Employment trends in textiles and apparel, 1973–2005

Increased globalization and new technology were leading factors in recent employment declines; although the declines are expected to continue, the industries will remain an important provider of jobs, employing 1.3 million workers in 2005

Mark Mittelhauser

Every industry in the American economy has been affected in some way by increased globalization and new developments in technology. Few, however, have felt the effects of these trends more acutely than the textiles and apparel industries. Indeed, these factors have been the primary reasons for the almost continuous employment decline in the industries for nearly 25 years. In 1973, for example, there were more than 2.4 million textile and apparel workers employed in the United States; by 1996, that figure had dropped to 1.5 million. This 39-percent decline contrasts with the 8-percent decline among all manufacturing workers, and the 56-percent rise in employment among all workers over the same period. In addition, job losses appear to be intensifying in the textile and apparel industries, and are projected to continue in the coming decade.[1]

While much of the job loss resulted from textile mills and apparel factories going out of business in the face of fierce domestic and international competition, a significant part of the decrease was caused by efforts made by companies to survive. In the past few decades, textile and apparel companies have been struggling to reinvent themselves. By investing in new technologies, merging to reduce costs, employing offshore plants to perform certain operations, and developing new products and services, they have been attempting to find a niche in the international market. According to some measures, they have been successful, as production has remained stable and many companies have been profitable. On the basis of other measures, however—such as employment and foreign trade balances—they have not fared as well.

What emerges from recent changes in the international economy and the domestic textile and apparel industries is a complex picture of job loss and survival strategies. This dynamic is likely to increase in the coming years, as international trade continues to grow. As a result, employment declines are expected to continue. Still, as many firms adapt to the changes, the textile and apparel industries will remain an important provider of jobs, with employment projected to be more than 1.3 million in the year 2005.[2] This article examines employment trends in the textile and apparel industries, reviewing the likely causes of both the recent historical and projected declines, their varied effects across occupational groups, and the response American producers have developed to adapt to rapidly changing economic realities. It attempts to sketch how the industry and its workers will fare in an uncertain and rapidly changing future.[3]

The two industries

Although the terms "textile industry" and "apparel industry" often are used interchangeably, they represent two distinct, albeit closely related, industries.[4] The two industries are important links in the chain of production and distribution responsible for providing consumers with clothing as well as a number of other products. Textile mills not only manufacture yarn, thread, and fabric for clothing, but also such products as car-

Mark Mittelhauser is an economist in the Office of Employment Projections, Bureau of Labor Statistics.

peting, automotive upholstery, fire hoses, cord, and twine. The major processes in these highly automated mills include yarn spinning, weaving, knitting, tufting, and nonwoven production. Although employment is widely distributed throughout the different sectors of the industry, most workers are involved in the manufacture of products eventually used to make apparel. In 1996, the textile industry employed 624,000 workers (table 1), with the majority working in three States: Georgia, North Carolina, and South Carolina.[5] Also, nearly half of the textile workers employed in 1996 were women.[6]

Apparel workers, on the other hand, convert fabrics produced by the textile industry into clothing and other finished goods, eventually to be sold on the retail market. In addition to being cut, sewn, and assembled, these garments and other products must be designed, spread, pressed, dyed, washed, and transported to consumers—functions requiring a variety of occupations. Still, sewing machine operators, who perform the most labor-intensive step in apparel production, make up the most common occupation in the industry. In part because apparel production is more labor-intensive than textile production, the apparel industry employs more workers—about 864,000 in 1996. (See table 1.) Most of these jobs are found in eight States: Alabama, California, Georgia, New York, North Carolina, Pennsylvania, Tennessee, and Texas.[7] Also, nearly three-quarters of the employees working in the apparel industry in 1996 were women, compared to about a third of the workers in the entire manufacturing sector.[8]

Historical employment trends

Although a number of differences exist between the two industries, they both share a recent history of employment declines. Between 1973 and 1996, nearly a million jobs were lost in the textile and apparel industries combined—a decline of nearly 40 percent. Although the number of jobs lost in apparel was greater than in textiles, in percentage terms, both industries declined by similar amounts. Not surprisingly, employment fell most rapidly during periods of economic downturn—especially the 1973–75 recession. In each of the subsequent recoveries, however, employment failed to return to prerecession levels. As the current expansion got underway in the early 1990s, it appeared that the industries might receive some respite from job losses (especially in textiles). But over the last few years, the rate of job loss has increased again—with more than 50,000 textile jobs lost from 1994 to 1996, and 143,000 apparel jobs lost from 1993 to 1996. (See chart 1.)

Table 1. Employment in the textile and apparel industries, 1996

[In thousands]

Industry title	Employment
Textile mill products	624
Weaving, finishing, yarn, and thread mills	332
Knitting mills	180
Carpets and rugs	61
Miscellaneous textile goods	51
Apparel and other textile products	864
Apparel	643
Miscellaneous fabricated textile products	221

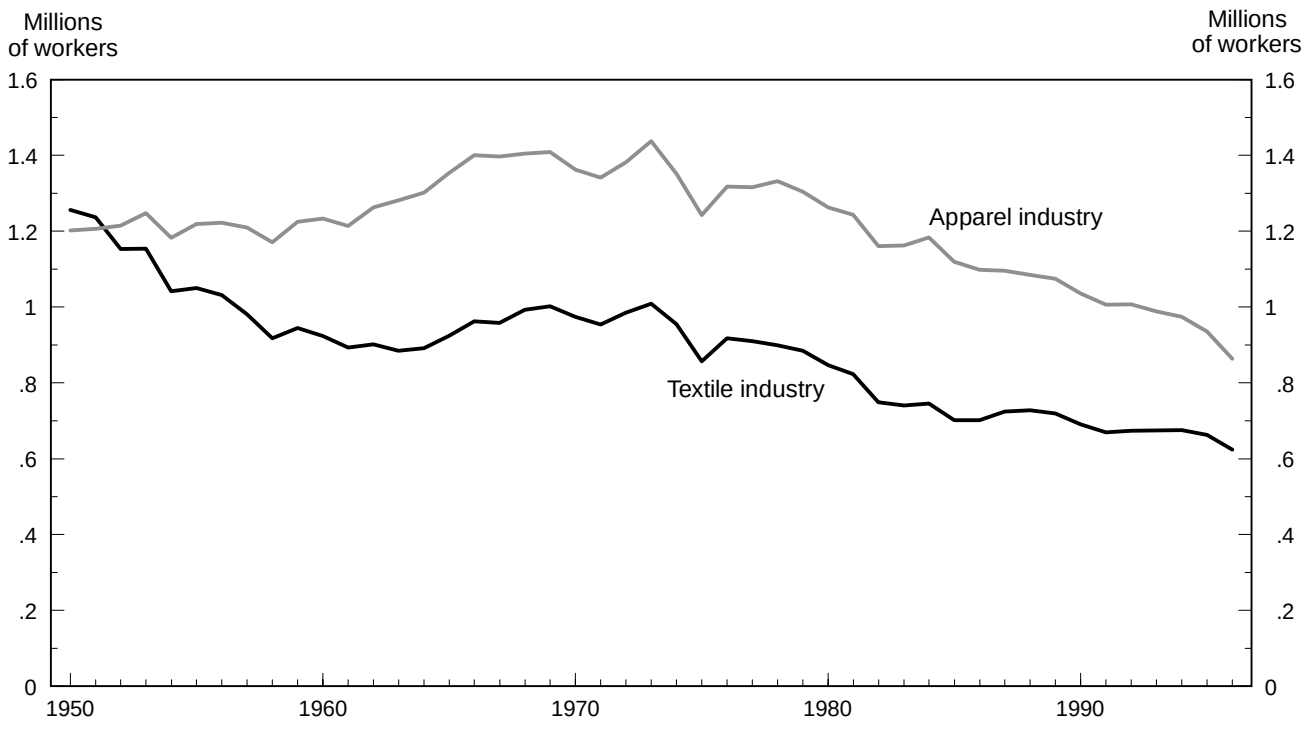
The recent acceleration in job losses was due to a number of factors, but the primary reasons seem to have been growth of imports and increases in productivity. Recent declines, for instance, occurred in the context of investment in new technological advancements and recent trade agreements that have significantly altered trade regulations. The following sections examine how these trends have affected textile and apparel workers.

Foreign trade and investment. One of the most salient trends in recent years has been the growing interconnectedness of the international economy. Globalization has been driven by many forces, including technological advances in transportation, communication, and production, as well as the worldwide search for markets. These developments have allowed international investors and entrepreneurs to take advantage of differing production costs by locating factories and offices in a number of countries. As a result, a garment could be designed in New York, produced from a fabric made in Australia, spread and cut in Hong Kong, assembled in China, and eventually distributed in Germany.

As a result of these and other factors, textile and apparel production has grown rapidly in recent years in less-developed countries (LDC's), such as China, Mexico, and Indonesia. According to the U.S. International Trade Commission, roughly half of the total productive capacity in the apparel industry has shifted from developed countries to LDC's over the past three decades.[9] Many of these nations now play a key role in textile and apparel trade with the United States, as is clear from the data on exports and imports. Several LDC's are among the top 10 countries receiving U.S. textile and apparel exports. As for imports, the largest supplier to the United States is China, followed by Hong Kong, Mexico, Taiwan, and South Korea. (See tables 2 and 3.) Among the major suppliers, apparel imports are growing most rapidly from Mexico, the Dominican Republic, Indonesia, and India.[10] The primary incentive for transferring certain phases of production to LDC's is the lower cost of labor in these countries. It is estimated, for example, that the average apparel worker in Honduras earns about 10 percent of the hourly wage of a comparable worker in the United States.[11]

Textile and apparel imports have grown substantially in recent years, even under the Multifiber Arrangement (MFA),

Chart 1. Wage and salary employment in the textile and apparel industries, 1950–96



which was instituted to protect U.S. producers.[12] In addition, two other trade agreements that will significantly alter the trade regime in the industries—the North American Free Trade Agreement (NAFTA) and the Uruguay Round of the General Agreement on Tariffs and Trade (GATT)—are currently being implemented. These agreements are creating a more open trading environment in textiles and apparel that will have an important impact on workers in the industries.

In addition to increased international trade in the industries, investment also increasingly flows freely across national borders. A primary reason for growing investment in textile and apparel production abroad is "sourcing." Sourcing is the name given to the growing practice of relying on foreign production sites to perform some of the operations involved in making apparel. For example, a U.S.-based apparel firm may cut domestically-produced fabrics and ship them to Guatemala to be assembled into shirts before they are sold in the U.S. market. Sourcing allows U.S. apparel makers to take advantage of lower labor costs while controlling most production and distribution decisions.

The majority of "sourced" goods enter the United States through an arrangement known as the Caribbean Basin Initiative (CBI). CBI allows special access to the U.S. market for nations in the Caribbean Basin, such as the Dominican Republic and El Salvador.[13] Under CBI, apparel assembled abroad of fabric produced domestically can reenter the United States with a partial duty exemption. This has contributed to job losses, especially among production workers in the U.S. apparel industry. At the same time, however, by allowing U.S. apparel firms to remain competitive with their foreign counterparts, CBI probably has saved some jobs as well. CBI also benefits the U.S. textile industry by ensuring that much of the apparel sold in the United States is produced with fabrics manufactured in U.S. textile mills.[14]

One of the reasons that textile employment has not declined as rapidly as apparel employment in recent years may be linked to the nature of textile production itself. The U.S. textile industry has become highly automated, with labor constituting a relatively small share of the total cost of production. As a result, U.S. textile producers are quite competitive with foreign textile producers. And while the industry ran a trade deficit in the 1990s, it was too small to have had much effect on employment. (See chart 2.)

Some of the declines that did take place in the textile industry were probably indirectly related to rising apparel imports. Historically, the U.S. apparel industry has been the largest consumer of U.S textile products. Thus, textile employment has been somewhat dependent on the health of the U.S. apparel industry. As apparel imports have increased in recent years, however, U.S. apparel manufacturers have purchased fewer products from the U.S. textile industry. And while apparel from Latin America may be an exception,[15] as apparel

imports from other nations have grown, the likelihood that these goods were made with U.S. textiles has diminished.

The most telling indicator of the profound effect that increased globalization has had on the U.S. apparel industry is the trade deficit in apparel—$34 billion in 1995.[16] (See chart 3.) In addition, imports continue to account for a larger share of domestic consumption. In fact, in 1995, for the first time, the majority of the apparel purchased in the United States was imported. The average U.S. citizen need look no further than in his or her own closet to appreciate the tremendous growth in imported apparel in recent years. While these imports have helped to keep prices low for most consumers, they also have contributed to employment declines in the U.S. apparel industry.[17] In addition, world demand for apparel has been stagnant due to sluggish economic activity and slow population growth in many developed countries.[18] With the increasingly inter-related nature of the world economy, such trends are becoming more important to U.S. producers.

Productivity growth. The textile and apparel industries have been able to maintain production levels—and even increase them in some segments—while reducing employment consistently over the past two decades. This increased productivity was largely the result of new automation and the restructuring of work processes.[19] In many cases, this has resulted in more jobs for skilled workers, such as computer operators; in others, however, increased automation has reduced dependence on skilled workers.

As with international trade, productivity growth has impacted each of the industries differently. Multifactor productivity has grown faster in the textile industry than in apparel in recent years.[20] Although textile workers have been less affected by increasing imports than apparel workers, they have been more affected by technological change. Technology is more easily applied in textile manufacturing due to the large scale and uniformity of much of the production process. After decades of investment in new technologies, textile firms are able to churn out thousands of square yards every hour with as few as 10 or 20 employees.[21] Examples of some of the technological developments that have made this possible include open-end spinning in yarn production and shuttleless looms that allow more fabric to be produced than did the previous generation of looms. The application of computers and lasers to textile production also has boosted productivity (as well as quality) significantly.

Because these new technologies are fairly expensive, larger textile mills that could afford to invest in such equipment benefited at the expense of smaller mills that used the older equipment. In order to raise the funds required to invest in such equipment, a number of mergers and acquisitions occurred in the 1980s and 1990s, increasing the concentration of ownership in the textile industry.[22] These larger firms have more access to capital to invest in automation and basic research and development than do the majority of smaller firms comprising the apparel sector. As a result, investment levels in textiles consistently have been higher than those in apparel. According to the U.S. International Trade Commission, the textile industry spent more than $4,269 annually per worker for investment in new plants and equipment between 1989 and 1993. By contrast, the apparel industry spent only about $924 per worker each year over the same period.[23]

Only part of the reason for the smaller productivity gains in apparel can be attributed to the smaller size of apparel firms, however. Another important reason is the difficulty firms have had in automating apparel production due to the soft and varied nature of fabrics, the complexity of the assembly process, and the modifications required by rapidly changing fashions. This difficulty has been especially apparent in the assembly of pieces into finished apparel, whereas other areas of apparel production—such as designing, spreading, cutting, and pressing—have been automated to a greater extent through the intelligent

Table 2. National destination of textile and apparel exports, 1995

[Millions of dollars]

Country	Export value	Percent
Total, world	12,884.8	100.0
Canada	2,397.5	18.6
Mexico	2,355.2	18.3
Japan	1,246.3	9.7
Dominican Republic	979.7	7.6
Honduras	489.7	3.8
Costa Rica	468.9	3.6
Jamaica	416.8	3.2
United Kingdom	353.9	2.7
Belgium	293.0	2.3
Germany	290.8	2.3
Total, others	3,593.0	27.9

SOURCE: U.S. Department of Commerce, Bureau of the Census

Table 3. National origin of textile and apparel imports, 1995

[Millions of dollars]

Country	Import value	Percent
Total, world	48,172.7	100.0
China	6,873.7	14.3
Hong Kong	4,529.3	9.4
Mexico	3,962.9	8.2
Taiwan	2,684.7	5.6
Korea, South	2,380.4	4.9
India	1,835.7	3.8
Dominican Republic	1,780.5	3.7
Canada	1,742.1	3.6
Italy	1,739.8	3.6
Philippines	1,623.9	3.4
Total, others	19,019.7	39.5

SOURCE: U.S. Department of Commerce, Bureau of the Census

application of computers. While some new technologies exist that could boost assembly productivity (vision recognition systems that match seams, for example), investment in these machines is hampered by their high cost. Many larger apparel producers have implemented these technologies; for many smaller firms, however, the technology remains out of reach.

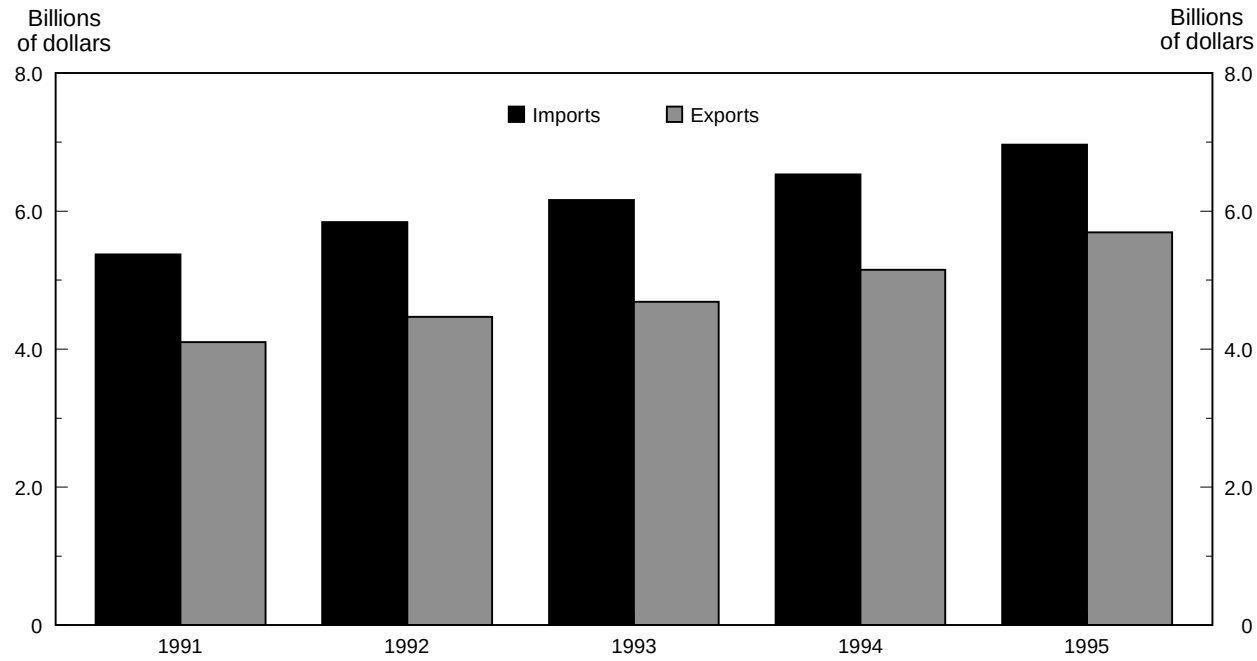
Productivity gains in both industries resulted largely from changes in the production process. One of the major modifications in apparel in recent years has been the adoption of the modular manufacturing system. In contrast to the bundle system, in which a worker performs the same operation on a piece as it moves along the production line as part of a bundle, the modular system uses a group of workers trained in several operations to produce a piece from start to finish. Each module contains the machines and the workers necessary to take cut pieces of fabric and transform them into finished apparel. Workers in the modular system are trained to perform a number of functions so that they can fill in for other workers who are absent or help out when pieces back up at a station. As a result, the modular system is more flexible, productive, and responsive to changes in demand. It also is better from an ergonomic perspective, reducing the costs of injuries and lifting morale. Estimates suggest that the productivity gains resulting from the system have been significant.[24]

Although they have been the most important, trade and technology have not been the only factors affecting employment levels for textile and apparel workers in recent years. Other factors, such as changing consumer preferences, high material costs, and corporate mergers, also have contributed to job loss. Still, as changes in international trade, technology, and industrial structure continue at a rapid pace in the coming years, it is difficult to project what the future holds for textile and apparel workers. The following section outlines some possibilities.

An uncertain future

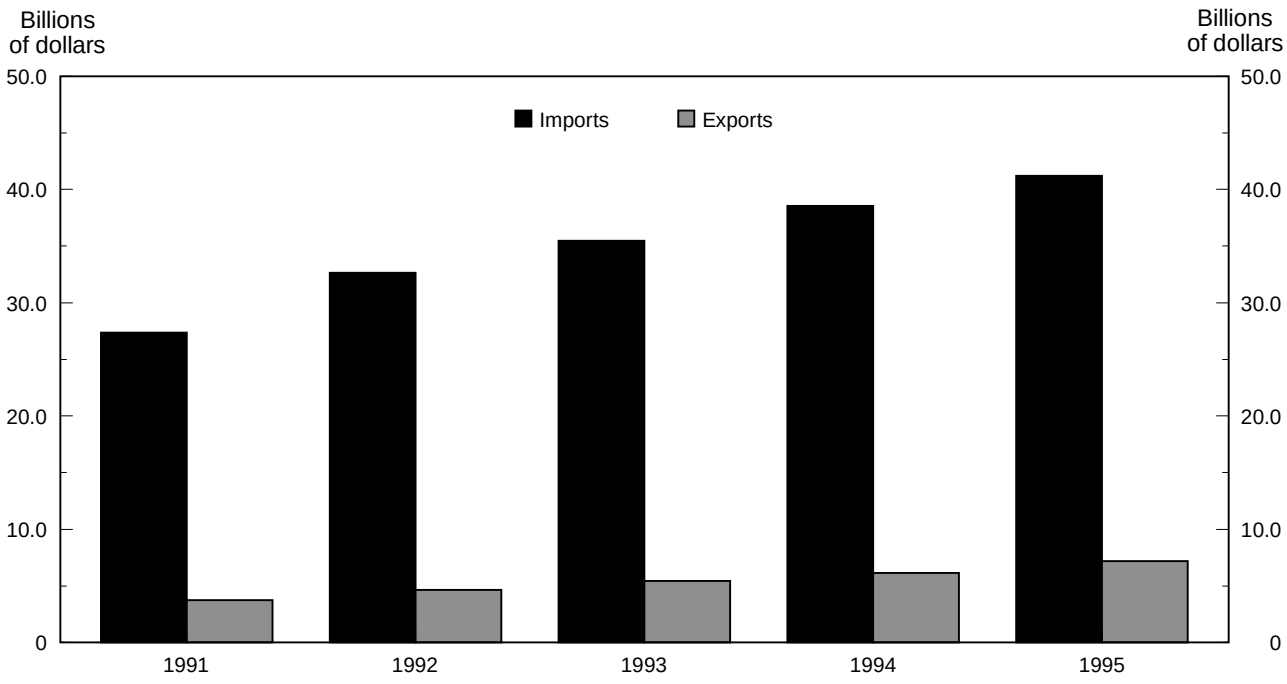
In coming years, employment change is expected to vary across the different components of the textile and apparel industries. (See table 4.) Two segments—carpets and rugs and miscellaneous fabricated textile products—are projected to see slight employment gains. Taken as a whole, however, textile and apparel workers are expected to lose jobs at an even faster rate. Employment in these industries has been projected to decline by about 300,000 jobs over the 1994–2005 period,[25] compared to a net loss of about 250,000 jobs over the previous 11-year period. (See chart 4.) Nearly two-thirds of these job losses are projected to occur in the apparel industry. The primary reasons for the expected decline—increased international trade and technology—will combine to negatively affect the labor market for textile and apparel workers. Imports will likely supply most of the net growth in apparel

Chart 2. Textile industry trade in the 1990s



SOURCE: U.S. Department of Commerce, Bureau of the Census.

Chart 3. Apparel industry trade in the 1990s



SOURCE: U.S. Department of Commerce, Bureau of the Census.

consumption in the domestic market, leading to little growth in real output in the industries over the 1994–2005 period. This sluggish output will combine with continued productivity gains to eliminate jobs for textile and apparel workers.

International trade and investment. Primarily as a result of new trade agreements, a more open global economy is likely to play an even larger role in the two industries over the 1994–2005 period. On December 31, 1994, the MFA expired, and textile and apparel trade in the United States entered into a 10-year transition period, after which it will be fully governed by the World Trade Organization (WTO), a body created by the Uruguay Round of GATT.[26] At the end of this period, the quotas of the MFA will be eliminated and tariffs will be significantly reduced. In addition, NAFTA will be fully phased-in by 2004, further eliminating barriers to trade between the United States, Mexico, and Canada. The implementation of these agreements is expected to raise the trade deficit in textiles and apparel and contribute to employment losses in the industries.[27]

A related concern for workers and jobseekers in the textile and apparel industries is the future of international sourcing. NAFTA gives advantages to producers in Mexico that firms in other Caribbean Basin nations do not enjoy. In the year preceding July 1995 textile and apparel imports from all CBI nations combined increased by 28 percent, while those from Mexico grew at a rate approaching 70 percent.[28] Confronted with this challenge, producers from the other Caribbean nations urged the U.S. Congress to pass so-called CBI Parity legislation, which, if passed, would have provided trade benefits to the CBI nations equal to those given to Mexico under NAFTA.[29]

Regardless of the status of CBI Parity, however, investment in production abroad will probably continue to increase. As communication and production technologies are more widely dispersed in developing countries, they will raise productivity and quality levels and make sourcing more appealing. Firms most likely will continue to relocate production to low-cost sites throughout the world, placing downward pressure on the labor market for textile and apparel workers in the United States.

As in recent years, increased globalization is expected to be harder on the U.S. apparel industry than on U.S. textile producers. The central role of workers in the assembly of apparel will continue to make producers in the United States vulnerable to low-cost imports originating in developing nations. In addition, sourcing will primarily impact workers in the apparel industry. Not all apparel producers will be equally affected, however. Those apparel companies that have strong name recognition and an ability to respond quickly to changes

in demand are expected to fare better than those who produce standard items on the low end of the market.

In addition, the growth of the apparel industry in Mexico and the Caribbean Basin probably will help maintain the demand for textiles produced in the United States. U.S. textile mills are very competitive with mills throughout Latin America, and hence should be in an excellent position to supply apparel producers throughout the Americas. To the extent that the dissolution of MFA leads to growing production in Asia, however, U.S. textile mills will probably be displaced by Asian textile producers. Competitive textile mills throughout Asia should assure that nearly all of the apparel produced there will be manufactured from Asian-made textiles.

As textile and apparel producers are increasingly exposed to competitors in the global economy, they will need to specialize in textile and apparel products in which they have a competitive advantage. The textile industry, for example, has developed a number of advanced manmade textiles and applied them in uses ranging from building construction to tire reinforcement. Some new synthetics also have allowed U.S textile producers to capture a larger share of the luxurious fibers market.[30]

Due to certain competitive advantages, the U.S. apparel industry has maintained the lowest import penetration rates in three product lines—dresses, men's and boy's trousers and shorts, and underwear. Because dresses are high fashion items, the market is best served by producers who can respond rapidly to changes in demand—something in which U.S. manufacturers have an obvious advantage. In the jeans market, U.S. brand-name companies remain competitive due to product loyalty and name recognition. Finally, in underwear production, partial automation has made U.S. manufacturers more competitive with foreign producers.[31]

Textile and apparel producers will continue to look to the international market to sell their goods. Trade liberalization will allow U.S textile producers easier access to foreign markets to supply overseas apparel factories. It also will give retail consumers better access to textiles and apparel produced around the world. While increased international trade presents significant market potential to textile producers, it offers only limited opportunities to most apparel producers. Due to the labor-intensive nature of apparel production and other factors, foreign producers continue to have cost advantages. The relatively high cost of transporting apparel is a factor as well.[32] Nevertheless, trade liberalization also will allow U.S. producers to take advantage of name recognition and other advantages to increase their share in some international markets that were previously less open to them.

Productivity growth. One of the factors that will keep textile mills competitive in the coming years will be remaining on the forefront of technology. Investment in research and development has historically been higher in the textile industry than in apparel, and this pattern is expected to continue. For this reason, new technology will boost productivity significantly in the textile industry. Perhaps the most important development will be the introduction of new air-jet machines that can insert up to 745 threads per minute, compared with projectile looms currently in use that process about 250 threads every minute.[33] In addition, computer-integrated manufacturing uses machines that are easier to operate and more productive than their predecessors, and optical scanning equipment is now being used to automatically check fabric for flaws.

The technology currently exists to automate almost an entire textile mill—from the moment bales are placed on the opening line to the time finished products are loaded onto trucks. Costs may keep these machines from being implemented in many mills, but there is clearly a tremendous potential for the application of labor-saving automation in the industry. Because textile output is expected to grow only slightly over the 1994–2005 period, textile mills will most likely maintain production levels while at the same time gradually introducing new labor-saving technology, leading to further job losses.

Although productivity gains will be limited in the apparel industry, they will still influence employment and work processes. In addition to increased implementation of modular manufacturing systems, a number of

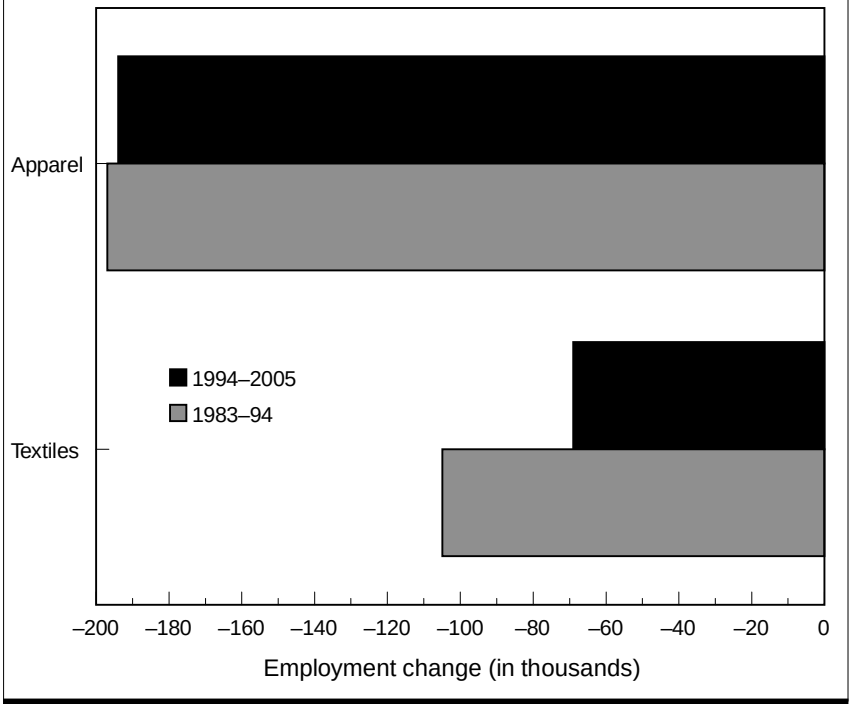
Table 4. Textile and apparel employment, 1983, 1994, and projected 2005

[In thousands]

Industry title	Employment			Annual growth rate, 1994–2005	
	1983	1994	2005	Employment	Output
Textile mill products	742	676	568	–1.6	.2
Weaving, finishing, yarn, and thread mills	432	360	281	–2.2	–.2
Knitting mills	207	200	173	–1.2	.0
Carpets and rugs	49	64	65	.1	1.0
Miscellaneous textile goods	55	52	49	–.6	1.3
Apparel and other textile products	1,163	974	772	–2.1	.5
Apparel	990	757	547	–2.9	–.4
Miscellaneous fabricated textile products	173	217	225	.4	2.6

NOTE: Employment estimates for 1994 shown in this table differ slightly from those published in James C. Franklin, "Industry output and employment projections to 2005," *Monthly Labor Review*, November 1995. Franklin's article used Current Employment Statistics (CES) survey data based on the 1994 benchmark. The current article uses CES data based on the 1996 benchmark. For more information, see references in footnote 1.

Chart 4. Employment decline in the textile and apparel industries, actual, 1983–94, and projected, 1994–2005



functions—such as designing, spreading, folding, cutting, pressing, and coordinating—will continue to become more automated. As the cost of these technologies drops and their importance to the survival of the U.S. apparel industry increases, a larger share of apparel producers probably will implement this labor-saving equipment, further reducing the need for workers in the industry.

Efforts to produce these new technologies are being led by a number of private/public entities. The American Textile Partnership (AMTEX), a joint venture of industry and the U.S. Department of Energy, is currently working to link textile mills, apparel factories, wholesalers, and retailers in a vast electronic web to allow producers to respond more effectively to the changing spending patterns of consumers. Also leading the way is the Textile/Clothing Technology Corporation, an organization of over 185 apparel producers that is partially funded by the U.S. Department of Commerce to transfer technology to the apparel industry. It has helped to develop technology involved in flexible manufacturing, tools with better ergonomics, automated inspection machines, and knitwear automation. One of its most promising projects is called Apparel on Demand, in which a consumer's body is scanned in three dimensions and a computer converts the image into a two-dimensional pattern. The pattern is then cut from the chosen fabric and assembled into a finished product by a flexible manufacturing system.[34] In addition, the National Aeronautics and Space Administration and the U.S. Department of Energy currently are working to develop technologies that will eventually transfer to the apparel industry, including robotics, vision systems, and sensor technologies.[35]

Another promising use of new technology is embodied in the Quick Response (QR) strategy. QR allows domestic producers to take advantage of their proximity to the most lucrative market in the world: U.S. consumers. The QR strategy is based on two technological and workplace innovations—electronic data interchange (EDI) and modular manufacturing. Through the use of bar-code scanners and telecommunications equipment, EDI links the levels of production and distribution electronically so that changing inventories are immediately communicated to producers. The resulting flexible manufacturing allows producers to respond rapidly to changing demand. In some cases, QR technology has allowed firms to reduce the time needed to design and produce a product from several months to a few days. According to Kurt Salmon Associates, more than 70 percent of textile and apparel manufacturers had QR programs with the firms that they supplied in 1994—an increase of more than 10 percent over the previous year's level.[36] The more that U.S. producers can take advantage of new technologies like QR, the more they will be able to remain competitive in the international market and provide jobs for U.S. workers.

Apart from growing trade and the implementation of new technology, employment levels will be affected by other factors as well. There is some evidence, for example, that consumers are spending relatively more on other goods, such as consumer durables and health insurance, while spending less on apparel.[37] Consumers also have become more value-conscious, and are shopping more frequently in factory outlets, off-price retailers or discounters, or by direct mail. Such changes should continue to pressure the textile and apparel industries (and related retailers) to become more efficient and lower their costs. Already, competitive pressures have contributed to numerous plant closings and a growing concentration of producers in the industries.[38] As companies merge and take advantage of economies of scale, they commonly reduce the number of workers that they employ.

Occupational changes

The fundamental changes in the global economy have affected each occupation in the textile and apparel industries in distinct ways. Tables 5 and 6 show the changes in the occu-

pational composition of these industries over the 1983–94 period and those changes projected to occur between 1994 and 2005. Employment in nearly every occupational group declined over the 1983–94 period, and is expected to continue in most occupations over the projected period. Still, employment changes have varied across occupations and will continue to do so for a number of reasons. In this section, occupational groups are broadly divided into three categories depending on their absolute employment change and their share of employment in the industry.

The first category is made up of occupational groups that are growing in terms of both absolute employment and their share of industry employment. Only one group is in this category—professional specialty occupations. Its growth primarily reflects the increasing importance of engineers and computer systems analysts as textile and apparel firms continue to implement new automation. Steady growth among designers in the apparel industry also has contributed to the increases in the group. Professional specialty occupations represent only a small portion of both industries, however, and will create fewer than a thousand additional jobs over the projected period.

A number of occupational groups are in the second category—those declining in absolute employment yet growing in their *share* of employment in the industry. The largest among these is precision production, craft, and repair occupations. Employment in most occupations in this group is projected to decline over the period. However, one of the largest occupations—industrial machinery mechanics—is expected to grow, as the use of machines that they service increases. Employment of inspectors also is projected to decline, as the inspection process becomes increasingly automated and distributed throughout the production process. Likewise, employment among supervisors of blue-collar workers is projected to decline as the number of workers they supervise contracts. Other groups in this category include executive, administrative, and managerial occupations, and marketing and sales occupations. The former group will increase its share of industry employment as the need for coordination grows, and the latter will increase its share as sales and marketing staff take on greater importance.

The final category of workers are in occupational groups declining in both absolute employment and in share of indus-

Table 5. Employment in the textile industry: 1983, 1994, 2005

[In thousands]

Occupational Group	Employment			Percent of Industry		
	1983	1994	2005	1983	1994	2005
Total, all occupations	742	676	568	100.0	100.0	100.0
Executive, administrative, and managerial occupations	32	30	26	4.3	4.4	4.6
Professional specialty occupations	8	8	8	1.0	1.1	1.4
Engineers	4	3	3	.5	.4	.5
Technicians and related support occupations	7	6	5	.9	.8	.8
Marketing and sales occupations	8	8	7	1.1	1.2	1.3
Administrative support occupations	60	54	41	8.1	8.0	7.3
Secretaries	7	5	4	.9	.8	.8
General office clerks	8	7	5	1.1	1.0	.9
Service occupations	14	10	7	1.9	1.4	1.2
Janitors and cleaners	7	6	4	1.0	.9	.7
Precision production, craft, and repair occupations	128	118	112	17.3	17.5	19.7
Blue collar worker supervisors	30	27	22	4.1	4.0	3.8
Industrial machinery mechanics	31	33	40	4.2	4.9	7.0
Inspectors, testers, and graders	35	31	26	4.7	4.6	4.6
Operators, fabricators, and laborers	484	443	362	65.3	65.4	63.7
Textile and related machine setters and operators	285	247	238	38.4	36.5	41.9
Hand workers, including assemblers and fabricators	17	19	16	2.3	2.9	2.8
Helpers, laborers, and material movers, hand	84	79	62	11.3	11.7	10.8

NOTE: Employment estimates for 1994 shown in this table differ slightly from those published in James C. Franklin, "Industry output and employment projections to 2005," *Monthly Labor Review*, November 1995. Franklin's article used Current Employment Statistics (CES) survey data based on the 1994 benchmark. The current article uses CES data based on the 1996 benchmark. For more information, see references in footnote 1.

Table 6. Employment in the apparel industry: 1983, 1994, 2005

[In thousands]

Occupational Group	Employment			Percent of Industry		
	1983	1994	2005	1983	1994	2005
Total, all occupations	1,163	974	772	100.0	100.0	100.0
Executive, administrative, and managerial occupations	42	40	36	3.6	4.1	4.7
Professional specialty occupations	9	10	11	.8	1.0	1.4
Designers	6	6	6	.5	.6	.8
Technicians and related support occupations	2	3	2	.2	.3	.3
Marketing and sales occupations	19	19	18	1.7	2.0	2.3
Administrative support occupations	100	86	70	8.6	8.8	9.1
Service occupations	14	9	7	1.2	.9	.9
Precision production, craft, and repair occupations	123	106	99	10.6	10.8	12.9
Blue collar worker supervisors	35	30	23	3.0	3.1	3.0
Industry machinery mechanics	12	11	12	1.0	1.1	1.5
Inspectors, testers, and graders	40	31	28	3.5	3.2	3.6
Operators, fabricators, and laborers	853	702	528	73.3	72.1	68.5
Sewing machine operators, garment	579	443	312	49.7	45.5	40.4
Hand workers, including assemblers and fabricators	80	72	63	6.8	7.4	8.1
Helpers, laborers, and material movers, hand	71	62	52	6.1	6.4	6.8

NOTE: Employment estimates for 1994 shown in this table differ slightly from those published in James C. Franklin, "Industry output and employment projections to 2005," *Monthly Labor Review*, November 1995. Franklin's article used Current Employment Statistics (CES) survey data based on the 1994 benchmark. The current article uses CES data based on the 1996 benchmark. For more information, see references in footnote 1.

try employment. Not surprisingly, operators, fabricators, and laborers are the largest group in this category. This group is expected to lose an additional 250,000 jobs in the textile and apparel industries between 1994 and 2005. The majority of these losses will occur among sewing machine and textile machine operators, as foreign sourcing and labor-saving machinery combine to eliminate thousands of jobs. The other major group that is projected to see absolute as well as share declines is administrative support occupations. As in other industries, fewer of these types of workers (secretaries, clerical personnel) will be needed in the textile and apparel industries in the future, as office work is increasingly automated and job responsibilities formerly performed by administrative support workers are transferred to others.

In the coming years, occupations requiring more education will enjoy the most stable employment in the textiles and apparel industries. The majority of new jobs, however, will continue to be held by relatively low-skilled workers. In spite of the rapid decline among operators, fabricators, and laborers, these occupations still are projected to provide nearly 900,000 jobs, or two-thirds of all jobs in the two industries in 2005. While some workers in these occupations may need additional training in order to use new technology or to work in a flexible manufacturing system, skill levels are expected to remain low because much of the new equipment is designed to keep worker retraining to a minimum. The modernization of the industry will result in a premium being placed on workers who understand how to work with new computer-controlled machines.

ALTHOUGH EMPLOYMENT declines in the textile and apparel industries are expected to continue, the industries will still provide more than 1.3 million jobs in 2005, or nearly 8 percent of all projected jobs in manufacturing. Employment is rapidly declining, but in terms of profitability, export levels, and production, the industries are showing tenacity, and some firms have become highly diversified world leaders in a number of lines.[39] Their greatest competitive strength will lie in their ability to capitalize on high quality, maintain strong brand names, develop market niches, and respond to changes in demand rapidly. Paradoxically, many of the steps being taken to ensure the survival of textile and apparel firms—foreign outsourcing, industrial restructuring, and investing in new technology—may often lead to job losses. At the same time, however, by contributing to the survival of U.S. firms, these measures may save some jobs that would have gone abroad in their absence. But regardless of the success of these strategies, intensifying competition and advancing technology will ensure turbulent and challenging years ahead for the U.S. textile and apparel industries. □

Footnotes

[1] Between 1994 and 1996, for example, another 162,000 textile and apparel jobs were lost—a 10-percent decline over the two-year span. Also, employment in the industries is projected to fall to 1.3 million by 2005. Historical employment figures are from the Current Employment Statistics (CES) survey of the Bureau of Labor Statistics (BLS). The CES is an establishment-based survey, collected in cooperation with State agencies from a sample of more than 390,000 reporting units employing over 47 million nonfarm wage and salary workers. Projections are from the Office of Employment Projections, BLS. For more information on these programs, including methodology and background, see *BLS Handbook of Methods*, Bulletin 2490 (Bureau of Labor Statistics, 1997), ch. 2, "Employment, hours, and earnings from the establishment survey," pp. 15–27; and ch. 13, "Economic growth and employment projections," pp. 122–9.

[2] See the following two articles from the November 1995 issue of the *Monthly Labor Review*: James C. Franklin, "Industry Output and Employment Projections to 2005," pp. 45–59; and George T. Silvestri, "Occupational Employment to 2005," pp. 60–84.

[3] For an earlier BLS analysis of employment trends in the textiles and apparel industries from 1939 to 1994, see Lauren A. Murray, "Unraveling employment trends in textiles and apparel," *Monthly Labor Review*, August 1995, pp. 62–72.

[4] The Standard Industrial Classification (SIC) system is used in this article for industry definitions. The textile industry is defined as SIC major group 22, textile mill products; the apparel industry is defined as SIC major group 23, apparel and other finished products made from fabrics and similar materials. For more on the SIC and industry definitions, see *Standard Industrial Classification Manual: 1987* (Office of Management and Budget, 1987).

[5] *Employment and Wages: Annual Averages, 1995*, Bulletin 2483 (Bureau of Labor Statistics, December 1996), pp. 117–28. (The latest year for which ES-202 data are available is 1995.) These data were collected as part of the Covered Employment and Wages program. Commonly called the ES-202, this program is a cooperative endeavor of the Bureau of Labor Statistics and the employment security agencies of the 50 States, the District of Columbia, Puerto Rico, and the Virgin Islands. The ES–202 is essentially a universe count and the data are used to "benchmark" the establishment survey (CES) data. The employment figures from the two programs therefore differ slightly. For more information on the CES and ES-202 programs, see *BLS Handbook of Methods*, Bulletin 2490 (Bureau of Labor Statistics, 1997), ch. 2, "Employment, hours, and earnings from the establishment survey," pp. 15–27; and ch. 5, "Employment and wages covered by unemployment insurance," pp. 42–47.

[6] *Employment and Earnings* (Bureau of Labor Statistics, June 1997), p. 98.

[7] *Employment and Wages* (December 1996), pp. 117–28.

[8] *Employment and Earnings* (June 1997), p. 98.

[9] "Industry and Trade Summary: Apparel," Publication 2853 (Washington, U.S. International Trade Commission, January 1995), p. 1.

[10] Data are from the U.S. Department of Commerce, Bureau of the Census, and are based on trends between 1991 and 1995.

[11] U.S. earnings data are from the CES (see footnote 1). In 1995, average hourly earnings of production workers in the apparel industry was $7.64. Earnings data for apparel workers in Honduras are from Larry Luxner, "Honduras Disfruta de Nuevas Inversiones," *La Bobina*, January 1996, p. 56.

[12] The MFA was established under GATT in 1974 to control market disruptions in developed countries while permitting some growth in textiles and apparel exports in developing countries The arrangement consists of a number of bilateral agreements that establish quotas for certain product lines.

[13] The practice of sourcing through the CBI is generally called "807 sourcing," referring to the relevant number in the previous U.S. tariff schedule. The relevant section of the current tariff schedule is "9802." In 1986, the Guaranteed Access Level program was initiated, assuring beneficiary nations access to the U.S. market for apparel that they assemble from fabric formed and cut in the United States. See "1996 Trade Policy Agenda and 1995 Annual Report," (Washington, Office of the United States Trade Representative, 1996).

[14] Interview with David Link, Chief Economist, American Textile Manufacturers Institute, Washington, June 21, 1996.

[15] According to the American Textile Manufacturers Institute, for example, 80 percent of apparel imported from Mexico is made from U.S. fabric.

[16] Data are compiled from official statistics of the U.S. Department of Commerce, Bureau of the Census. The trade deficit in apparel and other textile products grew steadily throughout the 1990s.

[17] Lauren A. Murray, "Unraveling employment trends in textiles and apparel," *Monthly Labor Review*, August 1995, p. 68.

[18] See, for example, Kurt Salmon Associates, "No Quick Fix for '96," *Bobbin*, December 1995, pp. 68–73.

[19] Output per hour is the traditional measure of productivity. Measures of output per hour relate output to one input—labor time. Maintaining current production (output) while decreasing the number of workers (input), increases productivity. For more on productivity measures, see *BLS Handbook of Methods*, Bulletin 2490 (Bureau of Labor Statistics, 1997), ch. 11, "Industry Productivity Measures," pp.103–09.

[20] Productivity figures are from the Office of Productivity and Technology, BLS, and cover the 1980–93 period.

[21] John Holusha, "Squeezing the Textile Workers," *The New York Times*, February 21, 1996, pp. D1, D20.

[22] Recent consolidations include Spring Industries purchase of Dundee in the home furnishings segment and the sale of Cannon Mills to Fieldcrest, creating Fieldcrest Cannon.

[23] "Industry and Trade Summary: Apparel," Publication 2853 (Washington, U.S. International Trade Commission, January 1995), p. 4.

[24] See, for example, Carl Propper and Rebecca Plattus, "Cupid Hits Bull's Eye with Modular System," *Apparel Industry Magazine*, September 1993; or *U.S Industrial Outlook: 1994*, (U.S. Department of Commerce, Washington, 1994), p. 32–6.

[25] See the following two articles from the November 1995 issue of the *Monthly Labor Review*: James C. Franklin, "Industry Output and Employment Projections to 2005," pp. 45–59; and George T. Silvestri, "Occupational Employment to 2005," pp. 60–84.

[26] "The Agreement of Textiles and Clothing (ATC), which entered into force on January 1, 1995 as part of the World Trade Organization agreements, superseded the MFA and will provide for the gradual and complete integration of apparel and textile products into the WTO regime over a 10-year transition period. Most of the significant suppliers of textiles and apparel products to the United States are members of the WTO. Therefore, quota arrangements on a bilateral basis will now be governed by the provisions of the ATC." See "1996 Trade Policy Agenda and 1995 Annual Report," (Washington, Office of the United States Trade Representative, 1996).

[27] For a discussion of the likely effects of trade liberalization, see "Potential Impact on the U.S. Economy and Industries of the GATT Uruguay Round Agreements," Publication 2790 (Washington, U.S. International Trade Commission, June 1994); and "Potential Impact on the U.S. Economy of the North American Free-Trade Agreement," Publication 2596 (Washington, U.S. International Trade Commission, January 1993).

[28] Larry Luxner, "CBI Grows, But Mexico Dominates," *Bobbin*, November 1995, p. 73.

[29] Although it was considered, the CBI Parity legislation was not passed by the 104th Congress (1996–97). The current Congress (105th) is not considering the legislation. For some background on the issue, see Brenda A. Jacobs, "U.S. Moves to Control 807 Trade," *Bobbin*, June 1995, pp. 12–17; and "1996 Trade Policy Agenda and 1995 Annual Report" (Washington, Office of the United States Trade Representative, 1996).

[30] Raye Rudie, "Synthetics: A Sure Thing," *Bobbin*, May 1996, p. 20.

[31] "Industry and Trade Summary: Apparel," Publication 2853 (Washington, U.S. International Trade Commission, January 1995), p. 19.

[32] See "Potential Impact on the U.S. Economy and Industries of the GATT

Uruguay Round Agreements," Publication 2790 (Washington, United States International Trade Commission, June 1994); and "Potential Impact on the U.S. Economy of the North American Free-Trade Agreement," Publication 2596 (Washington, United States International Trade Commission, January 1993).

[33] John Holusha, "Squeezing the Textile Workers," *The New York Times*, February 21, 1996, pp. D1, D20.

[34] "[TC]2 Moves Forward with Body Scanning, other Research," *Bobbin*, May 1996, pp. 26–28.

[35] *U.S Industrial Outlook: 1994*, p. 32–6.

[36] Kurt Salmon Associates, "Soft Goods Outlook for 1995," *Perspective*, November 1994, p. 3.

[37] Kurt Salmon Associates, "No Quick Fix for '96," *Bobbin*, December 1995, pp. 68–73.

[38] "Competitive Pressures Cited in U.S. Plant Closings," *Bobbin*, December 1995, p. 30. The article says that both companies cited "competitive pressures and a difficult retail environment for apparel" as reasons for the closings.

[39] For a discussion of profitability in the textile and apparel industries, see "Industry and Trade Summary: Apparel," Publication 2853 (Washington, U.S. International Trade Commission, January 1995), p. 6. Examples of successful firms in the apparel industry are highlighted in *Bobbin* magazine's yearly list of the top 40 firms in industry, published each year in June.