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# China Takes All? An Empirical Study on the Impacts of Quota Elimination on World Clothing Trade from 2000 to 2009

# China Takes All? An Empirical Study on the Impacts of Quota Elimination on World Clothing Trade from 2000 to 2009[1]

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**Abstract**

**Purpose –** This study aims to empirically investigate the impacts of quota elimination on world clothing trade.

**Design/methodology/approach** - Multivariate analysis of variance (MANOVA) was undertaken based on trade statistics of 51 clothing exporters from 2000 to 2009 provided by the World Trade Organization (WTO).

**Findings –** First, exporters' performances in response to quota elimination overall were suggested unequal among countries located in different geographic regions of the world. Second, clothing exporters located in different geographic regions were suggested having unequal results of compound annual growth rate from 2005 to 2009 and market share changes from 2000 to 2009. Third, European countries were suggested achieving faster clothing export growth from 2005 to 2009 and more market share gains from 2000 to 2009 than the rest of the world. China was also suggested achieving more market share gains from 2000 to 2009 than other clothing exporters.

**Research limitations/implications –** Although China once again was suggested as one of the largest beneficiaries of quota elimination, findings of this study remind us that neither China's gains nor some other countries' losses should be exaggerated. Findings of this study also call for attention to the influence of geographic location as a key factor shaping the pattern of world clothing trade in the post-quota era. Besides, the findings suggest special care be given to African clothing exporters in the future.

**Originality/value –**Evaluate the real impacts of quota elimination on world clothing trade by taking a global perspective based on updated data.

**Key words –** Clothing trade, quota elimination, China

**Classifications** – Research paper

[1] The author wishes to acknowledge Dr. Kitty Dickerson and her book *Textiles and Apparel in the Global Economy* in inspiring the academic thought of this paper. Also appreciate the constructive comments and suggestions from the reviewers.

## Introduction

Since 1960s, world clothing trade[1] had been subject to a special set of trading rules which allowed the using of quota, a trade restriction tool, by major importing countries to quantitatively limit imports (Dickerson, 1999). However, as one breakthrough achievement of the Uruguay Round multilateral trade negotiations under the auspicious of the General Agreement on Tariff and Trade (GATT) (later became the World Trade Organization, WTO), the decades-long quota system was finally removed on January 1st, 2005 over a ten-year period according to the Agreement on Textiles and Clothing (ATC) (Ahmad & Diaz, 2008).

The elimination of quota system attracted world attention because of its expected consequential and far-reaching impacts on world clothing trade (Mayer, 2005). On one hand, quota elimination significantly shifted "rules of the game" for world clothing trade (Ernst, Hernandez & Zult, 2005). In the post-quota era, clothing exporters' performance would largely depend on their genuine competitiveness rather than the results of quota arrangement, implying patterns of world clothing trade before and after quota elimination could be fundamentally different (Nordas, 2004). On the other hand, developing countries were of grave concerns about their gains and losses from quota removal. For many of them, especially the Least Developed Countries (LDCs), the clothing sector was one of their few opportunities to participate in globalization and achieve economic growth through export (Dickerson, 1999). Although quota removal initially was pushed by these developing countries, China's WTO entry in late 2001 much complicated the situation (Mayer, 2005). In particular, it was deeply worried that because of China's unparalleled capability and competitiveness, it would dominate world clothing export in the post-quota era and result in other developing countries in smaller size and with less export competitiveness as losers (United Nations Conference on Trade and Development, UNCTAD, 2004; Brenton & Hoppe, 2005).

A preliminary review of statistics also revealed that patterns of world clothing trade had undergone tremendous changes along with quota removal (WTO, 2010). First, size of world clothing trade substantially expanded. Value of world clothing export totaled $158 billion in 1995 when the ten-year quota removal process just started. When quota was fully eliminated in 2005, this figure had increased to $276 billion, up nearly 75%. Since quota removal, world clothing trade further achieved a compound annual growth rate (CAGR) of 6.99% from 2005 to 2009, which was higher than the rate of 5.12% from 1995 to 2004 when a good proportion of clothing categories were still subject to quota restrictions. Second, world clothing export became more geographically concentrated. Statistics showed that, 53.16% and 35.44% of world clothing exports in 2009 came from Asia and the European Union (27 countries) respectively, which were much higher than the

level of 46% and 32.6% in 2000 (WTO, 2010). In comparison, market shares of South and Central America, where many small and medium sized clothing exporters were located, declined sharply from 10.3% to only 0.3% over the same period. Third, impacts of quota elimination appeared to be unevenly distributed among different clothing exporters. As one example, since quota removal, market share changes of 59 world top clothing exporters significantly varied from gaining 15.7 percentage points to losing 5.8 percentage points from 2005 to 2009.

This study aims to empirically investigate the impacts of quota elimination on world clothing trade. Although a considerable number of studies have been conducted on this topic, research gaps and necessity for further study still exist. First, most previous studies were based on statistics earlier than 2005. This means these studies forecasted rather than actually evaluated the real impacts of quota elimination (such as Mayer, 2005; Nordas, 2004; Brenton & Hoppe, 2005). What has happened to world clothing trade since quota removal in 2005 still is largely unknown. Second, most previous studies limited their research scope to the United States and the Europe market only (such as Ernst, Hernandez, & Zult, 2005; Curran, 2008; Ahmad & Diaz, 2008). Although around 70% world clothing exports stably went to these two markets in the past decades (WTO, 2010), situation in the rest one-third of the world clothing market shall not be simply neglected. This is because the quota system not only restricted clothing exports to key import markets including the United States and the Europe, but also artificially "created" some special trade patterns such as the "triangle manufacturing" with the main purposes of circumventing country-specific quota restrictions (Dickerson, 1999). However, when quantitative trade restriction no longer becomes a problem for clothing exporters since quota removal, it is questionable that these special trade patterns can still justify their existence (Dicken, 2003). This implies that quota elimination not only will affect clothing exports to the U.S. and EU markets, but also may lead to changes of trade flows among a much border scope of countries and regions. To fulfill the research gaps, this study assesses the impacts of quota elimination on world clothing trade based on more updated trade data from a global perspective.

The rest of the paper is composed of four parts. The second part reviews and summarizes findings of previous studies on the topic. The third part introduces research methods and data sources of this study. The fourth part presents and discusses test results. Conclusions will be drawn in the last part.

## Literature Review

*Evolution of the quota system on world clothing trade: a brief history*

The quota system had been imposed on world clothing trade since 1960s. In 1961, aiming to achieve "orderly development" of world clothing trade, the Contracting Parties to the General Agreement on Tariffs and Trade (GATT) reached the Short-Term Arrangement (STA), which for the first time institutionalized the using of quota by major importing countries to quantitatively limit clothing imports (Blokker, 1989). Although the quota system initially was indented to be a one-year temporary mechanism under the STA, pushed by strong protectionism forces, the GATT reached another Long-Term Arrangement (LTA) in 1962 which extended the quota system until 1973 (Lenway, 1985). Under the LTA, clothing importing countries were allowed to continue setting discriminatory country-specific quota with modest annual quota growth rate, which effectively prevented the flood of imports from most competitive clothing exporters (Dickerson, 1999).

Later, intensified market competition due to new entrance of clothing suppliers and the rapid import growth of man-made fiber products not covered by the LTA ended up with a new negotiation among clothing importers and exporters under the GATT (Blokker, 1989). As result, the Multi-fiber Arrangement (MFA) came into force in 1974, which once again extended the quota system and also expanded the product coverage to newly include man-made-fiber and wool clothing. The MFA originally was set as a four-year mechanism, however, after numerous renewals it eventually lasted for as long as 20 years (Dickerson, 1999).

The decades-long quota system on world clothing trade finally came to its end with the reaching of the Textiles and Clothing (ATC) in early 1990s. As part of the GATT Uruguay Round deal, clothing importers agree to gradually eliminate quota through four stages over a ten-year period from 1995 to 2005 (Dickerson, 1999; Nordas, 2004).

Although globally the quota system on world clothing trade was terminated on January 1, 2005 according to the ATC, China became an exception. Since its WTO accession in 2001, China instantly demonstrated strong competitiveness in clothing export. For some product categories integrated in the first or second stage of the ATC, China's export to the U.S. and EU markets more than doubled from 2001-2005(Nordas, 2004). Faced by such import surge, the United States and the European Union triggered the special safeguard mechanism agreed by China as part of its WTO membership deal and re-imposed quota on certain Chinese clothing products (Jones, 2006). Due to the negative impacts of safeguard measures on China's overall clothing export, China reached the bilateral Memorandum of Understanding (MOU) respectively with the United States and the

European Union in late 2005. Under the MOUs, China allowed the United States and the European Union to further extend the country-specific quota system on certain categories of its clothing export until either the end of 2008 and 2007 in exchange for no more invoking of safeguard measures and a more predicable policy environment for export (Martin, 2007).

Looking back at the 40-year quota system, it not only substantially curbed the growth of world clothing trade, but also ended up with some "unexpected" results (Dickerson, 1996). As one of them, many countries joined the forces of clothing export simply because of the guaranteed market access under the quota system. Some special trade patterns such as the "triangle manufacturing" were also artificially-created because competitive exporters were often short of quota while some other countries were given more than they themselves can fill up (Dickerson, 1999). However, it shall be noted that these artificially-created patterns were lack of economic foundation in a free-market environment. This implies that sweeping adjustment somehow is inevitable, since quota removal fundamentally shifted "rule of the game" for world clothing trade (Nordas, 2004).

*Empirical studies on the impacts of quota elimination: a brief review*

Numerous studies have been undertaken which provide valuable insights into the impacts of quota elimination. Although research scope and analysis method vary from each other, these studies universally agree that quota elimination will exert significant impacts on world clothing trade and both winners and losers will emerge in the post-quota era. However, there is no consensus among these studies with regard to who would be the winners or losers (Curran, 2008).

Some studies provided descriptive statistical analysis on the impacts of quota elimination. Mayer (2005) compared clothing exporters' market share changes and growth rate in the EU and U.S. markets from 1995 to 2003 for 11 clothing categories integrated in the initial three stages of the ATC. The study found that China was able to achieve fast export growth and substantial market share gains for nearly all product categories, whereas many exporters in Africa and other part of Asia suffered from loss of market share and negative export growth. Ahmad & Diaz (2008) reviewed clothing exporters' performance in the EU and U.S. market from 2004 to 2007 and concluded that both China and India appeared to be the two largest winners of quota elimination. However, the study also found that different from what many previous studies had predicted, a good proportion of countries in Africa and Asia remained good shape in the post-quota era with modest export growth. Curran (2008) also looked at major clothing exporters' performance in the EU and U.S. markets from 2004-2005. Accord to the study, China and India achieved large increase of their exports, but Asian tigers—especially Korea and Taiwan suffered from heavy losses.

Some other studies applied sophisticated economic modeling techniques to quantify the impacts of quota elimination from a broad economic perspective. By using the Global Trade Analysis Project (GTAP) model, Yang, Martin & Yanagishima (1997) argued that most countries would benefit from quota removal due to the additional market access opportunities it created. This view was echoed by Walkenhorst (2003) and USITC (2004) which found that quota removal would result in welfare gains for both clothing exporters and importers. However, Walkenhorst (2003) also warned that clothing sector in industrialized countries would face intensified competition from increased imports and further contract in production and employment. Based on the GTAP model, Nordas (2004) concluded that both China and India would gain market shares in the EU, the U.S. and Canada markets, although their export surge would be less than expected due to the impacts of other factors such as tariff and formation of regional production network.

Additionally, some studies focused on how specific group of countries or aspects of the clothing sector were affected by quota elimination. Based on the analysis of historical data from 1985-1998, Someya & Srinvasan (2002) suggested that Middle East and North African countries could remain competitive in the wake of quota elimination because of their enjoyed preferential market access to the EU and US markets. UNCTAD (2005) argued that transnational corporations (TNCs) had a key role to play in shaping the scenario in the post-quota era. The study was worried that many developing countries would suffer from quota removal when their attractiveness as competitive locations for export-oriented foreign direct investment (FDI) started to disappear. Ernst, Hernandez & Zult (2005) and International Labor Organization, ILO (2005) by using the gravity model evaluated how quota elimination would affect employment in the clothing sector. They suggested that China, Pakistan and countries in South Asia would benefit from quota elimination and expand their employment. However, the study also identified Thailand, Cambodia as “light losers” and some small OECD (organization of economic cooperation and development) exporters as “big losers”. Also based on the gravity model, Amann, Lau & Nixon (2009) found that although China’s clothing exports posted threat to other Asian countries, higher-income exporters were more likely to survive as they specialized in products less exposed to Chinese competition. Curran (2007) and Seyoum (2010) further examined the impacts of quota elimination on developing countries’ export to the United States. The study reached conclusions similar as many previous studies that China and India would grasp most of the benefits of quota removal and leave many developing countries as losers.

Despite important progress achieved so far, research gaps still exist. First of all, most previous studies on the topic were based on statistics earlier than 2005. This means they predicted rather than

actually evaluated the impacts of quota elimination. Particularly, many findings suggested by these studies were already found inconsistent with the reality (Ahmad, & Diaz, 2008). Moreover, a good proportion of China's clothing exports to the EU and U.S. markets were still subject to quota restriction from 2005-2008 because of the bilateral MOUs (Jones, 2006). Therefore, 2009 strictly is the first year when world clothing trade truly entered the "post-quota" era. However, few updated studies have been conducted so far (Curran & Zignago, 2010).

Second, most previous studies limited their research scope to what happened in the U.S. and EU markets only. Although these are the major markets affected by quota restriction, as mentioned earlier, the quota system had the effect of both "trade restriction" and "trade creation" (Dickerson, 1999). Whether and to which extent quota elimination has affected some special trade patterns under the quota system will not be revealed until a global perspective is taken. Additionally, statistics indicate that Asia, South America, Middle East and Africa have emerged as the fastest growing clothing import markets in recent years. From 2005 to 2009, Brazil, Argentina, Egypt, United Arab, China and Malaysia all achieved robust two-digit annual increase of clothing import compared to only 1.96% and 8.67% growth rate in the United States and the European Union (27 countries) respectively (WTO, 2010). This further implies that it is no longer appropriate to identify "winners" and "losers" of quota elimination simply looking at clothing exporters' performance in the EU and US markets.

Third, research methods adopted in previous studies also raise some concerns. Some studies only selected a number of indexes such as market share changes or export growth rate of individual clothing exporters over certain period of time as the basis for assessment (such as ILO, 2005; Curran , 2008; Ahmad & Diaz, 2008). However, without using statistical tools, it is unknown whether apparent variance of clothing exporters' performance shall be attributed to random effect or any specific explanatory variables. Some other studies applied the sophisticated GTAP model (such as Yang, Martin & Yanagishima, 1997; Walkenhorst, 2003; Nordas, 2004). However, interpreting the GTAP results needs to be cautious, because the model was built upon strict economic assumptions (such as full employment, free movement of goods and services) which may not hold in the real world (USITC, 2004). The GTAP model also raises concern because it often failed to sufficiently take account of factors critical to the world clothing trade, such as the industry structure, patterns of tariff protection or other trade policies, sourcing strategies of buyers and the development goal of clothing exporters (UNCTAD, 2005; Mayer, 2005).

Last but not least, although previous studies universally agree that the impacts of quota elimination would be unequally distributed among clothing exporters, except for China which was

unanimously identified as the largest beneficiary, what type of countries in general will be better off than others in the post-quota era and why such patterns happens haven't been sufficiently explained (Mayer, 2005; Curran, 2008; Ahmad & Diaz, 2008).

*Winners and losers of quota elimination: theoretical view*

From theoretical views, two factors are closely related to clothing exporters' performance in the post-quota era.

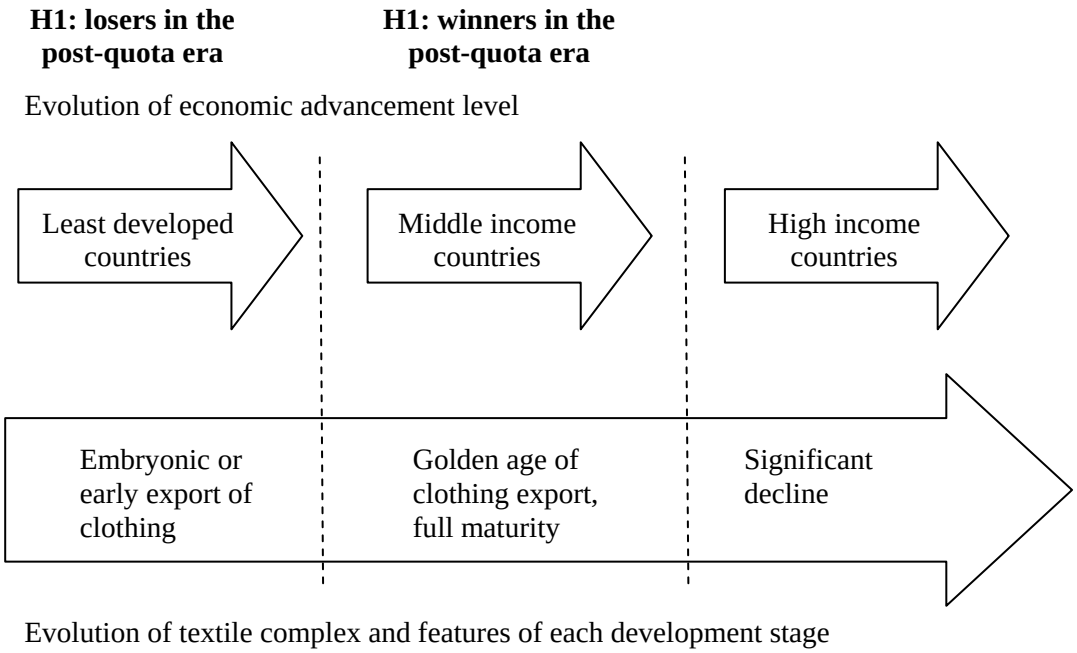


Figure 1. Economic advancement level and impacts of quota elimination

Reference: Toyne (1984); Dickerson (1999)

One factor is clothing exporters' economic advancement level. According to Toyne (1984), a country's textile and clothing (T&C) sector generally will go through several development stages, each of which is characterized by distinct production and trade patterns. At the stage of embryonic or early export of clothing, a country can only produce and export limited categories of clothing products requiring relatively simple skills. At the stage of golden age or full maturity, a country's competitiveness for clothing export reaches its peak (Kang & Jin, 2007). When moving to the stage of significant decline, a country will mostly produce and export textiles and become a net importer of clothing (Dickerson, 1999). Moreover, the evolution process of a country's T&C sector is suggested in parallel with its overall economic advancement level (Toyne, 1984). This is because

each time when the T&C sector moves to the next development stage, it places higher demand for the input of supporting technology and capital investment which are positively associated with a country's overall economic strength (Dickerson, 1999).

As shown in Figure 1, T&C sector in least developed countries mostly is still at the stage of embryonic or early export of clothing. In comparison, T&A sector in middle-income countries has moved to the stage of golden age of clothing export or full maturity. This may explain why the LDCs and many economically lagging-behind African and Asian countries were often suggested lack of competitiveness in clothing export compared with more advanced economies such as China and India (Nordas, 2004; Amann, Lau & Nixon, 2009). Since quota removal creates a free-market environment for world clothing trade, gaps in genuine export competitiveness will eventually transit into divergent market performances among clothing exporters. On the other hand, high-income countries will not heavily engage in clothing export competition as they have become clothing importers. Therefore, this study proposes that:

**Hypothesis 1: Impacts of quota elimination will be related to clothing exporters' economic advancement level. Generally, least developed countries will become "losers"; middle-income countries will become "winners" and high-income countries will not be much affected.**

The other factor is clothing exporter's geographic location. This is because regional production-trade network has become one important feature of the world T&C sector today, especially in America, Asia and Europe (Dicken, 2003; Dickerson, 1999). As illustrated in Figure 2, within each of the three regions, countries with geographic proximity form close vertical collaboration in T&C manufacturing and trading. Specially, on the basis of tiered economic structure, more economically-advanced countries in the region function as the suppliers of textile intermediaries and consuming market of clothing, while less developed countries undertake the role as clothing manufacturers and exporters (Gereffi, Spener & Bair, 2002).

In addition to the economic foundations, regional clothing production-trade network also receives strong support from government policy tools, such as free trade agreements (Dicken, 2003). For example, the North America Free Trade Agreement (NAFTA) and the Dominican Republic-Central America Free Trade Agreement (DR-CAFTA) provide preferential tariff rate as incentives to encourage U.S. firms importing clothing specifically from Mexico and the Caribbean Basin region (Gereffi, 1999). Similar trade agreements also exist in Asia and the Europe which effectively facilitate the integration of T&C production-trade within these regions (Bair, 2006).

The existence of regional production-trade network implies that clothing exporters located in Asia, America and Europe will likely to remain good shape in the post quota era because they have relatively stable local export markets to serve. In comparison, African countries which belong to none of such network will become much more vulnerable when be exposed to free-market competition. However, it shall also be noted that Asian countries may substantially expand their exports outside the region after quota removal, especially to the U.S. and EU markets previously setting strict quantitative import restrictions (Nordas, 2004; Mayer, 2005). The intensified competition causes uncertainty to clothing exporters' destiny in America and Europe. Therefore, this study proposes that:

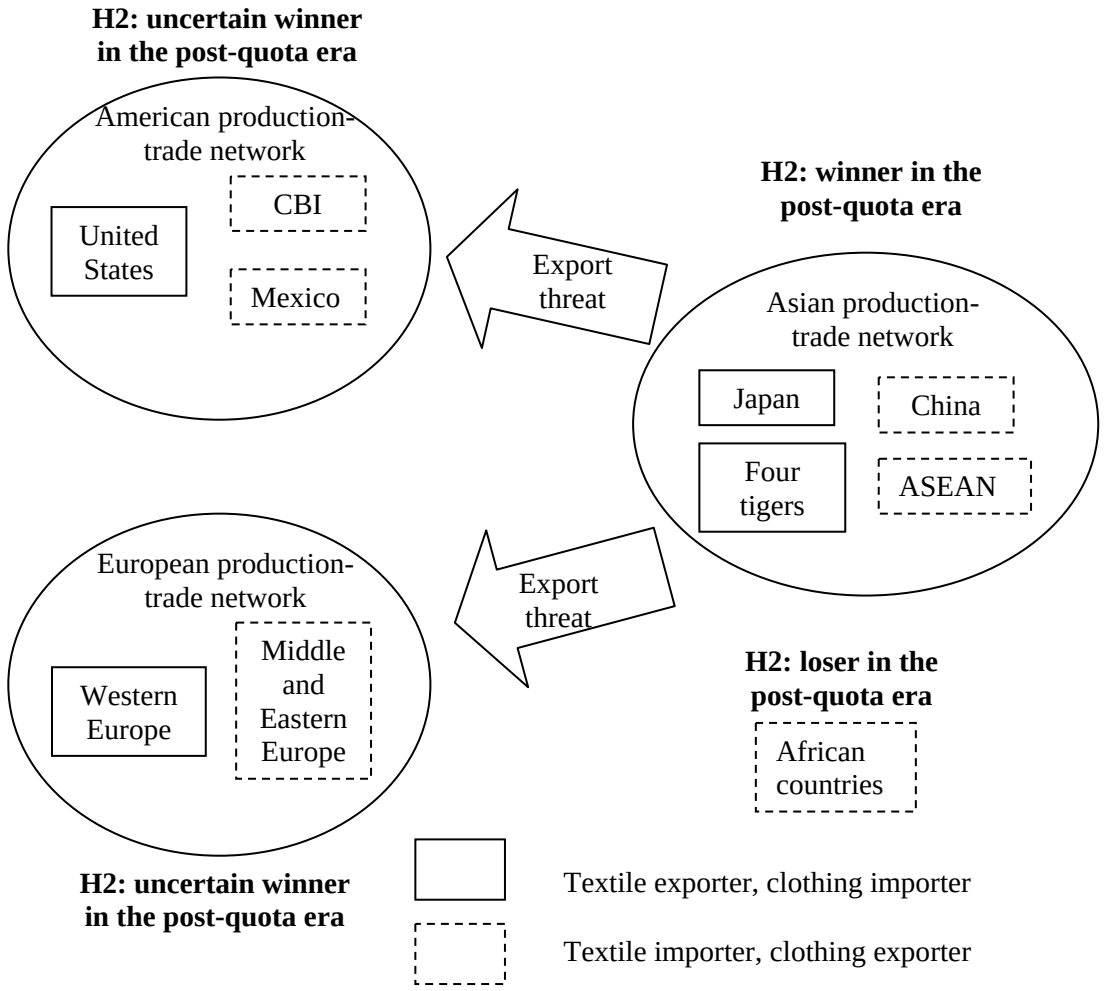


Figure 2. Geographic location of clothing exporters and impacts of quota elimination

**Hypothesis 2: Impacts of quota elimination will be related to clothing exporters' economic geographic location. In general, Asian exporters will become winners; African countries will become "losers" and impacts on American and European exporters are uncertain.**

**Methodology and Data**

This study uses multivariate analysis of variance (MANOVA) to test the proposed hypotheses. As shown in Equation 1, MANOVA is commonly used to compare the mean value of observation vectors ($y_{ijr}$) to see whether they are sufficiently different between groups ($\mu_{ir}$) (Rencher, 2002). MANOVA meets the need of the study to explore whether impacts of quota elimination were unequal among clothing exporters either at different economic advancement level (Hypothesis 1) or in different geographic locations (Hypothesis 2). MANOVA also has the advantage of dealing with multiple dependent variables in the model without inflating Type I errors (Rubin, 2010). Compared to previous studies that did not use any statistical tools, adopting MANOVA is helpful to improve reliability of the research findings (Huberty & Olejnik, 2006). Given those concerns about the GTAP model, MANOVA also has the advantage of providing valid assessment on possible cause-and-effect relationship without having to consider stringent but often unrealistic economic assumptions (Rencher, 2002; Mayer, 2005).

$$y_{ijr} = \mu_{ir} + \varepsilon_{ijr} \quad (1)$$

Where:

$y_{ijr}$ denotes value of the $r^{th}$ variable for observation *j* in group *i*

$\mu_{ir}$ denotes value of group *i* for the $r^{th}$ variable

$\varepsilon_{ijr}$ denotes residual of the $r^{th}$ variable for observation *j* in group *i*

*Dependent variables*

In previous studies, impacts of quota elimination were often measured by clothing exporters' market share changes and export growth rate in the EU and U.S. markets, although specific examining periods varied (Ahmad, & Diaz, 2008; Curran, 2008) . This study also adopted these two indices as measurement, because they can directly reflect how differently clothing exporters respond to the market environment shift. On the other hand, in this study, impacts of quota

elimination were evaluated based on clothing exporters' performance in the world market. This is mainly to overcome the shortcomings of limiting the research scope to the EU and U.S. markets only as discussed earlier. Additionally, it shall be noted that quota removal actually went through several stages and China's WTO accession in late 2001 was another influential factor shaping the patterns of world clothing trade. Therefore, multiple examining periods were included in the study so as to best possibly reveal the full picture of quota-removal effect (Nordas, 2004; Jones, 2006).

Specifically, $y_{ijr}$ is composed of four dependent variables:

Variable *growth09vs05* measures a country's compound annual growth rate (CARG) of clothing export from 2005 to 2009. *Growth09vs05* was calculated by taking the fourth root of a country's accumulative clothing export growth rate over these four years (Parkin, 2008). This particular examining period was selected because: first, 2005 was the first year when quota restriction on many clothing categories were removed globally (Dickerson, 1999); Second, including data of 2009 can reveal relatively long-term impacts of quota elimination to date; Third, with the termination of the U.S.-China MOU at the end of 2008, 2009 was the first year when China's clothing export was no longer restrained by any formats of quota restriction and world clothing trade truly entered a "post-quota" era (Jones, 2006). *growth09vs05* reflects an exporter's absolute gains and losses in the post-quota era (Nordas, 2004). When a country is able to achieve a sound positive growth rate, it suggests impact of quota elimination overall is beneficial. In contrast, if the growth rate turns out to be negative or slower-than-world-average, it suggests an unfavorable consequence of quota elimination to that particular exporter.

Variable *share09vs05* measures a country's market share changes in world clothing trade from 2005 to 2009. *share09vs05* was calculated by subtracting the market share in 2009 from the value in 2005. The particular examining period of 2005 to 2009 was selected for the same reason as the case for variable *growth09vs05*. Market share changes reflect an exporter's relative gains and losses in market competition (Nordas, 2004). A positive value of *share09vs05* suggests a clothing exporter moves to a better market position after quota removal and a negative value suggests the opposite.

Similarly, variable *share09vs00* measures a country's market share changes in world clothing trade from 2000 to 2009. *share09vs00* was calculated by subtracting the market share in 2009 from the value in 2000. This particular examining period of 2000 to 2009 was included because: first, it can reveal the influences of China's WTO accession in 2001 on other clothing exporters' performance after quota removal; second, together with *share09vs05*, it can reveal the adjustment

pattern of world clothing trade toward quota elimination over a relatively extended period of time (Curran, 2008). [2]

Moreover, as suggested by Mayer (2005), medium and long-term economic development goals of China and many developing countries make them on the track of gradually replacing clothing exports with more skill-intensive products. Mainstream economic development theories and the "flying-geese" model also argue that with the advancement of a country's national economy, it will upgrade and diversity its industries from labor-intensive ones to more capital-intensive ones (Kojima, 2000; Parkin, 2008). This implies that strategic upgrading of export structure also has influences on a country's performance in clothing export.

Therefore, dependent variable *structure09vs00* is included to measure changes of the share of clothing in a country's total merchandise export from 2000 to 2009. *structure09vs00* was calculated by subtracting the share of clothing in a country's total merchandise exports in 20009 from its value in 2000 (WTO, 2010). Although *structure09vs00* itself may not inherently be a sign of industrial upgrading, its value can reveal the shifting importance of clothing to a country's merchandise export. Particularly, if the MANOVA analysis suggests significantly different value of *structure09vs00* together with other dependent variables among clothing exporters, it is reasonable to suspect that industrial upgrading could be another factor affecting clothing exporters' performance in the post-quota era.

*Independent variables*

In response to the two proposed hypotheses, independent variables include two dimensions that categorize clothing exporters into different groups for the MANOVA comparison.

The first dimension is clothing exporters' economic advancement level (to test Hypothesis 1). The categorization follows the criteria set by the World Bank which is based on a country's Gross National Income (GNI) per capita (World Bank, 2011). Specifically, if a country's GNI per capita is at or less than $1,005, it will be classified into the "Low-income" country group; (2) if a country's GNI per capita is between $1,006 and $12, 275, it will be classified into the "Middle-income" country group; (3) if a country's GNI is at or more than $12,276, it will be classified into the "High-income" country group. Moreover, given the special concerns toward China (Amann, Lau, & Nixon, 2009), it was removed from the "Middle-income" country group and separately constituted an independent group in the analysis.

The second dimension is the geographic location of clothing exporters (to test Hypothesis 2). By following the World Factbook criteria set by the U.S. Central Intelligence Agency (CIA, 2011),

clothing exporters were divided into the following regional groups: (1) Asian countries; (2) African countries; (3) North American countries; (4) South & Central American countries; and (5) European countries (which also include middle-east countries). Similar as above, given the special concerns toward China (Amann, Lau, & Nixon, 2009), it was removed from the "Asian country group" and separately constituted an independent group in the analysis.

The null hypothesis for MANOVA suggests that there is no significant difference across country groups in terms of their mean vector (dependent variables) values, i.e. $H_0 : \mu_1 = \mu_2 = \mu_3 = \cdots \mu_i$ .While the alternative hypothesis suggests that at least not all mean vector (dependent variables) values are the same across all country groups, i.e. $H_1$ :at least two $\mu_i$ are unequal. Whether to accept the null hypothesis or the alternative hypothesis was based on the results of Wilks' Lambda test, Pillai's Trace test, Hotelling-Lawley Trace test and Roy's Greatest Root test (Rencher, 2002).

*Data source*

Data used in the study came from the World Trade Organization (WTO) 2010 International Trade Statistics Report, one of the most authoritative sources for official international trade data (WTO, 2010). The statistics report covers country-level export performances of 51 countries from 2000 to 2009. Since the total export of these 51 countries was treated as the value of "world clothing export" in the report, it is reasonable to assume that these 51 countries represented world top clothing exporters over that period.

Table I shows the grouping results of these 51 countries by following the World Bank standard for a country's economic advancement level and the CIA's standard for a country's geographic location (WTO, 2010; World Bank, 2011; CIA, 2011).

Table I. Country groupings of 51 clothing exporters

| Income/region | *Asia* | *Africa* | *North America* | *South and Central America* | *Europe* |
|---|---|---|---|---|---|
| *Low income* | Bangladesh<br>Cambodia<br>Myanmar<br>Pakistan<br>Viet Nam | Kenya<br>Madagascar<br>Mauritius | / | Haiti | / |
| *Middle income* | India<br>Indonesia<br>Malaysia | Egypt<br>Jordan<br>Lesotho | Mexico | Botswana<br>Colombia<br>Costa Rica | Albania<br>Belarus<br>Bosnia and |

| | | | | | |
|---|---|---|---|---|---|
| | Philippines<br>Sri Lanka<br>Thailand | Morocco<br>Swaziland<br>Syrian Arab Republic<br>Tunisia | | Dominican Republic<br>El Salvador<br>Guatemala<br>Honduras<br>Peru | Herzegovina<br>Croatia<br>Moldova<br>Serbia<br>Turkey<br>Ukraine |
| *High income* | Hong Kong<br>Japan<br>Korea<br>Macao<br>Singapore<br>Taiwan<br>United Arab | / | Canada<br>United States | / | European Union(27 countries)<br>Switzerland |

Note: as noted above, given the special concerns toward China, it separately constituted one independent group in the analysis.

**Results and Discussion**

*Descriptive analysis*

Table II. Mean of dependent variables by income groups

| Variables | Low Income | Middle Income | High Income | China |
|---|---|---|---|---|
| *growth09vs05 (%)* | -5.93 | -1.03 | -6.93 | 9.66 |
| *share09vs00 (percentage points)* | 0.28 | -0.21 | -0.98 | 15.73 |
| *share09vs05(percentage points)* | 0.17 | -0.12 | -0.45 | 7.19 |
| *structure09vs00 (percentage points)* | -6.86 | -5.65 | -5.10 | -5.50 |

Data source: calculated based on WTO (2010)

Note: The mean of a dependent variable for a specific country group was calculated by adding up values of all its member countries and dividing by their total number.

Table III. Mean of dependent variables by regional groups

| Variables | Asia | Africa | North America | South & Central America | Europe* | China |
|---|---|---|---|---|---|---|
| *growth09vs05 (%)* | -1.77 | 1.72 | -8.14 | -9.42 | 5.51 | 9.66 |
| *share09vs00 (percentage points)* | -0.54 | -0.02 | -1.69 | -0.25 | 0.31 | 15.73 |
| *share09vs05(percentage points)* | -0.15 | -0.02 | -0.54 | -0.20 | -0.03 | 7.19 |
| *structure09vs00 (percentage points)* | -7.74 | -6.52 | 0.00 | -8.86 | -1.79 | -5.50 |

Data source: calculated based on WTO (2010)

*Data for European Union (27 countries) include both extra and intra-region trade.
Note: The mean of a dependent variable for a specific country group was calculated by adding up values of all its member countries and dividing by their total number.

Clothing exporters' performances in response to quota elimination are summarized in Table II and III by country groupings. Similar as most previous studies had suggested, impacts of quota removal overall appeared to be unevenly distributed among clothing exporters (Nordas, 2004; Ahmad & Diaz, 2008). First, China seemed to be one of the largest beneficiaries of quota removal. As shown in Table II and III, China achieved substantial growth of its clothing export in the world market both in absolute and relative terms. Despite the discriminatory country-specific safeguard quota restrictions it faced in the EU and U.S. markets, China still achieved an annual 9.66% growth of its clothing export and gained additional 7.19 percentage points market share in the world market from 2005 to 2009. China was also able to grasp 6.07 percentage points market share from 2000 to 2004, although only a small proportion of its clothing export was removed from quota at that time (Nordas, 2004). However, despite robust export growth, clothing products accounted for declining share in China's total merchandise export from 2000 to 2009. Considering China's remarkable economic progress over that period, industry upgrading might be the cause as suggested by some previous studies (Kojima, 2000; Parkin, 2008).

Second, even without considering China, market performance of other clothing exporters in response to quota elimination still turned to be significantly varied. In terms of country groupings by income level, from 2005 to 2009, lower-income countries and high-income countries on average experienced steeper drop in export growth compared with middle-income countries. From 2000 to 2009, high-income countries and middle-income countries also suffered modest market share losses in contrast to slight market share gains of low-income countries. In terms of country groupings by geographic locations, export performance of countries in North America and South America seemed to be much worse off than countries in Europe both measured by absolute and relative terms. Besides, countries in Asia, South & Central America and Africa also saw declining share of clothing in their total merchandise export from 2000 to 2009. It is interesting to note that these regions are concentrated with developing countries (CIA, 2011).

However, it shall be kept in mind that figures in Table II and III are the means of dependent variables for each country group. Statistically, whether clothing exporters' performances in response to quota elimination significantly differ across country groups still need to be judged based on the results of MANOVA.

*Main effect and interaction effect test*

As the first step of the MANOVA procedure, main effect and interaction effect test was conducted to evaluate whether clothing exporters' performances (*growth09vs05*, *share09vs00, share09vs05* and *structure09vs00*) overall are statistically different across countries: (1) at different economic advancement level (development main effect, corresponding to Hypothesis 1); (2) in different geographic locations (region main effect, corresponding to Hypothesis 2); (3) the interaction of the above two dimensions (Rencher, 2002).

Test results were shown in Table IV, according to which:

First, development main effect was not supported by the test ($p>0.05$). This means there was no evidence showing clothing exporters' performances in response to quota elimination overall were unequal among countries at different economic advancement level, i.e. Hypothesis 1 was not supported.

Second, region main effect was statistically significant at 95% confidence level ($p<0.05$). This means that clothing exporters' performances in response to quota elimination overall were suggested unequal among countries located in different geographic regions of the world, i.e. Hypothesis 2 was supported.

Third, although the Roy's Greatest Root test suggested a statistically significant interaction effect, Wilks' Lambda, Pillai's Trace and Hotelling-Lawley Trace tests all suggested the opposite. Also, as development main effect was not statistically supported, technically the apparent significant Roy's Greatest Root test result could be a Type II error (Rencher, 2002).

Table IV. Results of MANOVA Type III Value

| Statistics | Development main effect | Region main effect | Interaction effect |
|---|---|---|---|
| Wilks' Lambda | 0.79 | 0.42 | 0.57 |
| | (0.39) | (0.01)** | (0.16) |
| Pillai's Trace | 0.20 | 0.67 | 0.49 |
| | (0.41) | (0.01)** | (0.17) |
| Hotelling-Lawley Trace | 0.25 | 1.21 | 0.65 |
| | (0.37) | (0.03)* | (0.16) |
| Roy's Greatest Root | 0.24 | 1.03 | 0.45 |
| | (0.08) | (0.00)** | (0.01)** |

Note: number in the bracket is *p*-value; * denotes $p<0.05$; ** denotes $p<0.01$

Two factors may explain why the proposed development main effect turned out to be statistically insignificant. First, from technical perspective, both "winners" and "losers" of quota elimination seemed to exist in each country groups, which may neutralize the test result. For example, Vietnam (low income group), India (middle income group) and European Union (high income group) all achieved remarkably high export growth over the examining periods. While Mauritius (low income group), Mexico (middle income group) and Macao (high income group), among some others all suffered negative export growth and loss of market share over the same periods (see Appendix). Second, although clothing exports from countries at different economic advancement level were different in product quality and price, all of them may find certain export markets to serve because of consumers' diversified demand and preferences around the globe (Dickerson, 1999). Instead, the real export competition may exist within each income group, since countries at similar economic and technology advancement level were more likely to target the same export markets. This could explain why each income group had both "winners" and "losers".

*Between-subject test for Region Main Effect*

As the second step of the MANOVA procedure, between-subject test was conducted to further explore which of the four dependent variables (observation vectors) that measured clothing exporters' performances (i.e. variable *growth09vs05, share09vs00, share09vs05, structure09vs00*) contributed to the statistical significance of the region main effect (Rencher, 2002).

Table V. Results of Between-Subject Test F-value

| Variables | Region Main Effect |
|---|---|
| *growth09vs05* | 2.35 |
| | (0.02)* |
| *share09vs00* | 3.71 |
| | (0.01)** |
| *share09vs05* | 0.89 |
| | (0.47) |
| *structure09vs00* | 0.77 |
| | (0.54) |

Note: number in the bracket is *p*-value; * denotes $p<0.05$; ** denotes $p<0.01$

Results of the between-subject test were summarized in Table V, according to which:

First, variable *growth09vs05* was found statistically significant at 95% confidence level ($p$<0.05). This means clothing exporters located in different geographic regions were suggested having unequal results of CAGR from 2005 to 2009.

Second, variable *share09vs00* was found statistically significant at 95% confidence level ($p$<0.05). This means clothing exporters located in different geographic regions were suggested having unequal results of market share changes from 2000 to 2009.

Third, variable *share09vs05* did not pass the statistical test at 95% confidence level. This means there is no evidence suggesting that clothing exporters located in different geographic regions have unequal results of market share changes from 2005 to 2009. The imposition of new country-specific quota on China's clothing exports in the U.S. and EU markets since 2005 could explain why *growth09vs05* and *share09vs00* were statistically significant while *share09vs05* was not. This is because discriminatory restriction could both substantially slow down China's export growth and create additional export opportunities for other exporters (Jones, 2006). Without such restriction, *share09vs05* could pass the statistical test and China's *growth09vs05* could be even higher and.

Fourth, variable *structure09vs00* did not pass the statistical test at 95% confidence level. This means there is no evidence suggesting that clothing exporters located in different geographic regions have unequal shift of clothing's share in their total merchandise export from 2000 to 2009.

*Contrast Analysis*

Between-subject test suggested that when responding to quota elimination, clothing exporters located in different geographic regions have unequal market performances on variable *growth09vs05* and *share09vs00*. However, it is still unknown whether performances of all regional country groups were different from each other. Therefore, as the third step of the MANOVA procedure, contrast analysis was conducted to explore whether any two paired county groups had different results on variable *growth09vs05* and *share09vs00* (Rencher, 2002).

Results of the contract analysis are summarized in Table VI, which can be reviewed together with Table III. According to the results:

First, for variable *growth09vs05*, European countries were suggested having unequal performance with clothing exporters in the rest of the world. This result happened largely because several EU countries were able to achieve a remarkably high CAGR from 2005 to 2009, including Bosnia and Herzegovina (22%), Albania (10.2%) and Moldova (7. 2%) (see Appendix). On the other hand, contrast analysis did not support the view that China's CAGR from 2005 to 2009 was significantly different with performance of other regional groups. Although this result seemed

surprising at first glance, it happened because a number of countries actually achieved much higher CARG from 2005 to 2009 than China. Besides those European countries mentioned earlier, other exporters that achieved fast growth include Bangladesh (9.32%, Asia), Egypt (13.04%, Africa), India (7.44%, Asia), Myanmar (11.13%, Asia), Syrian Arab Republic (31.25%, Africa), United Arab (17.78%, Asia), Vietnam (16.52%, Asia). Interesting enough, in previous studies that focused on the EU and U.S. markets, some of these countries were suggested as "losers" (Curran, 2008; Ahmad & Diaz, 2008). Considering the robust growth of clothing imports of some developing countries in recent years, this phenomenon to certain extent supports the suspicion that clothing exporters were diversifying their export markets.

Second, for variable *share09vs00*, China, North America and Europe were suggested having unequal performances with clothing exporters in the rest of the world. Checking together with Table III, it seemed that both China and the European countries were indicated as "different" because of their remarkable market shares gains. In comparison, countries in North America were indicated "different" because of their significant market share losses over that period. This was particularly the case for Mexico and the United States, whose market share dropped 3.05 and 3.04 percentage points respectively. On the other hand, it was interesting to note that performances of Asian and African countries were suggested having no significant differences with the world average level. This implies that as a whole, impacts of quota elimination could be "neutral" to clothing exporters from these two regions.

Table VI. Results of Contrast Analysis (Region Main Effect) F-value

| Region/variable | *growth09vs05* | *share09vs00* |
|---|---|---|
| China with the rest | 1.04 | 244.04 |
| | (0.31) | (0.00)** |
| Asia with the rest† | 0.05 | 0.16 |
| | (0.82) | (0.69) |
| Africa with the rest† | 1.47 | 1.98 |
| | (0.23) | (0.17) |
| North America with the rest† | 1.36 | 8.62 |
| | (0.25) | (0.01)** |
| South & Central America with the rest† | 3.57 | 0.34 |
| | (0.06) | (0.56) |
| Europe with the rest† | 5.75 | 6.72 |
| | (0.02)* | (0.01)** |

Note: †: excluded China; number in the bracket is *p*-value;

* denotes $p<0.05$; ** denotes $p<0.01$

**Conclusions**

By using the MANOVA technique, this study empirically evaluated the impacts of quota elimination on 51 clothing exporters' performance in the world market from 2000 to 2009. Results show that:

First, exporters' performances in response to quota elimination overall were suggested unequal among countries located in different geographic regions of the world. However, there was no evidence showing that countries at different economic advancement level were different with their performance in response to quota elimination.

Second, clothing exporters located in different geographic regions were suggested having unequal results of CAGR from 2005 to 2009 and market share changes from 2000 to 2009. However, no evidence showed that their market share changes from 2005 to 2009 were statistically different.

Third, with respect to specific regional country groups, European countries were suggested achieving faster clothing export growth from 2005 to 2009 and more market share gains from 2000 to 2009 than the rest of the world. China was also suggested achieving more market share gains from 2000 to 2009 than other clothing exporters. However, over the same period, North American countries were suggested suffering from more market share losses than the world average level.

Findings of this study contribute to the deeper understanding of the impacts of quota elimination on world clothing trade and have several important implications.

First, although China once again was suggested as one of the largest beneficiaries of quota elimination, findings of this study remind us that neither China's gains nor some other countries' losses should be exaggerated. In particular, when taking a global perspective, both China's export growth and market share gains turned out to be much more modest than what was found by previous studies that only focused on the EU and U.S. markets (Nordas, 2004; Curran & Zignago, 2010). A further detailed look at trade data shows that, China's market share in world clothing export substantially increased from 18.26% to 33.98% from 2000 to 2009, but merely gained additional 0.27 percentage points from 2007 to 2009 (WTO, 2010). This implies that China's apparent "surge" in clothing export in the initial several years after quota elimination was mainly a temporary adjustment rather than a "normal pattern" that can sustain in the long run. Instead, with China's growing interests in exporting more capital intensive products (eg: negative value of *structure09vs00)*, other clothing exporters may face less competition from China in the future, especially at the low-end markets (Mayer, 2005).

Second, findings of this study call for attention to the influence of geographic location as a key factor shaping the pattern of world clothing trade in the post-quota era. For example, having preferential access to the regional markets may be an important reason why European clothing exporters were able to achieve better-than-average performance in response to quota elimination (Dicken, 2003). Data further showed that over 70% clothing trade of the European Union (27 members) were still between its members in 2009 (WTO, 2010). However, some new regional clothing production-trade networks may also have emerged since quota elimination. For example, major clothing importers in North America—mainly the United States and Canada were found increasing their clothing import from the "big Asia" region (WTO, 2010). This may explain why in this study Asian clothing exporters did not turn out to be worse off even when China's export substantially increased. With the recent passage of the U.S.-Korea Free Trade Agreement and the potential reaching of the Transpacific Partnership Agreement which includes eight countries in the Asia-pacific region, clothing production-trade ties between North America and Asia could become even closer in the future.

On the other hand, even no evidence showed that quota elimination had resulted in significantly negative impacts on clothing exporters in Africa, special care still should be given to that particular region. It is important to keep in mind that in 2009, African countries altogether still only accounted for 3.6% of world clothing exports in 2009, while for many of them, as high as 70—80% of their total merchandise exports depended on clothing (WTO, 2010). Limited participation in clothing export may be a reason why African countries didn't appear to substantially "lose" market shares nor suffer sharp export decline when quota "protection" was gone. How to help African countries strengthen their genuine competitiveness in clothing export and significantly grasp the benefits of quota removal remain a critical challenge to solve.

Despite the meaningful and interesting results, this study also has several limitations. First, although including the data of year 2009 is necessary for the purpose of this study, the occurrence of the 2008 global financial crisis complicates the situation. In particular, the financial crisis was suggested having significant impacts on clothing exporters' performance (Curran & Zignago, 2010). However, this study wasn't able to remove such "noise" on the results. Second, many other trade policies were newly adopted since quota removal. This includes China's appreciation of its currency, enforcement of some new free trade agreements and many newly launched anti-dumping measures. All of these policies may affect clothing exporters' performances over the examining periods of this study. However, their impacts weren't able to be separated from quota elimination in the MANOVA analysis. Besides, some clothing exporters covered in this study had only tiny

presence in world clothing trade. However, slight changes of their export in absolute terms may transit into "big changes" in export growth rate and export structure (i.e. variable *growth09vs05* and *structure09vs00*). This factor may further affect the MANOVA results.

Future research on the topic can be carried out in several aspects. First, future research can look at disaggregated data at product-level to further examine the impacts of quota elimination in greater detail. Given the growing popularity of niche market strategy, it is likely that competition in the post-quota era can be product-based. Second, based on some econometric models, future study can separate the impacts of other major trade policies from quota elimination, thus more accurately reflecting how world clothing trade responded toward quota removal. Additionally, when longer timer-series data become available in the future, more advanced econometric or statistical models can be applied to provide more detailed and comprehensive evaluation of the impacts of quota elimination.

**Note**

1. Although quota elimination affects both textile and clothing trade, this paper focuses on clothing trade only. This is because textile and clothing are two sectors heterogeneous in nature. In general, textile manufacturing is much more technology and capital intensive than clothing. This makes the U.S. and EU, the two largest clothing importers, still the No. 1 and No. 3 world largest textile exporters in 2009 (WTO, 2010). As specific trade patterns and leading players of the two sectors were substantially different, it is necessary to distinguish textile trade with clothing trade in the analysis.
2. However, this study did not include a dependent variable measuring a country's compound annual growth rate (CARG) of clothing export from 2000 to 2009. This is because globally most clothing categories were still subject to quota restriction between 2000 and 2004. Over that period, a country's clothing export growth was largely determined by the amount of quota it received. Thus, CARG from 2000 to 2009 was out of clothing exporters' own control and had little meaning to analyze.

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**Appendix:**

Clothing exporters' performance in response to quota elimination: 2000—2009

| Country | *growth09vs05* (%) | *share09vs00* (percentage points) | *share09vs05* (percentage points) | *structure09vs00* (percentage points) |
|---|---|---|---|---|
| Albania | 10.21 | 0.04 | 0.02 | -10.8 |
| Bangladesh | 9.32 | 0.83 | 0.69 | -8.2 |
| Belarus | 1.02 | -0.02 | -0.01 | -2.0 |
| Bosnia and Herzegovina | 22.27 | 0.06 | 0.03 | 4.7 |
| Botswana | -0.84 | 0.05 | -0.01 | 4.5 |
| Cambodia | 7.45 | 0.45 | 0.14 | 1.0 |
| Canada | -14.27 | -0.73 | -0.35 | -0.4 |
| China | 9.66 | 15.73 | 7.19 | -5.5 |
| Colombia | -10.03 | -0.08 | -0.14 | -2.2 |
| Costa Rica | -19.96 | -0.27 | -0.11 | -9.0 |
| Croatia | -2.82 | -0.08 | -0.04 | -5.7 |
| Dominican Republic | -27.81 | -1.13 | -0.52 | -35.1 |
| Egypt | 13.04 | 0.10 | 0.14 | -8.9 |
| El Salvador | -7.56 | -0.42 | -0.24 | -21.2 |
| European Union | 3.16 | 2.20 | -0.21 | -0.2 |
| Guatemala | -8.66 | 0.31 | -0.21 | 12.7 |
| Haiti | 2.34 | 0.01 | -0.01 | 9.0 |

| | | | | |
|---|---|---|---|---|
| Honduras | -3.93 | -0.40 | -0.25 | -22.3 |
| Hong Kong | -4.37 | -5.02 | -2.63 | -5.0 |
| India | 7.44 | 0.61 | 0.52 | -7.0 |
| Indonesia | 4.51 | -0.52 | 0.08 | -2.3 |
| Japan | -0.59 | -0.12 | -0.03 | 0.0 |
| Jordan | -5.34 | 0.21 | -0.11 | 7.3 |
| Kenya | -0.86 | 0.05 | -0.01 | 3.4 |
| South Korea | -14.24 | -2.10 | -0.49 | -2.5 |
| Lesotho | 2.00 | 0.07 | -0.01 | -8.7 |
| Macao, China | -36.51 | -0.85 | -0.51 | -44.8 |
| Madagascar | 5.78 | -0.02 | 0.01 | 0.4 |
| Malaysia | 5.97 | -0.15 | 0.10 | -0.3 |
| Mauritius | -0.94 | -0.25 | -0.04 | -23.9 |
| Mexico | -13.11 | -3.05 | -1.32 | -3.4 |
| Moldova | 7.35 | 0.03 | 0.01 | 1.6 |
| Morocco | 1.98 | -0.24 | -0.05 | -10.1 |
| Myanmar | 11.13 | -0.24 | 0.04 | -41.1 |
| Pakistan | -1.75 | -0.02 | -0.24 | -4.8 |
| Peru | 2.49 | 0.11 | -0.01 | -2.8 |
| Philippines | -9.50 | -0.80 | -0.34 | -2.4 |
| Serbia | 6.19 | 0.17 | 0.17 | 6.4 |
| Singapore | -11.50 | -0.59 | -0.28 | -0.9 |
| Sri Lanka | 1.00 | -0.48 | -0.09 | -11.1 |

| | | | | |
|---|---|---|---|---|
| Swaziland | -29.65 | -0.04 | -0.07 | -9.4 |
| Switzerland | 1.46 | 0.20 | -0.04 | 0.2 |
| Syrian Arab Republic | 31.25 | 0.07 | 0.08 | 1.2 |
| Taiwan | -12.77 | -1.24 | -0.28 | -1.6 |
| Thailand | -2.28 | -0.72 | -0.30 | -3.0 |
| Tunisia | -0.03 | -0.14 | -0.14 | -16.5 |
| Turkey | -0.59 | 0.35 | -0.61 | -12.2 |
| Ukraine | -5.44 | -0.04 | -0.07 | -1.5 |
| United Arab | 17.78 | 0.46 | 0.38 | -0.2 |
| United States | -4.33 | -3.04 | -0.48 | -0.7 |
| Viet Nam | 16.52 | 1.81 | 1.04 | 2.5 |

Data source: WTO (2010)