# The Forces Shaping World Cotton Consumption After the Multifiber Arrangement

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## Abstract

The phaseout of the Multifiber Arrangement (MFA) and other forces are reshaping world textile and cotton markets. The elimination of the MFA is helping reduce clothing prices in the United States and the EU and effecting a shift in industrial demand for cotton to China, India, and Pakistan. At the same time, world cotton consumption has accelerated along with economic growth since 1999, especially in developing Asia, where an emerging consumer society is driving increases in household consumption of clothing and other cotton products. In the long run, income growth and technical change have more of an effect on world cotton consumption than the elimination of the MFA.

**Keywords:** Textiles, cotton, clothing, apparel, Multifiber Arrangement, quotas, trade policy, China, India, fiber, income.

## Acknowledgments

# Introduction

World cotton consumption has been growing strongly in recent years, rebounding from nearly a decade of stagnation during the 1990s. During this time, the Multifiber Arrangement's (MFA) phaseout was concluded on December 31, 2004, setting in motion changes in global textile production and consumption. The MFA and its predecessor agreements have influenced world textile and clothing trade patterns for nearly 50 years (see box, "From Cotton to Clothing—The Textiles Complex"). These agreements protected U.S. and EU textile and clothing producers from imports, but raised prices and reduced consumption in these developed countries. The gradual phaseout of MFA quotas has already driven shifts in world textile production and consumption. More changes are likely in 2005 and beyond. Over time, the level of world cotton consumption will likely be strongly influenced by factors other than the removal of the MFA.

## From Cotton to Clothing—The Textiles Complex

About 80 percent of all cotton fiber-based products are consumer products, primarily clothing (also known as apparel or garments). Other consumer products include sheets, towels, and other home furnishings (also known as home textiles).

The industry that creates clothing and other products from fiber and delivers them to consumers is most broadly described as the "softgoods industry." The industrial portion of the softgoods industry supply chain is often referred to as the "textiles industry," although the term "textiles" is often reserved for intermediate products, like yarn and fabric. In this report, "textiles" refers to yarn and fabric.

Fiber is transformed into consumer products as follows:

**Fiber**

↓

**Yarn**

**Textiles**

↓

**Fabric**

↓

**Clothing and home furnishings**
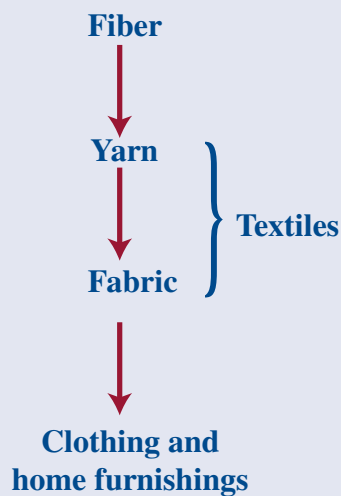
The fibers spun into yarn are predominantly polyester and cotton, but include rayon, wool, jute, flax, and silk. Yarn is either woven or knitted into fabric. Fabric is then dyed, printed, or otherwise "finished" with softeners, wrinkle-resistance resins, or other processes. Note that finishing can account for a substantial part of the value added in fabric production. Clothing is produced from fabric that has been cut and then sewn.

Yarn and fabric production is often vertically integrated, that is, a single firm controls both processes. Home furnishings are occasionally produced by firms integrated with yarn production. In fact, bed linen and towels are aggregated with fabric and yarn as textiles in the Standard International Trade Classification (SITC, division 65). Textile production and clothing production are not typically integrated within one firm.

# How the Multifiber Arrangement Affected World Textile Markets

In the 1930s, Japan rose to become the world's largest textile exporter during a period of global economic distress, leading Europe and the United States to restrict imports from Japan as a way to protect domestic industries. Quotas restrained Japan's exports throughout the 1950s, and by 1960, textile imports from Hong Kong, Pakistan, and India faced similar restraints. These restraints were codified in a series of multilateral agreements that culminated in 1974's MFA. Under the MFA, quotas were implemented on a country- and product-specific basis when textile and clothing exports posed a threat of "market disruption." Over time, these barriers increasingly constrained the major developing-country suppliers.[1]

In 1962, the United States had one bilateral export restraint agreement, with Japan. The number of agreements grew to 30 countries by 1972 and 40 by 1994, with restraints governing about half of U.S. clothing imports.[2] These agreements specified annual import limits for as many as 105 categories of products, and sometimes included an additional set of import limits for groups and subgroups of these products. Exporters were allowed some flexibility to shift quotas to different products and different years. Quotas typically grew from one year to the next at varying rates. The MFA specified a target of 6-percent annual growth, although lower rates were typically negotiated with major exporters.

Starting in 1995, the MFA was formally replaced by the Agreement on Textiles and Clothing (ATC). The ATC established a schedule for eliminating the MFA's quotas and for accelerating the annual growth rates in the import quantities permitted under quota. The ATC also lowered textile and clothing tariffs and highlighted the need to bring all trade policies applied to the sector into alignment with World Trade Organization (WTO) rules.

Bilateral quotas have fragmented world production and altered patterns of trade. The MFA has effected greater production of textiles and clothing in the United States, the EU, and many countries with preferential access to these developed-country markets.[3] The agreement also raised prices for clothing and lowered consumption in the United States and the EU (appendix). MFA quotas added an estimated 5-10 percent to clothing prices paid by U.S. consumers, according to a range of studies. The agreement's impact on developing-country suppliers varied. The MFA restrained some countries' exports, but in others, such as Bangladesh and Mauritius, it created an export industry that might not otherwise have existed.

## Quota Restraints Like a Tax on Exports

The complexity of the MFA hindered direct measurement of its impact.[4] A quota's impact depends on market conditions as well as the quota's size and conditionality. A widely accepted measure of the restrictiveness of the MFA is the price that exporting firms paid for the right to export to the United States and the EU. Quotas raise the price of a product in importing countries and limit shipments from exporting countries, which makes these exports particularly

[1]See Dickerson (1999). Cline (1990) also provides a summary through the 1980s.

[2]There were 45 agreements in 2002. Japan has been outside the system since 1995.

[3]Regional trade agreements, such as NAFTA, typically reduced applied textile and apparel tariffs and relaxed or removed quota restrictions. Agreements with development objectives sometimes also offered similar access, such as the EU's Lomé Convention and the U.S. African Growth and Opportunity Act (AGOA).

[4]Economists view quotas less favorably than tariffs for several reasons, including lack of transparency (Feenstra, 1995). One of the founding principles of the General Agreements on Tariffs and Trade (Article 11) is that quantitative restrictions should be replaced with tariffs.

profitable. The size of the "excess profits" corresponds to the restrictiveness of a particular quota.

Exporting countries' total quotas were determined by bilateral agreement with importers. Exporting countries allocated quotas among domestic firms either on the basis of their past export performance, auction bids, or ad hoc criteria. For example, 70-80 percent of Thailand's and India's garment quotas were usually distributed free of charge on the basis of past export performance.[5] In China, the Textiles Chamber of Commerce sold quota rights to firms at market-determined prices, according to the U.S. International Trade Commission (USITC, 2004a). Indonesia's system in the early 1990s reportedly lacked transparency. "The absence of published information on quotas serve[d] to reinforce suspicion and mistrust…, and to force exporters to spend excessive amounts of time lobbying key government officials."[6]

Firms receiving quotas could sometimes exchange quota licenses on open markets.[7] The price of these licenses corresponded to the opportunity to earn excess profits, or rents (appendix). Economists often used an export tax equivalent (ETE) derived from these license prices (or "quota premiums") as an indicator of the MFA's restrictiveness. ETEs could be calculated as a ratio of the license prices to the export price of the restricted product (after the license price was deducted from the price)—but for many countries, ETEs were imputed from quota trading in Hong Kong, the most open market.

ETEs have varied across countries, and through time (table 1).[8] Most recently, China's exporters, on average, have faced a 20-percent ETE on clothing and 10 percent on textiles. China is widely regarded to be the world's most competitive exporter, and its ETEs were typically higher than those for other countries. A downward trend over time in a number of countries' ETEs shows that the restrictiveness of the MFA quotas has been declining.

[5]Suphachalasai (1998) for Thailand, and Kumar and Khanna (1990) and Kathuria and Bhardwaj (1998) for India.

[6]Krishna et al. (1997).

[7]Outside of Hong Kong, secondary quota markets were illegal in many countries throughout most of the time the MFA was in force.

[8]Estimates also vary from study to study. Yang et al. (2004) estimated China's clothing ETE at 34 percent and India's at 8 percent.

**Table 1—Tariff equivalence of U.S. Multifiber Arrangement quotas, estimated "export tax equivalence" (ETE) [1]**

| Exporting country | Textiles ETE | | | | Clothing ETE | | | |
|---|---|---|---|---|---|---|---|---|
| | 1992 | 1998 | 2001 | 2002 | 1992 | 1998 | 2001 | 2002 |
| | *Percent* | | | | | | | |
| China | 18 | 20 | 21 | 10 | 40 | 33 | 27 | 20 |
| Hong Kong | 8 | 1 | 0 | 1 | 18 | 10 | 0 | 19 |
| South Asia | 18 | 15 | — | — | 40 | 8 | — | — |
| India | — | 10 | 9 | 18 | — | 34 | 7 | 12 |
| Bangladesh | — | — | — | 0 | — | — | — | 22 |
| Pakistan | — | — | — | 12 | — | — | — | 11 |
| Indonesia | 12 | 8 | 13 | 0 | 47 | 8 | 7 | 5 |
| Thailand | 9 | 8 | 4 | — | 35 | 13 | 2 | — |
| South Korea | 10 | 2 | 2 | — | 23 | 2 | 0 | — |
| Taiwan | 8 | 2 | 2 | 1 | 19 | 8 | 0 | 1 |
| Africa / Middle East | 5 | 1 | — | — | 10 | 1 | — | — |
| Turkey | — | 7 | 0 | — | — | 5 | 1 | — |
| Latin America | 9 | 7 | 2 | — | 20 | 5 | 1 | — |
| Mexico | 9 | 0 | — | — | 20 | 0 | — | — |
| Brazil | 9 | — | — | — | 20 | — | — | — |

[1] If both a region (e.g., South Asia) and major components of that region (e.g. India and Bangladesh) are reported, then the regional estimate is for the remaining countries (in this case, Pakistan accounts for most of the remaining activity). If a particular region or exporter was not included in the study used for a given year's estimate, a "—" is reported.

Sources: Hertel et al. (1996) and Harrison et al. (1997) for 1992 data; Francois and Spinanger (2001) and Rivera et al. (2003) for 1998 data; Francois and Spinanger (2004) for 2001 data; Andriamananjara et al. (2004) for 2002 data.

Supply and demand in the importing market, along with the conditions in the exporting country and its competitors, jointly determined the restrictiveness of each quota. Intuitively, the smaller the quota, the more restrictive the trade barrier. But, the size of the import market is also a factor—as is the size of the industry in the exporting country—in determining the economic effect of a particular quota. More generally, the relative competitiveness of the producing industries in the importing and exporting countries determines the restrictiveness of a given quota. Under the MFA, quotas generally grew each year, reflecting the fact that consumption in importing countries tended to grow. Moreover, rising wages tended to increase costs in importing countries, and technology transfer and improved infrastructure could cut costs in exporting countries. Finally, the impact of a quota imposed on an exporter also depended on the quotas imposed on its competitors.

## Effect of the MFA Varied Over Time

The locus of competitive textile and clothing production regularly shifted over the last 40 years. Quotas imposed first on Japan and Hong Kong helped shift production to South Korea and Taiwan.[9] By the end of the 1990s, production costs had risen in these countries. Eventually, producers of textiles and clothing in these relatively high-income Asian countries became beneficiaries of the protection the quota system offered against competition from China and India.

[9]See Trela (1998) for overview.

Over time, the effect of the MFA was to actually increase textile and clothing exports by some developing countries. Resources from restricted countries flowed to other countries not constrained by quotas, giving their exports a boost. Eventually quotas were imposed on many of these newly producing countries as well. While firms purchasing quota in these countries may have paid a high ETE, they were often net beneficiaries of the quota system. The excess profits creating the ETE were ultimately derived from the restrictions imposed on other exporters. Bangladesh, for example, had one of the highest clothing ETE's in the world (table 1), but its clothing industry is generally believed to be larger because of the MFA.[10]

[10]Yang and Mlachila (2004).

World trade policy for textiles and clothing encompasses more than the MFA quotas. Tariffs are substantially higher than the 4-percent global average for manufactured products: applied tariffs generally range from 10 to 20 percent for textiles and from 20 to 40 percent for clothing. Nontariff barriers (NTB) also exist, including burdensome custom procedures, stringent labeling requirements, and outright bans on clothing imports. For example, many countries have outright bans on used clothing imports; for a time, Egypt banned all clothing imports. Many other countries reportedly implement minimum import prices and other customs procedures as NTBs. Smuggling is a problem in a number of developing countries, suggesting trade barriers other than the MFA can be significant. Antidumping cases are frequently pursued by both developing and developed countries in the sector.

Given the level of protection observed around the world, the removal of MFA quotas will have significant impacts on global textile markets. However, other factors will also help shape how global textile and cotton markets change with the end of the MFA.

# Trends in Global Cotton Consumption

Over the last several years, worldwide consumption of cotton has accelerated, boosted by favorable trends in incomes, fiber prices, and clothing trade. Global consumption of cotton fell slightly in 2003/04, its first decline since the Asian financial crisis in 1998/99, but has recently increased well above the longrun average rate.[11] After growing 0.3 percent during the 1990s, cotton consumption grew at an estimated 3 percent annually during the first 5 years of the 21st century.

[11]Over 1980-2003, world cotton consumption grew 1.6 percent annually. Total fiber consumption grew 2.6 percent annually.

Clothing is the primary consumer good produced with cotton, and clothing consumption is very responsive to shortrun changes in income. During the Asian financial crisis, for example, urban incomes in South Korea dropped 15 percent in the second quarter of 1998, while clothing consumption fell 33 percent, the largest decline of any expenditure category.[12] While clothing is a necessity, its purchases can be delayed, making demand potentially extremely responsive to short-term changes in income. In the long run, clothing consumption is far less responsive to changes in income, actually growing more slowly than income on average (fig. 1).

[12]Korea National Statistical Office.

## Global Income Trends Have Been Particularly Favorable

The International Monetary Fund forecasts a 4.3-percent increase in global economic output in 2005, the third consecutive year of above average growth.[13] Since 1998, world GDP growth has been below its longrun average level only twice, in 2001 and 2002. The outlook for 2005 is indicative in several other ways of income trends seen in recent years. China is expected to remain the fastest growing major market in 2005, increasing at an 9-percent annual rate. India's economy is also expected to grow rapidly,
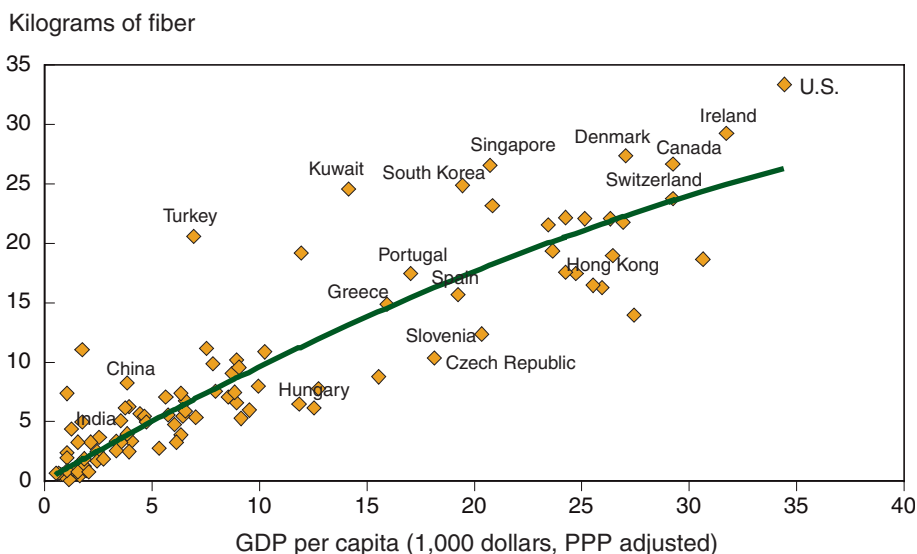
[13]International Monetary Fund (2005).

Figure 1

**International fiber consumption and income, 2000**

Kilograms of fiber



GDP per capita (1,000 dollars, PPP adjusted)

Source: Calculated by ERS based on data from Global Insight, International Cotton Advisory Committee, and World Bank.

increasing at a 7-percent rate. The economies of the EU and Japan have grown substantially slower than those of the rest of the world since 1999, and will continue to do so in 2005.

Income growth trends have been conducive to market expansion for clothing. Not only has world income grown at an above-average rate, but income growth has been particularly high in many of the lower income countries where the demand for clothing is particularly strong. As shown in figure 1, clothing purchases respond more strongly to income changes in poorer countries. For example, Zambia and Mali have the highest income elasticity of textile consumption while Luxembourg and the United States have the lowest.[14] Even though consumption is less responsive to income growth in Asia than in Africa, the potential for increased consumption in Asia is high. Household fiber consumption in developing Asia is only 5.6 kilograms per capita, compared with 33 kilograms in the United States.[15] Clearly, consumers in Asia are much further from satiation of potential fiber demand than are consumers in the developed countries. Moreover, Asian consumers direct a greater proportion of their growing incomes toward clothing purchases than do consumers in either the United States or the EU. Consumption growth in the developing countries has helped sustain above-average global cotton consumption over the last 5 years.

## Lower Prices Encourage Consumption of Clothing and Cotton

Declining prices, in addition to rising incomes, have driven worldwide demand for clothing higher. Local currency, inflation-adjusted clothing prices in a basket of 10 countries fell 7 percent during 1999-2003.[16] The fall in clothing prices was greatest in the developed countries (fig. 2). Trade liberalization—like the phaseout of the MFA—and reduced transportation costs helped open U.S. and EU markets to lower priced products from abroad. Clothing price declines were much less pronounced in lower income
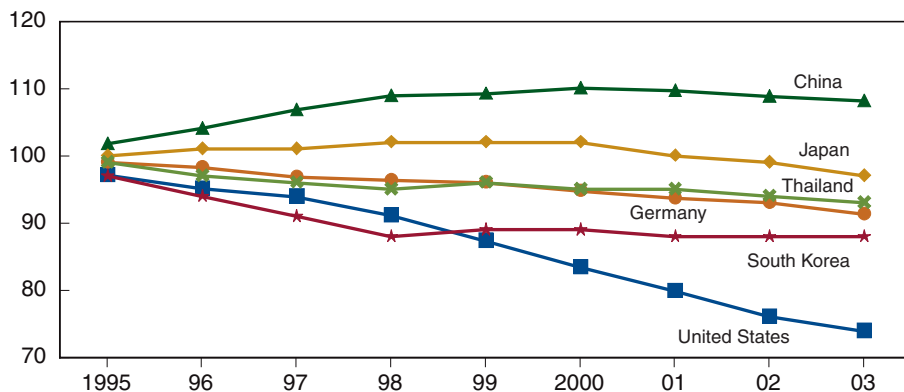
[14]Seale et al. (2003).

[15]International Cotton Advisory Committee/ Food and Agriculture Organization of the United Nations (2003).

[16]Brazil, China, France, Germany, Japan, South Korea, Taiwan, Thailand, Turkey, and the United States.

Figure 2

**Real clothing prices**

Index, 1994=100



Sources: Calculated by ERS based on data from U.S. Department of Labor, Bureau of Labor Statistics; Federal Statistical Office, Germany; National Bureau of Statistics of China; Ministry of Internal Affairs and Communications, Statistics Bureau (Japan); Korea National Statistical Office; Bureau of Trade and Economic Indices, Ministry of Commerce Thailand.

countries. Prices in South Korea and China fell just 1 percent between 1999 and 2003.

Global changes in trade policies have accounted for some of the decline in clothing prices. A growing web of bilateral trade agreements permitted the United States and the EU to tap the opportunities for lower processing costs in nearby countries. In the years following the 1994 implementation of the North American Free Trade Agreeement (NAFTA), Mexico replaced China as the largest single source of clothing exports to the United States.[17] The EU's use of free-trade agreements throughout much of the Mediterranean region and Eastern Europe means about 45 percent of EU imports have been sourced from the region. More recently, China has recovered its role as the top-ranked U.S. clothing supplier despite Mexico's preferential access, and has increased its exports to the EU as well.

Trade liberalization has also occurred under the aegis of the WTO. In 1995, the WTO's Agreement on Textiles and Clothing mandated lower tariffs, the progressive removal of import quotas, and more rapid growth in the quantities allowed under the remaining quotas. Under the ATC's provisions, the EU's quotas grew 64 percent between 1994 and 2004, while U.S. quotas grew 90 percent.[18] China's accession to the WTO in December 2001 was a milestone for global cotton markets, ensuring that the world's largest exporter participated in the liberalization of global textile trade.

Figure 3 indicates that although the U.S. and the EU receive a substantial portion of their clothing imports from preferential trading partners, such as Mexico (for the United States) and the Mediterranean region (for the EU), world clothing trade is dominated by U.S. and EU imports from other developing countries. Trade with these countries was largely governed by the MFA through December 2004.

## International Trade Increasingly Important

Opportunities for trade have been enhanced by lower shipping and transaction costs. While international shipping rates rose due to a surge in global merchandise trade and an increase in oil prices in 2004, the longer term trend has been significantly downward. At the end of the 1990s, unit costs of sea freight had declined almost 70 percent in real terms over the preceding 10-15 years, while air freight costs fell 3-4 percent annually during this period.[19] In addition, falling telecommunications and computing costs increased the efficiency of importing, permitting retailers to extend electronic data interchange (EDI) of sales and inventory data to manufacturers overseas as well as domestically.[20]

Trade liberalization and reduced transactions costs have helped expand imports of cotton products in developed countries. On a global basis, 31 percent of the clothing and other consumer products consumed in the world were imported in 2000, up from 23 percent in 1992.[21] Imports accounted for the majority of cotton clothing consumed by developed countries (see table 2). As of 2004, trade's role in world clothing consumption has probably increased, approaching 90 percent in the U.S. and Japan by some measures. [22]

[17]See ERS's Bilateral Fiber and Textile Trade database, *www.ers.usda.gov/data/fibertextiletrade/*

[18]United Nations Conference on Trade and Development (1998).

[19]World Trade Organization (1998).

[20]Barcode scanning allows retailers to electronically track product sales. With EDI, sales data can be shared with suppliers for timely inventory replenishment.

[21]International Cotton Advisory Committee/ Food and Agriculture Organization of the United Nations (2003).

[22]Clothing is traded in heterogeneous units (e.g., pieces, pairs, dozens), and aggregate measures of activity for the industry are reported in terms of value, square-meter equivalents, or units of weight. Import penetration estimates can vary depending on the units and product aggregation used.

Figure 3
**World clothing trade, 2002**

Bil. dollars
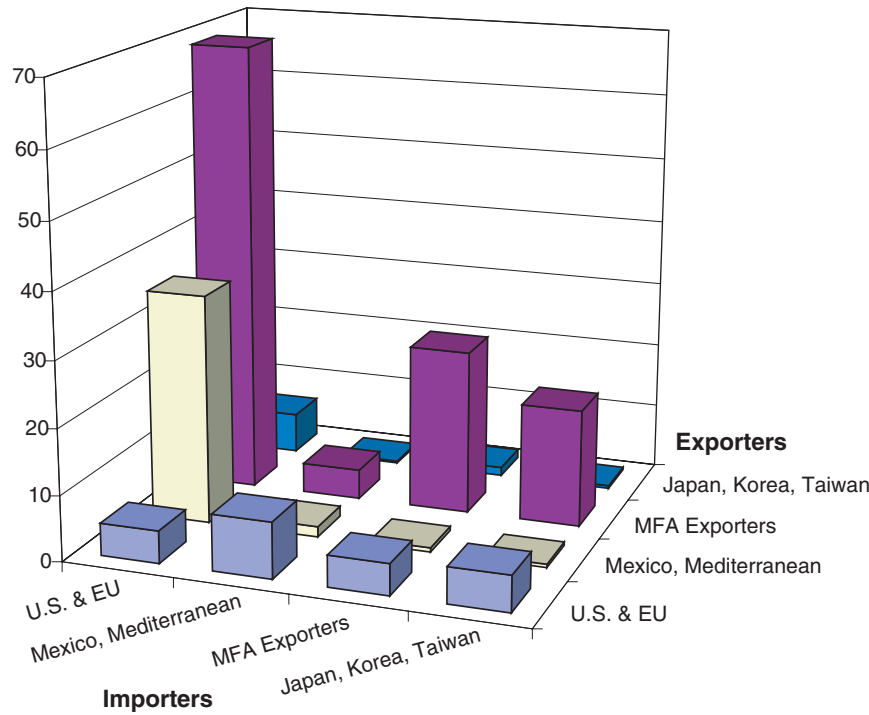


Note: "Mexico, Mediterranean" also encompasses the Caribbean Basin, Eastern Europe, and much of Sub-Saharan Africa—the countries with preferential access to the U.S. and EU markets. "MFA Exporters" is the rest of the world, which includes some countries outside the MFA, but is predominantly comprised of MFA-constrained exporters, such as China.

Source: U.S. Department of Agriculture, Economic Research Service (2004).

**Table 2—Imported share of cotton clothing**

|  | 1992 | 1996 | 2000 |
|---|---|---|---|
|  | *Percent* | | |
| United States | 32 | 45 | 63 |
| Japan | 29 | 43 | 61 |
| EU | 71 | 75 | 84 |

Source: International Cotton Advisory Committee/Food and Agriculture Organization of the United Nations (2003).

Rising incomes and falling clothing prices have driven demand for clothing higher, boosting world demand for fiber. Fiber prices have also fallen, ensuring that increased clothing consumption translates directly into increased fiber consumption.[23] Furthermore, cotton prices have fallen even more than prices for competing fibers. Just as fiber is only one portion of the bundle of goods and services that make up clothing, cotton is only one of the alternative fibers transformed into clothing. Cotton accounts for about 40 percent of global fiber use and has been losing ground to polyester for many years. While polyester prices during 1999-2003 were down 28 percent in real terms from the previous 5 years, cotton prices fell 35 percent, helping stabilize cotton's share of world fiber consumption.[24]

[23]Fiber prices also affect clothing prices—U.S. retail prices for men's blue jeans have a 30-percent correlation with cotton prices (Messura, 1996).

[24]Rising petroleum prices have likely constrained declines in polyester prices in recent years.

Since the commercial introduction of polyester in 1949, cotton's role in world fiber consumption has been retreating. As early as 1965, cotton came to account for less than 50 percent of household consumption of fiber-based products in developed countries. Since 1997, developing-country consumers have also relied on cotton products for less than 50 percent of their household consumption. The adoption of synthetic fibers has, however, slowed in recent years, due in part to shifting global price trends.

# Trends in Production and Consumption After the MFA

The world is entering the post-MFA era led by several trends in addition to those cited in the previous section. Investment in textile production has grown significantly in China as well as in India and Pakistan. Meanwhile, disinvestment has occurred in North America, the EU, and higher income East Asia. These two trends are clearly linked. U.S. textile plants have been shut down, disassembled, and shipped to a number of countries, most prominently, China, India, and Pakistan.[25]

[25]Sparshott (2004).

Macroeconomic developments have had a bearing on changes in the location of textile and clothing production in recent years. The U.S. dollar, after rising dramatically in value during the last half of the 1990s and reaching a peak in 2001, has been steadily losing value on international markets. In recent years, the Chinese economy has started booming. Economic growth in China has spurred a strong rebound across East and Southeast Asia. The consumer society that appeared first in higher income Asian countries like Korea and Thailand, and then in China, has more recently taken hold in India.

## Textile Production To Continue Falling in the United States and the EU

Domestic clothing production in the United States and the EU is likely to continue declining after 2005 but will not disappear. "Lean retailing" practices ensure important niches will remain for U.S. and EU producers. Retailers in the developed countries have adopted practices that reduce overhead by eliminating warehousing and inventory functions and by relying on more rapid response and careful management of deliveries from manufacturers. Technological change, such as the development of EDI, has transformed the industry. EDI has proved particularly successful in facilitating inventory management of "basic" goods that are sold year-around and for years at a time.[26] Following the development of bar codes, retailers used EDI to better coordinate production and shipment schedules with manufacturers, eliminating the need for large inventories. For manufacturers close to retail distribution centers, reduced shipping times can make them preferred suppliers.

[26]Men's jeans and underwear are examples of "basic" goods. See Abernathy et al. (1999) for an extensive discussion on the significance of EDI and modern inventory management for basic goods sourcing.

Shipping merchandise from Mexico and Central America to the United States takes 1-6 days. By contrast, shipping goods from southern China to the U.S. west coast takes 11-15 days, and it takes 25 days to ship goods from India. However, the extension of EDI to include overseas firms is increasing China's competitiveness. With improved efficiency and reliability, firms producing in southern China, often through intermediaries in Hong Kong, have become an attractive sourcing option for many basic clothing products despite their great distance to developed-country markets.

Demand for newly introduced products, or for those at the end of their product cycle, is highly variable, enhancing the benefit of minimal shipping times in "quick-response" strategies by manufacturers. Producers in the United States and the EU will be more successful in these niches. Furthermore, by reducing the cost of product differentiation, lean retailing has also

facilitated product proliferation, expanding these and other niches for higher cost producers of basic products.[27]

In contrast with basic goods, "fashion" items are often sourced on a one-time basis and with smaller production runs.[28] Imported goods already account for much of the fashion items sold in developed countries, since timely inventory replenishment is not an issue, and their production often has small economies of scale. The removal of the MFA quotas is likely to increase the level of such imports. However, as with basic goods, proximity allows quick response, again leaving niches for producers in the United States, the EU, and nearby countries. For example, the Spanish retailer Zara is vertically integrated into manufacturing. and produces almost entirely within Europe. Zara takes products from the design stage to retail delivery in as little as 3 weeks. Abernathy et al. note that in the late 1990s most clothing products had a comparable cycle of 40-50 weeks.

With developed-country apparel producers filling nontrivial market niches, local textile producers there will still have customers and will demand fiber to make fabric for clothing. Cotton consumption in 2005 is, therefore, not expected to drop precipitously in the United States, Mexico, the EU, and Turkey. Furthermore, the long-anticipated MFA phaseout influenced investment in the capital-intensive textile sector well before 2005, shifting capacity out of developed countries. The ability of the U.S. textile sector to maintain capacity in recent years was also constrained by an above-average U.S. exchange rate. As a result, some of the geographic shifts in industrial demand for fibers pre-dated 2005.

## Exporters Differentiated by Timeliness as Well as Wages

The time and cost to produce a garment can be balanced in various ways. Assembling a men's shirt may require 12 minutes of sewing, but those 12 minutes can be spread over 30 days or 5 days depending on the urgency of the order. The cost and time required to produce a garment reflects a combination of the prevailing wages, productivity of the workforce, managerial skill, and the reliability of local input supplies and infrastructure. For example, while wages in Bangladesh and India are half those in China (which are one-tenth of U.S. wages), orders from China require only 60 days' lead time for delivery. For India, the lead time ranges from 90 to 120 days; for Bangladesh, 120 to 150 days.[29]

Industry sources and economic studies indicate that China and India will see the largest gains in clothing exports and output in the years after the MFA's removal. China's exports soared in the first months after December 2004, supporting this projection. In some cases, these gains will be at the expense of other lower income clothing exporters, like Bangladesh, Mauritius, and Mexico. Without the quota system, sourcing from these countries is far less attractive for importers in the United States and the EU.

Cotton is not directly consumed by clothing producers, but is an input for the yarn and fabric that clothing manufacturers purchase. In the post-MFA world, cotton consumption is expected to increase in India, China, and

[27]Beath and Katsoulacos (1991) provide a theoretical discussion.

[28]"Fashion" items include much of women's clothing, although Pashigian (1988) notes white shirts accounted for 72 percent of U.S. men's dress shirts sold in 1962, but only about 20 percent by the 1980s. Patterned or colored shirts are more subject to changes in taste over time, and in some cases will be a fashion item.

[29]Local or nearby fabric supplies help reduce lead times. The least sophisticated clothing producers assemble pre-cut pieces of fabric, and lead times include procurement of these pre-cut components. A firm offering "full-package" production is responsible for procuring fabric and other components such as zippers, as well as cutting and sewing.

Pakistan as their textile industries supply domestic clothing producers and those in other countries with yarn and fabric. Cotton consumption is, expected to decline in many other textile-producing developing countries, such as Mexico and Mauritius. Bangladesh and Central American producers may also lose their competitiveness in clothing to lower cost producers in a global market free from quota restrictions. Similarly, U.S. and EU mills would be expected to use less cotton as the number of their local clothing manufacturers is reduced.

The outlook for cotton consumption in such countries as Taiwan, South Korea, Indonesia, and Thailand is less obvious. Clothing production, in contrast to textile production, is not easily automated, and remains a labor-intensive activity. For this reason, clothing is a classic growth sector especially suitable for low-income countries having a relative abundance of low-cost labor. As incomes rise in these countries, wages also rise, rendering traditional producers less competitive. Eventually, economic dynamics induce shifts in the location of clothing production to other countries as patterns of comparative advantage change. Today, neither South Korea nor Taiwan rank among the world's top ten net clothing exporters (table 3), while Indonesia and Thailand are ranked eighth and ninth.

## Textile Production Shifting to Lower Income Countries

Had the MFA been removed in the early 1980s, South Korea and Taiwan would have probably increased their clothing exports and cotton consumption. In the early 1990s, the same would have likely held for Thailand and Indonesia.[30] But incomes have risen in these countries, and the productive capacity of China and India has increased. Since the economies of South Korea, Taiwan, and Thailand are more capital rich than China's, these newly industrialized countries would appear to be a natural source of fabric for China and other low-cost clothing exporters. Globally, South Korea and Taiwan outrank China as net textile exporters (table 3). While Indonesia is barely among the world's top ten, on a per capita basis it exports many more

[30]See Trela and Whalley (1990) and Hertel et al. (1996) for examples.

**Table 3—Leading destinations and sources for world textile and apparel trade, 2002[1]**

| Clothing, net imports | | Clothing, net exports | | Textiles, net imports | | Textiles, net exports | |
|---|---|---|---|---|---|---|---|
| | | | *Billion dollars* | | | | |
| US | 60.7 | China | 39.9 | US | 6.3 | Taiwan | 8.4 |
| Japan | 17.1 | Turkey | 7.8 | Mexico | 3.4 | Korea | 7.5 |
| UK | 11.4 | Hong Kong | 6.7 | UK | 2.6 | China | 7.5 |
| Germany | 10.8 | Italy | 7.0 | Romania | 2.1 | Italy | 6.0 |
| France | 6.4 | India | 6.0 | Poland | 1.8 | India | 5.1 |
| Russia | 3.6 | Mexico | 4.4 | Canada | 1.6 | Pakistan | 4.6 |
| Switzerland | 2.7 | Bangladesh | 3.9 | Morocco | 1.3 | Belgium | 2.8 |
| Spain | 2.1 | Indonesia | 3.9 | Tunisia | 1.2 | Germany | 2.2 |
| Netherlands | 2.1 | Thailand | 3.2 | Australia | 1.2 | Indonesia | 2.0 |
| Canada | 2.0 | Romania | 2.8 | Sri Lanka | 1.1 | Japan | 1.5 |

[1]See ERS's Bilateral Fiber and Textile Trade database for more details, www.ers.usda.gov/data/fibertextiletrade/

Source: WTO, and United Nations.

textiles than China. However, in recent years, industrial consumption of cotton has already either declined significantly or stagnated in these four newly industrialized countries as China's capacity has increased.

The MFA's direct impact was primarily on clothing. For example, the ETE on China's textile exports was half that for clothing in 2002 (see table 1). Increasing clothing exports by one country, however, can boost exports of textiles by other countries if the clothing industry imports fabric. For example, until recently, China's lack of capacity for finishing fabric necessitated large imports from Japan, South Korea, and Taiwan to supply its clothing industry. While China still imports fabric for processing into clothing, it has increased it capacity to supply its own clothing sector with domestically produced fabric, following a reported $24-billion investment in textiles since 2000.[31] India reports less than half as much investment in textiles. However, India's capacity to produce textile inputs to produce clothing has also increased substantially. With substantially improved capacity in India and China, cotton consumption is likely to decline in Taiwan and South Korea and increase by only a small amount in Thailand and Indonesia.

[31]National Bureau of Statistics of China.

## Outlook for World Cotton Consumption

While households do not purchase cotton themselves, household clothing purchases are what ultimately determine the consumption of cotton. World cotton consumption has been growing strongly in recent years, largely due to increased demand for clothing by increasingly affluent Asian consumers. However, demand has been far less favorable in developed countries. Trends have been weak for clothing consumption in much of the developed world in recent years, particularly for cotton products. Spending on clothing has lagged in Japan and Germany, and while spending has been relatively stronger in the United States, it has not been sufficient to significantly offset declines elsewhere.

World cotton consumption is not expected to be strongly affected by the removal of the MFA quotas because the overall demand for clothing is not likely to change fundamentally. Clothing consumption is likely to increase in the United States and the EU as prices fall in response to the total elimination of quotas. Clothing (and home furnishings) consumption in these markets accounts for about 40 percent of the cotton fiber products sold worldwide (fig. 4). Clothing prices in the rest of the world would face upward pressure as demand rises in the United States and the EU and world prices equalize (appendix). Trade barriers and product differentiation will probably insulate many developing countries from this effect, but Japan, Australia, and, to some extent, the Middle East could see import costs rise as a result of global trade liberalization. These markets have high import penetration, reflecting openness to trade, and consume products similar to those imported in U.S. and EU markets.

## Outlook for Clothing Prices in the United States and the EU

While the quotas added 20 percent to the average price of imports from some countries, clothing prices in the United States and the EU are likely to

Figure 4

**Global household cotton product consumption, 2000**
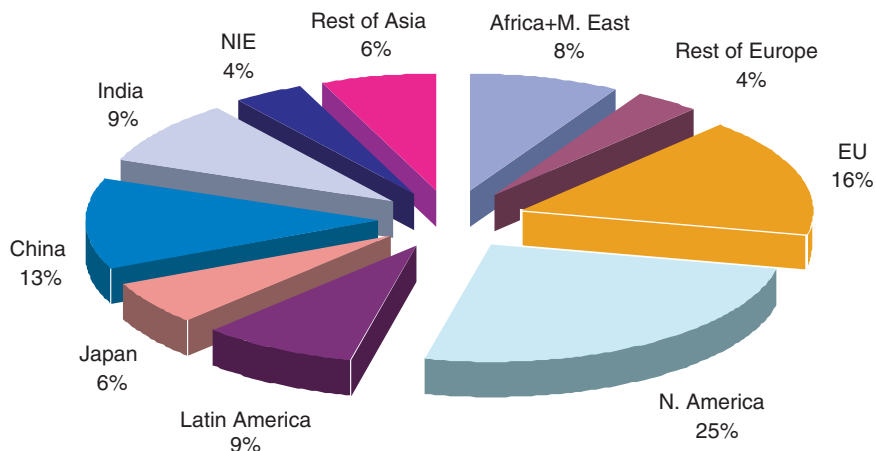


Note: EU is EU-15; North America is Canada and the United States; NIE is Newly
Industrialized East Asia (Hong Kong, South Korea, Singapore, and Taiwan); and
Rest of Europe includes Russia and other former members of the Soviet Union.

Source: International Cotton Advisory Committee/ Food and Agriculture Organization
of the United Nations (2003).

drop by substantially less with the removal of the MFA. Some of the savings
from quota elimination could be absorbed along the marketing chain.
However, no segment within the chain has obvious market power. For
perspective, U.S. apparel retailing remains less concentrated than grocery
retailing on a national level even though U.S. retailing has become more
concentrated in recent years. The recent merger of K-Mart and Sears will
further increase the four-firm concentration level of apparel retailing.[32]

Moreover, price adjustments from quota removal are likely to be spread out
over several years. The costs of the bilateral quotas were not confined to the
payments some firms needed to obtain export licenses. On the one hand, the
license prices might have understated the rents created by the system of
quotas.[33] Furthermore, competition for quota rights involved inefficient
investment in physical and human capital. Shifting these investments to
realize all potential efficiency gains could take years. Some of the adjust-
ments undoubtedly began before 2005 due to the gradual phaseout of MFA
quotas. Others will likely occur now that these quantitative restrictions have
been fully removed.

Quota removal also promises to change the mix of clothing products
imported by the United States and the EU. Quota-constrained exporters
move into higher valued product categories in order to maximize profits per
unit exported. Without MFA quotas, exporters will likely be more willing to
supply lower cost qualities of clothing. The removal of distortions in the
composition of clothing trade is an important source of the welfare gains of
quota removal.[34]

[32]U.S. apparel retailing's four-firm
concentration was 23 percent in 2001,
and would have been 27 percent with
the merger. Grocery retailing's concen-
tration was 31 percent in 2002.

[33]Krishna and Tan (1998) point out
that importing firms may have cap-
tured some of the rents associated with
the quota system (appendix).

[34]Feenstra (1995). See appendix for
discussion of the welfare impacts of
quotas.

## Prospects for U.S. Household Cotton Product Consumption

Consumers in the United States indirectly purchase more fiber in their clothing and home furnishings than any other market, surpassing even the EU. In 2000, 20 percent of the world's annual consumption of fiber was embodied in products sold in the United States. For cotton, the U.S. share was 24 percent. Through their clothing purchases, U.S. consumers accounted for a substantial share of the growth in total world demand for cotton during the 1990s. However, U.S. household demand weakened thereafter, growing at only a 1-percent annual rate after 1998. U.S. consumer demand for cotton products is unique—not only is the U.S. share of total fiber consumption higher than that of any other developed country, but the United States has the world's only significant consumer promotion effort for cotton.[35]

The removal of all MFA quotas on December 31, 2004, is likely to lead to lower clothing import prices in the United States. The 1995 Agreement on Clothing and Textiles called for a phased removal of bilateral quotas over a 10-year period, providing time for producers to prepare themselves for adjustments to a more open international market. But, the agreement permitted the "backloading" of quota removal. Strictly speaking, importing countries were not obliged to remove virtually any quotas in the initial stages of the phaseout. Importing countries were only obliged to forgo the right to impose or maintain quotas for a given share of their imports, for example, 16 percent of their imports in the first phase of liberalization (1995). This 16-percent share could include products not yet protected by quota, and largely did. The same was true of the second phase (1998), and, to a lesser extent, the third phase (2002). As a result, 80 percent of the effective quotas in the United States remained in place through 2004, according to the International Clothing and Textile Bureau (2001). Given this backloading of quota removal, the full impact of the ATC on U.S. market prices has yet to be realized.

U.S. price reductions associated with trade liberalization for clothing and textiles is likely to have a larger than average impact on cotton products because 60 percent of net textile product imports are made of cotton rather than polyester, wool or other fibers. Also, developing countries have traditionally been more competitive in cotton-based than man-made-fiber-based products. As a result, gains in U.S. household consumption of cotton are likely to be higher after 2004 than before.

One potentially offsetting factor is the weakening of the U.S. dollar on foreign exchange markets. The declining international value of the dollar, which began its descent in early 2002, exerted upward pressure on domestic prices in 2004. Not surprisingly, the U.S. consumer price index for apparel began to rise in nominal terms for the first time since 1998. However, studies of the "pass-through" of exchange rate changes to changes in domestic U.S. prices have indicated that only about half of the changes in the U.S. exchange rate are reflected in changes in U.S. prices. For apparel, the proportion is even less.[36] The fact that the largest exporter to the United States, China, has a nominal exchange rate that has been fixed at 8.3

[35]Lewis (2002). Cotton Incorporated's 2003 budget for domestic marketing operations totaled $31.3 million.

[36]See Goldberg and Knetter (1997) for general conclusions. See Olivei (2002) and Pollard and Coughlin (2003) for results specific to U.S. textiles.

renminbi per dollar since 1995 limits the role a weakened dollar can play in raising U.S. clothing prices.

## EU and Japan Consumer Spending Lagging

The EU, just like the United States, is likely to see lower clothing prices in 2005 following the MFA quota removal. Furthermore, the rise in the value of the euro is likely to continue to exert downward pressure on domestic EU clothing prices.[37] The euro has strengthened significantly, rising 30 percent in real terms against the dollar between spring 2002 and late 2004.

Marketing margins, however, are higher in the EU than in the United States, suggesting that changes in spending may not completely translate into changes in fiber demand. Also, clothing expenditures have been rising slowly throughout the EU in recent years, as consumers, particularly those in Germany and France, increasingly prefer to save rather than consume (table 4). The conservative pattern of spending is likely to continue in the foreseeable future, particularly limiting increases in EU household demand for products made of cotton. Recent research suggests cotton product consumption is more income responsive in Germany and France than elsewhere in the EU.[38]

In Japan, cotton's share of the fiber embodied in household purchases and total consumer spending have been weak, as in the EU, and marketing margins are even higher than in the EU. Japan's spending on clothing during 1993-2003 was even weaker than that of France and Germany. All other things being equal, economic theory suggests clothing prices could rise in Japan as a result of the elimination of the MFA (appendix). Japan could offset some of this price change through its own textile trade policy

[37]Exchange-rate pass-through is reportedly greater in the EU than the United States (Campa and Minguez, (2002). See Uctum (2003) for similar results for Japan.

[38]Lopez and Malaga (2004).

**Table 4—Changes in GDP, clothing prices, and personal consumption expenditures on clothing, 1999-2003**

| Country | Real GDP | Real clothing prices (local currency) | Personal consumption expenditures, clothing (real) | Share of global cotton consumption, 2000 |
|---|---|---|---|---|
| | ——— Percent change ——— | | | Percent |
| China | 36 | -1 | 41 | 12 |
| United States | 10 | -15 | 19 | 24 |
| Korea | 24 | -1 | 19 | 3 |
| France | 8 | -6 | 0 | 4 |
| Germany | 4 | -5 | -3 | 4 |
| Japan | 5 | -5 | -12 | 6 |
| Turkey | 13 | -8 | — | 4 |
| Brazil | 8 | -10 | — | 4 |
| Thailand | 20 | -3 | — | 1 |

Note: — indicates no data available.

Sources: National Bureau of Statistics of China; U.S. Department of Labor, Bureau of Labor Statistics, and U.S. Department of Commerce, Bureau of Economic Analysis; Korea National Statistical Office; Ministry of the Economy, Finance, and Industry, National Institute for Statistics and Economic Studies; Federal Statistical Office, Germany; Ministry of Internal Affairs and Communications, Statistics Bureau; Republic of Turkey, Prime Ministry State Institute of Statistics; Brazilian Institute of Geography and Statistics; Bureau of Trade and Economic Indices, Ministry of Commerce Thailand; National Statistical Office, Ministry of Information and Communication Technology; International Cotton Advisory Committee/Food and Agriculture Organization of the United Nations (2003); and Global Insight.

(officially characterized as "market surveillance"). Furthermore, structural change in Japan's distribution sector has been favorable. Product distribution has been notoriously inefficient in Japan, but recent deregulation and the rise of discount retailing have helped reduce marketing margins, trends that are likely to continue.

As in the EU, trends in clothing consumption have been weak in Japan. Clothing spending has declined 8 percent in real terms since 2000. Household cotton product consumption in Japan declined in the last few years and unless consumer sentiment improves, the prospects for significant gains in consumption are poor.

## China's Consumer Spending Booms

The booming U.S. economy defined much of the decade before 2001. More recently, China's economic surge has taken center stage. China's demand for raw materials since becoming a member of the WTO has helped commodity prices rebound as its exports of manufactured products have soared. Rising incomes have profoundly transformed the lives of millions of China's consumers. China is now the world's fastest growing economy, with reported GDP growth exceeding 9 percent in 2004. China tightened lending requirements in 2004, seeking to moderate its economic expansion. Slower growth is expected in 2005, but GDP is still expected to expand at least by 7 percent for several years.

China is widely recognized as the world's largest producer and exporter of textiles. However, China is also one of the world's largest consumers of textiles. While per capita urban incomes reached only $1,000 in 2003, the lower cost of services and other nontradables in China means that household income based upon purchasing-power-parity (PPP) is about $5,000.[39] According to data from China's National Bureau of Statistics, real clothing spending nationwide rose 41 percent between 1999 and 2003 (table 4). Annual growth rates have ranged between 10 and 15 percent since 2001.

[39]PPP adjustment from the International Comparison Program (World Bank, 2002).

Because current data on the fiber embodied in household's purchases in China is limited, the volume and mix of fibers in these purchases can only be hypothesized. For many years, China subsidized its synthetic fiber industry through petroleum subsidies and import protection. Consequently, household cotton product consumption in China declined even as total fiber product consumption rose strongly. According to the World Bank (1997), China's petroleum subsidies were largely gone by 1995, slowing consumers' shift to products containing synthetic fibers. ERS analysis shows that household consumption of cotton products in China has recently stabilized. Undoubtedly, much of China's additional spending on clothing in recent years was devoted to increasing the quality and retail services associated with clothing rather than simply increasing the consumption of fiber. The International Cotton Advisory Committee has estimated that household consumption of cotton products in China grew at a 3.6-percent annual rate since 2000.[40] Economic growth forecasts for China suggest that this trend would continue.

[40]International Cotton Advisory Committee (2004).

## Cotton Consumption Grows in Developing Asia

The consumer society emerging in China appeared even earlier in higher income Asian countries, and most recently has started to take hold in India. Products purchased by Indian consumers account for more cotton than the products purchased in almost any other country (fig. 4). India has also seen above-average economic growth in recent years, driving clothing consumption higher. Domestic policies in India were long biased against manmade fibers, ensuring consumers largely purchased cotton products. Market liberalization during the 1990s removed some of this bias, contributing to a declining share for cotton products in Indian household consumption. More recently, cotton products' share of household demand has stabilized.[41] India's economy and consumer spending are expected to continue rising in 2005 and beyond, and consumers appear to have responded positively to recent industry efforts to promote cotton products, based on recent surveys. The end of the MFA quotas could, however, result in higher clothing prices in India (just as in China) somewhat dampening demand increases, although market segmentation may minimize this in the short run.

Elsewhere in Asia, clothing consumption slowed with the Asian financial crisis but then rebounded. Financial sector restructuring throughout the region helped encourage consumers to shift from saving to spending.[42] For example, real expenditure on clothing rose 19 percent in Korea between 1999 and 2003. Consumer credit is now much more widely available throughout Asia. As a result, developing Asia has replaced North America over the last 5 years as the source of growth in world household consumption of cotton fiber. Clothing is just one of a number of consumer goods where markets are increasingly influenced by Asian consumers as well as producers.

[41]Textile Committee (2002).

[42]Rohwer (2001).

# Future Developments

World cotton consumption is expected to grow 8 percent in marketing year 2004/05, which includes the first year of the post-MFA era.[43] The removal of the textile quotas has had only a minor impact on this forecast. The impact of MFA liberalization on total world cotton consumption is likely to be small and spread out over the years preceding and following the December 2004 elimination of MFA quotas. The removal of these quotas is expected to affect the geography of textile production more than the level of worldwide consumption. Developed country consumers will, however, consume more cotton products, and developing country textile mills will consume more cotton fiber.

The removal of MFA quotas has and will continue to affect the geographic distribution of industrial production. The economics of comparative advantage favors production of clothing in lower income countries. The MFA quota phaseout has empowered market forces of demand and supply to relocate production. Market forces will continue to influence decisions about location that will undoubtedly reshape the landscape of production after 2005.

Strong economic growth, particularly in Asia, and falling cotton prices have driven world cotton consumption to above average growth rates in recent years. These factors account for much of the expected strong performance in 2004/05. In the longer run, world consumption growth for cotton is expected to again slip below the 1980-2004 annual rate of 1.6 percent, as developing Asia's economic growth rates slow, converging with those of the rest of the world.[44] However, gains in world cotton consumption over the next decade are expected to outpace the poor performance of the 1990s. Continued strong income growth is expected to support increased consumption in developing countries, and continued adjustment to trade liberalization is expected to kindle increased consumption in the United States and the EU.

As with any forecasts, much uncertainty remains. China's economic expansion has seemed relentless. However, reports of rising labor costs and electric power shortages suggest costs there are rising. Moreover, China's exchange rate, which has been firmly tied to the U.S. dollar for about a decade, is viewed as being overvalued. Forward trading in foreign exchange markets suggest a revaluation is possible, but these markets also foretold a devaluation that failed to materialize late in the 1990s. A successful revaluation of the renmimbi would also tend to increase the cost of producing in China relative to the rest of the world.

There are also many unresolved issues regarding the potential effects of quota removal on trade policy in importing and exporting countries. China imposed export duties on about 60 percent of its clothing exports in December 2004, to help alleviate concerns about its post-MFA export prospects. Also, China's WTO accession agreement included provisions for importing countries to impose special safeguards on textile and apparel imports from China through 2008. If invoked, these safeguards limit annual import growth to 7.5 percent on a product specific basis for 1 year. The

[43]U.S. Department of Agriculture, Economic Research Service (2005).

[44]See ERS's Agricultural Baseline Projections briefing room for an overview, *www.ers.usda.gov/Briefing/Baseline/*

United States imposed safeguards on three products in 2003.[45] In October 2004, the U.S. textile industry requested that the U.S. government extend product safeguards established in 2003 and cap China's shipments on trousers, shirts, and sheets.

More recently, Turkey announced plans to limit textile imports from China in 42 product categories, the European Commission has expressed concern about China's textile exports, and the U.S. Committee for the Implementation of Textile Agreements initiated safeguard proceedings in early April 2005 to determine whether imports of certain Chinese origin textile and apparel products are contributing to the disruption of the U.S. market.[46]

Although the MFA quotas have been completely phased out, other policy instruments, such as tariffs and preferential agreements, will affect the market. Tariffs on textiles and clothing remain significantly higher than tariffs on most manufactured products. Countries with preferential market access typically pay lower tariffs, and this will also influence future production trends. For example, the EU is considering regulations that would move China to a less preferential duty category. On the other hand, more preferential access can be extended, such as the proposed Central America Free Trade Agreement under current consideration in the United States.

[45]Knit fabrics (Category 222), brassieres (Category 349/649), and robes and dressing gowns (Category 350/650). See the U.S. Department of Commerce website for information on requests for China Textile Safeguard Action in 2004: http://otexa.ita.doc.gov/Safeguard_intro.htm

[46]Cotton knit shirts and blouses (Category 338/339), cotton trousers (Category 347/348), and cotton and man-made fiber underwear (Category 352/652).

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# Appendix: The Impact of Quotas on World Clothing Trade

A simple framework can illustrate how the Multifiber Arrangement (MFA) quotas affected world clothing trade, prices, consumption, and production. In Appendix figure 1, quota-imposing countries' domestic clothing production is shown as[1],

$$S_d = a + bP,$$

where $S_d$ is domestic production and $P$ is the domestic price. Domestic consumption is illustrated as,

$$D_d = c - dP.$$

With no imports or exports, $S_d = D_d$, (point E in the figure). The rest of the world also produces and consumes clothing, and does so at a lower price. When imports are possible, the total supply ($S_t$) available to consumers in the quota-imposing country is the domestic supply plus the rest of the world's excess of production over consumption:

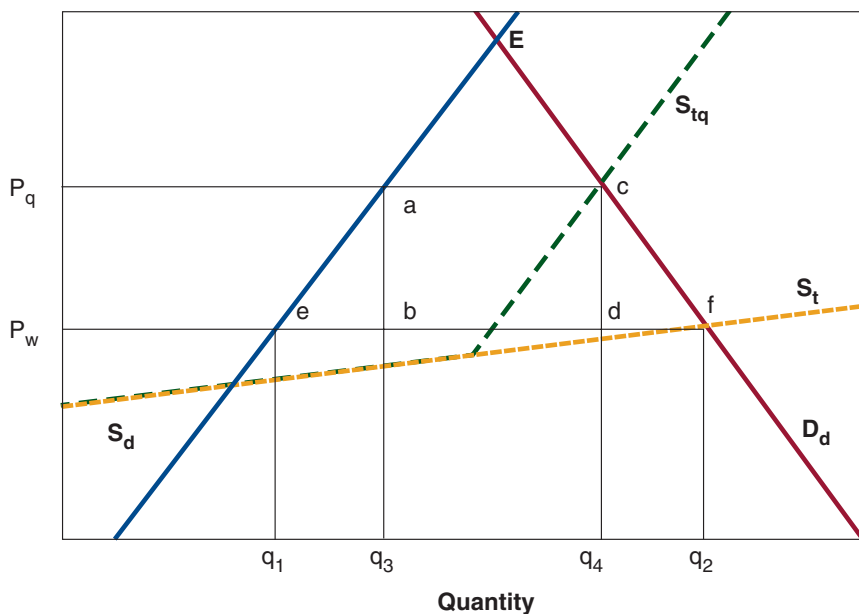$$S_t = S_d + \Sigma(S_d - D_d)_i ,$$

where $\Sigma(S_d - D_d)_i$ is the sum of excess supply in every other country in the world. This excess supply, and the price at which it is available, $P_w$, is determined by a global market equilibrium that includes the quota-imposing countries.

Market equilibrium with free trade, $S_t = D_d$, is at point "f" in Appendix figure 1, where the quantity $q_2$ is consumed at the price $P_w$. At this price,

Appendix figure 1

**Quota-imposing countries**

**Price**



**Quantity**

*The Forces Shaping World Cotton Consumption After the Multifiber Arrangement*
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domestic production is $q_1$, resulting in imports of $q_2 - q_1$. If the U.S. has an import quota, the quota prevents $\mathbf{S_t}$ from ever exceeding $\mathbf{S_d}$ by more than the quota. Total supply with a quota becomes $\mathbf{S_{tq}}$, which intersects $\mathbf{D_d}$ at "c." Price rises to $P_q$, and with consumption lower ($q_4$) and production higher ($q_3$), imports are smaller, at $q_4 - q_3$, which equals the quota.

Since the rest of the world is no longer permitted to supply the quota-imposing countries with more clothing than the amount $q_4 - q_3$, the price of clothing in the rest of the world falls. Thus, importers that don't impose quotas import more (app. fig. 2)[2], and exporting countries export less (app. fig. 3)[3], at the price $P_q{'}$.

In this framework, consumers are assumed to be indifferent to the source of their clothing. While households have demonstrated a willingness to consume clothing from almost any country, retailers and importers may have a more heightened interest in the source of clothing, but no such differentiation is assumed here.

## Extensions of the Framework:  Exchange Rates, Welfare Effects, Quota Rents

In this framework, a currency devaluation by the quota-imposing countries has no impact on either the domestic price of clothing or the amount consumed when quotas are constraining imports. Within a relatively broad range, changes in the exchange rate have no effect on $\mathbf{S_{tq}}$. For example, a stronger currency will shift $\mathbf{S_t}$ downward in Appendix figure 1, as the free trade price of clothing falls in local currency terms, but $P_q$ will be unchanged.

When quotas are imposed, clothing imported by the quota-imposing countries receives a higher price than clothing in the rest of the world. Consumers in the
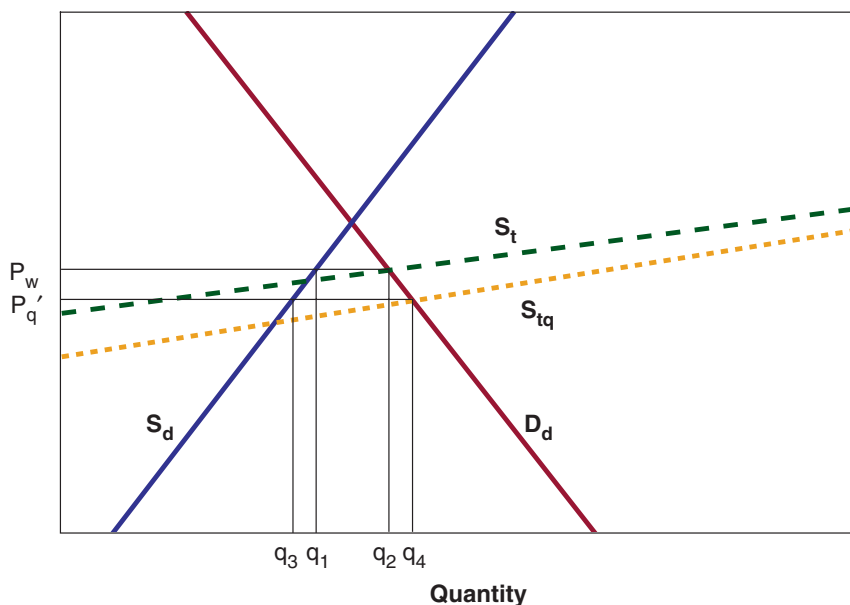
[2]Appendix figure 2 illustrates importers that do not impose MFA quotas, including much of the Middle East, Russia, Switzerland, and Japan. This figure shows no trade barriers, although Japan's and Switzerland's "market surveillance" does affect imports.

[3]Appendix figure 3 illustrates competitive exporters, which includes China, India, and Pakistan, among other countries.
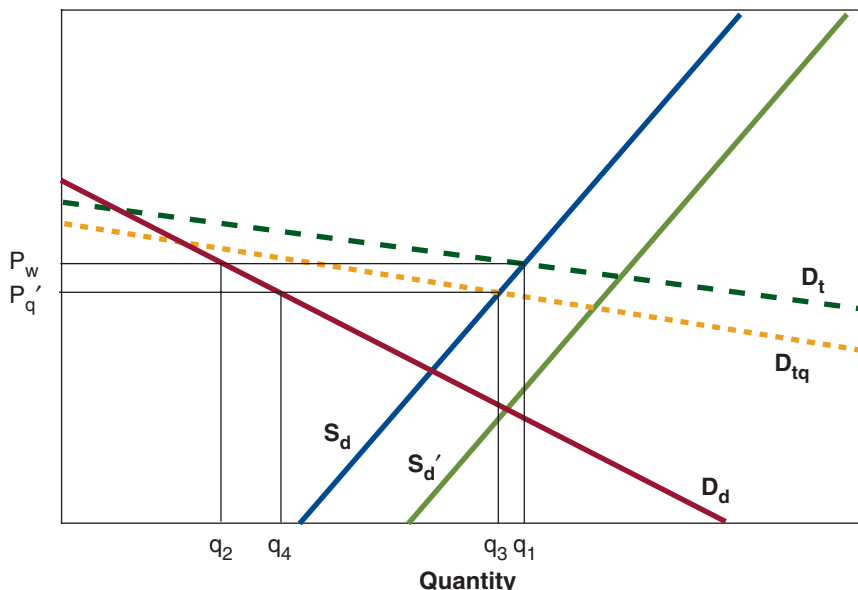
Appendix figure 2

**Nonquota-imposing importing countries**

**Price**



**Quantity**

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**Competitive exporting countries**

**Price**



Note: Equilibrium in the exporting countries is illustrated with total demand ($D_t$) rather than total supply ($S_t$). Total demand is domestic demand plus excess demand from the rest of the world: $D_t = D_d + \Sigma(D_d - S_d)_i$. Also, $D_{tq}$ is the total demand producers in exporting countries face when the United States and other countries implement quotas.

quota-imposing country see their welfare decline as they pay more for imports, and pay more for a larger amount of domestically produced clothing. These are transfers of welfare from consumers to producers. The welfare of consumers in the United States is further reduced by "deadweight losses," which are the consequence of reduced opportunities for exchange.

The transfer from consumers to producers in the quota-imposing countries equals the area in Appendix figure 1 within the points $P_q$, $P_w$, e, and a. The deadweight losses there equal the area of the triangles within the points e, a, b and d, c, f. However, welfare improves in other importing countries as lower world prices increase the opportunity for exchange. In appendix figure 2, welfare improves in the non-quota-imposing importers as lower world prices improve their terms of trade with the rest of the world, and their imports increase. The two smaller triangles in appendix figure 1 illustrate the increases in welfare in addition to the transfers from exporting countries. Global welfare declines as the deadweight losses exceed the gains.

Quota rents are generally considered transfers from consumers in the United States and other quota-imposing countries to exporting countries. Exports to the quota-imposing countries are sold there for $P_q$ in appendix figure 1, which is above the free trade price, $P_w$, and above the world price with quotas, $P_q'$. The excess earnings stemming from restricted trade with quotas in place are referred to as quota rents, and equal the area of the rectangle in appendix figure 1 with the points a, b, c, and d.

In an otherwise competitive market, an exporter would be willing to purchase the right to export to the United States for $P_q - P_q'$ dollars. This is important

because measuring the degree of import protection offered by a quota is not as straightforward as with a tariff. In this example, $P_q$ is about 20 percent higher than $P_q{'}$, which is a measure of the degree of protection in the model. In real life, a simple comparison like this is difficult due to product differentiation, transportation, and other factors. Sales prices for the right to export to quota-imposing countries (license prices or quota premiums) were sometimes available, and have been used to estimate the "export tax equivalent," or ETE, of MFA quotas.

## Impact of Removing the MFA

Removing the quotas means total supply and total demand in the three appendix figures returns to $S_t$ and $D_t$, in the importing and exporting countries, respectively. However, MFA removal is expected to have an effect not captured in the static, single market model illustrated here. The less competitive exporters are able to export a certain amount while quotas are in place because resources were shifted to these countries from quota-restricted competitive exporters (see app. fig. 3). Removing the quotas also removes the incentive to keep resources in these less competitive countries. In this illustration, resources would flow back to the competitive exporters. This shifts $S_d$ in the figure to $S_d{'}$, increasing exports from the competitive exporters. In a graph for a country losing resources, the new supply curve would be on the other side of the original supply curve, and exports would decline.

Removing the MFA quotas does not necessarily result in larger world consumption of clothing. Removing the quotas reduces the price of clothing in the quota-imposing countries, and consumption rises there. But in the model used in these illustrations, the price responsiveness of consumers in the rest of the world is greater, and world consumption is actually lower without the quotas. This example does not account for all the possible effects of MFA reform. Quota administration consumes resources, and rent-seeking behavior adds to production costs around the world. Also, more efficient allocation of resources would be expected to increase incomes. These factors suggest lower production costs (shifts in the supply curves) and higher consumption (shifts in the demand curves) that this simple model does not capture. Computable general equilibrium (CGE) models have been used to capture these additional effects and typically show a small increase in world consumption stemming from liberalization.[4]

Finally, the use of license prices to determine the degree of protection offered by the MFA quotas carries some dangers, with implications for interpretation of the results from studies using these prices. One danger of using license prices is that they might reflect a longrun right to export, since past export performance is often used to assign quota rights. In this case the license price overstates the protection offered by the quota because the license purchase price is for long term stream of quota rents. License prices may also overstate the impact of quotas since they reflect $P_q - P_q{'}$ which is greater than $P_q - P_w$, the true difference between earnings with and without quotas. Another danger is that retailers, importers, or other intermediaries might capture some of the difference between $P_q{'}$ and $P_q$, reducing the value of the right to export. In this case, the impact of the quota on trade is understated by the license price.[5]

[4]Hertel et al. (1996) report a 0.32-percent increase in global textile output stemming from MFA removal. Yang et al. (2004) find a 1.6-percent increase. Clothing production falls 2.7 percent in Yang et al.'s analysis.

[5]Krishna and Tan (1998) estimated that half the quota rents for Hong Kong's exports may have been appropriated by importers.