# A CROSS COUNTRY ANALYSIS OF DYNAMICS IN COMPARATIVE ADVANTAGE AND TRADE PATTERNS IN TEXTILES AND CLOTHING

## IKM Mokhtarul Wadud[*]

*Economics and Finance, Faculty of Business and Law, Deakin University*

## Abstract

This paper examines pattern of comparative advantage in textiles and clothing trade as revealed by export shares of selected developed and developing economies. The estimated revealed comparative advantage (RCA) indices provided strong evidence of comparative advantage enjoyed by the developing economies. However, a few developed high-income economies have enjoyed sustainable comparative advantage, especially in textiles trade. Significant negative correlations are observed between country specific income levels and the estimated absolute and relative RCA indices.  While most of the developing economies achieved significant improvement of comparative advantage over time in clothing trade, the evidence is mixed for textiles. Additional evidence from Grubel-Lloyd (G-L) index of intra industry trade (IIT) suggest that global textiles trade could be mainly explained on the basis of product differentiation and economies of scale while clothing trade is more based on comparative advantage. Results of the study also suggest that the trading nations should engage in exploitation of forms of competition such as product differentiation in textiles trade, whereas for clothing, cost minimising remains a valid strategy.

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[*] Correspondence author:  IKM Mokhtarul Wadud, School of Accounting, Economics and Finance, Faculty of Business and Law, Deakin University, Pigdons Road, Waurn Ponds, Geelong, Victoria 3217, Australia. Selangor. E-mail: mokhtarul.wudud@deakin.edu.au

## 1. Introduction

Textile and clothing industries have been the leading sub-sectors during initial industrialisation processes in many developed industrialised economies. The growth of textiles in these economies ignited a dynamic phase of development through industrialisation and growing cross-border trade. The models of product life cycle (Vernon, 1966, 1979; Hirsch, 1975) and dynamic comparative advantage (Klein, 1973; Claudon, 1977) explain how countries tend to climb up the product cycle ladder via dynamic comparative advantage - from initially resource - intensive exporting commodities to commodities that are unskilled labour-intensive such as textiles and clothing, to skilled labour-intensive, to capital-intensive and finally, to knowledge intensive products. Given the theory and practice revealing the strategic role textile and clothing industries could play, it is not surprising to see why these industries have rapidly emerged among many developing economies over the last few decades. Although a considerable number of the developed countries have protected their domestic textile industries with tariff and quantitative restrictions such as the ones implemented under the Multi Fibre Arrangement (MFA) over decades, the growth of textile-clothing imports from the developing economies to the high income developed economies have been significant. Elimination of MFA and advent of freer trade in textiles since 2005 provided further support to the developing economies to raise their exports. While the general shifting trend of comparative advantage from developed to developing world remains apparent, the specific nature of the dynamics of comparative advantage in textiles-clothing for various economies, country-groups and regions calls for further scrutiny to attain more conclusive evidence.

Ariovich (1979) suggested that some of the key methods to measure comparative advantage or international competitiveness include measuring the commodity's trade balance, comparing the production costs and computing export shares of the commodity. Among these, the first and the second methods are not feasible due to inter-country differences in protection and the complexities involved in accessing comparable information, respectively. In contrast, export shares indicate the relative competitiveness or comparative advantage of the commodity. Ariovich's opinion was heavily drawn upon the seminal work of Balassa (1965) who maintained that differences in relative costs and non-price factors are reflected in the pattern of trade in manufacturing and this are assumed to 'reveal' the comparative advantage of trading nations. Balassa argued that as opportunity costs differ among countries and the countries specialize in production and trade, the nature of specialization would be such that export structure of each country will be dominated by the product in which its comparative advantage will be stronger.

Balassa's (1965) RCA approach has been applied in a wide range of empirical studies. Some of these (e.g., Ariovich, 1979; Olga, 1994; Lee, 1995; Ferto and Hubbard, 2003) focused on intra-economy analyses such as comparison of sub-sectors that considerably resembled Balassa's original work and the others (Reza, 1983; Peterson, 1988; Yeats, 1991; Bender and Li, 2002) examined international trade performances. Pigato et. al. (1997) computed dynamic RCA indices for textiles and clothing in twelve selected economies from South and East Asia to compare the trade performance among the economies of these regions. They computed relative changes in the RCA over every four-year period beginning from early 1960's to mid 1990's. Their study indicated relative competitiveness of the economies of South and East Asia, which mostly comprised economies with homogeneous development or income status. However, this study did not reveal how these Asian economies compare with their trading partners from developed economies from the other continents, mainly from Europe and North America., Hence, the study did not examine economies possessing differences in technology, input mix and labour costs, that are presumably the sources of comparative advantage in textiles trade.

This paper attempts to provide a more detailed set of empirical evidence by considering a wide group of developed and developing economies. The paper computes the RCA indices followed by an examination of trade pattern in a longitudinal perspective. The RCA indices have been computed in absolute terms for various years over time, as well as over two periods of time to reflect the relative changes. Changing patterns of comparative advantage in textiles and clothing have been compared across major country-groups. The paper also computes the G-L indices of trade pattern to assess whether trade in textiles and clothing is based on product differentiation or purely on comparative advantage. Section Two provides a brief theoretical overview of the measurement issues of RCA as proposed by Balassa (1965) and G-L indices. In section Three, empirical estimates on RCA and G-L indices have been reported and analysed. Section Four summarises the major findings of the study and concludes.

## 2. Theoretical Underpinnings

*The Revealed Comparative Advantage (RCA) Approach*

Balassa (1965) pointed out that a country's relative export share of a commodity in a particular region reveals the comparative advantage in that commodity. He showed that such relative export shares could also be used to reflect changes over time. The relative shares are expressed as the ratio of the share of country $i$ in the exports of commodity $j$ to the

share of country *i* in the total manufacturing exports in a particular region. This can be symbolically represented as follows:

$$\frac{X_{ij}}{X_{rj}} \bigg/ \frac{X_{iT}}{X_{rT}} = \frac{x_{ij}}{x_i} \; , \tag{1}$$

where *X* stands for exports, *x*'s are the relative shares, subscripts *i, j, r* and *T* represent *i*th country, *j*th commodity, aggregate of any region or group of economies and manufacturing total, respectively. The relative export share of a product of a country expressed in Equation (1) above numerically reveals the country's share in the commodity's exports in a region or group of economies to the share of total manufacturing exports in that region or group.[1]   Equation (1) helps estimate RCA indices at various points of time and hence provides the RCA indices in absolute terms.

To obtain indices showing changes in relative shares, the following expression could be used:

$$\frac{x_{ij}^1}{x_i^1} \bigg/ \frac{x_{ij}^0}{x_i^0} \; , \tag{2}$$

where the superscripts 0 and 1 represent the first and the next time periods, respectively. However, growth of relative share expressed by Equation (2) may still provide a false impression of relative changes in RCA, as high growth rates are achievable even when exports are small in absolute terms. Also, growth would be low for a country with an export share too large to extend any further. As a remedy, Balassa reformulated Equation (2) as follows:

$$\frac{1}{2}\left[\frac{x_{ij}^1}{x_i^1} + \frac{x_{ij}^1}{x_i^1}\frac{x_{ij}^1}{x_i^1} \bigg/ \frac{x_{ij}^0}{x_i^0}\right]. \tag{3}$$

Equation (3) is based on the presumption that while past trends in relative shares can be expected to continue, this will take place at a declining pace as compared to the past.

Balassa argued that assuming uniformity of tastes and rates of protection across countries, comparative advantage could also be revealed by export-import ratios. However, as tastes and rates of protection widely vary among economies, the use of relative export

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[1] Thus an index of 140 means that the country's export-share in the particular commodity is 40 percent higher than its total export share of all the manufactured products.

shares could be a better measure as indicative of comparative advantage. Moreover, for intermediate products, export import ratios are influenced by demand for purposes of further transformation in producing for exports.

*The Intra Industry and Inter Industry Trade*

New trade theory suggests that trade could be based on product differentiation, often termed as intra-industry trade (IIT) or on comparative advantage, also known as inter-industry type of trade. IIT arises due to product differentiation under imperfectly competitive markets, changes in consumers' preferences and ability of trading nations to exploit benefits of economies of scale. Grubel and Lloyd (1975) provide one of the most widely used measures of IIT. They calculated indices of IIT for various industries in ten industrial countries in the year 1967. The Grubel-Lloyd (G-L) index for the ith industry is given by,

$$GL = \frac{\left[ (X_i + M_i) - |X_i - M_i| \right]}{(X_i - M_i)},$$

or

$$GL = 1 - \frac{|X_i - M_i|}{(X_i - M_i)}, \tag{4}$$

where GL stands for Grubel-Lloyd index of IIT, X and M represent values of total exports and imports, respectively. The GL index can range from zero to one. A value of zero of the G-L index indicates that trade is purely inter industry and that there is no IIT in the corresponding sector. On the other, a value of unity of the index shows that trade is intra industry type. In general, the higher is the value of the index, the higher is the magnitude of IIT in a given industry.

*Data*

This study considers a period from 1980 to 1996. The years from 1997 onwards was excluded from the sample in order to avoid possible biases that might occur reflecting export declines over the period of the Asian crisis, since a considerable proportion of our selected economies are from the severely affected regions of South East and East Asia. Textile and clothing industries have been categorised according to revision three of Standard Industrial Trade Classification (SITC) scheme. Under this scheme, textile and clothing industries are coded as SITC division 65 and 84, respectively. The data on exports of these industries and total

merchandise have been obtained from the annual reports of the General Agreement of Tariff and Trade (GATT) and the World Trade Organization (WTO). These publications report values of total exports and imports for textiles and clothing along with some other major products. It was found that exports of total manufacturing are not reported in the GATT and WTO annual reports. Therefore, total merchandise exports, were used instead of total manufacturing exports in calculation of the RCA indices.

## 3. Empirical Evidence

*Evidence of RCA in Absolute Terms*

The RCA indices have been estimated based on Equations (1) and (3) for the twenty-six selected economies from Asia and the Pacific, Europe and North America. The indices of absolute change have been computed for the period 1980-1996. However, to conserve space and enhance ease of understanding, the RCA indices have been reported only for selected years and mostly at two-year benchmark. Following Lee (1995) and Petri (1988), the logarithmic values (of base10) of the indices have been calculated for ease of interpretation. This implies high and low comparative advantage in terms of positive and negative values of the indices, respectively. An RCA of zero means that a country's global share of export of a given commodity, say textiles is as large as its global share of total merchandise exports, and hence, does not indicate comparative advantage.

Table 1 reports RCA in textiles of the selected economies. It could be easily seen that a significant number of developed economies from Europe and North America enjoyed comparative advantage in the early 1980's. In fact, eleven out of fourteen developed economies possessed high RCA in textiles trade in 1980. Except for Austria, Belgium-Luxemburg, Italy and Portugal, which enjoyed comparative advantages throughout the period, other developed economies lost their comparative advantage by mid 1980's with significant decline in their export shares. Countries such as Germany and Switzerland retained comparative advantage up to early 1990's.

In textiles, the RCA indices have evolved more favourably for most of the developing economies of Asia. As Table 1 reveals, except Singapore, Malaysia and Philippines, all the other countries attained high RCA by the end of 1980's.  Some of the best achievers include Pakistan, India, China, Bangladesh and Asian newly industrialised economies (NIEs) such as South Korea and Taiwan. However, note that while Asian NIEs except Singapore have recorded high and consistent RCA, some developing economies such as Bangladesh, Thailand and China

experienced declining comparative advantage as evidenced by the high but diminishing trend of their RCA indices (Table 1). Thus, there has been mixed evidence on the changing pattern of comparative advantage in textiles among the developing economies.

**Table 1**
**Revealed Comparative Advantage in Textiles Trade: Indices of Export Shares**

| Countries | 1980 | 1982 | 1985 | 1988 | 1990 | 1992 | 1994 | 1996 | Rank 1980 | Rank 1996 |
|---|---|---|---|---|---|---|---|---|---|---|
| *Developed Economies* | | | | | | | | | | |
| **Australia** | -0.623 | -0.631 | -0.685 | -0.833 | -0.902 | -0.836 | -0.679 | -0.593 | 24 | 25 |
| Austria | 0.360 | 0.349 | 0.270 | 0.230 | 0.219 | 0.165 | 0.125 | 0.091 | 8 | 12 |
| Belgium-Luxemburg | 0.355 | 0.250 | 0.280 | 0.259 | 0.249 | 0.221 | 0.207 | 0.180 | 9 | 11 |
| Canada | -0.779 | -0.856 | -0.882 | -0.783 | -0.754 | -0.696 | -0.638 | -0.541 | 25 | 24 |
| France | -0.061 | -0.023 | -0.009 | -0.033 | -0.038 | -0.076 | -0.066 | -0.054 | 17 | 16 |
| Germany | 0.083 | 0.027 | 0.055 | 0.041 | 0.016 | 0.009 | 0.017 | -0.039 | 16 | 15 |
| Italy | 0.291 | 0.270 | 0.328 | 0.291 | 0.261 | 0.257 | 0.270 | 0.266 | 10 | 10 |
| Japan | 0.171 | 0.100 | -0.016 | -0.154 | -0.176 | 0.180 | 0.256 | 0.228 | 13 | 19 |
| Netherlands | -0.054 | -0.020 | -0.025 | -0.005 | -0.141 | -0.175 | -0.256 | -0.240 | 18 | 21 |
| Portugal | 0.678 | 0.663 | 0.604 | 0.510 | 0.424 | 0.400 | 0.387 | 0.375 | 4 | 7 |
| Spain | 0.096 | 0.059 | 0.021 | -0.033 | -0.055 | -0.093 | -0.063 | -0.006 | 15 | 14 |
| Switzerland | 0.127 | 0.256 | 0.259 | 0.161 | 0.118 | 0.045 | -0.010 | -0.059 | 14 | 17 |
| United Kingdom | 0.018 | -0.147 | -0.137 | -0.098 | -0.111 | -0.143 | -0.148 | -0.141 | 19 | 18 |
| United States | -0.211 | -0.358 | -0.397 | -0.392 | -0.377 | -0.380 | -0.379 | -0.347 | 20 | 23 |
| *Asian NIEs* | | | | | | | | | | |
| Hong Kong (China) | 0.228 | 0.317 | 0.628 | 0.380 | 0.389 | 0.368 | 0.342 | 0.355 | 12 | 8 |
| South Korea | 0.673 | 0.575 | 0.461 | 0.429 | 0.486 | 0.531 | 0.559 | 0.536 | 5 | 4 |
| Singapore | -0.571 | -0.078 | -0.150 | -0.879 | -0.878 | -0.884 | -0.860 | -0.921 | 23 | 26 |
| Taiwan | 0.501 | 0.434 | 0.447 | 0.402 | 0.476 | 0.469 | 0.555 | 0.562 | 7 | 3 |
| *Other Developing Economies* | | | | | | | | | | |
| Bangladesh | 1.283 | 1.211 | 1.104 | 0.866 | 0.777 | 0.690 | 0.645 | 0.423 | 1 | 6 |
| China | 0.657 | 0.653 | 0.670 | 0.693 | 0.581 | 0.505 | 0.502 | 0.449 | 6 | 5 |
| India | 0.705 | 0.643 | 0.569 | 0.619 | 0.599 | 0.677 | 0.696 | 0.633 | 3 | 2 |
| Indonesia | -1.111 | -1.211 | -0.351 | 0.069 | 0.199 | 0.424 | 0.307 | 0.300 | 26 | 9 |
| Malaysia | -0.341 | -0.355 | -0.415 | -0.409 | -0.418 | -0.353 | -0.338 | -0.235 | 21 | 20 |
| Pakistan | 1.088 | 1.123 | 1.088 | 1.127 | 1.193 | 1.196 | 1.245 | 1.268 | 2 | 1 |
| Philippines | -0.352 | -0.383 | -0.523 | -0.470 | -0.271 | -0.298 | -0.270 | -0.271 | 22 | 22 |
| Thailand | 0.274 | 0.244 | 0.305 | 0.204 | 0.120 | 0.085 | 0.074 | 0.080 | 11 | 13 |

Source: Author's calculation.

**Table 2**
**Revealed Comparative Advantage in Clothing Trade: Indices of Export Shares**

| Countries | 1980 | 1982 | 1985 | 1988 | 1990 | 1992 | 1994 | 1996 | Rank 1980 | Rank 1996 |
|---|---|---|---|---|---|---|---|---|---|---|
| *Developed Economies* | | | | | | | | | | |
| **Australia** | -1.342 | -1.371 | -1.521 | -1.398 | -1.106 | -1.074 | -0.874 | -0.858 | 26 | 24 |
| Austria | 0.224 | 0.204 | 0.129 | 0.009 | -0.046 | -0.089 | -0.146 | -0.104 | 11 | 14 |
| Belgium-Luxemburg | -0.064 | -0.186 | -0.259 | -0.302 | -0.268 | -0.267 | -0.323 | -0.260 | 14 | 17 |
| Canada | -0.810 | -0.873 | -0.959 | -0.971 | -1.127 | -1.428 | -1.509 | -1.358 | 24 | 25 |
| France | 0.017 | 0.068 | 0.110 | 0.184 | -0.165 | -0.201 | -0.196 | -0.212 | 12 | 16 |
| Germany | -0.125 | -0.188 | -0.203 | -0.258 | -0.275 | -0.261 | -0.327 | -0.341 | 17 | 18 |
| Italy | 0.466 | 0.434 | 0.447 | 0.372 | 0.344 | 0.287 | 0.300 | 0.316 | 7 | 10 |
| Japan | -0.717 | -0.743 | -0.783 | -1.132 | -1.204 | -1.277 | -1.355 | -1.408 | 23 | 26 |
| Netherlands | -0.226 | -0.325 | -0.357 | -0.313 | -0.278 | -0.264 | -0.301 | -0.302 | 18 | 18 |
| Portugal | 0.828 | 0.851 | 0.860 | 0.842 | 0.829 | 0.792 | 0.742 | 0.687 | 3 | 5 |
| Spain | -0.122 | -0.170 | -0.238 | -0.381 | 0.467 | 0.506 | 0.463 | 0.364 | 16 | 20 |
| Switzerland | -0.360 | -0.281 | -0.456 | -0.478 | -0.467 | -0.540 | -0.543 | -0.555 | 20 | 22 |
| United Kingdom | -0.069 | -0.162 | -0.221 | -0.239 | -0.283 | -0.265 | -0.172 | -0.111 | 15 | 15 |
| United States | -0.552 | -0.682 | -0.880 | -0.772 | -0.684 | -0.577 | -0.481 | -0.411 | 21 | 21 |
| *Asian NIEs* | | | | | | | | | | |
| Hong Kong (China) | 1.070 | 1.221 | 1.140 | 1.012 | 1.006 | 0.968 | 0.996 | 1.024 | 1 | 2 |
| South Korea | 0.930 | 0.896 | 0.769 | 0.678 | 0.585 | 0.396 | 0.249 | 0.021 | 2 | 11 |
| Singapore | -0.042 | 0.176 | 0.160 | 0.077 | -0.043 | -0.171 | 0.456 | 0.662 | 13 | 23 |
| Taiwan | 0.769 | 0.776 | 0.659 | 0.413 | 0.275 | 0.155 | 0.049 | -0.049 | 4 | 13 |
| *Other Developing Economies* | | | | | | | | | | |
| Bangladesh | -0.901 | -0.082 | 0.668 | 1.030 | 1.046 | 1.162 | 1.218 | 1.402 | 25 | 1 |
| China | 0.595 | 0.220 | 0.484 | 0.689 | 0.694 | 0.744 | 0.772 | 0.728 | 5 | 4 |
| India | 0.549 | 0.520 | 0.539 | 0.593 | 0.650 | 0.651 | 0.648 | 0.616 | 6 | 6 |
| Indonesia | -0.651 | -0.611 | -0.190 | 0.134 | 0.309 | 0.421 | 0.382 | 0.367 | 22 | 9 |
| Malaysia | -0.240 | -0.144 | -0.075 | 0.117 | 0.152 | 0.113 | 0.026 | -0.011 | 19 | 12 |
| Pakistan | 0.290 | 0.424 | 0.580 | 0.661 | 0.760 | 0.749 | 0.810 | 0.812 | 10 | 3 |
| Philippines | 0.382 | 0.453 | 0.671 | 0.319 | 0.834 | 0.767 | 0.695 | 0.577 | 8 | 7 |
| Thailand | 0.314 | 0.384 | 0.506 | 0.605 | 0.588 | 0.517 | 0.479 | 0.368 | 9 | 8 |

Source: Author's calculation.

Table 2 shows that the number of developed economies having comparative advantage in the clothing trade is lower than that of textiles. The RCA indices are significantly high throughout the period

only for two economies, viz., Italy and Portugal.. However, the RCA indices of Portugal have continuously declined over time. In contrast, all of the developing economies except Singapore have enjoyed substantially high levels of comparative advantage in clothing exports for most of the period. Some of the low wage economies such as Bangladesh and Indonesia that possessed no comparative advantage at the beginning of 1980's, recorded phenomenal export growth in the later years. For example, the RCA index of clothing in Bangladesh has increased from a low −1.9 in 1980 to a high 1.4 in 1996. Similarly, while Indonesia's index was -0.65 in 1980, it rose to 0.36 in 1996. Other economies showing rapid improvement include Pakistan, Philippines, China and India. Clearly, comparative advantage in clothing trade appears to be tilted towards low wage economies. Since the clothing industries are typically more labour intensive than textiles, comparative advantage of these low wage economies in clothing products is expected to have sourced from their cost competitiveness. On the contrary, rising labour cost seems to have subscribed significantly towards declining export ratios in clothing trade for developed economies as well as for some Asian high-income economies such as Singapore, Taiwan and Hong Kong.

*RCA Indices of Relative Change*

The RCA indices reported in Tables 1 and 2 provide country specific estimates of comparative advantage in textiles and clothing trade in absolute terms. These indices could be supplemented with a set of dynamic indices estimated using Equation (3). The dynamic RCA indices would provide further insights of the relative change of comparative advantage over time and would be free from any short-term random effects. To explain dynamic RCA from the 1980's to the 1990's, we could take a combined series of indices averaged over relative export shares of first three years, viz., 1980 to 1982 and of the last three years, from 1994 to 1996.[2] These indices are reported in Table 3 for both textiles and clothing. As seen from the table, three developed economies, viz. Italy, Portugal and Belgium-Luxemburg possess comparative advantage in textiles. This list has discarded Austria, which was found to have comparative advantage in textiles in absolute terms, as reported in Table 1. There are also some other economies with substantially low RCA indices. For example the indices for Australia, Canada, US and Japan are -0.63, -0.48, -0.41 and −0.40, respectively. Presumably, these countries have suffered from some of the greatest declines in their comparative advantage in textiles trade over the decades. On the other hand, except for Singapore, the other Asian NIEs have recorded considerably high indices of RCA. Among the other

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[2] This methodology conforms to Balassa's original work where he estimated average relative share of exports over 1953-55 and 1960-62.

developing Asia, three countries, viz., Malaysia, Philippines and Thailand fail to exhibit comparative advantage in textiles over time. In contrast, the RCA indices are high for Indonesia, Pakistan, India, China and Bangladesh. Among these, Indonesia and Pakistan scores 1.49 and 1.34, respectively, reflecting substantial improvement of their export trade and comparative advantage in textiles over the period (Table 3).

**Table 3**
**RCA Indices of Relative Change from Early 1980's to Mid 1990's**

| | Early 1980's to mid 1990's | | | |
|---|---|---|---|---|
| | **Textiles** | **Rank** | **Clothing** | **Rank** |
| Developed Economies | | | | |
| **Australia** | -0.629 | 25 | -0.566 | 22 |
| Austria | -0.019 | 13 | -0.271 | 14 |
| Belgium-Luxemburg | 0.136 | 11 | -0.367 | 18 |
| Canada | -0.483 | 24 | -1.614 | 26 |
| France | -0.096 | 16 | -0.280 | 15 |
| Germany | -0.072 | 14 | -0.415 | 20 |
| Italy | 0.259 | 9 | 0.237 | 10 |
| Japan | -0.402 | 22 | -1.607 | 25 |
| Netherlands | -0.346 | 21 | -0.332 | 16 |
| Portugal | 0.256 | 10 | 0.665 | 8 |
| Spain | -0.080 | 15 | -0.519 | 21 |
| Switzerland | -0.121 | 17 | -0.638 | 23 |
| United Kingdom | -0.182 | 18 | -0.392 | 19 |
| United States | -0.411 | 23 | -0.352 | 17 |
| *Asian NIEs* | | | | |
| Hong Kong (China) | 0.381 | 7 | 0.963 | 4 |
| South Korea | 0.496 | 5 | -0.100 | 12 |
| Singapore | -1.103 | 26 | -0.760 | 24 |
| Taiwan | 0.590 | 4 | -0.243 | 13 |
| *Developing Economies* | | | | |
| Bangladesh | 0.300 | 8 | 2.691 | 1 |
| China | 0.406 | 6 | 0.913 | 5 |
| India | 0.670 | 3 | 0.683 | 7 |
| Indonesia | 1.493 | 1 | 1.139 | 2 |
| Malaysia | -0.248 | 20 | 0.115 | 11 |
| Pakistan | 1.336 | 2 | 1.087 | 3 |
| Philippines | -0.221 | 19 | 0.759 | 6 |
| Thailand | -0.012 | 12 | 0.478 | 9 |

Source: Author's calculation.

The RCA indices of relative change indicate that only two developed economies, viz., Italy and Portugal have dynamic comparative advantage in clothing (Table 3). Similarly, among the Asian NIEs, only Hong Kong possesses comparative advantage in clothing. As Table 3 shows, all other developing economies enjoy comparative advantage over time. The RCA indices are noticeably high for some of the low-income economies such as Bangladesh (2.69), China (0.913), Indonesia (1.14) and Pakistan (1.087), partially reflecting the rapid growth of export oriented clothing industry in these economies over recent decades.

*The RCA Ranking*

Based on the relative indices of export shares, the twenty-six selected economies have been ranked in descending order in 1980 and 1996. These ranks are reported in the last two columns of the Tables showing absolute and relative RCA indices. The full details of the ranks in various years have been presented in Table A1 and A2 in the appendix, for textiles and clothing, respectively. These two tables in the appendix reveal the evolving pattern of ranks among the economies based on their respective RCA scores. The RCA ranks in 1980 and 1996, as reported in Table 1 indicate that in textiles the RCA ranks deteriorated for eight developed economies. However, although marginally, the ranks improved for five other economies and for Italy it remained the same (with 10th position in both the years). The ranks of the developing economies improved except for a few such as Singapore, Thailand and Malaysia.

In clothing industry, RCA ranks for almost all the developing economies improved from 1980 to 1996 except for the Asian NIEs (Table 2). Some countries such as Bangladesh and Indonesia that ranked the 25th and 22nd, respectively in 1980 moved to the 1st and 9th positions, in the same order in 1996. Note that the ranks of three out of four Asian NIEs actually deteriorated over 1986 to 1996 (Table 2). The only exception is Hong Kong who has been an excellent and consistent performer in the export market over these years reflected by its RCA indices being the highest and second highest in 1980 and 1996, respectively.  The RCA ranks in clothing have not improved for any of the high-income developed economies from 1980 to 1996. For a few countries such as UK, US and Netherlands, the ranks remained unchanged over the period. However, Table A2 in the appendix confirms that RCA ranking of UK and the US in clothing trade actually improved notably from the early 1990's. With a set of similar results, Lowinger (1977) showed that the structure of US comparative advantage has been tilted towards less technologically intensive industries.

In order to reveal more general pattern of association of comparative advantage shift across individual and groups of economies, it would be of interest to examine how country specific income levels correlates with their comparative advantages. This would also partly imply the magnitude of labour cost and hence input-mix as a factor explaining comparative advantage in these economies. Table 4a and Table 4b report the rank correlation coefficients based on country-specific per capita income and the RCA indices. The correlation coefficients between ranks based on country specific income and absolute RCA indices have been reported in Table 4a, for the first and the last year of the sampled time frame, viz., 1980 and 1996, respectively, and for one selected year 1990. It is seen from both Tables 4a and 4b that the signs of the correlation coefficients are negative in all cases suggesting that the ranks based on country specific income levels and RCA indices are inversely correlated for both textiles and clothing. This result provides a general support to the Heckscher-Ohlin model of trade, i.e., given the labour-intensive nature of production processes in the textile-clothing industries, the high income economies are likely to possess less comparative advantage in the production and trade of these products.

**Table 4a**
**Rank Correlation Between Country Specific Income and Absolute RCA Indices**

|  | 1980 | | 1990 | | 1996 | |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Correlation Coefficient** | ***t-*** **value** | **Correlation Coefficient** | ***t-*** **value** | **Correlation Coefficient** | ***t-*** **value** |
| Textiles | -0.295 | -1.514 | -0.504** | -2.862 | -0.539** | -3.132 |
| Clothing | -0.349 | -1.824 | -0.765** | -5.819 | -0.666** | -4.372 |

Notes: The 5 per cent and 1 per cent critical *t-* values are −2.064 and −2.837, respectively.  ** Significant at 1 per cent level.

Table 4a shows that while in 1980 comparative advantage in textiles and clothing trade did not vary much with country–specific income levels (as revealed by the low and insignificant values of the coefficients), the RCA ranks tended to be significantly and negatively correlated with ranks based on levels of income in 1990 and in 1996. This also indicates how an increased number of low wage developing economies have acquired competitiveness towards the end of the century. Table 4b also show that there have been significant negative correlations between the ranks based on income levels and RCA indices in both textiles and clothing. Further scrutiny of results presented in Table 4a and Table 4b reveal that evidence of comparative advantage in clothing trade enjoyed by the low wage economies has been more pronounced compared to

trade in textiles. This is indicated by the higher correlation coefficients for clothing in all the years, e.g., 0.66 for clothing compared to 0.54 for textiles in 1996 (Table 4a), and 0.77 for clothing compared to 0.61 for textiles from early 1980's to the mid 1990's (Table 4b).

**Table 4b**
**Rank Correlation between Country Specific Income and Dynamic RCA Indices**

|  | **Correlation Coefficient** | *t*-**value** |
|---|---|---|
| Textiles | -0.612* | -2.790 |
| Clothing | -0.766** | -5.837 |

Notes: The 5 per cent and 1 per cent critical *t*- values are −2.064 and −2.837, respectively. * Significant at 5 per cent level. ** Significant at 1 per cent level.

*RCA Trend of Country Groups*

Table 5 reports the number of developed and developing economies that possessed comparative advantage in textiles and clothing trade in the selected years. In 1980, out of 19 economies that had comparative advantage, 11 economies (or 42 percent) were from the developed world. This number declined afterwards by the mid 1980's and a larger proportion of developing economies started to enjoy comparative advantage. However, this trend has been less than steady. Note that from 1988 to 1996, the proportion of developing economies with high RCA remained stable at 35 per cent compared to the proportion of developed economies that varied between 23 to 27 percent from mid 1980's till the end of the decade. The proportion of developing economies having comparative advantage declined considerably by about mid 1990's, e.g., to 15 percent in 1996. For the clothing industry, higher number of developing economies seems to have comparative advantage over the entire period. Throughout the period, the proportion of developed economies with high RCA varied from 15 percent in 1980 to 8 percent in 1996 compared to the proportion of the developing economies, which ranged from 31 per cent in 1980 to 46 per cent in 1988 and to 35 percent in 1990.

Figure 1 and 2 plot the trend of RCA indices over time for developed and developing country groups. Additional decomposition has been made for the developing economies including and excluding the Asian NIEs. Note that Figure 1 has been drawn using RCA indices calculated on the basis of group export shares and these are not simple averages of the country specific indices reported in Tables 1 and 2. The Figure reveals that the developed economies lost comparative advantage in textiles by the mid 1980's.

**Table 5**
**Number of Economies with high RCA in Textiles and Clothing**
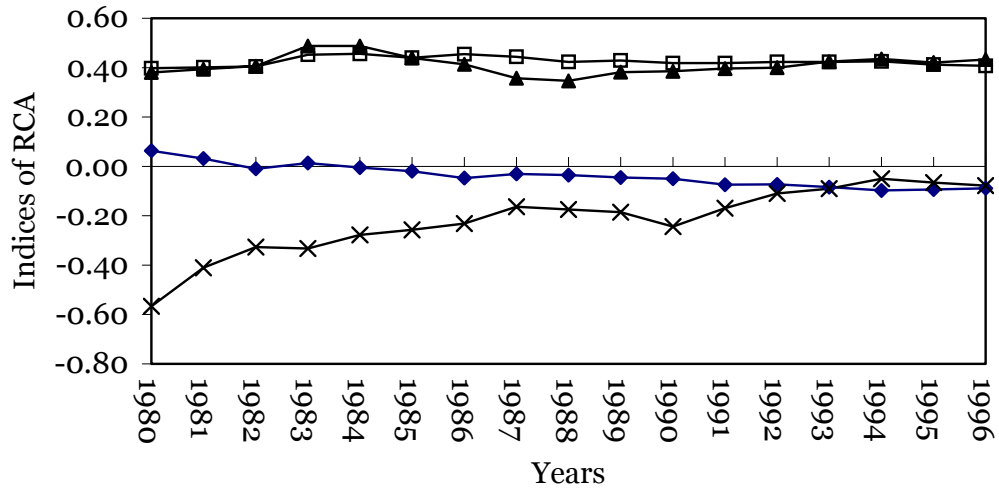**Trade (1980-1996)**

| Year | | Textiles | Proportions | Clothing | Proportions |
|------|------|----------|-------------|----------|-------------|
| 1980 | A | 11 | 0.42 | 4 | 0.15 |
|      | B | 8 | 0.31 | 8 | 0.31 |
|      | Total | 19 | 0.73 | 12 | 0.46 |
| 1985 | A | 7 | 0.27 | 3 | 0.12 |
|      | B | 8 | 0.31 | 10 | 0.38 |
|      | Total | 15 | 0.58 | 13 | 0.5 |
| 1988 | A | 6 | 0.23 | 3 | 0.12 |
|      | B | 9 | 0.35 | 12 | 0.46 |
|      | Total | 15 | 0.58 | 15 | 0.58 |
| 1990 | A | 6 | 0.23 | 2 | 0.08 |
|      | B | 9 | 0.35 | 11 | 0.42 |
|      | Total | 15 | 0.58 | 13 | 0.5 |
| 1994 | A | 4 | 0.15 | 2 | 0.08 |
|      | B | 9 | 0.35 | 11 | 0.42 |
|      | Total | 13 | 0.5 | 13 | 0.5 |
| 1996 | A | 4 | 0.15 | 2 | 0.08 |
|      | B | 9 | 0.35 | 9 | 0.35 |
|      | Total | 13 | 0.5 | 11 | 0.42 |

Notes:  A= Developed Economies; B=Developing Economies.


In contrast, the developing economies seem to have acquired stable comparative advantage (with RCA index of around 0.4) for the whole period. However, the line showing pattern of RCA indices for the Asian NIEs separately reveal that comparative advantage in textiles for developing economies over the whole period has been strongly dominated by the comparative advantage acquired by the Asian NIEs. Hence, the group of other developing economies excluding the Asian NIEs does not appear to have comparative advantage over the whole period, but the growth of RCA indices has been remarkable for this group of developing economies (Figure 1).  In the clothing industry as shown in Figure 2, it is found that the developed economies as a group failed to possess comparative advantage over the period. The groups and sub-groups of developing economies, on the other hand, possess clear comparative advantage for the whole period. For the group of all developing economies, slight deterioration of the RCA indices could be observed from the mid 1980's onwards. This has been the predominant reflection of the perpetual decline of the RCA indices for the Asian NIEs since early 1980's till the end of the period (Figure 2). For the Asian NIEs, the RCA indices declined from about 0.8 in early 1980's to about 0.2 by the mid 1990's. Interestingly, the growth pattern of comparative advantage for developing economies excluding Asian NIEs, appears to

be a mirror image of the growth in Asian NIEs. This reveals the pattern of shifting comparative advantage in clothing trade from the high income to low income economies of Asia over the last few decades.

**Figure 1**
**Pattern of RCA in Textiles Trade by Country Groups, 1980-1986**



Legend:
- Developed Economies
- All Developing
- Asian NIE's
- Developing Economies excluding Asian NIE's"

**Figure 2**
**Pattern of RCA in Clothing Trade by Country Groups, 1980-1986**
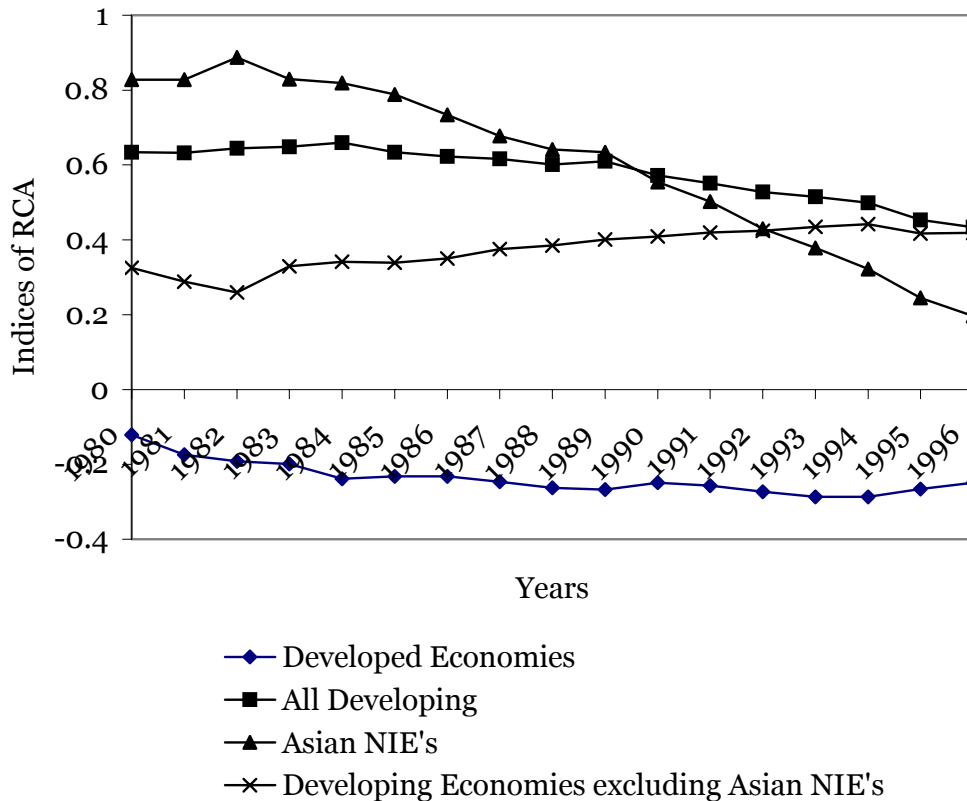


*Intra-Industry Trade in Textiles and Clothing*

Based on Equation (4), the G-L indices for trade in textiles and clothing have been measured for all the selected developed and developing economies. These indices have been reported in Table 6 and Table 7, for textile and clothing industries, respectively for selected years covering the period of 1980 to 1996.  Table 6 shows that for few developed high-income economies such as Austria, France, Germany and Netherlands, the G-L indices have been high and more than 90 per cent for most of the concerned period. Hence, trade in textiles has been predominantly intra industry type in these economies. High G-L indices are also reported for some other developed countries, revealing presence of IIT in textiles trade in these economies. A considerable proportion of these industries have actually recorded a significant shift towards intra industry type of trade over time, indicated by rise in the values of the

indices.  For example, Japan recorded an index of 0.49 in 1980 that rose almost consistently to about .93 in 1996. Similarly, G-L indices of Portugal and Spain increased from about 0.67 in 1980 to 0.92 and 0.99, respectively in 1996. Economies such as Australia and Canada also moved towards Intra industry type trade in textiles over time, but the magnitude of IIT in textiles in these economies have been low, revealed by their lower G-L indices (Table 6). Havrilla and Gunawardana (2003) examined comparative advantage and IIT in the Australian textiles and clothing industries over the period 1965-1996, based on two and three digit SITC scheme and found that prior to the 1980s the values of the G-L indices were very low and close to zero for most categories of textiles and clothing. They also found that textile and clothing industries in Australia moved more towards intra industry type of trade since the 1980's. Table 6 also shows that Asian NIEs such as South Korea and Singapore moved towards IIT in textiles from 1980's to the 1990's, However, Hong Kong (China) record declining indices that indicate falling IIT in its textile trade. Rising trend of IIT in textiles could be also observed for a considerable number of developing low wage economies. This is probably because with growth of industrialisation, skills and technical knowledge achieved in recent decades by most of these economies, trade in textiles has been determined by product differentiation, consumers' preferences etc.

The G-L indices of IIT for clothing reported in Table 7 show that, none of the countries seem to possess a close to perfect IIT in clothing. Also, the G-L indices have been zero for almost all the developing low wage economies over the period, as these economies only export clothing in the world market. Among the Asian NIEs, Hong Kong (China), South Korea and Taiwan show significant move towards IIT, especially in the 1990's. As Table 7 also shows that trade in clothing has become more intra industry over time for only a few developed high-income countries such as Australia, Italy, Netherlands and Portugal. For the most of the other high-income economies, the estimated G-L indices for clothing have declined from the 1980s to the 1990s. This group of countries includes Austria, Canada, France, Germany, Japan, Switzerland and United States.

**Table 6**
**Grubel-Lloyd Index of Intra Industry Trade in Textiles, 1980-1996**

| Countries | 1980 | 1985 | 1988 | 1990 | 1992 | 1994 | 1996 |
|---|---|---|---|---|---|---|---|
| **Australia** | 0.226 | 0.217 | 0.180 | 0.191 | 0.230 | 0.300 | 0.390 |
| Austria | 0.956 | 0.985 | 0.985 | 0.972 | 0.966 | 0.989 | 0.972 |
| Belgium-Luxemburg | 0.794 | 0.732 | 0.732 | 0.719 | 0.712 | 0.695 | 0.685 |
| Canada | 0.385 | 0.000 | 0.418 | 0.456 | 0.509 | 0.573 | 0.665 |
| France | 0.909 | 0.914 | 0.884 | 0.887 | 0.911 | 0.972 | 0.982 |
| Germany | 0.956 | 0.902 | 0.901 | 0.928 | 0.944 | 0.929 | 0.912 |
| Italy | 0.773 | 0.694 | 0.786 | 0.785 | 0.714 | 0.682 | 0.633 |
| Japan | 0.491 | 0.555 | 0.832 | 0.824 | 0.742 | 0.864 | 0.934 |
| Netherlands | 1.000 | 0.979 | 0.979 | 0.892 | 0.896 | 0.939 | 0.970 |
| Portugal | 0.673 | 0.624 | 0.980 | 0.883 | 0.851 | 0.910 | 0.915 |
| Spain | 0.673 | 0.592 | 0.958 | 0.844 | 0.790 | 0.932 | 0.993 |
| Switzerland | 0.861 | 0.773 | 0.826 | 0.839 | 0.847 | 0.894 | 0.921 |
| United Kingdom | 0.932 | 0.713 | 0.695 | 0.768 | 0.767 | 0.789 | 0.801 |
| United States | 0.807 | 0.677 | 0.765 | 0.856 | 0.835 | 0.811 | 0.856 |
| *Asian NIEs* | | | | | | | |
| Hong Kong (China) | 0.603 | 0.771 | 0.709 | 0.688 | 0.678 | 0.589 | 0.599 |
| South Korea | 0.312 | 0.403 | 0.494 | 0.485 | 0.475 | 0.650 | 0.647 |
| Singapore | 0.369 | 0.531 | 0.200 | 0.244 | 0.268 | 0.452 | 0.469 |
| Taiwan | 0.279 | 0.265 | 0.313 | 0.284 | 0.346 | 0.291 | 0.257 |
| *Developing Economies* | | | | | | | |
| Bangladesh | 0.364 | 0.552 | 0.961 | 0.894 | 0.672 | 0.865 | 0.799 |
| China | 0.604 | 0.609 | 0.754 | 0.846 | 0.937 | 0.883 | 0.995 |
| India | 0.115 | 0.265 | 0.000 | 0.198 | 0.107 | 0.156 | 0.000 |
| Indonesia | 0.350 | 0.588 | 0.616 | 0.775 | 0.559 | 0.638 | 0.617 |
| Malaysia | 0.702 | 0.699 | 0.585 | 0.530 | 0.608 | 0.748 | 0.977 |
| Pakistan | 0.372 | 0.220 | 0.000 | 0.090 | 0.067 | 0.038 | 0.044 |
| Philippines | 0.000 | 0.276 | 0.000 | 0.253 | 0.259 | 0.333 | 0.398 |
| Thailand | 0.690 | 0.712 | 0.890 | 0.984 | 0.985 | 0.904 | 0.842 |

Source: Author's calculation.

**Table 7: Grubel-Lloyd Index of Intra Industry Trade in Clothing, 1980-1996**

| Countries | 1980 | 1985 | 1988 | 1990 | 1992 | 1994 | 1996 |
|---|---|---|---|---|---|---|---|
| **Australia** | 0.114 | 0.082 | 0.136 | 0.242 | 0.253 | 0.314 | 0.311 |
| Austria | 0.763 | 0.789 | 0.714 | 0.665 | 0.657 | 0.571 | 0.608 |
| Belgium-Luxemburg | 0.708 | 0.712 | 0.682 | 0.716 | 0.724 | 0.720 | 0.799 |
| Canada | 0.454 | 0.325 | 0.329 | 0.223 | 0.136 | 0.126 | 0.194 |
| France | 0.930 | 0.837 | 0.706 | 0.716 | 0.701 | 0.706 | 0.673 |
| Germany | 0.514 | 0.580 | 0.541 | 0.521 | 0.503 | 0.454 | 0.468 |
| Italy | 0.296 | 0.257 | 0.343 | 0.358 | 0.519 | 0.481 | 0.474 |
| Japan | 0.482 | 0.844 | 0.161 | 0.122 | 0.108 | 0.073 | 0.049 |
| Netherlands | 0.467 | 0.536 | 0.572 | 0.629 | 0.638 | 0.820 | 0.719 |
| Portugal | 0.043 | 0.038 | 0.162 | 0.222 | 0.337 | 0.357 | 0.390 |
| Spain | 0.655 | 0.511 | 0.845 | 0.532 | 0.362 | 0.516 | 0.632 |
| Switzerland | 0.402 | 0.277 | 0.305 | 0.333 | 0.317 | 0.323 | 0.315 |
| United Kingdom | 0.793 | 0.724 | 0.625 | 0.608 | 0.634 | 0.761 | 0.787 |
| United States | 0.308 | 0.085 | 0.133 | 0.174 | 0.227 | 0.254 | 0.296 |
| *Asian NIEs* | | | | | | | |
| Hong Kong (China) | 0.152 | 0.458 | 0.196 | 0.154 | 0.050 | 0.863 | 0.794 |
| South Korea | 0.009 | 0.009 | 0.008 | 0.038 | 0.077 | 0.219 | 0.526 |
| Singapore | 0.326 | 0.714 | 0.439 | 0.497 | 0.538 | 0.602 | 0.445 |
| Taiwan | 0.005 | 0.006 | 0.054 | 0.136 | 0.185 | 0.369 | 0.448 |
| *Developing Economies* | | | | | | | |
| Bangladesh | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| China | 0.000 | 0.019 | 0.000 | 0.010 | 0.051 | 0.051 | 0.080 |
| India | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Indonesia | 0.000 | 0.065 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Malaysia | 0.333 | 0.060 | 0.000 | 0.109 | 0.129 | 0.142 | 0.126 |
| Pakistan | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Philippines | 0.000 | 0.036 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Thialand | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Source: Author's calculation.

## 4. Conclusions

This paper examines dynamic comparative advantages and trade pattern in textile and clothing among a selected economies and country groups. The findings make the following contributions. Firstly, the paper computes RCA indices using the global exports total, an effort that has not been made in literature so far, however, this provides a useful analytical platform for examining dynamics in comparative advantage involving a wider range of countries and for industries such as textile and clothing that remain significant concerns for many economies. Secondly, although the empirical findings of this study reconfirm that comparative advantage in trade of textiles and clothing has been generally tilted towards developing economies, the results specifically indicate that developing economies seem to possess more comparative advantage in clothing trade. This is also revealed by higher significant negative correlation between country specific income levels

and RCA indices for these products. Also, over time, the pattern of shifting comparative advantage from high income to low income economies has been more pronounced for clothing industry. Thirdly, it is identified that a few developed economies have enjoyed comparative advantage, especially in textiles trade. Fourthly, estimated G-L indices show that trade in textiles in the developed countries has been mainly of intra industry type and that a high proportion of these economies swayed towards IIT from early 1980s to mid 1990s. In contrast, it is found that there has been no evidence of IIT in clothing in most of the developing economies. Also, the magnitude of IIT in clothing trade has declined for a significant number of developed countries. This means that while developed economies shifted towards textiles trade based on product differentiation, developing economies moved towards clothing trade based on comparative advantage.

These results suggest that for the trading nations, the policy focus in textiles should be on exploitation of forms of competition, such as product differentiation sourced from quality and design, rather than comparative advantage. Conversely, in clothing trade, policies should be directed towards sustaining comparative advantage with cost-minimising strategies. While the developing nations seem to have succeeded in acquiring comparative advantage, there should be a concern of sustenance for many of these economies, as indicated in this study. For these economies, with escalating competition from 2005 onwards, factors such as just-in-time and efficient dispatch of products, entrepreneurial networking are likely to be increasingly important to determine their global market shares.

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