

AN ANALYSIS OF COTTON PRODUCT COMPETITIVENESS IN THE TOP TEN
COTTON PRODUCT EXPORTERS TO THE UNITED STATES USING
THE ENVIRONMENTAL ANALYSIS FRAMEWORK

by

YEJUAN JIN

(Under the Direction of Dr. Jan Hathcote)

ABSTRACT

This study examined important environmental factors influencing the cotton export performance in the current top ten cotton suppliers to the United States, including Mexico, China, India, Honduras, Pakistan, Bangladesh, Dominican Republic, El Salvador, Indonesia, and Guatemala, using Austin's Environmental Analysis Framework (EAF). The research used secondary data collected from various government sources with a 26 year time period from 1974 to 2000. The results indicate that three variables, GNP, exchange rates, and roads, have significant positive impacts on U.S. cotton import volume; while tariff rates have significant negative impacts on U.S. cotton import volume. This study also examined trend and changes of U.S. cotton imports. The findings have important managerial implication to U.S. cotton importers and retailers, and for the ten cotton exporting countries.

INDEX WORDS: cotton, international trade, Environmental Analysis Framework, import, export, competitive advantage, GNP, exchange rate, labor cost, roads, merchant marine, tariff rate, quota

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YEJUAN JIN

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YEJUAN JIN

Major Professor: Jan Hathcote

Committee: J. Nolan Etters
Soyoung Kim

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
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CHAPTER I

INTRODUCTION

Cotton production has been an important human activity since prehistoric times, and cotton clothing dominated the clothing market before man-made fiber was invented. The consumption of cotton declined for a short period due to the emergence of man-made fiber in the early 1960s. However, now people prefer the natural fibers due to their splendid performance. According to a survey conducted by Cotton Incorporation (2001), 75% of consumers consider fiber content as one of their top concerns when they are purchasing clothing. Cotton currently holds the strongest position in the market, with a market share of 60%, in the United States (Cotton Incorporated, 2001). Many consumers who would likely pay more for natural fibers reside in Taiwan (87%), Italy (80%), India (78%), and Hong Kong (72%) (Cotton Inc., 2001). Why is cotton so attractive? There are several reasons. First, cotton's unique properties, its softness, breathability, absorbency, and durability, are the main reasons cotton attracts consumers. Second, unlike wool and silk fiber, cotton is suitable for every season. With the development of dying and finishing techniques, cotton has been imparted with new values such as wrinkle resistance, oil or water resistance, which make cotton easy to use and even more functional. Therefore, it is predicted that the market share of cotton will steadily increase in the future. Statistically, world cotton production increased from 44.5 million bales in 1961 to 98.3 million bales (480-lb. bales) in 2001 (Figure 1.1), and the world cotton

consumption has expanded from 44.8 million bales in 1961 to 94.3 million bales in 2001 (United States Department of Agriculture, 2002b).

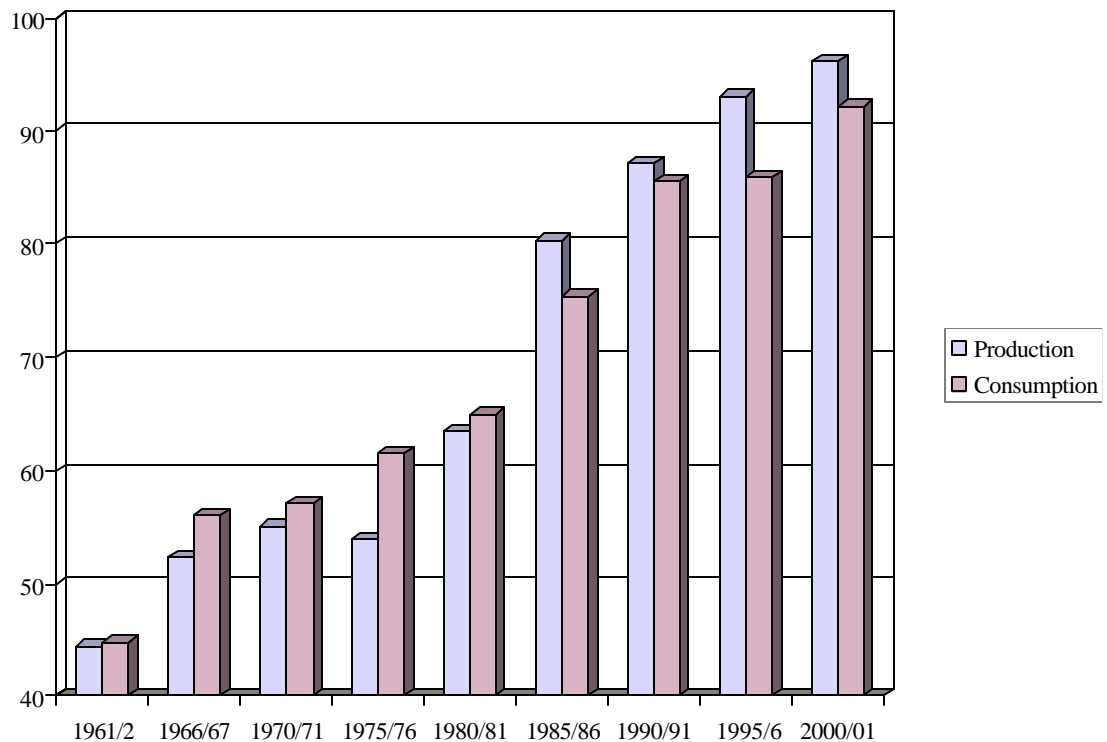


Figure 1.1 World Cotton Production and Consumption

Source: United States Department of Agriculture.

Cotton Origin

Cotton has been planted for a long time. The DNA sequence data of the extant *Gossypium* species indicate that the genus might have emerged about 10-20 million years ago, although the geographic origin of the cotton genus has not been identified (Wendel and Albert, 1992). However, the earliest record of cotton dates back to about 3500 BC in Southern Mexico, where a specimen of a large-bolled cotton plant was found (Smith &

Cothren, 1999). The earliest cotton fabric record (Gulati & Turner, 1928) is in the Indus, which is now known as Pakistan, dated at around 3000 BC. Currently cotton is grown in over seventy countries, and significantly contributes to the agriculture industry, textile industry, food industry, and export earnings in these countries, especially in some African and Asian countries.

Cotton grows in tropical and subtropical regions. About two-thirds of world cotton production grows between latitudes 30° and 37° North, which includes China, the former Soviet Union (mainly Uzbekistan), and the United States. Small quantities of cotton come from 40° North, where Bulgaria, Russia, China and Korea are located (Bell & Gillham, 1989). The remaining quantities are produced mostly in countries located at latitudes 30° North to 30° South, such as Greece, India, and Pakistan. (Bell & Gillham, 1989).

Cotton Varieties

Fryxell (1992) found that there are about 45 diploid and 5 allotetraploid species of *Gossypium* in the world. However, the modern concept of cotton normally refers to only four domesticated species in the genus *Gossypium*: two Old World species, *G. herbaceum* and *G. arboreum*, and two New World species, *G. barbadense* and *G. hirsutum* (Bell & Gillham, 1989). Zaitzev found that the Old World cottons were diploids, $2n=2x=26$, and the New World cottons are tetraploids, $2n=2x=52$ (Fryxell, 1979). Two Old World cotton species, *Gossypium arboreum* and *Gossypium herbaceum*, have short and coarse staples (less than 25mm) and big micronaire values in excess of 6.0. *Gossypium arboreum* can be found mostly in Asia, which includes the Indian subcontinent, China, and Southeast Asia. Small quantities of *Gossypium arboreum* grow

in southern Arabia and northern and eastern coastal Africa. The species of *Gossypium* herbaceum are found in northern Africa, Arabia, western China, India, and Iraq (Hutchinson, 1950, 1954). These species of cotton currently account for 2% of the world cotton production.

The *Gossypium barbadense* group, including the Egyptian, American Egyptian and Sea Island Extra Long Staple cotton, is well known as the highest valued cotton and is defended as extra fine cotton by the International Cotton Advisory Committee. The fiber in this group is long and fine. The staple length is in excess of 37 mm and the micronaire value is below 4.0. The *G. Barbadense* normally is used for spinning high-count yarn such as 40s or above. The fabric woven by this yarn is very delicate. Egypt was the first country to specialize in long-staple cotton early in 1820 and traditionally has been the leading producer of this species. *Gossypium barbadense* is currently grown in Egypt, Sudan, India, the United States, China and the Commonwealth of Independent States. As the long-staple cotton has low yield, *Gossypium barbadense* is not as popular as *Gossypium hirsutum*. This group accounts for only eight percent of the world cotton production. The *Gossypium hirsutum* consists of the American and African Upland Medium Staple cottons. The staple length is about 25 to 30 mm and its Micronaire value is around 3.8 to 5.0. *Gossypium hirsutum* was probably domesticated in the Yucatan peninsula in Mesoamerica (Brubaker & Wendel, 1994). Currently *Gossypium hirsutum* is the most common species in the world and can be found in many countries. This group dominates the world cotton market and accounts for 90% of the total world cotton production (Bell & Gillham, 1989).

The Cotton Imports in the United States

The U.S. market is a major cotton consumer market. U.S. cotton apparel imports have steadily increased at a yearly growth rate of 37.1% since 1992 to 8.2 billion square meter equivalents (Cotton Incorporated, 2002). In 2001, The United States consumed 7.9 million bales of cotton (USDA, 2002b), which accounted for approximately 8% of the world cotton consumption. Although the United States is the second largest cotton fiber producer, most final products made from cotton are imported. In 2000, the United States imported \$36,681 million of cotton products (Office of Textile and Apparel, 2002). Among all cotton suppliers, the top ten, namely Mexico, China, India, Honduras, Pakistan, Bangladesh, Dominican Republic, El Salvador, Indonesia, and Guatemala, supply about 58% of total U.S. cotton imports (Figure 1.2). Mexico, China and India are the three major shippers who provided 32% of total cotton products for the United States in 2001. Mexico, as one of the members of NAFTA (The North American Free Trade Agreement), has some unique privileges in that most of its textile products are tariff and quota free. Every year, Mexico provides approximately 30% of the total cotton apparel products for the United States. On the other hand, China, the largest cotton producer in the world, entered into the WTO at the end of 2001. In the next few years, quota and heavy tariffs attached to Chinese exports will be phased out; hence cotton export quantities to the United States are expected to have a substantial increase. Caribbean countries, such as El Salvador and Honduras, have expanded their exports to the United States at an astonishing growth rate, 1,020% and 609% respectively, since October, 2001 when the United-States-Caribbean Basin Trade Partnership Act (CBTPA) came into effect. In 2001, four Caribbean countries including Honduras, Dominican Republic, El

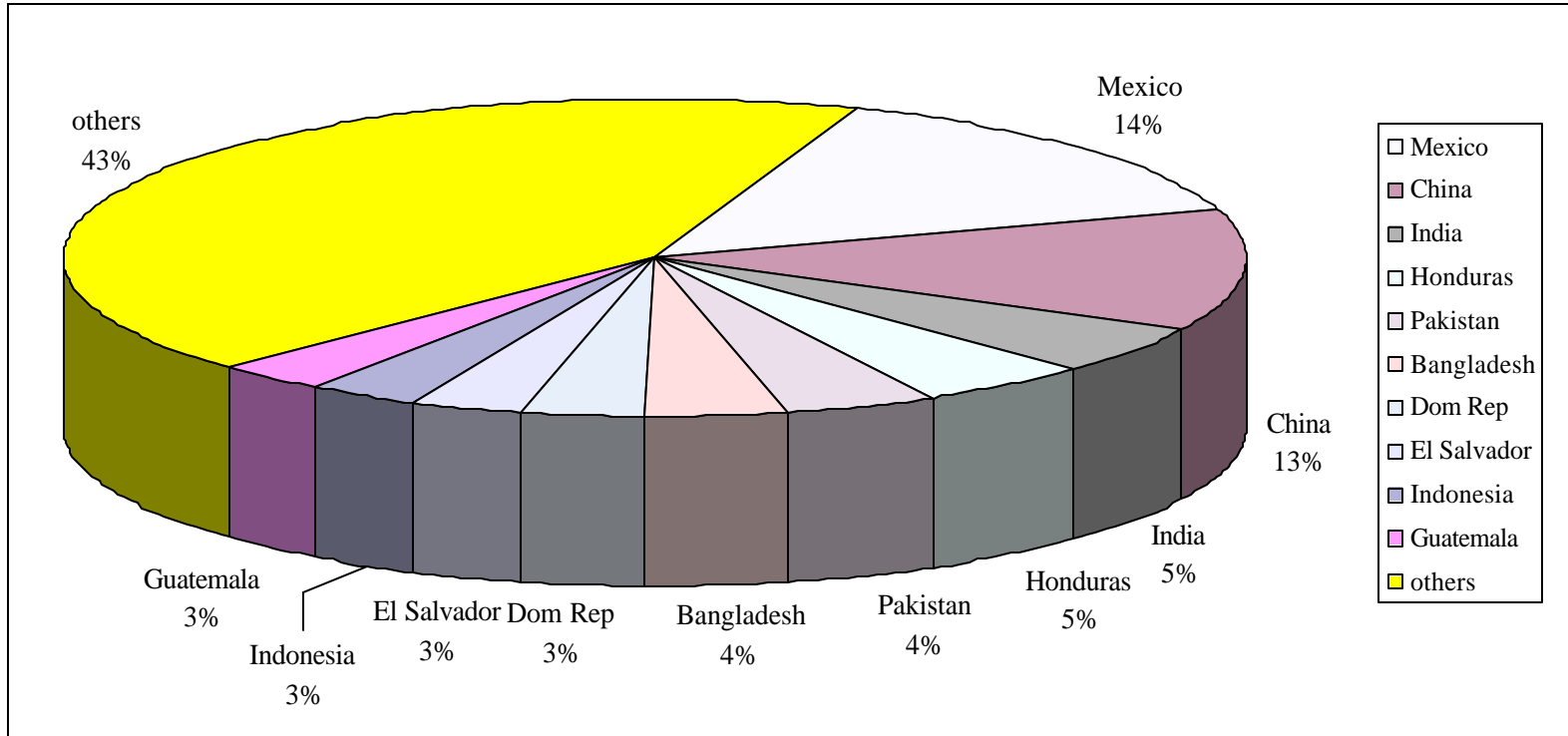


Figure 1.2: The U.S. Cotton Product Imports in 2000, by Country.

Source: Office of Textile and Apparel.

Salvador, and Guatemala provided 11% of total cotton product imports for the United States (Office of Textile and Apparel, 2002). Other countries, such as Bangladesh, Pakistan, and Indonesia who have abundant low cost labor, are also very competitive on cotton products. Among so many aggressive competitors, who has more competitive advantages? This study will compare and examine the top ten cotton product exporters to the United States, analyze the situation, and predict future winners.

Mexico

Although Mexico has only 12% arable land, it is an important cotton producer. There are various cotton species including EPL-80, EPL-16 and STONEVILLE 213 in Mexico (Bell & Gillham, 1989). The staple length ranges from 25 mm to 30 mm. In recent years, the annual cotton production has been about 1.9 million bales. Cotton producers in Mexico receive some direct subsidies from the government. The program, PROCAMPO, a direct cash subsidy to farmers, is designed to alleviate the transition from a guaranteed price regime to an open market (Juarz & Hernandez, 2002). However, this support is insufficient to promote cotton production. The cotton output in 2002 was expected to decline due to both rising costs without a commensurate increase in price and overall economy depression in the United States and Mexico (Juarz & Hernandez, 2002).

As Mexican cotton normally has long staple, which is not suitable for lower count yarns produced for coarse fabric such as denim, a great amount of this Mexican cotton is reserved for export. They import medium-length cotton for domestic consumption (International Cotton Advisory Committee, 2002). Mexico is the top export market for U.S. cotton fiber. About ninety percent of cotton imports (including cotton fiber, yarn and fabric) in Mexico came from the United States. Under NAFTA provisions, the Mexican

tariff on cotton from the United States was only 1% in 2002 and was completely eliminated by January 1, 2003 (Juarz & Hernandez, 2002). Among cotton imports from other countries, Korea, Chile, India, China, Spain, Indonesia, and Italy are strong competitors with the United States. However, the United States has its distinct advantages, such as proximity to Mexico, and, under NAFTA, Mexico must use raw materials from NAFTA members to comply with the rules of origin.

At the same time, the United States also is the primary importer of Mexican cotton products. Under NAFTA, duty-free and quota-free treatment has made the Mexican textile market share in the United States soar since 1996. Around 90% of Mexican cotton yarn was exported to the United States and around 80% of Mexican woven cotton fabric went to the United States in 2001 (Juarz & Hernandez, 2002).

China

China, which consumes around 25% of world cotton every year, is the world's largest cotton consumer. In addition, China, which produces about 20% of the total world cotton, is the second largest cotton producer and ranks just after the United States. There are two main cotton production areas: the Northern region including the provinces in the Huang He River, and the Central region comprising the provinces in the Yangtze River. The Chinese have produced cotton for thousands of years. The earlier species planted in China was *Gossypium aboreum*, which produces a short, coarse fiber (Bell & Gillham, 1989). The modern cotton varieties include *Gossypium aboreum* derivatives and *Gossypium hirsutum* lines which were introduced in the 1950s and 1960s respectively (Bell & Gillham, 1989). In Xinjiang, an extremely fine and long staple cotton species, a derivative of *Gossypium barbadense* Pima cotton, is produced.

Chinese government policies heavily influence the cotton industry. Chinese cotton producers are mostly small-scale producers. In the last few decades, the Chinese government monopolized cotton procurement. To protect the domestic cotton industry, the Chinese government subsidized cotton producers in different ways such as fertilizer allocations and guaranteed grain rations for producers. Since 1978/79, procurement prices have gradually increased, which made the domestic cotton price higher than average world cotton prices. To encourage cotton exports in order to balance trade, the Chinese government offers export subsidies, and to discourage imports, imposes heavy import tariffs and quotas. Nevertheless, after accession to the WTO in 2001, China agreed to an initial tariff-rate quota at least 743 TMT for cotton fiber and is also planning to eliminate all cotton export subsidies by 2005 (Chao & Bean, 2001). In this case, cotton imports are expected to increase.

India

The textile industry in India contributes nearly one-third of the country's export earnings. Cotton in India is the “King of Crops”. The history of cotton in India can be dated back to 5000 years ago. In fact, India is believed to be the cradle of the world cotton industry. The earliest reference to cotton is found in the Rig-Veda, written about 1500 BC. In modern India, over 80 varieties/hybrids are cultivated in different areas (Bell & Gillham, 1989). The major varieties/hybrids, which account for about 80% of total production, include G.hirsutum, G.barbadense, G.arboreum, and some hybrids between them (Bell & Gillham, 1989).

There are three major cotton producing areas in India, the North Zone comprising the States of Punjab, Haryana and Rajasthan, the Central Zone comprising Maharashtra,

Gujarat, and Madhya Pradesh, and the South Zone comprising Andhra Pradesh, Tamil Nadu and Karnataka. Some reputed long and extra long staple cotton (ELS) species grow in the South Zone because there is a more equable climate with temperatures ranging from 18 to 35°C compared to other zones (Bell & Gillham, 1989).

The weaving industry in India mainly uses local cotton yarn/fabric because of the adequate supply of various count yarns at low price and quick delivery. Traditionally, Indian cotton exports targeted the lower-end of the world market. For example, more than 80% of yarn exports were 40-count or below and about 37% of fabric exports were grey fabric in 1995 (Singh, 2002). In recent years, India has tried to develop more exports of finer count yarns, fabric and garments for the upper-end of the world market. For instance, the majority of the ELS cotton is now reserved for export, instead of domestic consumption.

Pakistan

Cotton is a traditional cash crop in Pakistan. Pakistan is the fourth largest global producer, with output greater than 1.5 million tons in recent years. The cotton industry, Pakistan's economic backbone, provides employment for millions of farm and factory workers. Cotton and cotton-product exports contribute, directly and indirectly, to 60-65 percent of national foreign exchange earnings to the economy (Food and Agriculture Organization of the United Nations, 2000).

A century ago, the indigenous short staple cotton species, Desi (*G. arboreum*), was the main cotton species planted in Pakistan (Bell & Gillham, 1989). Since their introduction around 1884, the Upland varieties (*G. hirsutum*) developed rapidly and now comprise approximately 95% or more of Pakistan's cotton production (Bell & Gillham,

1989). Cotton is mainly produced in two provinces, Punjab and Sindh, which jointly account for more than 99% of the total production. However, some climatic factors such as unexpected heavy rainfall and drought lead to cotton production instability.

From 1960s to 1980s, Pakistan played no significant role in the world cotton market due to government restrictions on the establishment of textile mills, high tariff rates on imports of cotton spinning machinery, and unstable supply. Since 1984, however, the government has gradually abolished restrictions on the establishment of mills and has significantly reduced import tariffs on textile machinery. These reforms liberalized Pakistan's cotton industry. The number of cotton mills in 1997 was almost double the number of installations in 1984. Correspondingly, the output of cotton and cotton-products increased on average by 11% annually between 1984 and 1995 (Food and Agriculture Organization of the United Nations, 2000).

The rapid expansion in cotton production means the country has now become the fifth largest cotton producer in the world. Moreover, Pakistan has aggressively expanded both its market share of cotton yarn, fabric and clothing in the global market, and has become a significant exporter since 1985.

Bangladesh

Bangladesh, formerly East Pakistan, has been a traditional cotton producer. Bangladesh mainly grew short staple varieties, G. arboreum, till independence (Bell & Gillham, 1989). In 1972, the upland cotton species were introduced (Bell & Gillham, 1989). Since then, the government has tried to develop cotton production and reduce its dependence on imports. Until 2001, Bangladesh was able to provide only 10-15% of the cotton needed for domestic consumption. Although its production has increased,

Bangladesh still imports large amounts of cotton and cotton products to fulfill industry needs. The United States, CIS, Australia, Africa, and Pakistan are the main suppliers of raw cotton; while India supplies 60-70% of cotton yarn, and China provides about 80% of cotton fabric for Bangladesh (Hussain, 2002).

The textile sector, which provides 50% of industrial employment and contributes 50-60% of export earnings, is the most important manufacturing sector in Bangladesh (Hussain, 2002). The government provides a lower interest rate for textile investment and passed the Textile Policy in 1995 with the purpose of further developing the textile industry (Hussain, 2002). The spinning manufacturers have been growing rapidly in recent years, yet they still can not fulfill the knit industry needs for the export oriented ready-made garments (RMG) sector. The main export items from Bangladesh are hosiery, knitwear, and garments.

Indonesia

The textile industry in Indonesia is a very important sector. Textile exports, including fiber, fabric, and garments, contributed approximately 80-90% of the total export value in 2001 (Nababan & Rahayu, 2002). Nevertheless, cotton production has not yet been well developed in Indonesia. The main cotton species are the Upland varieties (*G. hirsutum*) which were introduced from the United States (Bell & Gillham, 1989). Cotton production provides less than 5% of the domestic industry's needs (Nababan & Rahayu, 2002). The major cotton import partners are Australia, the United States, Pakistan, India, China, and Hong Kong. The United States is one of the most important markets of Indonesia's cotton fabric and garment exports.

Guatemala

Cotton is not a major crop in Guatemala. The Guatemalan cotton market is totally supplied by imports. As it is eligible for CBTPA (effective on October 1, 2000), Guatemala is allowed to export assembled garments to the United States free of quotas or duties, provided the U.S. yarns and fabrics are used. In addition, the U.S. fabric in Guatemala has a high level of recognition and is regarded as good quality fabric (Office of Textile and Apparel, 2001c). In 1999, the United States supplied approximately 88% of cotton and cotton fabric for garment assembling (Office of Textile and Apparel, 2001c). Among all Caribbean trading partners, Guatemala is one of the major Caribbean suppliers to the United States.

Honduras

Agriculture is the most important industry in Honduras, while most arable land is planted with coffee and fruits such as bananas and plantains instead of cotton (Bell and Gillham, 1989). However, the Honduras government is trying to expand the manufacturing sector. As a member of CBI, Honduras is enjoying its privilege of duty-free and quota-free treatment for exporting to the United States. The textile sector is developing at an astonishing rate. Now Honduras has become one of the primary Caribbean textile suppliers for the United States. The export products are mainly cotton products such as knitwear, underwear, and other products which are made from the U.S. produced and cut fabric (Office of Textile and Apparel, 2001d).

Dominican Republic

The Dominican Republic has long been regarded primarily as an exporter of sugar, coffee, and tobacco (Bell & Gillham, 1989). The Dominican Republic plants only

small quantities of cotton. As a member of CBTA, The Dominican Republic has developed into an important textile assembler for the United States with the growth of export processing zones. Most of the cotton required by the textile industry is imported from the United States (Office of Textile and Apparel, 2001a). The Dominican Republic has experienced dramatic growth over the last decade.

El Salvador

Cotton had traditionally been a major crop in El Salvador. However, due to rising production costs and lack of financial assistance to cotton producers, cotton production in El Salvador has almost vanished (Office of Textile and Apparel, 2001b). As a member of CBTPA, El Salvador also enjoys quota free and low duties on apparel exports to the United States with use of U.S. fabric produced and cut in the United States. Virtually the United States supplies all of El Salvador's cotton import needs (Office of Textile and Apparel, 2001b). Cotton consumption has increased as a result of growth in the maquila sector. The major cotton exports to the United States are cotton yarns and assembled garments.

Purpose of the Study

The purpose of this study is to examine the competitive advantages of the current top ten cotton product suppliers to the United States, namely Mexico, China, India, Honduras, Pakistan, Bangladesh, Dominican Republic, El Salvador, Indonesia, and Guatemala, based on the Environmental Analysis Framework (Austin, 1990). Specifically, this research will examine the impacts of several external environmental factors on U.S. cotton product import volume from the ten cotton producing countries, including economic factors, political factors, cultural factors, and demographic factors an

three levels—the international level, national level, and industry level. In addition, the manner in which these factors impacted on cotton product trade volume from 1974 to 2000 will be identified. Lastly, future trends and changes of cotton product trade patterns between the United States and the aforementioned ten countries will be predicted.

Objectives

The objectives of this study are:

1. To examine important environmental factors influencing U.S. cotton product (including raw cotton, cotton products made from cotton) imports from the top ten cotton suppliers—Mexico, China, India, Honduras, Pakistan, Bangladesh, Dominican Republic, El Salvador, Indonesia, and Guatemala.
2. To examine trends and changes in U.S. cotton imports from the ten countries from 1974 to 2000.
3. To examine the impact of international trade issues on cotton product trade between the United States and these ten countries.
4. To compare and analyze the aforementioned ten countries' competitive advantages in cotton products.
5. To predict possible future changes of cotton trade patterns among the United States and the ten countries after 2005 when quotas will be phased out worldwide.

CHAPTER II

REVIEW OF LITERATURE

The rationality of national advantage theories

The subject of trade patterns in international trade is so extensive that no one can fully explain why some nations succeed over others in certain areas. However, many researchers have made efforts to explain international trade since the early eighteenth century. Adam Smith (1776), father of the international trade theory, proposed a theory named “absolute advantage”, which suggested that some countries can produce certain goods more efficiently than others and these countries should concentrate on and export these products whose costs are the lowest. The absolute advantage suggests that a nation is competitive in producing certain products that have a natural advantage or an acquired advantage, such as technologies or skills. For instance, China should be competitive in international trade in the cotton industry because of the availability of arable land and a suitable climate.

Nevertheless, Adam Smith’s absolute advantage theory is inadequate to explain the trade patterns in the nations which have no superior production areas (Porter, 1990). In 1817, David Ricardo refined Smith’s notion and developed the “comparative advantage” theory, which advocates that a country should specialize in and export the commodity in which the nation has a relatively greater advantage (Ricardo, 1817). This theory relies heavily on the “labor theory of value” which advocates that labor cost determines the value of goods. Ricardo (1817) suggested that a nation should concentrate on and export the commodity with the lowest amount of labor time compared to other

nations. Ricardo's theory was an advance over Smith's philosophy but failed to explain why the comparative advantage exists (Porter, 1990).

The "factor proportions theory" (Ohlin, 1933), sometimes namely the Heckscher-Ohlin theory, was developed in the early twentieth century and was an extension of Ricardo's comparative advantage theory. This theory assumed that all nations have equivalent technologies. The nation gains comparative advantages in industries for which the nation makes intensive use of its endowments of factors of production, including land, labor, natural resources, and capital (Ohlin, 1933). Ohlin suggested that nations with abundant cheap labor and arable land such as India should produce and export labor-intensive goods such as apparel or linen fiber products, while nations with abundant capital such as the United States should concentrate on and export capital-intensive goods such as fibers or automobiles. The Heckscher-Ohlin theory is certainly an improvement in that it considers more factors than the previous two theories, but it is insufficient to explain patterns of trade for some industries, for example, those with sophisticated technology and highly skilled employees involved (Porter, 1990).

Porter (1990) developed "the Competitive Advantage of Nations" theory. Porter established a diamond model to illustrate the determinants of national competitive advantage. In the model, Porter allocated the determinants of national competitive advantages to four broad categories: a) factor conditions which include all factors of production--human resources, physical resources, knowledge resources, capital resources and infrastructure; b) demand conditions; c) related and supporting industries; d) firm strategy, structure and rivalry. "Nations are most likely to succeed in industries or industry segments where the national 'diamond,' ...are most favorable" (Porter, 1990, p.

72). Two additional factors, chance and government, have important influences on each category and play an important role in national advantages. Porter's diamond model has been proved to be successful by a wide usage of the model. Numerous researchers have applied Porter's comparative advantage theory to the study of national competitive advantages of different countries.

Austin (1990) proposed that Porter's diamond model was based on developed countries' markets, industries, and experience and was not applicable to developing countries. Austin argued that fundamental differences existed between developed nations and less developed nations in the business environment. In less developed countries, the success of a firm is significantly influenced by environmental factors such as macroeconomic environment, political environment, socioeconomic conditions, cultural diversity, and development levels. Based on Porter's diamond model, Austin (1990) developed the Environmental Analysis Framework (EAF) which is suitable for companies that aim to invest and expand their business in less developed countries to analyze local business environment. Although the EAF model is designed for international expansion from the point of view of investors, researchers found that the EAF model can be adapted for the use of identifying and understanding a developing country's national advantage through which external forces impact a certain industry.

The Environmental Analysis Framework (EAF)

Austin's EAF model is an ideal framework to analyze national advantages in developing countries. Figure 2.1 is a summary view of the EAF model. First, Austin suggested that four broad categories of environmental factors—economic, political, cultural, and demographic—are fundamental external forces to the success of firms.

Second, Austin analyzed the business environment in four levels—international, national, industry, and company levels. Each of the four environmental levels is shaped by the four external forces. In addition, interaction occurs among the four environmental factors.

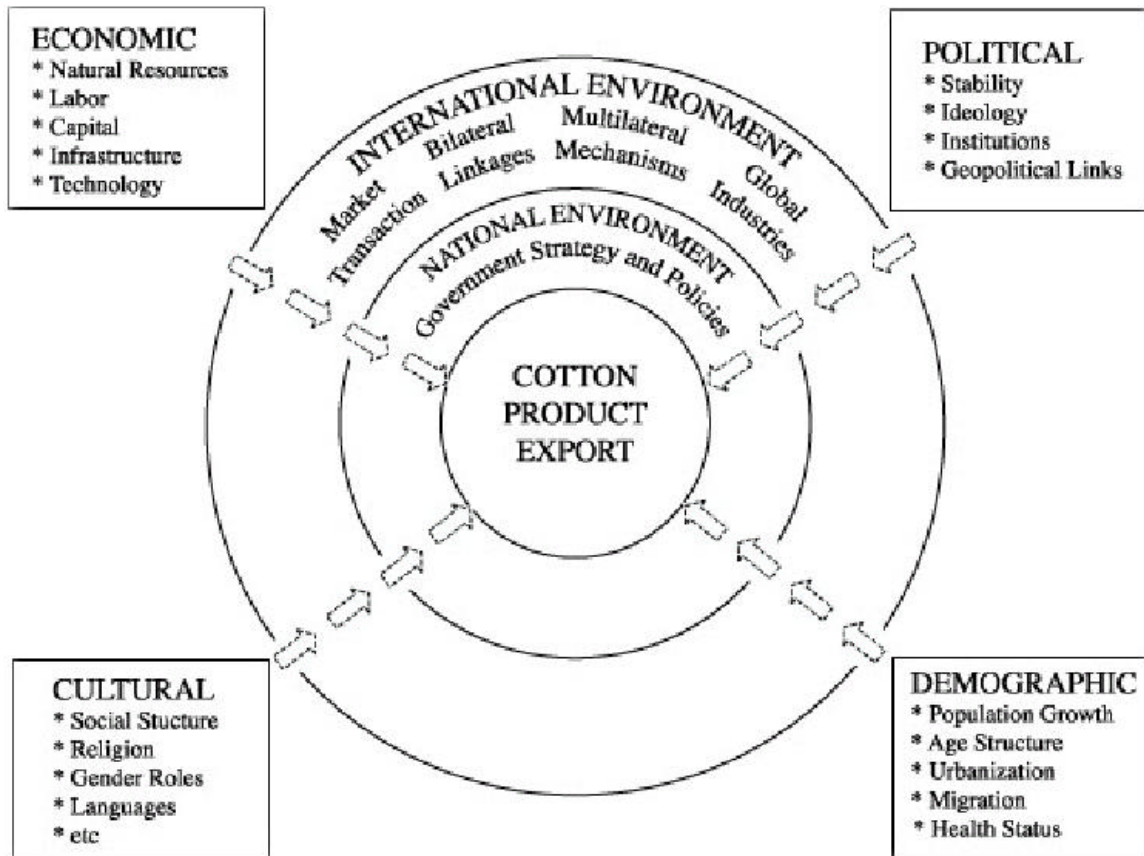


Figure 2.1: Adapted Environmental Analysis Framework (EAF model), (James E. Austin, 1990)

Source: Austin, J.E. (1990). Managing in Developing Countries: Strategic Analysis and Operating Techniques. New York: The Free Press, A Division of Macmillan, Inc.

Environmental factors

Figure 2.2 shows the details of each environmental factor and their interrelationships. Each category of environmental factors is composed of several subcategories. As mentioned, each individual factor is not independent but interactive. The four categories of environmental factors are interrelated and “they are woven together to create the larger environmental fabric (Austin, 1990, p31)”.

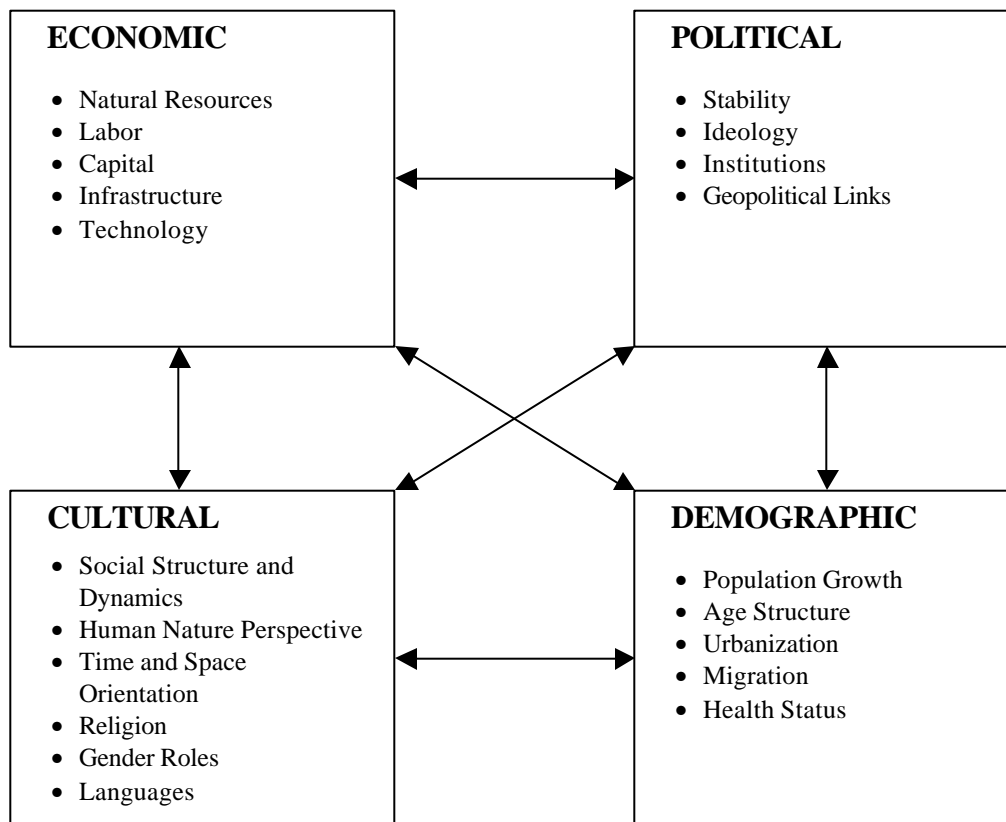


Figure 2.2. Environmental Factors (James E. Austin, 1990)

Source: Austin, J.E. (1990). Managing in Developing Countries: Strategic Analysis and Operating Techniques. New York: The Free Press, A Division of Macmillan, Inc.

Economic factors

The first category of environmental factors, economic factors, includes influences that form a nation's economic characteristics. This category has five subcategories—natural resources, labor, capital (including domestic capital and foreign exchanges), infrastructure, and technology.

Natural resources

According to Austin (1990), developing countries' economies heavily rely on the natural resources which include arable land, minerals, timber, fuels and other energy sources, and natural tourist attractions - e.g. wildlife, unspoiled mountains, (Austin, 1990). Therefore, the availability of natural resources in a developing country is an important national advantage. The importance of natural resources to the national comparative advantage has been traditionally regarded as one substantial national advantage by researchers (Ohlin, 1933; Heckscher, 1949). The Heckscher-Ohlin model suggested that a country should specialize in and export commodities that use resources including natural resources which are abundantly available for production. For instance, countries with abundant land, such as China and India, have advantages in cotton production. Sweden achieved an important international position in manufactured goods because of its utilization of abundant natural resources (Porter, 1990). Porter (1990) noted that the success of the United States after World War II can be traced in some ways to its rich endowment of natural resources such as an exceptionally large supply of arable land, abundant forests, and indigenous deposits of many resources including phosphate, copper, iron ore, coal, oil, and natural gas. Vanek (1963) found macroeconomic evidence that natural resource availability has had important impact on U.S. foreign trade

composition from 1870 to 1955. Other researchers have also found that natural resource availability is a determinant of comparative advantage (Leontief, 1956; Moroney, 1970; Horiba, 1981). Leamer (1984) found that the supply of natural resources (such as oil, minerals, land etc) is the major determinant for the export of raw materials. The most important natural resource for the cotton industry is arable land. A country with abundant arable land certainly gains a national advantage in raw cotton production.

Labor

Classical international theories emphasize on labor costs as the central determinant of comparative advantage (Ricardo, 1817; Ohlin, 1933; Heckscher, 1949, etc). Labor cost was originally regarded as the main cause of trade flow. Ricardo's labor theory of value (1817) suggested that the value of merchandise was decided by labor productivity. Austin (1990) pointed out that the availability of abundant unskilled labor in developing countries creates one of the greatest comparative advantages—low cost labor. Italy gained comparative advantage mainly based on low-cost labor in the early postwar period (Porter, 1990). Because the textile industry, particularly the apparel industry, is most likely to be a labor-intensive industry, labor costs play a significant role in determining the final cost of goods. Lardner (1988) found that labor costs are often a major concern in deciding from where to source textile merchandise in the apparel industry. Dickerson (1995) pointed out that retailers in developed countries have increasingly tried to source textile products from developing countries with lower labor cost. Wage differences in developing countries contribute to their national advantages in cotton exports.

Capital: GNP and exchange rates

Capital availability is important in starting a business, financing current operations, or business expansion. Austin (1990) pointed out that the shortage of capital in developing countries limits the availability of bank credit and investment in capital-intensive production. Proper control of capital can increase a nation's comparative advantage. Joshi (2001) found that India was successfully insulated from a financial crisis by having control of capital in the early twentieth century. In addition, the availability of capital directly influences productivity. Cotton fiber, fabric, and apparel productivity are heavily impacted by the advancement of technology—for example the invention of new methods of production and machinery. A nation's capital level is measured in many ways including: Gross Domestic Product (GDP); Gross national product (GNP); income distribution; income and savings (Austin, 1990). Among these factors, GNP is one of best indicators which reflects capital availability at the national level. GNP is the dollar value of a country's final output of goods and services in a year which reflects a country's economic size and strengths (The World Bank Group, 2002). Leamer (1984) found that capital measure is highly correlated with GNP.

Foreign exchange, another form of capital in developing countries, plays an important role in national advantages (Austin, 1990). In developing countries, the exchange rate is controlled by the government instead of set by the forces of supply and demand. The government may increase its exchange rate to create a competitive advantage for its exports. In the East Asia Financial Crisis, many countries adjusted their exchange rates to increase their national advantages in exporting. Researchers (e.g., Ghadar, Davidson, & Feigenoff, 1987; Toyne, Arpan, Barnett, Ricks & Shimp, 1984)

asserted that trade flows were significantly affected by changes in exchange rates. Seyoum (2000) also asserted that “exchange rate fluctuations can have a profound effect on international trade” (p184). Amvouna (1998) found that certain African countries, which had a flexible exchange rate, experienced better performance on export growth during 1970-1980. Other researchers found that exchange rate was an important determinant of manufactured exports (Sekkat & Varoudakis, 1998). Japan’s conservative exchange rate gained its comparative advantage on exports in the early 1970s (Porter, 1990). However, Ogun (1996) found that exchange rate misalignment was detrimental to the variability of exports and imports. For products with low profit margins, such as cotton, textiles and apparel, even small changes in the value of the dollar have substantial impacts on trade flow (Ghadar et al., 1987).

Infrastructure: transportation, telecommunications, and electrical

Infrastructure includes national physical facilities such as transportation, postal, telecommunications, electrical, water waste disposal, and other utilities, and media or informational sources such as trade journals, newspapers, and televisions. A poor infrastructure contributes to national competitive disadvantage for international trade in developing countries (Austin, 1990). Deficient infrastructure, found in numerous developing countries, directly influences a country’s volume of exports. For example, having inadequate transportation facilities such as lack of highways, limited port capacity, little air cargo space, and limited railroad availability not only increases product cost but also significantly hinders the flow of materials and prompt delivery. A favorable physical infrastructure will bring benefits to an expanding global market (Cornia, 2001). A good infrastructure, especially in a logistics-related field such as roads, railroads, and

airport service, is an important comparative advantage. Having excellent logistics not only allows for efficient allocation of resources but also accelerates merchandise delivery and reduces transportation costs (Seyoum, 2000). In Switzerland, a well-developed infrastructure, especially with respect to airport services, roads, and railroads, is a competitive advantage. However, poor telecommunication in Switzerland is a disadvantage for its national diamond (Porter, 1990). Thuermer (1998) found that poor logistics in Colombia presented a loss to its natural resource advantage in producing flowers. Among all possible indicators of a nation's infrastructure level, highways, ports, air cargo, railroads, and electricity are main contributors to the degree of infrastructure development.

Political factors

Political factors consist of four variables—instability, ideology, institutions, and international links. These four political factors have different development levels which vary in developing countries. Instability significantly impacts the trade pattern since it “increases uncertainty, adds to indirect costs, causes planning problems, and leads to centralization of authority and bureaucratic bottlenecks (Austin, 1990, p. 58)”. Seyoum (2000) found that “Political instability may also lead to damage to property and/or disruption of supplies or sales” (p. 61).

Ideology is “a set of beliefs and assumptions about values and that the nation holds to justify and make legitimate the actions and purpose of its institutions (Lodge & Vogel, 1987, p. 283).” A political ideology has substantial impact on government policy and national strategies. Strong ideological coherence in nations such as Korea and

Taiwan enhances their development, whereas a nation such as Mexico is held back by its low coherence ideology (Lodge & Vogel, 1977).

Political institutions include parties, bureaucracies, and other political organizations. A weak political institution not only increases the mobility of government and economic policy but also leads to inefficient, slow, costly government services (Austin, 1990). Countries with democratic governments tend to be politically stable and in favor of open trade policies; they are also less likely to resort to measures that restrict imports or impede companies' abilities to take certain actions (Seyoum, 2000, p. 61).

International links

International links include both political links, for example, colonial ties between Britain and India, and economic links such as multilateral and bilateral capital flows and trade agreements with foreign entities (Austin, 1990). With future globalization, the interdependence among countries becomes increasingly important. Economic links among nations play a significant role in international trade. A wide variety of economic links, including multilateral and bilateral trade agreements and trade bills, have a significant effect on the export performance of developing countries. The multilateral agreements which have important impact on cotton trade include the General Agreements on Tariffs and Trade (GATT), the Multi-fiber Arrangement (MFA), the North American Free Trade Agreement (NAFTA), and the Agreement on Textile and Clothing (ATC). Bilateral agreements such as the Bangladesh ELVIS Arrangement, the China ELVIS Arrangement, and the Dominican Republic ATC 2.17 Notification vary, and each has a certain degree of impact on trade. Other national strategies such as various trade bills,

include, for example, the United-States-Caribbean Basin Trade Partnership Act (CBTPA), and the African Growth and Opportunity Act (AGOA).

Numerous researchers studied the impacts caused by different multilateral, bilateral agreements, and trade acts. The STA, which was effective from October 1961 to September 1962, was the first multilateral agreement regarding international trade in cotton textiles. The STA was proven to be successful in restricting 64 categories of cotton textile imports (Aggarwal, 1985). Following the STA, a series of trade agreements, such as the LTA, the MFA, and NAFTA, were enacted to regulate international trade. NAFTA, which took effect on January 1, 1994, not only immediately reduced tariff rates on 49% of U.S. imports from Mexico, but also eliminated other non-tariff barriers including import prohibitions, quotas, and import licensing requirements. NAFTA provided enormous opportunities for Mexico's exports. Mexico gained significant competitive advantages over other countries, and trade volume increased dramatically. Mexico had a trade surplus of \$7.1 billion in 1995 compared to a trade deficit of \$18.5 billion in 1994 (USITC, 2000). Mexico became the largest supplier of apparel for the U.S. market and surpassed China for the first time in 1999. Trade acts also bring substantial advantages to certain countries. For example, the United-States-Caribbean Basin Trade Partnership Act (CBTPA), which took effective on October 1, 2000, provided similar privileges to Caribbean countries as NAFTA does to Mexico. With CBTPA benefits, CBI countries gained a total of \$5.3 billion trade, and provided 22 percent of apparel imports of the United States in 2001 (Borneman, 2002).

Cultural factors

Cultural factors are composed of six subcategories: a). social structure and dynamics—which refer to social relationships among people reflected by their personal values, attitudes and behaviors, b). human nature (goodness and changeability), c). time and space orientation concerning attitudes toward time such as punctuality and space, d) religion, e) gender roles, f). language (Austin, 1990). According to Austin (1990), each cultural dimension has important influence on national strategies in many ways.

Among these six subcategories, religion—which shapes moral standards, individual attitudes and personal values—is found to have a significant influence in shaping national strategies (Austin, 1990), and therefore has a profound impact on trade.

Language is well-documented as another important factor to international trade. Halliwell (1999) found that multilingual societies have a competitive advantage over monolingual societies in international trade. Switzerland, a country in which people speak multiple languages (including English, German, French, and Italian), possesses a competitive advantage on international trade. This is especially the case for trade involving intricate foreign sales and service, because the Swiss are accustomed to multiple cultures and therefore can work effectively with people from a variety of nationalities (Porter, 1998). Sweden, where most speak English, is found to have considerable competence in foreign languages, which moderately contributes to its national advantage (Porter, 1998). Developing countries such as India and Pakistan, which were colonies of Britain, also enjoy national advantages due to language competence.

Demographic factors

Demographic factors include five main attributes—population growth rates, age structure, urbanization, migration, and health status. Austin (1990) found significant differences among developmental levels of demographic characteristics exist in developing countries. Certain demographic features have substantial impact on national advantages in many indirect ways. For example, high population creates abundant cheaper labor, which is an important advantage for labor-intensive industries such as cotton and textile industries. However, high population density might increase pressure on existing resources including natural resources and public services, thereby indirectly reducing advantages of natural resources such as arable land. Therefore, comparing and studying population is very important in understanding a country's comparative advantage.

CHAPTER III

METHODOLOGY

Austin's Environmental Analysis Framework (EAF) (1990) is applied as the theoretical model in this study. The EAF model suggests that four broad categories of environmental factors—economic, political, cultural, and demographic—are external forces fundamental to the success of the firms (Figure 3.1). Conceptual definitions for four fundamental environmental factors are included in table 3.1.

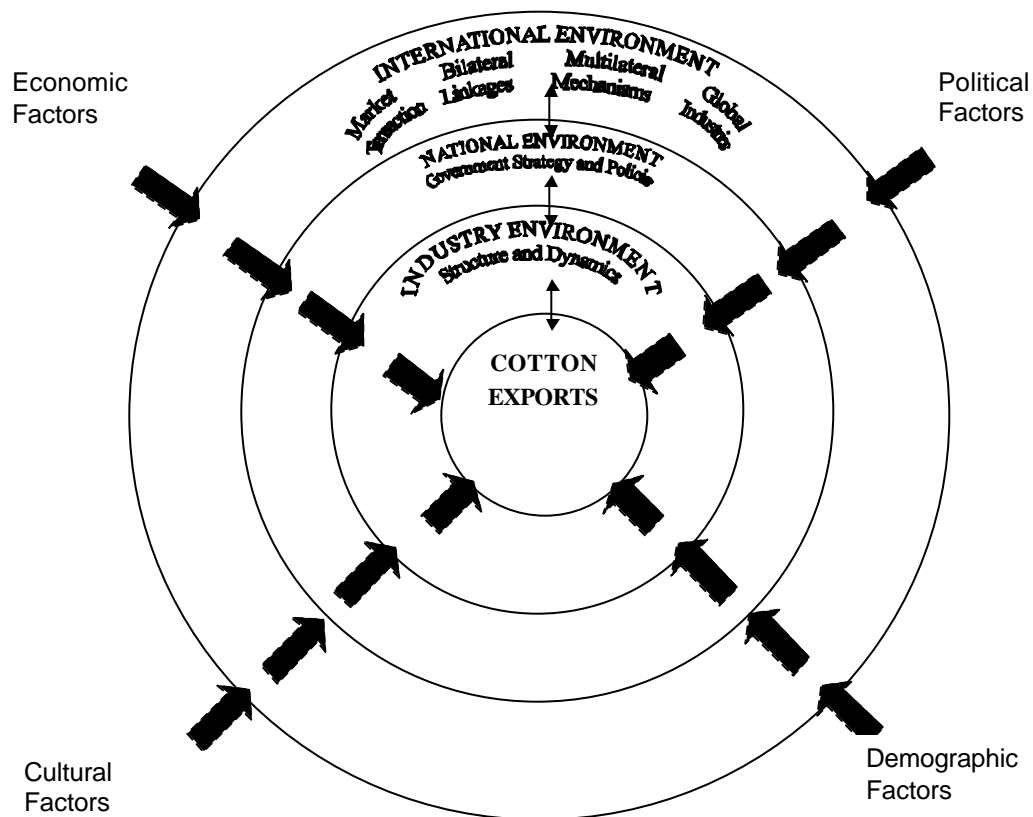


Figure 3.1: Adapted Environmental Analysis Framework (EAF model), James E. Austin, 1990)

Source: Austin, J.E. (1990). Managing in Developing Countries: Strategic Analysis and Operating Techniques. New York: The Free Press, A Division of Macmillan, Inc.

Table 3.1 Conceptual Definitions

Factors	Definition
Economic factors	The factors identified in this study include arable land, labor cost, GNP, foreign exchange, roads, and merchant marine.
Political factors	Political factors include four political variables—instability, ideology, institutions, and international links. The research will compare and analyze three variables: instability, ideology, and institutions in each country. It will also identify the trade impact of international links including multilateral, bilateral agreements and trade bills, which mainly result in tariff rate and quantitative limitation (quotas) on international trade.
Cultural Factors	Cultural factors refer to “the set of shared values, attitudes, and behaviors that characterize and guide a group of people” (Austin, 1990, pp.62). The cultural factors identified in this study include religion and language.
Demographic factors	Demographic factors are the most fundamental factors which shape a nation’s characteristics and structure differences. The research will identify one main demographic factor—population.

The methodology used in this study is composed of three steps. First, a simple linear model will be applied to examine and identify relationships among U.S. cotton import volume from each country and attributes of suppliers, using secondary data systematically selected every two years from 1974 to 2001. Seven attributes considered likely to affect U.S. cotton import volume from each country were applied to this model. The variables include GNP, exchange rate, labor cost, merchant marine, roads, tariff rates, and quota. See Table 3.2 for operational definition. The following equation is the simple linear model used in this study.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e$$

Where:

Y: the dollar value of U.S. cotton imports from a country.

X₁: the GNP in a country.

X₂: the exchange rate of local currency with one U.S. dollar.

X₃: the labor cost in a country.

X₄: the merchant marine in a country.

X₅: the total roads in a country.

X₆: U.S. tariff rate to the imports from another country.

X₇: dummy variable, quota limit on cotton imports from a country. (0 means no quota limit, 1 means with a quota limit)

β: estimated parameters.

e: random error.

The expected signs for each variable were shown in the following equation.

Expected sign: [+] [+] [-] [+] [+] [-] [-]
Equation: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e$

The linear model applied in this study is used because previous researchers found that a simple linear model does an excellent job in explaining the relationships between trade data and factor endowments of comparative advantage (Leamer, 1984).

Table 3.2 Operational Definitions of Variables

Variables	Definition
U. S. cotton import value	The F.O.B. dollar value of the U.S. imported cotton products in terms of notional category 30—cotton products (includes 35 MFA categories, see Appendix A) from each country
GNP	The dollar value of a country's final output of goods and services in a year
Exchange rate	The number of units of a given currency that can be purchased for one U.S. dollar
Labor cost	Hourly wages in the manufacturing sector in U.S. dollars
Merchant marine	Capacity of carrying goods by ships (Unit: tons)
Road	Sum of railways and highways available in a nation
Tariff	U.S. average tariff rates on all textile imports (SITC 65 & 84) from each country (equals total duty paid for textile imports divided by total textile imports customs value)
Quota	A dummy variable (0 means no quota, 1 means with quota)

A qualitative analysis of the seven important attributes of a nation which contribute to its comparative advantage on cotton exports, will be conducted. The seven attributes include arable land, instability, ideology, and institutions, religion, language, and population. The conclusion briefly makes suggestions and provides implications for U.S. cotton importers and retailers, the ten countries, and policy makers.

Data collection

The research used secondary data collected from various government and non-government sources. The dataset for the quantitative research, including the data of U.S. cotton import values and seven variables: GNP, exchange rate, labor cost, merchant marine, roads, tariff rates, and quota, contain 140 observations and cover ten countries over a 26 year time period from 1974 to 2000. Data of the seven attributes—arable land, instability, ideologies, institutions, religions, languages, and population—in the qualitative research are of 2002 for each country.

Quantitative

From 1990 to 2000, the U.S. cotton import value from ten countries was extracted from trade data in the website of Office of Textiles and Apparel; the data from 1980 to 1988 were provided by the Office of Textile and Apparel via personal contact. The U.S. cotton imports data from 1974 to 1978 were extracted from U.S. General Imports: Schedule A Commodity and Country published by USITC.

GNP data for ten countries were obtained from the 2002 World Development Indicator, a CD-Rom issued by the World Bank. The exchange rates and labor cost data were extracted from Statistical Yearbooks compiled by the United Nations. However,

various country statistical yearbooks were consulted to estimate the missing data of labor costs. Labor costs were all converted to U.S. dollars.

The merchant marine data were obtained from the Register of Ships published by Lloyd's Register of Shipping. The World Factbook issued by the Central Intelligence Agency was used to extract the roads data. Due to the inconsistency in the method used to calculate the tariff rate, for example, 7% of dollar value for a cotton jacket while 5 cents per lb for cotton yarn, the tariff rate was calculated by total actual duty paid for textile imports divided by total actual textile import customs value. The data for tariff rates were collected from the data base of U.S. imports 1972-2001 by SITC code compiled by Rober C. Feenstra from the National Bureau of Economic Research. Quota information came from various years of U.S. Imports of Textile and Apparel Under the Multi-fiber Arrangement, the annual publication, issued by USITC.

Qualitative

The data for six attributes, arable land, ideology, institutions, religion, languages, and population were collected from 2002 The World Factbook issued by the Central Intelligence Agency. The data for political instability were extracted from 2003 Political Risk Yearbook Online compiled by East Syracuse.

Statistical Analysis

In this study, SPSS was used to conduct the statistical analysis. A simple linear regression procedure was used to identify the relationships between U.S. cotton import volume from each country and seven variables including GNP, exchange rates, labor costs, merchant marine, roads, tariff rates, and quotas. First, Pearson correlation coefficients were obtained to detect the multicollinearity problem among the independent

variables. Second, a linear regression model was used to examine deterministic components. After that, a global F-test and R-square (Multiple coefficient of determination) were used to measure the utility of the regression model. Finally, t-tests for individual parameters— β , which are used to examine how each variable affected U.S. cotton import volume—were performed to examine whether all parameters are significant. To examine the changes of comparative advantages among the ten countries, a one-way ANOVA (Scheffe test) was applied with respect to the variables which have significant relationships with cotton import volume for three time periods: 1970s (1974-1980), 1980s (1981-1990), and 1990s (1991-2000).

CHAPTER IV

RESULTS

This study examined seven environmental factors, which include GNP, labor costs, merchant marine, roads, tariff rates, quotas, and exchange rates, influencing the cotton exports from the top ten cotton suppliers to the United States. The researchers applied both quantitative and qualitative methods for the study.

Linear Regression Model

The ten countries which were selected for the study are all developing countries. They were the top ten cotton product suppliers to the United States in 2000. Five of them, Mexico, Honduras, El Salvador, Dominican Republic, and Guatemala are neighbors of the United States. The other five countries - China, Pakistan, India, Indonesia and Bangladesh - the primary cotton producers in the world, are located far away from the United States.

Simple linear regression models were used to detect the relationships between U.S. cotton import volume and seven variables: GNP, exchange rates, labor costs, roads, tariff rates, and quotas. First, Pearson correlation coefficients were obtained to detect the multicollinearity problem among the independent variables. The results, which are presented in table 4.1, show that GNP (X_1) has a high correlation of 0.69 and 0.66 respectively with merchant marine (X_4) and roads (X_5) at significant level of 0.001. All other asymptotic correlations were less than 0.60 which indicate that no multicollinearity exists among them. The results of Pearson correlation analysis indicates that overparameterization might be caused by high parameter correlations among X_1 and

Table 4.1 Correlation Analysis

	X ₁ (GNP)	X ₂ (exchange rate)	X ₃ (labor cost)	X ₄ (merchant marine)	X ₅ (roads)	X ₆ (tariff)	X ₇ (quota)	Y ₁ (cotton import \$)
X ₁	—							
X ₂	0.26**	—						
X ₃	0.23**	0.37**	—					
X ₄	0.69***	0.18*	-0.14	—				
X ₅	0.66***	-0.03	-0.13	0.60***	—			
X ₆	-0.21*	-0.21*	-0.18*	-0.05	-0.08	—		
X ₇	0.33***	0.16**	0.28***	0.27**	0.31***	-0.11	—	
Y ₁	0.61**	0.56***	0.35***	0.32***	0.30***	0.47***	0.35***	—

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

*** Correlation is significant at the 0.001 level (2-tailed).

X_4 , X_5 if they are put in the same model. Therefore, two models were run separately.

Table 4.2 presents the results of regression analysis.

In the first model, $Y_1 = \beta_0 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e$, GNP was included to avoid the multicollinearity problem. Also, the multiple coefficient of determination (adjusted R-square=0.55) shows that 55% of variability can be explained by the model. Four variables, exchange rates, labor costs, roads, and tariff rates are found to be significantly related to the U.S. cotton import volume with parameters estimate of 0.40, 0.16, 0.21, and -0.32 respectively at a significance level of 0.05. This means that exchange rate, labor costs, and roads have significant positive relationships with cotton import volume while tariff rate has a significant negative relationship with cotton import volume. These results indicate that high labor costs and exchange rates have a positive impact on the cotton import dollar value while low tariffs will increase the cotton import volume when holding other variables constant. The significance of probabilities (p-value) of two variables, merchant marine and quota is larger than 0.05, which indicates that neither has a significant relationship with cotton import volume.

Model 2, $Y_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_6 X_6 + \beta_7 X_7 + e$, included GNP but not merchant marine and roads. Table 4.2 shows that Model 2 has a higher R-square value at 0.63 than Model 1 although Model 2 has only 5 variables, which means that GNP is a better indicator than merchant marine and roads. The results show the same relationships among exchange rates, tariffs, quotas and U.S. cotton product import dollar value as Model 1 does. Nevertheless, labor cost was found to have no significant relationship with cotton exports volume with p-value higher than 0.1 which differs from the results of Model 1.

Table 4.2 Linear Regression Analysis

	Model 1 Standardized coefficients	Model 2 Standardized coefficients	Model 3 Standardized coefficients
Parameter estimates	(Y ₁ -cotton import dollar value)	(Y ₁ -cotton import dollar value)	(Y ₂ -cotton import quantity, sq meters)
GNP (X ₁)		0.41*** (0.000)	0.46*** (0.000)
Exchange rate (X ₂)	0.40*** (0.000)	0.36*** (0.000)	0.15* (0.022)
Labor cost (X ₃)	0.16* (0.020)	0.05 (0.431)	-0.11 (0.106)
Merchant marine (X ₄)	0.10 (0.198)		
Roads (X ₅)	0.21** (0.005)		
Tariff (X ₆)	-0.32*** (0.000)	-0.29*** (0.000)	-0.27*** (0.000)
Quota (X ₇)	0.11 (0.084)	0.11 (0.058)	0.26*** (0.000)
R-square	0.57	0.64	0.53
Adjusted R-square	0.55	0.63	0.52

Note: Significance probabilities are indicated in parenthesis besides the parameter estimates.

* P < 0.05

** P-value < 0.01

*** P-value < 0.001

To better understand the relationships, the researcher ran a third model, $Y_2 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_6 X_6 + \beta_7 X_7 + e$, using the quantity of U.S. cotton imports (measured in square meters) as the dependent variable instead of the dollar value. In Model 3, the same relationships emerged among cotton import quantity, GNP, exchange rate, and tariff. Two variables, GNP and tariff, have the most significant relationships with cotton import quantity with β at 0.46, and 0.26 ($p\text{-value} < 0.001$). The parameter estimates of labor cost is a negative sign, -0.11, but not significant at the level of 0.05. This means that labor cost does not have a significant impact on cotton import quantity. Surprisingly, quotas were found to be positively related with cotton import quantity with β_7 of 0.26 at significance level of 0.001 ($p\text{-value} < 0.001$), which means if the cotton import quantity from one country grows too rapidly, quotas were imposed on that country.

One way – ANOVA test

Table 4.6 presents the one way ANOVA analysis on the three most important variables, GNP, tariff rates, and exchange rates for the three time periods: 1970s (1974—1980), 1980s (1981—1990), and 1990s (1991—2000). Scheffe’s Multiple Range Test was applied to compare the means of the three variables at a significance level of 0.05. Table 4.3 shows the relatively small changes of GNP among the ten economies from the 1970s to the 1990s for all countries, although significant changes occurred for individual economies. The GNPs of China, India, and Mexico are significantly different from others. The values of GNPs in these three countries are much higher than others; while Bangladesh, Pakistan, and four Caribbean countries have relatively low GNPs compared with the others.

Table 4.3 shows that tariff rate, one of the variables which has the most significant negative impact on cotton export volume, changed dramatically both among countries and

Table 4.3 One-way ANOVA Analysis

Means	GNP (billion \$)			Tariff rates (percentage)			Exchange Rates		
	1970s	1980s	1990s	1970s	1980s	1990s	1970s	1980s	1990s
Bangladesh	13.3 ^c	22.7 ^{c,d}	39.1 ^c	0 ^a	11.8 ^a	15.4 ^{c,d}	13.55 ^a	28.84 ^a	44.00 ^a
China	161 ^a	284 ^a	752 ^a	27.5 ^d	16.4 ^{a,b}	11 ^{b,c}	1.69 ^a	3.23 ^a	7.80 ^a
Dominican Republic	4.5 ^c	7.1 ^d	12.9 ^c	25.5 ^d	21.8 ^b	8.4 ^b	1.00 ^a	3.91 ^a	14.28 ^a
El Salvador	2.6 ^c	3.9 ^d	9.8 ^c	28 ^d	17.2 ^{a,b}	10.4 ^{b,c}	2.50 ^a	4.34 ^a	8.69 ^a
Guatemala	5.3 ^c	8.0 ^d	15.3 ^c	13.5 ^{b,c}	16 ^{a,b}	13.4 ^{b,c,d}	1.00 ^a	2.20 ^a	6.23 ^a
Honduras	1.6 ^c	3.2 ^d	4.2 ^c	21 ^{c,d}	20.8 ^{a,b}	9 ^b	2.00 ^a	2.42 ^a	10.77 ^a
India	129 ^{a,b}	250 ^{a,b}	363 ^b	11.5 ^b	13.8 ^{a,b}	12.6 ^{b,c}	8.27 ^a	12.97 ^a	35.78 ^a
Indonesia	48 ^{b,c}	8.9 ^c	152 ^{b,c}	19.8 ^{c,d}	21.4 ^b	17.8 ^d	520.44 ^b	1299.69 ^b	4993.71 ^b
Mexico	119 ^{a,b}	180 ^b	409 ^b	23.3 ^{c,d}	18.4 ^{a,b}	3.2 ^a	19.61 ^a	1184.34 ^{a,b}	6536.00 ^b
Pakistan	15.7 ^c	33.8 ^{c,d}	55.8 ^c	12.25 ^b	12.8 ^{a,b}	13 ^{b,c,d}	9.91 ^a	16.45 ^a	37.41 ^a

Note: The table presents the mean values for three variables by country.

Scheffe's grouping is indicated in superscript above the mean values, significance level: 0.05.

within each individual country from the 1970s to the 1990s. For example, the tariff rates for Bangladesh textile exports increased from 0% in the 1970s to 15.4% in the 1990s. Mexico appears to be the biggest winner in reversing the trade competitive advantage from a very high tariff rate at 23.3% in the 1970s to the lowest tariff rate at 3.2% in the 1990s among all countries. Four countries, China, Dominican Republic, El Salvador, and Honduras have different degrees of improvement on tariff rates, while Guatemala, India, Indonesia, and Pakistan maintained similar tariff rates between the 1970s and 1990s. From 1974 to 1980, the tariff rates of textile products from Bangladesh, Pakistan, India, and Guatemala were significantly lower than the others at a significance level of 0.05; while textile products of China, the Dominican Republic, El Salvador, Honduras, Indonesia, and Mexico have significantly higher tariff rates than the others. From 1980 to 1990, the average tariff rates in each country were quite close to each other. Only the tariff rate of Bangladesh products was significantly different from the others with the lowest rate of 11.8%; however, Dominican Republic and Indonesia had significantly higher tariff rates, 21.8% and 21.4% respectively while the average tariff rates on textile products from other countries were statistically not different from each other. From 1990 to 2000, the average tariff rates were much lower than those in previous years. The tariff rates on textile products from Mexico, Dominican Republic, and Honduras, which are relatively low, were significantly different. Indonesia had the highest tariff rate of 17.8% in the 1990s.

Table 4.3 indicates that all ten countries raised their exchange rates in different degrees since 1974. The increases were moderate for China, El Salvador, Guatemala, Honduras, India, Pakistan, and Bangladesh, whose exchange rates in the 1990s were about 4-5 times of those in 1970s, while Mexico's and Indonesia's increases in the exchange rates

were remarkable. The exchange rate of the Mexican peso to the U.S. dollar changed most significantly from 19.61 in the 1970s to 6536.00 in the 1990s, followed by Indonesia, from 520.44 to 4993.71, then the Dominican Republic, from 1.00 to 14.28. Table 4.3 shows that the exchange rates of Indonesia and Mexico are significantly different from the others.

Qualitative analysis

Table 4.4 presents the comparisons of seven important attributes - arable land, political instability, ideology, institutions, religion, languages, and population - among the United States and the ten countries. China and India have very large amounts of arable land and population compared with the others. Bangladesh, Guatemala, Honduras, Indonesia and Pakistan are less politically stable than the others (A means most stable, D means least stable). India and Pakistan have similar institutions and ideology, Federal Republic and English Common Law, to the United States. Mexico shares the same institutions and religion as the United States. Four Caribbean countries, the Dominican Republic, El Salvador, Honduras, and Guatemala, have similar ideologies (either democracy or republic) and the same religion (Roman Catholic) to the United States. Other than that, Mexico, four Caribbean countries, and the United States, have the common language—Spanish. India, Indonesia, Pakistan, and Bangladesh have different religions but speak the same official language—English—as the United States. China is the only country which has the most different systems—ideology, institution, language, and religion—from the United States.

Table 4.4 Comparison of Seven Important Attributes

Country	Arable land (thousands sq km)	Instability	Ideology	Institutions(legal system)	Religion	Official Language	Population (million)
Bangladesh	81	C+	Democracy	English common law	Muslim, Hindu	Bangla, English	133.3
China	1,241	B-	Communist state	Criminal law	Daoist, Buddhist	Mandarin	1,284.3
Dominican Republic	10	B-	Democracy	French civil codes	Roman Catholic	Spanish	8.7
El Salvador	6	B (B+)	Republic	Civil and Roman law	Roman Catholic	Spanish	6.4
Guatemala	14	C	Republic	Civil law system	Roman Catholic	Spanish	13.3
Honduras	17	C+	Republic	Roman and Spanish civil law /English common law	Roman Catholic	Spanish	6.6
India	1,616	B-	Federal Republic	English common law	Hindu, Muslim	English Bahasa,	1,045.8
Indonesia	181	C	Republic	Roman-Dutch law	Muslim	English	231.3
Mexico	254	B+	Federal Republic	Mixture of U.S. constitutional theory and civil law system	Roman Catholic	Spanish	103.4
Pakistan	217	D+	Federal Republic	English common law	Muslim	Punjabi, English	147.7
United States	1,769	B+	Federal Republic	English common law	Protestant, Roman Catholic	English, Spanish	280.6

Source: World Factbook & 2003 Political Risk Yearbook Online

Note: For Instability, A means most stable, D means least stable

CHAPTER V

CONCLUSIONS, DISCUSSION, AND IMPLICATIONS

Conclusions and Discussions

In this chapter, the findings of this research will be addressed and discussed. Implications for trade analysts, policy makers, cotton product suppliers and buyers will be posited and finally, suggestions for future research will be made. The results of this research indicate that four environmental factors, GNP, tariff rates, exchange rates, and roads, are important environmental factors influencing the cotton export volume in the top ten cotton suppliers to the United States. In this chapter, the results for each objective will be discussed and summarized.

Objectives

1. To examine important environmental factors influencing U.S. cotton product (including raw cotton, cotton products made from cotton) imports from the top ten cotton suppliers—Mexico, China, India, Honduras, Pakistan, Bangladesh, Dominican Republic, El Salvador, Indonesia, and Guatemala.

This research used three different models to examine the important environmental factors. The results in Table 4.2 reveal that two factors, GNP and tariff rates, have the most significant impact on the U.S. cotton import volume, followed by exchange rates. In addition, the researchers found that the road factor has significant positive relationship with the U.S. cotton import dollar value. However, the merchant marine factor was found to be statistically insignificant to the U.S. cotton import dollar value. Labor cost was found to have a positive

relationship with the U.S. cotton import volume in Model 1, but to be an insignificant factor in the other models. Quotas were found to have a significant positive relationship with the U.S. cotton import quantity, while they had an insignificant relationship with the U.S. cotton import dollar value.

GNP is one of two factors which most significantly affects cotton imports. The parameter estimate is positive, which means a country will export more cotton products to the United States if the country has a higher GNP than others. This finding indicates that among the ten developing countries, the larger, more developed countries will produce and export more cotton products. Table 4.3 shows that China, India, and Mexico had comparative advantages in GNP during the twenty-six year period. This finding is consistent with the fact that these three countries have been the top three cotton suppliers to the United States since 1974.

Tariff rate is the other major factor which influences U.S. cotton imports. The negative sign of the parameter estimate indicates that low tariff rates will stimulate cotton imports. From 1974 to 2000, the United States adjusted the tariff rates on cotton imports from each country to different extents. Table 4.3 suggests that Bangladesh, India and Pakistan gained competitive advantages of low tariff rates in the 1970s. In the 1980s, only Bangladesh enjoyed absolute low tariff rates, while all other countries except Indonesia had statistically no difference in tariff rates. However, after several important multilateral agreements and trade bills took effect in the 1990s, including the NAFTA and the Uruguay agreement, the tariff rates on textile products from different countries started to differentiate again. The results presented in Table 4.3 suggest that Mexico had the most comparative advantage in tariff rate in the 1990s, followed by the Dominican Republic and Honduras, to a

lesser extent. Indonesia and Bangladesh have comparative disadvantages in tariff rates. These findings explained how the U.S. cotton imports changed in 26 years: India and Pakistan were the first and third biggest suppliers to the United States in the 1970s; Bangladesh had the biggest growth rate of 1242% from 1974 to 1985; in the 1990s, Mexico took the first place as the biggest cotton product supplier to the United States with a low tariff rate of only 3.2% in 1990s. Dominican Republic and Honduras increased their exports significantly in 1990s.

The findings show that the exchange rate has a significant positive impact on U.S. cotton imports. This result is consistent with the finding by Amvouna (1998), who found that increasing a country's exchange rate can improve its export performance; hence, exchange rate is an effective method to control the trade flow. Mexico and Indonesia raised their exchange rates the most from 1980 to 2000, which means that both of them decreased the unit price of their cotton products dramatically at that time; hence, they gained a strong comparative advantage on cotton exports over others.

The factor, road, an important indicator of a country's infrastructure, was found to have a positive relationship with U.S. cotton imports. The finding indicates that a good infrastructure will improve a country's export performance. If a country wants to increase its exports, it must improve its transportation system.

Labor cost was found to have a significant positive relationship with U.S. cotton import dollar value in Model 1, while the relationship was insignificant when holding other variables including GNP same. The results indicate that higher labor cost will increase the U.S. cotton import volume if the GNP is different. However, labor cost was found to be an insignificant indicator to the U.S. cotton import quantity, mainly due to the fact that the ten selected cotton suppliers are developing countries. Comparing their labor costs, little

difference exists among these ten developing countries. However, higher labor cost does increase the unit price of cotton products; hence, labor cost was found to have a positive relationship with U.S. cotton import dollar value.

Quotas were found to be a statistically insignificant indicator to U.S. cotton import dollar value but to have a significant positive relationship with the U.S. cotton import quantity. This finding may be explained in that the United States imposed quotas on the countries which have higher cotton export volume to the United States. The finding also implies that quota is not an effective way to stop or decrease cotton imports, as Pelzman (1995) predicted. Pelzman concluded that the MFA quota system “has generated enormous rents and redirection of trade, it was never able to stop textile and apparel imports” (p. 189). Because the United States did not impose a quota on every item of cotton, a country could always export more products which did not have quantitative limits. Therefore, the U.S. cotton import quantity can always increase no matter whether a quota is imposed or not.

2. To examine trends and changes in the United States’ cotton imports from the top ten suppliers from 1974 to 2000.

The ten countries’ cotton exports to the United States from 1974 to 2000 are shown in Figure 5.1. Each country’s cotton export volume to the United States had tremendous expansion during the 26 years. The average yearly growth rate ranged from 27% to 351%. Indonesia enjoyed the highest expansion among the ten countries starting from \$0.04 million in 1974 to \$1,019.25 million in 2000. Two Caribbean countries, Dominican Republic and Honduras, had high growth rates, 121% and 102% respectively, because the United States decreased tariff rates on their products. India and Pakistan had relatively low expansion rates.

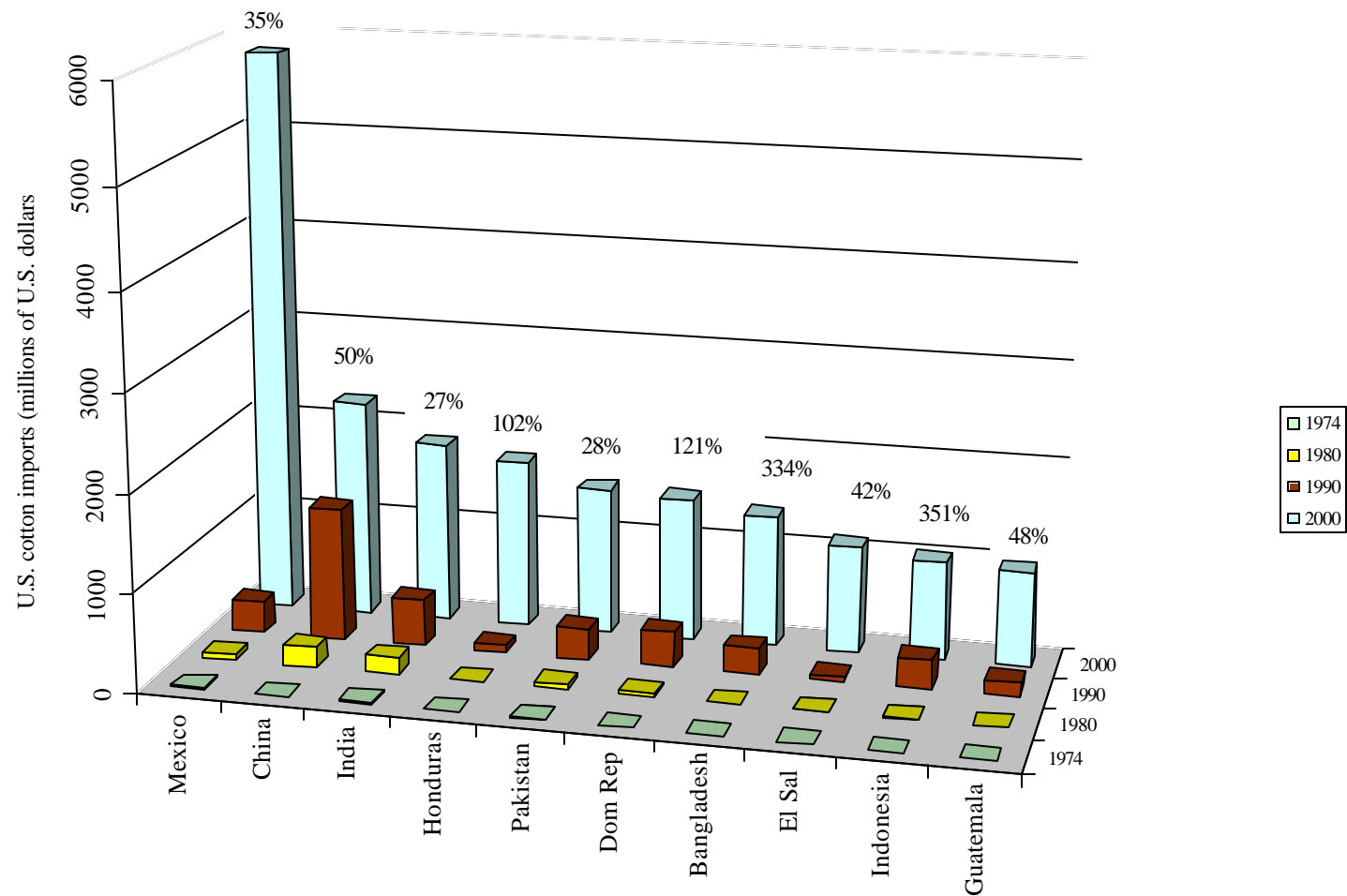


Figure 5.1. The U.S. Cotton Imports and Average Yearly Growth Rate, by Country

Source: Office of Textile and Apparel (2002, October 30).

Note: The percentage of average yearly growth rate for each country is shown above the bars.

However, both countries have maintained their status as leading cotton export countries to the United States since 1974. Bangladesh, with a yearly growth rate of 334%, is an exception because the country was established in 1974 and only began an international trade relationship with the U.S. in 1975.

During the past 26 years, the status of these ten countries has completely changed. In 1974, India was the biggest cotton product supplier to the United States among the ten countries, followed by Mexico and Pakistan. Four Caribbean countries, Honduras, El Salvador, Dominican Republic, and Guatemala were not as important as the others. In 1980, China took the first place instead of India, followed by India, Pakistan, Mexico, and the Dominican Republic, while the other countries were still not the main cotton product suppliers to the United States. In 1990, China was still in first place, but Bangladesh, Indonesia, and four Caribbean countries started to catch up and were becoming important cotton exporters to the United States. After NAFTA took effect in 1994, Mexico became the top cotton product supplier to the United States in 2000 due to its lowest tariff rate within a six-year period, followed by China, India, Honduras, and Pakistan. The four Caribbean countries, together with Bangladesh and Indonesia became the main cotton product suppliers to the United States, and their export volumes compete with those of India and Pakistan.

3. To examine the impact of international trade issues on cotton product trade between the United States and these ten countries.

International trade issues including multilateral, bilateral agreements, and trade bills mainly result in changes of tariff rates and quantitative limitations (quotas). Since the debut of MFA in 1973, the United States has gradually signed many bilateral agreements with GATT members including the ten countries in this study. To better understand the function

of quotas, one of the most important trade restriction methods, the researcher calculated and compared each country's yearly growth rate of cotton exports before and after quotas were imposed. The results are demonstrated in Table 5.1. Four countries, China, India, Mexico, and Pakistan were not included because they had quantitative limitations from 1974 to 2000. The data show that huge differences exist in the yearly growth rate before and after quotas were imposed. Bangladesh expanded its exports to the United States with a yearly growth rate of 1,242% in the beginning which fell to 35% after a quota was imposed in 1985. Indonesia, the Dominican Republic, Honduras, and Guatemala saw similar drops in growth rate after quotas were imposed. These results further strengthened the conclusion from the first objective: Quotas can not stop the U.S. cotton imports' growth, but they can redirect the trade and decrease the pace of import growth considerably.

Table 5.1 Comparisons of Average U.S. Cotton Import Growth Rates before and after Quotas

	The Year quotas were imposed	Before Quota	After Quota
Bangladesh	1985	1242%	35%
Dominican Republic	1979	543%	44%
El Salvador	1985	41%	42%
Guatemala	1985	63%	39%
Honduras	1995	123%	29%
Indonesia	1979	1968%	57%

Source: Office of Textile and Apparel

Figure 5.2 presents U.S. cotton imports from the ten countries from 1974 to 2000. During this period, all ten countries experienced tremendous growth. Among the ten countries, Mexico had the strongest growth power, especially after NAFTA took effect in 1994 which not only immediately reduced tariff rates on 49 % of U.S. imports from Mexico, but also eliminated other non-tariff barriers including import prohibitions, quotas, and import licensing requirements. Cotton imports from the four Caribbean countries, Honduras, El Salvador, the Dominican Republic, and Guatemala, which do not grow a large amount of cotton, increased substantially after the Special Access Program –9807 Program—took effect in 1986. The 9807 Program allows Caribbean countries to export assembled products, which are made from U.S. materials, free of quotas and with low tariff rates to the United States. The countries that are large cotton producers, such as China, India, Pakistan and Bangladesh, have moderate growth of their cotton exports.

4 & 5. To compare and analyze the ten countries' competitive advantages in cotton products; to predict possible future changes of cotton trade patterns among the United States and the ten countries after 2005 when quotas are phased out worldwide.

In summary, Mexico currently has the greatest competitive advantage compared with other countries: higher GNP, lowest tariff rate, and good infrastructure (more roads). In addition, Mexico has a stable political environment, high population, large arable land, same ideology, and similar religion to the United States. China and India are the next two countries which enjoy many relative advantages: higher GNP, moderate tariff rates, good infrastructure and a stable political environment, huge population, and abundant arable land. India benefits from having similar ideology, institutions, and official language of the United States. One point arising from international trade issues deserves emphasizing. China and India are the

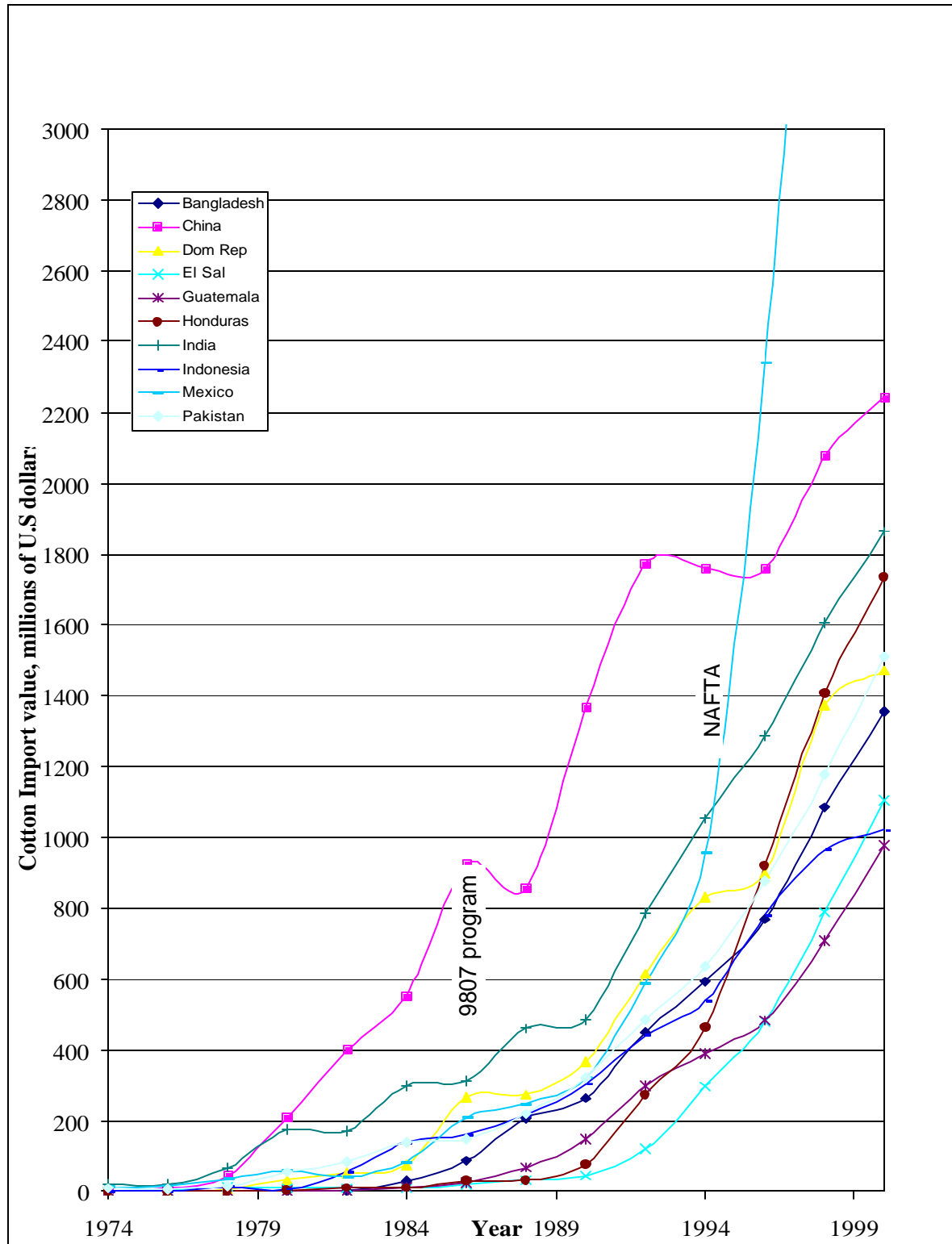


Figure 5.2 The U.S. cotton imports from 1974 to 2000, by country

Source: Office of Textile and Apparel

two countries whose cotton exports have been most extensively controlled by quotas among the ten suppliers. After quotas are phased out in 2005, China and India will dramatically increase their cotton export shares of US imports if nothing else changes. Among other countries which have relatively small economies, Honduras and the Dominican Republic have relatively lower tariff rates. Hence these two countries should continue to increase their cotton exports to the United States.

Bangladesh, Guatemala, and Pakistan are the three countries that have the most disadvantages: low GNP and high tariff rates. However, these three countries have similar ideologies and institutions to the United States. If any of them reverse their disadvantages, for example, if the United States decreases the tariff rates to Pakistan, Pakistan could become a very large and competitive cotton product supplier.

In conclusion, Mexico, India, and China continue to be the main cotton product suppliers to the United States. Two Caribbean countries, Honduras and the Dominican Republic, may increase their cotton export shares if they continue to have privileges on tariff rates.

Implications and Suggestions

This research explored four important environmental factors, GNP, exchange rates, tariff rates, and roads, which have significant impact on U.S. cotton import volume in the ten countries. The results of this study have important implications for U.S. importers and retailers, the ten cotton suppliers, and policy makers.

In these ten countries, a high GNP increases cotton exports. In other words, the cotton export volume is limited by a country's economy size. No matter how many competitive advantages a country has, it has a limited production capacity. This finding implies that U.S.

importers and retailers should not focus on buying from one country, as more orders will cause problems such as delivery or quality problems once the production capacity is saturated. A large retailer or importer should consider the supplier's economy size when he/she decides to place buying orders. The most secure way is to distribute orders among different countries; thus the buyer could be flexible if trade policies change or capacity is saturated.

The significant negative relationship between tariff rates and U.S. cotton import volume implies that the adjustment of tariff rates is a very effective method to control international trade volumes. The U.S. government could reverse the trade flow by changing tariff rates. This study also has important implications for the ten cotton suppliers. The positive relationship between exchange rates and U.S. cotton import volume suggests that increasing a currency's exchange rate will improve the country's export performance.

The findings of this study about roads suggest that an effective transportation system could be beneficial to exporters. An effective road network is necessary to improve international trade performances. A country should develop its infrastructure if it wants to increase its exports.

Limitations

This study has several limitations. First, the research only focused on the top ten cotton suppliers to the United States in 2000, which are mainly developing countries; hence, the results may not be applicable to developed countries. Second, the research includes only seven variables in the equation; some important factors such as inflation rate and product quality may have important impacts on U.S. cotton import volume but have not been included. Third, the data used in this study were obtained from various government

documents. Especially, the data for labor cost are continually being collected, revised, and estimated from multiple sources due to large amount of missing data in the primary source—the UN Statistical Yearbook; therefore, these data may not be completely accurate and bias free.

Fourth, the research used a dummy variable to measure the impact of quotas, which might not be the best way to study the relationship between quotas and U.S. cotton import volume. However, the researcher found that quota is the most difficult variable to measure. The researcher attempted to use quota filling percentages and quantity of quotas to measure quota impacts on U.S. cotton import volume. Both methods were proved to be impractical, because the United States imposed quotas only on a few categories in four of the ten selected countries in the beginning of the MFA (1973). In addition, different countries have quota limits on different categories. Therefore, quota filling percentages and quantity of quotas are not comparable among countries and within countries over the 26 year time period for a merged cotton category in this study.

Further Research

Further research could include more developed countries such as Japan and Italy. It would be very interesting to compare the changes and trends of developing countries and developed countries, and to find out how their competitive advantages change over the time. Further study also could extend beyond cotton products to other manufacturing goods; the results would be valuable to U.S. importers and exporters. Other than that, a future study could include more variables such as inflation rates and product quality, which could have important influences on cotton exports.

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APPENDIX A: MFA CATEGORY SYSTEM (notional category 30, cotton products, including 35 MFA category)

	MFA Category	Product Description
Yarn		
	300	Carded cotton yarn
	301	combed cotton yarn
Fabric		
	313	cotton sheeting fabric
	314	cotton poplin / broadcloth fabric
	315	cotton printcloth fabric
	317	cotton twill fabric
	326	cotton sateen fabric
Apparel		
	330	cotton handkerchiefs
	331	cotton gloves and mittens
	332	cotton hosiery
	333	m/b suit-type coats, cotton
	334	other m/b coats, cotton
	335	w/g cotton coats
	336	cotton dresses
	338	m/b knit shirts, cotton
	339	w/g knit shirts/blouses, cotton
	340	m/b cotton shirts, not knit
	341	w/g cot. shirts/blouses,n-knit
	342	cotton skirts
	345	cotton sweaters
	347	m/b cot. trousers/breeches/shorts
	348	w/g cotton trousers/slacks/shorts
	349	brassieres, other body support gar
	350	cotton dressing gowns, robes etc.
	351	cotton nightwear/pajamas
	352	cotton underwear
	359	other cotton apparel
Made-ups		
	360	cotton pillowcases
	361	cotton sheets
	362	cotton bedspreads / quilts
	363	cotton terry / other pile towels
	369	other cotton manufactures