preferential Tariff Scheme for the ASEAN Free Trade Area (1992) 11-04-2005). However, in 1995, an additional rule was implemented in order to increase the intra-

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[3] The World Bank has divided the countries of the world into groups according to their Gross National Income (GNI) per capita: for low-income countries $825 or less, middle-income countries $826-$10,065 and high-income $10,066 or more (World Bank, Country classification 01-10-2005).
[4] Some goods were temporarily or generally excluded from the CEPT scheme, due to 'sensitivity'. Temporary exceptions in order to smooth the progress of adjustment of certain goods were authorized for countries when a tariff reduction was likely to cause a sudden import surge and thereby great instability.
[5] Vietnam, Laos, Myanmar and Cambodia entered the AFTA framework during an ongoing process of liberalization and were given other time limits than the ASEAN-6 countries for abolishment of trade restrictions. In 2006 (Vietnam), 2008 (Laos and Myanmar) and 2010 (Cambodia) the initial phase of liberalization is supposed to be finished (ASEAN Secretariat 11-04-2005).

regional trade in textile and apparel products (ASEAN Secretariat, CEPT-AFTA Rules of Origin for Textile and Textile Products 11-04-2005). Since then, products in the textile and apparel sector can be considered to originate from an ASEAN member if they have undergone a substantial transformation, for example resulting in a new product. Hence, to simply dye or waterproof a fabric will not change the origin. Both the substantial transformation rule and the 40 per cent rule can be applied to the textile and apparel sector. Since April 2005, if the material does not achieve the cumulative 40 per cent in order to comply with the ROO, an additional clause admits a national content of 20 per cent in order to fulfill the requirements (ibid. 11-04-2005).

No FTA exists between ASEAN and the major export markets the United States (U.S.), the European Union (EU) and Japan (ASEAN Secretariat, Overview 11-04-2005). The ASEAN-China FTA is to be implemented by 2010 and hence is one step ahead of other FTAs under consideration (ASEAN Secretariat, ASEAN-China Free Trade Area (ACFTA) Brochure 01-11-2005). A close cooperation between the ASEAN countries and Japan has existed for a long time and an FTA between them is under construction (ASEAN Secretariat, Other Free Trade Areas under consideration 11-04-2005). Further, meetings between ASEAN and EU are being set up continuously to discuss the foundations on which a FTA may be realized in the future (ASEAN Secretariat, Economic Relations 11-04-2005, Europa, Bilateral Trade Relations 15-10-2005).

However, since 1971 the Generalized System of Preferences (GSP) has provided the ASEAN region preferential access to the EU market (European Commission 2005:16). The preferential trading arrangement (PTA) implies that the ASEAN region receives preferential access but the arrangement does give preference to all individual member countries (Europa, Generalized System of Preferences 23-11-2005). A country like Singapore, that has reached a similar stage of development to developed countries, has been removed from the EU GSP program.[6] Hence, a product originating from Singapore does not receive preference. However, since the EU recognizes the ASEAN countries as a region, a product that is exported from Singapore receives preference if the product originates from another ASEAN country.

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[6] The criteria for excluding a country are based on the classification of countries made by the World Bank and a development index which refers to the level of industrial development. The measure is based on the ratio between per capita income and the value of manufactured exports. If a country is classified for three successive years as a high-income country and has a development index higher than -1 it is excluded from the GSP.

2.2 Trade Liberalization in the Textile and Apparel Sector

In the light of subsequent reductions of tariffs and other barriers to trade in most manufacturing sectors, the textile and apparel sector in the ASEAN countries as well as in most countries in the world has continued to stay prominently protected. The relatively large numbers of labor-intensive activities in the production of textiles and apparel, as well as the relatively low use of technology inputs, generally give developing countries, that are able to compete with low-wage labor, a comparative advantage. In 1973, with increasing imports from developing countries, the U.S. administration pressured major exporters, including the ASEAN countries, to accept the MFA. The arrangement had the aim of limiting the growth of textile and apparel imports primarily to the U.S. and EU markets to 6 per cent per year (Hoekman & Kostecki 2001:227). If exporters failed to impose export restraints, the importing countries would have the right to simply restrain trade through quotas. Hence, the MFA quota system worked to limit the ability of a country to export and to grant market access to the same countries. Moreover, since some countries were prohibited from expanding their exports, this induced their production to move to locations with fewer restrictions. In this respect, some developing countries, that initially were lacking sufficient production, were able to take advantage of the quota system, as they were able to attract investments. Hence, the phasing out of quotas represents either an opportunity or a possible threat depending on the country in question.

The MFA was submitted several times but was replaced with the Agreement on Textile and Clothing (ATC) in 1995. The ATC termination date was set to January 1st 2005. At that time the textile and apparel sector was intended to be fully integrated in the General Agreement on Tariffs and Trade (GATT) system, apart from some exceptions where the quotas would be replaced with tariffs (ibid.:227-228). Of the Harmonized Commodity Description and Coding System (H.S.) categories that were restricted in the MFA in 1990, at least 16 per cent were integrated into GATT in 1995 and another 17 per cent in 1998.[7] By 2002 a further 18 per cent were incorporated into GATT and finally, by 2005 the remaining 49 per cent of quotas were phased out (ibid.:229). However, despite liberalizing the textile and apparel sector, the ATC was criticized for also encouraging ways to escape regulations. Until 2005, the included H.S.

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[7] See Chapter 4.1 for more information on H.S.

categories were those that were of no greater importance to the majority of the developing world, being either highly liberalized already or capital intensive (Minor 2002:10).

When the quota system is phased out, the PTA is likely to become less important for the location of production (ibid.:22). Regardless of tariff benefits under the GPS, they are not close to being as significant as quotas.

3 Theory of International Production Fragmentation

This chapter reviews the theory of international production fragmentation. First, the effects of trade in components on factors used in production are examined. Then, a PTA is introduced to the model and the trade flows and economical effects from international fragmentation on the participating countries are evaluated. Finally, the effects of ROO in the above-depicted setting are considered.

3.1 Effects on Factor Inputs

Production fragmentation goes all the way back to the beginning of the industrial revolution. However, due to lower transportation costs across borders, improved telecommunication technologies as well as the reductions of barriers to trade, the trade of components has increasingly become a cross-border phenomenon (Arndt & Kierzkowski 2001:2). The increasing occurrence of international fragmentation in the production process has caused a dramatic increase of trade in inputs used in the production of end-products.

According to factor proportion theory, a country has a propensity to specialize in production of products containing factor inputs that lie close to the factor proportions of the country, since this makes the production relatively cheap. Differences between countries in factor costs and different requirements of factor-intensities in each stage of production means that international fragmentation gives all countries, including developing countries, opportunities to produce according to their comparative advantage (Petersson 2004:1:764). Arndt, 2001, illustrates the effects of international production fragmentation in an extended version of the Heckscher-Ohlin model. The model assumes two countries, Home and Partner. In the first stage only the final goods, X and Y, are assumed to make a way into the world market. The model also assumes two factors of production, capital (K) and labor (L), and that the production of X is relatively more labor-intensive, and hence, the production of Y is relatively more capital-intensive. As presented in Figure 3.1, the factor requirements in each sector are given by unit-value isoquants X_0 and Y_0 and the factor-price ratio is given by (w/r).

Figure 3.1 Effects of International Production Fragmentation
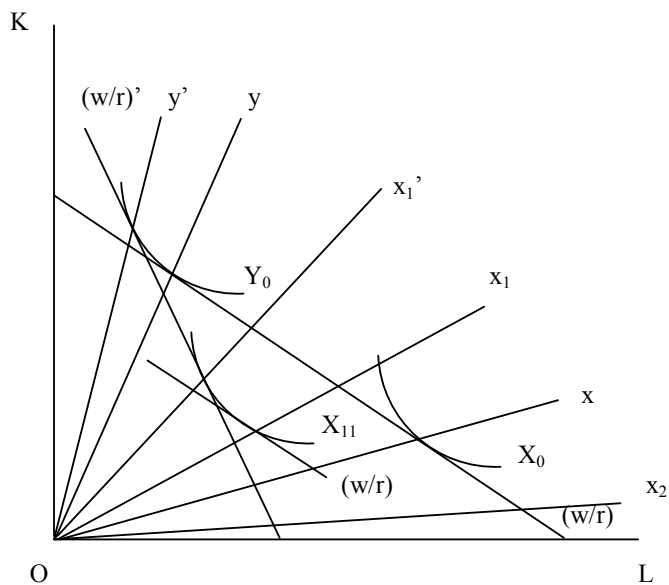
Source: Arndt (2001:77)

Introducing fragmentation to the model means that the production process of the labor-intensive good X is divided into two stages, where for example the first stage is a service stage that includes design and marketing, and the second stage is the assembly production of the final product. It is also assumed that the two different stages of production can be described in terms of their respective factor-intensities, and moreover, that the factor-intensities differs. The first stage of production (x_1) is more capital-intensive than the second stage of production (x_2). Hence, the weighted average of the different components' factor-intensities is the total factor-intensity of the final product X. The model also proclaims that the labor-intensive stage of production x_2 can be imported from a trading partner at substantial cost savings.

Taking x_2 into account, the imports of the production function of the X-industry can be completely explained by the x_1-isoquants. Assuming positive import of x_2, the model takes into account the cost of imports of x_2 measured in terms of exports of x_1. Hence, the quantity of capital and labor used in activity x_1, together with the amounts of capital and labor needed for production of the quantity of x_1 that will pay for imports of x_2, equals the factor content of X. The new unit-value isoquant X_{11} will be shifted inwards closer to the origin since the production of good X will be cheaper both when including the amount of x_1 needed to produce one unit of final X and the amount required to import the necessary x_2 units.

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At the initial factor-price ratio (w/r) the production costs of X have fallen while relative commodity prices remain the same. As a consequence producers will want to increase the output of X. The reduction of unit costs in the production of X changes the relative factor prices and therefore causes a shift to (w/r)', which is tangent to the original Y-isoquant and the new X isoquant X_{11} and hence, the capital-labor ratios increase in both industries.

3.1.1 Product Specialization in a Preferential Trade Arrangement

The introduction of a PTA into the model is illustrated in Figure 3.2. The PTA is assumed to be open to free trade in both end-products and components. Initially, the production is at Q and the consumption at C. The establishment of a PTA is assumed to lower the price of X from P_d to P_{pta}. This will shift Home's domestic production from Q to Q' and shift import to the Partner country. Hence, Home will change towards relatively more capital-intensive production of Y. The new consumption at C' is now at a lower indifference curve than before, and hence, represents a welfare reducing effect. In another set, the effect can also be welfare improving.

Figure 3.2 Trade in Components and Preferential Trade Arrangement
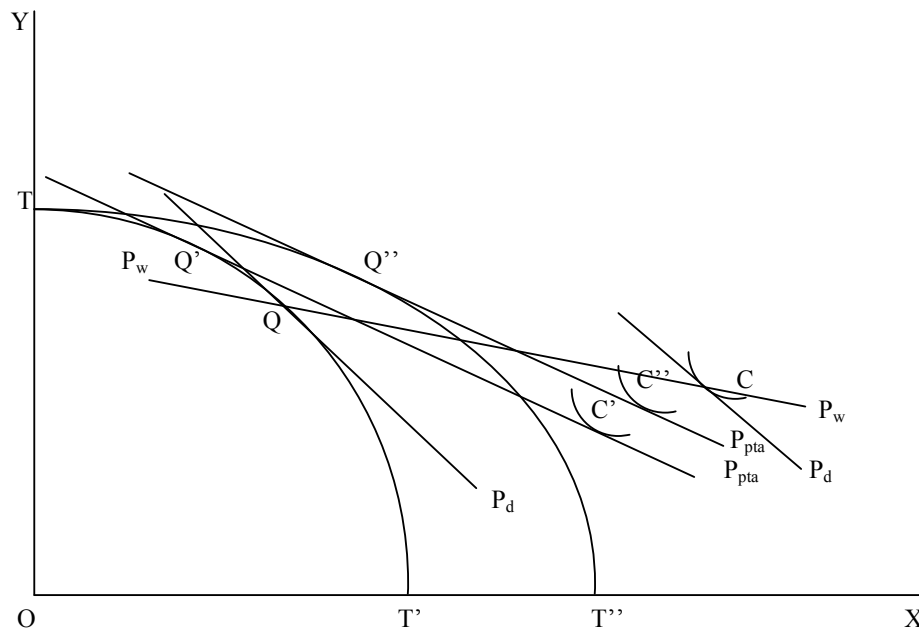
Source: Arndt (2001:80)

After introducing trade in components in the production of X in the PTA, the production possibility curve expands from T' to T'' along the X-axis. The new intersection between P_{pta} and the new production possibility curve shifts to Q''. As in the previous example, illustrated in Figure 3.1, the output of good X increases while the output of good Y decreases. In this situation the consumption moves to a higher indifference curve to C'', which tones down the negative effect of the PTA. Hence, the introduction of trade in components in a PTA is always represented by a welfare increase. Improved terms-of-trade for country Home is possible if the country is a large member of the PTA since the regional increase in output of X and the decrease of output of Y will cause a reduction in the relative price of X. The PTA price ratio will rotate counter-clockwise and hence lead to an even greater increase in Home's welfare.

According to the Stolper-Samuelsson theorem, a fall in the relative price of the end-product will also cause the relative price of the factor used intensively in production to decrease. Negative effects from a PTA that lower the price of the import competing end-product X can in turn lead to downward pressure on wages and employment and a smaller output of X. However, as illustrated in Figure 3.1, it is also important to point out that component specialization in the X-industry affects factor prices in the opposite way even with a lower relative price of the end-product. Hence, the introduction of specialization of components in a PTA that initiates greater price competition among end-products should be beneficial for workers. Thus, to the extent that the PTA also encourages intra-product trade i.e. trade in components in the X-industry wages, industry output and employment will fall less or even rise. If this effect dominates the terms-of-trade effect, both wages and employment will be higher in the import competing X-industry than before.

For some countries, the price of end-products is regulated by trade relations with non-member countries rather than by the associated PTA. In such a situation, the main objective for the country establishing a PTA with a low-wage country can be to introduce trade in components in the import competing industry. The arrangement will be welfare enhancing and in this way the country can benefit from cost savings from component specialization in order to stay competitive in the market of end-products.

3.1.2 Effects in the Partner Country

The effects in the Partner country when implementing the PTA can be of trade diverting as well as trade creating nature. The removal of tariffs on both end-products from Home causes the price of good Y to fall in Partner, and thereby the country's terms-of-trade changes. This is illustrated in Figure 3.3 by the shift of the unit-value isoquant from Y_0 to Y'_0. In turn, the wage-rental ratio increases from (w/r) to $(w/r)'$, tangent to the new Y-isoquant at point a and the initial X-isoquant at point b.

Figure 3.3 Trade in intermediate products and the partner country
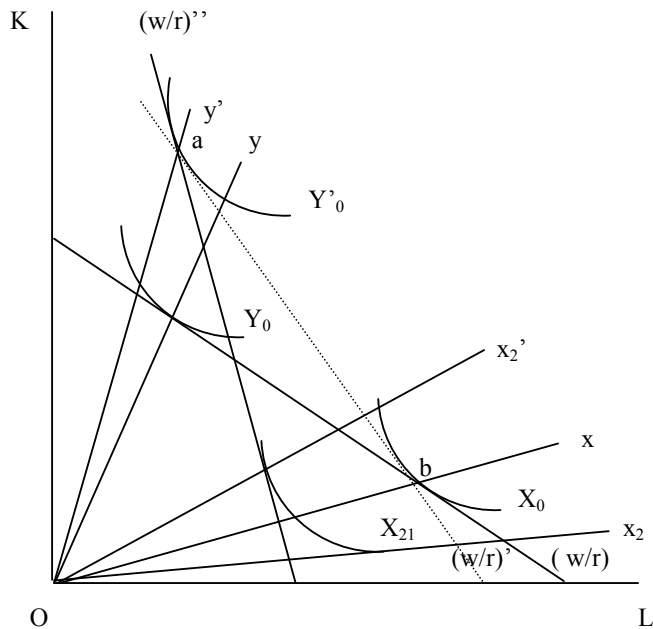
Source: Arndt (2001:83)

Moreover, the introduction of trade in components to the PTA causes Partner to abandon the production of component x_1, which will instead be imported from Home. The new production function for the X-sector is instead the x_2-isoquant, which includes the assembly production. The new relevant isoquant is set at X_{21} where it is tangent to a lower expansion path of the initial factor-price ratio (w/r). Hence, the new factor-price ratio equilibrium illustrates the change in terms-of-trade as well as the gains from component specialization, and thus $(w/r)''$ is tangent to Y'_0 and X_{21}. The new factor-price ratio causes the capital-labor ratio in production to increase to

Oy' and Ox'$_2$. The described scenario with the introduction of component specialization in the country's export industry clearly strengthens the terms-of-trade effect on the factor-price ratio.

However, a decreasing welfare effect is also possible. As recalled, total output of good X rises in the PTA region when trade in components is introduced since Home is specializing in component x$_1$ and is importing component x$_2$ from Partner. If the increase in the regional supply of end-product X is large relative to shifts in demand, the relative price of X in the region will depreciate. Although Home would benefit from this outcome, it would worsen the terms-of-trade for Partner and hence, deteriorate the improved wage-rental ratio.

To conclude the national welfare may either increase or decrease with trade in end-products between members of a PTA. However, the introduction of intra-product specialization is unmistakably beneficial to national welfare. Trade in components that leads to intra-product specialization can convert a welfare reducing PTA into a welfare creating one, and hence a PTA that encourages intra-product specialization among members should be beneficial.

3.2 Rules of Origin

An FTA involves the application of ROO in one form or another, which may affect the effect of international fragmentation. If ROOs are not implemented in an FTA, the definite effect will be a reduction of the effective tariff rate in the country with a higher tariff structure, and the FTA will become a customs union (Panagariya 2000:295). In a partial analysis between Home, the country that has a high tariff structure, and Partner, the preference receiving country, the lack of ROOs means that imported products in Partner can be re-exported to Home free from tariffs. Partner is then likely to be the sole supplier of the product to Home and will either produce the entire amount to be exported to Home, import the good from a third country, or a mix of the two. The use of ROO implies product discrimination on the basis of their 'country origin'. A ROO implies that in order to enter free of import tariffs, the commodity has to be classified as originating from a specified area or region, most often the territories of the partners in a FTA. Typically, two main distinctions are made; between foreign and domestic products and among foreign products where not all imports are to receive preferential treatment.

Since ROOs determine the eligibility for preferential treatment, one expects that they will influence resource allocation depending on the way they are defined. If ROOs change the origin

of a product so that it acquires favorable treatment and hence creates benefits for the producer that is larger than the increase in costs, the producer will adjust production processes and input choices away from suppliers that would otherwise have the lowest cost. In this way, the effect of ROOs that imply a shift from low-cost suppliers outside the arrangements to high-cost partners will be a decrease in the cost savings that arise from component specialization. The inefficiency caused by ROO eliminates the possibility for producers to fully exploit the benefits of intra-product specialization, and stands for a reduction in welfare gains. In this sense the ROO should be set in order to attain the least costly way, where costs include both the costs of the agreement and, most importantly, the cost of distorting the allocation of resources (Favley & Reed 1997:7).

Moreover, concerns have been raised about whether domestic content requirements will lead to lower production levels of both the production of the end-product and the component, rather than boost production. The potential for integration as well as the trade enhancing effects of preferential treatment may be hampered by the employment of ROOs (Grossman 1981:603). Moreover, for a small country the supply of components imported from abroad and the domestic supply of the same input are determined by the world market price. ROOs that require a certain percentage of the final product to contain region-specific content will lead to greater average costs of the end-product at higher output quantities than if all inputs were imported from abroad. This is because of the higher domestic demand of inputs, which will lead to increasing price levels of components. Furthermore, if the cost effect of ROO is the same as or greater than the tariff, the trade agreement is unnecessary. Hence, it is reasonable to believe that the increased cost of production due to ROO will still not shift the supply curve as much to the left as a tariff does.

4 Data and measures

This chapter seeks to clarify the methodology used for estimating the international production fragmentation. First, the data and the classification system are reviewed and impacts from these on calculations are investigated. Second, the measures are reviewed and difficulties with the application of them are discussed.

4.1 Data and classification

The trade data used in this study is based on data reported by the national statistical offices in the ASEAN-6 countries: Brunei (BRN), Indonesia (IDN), Malaysia (MYS), the Philippines (PHL), Singapore (SGP) and Thailand (THA). Each and every ASEAN country's trade with the rest of the world is reported and hence, the ASEAN trade with the world also includes the intra-ASEAN trade. The data extends over the period 1994 to 2002 and three sub-periods are employed when performing calculations. Three-year averages, 1994/1996, 1997/1999 and 2000/2002, are used in order to smooth out temporary fluctuations in the trade data.

The applied trade data is categorized according to the H.S. In this classification system, basic products are classified by what they are made of and not according to their stage of fabrication, their use, or origin. The system employs a six-digit code to identify products. The ASEAN trade statistics database applies the two-digit level of H.S., which is divided into 98 chapters whereof 14 belong to the textile and apparel sector. All trade flows are measured on a value basis, in thousands of US Dollars.

Different levels of aggregation may lead to distorted values in all classification systems. Overestimations of intra-industry trade, since non-perfect substitutes can be counted as intra-industry trade, come along with more aggregated data. Thus, it would be desirable to perform the analysis for quite narrowly defined industries in the sector. We aggregate the 14 industries into four industry-groups according to the capital-intensity in each stage of production. In descending order of capital-intensity the industry-groups 'Man-made fibers' (ch.54-55), 'Natural fibers' (ch.50-53), 'Other textiles' (ch.56-60, 63) and 'Apparel' (ch.61-62) are used in presentation of the results. The division of industries in the sector is of importance since it affects the results of calculations of intra-industry and intra-product trade as well as intra-industry-group trade. The

more industries in an industry-group, the larger will the share of intra-industry-group type of trade become. Moreover, if different stages of production in the value-added chain are fit into the same industry-group, it will be classified as intra-industry trade, even though there might be international fragmentation and in reality it is intra-product trade. Our calculations are performed on industry-group level if not specified otherwise.

Table 4.1 Industries and Industry-groups in the Textile and Apparel Sector

Chapter	Industry-group	Chapter	Industry
54-55	Man-made fibers	54	Man-made Filaments
		55	Man-made Staple Fibers
50-53	Natural fibers	50	Silk
		51	Wool
		52	Cotton
		53	Paper Yarn
56-60, 63	Other textiles	56	Wadding
		57	Carpets
		58	Special Woven Fabrics
		59	Laminated Textile Fabrics
		60	Knitted Fabrics
		63	Other Textile Articles
61-62	Apparel	61	Apparel, Knitted
		62	Apparel, not Knitted

Source: Division performed on H.S. retrieved at ASEAN Secretariat

It is notable that when producers located in two or more countries have been involved in the production of a product, the origin is ambiguous. The classification system will function as a divider of the production process and therefore contribute to the international fragmentation, where outputs at each production stage fall under the same, or different, tariff headings as their parts and components (Favley & Reed 1997:8). One would, however, expect there to be some relationship between the cost-based division and their heading division. The H.S. classifies incomplete or unfinished articles and unassembled or disassembled products according to their 'essential character', and the system therefore takes into account natural breaks in the production stages where intermediates are likely to cross borders. However, the cost-based and heading divisions need not to be identical.

4.2 Measures

With the aim of analyzing the outcome of specialization among regions that can be derived from production fragmentation, we employ certain measures. In order to find existing patterns and dynamic effects of fragmentation on trade, both static and dynamic measures are used (Petersson 2004:1:767-769). The measures can be applied to both industry and industry-group level.

A higher degree of product fragmentation in the textile and apparel sector promotes more inter-industry type of trade and specialization, which is consistent with the theory of comparative advantage. The revealed comparative advantage (RCA) gives an estimate indicating the comparative advantage, and hence preferable specialization for a country (Greenaway & Milner 1993:186). However, since the index is computed from trade data, various trade policies may distort the measure positively or negatively and hence give a non-accurate specialization index of comparative advantage. Moreover, the values refer only to the own, domestic trade data and not other countries'.

$$RCA_i = \frac{(X_i - M_i)}{(X_i + M_i)} \qquad\qquad 4.1$$

Industry or industry-group i in the textile and apparel sector will receive a value of RCA_i according to equation 4.1. The estimated value from this equation ranges from -1 to 1 and a negative value is interpreted as a comparative disadvantage while a positive value indicates a comparative advantage. In order to attain a deeper analysis of specialization in the textile and apparel sector the RCA_i index that estimates inter-industry trade can be complemented with a measure of intra-industry trade. The Grubel-Lloyd index estimates intra-industry trade (IIT_i) and is received through 1-$|RCA_i|$ (Grubel & Lloyd 1975:20). Since the definition of intra-industry trade is simultaneous imports and exports of essentially similar products, the measure can be applied to the industries or industry-groups in the textile and apparel sector and be written as (Petersson 2004:1:768):

$$IIT_i = \frac{2\min(X_i, M_i)}{(X_i + M_i)} \qquad\qquad 4.2$$

The index ranges from 0 to 1, where 0 signifies complete inter-industry trade and 1 signifies complete intra-industry trade.

Whereas the measures RCA_i and IIT_i are employed in order to explain specialization patterns in specific industries, some related measures help to estimate the extent of product fragmentation in the textile and apparel sector as a whole. The intra-sector trade (IST) is calculated in the same manner as IIT_i but on an aggregate level of the whole sector, and hence the balanced trade within the textile and apparel sector is determined.

$$IST = \frac{2\min(\sum_i X_i, \sum_i M_i)}{(\sum_i X_i + \sum_i M_i)}$$
4.3

Intra-sector trade can be divided into two categories of trade: intra-industry trade (IIT) and intra-product trade (IPT). Intra-industry trade in the textile and apparel sector is a weighted average of intra-industry trade on a specific aggregation level, in our case industry level and industry-group level, divided by the sum of trade in the sector.

$$IIT = \frac{2\sum_i \min(X_i, M_i)}{(\sum_i X_i + \sum_i M_i)}$$
4.4

As intra-industry trade is an exchange of commodities with similar production techniques, intra-product trade is an exchange of sector specific products produced with different factor-intensities and technologies. According to equation 4.5, the measure gives an approximation of the extent of net international fragmentation in the textile and apparel sector and is received by subtracting IIT from IST.

$$IPT = IST - IIT$$
4.5

However, the trade between industries that have the same factor-intensity can also be measured and will be referred to as intra-industry-group trade (IIGT) in this study. This measure estimates the exchange of commodities within the same industry-group that is not of intra-industry type. Hence, this measure could be an indication of international fragmentation that is neither directly

applicable to the theory of comparative advantage with factor proportions as the drive, nor theory of intra-industry trade with love for variety as the drive. Instead IIGT could be considered to measure the degree of trade in non-perfect substitutes, the trade of products that are both complements and substitutes. A higher degree of IIGT can be expected in an industry structure where, even though the factor-intensities are similar or equal, there is a lack in domestic competition in certain industries while other domestic industries are competitive on the world market. In equation 4.6, the sub-index 4 represents the above-mentioned calculations performed on the four industry-groups and the sub-index 14 represents the above-mentioned calculations performed on the fourteen industries.

$$IIGT = IPT_{14} - IPT_4 \qquad\qquad 4.6$$

To be able to perceive the dynamic effects of fragmentation on trade, marginal revealed comparative advantage (MRCA), marginal intra-industry trade (MIIT) and marginal net trade (MNT) measures are employed (Brülhart 1994).[8]

$$MRCA_i = \frac{(\Delta X_i - \Delta M_i)}{(\left|\Delta X\right|_i + \left|\Delta M\right|_i)} \qquad\qquad 4.7$$

$$MIIT_i = 1 - \left|MRCA\right|_i \qquad\qquad 4.8$$

The MRCA$_i$ index varies between -1 and 1 and indicates whether the changes in trade flows come from increased net-exports or net-imports. When the index is 0 the change in trade flows is entirely of an intra-industry type of trade, while -1 and 1 represent changes of complete inter-industry type of trade. A negative index signifies an increase in net-imports and a positive index signifies an increase in net-exports. To obtain the weighted average of the MIIT$_i$ index in the textile and apparel sector, the industry or industry-groups values must be summed up in the sector according to the formula:

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[8] The marginal measures are applied only to industry-group level in this study.

$$MIIT = \sum_i w_i MIIT_i \qquad\qquad 4.9$$

$$\text{where } w_i = \frac{(|\Delta X|_i + |\Delta M|_i)}{\sum_i (|\Delta X|_i + |\Delta M|_i)}$$

The drawback of these measures is that the results for the different industries or industry-groups may be misleading since they are not weighted and the volumes of trade differ between them. In order to overcome this incorrectness, the measure MNT_i accounts for the relative importance of the changes in net-exports and net-imports between the industries or industry-groups in the textile and apparel sector. Marginal net trade of industry-group i is accounted as follows:

$$MNT_i = \frac{(\Delta X_i - \Delta M_i)}{\sum_i (|\Delta X|_i + |\Delta M|_i)} \qquad\qquad 4.10$$

The MNT_i index ranges from -1 to 1 and indicates deficits or surpluses in the changes of trade of the industry or industry-group as a share of gross changes in trade flows for the textile and apparel sector. Altogether the MNT_i indexes for the different industries or industry-groups can illustrate the restructuring that is taking place in the textile and apparel sector. A surplus in one industry or industry-group matched by a deficit in another represents a change in international fragmentation, which is the same thing as marginal intra-product trade.

Moreover, in this way we can easily interpret the relative importance of the changes in net trade flows in the industries or industry-groups since the MNT estimates sum up to the aggregate MRCA. The absolute numbers of MNT together with MIIT also sum up to 1, since they represent all the changes in trade flows in the sector, both of intra-industry type and of net-exports or net-imports.

Distortions that may arise when considering RCA and MRCA are aggregation problems as well as problems that come from different governmental policies in the countries where, for example, subsidies to certain goods may give the false impression that the country has a comparative advantage in production of these goods. Calculations including imports worsen the problem since a decline in imports in combination with no change in exports will be interpreted as a positive MRCA and an increasing comparative advantage. However, excluding imports

would cause other weaknesses of the measures, such as not being able to calculate net trade and intra-industry trade, both of which are used in the analysis of international fragmentation. Likewise, declining exports will be interpreted as negative MRCA and a decreasing comparative advantage.

5 Specialization and Production Fragmentation in ASEAN

This chapter begins by categorizing the production of textiles and apparel into different stages and activities according to factor-intensity. Next, the impact of comparative advantages and international fragmentation on the ASEAN trade with the world in the textile and apparel sector is analyzed. Finally, the option for a regional supply-chain within ASEAN is evaluated.

5.1 A Fragmented Chain of Production

Historically the production of textiles and apparel has developed from mainly being domestically fragmented to being exposed to substantial international fragmentation (Petersson 2004:1:765). An internationally fragmented textile and apparel sector means that a product might for example be designed and marketed by a firm in one country (typically a developed country), while sewing takes place in another country (typically a low-wage country) (UNIDO 2003:110). The production of textiles and apparel, with the exception of natural fiber content, is mainly reliant on the factors capital and labor, both skilled and unskilled, with low costs of transportation (Petersson 2004:1:765). Graziani, 2001, divides the value-added chain of production in the textile and apparel sector into four major stages, with all stages being characterized by different factor-intensities (Graziani 2001:210). The first stage, the production of 'synthetic fibers', is about four times as capital-intensive as the second stage, the production of 'textiles' (more specifically, the making of 'yarn' and 'fabrics' is more capital-intensive than the production of 'finished textiles'). In turn this stage is about one and a half times more capital-intensive than the production of 'apparel', that usually is very labor-intensive. Lastly, the most value-added stage is 'distribution', which includes stages of packaging, inventory control, logistics, marketing and distributing. This stage is highly capital and technology intensive and often has a high demand for skilled labor.[9]

Moreover, each stage in the value-added chain also incorporates a number of different activities that varies widely in terms of their factor-intensities. For example, in the production of

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[9] Petersson 2004:1 uses an additional stage in his study, 'other textiles', as suggested by the South African statistics of manufacturing production (1996). This specific division on the SADC region suggests a larger range of factor-intensities in South Africa than the division applied to industrialized countries presented by Graziani, 2001.

apparel, value-added activities such as designing, pattern making, grading, nesting, marking and cutting are highly capital-intensive and automated. By contrast, the midstream activity of sewing is found to be highly dependent on unskilled labor. In the stages of product inspecting, pressing, dying and washing, some automation has been introduced and therefore they are more capital-intensive. Moreover, it should be emphasized that there are several other factors, aside from labor and capital-intensity in production of different stages, that may influence the international division. Factors such as geographical proximity, external economies, delivery time and preferential trading schemes all play important roles in specialization and the allocation of production (ibid.:227-228).

5.2 ASEAN Trade in the Textile and Apparel Sector

During the studied time frame, from 1994/1996 to 2000/2002, the textile and apparel sector represented around 6 per cent of total ASEAN export (presented in Table 5.2). Even though this may appear as a fairly small share of total exports, the sector is still substantial to especially Indonesia, the Philippines and Thailand, representing about 10 per cent or more to these countries. When considering the size of the economies it becomes apparent that the major exporters of textiles and apparel in ASEAN are Indonesia and Thailand, representing more than 30 per cent and 25 per cent, respectively, of all ASEAN exports in the textile and apparel sector.

Table 5.1 Wage, Value-added and Efficiency in Wearing apparel, except fur, Category 1810 ISIC Revision 3 for year 2001

	Number of employees	Wage per employee (US$)	Value-added per employee (US$)	Value-added per 1 US$ wage
Indonesia	497,750	721	1,744	2.42
Malaysia	74,087	3,176	5,929	1.87
Philippines	143,800	1,759	4,685	2.66
Singapore	8,081	10,324	16,057	1.56
Thailand	144,450	2,214	3,726	1.68
ASEAN-5	868,168	1,440	3,051	2.12

Source: Compiled and calculated from statistics provided by UNIDO 2001.

As noted in Table 5.1, the difference in wages in apparel production between the ASEAN countries is extensive, ranging from 721 US$ in Indonesia to 10,324 US$ in Singapore.

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However, the value-added per 1 US$ wage is the most important measure, which gives an approximation of the efficiency and hence the competitiveness in production of apparel on the world market. The Philippines prove to have the most competitive workers, followed by Indonesia. According to these calculations, Singapore and Thailand have the least competitive workers in the production of apparel.

Table 5.2 Textile and Apparel Sector Trade in ASEAN Total Trade and Increase of Textiles and Apparel for Years 1994/1996-2000/2002

		BRN	IDN	MYS	PHL	SGP	THA	ASEAN
Textile and	1994/1996	1.8	13.5	3.7	15.4	2.6	11.3	6.9
Apparel/Total	1997/1999	3.9	11.3	3.2	8.5	2.2	9.3	5.5
exports (%)	2000/2002	7.3	13.0	2.6	7.6	1.9	7.9	5.4
Textile and	1994/1996	2.9	3.6	2.4	5.9	3.1	3.4	3.6
Apparel/Total	1997/1999	6.0	3.3	2.2	4.4	2.5	3.6	3.3
imports (%)	2000/2002	12.5	3.1	1.8	4.1	2.4	3.7	3.1
% of ASEAN	1994/1996	0.2	31.0	12.1	12.9	13.5	30.3	100.0
Textile and Apparel	1997/1999	0.5	30.5	13.8	13.8	13.8	27.6	100.0
exports	2000/2002	1.0	36.8	11.5	12.9	12.1	25.7	100.0
% of ASEAN	1994/1996	0.7	22.6	14.3	12.4	29.8	20.1	100.0
Textile and Apparel	1997/1999	1.1	20.4	15.1	14.5	30.2	18.7	100.0
imports	2000/2002	1.6	21.5	13.4	12.6	28.3	22.5	100.0
Increase of Textiles	Exports	157.3	20.3	-1.9	3.1	-7.8	-13.6	3.0
and Apparel (%)	Imports	68.5	-16.4	-17.9	-10.1	-16.2	0.0	-11.3

Source: Calculated from statistics provided by the ASEAN secretariat.

As shown in Table 5.2, trade in the ASEAN textile and apparel sector is decreasing in relation to total trade. This share of exports decreased from about 7 per cent in the early 1990s to about 5.5 per cent of total ASEAN exports in the early 2000s. The proportion of textile and apparel imports stayed relatively unchanged during the period with a slight decrease from about 3.5 per cent to 3 per cent of total imports. However, in total the ASEAN exports increased by 3.0 per cent during the period, while the imports decreased by 11.3 per cent. As previously mentioned, Indonesia and Thailand are the biggest exporters of textile and apparel in ASEAN. However, while the Indonesian exports have increased by 20.3 per cent, the Thai exports have decreased by 13.6 per cent. These countries, together with Singapore, are also the largest importers of textiles

and apparel. Indonesia, Thailand and Singapore account for about 21, 20 and 30 per cent, respectively, of total ASEAN imports of textile and apparel products. However, while the Thai imports have remained unchanged, the Indonesian and Singaporean imports have been decreasing by some 16 per cent over the period.

The importance of the textile and apparel sector in the ASEAN region is a result of several related factors. The undertaking of an export-oriented strategy, which Singapore was the first country to adopt in 1965, is fundamental to the industrial development (Minns 2001:31-32). Most importantly the export-oriented industries benefited from the change in the pattern of world capital investments in the 1980s, in which firms from richer countries, beginning mainly with Japanese firms, relocated some of their labor-intensive production to the ASEAN countries. The Japanese long-term economic growth had led to a great trade surplus and foreign currency reserves in the middle of the 1980s. At that time the U.S. and EU demanded that Japan import more from their countries and imposed trade barriers against Japanese exports, in addition to demanding a correction of international currencies. The outcome was an appreciation of the Japanese Yen by approximately 50 per cent, which made the Japanese exports less competitive but also made the assets outside the country extremely cheap. The new investments in assets were different from previous ones in that the production of the firm now was exported back to the richer countries or directly to other western countries. The relocation of labor-intensive production started a massive export boom in several industries in the ASEAN countries. Although the Japanese investments were relocated to other industries in the late 1980s the ASEAN textile and apparel sector continued to benefit from FDIs mainly from South Korea and Taiwan that followed the Japanese pattern of investment. The industrial development caused a shift of ASEAN export from raw materials to more value-added production in all fields of the domestic industry.

Also, the MFA has affected the development of the textile and apparel sector in the ASEAN countries. As signatories of the MFA and the ATC, the ASEAN countries have had bilateral textile and apparel quota agreements with their largest export markets, the U.S. and the EU. Although the quota system has limited the producers' export market it also has had the advantage of excluding potential competitors from foreign high value-added producers, such as South Korea and Taiwan, as well as low-wage countries, such as China and India. As noted in Chapter 3, the ATC, established in 1995, implied that the quotas would be phased out and in

some cases be replaced with tariffs by 2005. However, the inefficiency and the included categories lack of relevance for the developing countries meant that much of the labor-intensive industry-group 'Apparel', which is the largest export product of the textile and apparel sector for ASEAN, was continuously subject to quotas during the period of time. Even so, most of the ASEAN countries do not fill their quotas. The AFTA region has instead been accused of encouraging illegal imports of Chinese fabric through Myanmar (USITC 2004:G-50) and a substantial amount of Chinese apparel has reportedly been re-exported through Thailand to quota markets (Salam 2004:66). Under the ASEAN-EU quota swap agreement program, unfilled textile and apparel quotas were allowed to be shifted from one ASEAN member to another, subject to certain exceptions (USITC 2004:G-36). In reality, however, the unfilled quotas were seldom replaced by export from another ASEAN-5 country but from one of the later entrants. For example, the Philippines have been unable to fill all of the EU quotas and as a consequence Vietnam has been using the quota allocated to the Philippines and has exported to the EU. When the quantitative restrictions in the MFA no longer are applicable, the quota markets are instead likely to impose additional regulations concerning technical, social and environmental issues in order to restrict the imports from all developing countries (Tantigate 2003:64). This will raise the costs of production in the ASEAN countries, as it requires certain adjustments in the production process in order to meet the criteria.

5.2.1 Revealed Comparative Advantage in ASEAN

As noted in Chapter 3, a country has a tendency to specialize in production of products using factor inputs that are abundant in the country, since this makes the production relatively cheap. This suggests that the middle-income countries should have greater RCA in the labor-intensive production of apparel and less so for the more capital-intensive production while the high-income countries, Singapore and Brunei, are expected to have higher RCA in the more capital-intensive production. Specialization according to factor-intensities in ASEAN is reflected in the estimates of comparative advantage in Table 5.3 in which the ASEAN countries, being relatively labor abundant and having access to raw materials (USITC 2004:G-3), have comparative advantages in labor-intensive production and are net-exporters of textile and apparel. However, as noted in chapter 4, restrictive trade policy will distort the RCA measure heavily since the

calculations are based on trade data. Since Indonesia, the Philippines and Thailand have relatively more restrictive trade policies than the other ASEAN countries (see Table 2.1) their RCA measures are likely to be less accurate.

Table 5.3 Revealed Comparative Advantage and Trends in the Textile and Apparel Sector

		BRN	IDN	MYS	PHL	SGP	THA	ASEAN
54-55	1994/1996	-0.98	0.41	0.12	-0.73	-0.04	0.21	0.15
Man-made	1997/1999	-1.00	0.50	0.31	-0.72	0.08	0.30	0.25
fibers	2000/2002	-0.95	0.52	0.31	-0.69	0.11	0.22	0.27
	MRCA	-0.90	1.00[a]	1.00[a]	1.00[a]	0.18[ab]	-0.03[ab]	1.00[a]
	MNT	-0.02	0.21[a]	0.33[a]	0.14[a]	0.06[ab]	0.00[ab]	0.24[a]
50-53	1994/1996	-0.98	-0.28	-0.34	-0.80	-0.19	-0.32	-0.34
Natural fibers	1997/1999	-0.99	-0.21	-0.23	-0.79	-0.19	-0.18	-0.26
	2000/2002	-0.60	-0.20	-0.29	-0.81	-0.24	-0.32	-0.31
	MRCA	-0.52	1.00[a]	0.44[ab]	0.76[ab]	0.15[ab]	0.30[ab]	0.51[ab]
	MNT	-0.12	0.08[a]	0.20[ab]	0.25[ab]	0.03[ab]	0.03[ab]	0.13[ab]
56-60, 63	1994/1996	-0.94	-0.23	-0.30	-0.44	-0.29	-0.04	-0.25
Other textiles	1997/1999	-1.00	-0.15	-0.37	-0.43	-0.28	0.03	-0.23
	2000/2002	-0.74	0.13	-0.33	-0.43	-0.32	0.05	-0.15
	MRCA	-0.47	1.00[a]	-0.59	0.61[ab]	0.19[ab]	0.50	1.00[a]
	MNT	-0.06	0.21[a]	-0.08	0.09[ab]	0.03[ab]	0.08	0.17[a]
61-62	1994/1996	0.36	0.99	0.83	0.95	-0.05	0.97	0.76
Apparel	1997/1999	0.60	0.99	0.83	0.95	-0.03	0.95	0.71
	2000/2002	0.73	0.99	0.80	0.96	-0.02	0.93	0.72
	MRCA	0.88	0.98	-1.00[b]	1.00[a]	0.10	-1.00[b]	0.22
	MNT	0.53	0.50	-0.08[b]	0.39[a]	0.03	-0.69[b]	0.07
Textile &	1994/1996	-0.33	0.41	0.19	0.29	-0.11	0.45	0.28
Clothing	1997/1999	-0.07	0.48	0.27	0.29	-0.07	0.47	0.31
	2000/2002	0.10	0.55	0.27	0.35	-0.07	0.40	0.34
	MRCA	0.33	0.99[a]	0.37[ab]	0.87[a]	0.15[ab]	-0.58[ab]	0.62[a]
	MIIT	0.26	0.01	0.31	0.13	0.85	0.19	0.38

Source: Calculated from statistics provided by the ASEAN Secretariat
[a] Declining imports add to positive value.
[b] Declining exports add to negative value.

The most apparent RCA in the textile and apparel sector for the ASEAN region is found in the labor-intensive production of 'Apparel' where the average ASEAN estimates are above 0.70 for all years. Interestingly, also the capital-intensive production of 'Man-made fibers' experiences a

trade surplus and a comparative advantage. This indicates that the skill and capital as well as the natural resources needed for this production is present in the ASEAN region and a future growth of this more value-added production could be advantageous. The production of 'Natural fibers' and 'Other textiles' both have trade deficits and show comparative disadvantages. Since the total textile and apparel sector has experienced a negative trend in trade flows and in imports, most of the marginal estimates are positive and appear as increasing comparative advantage. The seemingly increasing competitiveness over the years in the 'Natural fiber' and 'Man-made fiber' production mainly comes from decreased imports. In reality, this may just as well mean that there is a decreasing domestic demand and that some of the ASEAN countries are attempting to develop their textile industries and to create a more domestically integrated chain in the production of apparel.

The textile and apparel sector in Indonesia and Thailand incorporates almost every stage of production (USITC 2004:G-6, G-40). The two countries also have the greatest comparative advantages in the textile and apparel sector among the ASEAN countries. However, while Indonesia shows increasing values of RCA and a positive MRCA, which means that it is continuing to specialize into the sector, Thailand seems to be specializing out of the sector with decreasing values of RCA and a negative MRCA. The structural change comes from the changes in trade flows that are depicted in Table 5.2. For Thailand, which has a higher GDP per capita than Indonesia and hence is relatively more capital-intensive, the estimates and the decrease in exports indicate that some of the production has moved across borders out of the country in favor of a country in which labor is cheaper. For Indonesia, the advantage in terms of labor and cheap electricity and fuel has traditionally been beneficial to the textile and apparel sector (ibid.:G-6). In 1999, with the removal of President Suharto from power and the aftermaths of the economic crisis with low capital investments and high inflation, the costs of labor, electricity and fuel increased. This might lower the comparative advantage in the future (ibid.:G-9), but it cannot be seen in the trade flows so far.

Malaysia and the Philippines have experienced increasing comparative advantages, but this is mainly due to decreasing imports of textile and apparel products. Brunei presents a trade deficit in the beginning of the time frame but a trade surplus in the end, and the RCA is increasing.

Singapore, on the other hand, shows values of RCA close to zero during the entire time frame, which means that most trade is of intra-industry type. It also has a substantially larger MIIT than the other countries, which means that the changes in exports and imports are largely simultaneous and do not change the specialization. With an area of which only 1.6 per cent is arable, the economy has been highly liberalized with low tariffs in order to serve as an entrepôt for manufactured commodities with well supporting infrastructure. Hence, it seems natural that the other ASEAN countries indirectly affect Singapore's trade in the textile and apparel sector. However, the ASEAN exports that go through Singapore are accounted for as both imports and exports, and hence can be considered as intra-industry trade. Interestingly, since Singapore experiences simultaneous decreasing trade flows, this indicates that less textile and apparel products are transported through Singapore.

An interesting observation of the comparative advantage in Thailand is that the estimates show a peak during the period 1997/1999. The same thing can be glimpsed in Malaysia. In 1997, the Asian crisis started in Thailand and forced the Thai government to devaluate the Thai bath and then to convert to a floating rate system (Pantumsinchai et al 2002:36). Since the calculations are performed on trade data, the crisis is reflected in a temporarily increased comparative advantage. The Thai, Indonesian and Malaysian currencies were all pegged to the U.S. Dollar and Indonesia and Malaysia also adjusted the value of their currencies after the crash of the Thai Bath (Sato 2001:209). This meant that all exports became cheaper for foreign buyers while imports became more expensive. Due to better financial policies, the Philippines and Singapore were not struck as badly by the crisis (ibid.:208). The Brunei industry was also fairly protected against the Asian crisis due to its small size and insignificance as a target for FDI (Gunn 2001:81). However, the Brunei export of 'Apparel' to the ASEAN countries decreased severely between 1997 and 1999, which indicates that the textile and apparel sector was indirectly affected by the neighboring countries' financial problems.

When looking more precisely into each textile and apparel product in the ASEAN countries, substantial differences in RCA are revealed. All ASEAN countries except the richest country, Singapore, present their strongest specialization of the textile and apparel sector in the production of labor-intensive 'Apparel'. Despite the strong specialization in this product, the fairly rich and developed economies, Malaysia and Thailand, present declines in specialization of 'Apparel'. However, considering the MNT values and hence the relative importance of the

change, it becomes apparent that the decline in specialization is quite severe in Thailand but of less importance in Malaysia. Although labor abundant, labor costs in Malaysia are among the highest in ASEAN (see Table 5.2) and the sector heavily relies on foreign workers, mainly from Indonesia, in order to keep wages down (USITC 2004:G-16-18). The pressure from low-wage countries and governmental policies has pushed Malaysian manufacturers to leave low-quality production and to focus exclusively on high-quality apparel and develop their export through more value-added activities of branding and packaging (ibid.:G-16-18). Even though Thailand is moving in the same direction and the government has initiated a certification program in order to achieve more value-added production in the apparel sector (Pantumsinchai et al 2002:35), the need for upgrading in Thailand is larger than in the other ASEAN countries.[10]

The comparative advantages continue to increase for 'Apparel' in Brunei, Indonesia and the Philippines. In fact, the MNT values show that the increasing exports represent about half of all changes in trade flows in the sector. In Brunei the apparel sector has a comparative advantage in production of apparel despite extensive capital and foreign reserves. However, the reserves are built up by the exports of oil, which has meant that the other industries have lagged behind in progress and hence, the textile and apparel sector relies on low-wage unskilled labor (Gunn 2001:79). The Philippine 'Apparel' export has a comparative advantage even though it heavily relies on imports of raw materials like yarn and fabrics in production (USITC 2004:G-25). Indonesia, on the other hand, has a fairly well developed textile and apparel sector and the 'Apparel' exports are sustained and supported by the cheap, labor-intensive production.

Indonesia, Malaysia and Thailand, present positive values of RCA in the capital-intensive production and prove to be somewhat competitive in the production of 'Man-made fibers'. However, only Indonesia and Malaysia are continuing to evolve this competitiveness. The Indonesian textile and apparel sector has benefited from oil reserves and the sector has an integrated production of petrochemicals along all textile activities from spinning to apparel for man-made fibers (ibid.:G-6). Malaysia also has oil reserves and the petrochemical industry continues to develop (ibid.:G-17). However, in the Malaysian case the increased RCA mainly comes from decreased imports from the world. Thailand's competitiveness in man-made fiber production has evolved from Japanese mills moving abroad (ibid.:G-44). The smallest and poorest middle-income economy, the Philippines, and the high-income but financially

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[10] The certification program is further described and evaluated in Chapter 6.

mismanaged country Brunei, have strong comparative disadvantages in this capital-intensive production, but the Philippines show a tendency towards a more competitive production.

All countries have comparative disadvantages in the production of 'Natural fibers', which may be surprising considering the rich natural endowments that several of these countries have (USITC 2004:G-3). However, the natural fibers silk (ch.50), wool (ch.51) and cotton (ch.52) are expensive to grow in the ASEAN monsoon regions and are generally considered to be of inferior quality. Moreover, as a consequence of the export-led policy adopted by several ASEAN countries and the development of more value-added production in other fields, the incentive for further development of raw materials is limited (ibid.:G-16, G-26, G-44). The imports of 'Natural fibers' have decreased in all countries except in Brunei, and exports have decreased in all countries except in Brunei and Indonesia. The fact that imports have decreased more than the exports indicates a smaller dependency on imports of natural fibers, and, considering the MNT values, this is especially apparent in Malaysia and the Philippines. The Philippine government has actively been working on lessening the dependence on imports of natural fibers through the promotion of domestic production of fiber crops, banning of imports of used apparel, giving of financing for modernization and expansion and through the development of a competitive market for electricity (ibid.:G-25). As a consequence of the domestic integration of natural fibers, the import of cotton has decreased. Malaysia, on the other hand, is in the process of shifting from yarn and fabric production to production of high-end apparel and has abolished the import duties on textile and apparel inputs (ibid.:G-17). The number of spindles in the spinning industry has decreased and consequently, the import of raw cotton has decreased.

The RCA in 'Other textiles' is negative for all ASEAN countries or around zero for Indonesia and Thailand. The strong positive trend experienced by Indonesia and reflected in the marginal measures mainly comes from decreased imports, while Thailand presents an increase in comparative advantage due to increased exports. This may indicate a forthcoming specialization, but the change is still small in comparison to the overall change in the sector.

Considering the aggregate marginal measures, the development of the textile and apparel sector in ASEAN is heading towards specialization as a consequence of comparative advantages rather than intra-industry trade, and the MRCA is 0.62 while the MIIT is 0.38. The textile and apparel sector in Singapore experiences decreasing trade flows but the specialization in production does not change significantly. In the other countries the changes of trade flows

change the specialization according to comparative advantages in different ways. Indonesia continues to evolve competitiveness in the entire textile and apparel sector, Brunei is evolving competitiveness in apparel production and The Philippines are integrating the domestic production of textiles in the production of apparel. The trade flows in Thailand, and less so for Malaysia, and pressures for an upgrading in production.

5.2.2 International Production Fragmentation in ASEAN Trade with World

Exploiting RCA gives opportunities to participate in production of a stage of the value-added chain. As seen in Table 5.4, the IST is relatively high in all ASEAN countries' trade with the world, which gives a fairly high average for balanced trade in the textile and apparel sector for ASEAN. The IIT_4 for ASEAN is somewhat smaller which in turn gives decreasing IPT_4 measures from 19 to 14 per cent of all trade. This indicates that the degree of specialization in specific stages of the value-added chain is low and decreasing, representing a small proportion of all ASEAN international trade in the textile and apparel sector. However, RCA is the drive for the international fragmentation that takes place. The most important reason for the outcome is that the middle-income countries in ASEAN are producers and net-exporters of 'Apparel' to the world and are net-importers of inputs for the production. However, some of the net-export of 'Apparel' from primarily the largest exporters Indonesia and Thailand is reflected in a lower ASEAN IST and cannot be seen in the IPT due to lower volumes of total imports.

Differences in terms of pattern of international fragmentation can be revealed between the member countries. In Singapore, the IIT-values are very high while the IPT-values are very low. Hence, the specialization according to comparative advantages is of less importance to Singapore as would be expected by a developed country. Indonesia, Malaysia and Thailand have mid-high IIT-values, which symbolize a stage of development where they are still working through comparative advantage to some extent as well as showing a demand for varieties in intra-industry trade. The IPT measures for these countries are smaller than would be expected by a low-income country, since they have attempted to develop other segments of the textile and apparel sector so that they can phase out apparel production in the long run. Since apparel export is increasing during the period in question and the IST, IIT and IPT measures for Indonesia are all decreasing, which suggests that the apparel exporters are increasingly able to integrate the

domestic textile sector into production. The decreasing IST in Malaysia mainly exists because of decreasing imports of inputs. The international fragmentation is almost unchanged for the period, and hence the decreasing trade is in intra-industry trade, which could indicate domestic integration of fibers in production of apparel. Thailand, on the other hand, shows increasing values of IST and IIT. This is due to decreasing exports and comparative advantages, which pushes for a change in production. As the ASEAN countries continue to progress, the demand for variety is likely to increase. Since the middle-income countries have not yet reached a developed stage, they are still expected to rely on trade created from comparative advantages. Hence, over time, one can expect the IST and IIT to increase while the IPT decreases since, even though the specialization according to comparative advantages still will take place, it will become a smaller part of total trade.

Table 5.4 International Fragmentation of the Textile and Apparel Sector in ASEAN Trade with the World

		BRN	IDN	MYS	PHL	SGP	THA	ASEAN
IST	1994/1996	0.67	0.59	0.81	0.71	0.89	0.55	0.72
	1997/1999	0.93	0.52	0.73	0.71	0.93	0.53	0.69
	2000/2002	0.90	0.45	0.73	0.65	0.93	0.60	0.66
IIT_4	1994/1996	0.33	0.42	0.57	0.18	0.89	0.42	0.53
	1997/1999	0.24	0.40	0.51	0.19	0.90	0.46	0.54
	2000/2002	0.28	0.37	0.51	0.18	0.90	0.49	0.52
IPT_4	1994/1996	0.34	0.17	0.24	0.53	0.00	0.13	0.19
	1997/1999	0.69	0.12	0.22	0.52	0.03	0.06	0.16
	2000/2002	0.62	0.07	0.22	0.47	0.03	0.12	0.14
IIT_{14}	1994/1996	0.27	0.38	0.55	0.15	0.85	0.36	0.52
	1997/1999	0.24	0.37	0.49	0.15	0.85	0.40	0.52
	2000/2002	0.28	0.35	0.51	0.14	0.83	0.43	0.50
IPT_{14}	1994/1996	0.40	0.21	0.25	0.56	0.04	0.19	0.21
	1997/1999	0.69	0.15	0.24	0.56	0.08	0.12	0.17
	2000/2002	0.62	0.10	0.22	0.51	0.10	0.18	0.16
IIGT	1994/1996	0.06	0.04	0.01	0.03	0.04	0.06	0.02
	1997/1999	0.00	0.03	0.02	0.04	0.05	0.06	0.01
	2000/2002	0.00	0.03	0.00	0.04	0.07	0.06	0.02

Source: Calculated from statistics provided by the ASEAN Secretariat.

In contrast to the other ASEAN countries, the countries with the least developed textile and apparel sectors, Brunei and the Philippines, display low IIT-values and conversely high IPT-values, which indicate a strong specialization according to comparative advantages. Brunei is on average a rich country, but is a small economy and the income distribution within the country is uneven, and in this sense Brunei can be compared to a low-income country. This puts the results of Brunei in line with what should be anticipated for a small and less developed economy, since intra-industry trade increases with higher GDP per capita and a larger economy (Hine et al 1999:83; Helpman & Krugman 1999:205). In reality the imports have exceeded the exports heavily and the increasing measures of IPT come from the increasing exports that have given the sector a more balanced trade in which inputs are imported and apparel exported. However, the large extent of international fragmentation in the Philippine trade in comparison to the other ASEAN countries' trade is somewhat surprising. Nevertheless, despite the advantage of being an English speaking country and effective producer of apparel (as seen in Table 5.1), the Philippine textile and apparel sector is less developed and is lagging behind neighboring countries' sectors. Hence, the results indicate that the Philippines cannot supply the whole value-added chain and are dependent on imports to a larger extent than the other middle-income countries. However, the decreasing IPT measures support the previous analysis, in which the sector tends to become increasingly domestically integrated.

The international fragmentation that comes from trade in products that are both complements and substitutes is low in ASEAN total trade, which is reflected in low values of IIGT. Thailand and Singapore experience the highest values over the years with about 6 per cent of all trade representing this kind of international fragmentation. In Thailand this is mainly present in 'Other textiles'. A part of this can be explained by the statistical problem where 'Other textiles' consists of more industries than other industry-groups. Still, this cannot explain the differences in comparison to other countries. Thailand is a net-exporter of wadding (ch.56), carpets (ch.57) and especially other textile articles (ch.63), and trades this for net-imports of laminated textile fabrics (ch.59) but most prominently knitted fabrics (ch.60). Thailand has a large textile and apparel sector, which can supply most of the inputs for production of apparel (Tantigate 2003:63; USITC 2004:G-40). However, since many Thai manufacturers are assembly

producers of fashion brands, the IIGT values could be a sign of the power of contractors.[11] Singapore is the only country showing increasing IIGT values. The trade in non-perfect substitutes in Singapore is mainly present in the 'Man-made fibers' and 'Apparel' industry-groups with the exchange of net-exports of man-made filaments (ch.54) and knitted apparel (ch.61) and net-imports of man-made staple fibers (ch.55) and non-knitted apparel (ch.62).

5.3 Cooperation within ASEAN as a Production Base for Exports

The extra-regional trade in ASEAN is significantly more important than the intra-regional since the demand for final goods comes from outside the region. However, ceteris paribus, an FTA is expected to stimulate the trade in components more than normal trade due to multiple border crossings (Athukorala & Yamashita 2005:15). As a response to the changes on the world market with the liberalization of the sector, and in an attempt to maintain their competitiveness, cooperation between the ASEAN countries may work for the creation of a regional supply-chain. The commodities flow freely within AFTA, which means that the benefits from international production fragmentation can be fully taken advantage of. The ASEAN regional market is substantial and there should be gains from pooling resources and possibilities to integrate some of the production stages regionally. In order to achieve cost-efficient production of all stages in the value-added chain within a region, there must be a consistent specialization in the entire textile and apparel supply-chain (Petersson 2004:1:787).

As seen in Table 5.5, the intra-regional trade in the textile and apparel sector averages around 10 per cent of all ASEAN export and 20 per cent of all ASEAN import. The fairly low intra-regional trade is a consequence of historical reasons as well as of present political systems. In 1967 ASEAN was formed as a stabilizer when several countries in the region were on the verge of open war with each other. The spread of Communism in several ASEAN countries and insurgency actions in Malaysia, Singapore, Thailand and the Philippines were supported by

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[11] Large retailers, usually from developed countries, outsource production of apparel to manufacturers in the ASEAN countries. The contractor controls the sourcing and decides which fabric or other input to use in the production of apparel. These inputs can be sourced in another country even though similar products are produced in the ASEAN country. If the manufacturers in the ASEAN country made the decision, it would be more likely that the inputs, similar to the imported ones, would be sourced domestically. The result of the retailers' power is that the ASEAN country is importing certain products but is competitive and is exporting other similar ones, requiring similar factor inputs.

revolutionary groups who threatened the region. Also, the increasing resources and the rapid growth in Japan revived the underlying fears of being dominated. In addition, conflicts were a part of the domestic politics; Thailand, for example, experienced a trend of coup d'état. All of these were factors upon which the creation of ASEAN was realized. The prospect for strengthening regional bonds in ASEAN is limited by political tensions even today. An example of this is that Singapore does not report data on bilateral trade with the neighboring country Indonesia and has not done so since 1964 (Athukorala & Yamashita 2005:5). Hence, at the time of the creation of ASEAN, policy makers were focusing on peace and stability in the region in order to encourage the economic, social and cultural development. Moreover, several of the ASEAN countries have a colonial past and have been tied to countries outside the region, of which many are developed and internationally powerful (Dosch & Mols 1998:170), and not necessarily to each other.

To investigate whether there is a scope for creating a regional supply-chain in ASEAN, the differences in relative shares of industry-groups in total exports and imports have been estimated. As seen in Table 5.5, the shares of textile and apparel products in total ASEAN exports show that the dominating industry-group is 'Apparel' with an export accounting for about 62 per cent of all exports during 2000/2002. Hence, the countries exploit their comparative advantage in this industry-group. The second largest export group with a smaller comparative advantage is 'Man-made fibers', accounting for about 21 per cent. The import shares are about equally distributed between the industry-groups, although slightly smaller in 'Apparel'. However, it becomes evident that there are weaknesses in the ASEAN supply-chain with the share of imports from the rest of the world exceeding the share of exports in the 'Natural fibers' and 'Other textiles'. This indicates that ASEAN is not able to produce all stages of production in the value-added chain cost-efficiently. Considering the amount of the ASEAN exports and imports in relation to the total exports and imports reveals that almost 97 per cent of the exports of 'Apparel' go to the rest of the world, while almost 93 per cent of the imports of 'Natural fibers' come from the rest of the world. This is compatible with the RCAs.

Table 5.5 Share of Products and Share of ASEAN Trade in Total Trade and Revealed Comparative Advantage as well as Marginal Revealed Comparative Advantage with non-ASEAN members

	Shares of products in total trade 2000/2002 %		Shares of ASEAN trade in total trade 2000/2002 %		RCA in trade with extra-ASEAN 2000/2002	MRCA in trade with extra-ASEAN 1994/1996-2000/2002
	Exp.	Imp.	Exp.	Imp.		
54-55 Man-made fibers	20.9	24.2	18.8	15.5	0.25	0.67[a]
50-53 Natural fibers	7.6	29.3	17.8	6.7	-0.36	0.68[ab]
56-60, 63 Other textiles	9.4	26.0	32.9	12.7	-0.28	0.97[a]
61-62 Apparel	62.1	20.5	3.3	47.1	0.84	0.44
Textile & Clothing	100.0	100.0	10.4	18.7	0.45	0.64[a]

Source: Calculated from statistics provided by the ASEAN Secretariat
[a] Declining imports add to positive value.
[b] Declining exports add to negative value.

As presented in Table 5.6, the member countries participate in the regional trade in the textile and apparel sector to different degrees. Two groups can be distinguished: the countries that have a high share of trade with ASEAN in total trade and the countries that have a low share of trade with ASEAN in total trade. The high share of trade with ASEAN is found in Brunei, Malaysia and Singapore, ranging from about 20 to 50 per cent. Still these countries would be of less importance in the development of a regional supply-chain for different reasons. The Brunei trade is small and of insignificance for ASEAN, and the Malaysian textile and apparel sector is fairly small and less competitive on the world market than the other ASEAN countries. Moreover, due to the fact that Singapore is working as an entrepôt, the country has played a smaller part in the development of a regional supply-chain than the high degree of participation in regional trade would suggest. The low share of trade with ASEAN is found in Indonesia, the Philippines and Thailand, all beneath 10 per cent. Clearly, the textile and apparel producers in the latter group have stronger bonds with non-ASEAN members.

The production fragmentation within ASEAN, representing a regional supply-chain, is presented in Table 5.6. The IST in the textile and apparel sector in ASEAN differs between the countries and ranges from about 0.30 in Indonesia to about 0.75 in Malaysia and Singapore over

the years. This means that countries like Singapore, Malaysia and the Philippines have a more balanced trade in the textile and apparel sector with other ASEAN countries than Indonesia and Thailand have. Indonesia and Thailand are instead net-exporters of textile and apparel products in ASEAN and as a consequence they have lower values of IST.

Table 5.6 International Fragmentation in the Textile and Apparel Sector in the ASEAN Regional Trade

		BRN	IDN	MYS	PHL	SGP	THA
IST	1994/1996	0.15	0.23	0.76	0.73	0.96	0.39
	1997/1999	0.48	0.28	0.78	0.68	0.78	0.47
	2000/2002	0.98	0.36	0.77	0.61	0.62	0.46
IIT_4	1994/1996	0.15	0.23	0.67	0.50	0.38	0.39
	1997/1999	0.40	0.28	0.76	0.47	0.40	0.47
	2000/2002	0.47	0.36	0.66	0.45	0.39	0.46
IPT_4	1994/1996	0.00	0.00	0.09	0.23	0.58	0.00
	1997/1999	0.08	0.00	0.02	0.22	0.39	0.00
	2000/2002	0.50	0.00	0.11	0.16	0.24	0.00
IIT_{14}	1994/1996	0.15	0.22	0.64	0.27	0.38	0.39
	1997/1999	0.32	0.26	0.70	0.27	0.40	0.46
	2000/2002	0.47	0.35	0.60	0.31	0.38	0.45
IPT_{14}	1994/1996	0.00	0.01	0.12	0.46	0.58	0.00
	1997/1999	0.17	0.02	0.08	0.41	0.39	0.00
	2000/2002	0.50	0.00	0.17	0.30	0.24	0.01
IIGT	1994/1996	0.00	0.01	0.03	0.23	0.00	0.00
	1997/1999	0.08	0.02	0.06	0.20	0.00	0.01
	2000/2002	0.00	0.01	0.06	0.14	0.01	0.01
ASEAN share of total Exports (%)	2000/2002	44.6	5.4	19.0	1.9	20.9	8.4
ASEAN share of total Imports (%)	2000/2002	53.6	4.2	21.2	9.2	40.8	6.0

Source: Calculated from statistics provided by the ASEAN Secretariat.

Little international production fragmentation in the textile and apparel sector takes place between the countries in ASEAN throughout the period in question, as seen in the IIT- and IPT-values. Since ASEAN as a region does not have FTAs with major export markets, the incentive for a

regional cooperation in the pooling of resources and for the creation of a regional supply-chain is lower than for regions that have this kind of preferential treatment. The exports markets' ROO do not work for shifting from low-cost outsiders to high-cost partners in the same way as they do for regions with preferential treatment (Petersson 2004:1:783).

The IIT and conversely the IPT-values reveal that the Philippines and Singapore have substantially higher IPT estimates than the other ASEAN members, which implies that they take advantage of regional production fragmentation to a greater extent than the others. However, the regional fragmentation in these two countries decreases significantly during the period. The only country in which regional fragmentation increases is Brunei and this is due to an increase in exports of apparel to the other ASEAN countries. Moreover, with the small interaction that the Philippines have with the other ASEAN countries, they can hardly take advantage of large-scale regional production fragmentation.

However, according to theory, it is always beneficial on a national level for countries to make use of international production fragmentation and sometimes the possibilities for production fragmentation can be the main reason for joining an FTA with both high and low-income participants. Interestingly, the high-income country Singapore exhibits higher values of international fragmentation in trade with the middle-income AFTA members than in total trade. Since Singapore is more developed than the other ASEAN countries, the comparative advantage becomes more important in regional trade, and since Singapore is the only typical high-income country, the fragmented production can be distributed among several of the other members. In contrast, the middle-income countries only have Singapore as the high-income partner to specialize in capital-intensive production, which makes the regional fragmentation due to differences in factor-intensities between the countries smaller and of less importance. Hence, the middle-income countries have a larger degree of international production fragmentation with the world than with each other and Brunei and Singapore.

With the implementation of AFTA starting in 1992, the ASEAN countries lowered import duties on raw materials and textile and apparel products from the other member countries to 0-5 percent ad valorem and the reductions were to 90 per cent implemented in the year 2000. Since the trade policies in the biggest exporting ASEAN countries are restrictive, the ROO make producers outside AFTA pay tariffs to enter the market, which means that the textile and apparel producers in the region can supply cheaper products for the regional market than foreign

producers. This is working for the development of a regional supply-chain where the more capital-intensive production should be placed in the somewhat richer countries Malaysia and Thailand, and the more labor-intensive production should be located in Brunei, Indonesia and the Philippines, and the distribution of finished apparel should be administered by and exported through the low tariff country Singapore.

However, the reduction of tariffs between the member countries and the applied ROO that restricts the inflow of products from non-members have had little effect on the fragmentation of the regional market. Thailand continues sourcing outside ASEAN despite very high duty rates over the years (USITC 2004:G-49) and the Philippines raised tariffs towards the world in order to develop the domestic production in 1999 (ibid.:G-35). The development indicates that the ASEAN exchange of inputs in the textile and apparel sector is limited. Moreover, almost none of the Thai and Indonesian trade belongs to the IPT category, and this in combination with limited participation in the regional trade of textile and apparel products means that they are not dependent on the ASEAN region in the production of any part of the textile and apparel supply-chain. This strengthens the observation that the large and dominating textile and apparel producers, Indonesia and Thailand, have much stronger bonds with suppliers and buyers in the world than within ASEAN. Hence, their main source of income is the rest of the world and the two countries tend to continue their own paths, only including the other ASEAN members to a limited extent when they export some inputs for apparel production. Further, the export of apparel to the EU and the U.S. is of major importance for the ASEAN countries and the reliance on imports from non-members of natural resources, especially cotton (ch.52), is large. Since the consumers in quota markets generally demand high-quality products (Tantigate 2003:59) the continuous sourcing of inputs outside the ASEAN region indicates that ASEAN is not able to supply quantities of high-quality inputs that could be part of a regional supply-chain for production of apparel. Hence, the intra-regional trade mainly consists of trade in products of low quality.

The similar result of the measures of IIT and IPT on industry level with the result on industry-group level for the ASEAN countries indicates that the international fragmentation within the region primarily exists due to comparative advantages. Thailand, which had the largest share of international fragmentation, due to trade in products that are both complements and substitutes in trade with the world, does not show the same pattern in trade with ASEAN.

Instead the Philippines in particular, and to some extent Malaysia, show lower values of IPT on industry-group level than on industry level. As much as 23 per cent of all Philippine trade with ASEAN in the textile and apparel sector during the years 1994/1996 fell in the above mentioned category and the exchange of non-perfect substitutes with similar factor-price ratio primarily takes place in 'Other textiles'. Apart from the statistical issue in 'Other textiles', mentioned previously, the net exchange of knitted fabrics (ch.60) for laminated textile fabrics (ch.59) and later wadding (ch.56) for knitted fabrics (ch.60) could be due to imperfect competition because of the underdeveloped domestic structure of the textile and apparel sector and the limited Philippine participation in the ASEAN trade. The Malaysian textile and apparel sector is also fairly small and the IIGT-values arise due to trade in non-perfect substitutes in all industry-groups except 'Apparel', with the major part in 'Man-made fibers' and 'Other textiles'.

Even though the countries apply independent export strategies, there are some tendencies towards a restructure in specialization in the textile and apparel sector in ASEAN and hence scope for the development of a regional supply-chain. In 1994/1996 Thailand had a major net-export of 'Apparel' to the other ASEAN countries. This declined over the years and was substituted with an increasing net-export in the other industry-groups, which is reflected in increasing IST-values. The same goes for Malaysia and to some degree Indonesia, while the Singaporean export decreased in these industry-groups. Hence, it seems that a structural change has taken place where capital-intensive production of 'Man-made fibers', 'Natural fibers' and 'Other textiles' move from Singapore to especially Malaysia and Thailand. This could imply that producers in Malaysia and Thailand have established new plants in these production areas or enlarged existing ones since they have become increasingly competitive, or that the producers in Singapore have increased the use of sub-contractors in the two countries. The decreasing exports of assembly produced apparel in Indonesia, Malaysia and Thailand to the other ASEAN countries could be the outcome of less production in Malaysia and Thailand, or that the export goes to the world instead of to the region, or due to the relocation of assembly production to some of the least developed countries in ASEAN, such as Cambodia and Vietnam. Moreover, because of its status as a low tariff country Singapore is serving as an entrepôt for the other ASEAN exporters and is a net-importer of 'Apparel' from the ASEAN region. Further, the applied data reveals a peculiar trade pattern where the ASEAN countries' export of 'Apparel' is estimated at about half the import of 'Apparel' from ASEAN countries in Singapore. Most likely

the export is registered for the end market, the U.S. or the EU, while the goods are registered as both imports from ASEAN countries and exports to the rest of the world in Singapore.[12] In fact, Singapore reveals a large and increasing net-import of 'Apparel' from other ASEAN countries, while the country's trade in 'Apparel' with the world is almost balanced. Even though, as previously mentioned, Singapore's function as a transportation hub seems to be decreasing for the textile and apparel sector it is still of increasing importance to the ASEAN region. Hence, these trends together support the development of a regional supply-chain.

5.4 Conclusions

It should be beneficial for the ASEAN countries to make use of international fragmentation in production and to specialize in a certain stage according to their factor intensities in the value-added chain of production. The empirical study of this chapter, conducted on trade data between the years 1994/1996 and 2000/2002, shows that the international production fragmentation in the textile and apparel sector in ASEAN is rather small. The ASEAN countries are net-exporters of textiles and apparel and the major exporters are Indonesia and Thailand. The ASEAN countries have benefited from export-oriented strategies, foreign direct investments and to some extent from the multi fiber arrangement that has restricted access to international markets for some competing countries.

The trade performance of the textile and apparel sector in the ASEAN countries is related to their abundance of factors, according to which they specialize and exhibit their highest values of RCA. However, the small proportion of international production fragmentation of textiles and apparel in ASEAN as a result of comparative advantages is continuously decreasing and is

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[12] Another explanation for the odd trade patterns in ASEAN could be that there are gains for the exporting ASEAN countries to register their exports as 'Man-made fibers' and 'Other textiles' while it is imported in Singapore as 'Apparel'. The net-export of 'Man-made fibers' and 'Other textiles' to ASEAN from mainly Indonesia, Malaysia and Thailand almost equals the net-import of 'Apparel' from ASEAN in Singapore. Moreover, an explanation of larger export values than import values of especially 'Man-made fibers' and 'Other textiles' could be extensive smuggling into the ASEAN countries. The coastal lines are long and unguarded in most of the countries, and the goods are reported as exports in the producing country but are never registered in the importing country. Pirate copies could be an explanation. Still, if this is the case the smuggling is tremendously extensive since almost 50 per cent of all of these products are smuggled into the countries. Another explanation can be the statistical fault that comes along with the ASEAN countries reporting their export to all ASEAN countries, i.e. including Laos and Vietnam, since the imports of these countries cannot be seen in the same statistics. The ASEAN homepage does not display statistics for these countries.

matched by a larger share of trade in similar products (intra-industry trade). Still, the trend for the entire sector is more specialization according to RCA rather than specialization within the same industry-groups and this is reflected in lower values of IST for the whole sector as the net-export is increasing. However, different patterns are revealed between the countries.

Brunei, Indonesia and the Philippines are increasing their competitiveness in apparel production while the somewhat more developed countries, Malaysia and especially Thailand, are experiencing decreasing competitiveness in this, the most labor-intensive production. The countries with the least developed textile and apparel sectors, Brunei and the Philippines, are also the countries that exploit their comparative advantages in the international chain of production to the largest degree. However, the Philippines are moving in the same direction as the other middle-income countries in ASEAN with less international production fragmentation.

The rather low international production fragmentation in Indonesia, Malaysia and Thailand symbolize a stage of development where they have started and are continuing to develop all kinds of textile industries apart from apparel but have not yet phased out the labor-intensive production. For example, these countries have comparative advantages in the most capital-intensive production; the production of man-made fibers. Interestingly, the RCAs continue to increase, reflecting that skill and capital as well as petrochemical inputs are available in the region, which could be beneficial for future growth.

The high-income country Singapore shows low specialization indexes according to comparative advantages in comparison to the middle-income countries and Brunei, and the international production fragmentation in Singapore is extremely low.

Hence, the structure of international production fragmentation in ASEAN aligns with theory and the labor-intensive countries specialize mainly in apparel production, while the somewhat richer countries also attempt production in other segments of the sector.

However, no clear pattern between increasing participation in international fragmentation and export performance can be seen in the ASEAN countries. For example Brunei, which is the best performer with the largest relative increase of exports, also shows a large and increasing degree of participation in international fragmentation. This indicates that the specialization has been gainful for Brunei. On the other hand, Indonesia, with the second largest relative increase in exports, is gaining competitiveness in the entire textile and apparel sector, which means that the international production fragmentation is decreasing. The other countries also show mixed

results. The ASEAN countries cannot directly be compared to low-income countries in which the international production fragmentation must be high in order to succeed. Hence, it seems that the ASEAN countries previously have succeeded in exploiting international production fragmentation, but with increased development are now moving towards a more diverse production in the sector, which is reflected in the lower IPT values but not necessarily lower comparative advantages.

Although the region includes countries at different levels of development, which could, with the application of rules of origin, increase the pooling of resources and contribute to the development of a regional supply chain, the regional fragmentation in AFTA is small. The ASEAN intra-regional trade is only a small part of the ASEAN countries total trade and the major net-exporters of apparel, Indonesia and Thailand, participate with less than 10 per cent each of their trade. The regional trade is mainly driven by comparative advantages and this is reflected in low values of IST. Mainly the Philippines and Singapore take advantage of production fragmentation in the region, but these IPT-values are also decreasing. Since Singapore is the only typical high-income country in the region and the other countries are fairly similar in their textile and apparel production structures, the likelihood of a regional supply-chain is rather small. Still, Singapore has higher fragmentation in trade with the ASEAN countries than with the world, and production is relocating in the ASEAN countries with less capital-intensive production in Singapore and increasing capital-intensive production in Malaysia and Thailand and less labor-intensive production in the same countries and increasing exports of apparel through Singapore all indicate the development of a regional supply-chain. However, the intra-regional trade is mainly in low-quality products that cannot be exported to quota markets and the ASEAN countries are continuing their domestic export strategies with exports of apparel to quota markets and their sourcing of inputs from non-members with some attempt at developing their domestic production of inputs. Hence, ASEAN has been beneficial in promoting the region as an export base to the rest of the world, but the competitiveness of the textile and apparel sector in ASEAN is the result of each member country's individual performance.

6 Upgrading of the Textile and Apparel Sector in Thailand

This chapter begins with an introduction to industrial upgrading in the production of textiles and apparel. Next, the supply-chains in the Thai textile and apparel sector are identified through trade with major trading partners. Further, the scope for a more domestically integrated sector is evaluated, followed by a discussion of possibilities for maintaining competitiveness in the textile and apparel sector.

6.1 Value-added Production in Textile and Apparel

The major structural change in international production fragmentation in the textile and apparel sector has been the increasing occurrence of outsourcing. A firm in a developed country will deliver semi-finished products to the subcontractor in a developing country and buy back the finished product. Another trend is that the retailers that were the main customers of apparel manufacturers are today also taking over the previous responsibilities of the manufacturer and, hence, become their competitors (Gereffi & Memedovic 2003:7). In 1975 approximately 12 per cent of all imported apparel in the U.S. was assembly-produced apparel imported by retailers. By the mid-1990s, the share had gone up to about 50 per cent of all apparel imported into the U.S. and Europe. The growth was a consequence of retailers increasing the creation of their own brands and intervention in the production chain instead of simply buying ready made apparel.

For developing countries, sheer assembly production of imported inputs is typically the first step into the supply-chain (Petersson 2004:1:766). The production networks are often in regions where, for example, the U.S. and EU manufacturers outsource the assembly of their branded products, i.e. to manufacturers in Mexico and the Caribbean Basin and to North Africa and Eastern Europe respectively (Graziani 2001:217; Gereffi 1999:38-39). The retailers have also increasingly located their production of apparel in Asia, in which China, India, Hong Kong, Turkey and some of the ASEAN countries have become leading world exporters (Graziani 2001:212).

The East Asian Newly Industrialized Economies (NIE) were the first countries to make use of the opportunities offered by outsourcing. It is generally perceived that the key to East Asia's success in the textile and apparel sector was to shift from assembly production of

imported inputs to a more domestically integrated and higher value-added form of exporting, referred to as full-package supply or original equipment manufacturing (OEM) (Gereffi 1999:38). Because of the greater responsibilities that come with increased involvement in the products that are sold under the brand of foreign firms and export-oriented assembly, the revenue increases. The micro foundations of this upgrading pattern involve forward (marketing) and backward (sourcing) linkages from production as well as the skill enhancement that occurs across these stages. It gives the supplier more autonomy and learning potential for industrial innovation, and many developing countries try to emulate the NIEs. Eventually this may lead the firm to market its own design under its own original brand name (OBM).

The mutual relationship between parties within a supply-chain is often described as beneficial to all the involved parties (Salam 2004:19). However, more now than before, the textile and apparel sector tends to be dominated by large and powerful contractors with several and often internationally located outlets at the end of the value-added chain, while the manufacturers are often large numbers of small firms with limited power for negotiations in the beginning of the chain. In particular this tendency is noticeable in the U.S. with large retailers such as Wal-Mart, Sears, K-mart, Dayton Hudson Corporation and JC Penney. Hence, it is questionable whether the supply-chains within the textile and apparel sector are actually beneficial for all parties or whether it is a way by which the retailers can take advantage and, due to their power over the smaller manufacturers, push down prices. The structure of the textile and apparel sector does not offer many possibilities for skill enhancement in assembly producing developing countries, since the design comes from a foreign company, which controls distribution and is responsible for the entire supply-chain.

The multidivisional and international organizational structures, that are found in many firms today, mean that international fragmentation can occur internally within one firm or externally between several firms that specialize in such production (Petersson 2004:1:764). The starting point for a better collaboration within a firm is often to create an understanding of the organization's logistics systems (Salam 2004:10). Externally, a firm may identify the key suppliers and customers throughout the whole production line (ibid.:10). This creates a demand for service links between industry-groups that coordinate the supply-chain, such as transportation, communication, quality control, management coordination, and the timing and matching of supplies. The accuracy of coordination between production stages helps to keep the

cost of the supply-chain down and developing countries can participate in a part of the fragmented production chain both because of their comparative advantages in production and their ability to perceive and meet contractors' demands. On a firm level, in order to upgrade a production stage for it to become more value-added, it requires not only market skills and advanced technology but also the ability to interact efficiently with buyers, other suppliers and their customers (Campbell 1997:117). Hence, a successful supply-chain is becoming more beneficial with respect to cost and time efficiencies but also more complex with the textile and apparel sector becoming more and more internationally fragmented and the information technology more advanced. In order to increase the profitability of the supply-chain as well as for each firm in the supply-chain, all parties within the supply-chain must work collaboratively for a successful production fragmentation, which gives greater value to the end consumer (Salam 2004:96). Hence, firms have to focus not solely on the immediate consumer within the supply-chain, but to understand the role of each production stage and service link in the supply-chain. In this sense, the competition over end consumers is not firm against firm, but instead supply-chain against supply-chain (ibid.:13).

Moreover, according to fashion content and labor-intensity in production, two global supply-chains of textile and apparel can be distinguished. One supply-chain is for basics or standardized apparel (for instance the assembly of black trousers) and another more buyer-driven supply-chain is for apparel with a higher degree of fashion content (Graziani 2001:227). The standardized supply-chain is more appropriate for large-scale international fragmentation than the fashion chain since the design of such products is simple, which may include a greater degree of automation in production. However, the marginal rents in fashion products are larger than in standardized products. This makes the fashion line more attractive to producers. Because of the greater marginal revenue for products with higher fashion content, the assembly producers can demand and will get a higher price for putting together branded clothes than for standardized. However, in order to stay in this more value-added supply-chain, the assembly manufacturers must meet demands of quality, time limits, reliability and logistic standards, since demand uncertainty is costly to retailers as well as manufacturers, due to stock-outs for products in demand and overstocks for products of fashion (Pantumsinchai et al 2002:37-38). Seasonality and consumer taste are the main forces behind the dynamics of demand for apparel with higher fashion content. Hence, the rapid change of fashion requires higher levels of flexibility in

production and well-functioning service links, as well as of human skills and service capacities in design and marketing, so that the delay between the design and the final consumer market is short.

6.2 Trade Pattern between Thailand and Major Trading Partners

Thailand accounts for about 25 per cent of the ASEAN textile and apparel sector's total trade. The textile and apparel sector in Thailand is the country's second largest export sector, the second largest contributor to GDP and 20 per cent of the Thai manufacturing working force is working in the sector (Pantumsinchai et al 2002:36). However, the comparative advantages are decreasing and the changes in world trade arrangements with the phasing out of quotas put Thailand in a strategically critical position. Quota agreements have regulated Thai exports of apparel to the EU, the U.S., Canada and Norway (USITC 2004:G-51). The arrangement has granted Thai exporters a certain amount of exports and has also functioned as protection against competition from other countries (Tantigate 2003:56). Moreover, the arrangement supported the Thai development of the sector in the late 1970s when not only Japanese investors, but also investors from Taiwan and Hong Kong arranged joint ventures in Thailand, in order to escape quota restrictions, and supplied Thailand with foreign capital (Chompurat 2002:5). The countries continued their investments in the 1980s, fuelled by rising domestic labor costs and appreciating currencies. Hence, the MFA has both contributed to the comparative advantage for Thailand towards the EU and the U.S. and helped to develop the Thai textile and apparel sector.

The major trading partners of Thailand in the textile and apparel sector during the observed time frame are the U.S. (representing 24 per cent of all trade), the EU (representing 15 per cent of all trade) and Japan (representing 9 per cent of all trade). The trade with China is somewhat smaller and can be compared with Thailand's trade in textile and apparel products with ASEAN (representing 7 per cent of all trade).[13] The trade with these countries is used to

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[13] However, the Chinese imports represent 17 per cent of all the Thai imports while the ASEAN imports only represent 5 per cent of all imports. This can be compared to the export shares of 3 and 8 per cent respectively. Moreover, the trade with China increased by more than 600 per cent from 1994/1996 to 2000/2002. In addition, the Thai trade with the world and with ASEAN is already evaluated in Chapter 5 and hence, in this chapter only the trade with China is analyzed. The statistics provided by the ASEAN Secretariat only include the trade between Thailand and China from year 1996 onwards. Hence, the average for the trade between Thailand and China for years 1994/1996 is represented by 1996 values.

identify the main supply-chains in the Thai textile and apparel sector. Considering the measures of RCA for the textile and apparel sector, presented in Table 6.1, it turns out that Thailand has comparative advantages towards the major end export markets: the EU and the U.S., but less so for Japan and a disadvantage towards China.

The IST values confirm that the Thai trade with the two quota markets and the non-quota markets are different in structure. Higher degrees of balanced trade in the sector can be seen with China and Japan than with the EU and the U.S. Further, both the intra-industry trade and the production fragmentation with China and Japan are higher than with the EU and the U.S. Hence, while the EU and the U.S. merely serves as end markets, China and Japan have a higher degree of exchange of products with Thailand at the same as well as at different production stages within the textile and apparel sector. Moreover, the development of the textile and apparel sector has gone towards less trade with Japan and more interaction with China.

The total Thai export of 'Apparel' decreased during the period 1994/1996 to 2000/2002. More specifically, the development went towards less export to the EU and Japan. However, there was a 55 per cent increase in exports to the U.S., which was largely due to the increased export of 'Apparel' and in total the exports to the two quota markets increased. Further, the U.S. alone was the receiver of 50 per cent of all 'Apparel' exports. Hence, this export is extremely vital to Thailand's entire textile and apparel sector and the authorities are urging for a diversification of export markets to lessen the dependency on this supply-chain (USITC 2004:G-52). Still, the most apparent drop in exports of 'Apparel' was in trade with Japan, where Thailand lost more than half of the exports of 'Apparel' from the period 1994/1996 to 2000/2002.

The 'Apparel' export mainly consists of apparel made of cotton and man-made fibers, accounting for 34 and 21 per cent, respectively (ibid.:G-52). Considering the Thai IIT and IPT with the major export markets, the measures reveal that international production fragmentation is almost inexistent with the EU. This means that Thailand uses the EU as an export market for apparel but is not dependent on the import of a specific part in the supply-chain from the EU countries.

Table 6.1 Thailand's Trade in Textile and Apparel with Major Trading Partners

		Trade with China	Trade with EU	Trade with Japan	Trade with U.S.
RCA	1994/1996	-0.20	0.76	0.36	0.71
	1997/1999	-0.33	0.79	0.29	0.86
	2000/2002	-0.32	0.70	0.19	0.84
MRCA	1994/1996 – 2000/2002	-0.35	-0.95[b]	-0.62[ab]	1.00[a]
IST	1994/1996	0.80	0.24	0.64	0.29
	1997/1999	0.67	0.21	0.71	0.14
	2000/2002	0.68	0.30	0.81	0.16
IIT_4	1994/1996	0.40	0.24	0.32	0.17
	1997/1999	0.59	0.21	0.39	0.14
	2000/2002	0.62	0.27	0.45	0.13
IPT_4	1994/1996	0.40	0.00	0.33	0.12
	1997/1999	0.07	0.00	0.33	0.00
	2000/2002	0.06	0.03	0.36	0.03
IIT_{14}	1994/1996	0.32	0.18	0.18	0.15
	1997/1999	0.50	0.16	0.25	0.13
	2000/2002	0.60	0.20	0.32	0.12
IPT_{14}	1994/1996	0.49	0.06	0.47	0.14
	1997/1999	0.17	0.05	0.46	0.01
	2000/2002	0.08	0.10	0.48	0.04
IIGT	1994/1996	0.09	0.06	0.14	0.02
	1997/1999	0.10	0.05	0.13	0.01
	2000/2002	0.02	0.07	0.12	0.01
MNT_4	ch.54-55	-0.08	-0.09[b]	0.06[a]	0.03[a]
	ch.50-53	-0.22	-0.44[b]	-0.02[ab]	0.09[a]
	ch.56-60, 63	-0.10	-0.16[b]	0.07[ab]	0.12[a]
	ch.61-62	0.05	-0.25[ab]	-0.74[ab]	0.77[a]

Source: Calculated from statistics provided by the ASEAN Secretariat.
[a] declining imports add to a positive value
[b] declining exports add to a negative value

The U.S. has a certain degree of IPT, which is due to Thailand's dependency on imports of high-quality cotton from the U.S. (USITC 2004:G-43), and the main import product from Japan is

'Man-made fibers'. Further, Thailand has high values of IIGT in trade with Japan since Thailand is a net-exporter of silk (ch.50) and wool (ch.51) and a net-importer of cotton (ch.52) and also since it is a net-exporter of carpets (ch.57) and other textiles (ch.63) and net-importer of laminated textile fabrics (ch.59) and knitted fabrics (ch.60). This means that Thailand and Japan also have an exchange of inputs that are non-perfect substitutes.

The role of China in Thailand is quite different from the role of the other trading partners since China, a member of the World Trade Organization since 2001, is a competing, low-wage country that produces and exports apparel to international markets and is granted ATC benefits. The bilateral trade data between Thailand and China shows that the Thai textile and apparel sector has a comparative disadvantage in comparison to the Chinese sector and the imports from China continue to increase. After the economic crisis in 1997 there was an increased efficiency in production in Thailand (Tantigate 2003:54). However, as seen in Table 5.1, the wage levels in Thailand are fairly high in comparison to other low-cost countries and the efficiency in production is lower than average in ASEAN. Due to cheaper labor costs and economies of scale, China can compete on the world market with a cheaper production of textile and apparel products than Thailand possibly can.

However, China is not an end market for Thai apparel; nor is Thailand an end market for Chinese apparel. Instead the countries trade in inputs in the apparel supply-chain and both IIT- and IPT-values are high. The trade in inputs between Thailand and China is mainly in cotton (ch.52) and 'Man-made fibers'. The import of cheap cotton from China plays an important role, but all kinds of textile articles, for example wadding (ch.56) and knitted fabrics (ch.60) are sourced in the country and the imports of textiles continue to increase. In turn, Thailand exports man-made filaments (ch.54) and man-made staple fibers (ch.55) to China, but at the end of the studied period China takes over the role as the net-exporter of these industries as well. Interestingly, it turns out that the IIGT-levels are high with China. This means that the Thai trade with China derives not only from comparative advantages and love for variety but also from trade in non-perfect substitutes. Considering that the IIGT values may arise when some industries are underdeveloped in the domestic textile and apparel sector, and the country starts to trade with markets that have other underdeveloped industries at the same factor-intensity level, Thailand and China can be viewed as not only competitors but also as complementing producers of textile and apparel products.

An interesting observation is that despite increasing comparative disadvantages, the trade with China has increased and become increasingly important to Thailand's textile and apparel sector. The Thai textile and apparel sector has become more competitive in 'Other textiles' in comparison to China, while it has become less competitive in the other industry-groups. This could be an indication that the regular fiber and fabric production is being crowded out and that Thailand is attempting to specialize in a niche of production. According to the Thai Textile Institute (THTI) Thailand is attempting to specialize in technical textiles, such as car belts, textiles for hospitals and so forth. The imported Chinese fabrics are cheap but of low quality and have a limited variety of designs and innovation and, hence, are mainly used for domestic Thai production and are parts of a low-quality supply-chain (USITC 2004:E-7, G-44). The apparel manufacturers' sourcing of inputs in high-quality producing countries continues, which means that the increased trade with China does not stem from the demand in quota markets. Since the exports of Thai apparel to the quota markets have increased while the total exports of apparel have decreased, this indicates that the total demand for low-quality apparel produced in Thailand has decreased, which in turn means that the demand for low-quality imports in Thailand should have decreased. The paradox of increased imports of inputs used in production of low-quality apparel can be explained by either an increased domestic demand for apparel or by a decrease in production of inputs in Thailand or a combination of the two.

In recent years China has started to invest heavily in the Thai textile and apparel industries (ibid.:G-47). Moreover, an issue for the Thai government has been the extensive illegal re-exports of Chinese apparel through Thailand (Salam 2004:66). Since the MFA previously restricted the Chinese exports, the investments in Thailand and the use of Thai quotas are symbols of the production capacity in China, which in the future will change the competition on the world market. In 2002, the Thai government changed the quota allocation system in order to hinder Chinese apparel using Thai quotas to the EU and the U.S. However, the changes were made without prior warning, which caused uncertainty among authentic producers, especially among apparel exporters, who lost one quarter of the past year's quotas (USITC 2004:G-51). Moreover, since several foreign buyers had policies restricting them to trade with countries applying unclear quota allocation policies, the change caused orders in Thailand to be put on hold or to be relocated to neighboring countries, such as China and Vietnam.

6.3 Scope for Domestic Integration of the Textile and Apparel Sector

In line with what the NIEs did it could be preferable to integrate the domestic textile sector into the production of apparel, which can lead to OEM and eventually OBM. Of all the Thai assembly production of foreign brand name apparel, 79 per cent is exported to quota markets (USITC 2004:G-52). Some of the foreign brand names that outsource production to Thailand are Tommy Hilfiger, DKNY and Victoria's Secret. Of the exporting apparel producers, the small factories normally produce cheaper clothes, while the large-scale producers make high-quality, foreign brand name products (Chompurat 2002:9). Large firms also tend to complete all the production stages within the same factory, while small firms outsource simpler parts of the production to household enterprises (USITC 2004:G-42). The production capacity obtained from the large-scale manufacturers represents about 50 per cent of the total output in the industry (Tantigate 2003:54). The quota allocation system that Thailand used to apply tended to favor big firms since the quota distribution was based on past export performance (USITC 2004:G-51). Hence, the system limited the incentives for the favored firms to expand outside quota markets and it worked as a barrier to new entrants. It also meant that the SMEs were left to work towards other ASEAN countries and Japan. In addition, the new system imposed in 2002 hit SMEs harder than large-scale companies since prices of quotas became higher and beyond reach.

The Thai tariff and tax structure on imports of parts in the textile and apparel value-added chain has been very protective and has restricted the imports of textile and apparel related inputs, parts and machinery (Tantigate 2003:63). Still, the Thai domestic textile production has trouble supplying enough inputs for the apparel production. In 2001, 62 per cent of the domestic production of yarn consisted of man-made fibers (ibid.:52) in which a large share of the inputs was imported. In fact, in 1999, imports accounted for almost 50 per cent of the export value (ibid.:50). The production of cotton is small and expensive and not subsidized by any means and the domestic producers cannot supply enough fibers to the rest of the industry (USITC 2004:G-44). Further, the domestic production of all types of fibers is of inferior quality in comparison to imports (Tantigate 2003:50) and hence Thai fibers are not used in high-quality supply-chains. The quality difference is especially noticeable for cotton, which has the absolute highest proportion of import of all fibers, representing 76 per cent, primarily imported from the high-cost countries U.S. and Australia (USITC 2004:G-43).

Some manufacturers in Thailand, however, are able to produce high-quality man-made fibers. This has caused a continuous stream of Japanese textile mills of to be relocated to Thailand (ibid.:G-44) and has increased the export of these products to Japan. However, since the factories in man-made production in Thailand are all large-scale and joint ventures with Japanese investors, the possibilities of carrying out R&D in management for the firms are fairly low (Chompurat 2002:6). Moreover, the large share of imported inputs to this production gives less opportunity to develop and improve skills in backward activities.

In addition, the Thai weaving industry is quite old-fashioned with old machines that weave textiles of inferior quality in comparison to newer ones (Tantigate 2003:52). The small-scale weaving mills operate with lower technology standards and produce only for the highly protected domestic market and border provinces' markets (Chompurat 2002:12). The high-tech weaving mills produce fabrics of better quality, which are used in the supply-chains intended for both the domestic and international market. However, most exported cotton fabrics are sold as 'grey product' since Thailand has problems in finishing the product. The dying and printing and finishing mills have traditionally been considered as household manufacturing (Tantigate 2003:53), and the local entrepreneurs failed to produce high-quality products and to deliver them on time (Chompurat 2002:13). Nowadays, that section of production has become complex, and there are environmental issues, especially in water management, requiring heavy investments (Salam 2004:72). As a consequence, the industries have become less popular to invest in. The diverse dyeing and printing mills are still inefficient and lack responsiveness to current and presumptive foreign buyers. Since the dying, printing and finishing segment is the bottleneck in a domestic supply-chain of production, this stage of production is imported (ibid.:72). Overall, the industry structure in the textile and apparel sector is unbalanced where certain stages in the supply-chain are much more developed than others.

A domestic supply-chain has, despite protection of the Thai textile sector, not been able to develop as expected and in 1998 tariffs on parts and equipment were cut from 20-45 per cent to 5 per cent (Tantigate 2003:65). Moreover, in order to make the export price more competitive, the government has implemented a refund system where exporters can claim back the value-added tax of 7 per cent (USITC 2004:G-48). Since 1998 this had applied to Thai exporters as well as tax treaty partner firms, including U.S. firms. However, the sector remains very protected

with import duties ranging from 10-25 per cent ad valorem for yarns, 25-40 per cent for fabrics and 35-45 per cent for apparel (ibid.:G-49).

In 2000, at the time of AFTA entering into force, representatives for the sector requested a decrease of import duties on certain raw materials and components towards non-AFTA countries but the request was rejected by the government. Since many apparel exporters in Thailand are sub-contractors to foreign companies and are working towards high end markets with high-quality products, details of materials used in production are commonly specified and have to be imported (Tantigate 2003:53). Hence, the Thai apparel producers continuously had to pay high import duties when they imported from countries outside AFTA and this gave them a less competitive situation on the world market in comparison to countries with lower import duties. However, the exports to the quota markets have, as previously mentioned, continued to increase, which means that most large-scale manufacturers are competitive in their production of apparel. This indicates that the large-scale firms in Thailand compete not only in price, but in meeting the demands of contractors. However, apparel producing SMEs are losing exports and are having troubles staying competitive. It seems that the government measure of applying import duties to inputs have made it more difficult for SMEs to export their products due to the higher price level.

Moreover, the dependence in Thailand on specified, high-quality imports in the supply-chain, in which apparel is exported to high-quality markets and the underdeveloped but heavily protected domestic industry structure, means that integration backwards of the supply-chain and creation of well-functioning linkages between stages become difficult and limit the possibilities for Thai manufacturers to supply full-package services or OEMs intended for quota markets. However, in different kinds of upgrading and overtaking responsibilities from contractors, large-scale firms have an advantage over SMEs in their negotiating power with the foreign retailers.

The development of OBM in Thailand has gone slowly so far (ibid.:63). As a reaction, the Thai government initiated programs to support manufacturers to develop OBM through the creation of their own brand or through the incorporation of them in the already existing "Thailand" or "Land of Diversity" labels, which is intended for high end markets (Salam 2004:67; ibid.:67). Furthermore, by projects promoting Bangkok as the 'Fashion Center of the region' by 2005 and 'Bangkok, Fashion City of the World' by 2012, the government wanted to promote Thai entrepreneurs and sub-contractors in garments, leather and jewelry in order to ease

their upgrading and branding process (USITC 2004:G-49; ibid.:67). The project included the objectives to build a new image of the country and the industry as a whole, to develop business centers, to encourage marketing of Thai entrepreneurs and to provide infrastructure for a fashion center. Nevertheless, producers and buyers have not been ready to view Bangkok as a high-quality fashion center so far.

Instead, data points at the possibilities for Thai apparel SMEs in exploiting the domestic demand for apparel and to develop market skills on the domestic market in order to get more value-added production. The market for apparel in Thailand is considerable and growing (USITC2004:G-40) and even though Thailand's domestic demand largely consists of the demand for low-quality products, there is a tendency of a shift in preferences among consumers towards apparel of higher quality (Tantigate 2003:68). However, the apparel production in SMEs is increasingly satisfied with low-quality imports of inputs from China despite the domestic textile production being protected by import duties, which means that the textile production in Thailand is proving to be severely inefficient in production. Hence, the government's measure of protection of the textile sector is costly and questionable. The protection of the apparel sector, which is even higher than for the textile sector, is shielding the apparel producers, that are working on the domestic market, from foreign competition, and imports of apparel are small in comparison to imports of other products in the textile and apparel sector. However, imports of apparel from other low-quality producers such as ASEAN and China are increasing. Hence, a lowering of import duties on apparel would increase the competition on the domestic market, but if it was done simultaneously to a lowering of import duties on textiles, the apparel producers would be able to produce cheaper and stay competitive not only on the domestic market but possibly also become more competitive on the world market, and hence increase the possibilities for learning and upgrading.

6.4 Maintaining Competitiveness

As previously concluded, many apparel producers, in particular SMEs, in Thailand have trouble staying competitive on the world market and remaining in the contractors' supply-chains. The apparel producers are neither able to compete in price nor to upgrade into supplying full-package services. Many Thai firms have troubles in OBM development and are stuck in assembly

production. Due to the increasing liberalization and international fragmentation of the supply-chain, requirements of quality, time limits, reliability and logistics standards have become vital factors in order to coordinate and to make the entire supply-chain efficient. Hence, the ability to meet the demands of a particular production stage, gives prospects for maintained competitiveness among Thai manufacturers.

The textile and apparel sector in Thailand consists of a few big, dominating firms, and a large amount of SMEs (Salam 2004:84). In 2003 the average sized company had fewer than 200 employees. At the same time about 60 per cent of all factories manufacturing textile and apparel products were in the apparel sector, not even including small firms with less than 20 sewing machines (Pantumsinchai et al 2002:36). In 1993 the THTI concluded that 95 per cent of the manufacturers in the apparel sector were SMEs. Large-scale producers are generally mastering high-quality assembly production and, in order to obtain more value-added production, they are assembly producers of foreign fashion apparel companies that are working towards quota markets. However, SMEs are working in a supply-chain with lower quality for the domestic market and markets with low quality requirements. The situation of decreasing comparative advantages for the Thai manufacturers of apparel puts pressure on the government to implement effective policies for the textile and apparel sector. The governmental support has gone through several textile and apparel related associations that were trying to solve sector related problems.[14] In order to promote and coordinate projects among these textile and apparel related associations and to guarantee equal opportunities and benefits among the textile and apparel industry-groups, the THTI was established in 1990 (Tantigate 2003:65). In 2002, as a response to the situation the Thai textile and apparel sector is facing, various government agencies and the Thai Garment Manufacturers Association initiated a certification with six standards (Pantumsinchai et al 2002:37). The standards were intended to certify textile and apparel factories and were exclusively focused on the upgrading of the apparel sector to a more value-added production with higher fashion content, and thus disregarding the development of other industry-groups within the sector. The six standards are set as follows (ibid.:40-41):

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[14] For example Department of Export Promotion, Ministry of Commerce, Ministry of Industry and the Thai Garment Manufacturers Association (Salam 2004:67).

1. *Human Rights Standard*: the standard is intended to guarantee human rights in the production of apparel.

2. *Quality Assurance Standard*: the certification is an extension of the ISO 9000 set of quality standards, which is intended to guarantee quality standards applicable to foreign contractors.

3. *Productivity Standard*: the certification is intended to guide the manufacturer in the collection of data and to provide productivity benchmarks for the industry.

4. *Merchandising and Product Development Standard*: the certification is intended to guarantee that the manufacturer is able to respond to changes in the market, and hence, has the ability to work as some kind of middleman and to supply more than pure assembly production.

5. *Electronic Data Interchange Standard*: the standard is intended to ensure that the manufacturers have the ability to interact via electronic data with customs departments as well as with foreign contractors and consumers.

6. *Quick Response Standard*: the standard is intended to guarantee high accuracy of delivery time among the apparel manufacturers with respect to short lead times and a fast production cycle.

International standards and policies concerning human rights, working conditions, environmental issues and social responsibilities are often set by foreign governments and firms and they have to be met by the sub-contractors in Thailand as well as in the rest of the developing world (Salam 2004:69). Thai apparel exporters have strived to comply with the demands of international contractors, thus separating themselves from cheap labor competitors, such as China and India (ibid.:74). For example, Thailand has practically no usage of child labor in manufacturing (USITC 2004:G-45). A greater concern for the textile and apparel sector, however, has been the usage of immigrant labor in Thailand. Primarily immigrants from Myanmar are willing to accept lower wages than Thai workers. To come to terms with this the Thai government withdrew working permits, and reportedly expelled 60,000 illegal Myanmar workers in the late 1990s.

Many Thai manufacturers are able to produce high-quality apparel for the western markets. However, the quality control of apparel has been poor in Thailand and the international contractors have dealt with a high quantity of rejects (ibid.:G-43). Despite this, the Thai manufacturers have been reluctant to improve the controls since the rejects can be sold in the domestic market where the demand for quality is lower.

Moreover, the productivity in the Thai textile and apparel sector is low in comparison to other countries and well below average in ASEAN (see Table 5.1). Indonesia, Malaysia and the Philippines are all competitors that have substantially more productive workers in their textile and apparel sectors. The machinery and equipment used in production in the Thai textile and apparel sector are in many cases outdated (Salam 2004:74). There has been a lack of support for technological development and innovation by the government (Tantigate 2003:63) and, for example, there are reportedly only two computerized machines for cutting of apparel (USITC 2004:G-46). Investments to upgrade know-how in the industry have been restricted through limited access to capital because of the aftermath of the economic crisis in 1997 (ibid.:G-40). Consequently, many SMEs in particular are either unable or unwilling to invest in upgrading activities (Salam 2004:84). However, exporting industries have certain tax privileges and have been granted special loans for the upgrading of machinery (Tantigate 2003:65).

In the Thai textile and apparel sector there is a lack of skilled staff in marketing, management and in more value-added production of apparel (ibid.:63) and firms are commonly short of Thai staff with fluency in foreign languages (Salam 2004:75). This implies a weaker ability to respond efficiently to changes in the market process by sensing customer requirements, submitting first samples and purchasing raw materials and by informing the foreign contractors about the products. Hence, there is a lack of staff, that is skilled in negotiating with foreigners, which could help to extend the responsibilities of export oriented companies and to increase their work as middlemen. Often Thai managers have little or no experience and little confidence in implementing new arrangements and, as stated before, the financial resources in SMEs are limited.

An efficient logistics system is central for a well-functioning supply-chain and requires sub-contractors to be able to interact with foreign contractors via electronic data. However, one must not forget that building up a good logistics system is useless if there is no willingness to share information within the partnership. The THTI focuses on human resource by improving knowledge and competency in management and modernizing the textile and apparel sector (ibid.:67). However, one of the difficulties in implementing the supply-chain concept in Thailand is the issue of trust (ibid.:70). It is looked upon with suspicion that sensitive information could actually be kept within a partnership, and this resistance among the Thai manufacturers makes it more difficult to interact with other companies, even if they are business partners. Further, the

cultural difference between Thai manufacturers and foreign contractors can make it even more difficult to interact efficiently. There is a general perception among foreign contractors of Thailand as more 'visitor friendly' in comparison to neighboring countries (USITC 2004:G-47) due to the Buddhist tradition of harmony and consensus, which is an important feature of the Thai organizational climate (Deshpandé et al 2004:18). However, this also means that the companies are generally rather slow to react to changes on the market and more or less that open criticism is uncommon.

To avoid demand uncertainty in the production of fashion apparel, short delivery time is crucial. The Thai Apparel exporters have been able to shorten the average delivery time by 1 month, from 2-3 months to 1-2 months, which has resulted in Thai manufacturers being able to charge 20-30 per cent more than competitors (USITC 2004:G-43). Most textile and apparel factories are located in the Bangkok Metropolitan Area (Chompurat 2002:12; Tantigate 2003:47). During the 1990s, the Thai government worked on a decentralizing plan with the intention of distributing industries and labor more evenly across the country with incentives such as tax and duty privileges. However, most export-oriented industries stayed in the Bangkok Metropolitan Area where the infrastructure is better (Chompurat 2002:28). Increasing volumes of apparel delivered by air makes the access to good infrastructure even more important. The Thai infrastructure does not support the Thai textile and apparel sector as well as the Malaysian and Singaporean infrastructures support their sectors (USITC 2004:G-40). Still, in comparison to other low-cost countries, for example Cambodia, China, Indonesia and Vietnam, the Thai infrastructure is much better (ibid.:G-47).

The certification program's first three standards that are intended to work towards greater competitiveness for Thai apparel producers on the world market are quite straightforward in their implementation, but require extensive capital investments from each and every manufacturer. The later sets of standards are broader per definition and hence more difficult to implement. The certification is costly to companies and only about 15-20 per cent of the Thai apparel manufacturers manage the last of the six standards (Pantumsinchai et al 2002:38). The effects of the certification may be lessened due to the fact that the certified manufacturers are expected to primarily be large-scale firms, of which some are already participating in fashion apparel supply-chains and comply with the standards. Due to the great costs involved in upgrading, most small firms are unable to comply with the standards. Hence, they cannot increase their international

competitiveness through this measure and are bound to continue to work for the domestic market or other low-quality markets. The Thai structure of import duties that protects the domestic market for textiles and apparel means that the apparel producing SMEs have been less competitive on the world market due to their higher prices of production, but so far they have also been shielded from foreign competition on the domestic market. This suggests that market skills, the understanding of foreign companies and the need for coordination of the supply-chain are lacking among SMEs in Thailand. Hence, the certification may function as an incentive for upgrading in semi-sized exporting companies but will be of less importance to other apparel manufacturers if import duties in the sector are not lowered.

6.5 Conclusions

The increasing internationalization of the textile and apparel sector and the increasing efficiency in production makes the coordination of the supply-chains more important for the retailers. Hence, the manufacturers that want to participate in especially the fashion supply-chain cannot only compete in price but must also meet all kinds of demands from the contractors. Thailand is specialized in production of apparel but the comparative advantage in trade with the world is decreasing. The ongoing changes of the structure in the textile and apparel sector on a global level put Thailand in a critical position.

Thailand has a very high dependency on the demand for high-quality apparel from the quota markets, the EU and the U.S., and it continued to increase during the period 1994/1996-2000/2002. Mainly large-scale firms produce high-quality apparel and export to the quota markets, and since their exports of apparel continue to increase while the SMEs' exports of apparel decrease, this indicates that the large-scale producers in Thailand are able to meet the demands of contractors. These supply-chains require imports of high-quality inputs and hence, most apparel production is pure assembly production. Japan also functions as an export market for apparel but has a larger degree of exchange in inputs with Thailand than the quota markets have. A change in trade pattern can be seen where the trade with Japan decreases and the trade with China increases. Mainly Thai SMEs trade with China but they cannot compete with Chinese manufacturers in terms of the price of production of textile and apparel products, and the comparative disadvantages increase. However, the trade pattern also show that the two countries

are not only competitors but also complement each other as they trade in low-quality inputs used in the supply-chain for production of apparel that is intended for the domestic market.

The key for the success of the NIEs is commonly believed to be their ability to shift to a more domestically integrated production and supply full-package services. The most competitive production of inputs in Thailand is the production of man-made fibers, but the scope for developing skills is limited by the Japanese owners and the large share of imported inputs. Thailand has so far been unable to integrate the domestic textile and apparel sector into the high-quality supply-chain in which apparel is intended for quota markets. Even though the domestic textile sector has been protected by high import duties, the sector remains underdeveloped and there is no consistent specialization of the supply-chain. The increasing imports of low-quality inputs from China indicate that the textile production in Thailand is severely inefficient, which makes the protection costly and questionable. Moreover, contractors' specifications of inputs require the exporting apparel producers to import high-quality inputs rather than to source in Thailand. As a consequence, apparel producers have not been able to supply full-package services. The OBM development has gone slowly in Thailand and the Thai government aims to speed up the process through the project of making Bangkok into a fashion center. However, producers and buyers are not yet ready to view Bangkok as a high-quality fashion center. Instead, since apparel SMEs have troubles competing on the world market in terms of price, the lowering of import duties in the entire sector could be beneficial. Even though it would mean harder competition on the domestic market, it would also mean that they would be able to produce cheaper and gain competitiveness on the world market, which in the long run would give better opportunities for upgrading.

In an attempt to upgrade, the Thai government initiated a certification program that focused exclusively on apparel producers. Thai manufacturers', especially SMEs', ability to adjust to foreign demands of coordination of the supply-chain has been insufficient. Problems such as inadequate quality control, productivity, lack of skilled workers and a general lack of trust and information sharing make the upgrading of apparel manufacturers in Thailand difficult. However, factors such as human rights and delivery time are advantageous for Thailand. The perception of Thailand as being 'visitor friendly' is beneficial, but the organizational culture of consensus also makes it more difficult to react to quick changes in demand. The certification mainly directs large-scale companies but may also function as an incentive for some semi-sized

exporting companies to upgrade. However, the program does not support small enterprises to the same extent since they mainly produce for the protected domestic market or other low-quality markets, for which the standards in the certification are of less relevance. In addition, the manufacturers have been shielded from foreign competition on the domestic market. The reality of losing exports to other low-quality markets indicates that they are lacking in market skills and an understanding for foreign companies and supply-chains. In order to gain this knowledge the import duties must be lowered so that they can compete internationally with a lower price and in the long run be able to upgrade according to the certification.

7 Concluding Remarks

The purpose of this study was to evaluate the international fragmentation and specialization of the textile and apparel sector in six ASEAN countries. Further, our purpose was to evaluate the participation of Thailand in textile and apparel supply-chains in order to find prospects for more value-added production. The study was conducted with trade statistics for the period 1994/1996-2000/2002.

The increasing international fragmentation of the production of textiles and apparel gives opportunities for countries to participate in production according to their comparative advantages. The textile and apparel sector in ASEAN has evolved from the countries' export-oriented strategies and the world trade arrangements that have endorsed foreign direct investments. The comparative advantage is fairly high in apparel production in the ASEAN trade with the world, but the international production fragmentation is small. Some middle-income countries also have comparative advantages in man-made fibers, which is the most capital-intensive industry-group and they are continuing to develop this production. In contrast, the only typical high-income country in ASEAN, Singapore, relies on intra-industry trade and no substantial international production fragmentation can be seen. The more labor-abundant countries in ASEAN specialize according to their comparative advantages in production of apparel, while the relatively more capital-intensive countries also attempt to specialize in other stages of the value-added chain, which means that the trade in the sector in ASEAN is in accordance with the theory of international production fragmentation. However, the expected effects of international production fragmentation are not clearly displayed in the ASEAN countries. In fact, a clear relationship, between the countries with the largest relative increases in exports of textile and apparel products and the countries with the highest degree of international production fragmentation, cannot be spotted. Even though a high degree of fragmentation would be beneficial to developing countries according to theory, the results of this study point to the fact that the competitiveness in the middle-income countries is a result of their comparative advantages to a larger extent than of international production fragmentation.

According to theory, international production fragmentation is stimulated by the creation of an FTA and this should always be beneficial to the participating members. However, since Singapore is the only typical high-income country in the region and the other members are fairly

similar in respect to production structure of textiles and apparel, the scope for a regional supply-chain is fairly small. Consequently, the production fragmentation in AFTA is low but some restructuring is taking place, suggesting that the FTA has some effect on the location of production. Moreover, since the demand for ASEAN apparel comes from developed countries and the intra-regional trade is mainly in low-quality products, the incentive for a regional supply-chain is reduced.

The liberalization of the textile and apparel sector and the increasing efficiency in production of the sector has made the price-competition in labor-intensive production harsher. The decreasing performance of the textile and apparel sector in Thailand pressures for an upgrading. The exports of apparel to quota markets have continued to increase, while the exports to the rest of the world have decreased. The trade with Japan has decreased and the trade with China has increased, especially in input-trade. The exports to the quota markets mean that the large-scale firms in Thailand are able to meet the increasing demands from foreign contractors that arise due to the increasing importance of an effective supply-chain in high-quality production. Since the large-scale firms assembly-produce apparel and since the domestic industry structure in the textile sector is unbalanced, the possibilities for supplying full-package services and developing OBM are low.

Moreover, as a consequence of the high import duties in Thailand, that have protected the severely ineffective textile sector to fail and the increasing competition from foreign low-quality producers, apparel producing SMEs are having trouble remaining competitive. The government measures of 'Bangkok Fashion Center' and the initiation of a certification program, will most likely only have limited effects on the upgrading of the apparel sector in Thailand. However, the lowering of import duties would give apparel producing SMEs an incentive to obtain market skills and an understanding for foreign contractors' demands. Still, extensive problems such as inadequate quality-control, productivity, lack of skilled workers and a general lack of trust in information sharing are features of the apparel sector in Thailand today.

The full impacts of liberalization schemes related to the textile and apparel sector are still to come and may change future participation by the ASEAN countries in the global value-added chain of production and the competitiveness of the textile and apparel sector in Thailand. The development of this sector is to be continued and a sequel of this thesis will be anticipated with enthusiasm.

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List of Contacts

Ph.D. Candidate. Magnus Andersson, Faculty of Economics, Thammasat University and Area Representative Thailand and Lao PDR and Research Associate at European Institute of Japanese Studies, Stockholm School of Economics.

Assoc. Prof. Sukum Attavavutichai, Vice Dean, External Relations, Faculty of Economics, Thammasat University.

Ms. Suppalak Rungsaeng, Textile Information Center, THTI.

Asst. Prof. M. Asif Salam, Department of Management, Assumption University.

Dr. Chanchai Sirikasemlert, Director of Technology Department, THTI.

Ph.D. Somboon Siriprachai, Faculty of Economics, Thammasat University.