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## Executive Summary

The U.S. Department of Commerce’s Bureau of Industry and Security (BIS) has conducted a “comprehensive study on the health, competitiveness, and the contribution of the U.S. textile and apparel industry to the U.S. economy and in particular to the U.S. armed forces,” as requested by the Joint Statement of Managers accompanying the Conference Report on the Consolidated Appropriations Resolution, 2003 (H. Rept. 108-10). This report reflects the conclusions of that study. As specifically requested by Congress, the report includes: (i) an assessment of the current health and competitiveness of the U.S. textile and apparel industries;<sup>1</sup> (ii) an analysis of the contribution of the textile and apparel industries to the U.S. economy; (iii) an analysis of the contribution of the industries to the U.S. Armed Forces; (iv) a review of U.S. dependency on foreign sources for critical textile materials and potential threats to internal security from increased foreign sourcing and dependency; and (v) an analysis of whether the Berry Amendment and other Buy American restrictions are being effectively enforced by the Department of Defense. The report is based on: data obtained from a detailed survey distributed by BIS to more than 1,600 U.S. firms involved in the textile and apparel industries; publicly available financial and industry data; site visits to companies in the textile and apparel industries; and interviews with industry executives, analysts, trade associations, private research firms, and federal, state, and local government employees.

### **Current Health and Competitiveness of the U.S. Textile and Apparel Industries**

- In general, U.S. textile and apparel production has declined substantially over the past five years. However, there is significant variation between and within the textile and apparel industries, with production decreasing by 40 percent or more in certain subsectors

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<sup>1</sup> The textile industry is defined, for purposes of this report, as those U.S. companies which transform basic fibers into products that are later processed into end-use products (Textile Mills) or make non-apparel textile end-use products such as household furnishings, industrial textiles, and carpets (Textile Product Mills). The apparel industry is defined, for purposes of this report, as those U.S. companies which cut and sew fabric to make a garment, in some cases knitting the fabric as well (Apparel Manufacturing). These definitions are taken from the North American Industry Classification System (NAICS) categorization and are consistent with U.S. Census Bureau reporting on industrial output and activity.

(e.g., thread and knit fabrics) but holding steady or even increasing in other subsectors (e.g., fabrics used for home furnishings and industrial products).

- Analysis of industry financial data reinforces the conclusion that there are substantial differences between and within the industries. Whether measured by profitability, return-on-assets, or debt-to-equity ratios, the textile industry is in relatively weak health, while the apparel industry is in relatively good health, compared to other U.S. consumer cyclical industries, comparable non-cyclical industries, and the textile and apparel industries abroad. Data also suggest that industry health varies based on firm size, with larger firms (those with more than \$50 million in 2002 sales) reporting higher profitability rates than smaller firms.
- Alternative – non-financial – metrics of industry health, such as employment and plant closings, suggest overall weakness, with employment declining from 1997-2001 and a reduction in the number of textile and apparel establishments.<sup>2</sup> These data are consistent with longer-term trends in the textile and apparel industries. Declines in relative prices of textile and apparel output and in capacity utilization are consistent with this development. However, the period also shows substantial increases in labor productivity.
- Although in many subsectors U.S. textile and apparel production is shrinking and relatively unhealthy, the industries as a whole appear to be increasingly competitive in the global market vis-à-vis foreign competitors. Although still small, the U.S. share of the global textile and apparel market (as measured by export value) has grown substantially over the past decade. A review of various competitiveness factors suggests that the United States ranks high among all nations in various measures of competitiveness, such as human capital, infrastructure, access to technology, and access

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<sup>2</sup> The reduction in establishments reflects data provided by the Bureau of Labor Statistics on the number of work sites in a particular industry. Establishments include manufacturing plants, subsidiary service centers, corporate offices, research and development centers, distribution and retail sites, and other associated locations.

to financial markets. It lags behind only in productivity-adjusted labor costs and costs associated with environmental regulation.

- The foregoing suggests – and interviews and site visit evidence confirm – that U.S. textile and apparel firms are increasingly focusing on “niche,” higher value-added product markets, which may be less labor intensive, more profitable, and more competitive in the international markets. This trend is being supplemented by new marketing and production techniques (e.g., seeking to market to the end customer directly and producing some or all items at off-shore affiliates).

### **Contribution of the U.S. Textile and Apparel Industries to the U.S. Economy**

- The combined share of the U.S. textile and apparel industries to the U.S. gross domestic product declined from 2.80 percent in 1950 to 0.45 percent in 2001 – making it an increasingly small part of the overall U.S. economy. However, these industries do have higher than average multiplier effects.
- The contribution of the textile and apparel industries to U.S. employment has decreased over time but remains significant, with the industries employing over 800,000 workers. A large portion of that workforce today is made up of women and minorities and is heavily concentrated in the Southeast region.
- The textile and apparel industries make contributions through expenditures on research and development that may have ancillary benefits to the U.S. economy, although it is difficult to quantify those benefits. Research and development appears to be focused principally on the creation of new products and manufacturing processes for commercial and defense applications. This research supports several other fields, including information technology, biotechnology, and nanotechnology.

## **Contribution of the U.S. Textile and Apparel Industries to the U.S. Armed Forces**

- As measured by Department of Defense (DoD) consumption, the U.S. textile and apparel industries made relatively small contributions to the U.S. Armed Forces. DoD direct and indirect procurement of textile and apparel items, or items that consist significantly of textiles and apparel, constituted less than three percent of total DoD procurement.
- The textile and apparel industries' "contribution" to the Armed Forces can also be measured by the industries' ability to meet "surge" production requirements in times of mobilization. The data suggest that the textile and apparel industries have excellent surge production capabilities, with 80 percent of firms responding to BIS's survey that currently supply to DoD reporting that they have the ability to double production in six months.

## **Dependency on Foreign Sources for Critical Textile-Related Materials**

- For the purposes of the study, the report defines "critical textile-related materials" to be those textile-related items (including inputs) necessary for the production of textiles and apparel that are critical to the ability of the U.S. Armed Forces and the U.S. economy to function. This definition is consistent with input received from industry and DoD.
- Of the surveyed firms which indicated that they rely on foreign sources of textile and apparel inputs, 73 percent reported that they were "dependent" on foreign sources for at least one good or service. However, a substantial number of these firms acknowledged that there were, in fact, domestic producers of the goods/services currently obtained from foreign sources, but that the foreign source was "relied upon" because of lower costs.
- Those firms that indicated they rely on foreign sources of textile and apparel inputs for which there is no adequate domestic alternative noted primarily three categories of

foreign-sourced inputs: (i) textile and apparel manufacturing machinery and parts (principally obtained from Switzerland, Germany, and Japan); (ii) production, labor, assembly, and services (principally obtained from China, Taiwan, India, and South Korea); and (iii) raw inputs such as fabric, fiber, yarn sourcing, chemicals, and dyes (principally obtained from South Korea, India, and Mexico). Items in the second and third categories can often be obtained from alternative sources abroad (e.g., labor can be obtained in China *or* Taiwan *or* India), while items in the first category (machinery and parts) are more often available only from a single source.

- By virtue of statutory restrictions (the Berry Amendment and the Buy American Act), DoD directly purchases only very small amounts of foreign textiles and apparel (approximately 0.23 percent of total DoD expenditures on textiles and apparel). Further, DoD maintains a list of “critical” textile and apparel items, all of which must – and, according to DoD, can – be sourced domestically, consistent with the statutory restrictions. Accordingly, there is strong evidence that DoD itself is not dependent on foreign sources for its textile and apparel needs. However, the BIS survey indicated that many of the textile and apparel firms selling to DoD believe that they are dependent on a foreign source for some input to production. The foreign-sourced inputs most commonly cited include machinery, equipment and parts, dyes, and chemicals. This does not necessarily suggest non-compliance with the Berry Amendment and the Buy American requirements because (i) those requirements do not apply to machinery used to manufacture textile and apparel products, and (ii) chemicals and dyes do not account for a large enough percentage of the total value of the textile and apparel items purchased to invoke such restrictions.
- The U.S. textile and apparel industries’ greatest foreign dependency appears to be on foreign-manufactured textile- and apparel-related manufacturing equipment. The “threat” posed by this dependency is mitigated by the facts that (i) the countries producing this equipment are close U.S. allies, and (ii) there is currently domestic over-capacity in the textile and apparel industries, enabling U.S. firms to meet critical textile-

related needs even if access to foreign-manufactured machinery were cut off. U.S. textile and apparel manufacturers also currently rely upon foreign sources for other inputs, including labor and raw materials. While the countries from which these inputs are obtained pose more complex security issues for the United States, the threat posed by this reliance is mitigated by the fact that these inputs can commonly be obtained from more than one source.

### **Department of Defense Enforcement of Berry Amendment and Buy American Restrictions**

- Statistics provided by DoD suggest that it is granting very few waivers of the Berry Amendment and Buy American restrictions. These statistics were confirmed by interviews with industry.
- Based on BIS survey responses, more than two-thirds of firms supplying DoD consider DoD enforcement of the Berry Amendment and other Buy American Restrictions to be effective. Most of the remaining one-third disagree, but cannot provide specific examples of ineffective enforcement.
- Both industry and DoD employees interviewed indicated that certain clarifications to regulations implementing the Berry Amendment and the Buy American restrictions might be beneficial to help enhance understanding of the restrictions, both by service personnel and by industry.

## **Introduction: Process and Methodology**

This report responds to a Congressional directive<sup>3</sup> that the U.S. Department of Commerce's Bureau of Industry and Security (BIS):

[C]onduct a comprehensive study on the health, competitiveness, and the contribution of the U.S. textile and apparel industry to the U.S. economy and in particular to the U.S. Armed Forces. The study should include a review of whether the United States is increasing its dependency on foreign sources for critical textile-related materials; potential threats to internal security from increased foreign sourcing and dependency; and whether the Berry Amendment and other Buy American restrictions are being effectively enforced by the Department of Defense.

### **Background on BIS Analyses of U.S. Defense Industrial Base**

BIS's Office of Strategic Industries and Economic Security (OSIES) is the focal point in the Department of Commerce for issues relating to the health and competitiveness of the U.S. defense industrial base. OSIES works to maintain and enhance national and economic security by conducting primary research and analyses on critical technologies and defense-related industrial sectors. OSIES's capabilities are leveraged through partnerships with a wide range of defense and civilian federal agencies, state and local governments, industry associations, and universities. Congressional mandates and executive orders grant BIS the unique authority to conduct surveys and assessments of defense-related industries and technologies and to monitor economic and trade issues critical to the U.S. industrial base. Specifically, this study was conducted in accordance with BIS's authority under the Defense Production Act of 1950, as amended (50 U.S.C. App. Sec. 2155). BIS is delegated the authority under Section 705 of the Defense Production Act of 1950, as amended, and Section 401 of Executive Order 12656, as amended, to collect basic economic and industrial information from industry.

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<sup>3</sup> Conference Report to the Omnibus Appropriations Act of 2003 [P.L. 108-7, 20 February 2003, H901].

BIS worked in conjunction with an outside consultant, Strategic Resources, Incorporated (SRI), to prepare this report. SRI is an economics consulting firm with substantial experience in conducting industry analyses such as these.

### **Sources of Information**

The primary sources of information for this report included:

- The BIS Industry Survey sent to approximately 1,600 textile and apparel firms covering a representative sample of textile mills (NAICS 313), textile product mills (NAICS 314), apparel manufacturers (NAICS 315), footwear manufacturers (NAICS 3162), and other related industries;
- Publicly available data such as financial information, company annual reports, and data from Commerce's Bureau of Economic Analysis (BEA), Bureau of the Census, and Office of Textiles and Apparel (OTEXA), the Department of Labor's Bureau of Labor Statistics (BLS), the U.S. International Trade Commission, and the U.S. Department of Agriculture;
- Site visits to several companies in the textile and apparel industries; and
- Interviews with industry executives, industry analysts, government textile and apparel experts, DoD officials, state and federal government-funded research institutions, private research firms, and trade associations.

### **Working Groups**

In the preparation of this report, and in particular the Industry Survey referenced above, BIS worked in coordination with two working groups: one consisting of relevant U.S. government agencies; the other made up of associations from the textile and apparel industries.

The inter-agency working group consisted of representatives from Commerce's International Trade Administration and Bureau of the Census, the U.S. International Trade Commission, the U.S. Bureau of Customs and Border Protection, the DoD's Defense Logistics Agency and Defense Contract Management Agency, the U.S. Department of Labor, the Central Intelligence Agency, and the U.S. Department of Agriculture.

The industry working group consisted of representatives from the textile and apparel industries: the American Apparel & Footwear Association, the American Fiber Manufacturers Association, the National Cotton Council of America, the National Textile Association, the American Yarn Spinners Association, the American Textile Manufacturers Institute, the United States Industrial Fabrics Institute, the Industrial Fabrics Association International, the American Manufacturing Trade Action Coalition, and Clemson Apparel Research.

### **BIS Survey Methodology**

Significant parts of the report's analyses derive from the results of the BIS survey. The survey covers both U.S. and foreign-owned businesses with operations in the United States. Foreign businesses operating outside the United States were not included in this study.

BIS used the expertise of the aforementioned industry working group, as well as input from the inter-agency group to pre-test the survey and identify companies that were included in the survey mailing list. The time period covered in the BIS survey is 1999 through 2003, with 2003 data estimated by the textile and apparel firms. The final survey was then sent to the Office of Management and Budget for review and approval for compliance with the Paperwork Reduction Act.

BIS sent the survey to more than 1,600 firms, and a total of 1,024 responses were received. Of those, more than 500 firms were exempted from completing the survey because their operations were not within the scope of the study, they ceased operations, or they were very small (typically with fewer than 10 employees). Of the remainder, 497 submitted valid and complete responses with critical data. The responding firms represent a significant share of the textile and apparel industries in terms of employment, shipments, and sales. Table 1 compares survey response-generated employment data with total textile and apparel employment statistics from the Department of Labor for 2002 and is provided to show the portion of the industries represented by the survey responses.

| <b>Table 1. Comparison of Department of Labor Data With BIS Textile &amp; Apparel Survey Data: 2002</b> |                      |                           |
|---|----------------------|---------------------------|
| <b>Source of Data</b>   | <b>Total Workers</b> | <b>Production Workers</b> |
| Labor Data (NAICS)  | 847,000              | 691,500                   |
| Survey Data   | 291,362              | 179,681                   |
| Survey %  | 34.4%                | 26.0%                     |

Sources: DOC/BIS Industry Survey and Department of Labor

This shows that survey results came from firms representing 34.4 percent of the total textile and apparel workforces, and 26 percent of textile and apparel production workers respectively, both indicating substantial responses.

The textile and apparel industries in the United States are comprised of both publicly traded and privately held companies. This study incorporates data obtained from publicly traded and privately held textile and apparel companies operating domestically. Firms included in this report engage in one or more of the following activities:

- Manufacturing textile and/or apparel items;
- Manufacturing products for the textile and apparel industries;
- Providing specialized services for the textile and apparel industries;
- Distributing products for the textile and apparel industries;
- Reselling products for the textile and apparel industries;
- Conducting research and development (R&D) for the textile and apparel industries; and
- Conducting other activities relating to the textile and apparel industries.

In an effort to meet the requirements of Congress, BIS collected information about each firm's textile and apparel activities, such as their product lines, defense production, financial operations, investment, R&D expenditures, employment, partnerships with federal agencies and industry, competitors, and market projections. A copy of the BIS survey is included in the appendix. Consistent with the statutory authority under which the survey is issued, the individual responses filed by companies are kept confidential.

For the purposes of this assessment, the textile and apparel industries are comprised of companies that transform a basic fiber (natural or synthetic) into a product, such as yarn or fabric, that can be further processed or manufactured into woven, knitted, bonded, felted, needle-punched, lace, and crocheted goods for commercial or industrial use. The industries also include companies involved in two distinct manufacturing processes: (1) cut and sew (i.e., purchasing fabric and cutting and sewing to make a garment) and (2) the manufacture of garments in establishments that first knit fabric and then cut and sew fabric into a garment.



## **I. Current Health and Competitiveness of the U.S. Textile and Apparel Industries**

This chapter examines the health and competitiveness of the U.S. textile and apparel industries at both the macro- and micro-economic levels. It first provides an overview of the current state of the industries by discussing the main products, the demand trends, and the global and U.S. markets. Next, the chapter assesses the health of the U.S. textile and apparel industries using various relevant industry indicators, including key financial metrics, trends in output, employment, prices, and production capacity. Finally, the chapter compares these U.S. industries with their international counterparts in several key areas to gauge the U.S. industries' competitiveness.

The analysis uses data from public sources, including the U.S. DOC's Bureau of Economic Analysis and Bureau of the Census and the U.S. Department of Labor's Bureau of Labor Statistics. The analysis also relies on data collected through the DOC/BIS Survey Questions for Industry.

### **A. Current State of the U.S. Textile and Apparel Industries**

For purposes of this assessment, the U.S. textile and apparel industries together are comprised of four major segments, as defined by the Office of Management and Budget under the North American Industry Classification System (NAICS):

- **Textile Mills** (NAICS 313) – transform a basic fiber into a product that is usually purchased and processed into end-use products by either cutting and sewing or finishing;
- **Textile Product Mills** (NAICS 314) – make textile products (except apparel), purchasing fabric and cutting and sewing to make textiles and end products such as bed linens, curtains, draperies, and carpets;
- **Apparel Manufacturing** (NAICS 315) – either (1) cut and sew purchased fabric to make a garment, or (2) first knit fabric, then cut and sew the fabric into a garment; and

- **Footwear Manufacturing** (NAICS 3162) – manufacture footwear from a variety of materials.

This section reviews the current state of each of these industries and their major sub-product groups. To put the performance of these industries in context, Table I-1 presents figures for growth in overall national gross domestic product (GDP), retail sales, and industrial production for 1997 through 2002.

| <b>Table I-1. Change in Relevant U. S. Economic Figures (percent)</b> |             |             |             |             |             |             |
|---|-------------|-------------|-------------|-------------|-------------|-------------|
|   | <b>1997</b> | <b>1998</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> | <b>2002</b> |
| <b>GDP</b>  | 4.4         | 4.3         | 4.11        | 3.75        | 0.25        | 2.45        |
| <b>Retail Sales</b>   | 4.6         | 5.0         | 8.4         | 6.7         | 2.8         | 2.8         |
| <b>Industrial Output</b>  | 7.3         | 5.6         | 4.3         | 4.7         | -3.5        | -0.7        |

Source: Federal Reserve Statistics, U.S. Department of Commerce, Bureau of the Census

Overall, as described in greater detail below, the analysis suggests that there is substantial variation in the status of the different sectors. The analysis also discusses, in separate subsections, trends in end uses (away from apparel manufacturing and towards industrial applications) and trends in U.S. exports and imports relative to consumption (showing imports as a growing percentage of U.S. apparent consumption).

### **A.1 Textile Mills (NAICS 313)**

The U.S. textile industry includes firms that transform basic fibers such as cotton, wool, and polyesters into products such as yarn, fabric, and thread that are further manufactured into end-use items such as apparel, sheets, bags, or industrial items. Three broad categories describe the scores of products and processes these industries encompass, as seen in Table I-2: (1) fiber, yarn, and thread mills; (2) fabric mills; and (3) finishing and coating mills.

As shown in Table I-2, total shipments from textile mills declined from approximately \$49.8 billion in 1997 to approximately \$38.5 billion in 2001. The largest activity based on value of shipments is fabric forming, comprising 58 percent of basic textile production in the United States in 2001. Spinning, yarn throwing, and thread production comprise 26 percent of the

shipment value in basic textile production in 2001. Finally, 15 percent of the industry (based on value-added only) engages in textile finishing and coating.

All activities within the three main textile sectors recorded declines in the value of shipments over the period 1997-2001. The decline in these sectors preceded that of the general U.S. economy, which began to retrench in 1999. As explained later in this report, a decline in demand for textiles (by apparel producers in particular) and rising textile imports are commonly cited as significant factors affecting U.S. production of textiles. For example, there was a severe decline in apparel construction shipments, contributing in turn to substantial declines in demand for thread (by 47 percent) and knit fabrics (by 44 percent) during the 1997-2001 period. Spinning,

| <b>Table I-2. U.S. Shipments of Textiles 1997-2001</b> |                                      |               |               |               |               |               |                                 |
|--|--------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------------------------|
| (\$ Millions)  |                                      |               |               |               |               |               |                                 |
| <b>NAICS</b>   | <b>Description</b>                   | <b>1997</b>   | <b>1998</b>   | <b>1999</b>   | <b>2000</b>   | <b>2001</b>   | <b>Percent Change 1997-2001</b> |
| <b>31311</b>   | <b>Fiber, Yarn, and Thread Mills</b> | <b>12,897</b> | <b>12,669</b> | <b>11,904</b> | <b>11,334</b> | <b>10,030</b> | <b>-22%</b>                     |
| 313111   | Spinning                             | 8,143         | 7,943         | 7,216         | 6,374         | 5,720         | -30%                            |
| 313112   | Yarn Throwing                        | 4,232         | 4,123         | 4,376         | 4,586         | 4,033         | -5%                             |
| 313113   | Thread                               | 522           | 603           | 311           | 374           | 278           | -47%                            |
| <b>3132</b>  | <b>Fabric Mills</b>                  | <b>29,980</b> | <b>29,688</b> | <b>27,900</b> | <b>26,410</b> | <b>22,604</b> | <b>-25%</b>                     |
| 31321  | Broad woven                          | 18,269        | 18,306        | 16,655        | 15,562        | 13,295        | -27%                            |
| 31322  | Narrow Fabric                        | 1,646         | 1,711         | 1,834         | 1,759         | 1,724         | 5%                              |
| 31323  | Non-Woven Fabric                     | 4,368         | 4,416         | 4,674         | 4,873         | 4,407         | 1%                              |
| 31324  | Knit Fabrics                         | 5,697         | 5,255         | 4,737         | 4,216         | 3,179         | -44%                            |
| <b>3133</b>  | <b>Finishing and Coating Mills*</b>  | <b>6,896</b>  | <b>6,554</b>  | <b>6,245</b>  | <b>6,326</b>  | <b>5,905</b>  | <b>-14%</b>                     |
|  | <b>Total</b>                         | <b>49,773</b> | <b>48,911</b> | <b>46,049</b> | <b>44,070</b> | <b>38,540</b> | <b>-23%</b>                     |

Source: U.S. Department of Commerce, Annual Survey of Manufactures

\*Finishing and coating are intermediate services in textile production; the values presented here are value-added.

yarn throwing, thread shipments, and fabric forming declined by 22 percent, close to the industry average of 23 percent, while finishing and coating activities declined by 14 percent. However, within the three major categories considerable variation in performance is evident. Thread shipments declined by an average of 47 percent or more than double the industry average. Following closely behind the trend in thread shipments, knit fabric mill shipments declined by 44 percent -- almost double the industry average. In contrast, narrow fabric and non-woven fabric shipments expanded slightly based on value.

## A.2 Textile Product Mills (NAICS 314)

Textile product mills utilize yarn, fabric, and thread for the manufacture of end-use products. These are differentiated from apparel products (NAICS 315) because they are not worn and are frequently produced in vertically integrated operations. Some cutting and sewing may be required. Textile mills fall into two major groups: (1) textile furnishings mills (home furnishings), which comprised two-thirds of the shipments; and (2) other textile product mills (general industrial products) (see Table I-3).

| NAICS         | Description                             | 1997          | 1998          | 1999          | 2000          | 2001          | Percent Change 1997-2001 |
|---------------|---|---------------|---------------|---------------|---------------|---------------|--------------------------|
| <b>3141</b>   | <b>Textile Furnishings Mills</b>        | <b>20,296</b> | <b>20,658</b> | <b>21,119</b> | <b>22,436</b> | <b>21,793</b> | <b>7%</b>                |
| 31411         | Carpet and Rugs                         | 11,493        | 12,070        | 11,686        | 12,748        | 12,659        | 10%                      |
| 31412         | Curtains, Linens and Household Products | 8,803         | 8,588         | 9,433         | 9,688         | 9,134         | 4%                       |
| <b>3149</b>   | <b>Other Textile Product Mills</b>      | <b>10,756</b> | <b>10,479</b> | <b>11,570</b> | <b>11,219</b> | <b>10,178</b> | <b>-5%</b>               |
| 31491         | Textile Bags and Canvas                 | 2,502         | 2,516         | 2,606         | 2,598         | 2,464         | -2%                      |
| 314991        | Rope, Cordage and Twine                 | 777           | 766           | 804           | 821           | 809           | 4%                       |
| 314992        | Tire Cordage and Tire Fabric            | 1,269         | 1,300         | 1,428         | 1,479         | 1,038         | -18%                     |
| <b>314999</b> | <b>Products not listed elsewhere</b>    | <b>6,208</b>  | <b>5,897</b>  | <b>6,732</b>  | <b>6,321</b>  | <b>5,867</b>  | <b>-5%</b>               |
|               | <b>Total</b>                            | <b>31,052</b> | <b>31,137</b> | <b>32,689</b> | <b>33,654</b> | <b>31,971</b> | <b>3%</b>                |

Source: U.S. Department of Commerce, Annual Survey of Manufactures

Total shipments of textile mill products rose during the 1997-2001 period to about \$32 billion, up from approximately \$31.1 billion in 1997, with the principal area of growth being textile furnishings mills. Shipments of the major home products groups (carpets, rugs, curtains, linens, and house products) grew seven percent over the 1997-2001 period. The slight decline in shipments in 2001 was due, in part, to the general downturn suffered by most of the U.S. consumer sector.

In contrast to the growth in the furnishings mills, shipments of other textile product mills declined by five percent overall. Shipments of tire cordage declined by 18 percent over the 1997-2001 period, and shipments of textile bags and canvas also fell by two percent. Only the rope, cordage, and twine subsector grew over the period.

### A.3 Apparel Manufacturing (NAICS 315)

Activities in the apparel manufacturing subsector comprise two distinct manufacturing processes: (1) cut and sew (i.e., purchasing fabric and cutting and sewing it to make a garment) and (2) the manufacture of garments in establishments that first knit fabric and then sew the fabric into a garment.

The apparel manufacturing subsector includes a diverse range of establishments manufacturing full lines of ready-to-wear and custom apparel. Examples of subsector manufacturing include: apparel contractors performing cutting or sewing operations on materials owned by others; jobbers performing entrepreneurial functions involved in apparel manufacture; and tailors manufacturing custom garments for individual clients. Knitting, when done alone, is classified in the textile mills subsector, but when combined with the production of complete garments, is classified as apparel manufacturing.

| <b>Table I-4. U.S. Shipments of Apparel 1997- 2001</b> |                             |             |             |             |             |             |                                 |
|--|-----------------------------|-------------|-------------|-------------|-------------|-------------|---------------------------------|
| (\$ Millions)  |                             |             |             |             |             |             |                                 |
| <b>NAICS</b>   | <b>Description</b>          | <b>1997</b> | <b>1998</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> | <b>Percent Change 1997-2001</b> |
| 315  | Apparel Mfg.                | 68,018      | 64,932      | 62,305      | 60,339      | 54,598      | -20%                            |
| 3151   | Apparel From Knitting Mills | 9,601       | 8,526       | 7,669       | 7,569       | 6,838       | -29%                            |
| 3152   | Cut and Sew Apparel Mfg.    | 53,852      | 51,574      | 50,332      | 48,413      | 43,563      | -19%                            |

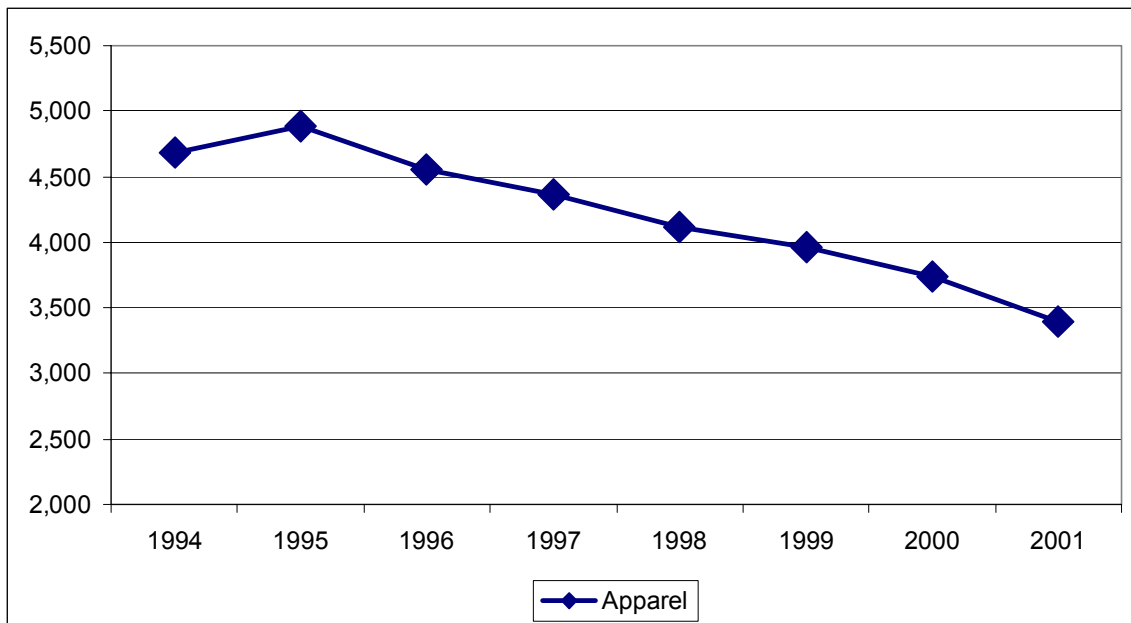
Source: U.S. Department of Commerce, Annual Survey of Manufactures

U.S. apparel shipments experienced a decline of 20 percent during the 1997-2001 period (see Table I-4). Shipments of apparel from knitting mills fell 29 percent over the period, while shipments from cut and sew establishments fell 19 percent.

Industry data in Figure I-1 shows the decline in the pounds of fiber consumed by the apparel industry. Figure I-1 also shows that the current decline in production began in 1995 and has continued unbroken.

More than 50 percent of U.S. apparel shipments are concentrated in three areas: the production of men's, boys', women's, and girls' trousers (29 percent); men's and boys' knit sport shirts (13 percent); and children's, girls', and infants' apparel (12 percent).

**Figure I-1. Consumption of Fiber by U.S. Apparel Industry, 1994-2001**  
(Millions of pounds)



Source: Cotton Counts its Customers, All Fibers

#### **A.4 Footwear Manufacturing (NAICS 3162)**

The U.S. footwear manufacturing industry is broken down into five categories: rubber and plastics footwear; house slippers; men's footwear; women's footwear; and other footwear. Rubber and plastics footwear includes manufacturers who produce footwear that has rubber or plastic soles with rubber, plastic or fabric uppers, as well as rubber and plastics protective footwear. House slipper manufacturing includes all house slippers and slipper socks, regardless of material. Men's and women's footwear is comprised of all footwear that is primarily designed for dress, street, and work. This includes all shoes with rubber or plastic soles and leather or vinyl uppers, except athletic shoes, which are classified under other footwear or rubber and plastics footwear if they have a fabric upper.

| <b>Table I-5. U.S. Shipments of Footwear 1997-2001 (\$ Millions)</b> |                                       |              |              |              |              |              |                                     |
|--|---------------------------------------|--------------|--------------|--------------|--------------|--------------|-------------------------------------|
| <b>NAICS</b>   | <b>Description</b>                    | <b>1997</b>  | <b>1998</b>  | <b>1999</b>  | <b>2000</b>  | <b>2001</b>  | <b>Percent Change<br/>1997-2001</b> |
| <b>3162</b>  | <b>Footwear<br/>Manufacturing</b>     | <b>4,211</b> | <b>3,764</b> | <b>3,797</b> | <b>3,760</b> | <b>3,511</b> | <b>-17%</b>                         |
| 316211   | Rubber and<br>Plastics Footwear       | 1,010        | 1,130        | 1,023        | 977          | 963          | -5%                                 |
| 316212   | House Slippers                        | 264          | 235          | 248          | 254          | 205          | -22%                                |
| 316213   | Men's Footwear<br>(except Athletic)   | 2,020        | 1,692        | 1,829        | 2,022        | 1,942        | -4%                                 |
| 316214   | Women's Footwear<br>(except Athletic) | 704          | 506          | 516          | 369          | 303          | -57%                                |
| 316219   | Other Footwear                        | 214          | 201          | 181          | 139          | 98           | -54%                                |

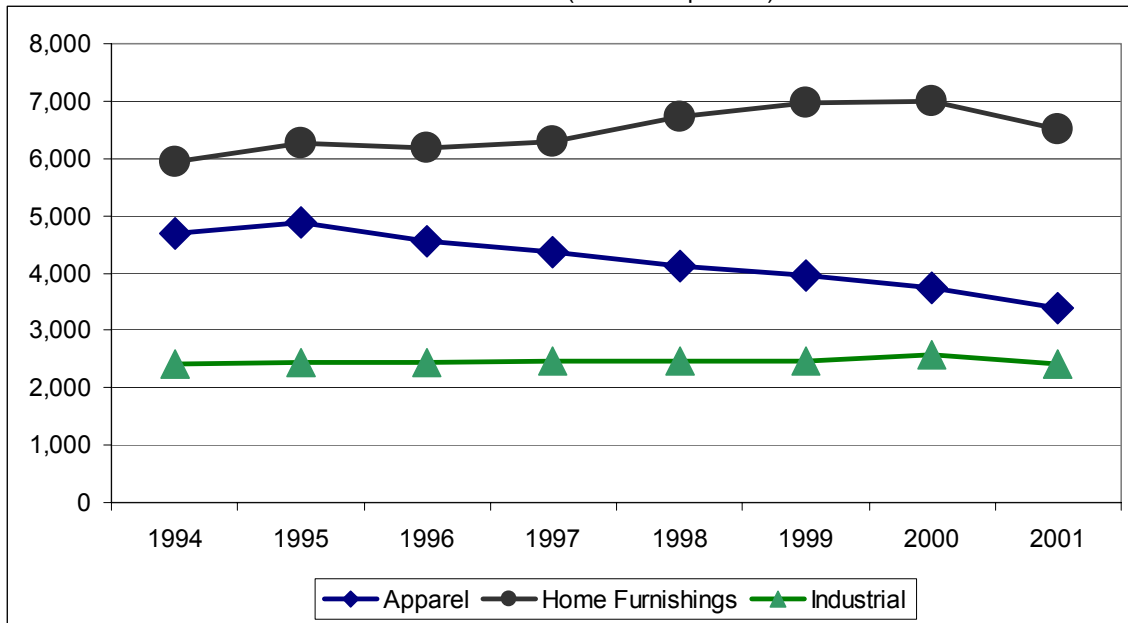
Source: U.S. Department of Commerce, Annual Survey of Manufactures

In the U.S. footwear manufacturing industry, men's footwear comprised 55 percent of all shipments in 2001 (see Table I-5). This was followed by rubber and plastics footwear which made up 27 percent. Women's footwear has substantially decreased in shipments, declining from \$704 million in shipments in 1997 to \$303 million in shipments in 2001. This represents a reduction of 57 percent in shipments over five years. The average change for all footwear manufacturing from 1997 to 2001 was a decline of 17 percent. In 2001, footwear shipments totaled only \$3.5 billion.

#### **A.5 Change in Textile End Uses in the United States**

With declines in U.S. apparel shipments, the composition of textile production in the United States has shifted away from fabrics for use in apparel to fabrics for use in home furnishing applications and other industrial uses. As shown in Figure I-2, 1994 apparel production consumed more than double the textiles used to produce industrial goods. By 2001, textile consumption by U.S. apparel firms had declined almost to the level of textiles demanded by industrial producers, whose consumption of textiles increased only slightly, growing from 18 percent of fiber consumption to 20 percent in 2001. The share of textile consumption for home furnishings increased from 46 percent in 1994 to 52 percent in 2001.

**Figure I-2. Demand for Textiles by End Use in the United States,  
1994-2001 (Millions of pounds)**



Source: Cotton Counts its Customers

## A.6 The Global and U.S. Markets for Textiles and Apparel

Table I-6 shows trends in shipments, imports, exports, apparent consumption, and imports as a percent of apparent consumption for spinning, yarn, and thread (NAICS 31311). While U.S. imports of thread and yarn first rose and then fell over the 1997-2001 period, imports as a percentage of apparent consumption rose steadily, as U.S. production generally declined. U.S. yarn imports increased by 17 percent, while imports of thread declined by 21 percent. The top five foreign sources of imported yarn and thread are: Canada (\$100 million or 20 percent), Mexico (\$87 million or 13 percent), Pakistan (\$69 million or ten percent), Italy (\$44 million or seven percent), and Thailand (\$31 million or five percent). Exports of yarn and thread grew over the period.

| <b>Table I-6. U.S. Shipments, Imports, Exports and Apparent Consumption, Spinning, Yarn, and Thread 1997- 2002</b> |                            |             |             |             |             |             |             |                           |
|--|----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------------------|
| (\$ Millions)  |                            |             |             |             |             |             |             |                           |
| <b>NAICS</b>   | <b>Description</b>         | <b>1997</b> | <b>1998</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> | <b>2002</b> | <b>Change 1997 - 2001</b> |
| <b>U.S. Shipments</b>  |                            |             |             |             |             |             |             |                           |
| 31311  | Spinning, Yarn, and Thread | 12,897      | 12,669      | 11,904      | 11,334      | 10,030      | N/A         | -22%                      |
| 313111   | Yarn/Spinning              | 8,143       | 7,943       | 7,216       | 6,374       | 5,720       | N/A         | -30%                      |
| 313112   | Yarn Throwing              | 4,232       | 4,123       | 4,376       | 4,586       | 4,033       | N/A         | -5%                       |
| 313113   | Thread                     | 522         | 603         | 311         | 374         | 278         | N/A         | -47%                      |
| <b>U.S. Imports (CIF-Cost, Insurance, and Freight)</b>   |                            |             |             |             |             |             |             |                           |
| 31311  | Spinning, Yarn, and Thread | 601         | 649         | 716         | 805         | 701         | 670         | 17%                       |
| 313111   | Yarn/Spinning              | 547         | 597         | 668         | 760         | 658         | 620         | 20%                       |
| 313112   | Yarn Throwing              | --          | --          | --          | --          | --          | --          | --                        |
| 313113   | Thread                     | 54          | 52          | 47          | 45          | 42          | 50          | -21%                      |
| <b>U.S. Exports (FAS-Free Along Side)</b>  |                            |             |             |             |             |             |             |                           |
| 31311  | Spinning, Yarn, and Thread | 513         | 548         | 614         | 731         | 607         | 590         | 18%                       |
| 313111   | Yarn/Spinning              | 358         | 347         | 372         | 415         | 409         | 423         | 14%                       |
| 313112   | Yarn Throwing              | --          | --          | --          | --          | --          | --          | --                        |
| 313113   | Thread                     | 155         | 201         | 242         | 315         | 198         | 167         | 28%                       |
| <b>U.S. Apparent Consumption</b>   |                            |             |             |             |             |             |             |                           |
| 31311  | Spinning, Yarn, and Thread | 12,985      | 12,770      | 12,005      | 11,409      | 10,124      | N/A         | -22%                      |
| 313111   | Yarn/Spinning              | 8,332       | 8,194       | 7,512       | 6,718       | 5,969       | N/A         | -28%                      |
| 313112   | Yarn Throwing              | --          | --          | --          | --          | --          | --          | --                        |
| 313113   | Thread                     | 421         | 453         | 116         | 105         | 122         | N/A         | -71%                      |
| <b>Imports as a Percent of Apparent Consumption</b>  |                            |             |             |             |             |             |             |                           |
| 31311  | Spinning, Yarn, and Thread | 5%          | 5%          | 6%          | 7%          | 7%          | N/A         | 50%                       |
| 313111   | Yarn/Spinning              | 7%          | 7%          | 9%          | 11%         | 11%         | N/A         | 68%                       |
| 313112   | Yarn Throwing              | --          | --          | --          | --          | --          | --          | --                        |
| 313113   | Thread                     | 13%         | 11%         | 41%         | 43%         | 35%         | N/A         | 172%                      |

Source: U.S. Department of Commerce, Annual Survey of Manufactures, and U.S. Imports and Exports of Merchandise Trade (as reported by the U.S. International Trade Commission)

Table I-7 illustrates U.S. shipments, imports, exports, apparent consumption, and imports as a percent of apparent consumption of textile fabrics for 1997-2002. While apparent U.S. consumption of fabric declined 29 percent over the 1997-2001 period and shipments of fabric have declined by 25 percent, imports have remained relatively steady, declining only three percent. The net result of declining U.S. shipments and steady imports of textile fabric has been a rise in the penetration of imports into the U.S. market.

| <b>Table I-7. U.S. Shipments, Imports, Exports, and Apparent Consumption 1997- 2002</b> |                               |             |             |             |             |             |             |                         |
|---|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------------------|
| <b>Textile Fabrics</b>  |                               |             |             |             |             |             |             |                         |
| (\$ Millions)   |                               |             |             |             |             |             |             |                         |
| <b>NAICS</b>  | <b>Description</b>            | <b>1997</b> | <b>1998</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> | <b>2002</b> | <b>Change 1997-2001</b> |
| <b>U.S. Shipments</b>   |                               |             |             |             |             |             |             |                         |
| 3132  | Fabric (Weaving and Knitting) | 29,980      | 29,688      | 27,900      | 26,410      | 22,604      | N/A         | -25%                    |
| 31321   | Broadwoven                    | 18,269      | 18,306      | 16,655      | 15,562      | 13,295      | N/A         | -27%                    |
| 31322   | Narrow Fabric                 | 1,646       | 1,711       | 1,834       | 1,759       | 1,724       | N/A         | 5%                      |
| 31323   | Non-Woven Fabric              | 4,368       | 4,416       | 4,674       | 4,873       | 4,407       | N/A         | 1%                      |
| 31324   | Knit Fabrics                  | 5,697       | 5,255       | 4,737       | 4,216       | 3,179       | N/A         | -44%                    |
| <b>U.S. Imports (CIF-Cost, Insurance, and Freight)</b>                                  |                               |             |             |             |             |             |             |                         |
| 3132  | Fabric (Weaving and Knitting) | 5,315       | 5,367       | 5,282       | 5,714       | 5,151       | 5,531       | -3%                     |
| 31321   | Broadwoven                    | 3,905       | 3,907       | 3,659       | 3,896       | 3,338       | 3,559       | -15%                    |
| 31322   | Narrow Fabric                 | 341         | 374         | 394         | 439         | 407         | 442         | 19%                     |
| 31323   | Non-Woven Fabric              | 265         | 277         | 286         | 355         | 372         | 422         | 40%                     |
| 31324   | Knit Fabrics                  | 804         | 810         | 944         | 1,025       | 1,034       | 1,107       | 29%                     |
| <b>U.S. Exports (FAS-Free Along Side)</b>   |                               |             |             |             |             |             |             |                         |
| 3132  | Fabric (Weaving and Knitting) | 4,369       | 4,378       | 4,680       | 5,635       | 5,715       | 6,033       | 31%                     |
| 31321   | Broadwoven                    | 2,388       | 2,425       | 2,683       | 3,315       | 3,237       | 3,301       | 36%                     |
| 31322   | Narrow Fabric                 | 538         | 551         | 660         | 728         | 749         | 769         | 39%                     |
| 31323   | Non-Woven Fabric              | 769         | 733         | 674         | 761         | 757         | 822         | -2%                     |
| <b>U.S. Apparent Consumption</b>  |                               |             |             |             |             |             |             |                         |
| 3132  | Fabric (Weaving and Knitting) | 30,926      | 30,677      | 28,503      | 26,489      | 22,040      | N/A         | -29%                    |
| 31321   | Broadwoven                    | 19,787      | 19,787      | 17,630      | 16,143      | 13,397      | N/A         | -32%                    |
| 31322   | Narrow Fabric                 | 1,449       | 1,534       | 1,568       | 1,470       | 1,382       | N/A         | -5%                     |
| 31323   | Non-Woven Fabric              | 3,864       | 3,959       | 4,286       | 4,466       | 4,022       | N/A         | 4%                      |
| 31324   | Knit Fabrics                  | 5,826       | 5,396       | 5,019       | 4,410       | 3,240       | N/A         | -44%                    |
| <b>Imports as a Percent of Apparent Consumption</b>                                     |                               |             |             |             |             |             |             |                         |
| 3132  | Fabric (Weaving and Knitting) | 17%         | 17%         | 19%         | 22%         | 23%         | N/A         | 36%                     |
| 31321   | Broadwoven                    | 20%         | 20%         | 21%         | 24%         | 25%         | N/A         | 26%                     |
| 31322   | Narrow Fabric                 | 24%         | 24%         | 25%         | 30%         | 29%         | N/A         | 25%                     |
| 31323   | Non-Woven Fabric              | 7%          | 7%          | 7%          | 8%          | 9%          | N/A         | 35%                     |
| 31324   | Knit Fabrics                  | 14%         | 15%         | 19%         | 23%         | 32%         | N/A         | 131%                    |

Source: U.S. Department of Commerce, Annual Survey of Manufactures, and U.S. Imports and Exports of Merchandise Trade (as reported by the U.S. International Trade Commission)

As illustrated in Table I-7, considerable variation in U.S. shipments exists between the major fabric sub-groups. Large declines were seen in shipments of broad woven and knit fabrics (27 percent and 44 percent respectively), compared with narrow fabrics and non-wovens, where shipments increased by five percent and one percent, respectively. The top five import sources for fabric are: Canada (\$800 million or 14 percent); South Korea (\$600 million or 11 percent);

Italy (\$500 million or nine percent); Taiwan (\$400 million or seven percent); and China (\$400 million or seven percent).

As shown in Table I-8, U.S. shipments of products from textile furnishing mills (home furnishings) grew by seven percent between 1997 and 2001, while shipments from other textile product mills (industrial applications) declined modestly (by five percent), about one-third the rate for fabrics and yarns. Imports of home furnishings and industrial textiles increased over the period.

The top five sources of U.S. imports of home furnishings are: China (\$1.5 billion or 26 percent); India (\$1 billion or 16 percent); Pakistan (\$700 million or 11 percent); Mexico (\$400 million or seven percent); and Canada (\$300 million or five percent). The top five sources of U.S. imports of industrial textiles are: China (\$900 million or 34 percent); Mexico (\$400 million or 16 percent); Canada (\$200 million or nine percent); South Korea (\$100 million or five percent); and Taiwan (\$100 million or four percent).

| <b>Table I-8. U.S. Shipments, Imports, Exports, and Apparent Consumption 1997- 2002</b> |                                    |             |             |             |             |             |             |                             |
|---|------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------------------|
| <b>Textile Furnishing Mills and Other Textile Product Mills</b>                         |                                    |             |             |             |             |             |             |                             |
| (\$ Millions)   |                                    |             |             |             |             |             |             |                             |
| <b>NAICS</b>  | <b>Description</b>                 | <b>1997</b> | <b>1998</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> | <b>2002</b> | <b>Change<br/>1997-2001</b> |
| <b>U.S. Shipments</b>   |                                    |             |             |             |             |             |             |                             |
| 3141  | Textile Furn. Mills                | 20,296      | 20,658      | 21,119      | 22,436      | 21,793      | N/A         | 7%                          |
| 31411   | Carpets and Rugs                   | 11,493      | 12,070      | 11,686      | 12,748      | 12,659      | N/A         | 10%                         |
| 31412   | Curtains and<br>Linens             | 8,803       | 8,588       | 9,433       | 9,688       | 9,134       | N/A         | 4%                          |
| 3149  | Other Products of<br>Textile Mills | 10,756      | 10,479      | 11,570      | 11,219      | 10,178      | N/A         | -5%                         |
| 31491   | Textile Bags and<br>Canvas         | 2,502       | 2,516       | 2,606       | 2,598       | 2,464       | N/A         | -2%                         |
| 314991  | Rope, Cordage,<br>and Twine        | 777         | 766         | 804         | 821         | 809         | N/A         | 4%                          |
| 314992  | Tire Cordage and<br>Tire Fabric    | 1,269       | 1,300       | 1,428       | 1,479       | 1,038       | N/A         | -18%                        |
| <b>U.S. Imports (CIF-Cost, Insurance, and Freight)</b>                                  |                                    |             |             |             |             |             |             |                             |
| 3141  | Textile Furn. Mills                | 2,985       | 3,613       | 4,185       | 5,018       | 5,089       | 6,089       | 70%                         |
| 31411   | Carpets and Rugs                   | 961         | 1,109       | 1,248       | 1,464       | 1,410       | 1,531       | 47%                         |
| 31412   | Curtains and<br>Linens             | 2,024       | 2,504       | 2,937       | 3,554       | 3,679       | 4,558       | 82%                         |
| 3149  | Other Products of<br>Textile Mills | 767         | 826         | 839         | 901         | 931         | 1,021       | 21%                         |
| 31491   | Textile Bags and<br>Canvas         | 342         | 387         | 410         | 438         | 462         | 503         | 35%                         |
| 314991  | Rope, Cordage,<br>and Twine        | 223         | 229         | 220         | 249         | 259         | 270         | 17%                         |
| 314992  | Tire Cordage and<br>Tire Fabric    | 202         | 210         | 208         | 214         | 210         | 247         | 4%                          |

| <b>Table I-8. U.S. Shipments, Imports, Exports, and Apparent Consumption 1997- 2002</b> |                                 |             |             |             |             |             |             |                         |
|---|---------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------------------|
| <b>Textile Furnishing Mills and Other Textile Product Mills</b>                         |                                 |             |             |             |             |             |             |                         |
| (\$ Millions)   |                                 |             |             |             |             |             |             |                         |
| <b>NAICS</b>  | <b>Description</b>              | <b>1997</b> | <b>1998</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> | <b>2002</b> | <b>Change 1997-2001</b> |
| <b>U.S. Exports (FAS-Free Along Side)</b>   |                                 |             |             |             |             |             |             |                         |
| 3141  | Textile Furn. Mills             | 1,297       | 1,295       | 1,197       | 1,246       | 1,151       | 1,085       | -11%                    |
| 31411   | Carpets and Rugs                | 858         | 826         | 772         | 791         | 711         | 684         | -17%                    |
| 31412   | Curtains and Linens             | 439         | 469         | 425         | 455         | 441         | 401         | 0%                      |
| 3149  | Other Products of Textile Mills | 299         | 310         | 310         | 308         | 285         | 288         | -5%                     |
| 31491   | Textile Bags and Canvas         | 76          | 81          | 79          | 73          | 71          | 77          | -7%                     |
| 314991  | Rope, Cordage, and Twine        | 63          | 75          | 69          | 78          | 81          | 86          | 28%                     |
| 314992  | Tire Cordage and Tire Fabric    | 159         | 154         | 162         | 158         | 133         | 126         | -16%                    |
| <b>U.S. Apparent Consumption</b>  |                                 |             |             |             |             |             |             |                         |
| 3141  | Textile Furn. Mills             | 21,984      | 22,976      | 24,106      | 26,208      | 25,731      | N/A         | 17%                     |
| 31411   | Carpets and Rugs                | 11,596      | 12,353      | 12,162      | 13,421      | 13,358      | N/A         | 15%                     |
| 31412   | Curtains and Linens             | 10,388      | 10,623      | 11,944      | 12,787      | 12,373      | N/A         | 19%                     |
| 3149  | Other Products of Textile Mills | 5,016       | 5,098       | 5,367       | 5,490       | 4,956       | N/A         | -1%                     |
| 31491   | Textile Bags and Canvas         | 2,768       | 2,822       | 2,937       | 2,962       | 2,854       | N/A         | 3%                      |
| 314991  | Rope, Cordage, and Twine        | 936         | 920         | 956         | 992         | 987         | N/A         | 5%                      |
| 314992  | Tire Cordage and Tire Fabric    | 1,312       | 1,357       | 1,474       | 1,536       | 1,115       | N/A         | -15%                    |
| <b>Imports as a Percent of Apparent Consumption</b>                                     |                                 |             |             |             |             |             |             |                         |
| 3141  | Textile Furn. Mills             | 14%         | 16%         | 17%         | 19%         | 20%         | N/A         | 46%                     |
| 31411   | Carpets and Rugs                | 8%          | 9%          | 10%         | 11%         | 11%         | N/A         | 27%                     |
| 31412   | Curtains and Linens             | 19%         | 24%         | 25%         | 28%         | 30%         | N/A         | 53%                     |
| 3149  | Other Products of Textile Mills | 15%         | 16%         | 16%         | 16%         | 19%         | N/A         | 23%                     |
| 31491   | Textile Bags and Canvas         | 12%         | 14%         | 14%         | 15%         | 16%         | N/A         | 31%                     |
| 314991  | Rope, Cordage, and Twine        | 24%         | 25%         | 23%         | 25%         | 26%         | N/A         | 11%                     |
| 314992  | Tire Cordage and Tire Fabric    | 15%         | 16%         | 14%         | 14%         | 19%         | N/A         | 22%                     |

Source: U.S. Department of Commerce Annual Survey of Manufactures, and U.S. Imports and Exports of Merchandise Trade (as reported by the U.S. International Trade Commission)

Table I-9 provides data for U.S. shipments, imports, exports, apparent consumption, and imports as a percentage of apparent consumption for the apparel sector. U.S. shipments of apparel declined by 20 percent during 1997-2001, due largely to substantial drops in shipments from apparel knitting mills (decreasing \$2.8 billion or 29 percent) and cut and sew apparel manufacturers (down almost \$10.2 billion or 19 percent). At the same time, imports of products from apparel knitting mills and cut and sew apparel manufacturers grew during 1997-2001. The top five sources of U.S. imports of all apparel products in 2002 were: China (\$9.3 billion or 15

percent of imports); Mexico (\$7.7 billion or 12 percent); Hong Kong (\$3.9 billion or 6.2 percent); Honduras (\$2.5 billion or four percent); and the Dominican Republic (\$2.2 billion or four percent).

| <b>Table I-9. U.S. Shipments, Imports, Exports, and Apparent Consumption 1997-2002</b> |                          |             |             |             |             |             |             |                         |
|--|--------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------------------|
| <b>Apparel (\$ Millions)</b>   |                          |             |             |             |             |             |             |                         |
| <b>NAICS</b>   | <b>Description</b>       | <b>1997</b> | <b>1998</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> | <b>2002</b> | <b>Change 1997-2001</b> |
| <b>U.S. Shipments</b>  |                          |             |             |             |             |             |             |                         |
| 315  | Apparel Mfg.             | 68,018      | 64,932      | 62,305      | 60,339      | 54,598      | N/A         | -20%                    |
| 3151   | Apparel Knitting Mills   | 9,601       | 8,526       | 7,669       | 7,569       | 6,838       | N/A         | -29%                    |
| 3152   | Cut and Sew Apparel Mfg. | 53,852      | 51,574      | 50,332      | 48,413      | 43,563      | N/A         | -19%                    |
| 3159   | Accessories              | 4,566       | 4,832       | 4,304       | 4,357       | 4,198       | N/A         | -8%                     |
| <b>U.S. Imports (CIF-Cost, Insurance, and Freight)</b>                                 |                          |             |             |             |             |             |             |                         |
| 315  | Apparel Mfg.             | 47,084      | 52,298      | 55,104      | 62,928      | 62,429      | 62,313      | 33%                     |
| 3151   | Apparel Knitting Mills   | 560         | 680         | 844         | 946         | 919         | 1,027       | 64%                     |
| 3152   | Cut and Sew Apparel Mfg. | 43,765      | 48,746      | 51,282      | 58,417      | 57,923      | 57,686      | 32%                     |
| 3159   | Accessories              | 2,759       | 2,872       | 2,978       | 3,564       | 3,587       | 3,599       | 30%                     |
| <b>U.S. Exports (FAS-Free Along Side)</b>  |                          |             |             |             |             |             |             |                         |
| 315  | Apparel Mfg.             | 8,274       | 8,412       | 7,876       | 8,104       | 6,469       | 5,462       | -22%                    |
| 3151   | Apparel Knitting Mills   | 353         | 417         | 445         | 423         | 363         | 344         | 3%                      |
| 3152   | Cut and Sew Apparel Mfg. | 6,361       | 6,141       | 6,012       | 6,260       | 4,894       | 4,067       | -23%                    |
| 3159   | Accessories              | 1,560       | 1,855       | 1,418       | 1,420       | 1,213       | 1,050       | -22%                    |
| <b>U.S. Apparent Consumption</b>   |                          |             |             |             |             |             |             |                         |
| 315  | Apparel Mfg.             | 106,827     | 108,818     | 109,533     | 115,163     | 110,558     | N/A         | 3%                      |
| 3151   | Apparel Knitting Mills   | 9,808       | 8,788       | 8,068       | 8,092       | 7,395       | N/A         | -25%                    |
| 3152   | Cut and Sew Apparel Mfg. | 91,255      | 94,180      | 95,601      | 100,571     | 96,592      | N/A         | 6%                      |
| 3159   | Accessories              | 5,764       | 5,850       | 5,864       | 6,500       | 6,572       | N/A         | 14%                     |
| <b>Imports as a Percent of Apparent Consumption</b>                                    |                          |             |             |             |             |             |             |                         |
| 315  | Apparel Mfg.             | 44%         | 48%         | 50%         | 55%         | 56%         | N/A         | 28%                     |
| 3151   | Apparel Knitting Mills   | 6%          | 8%          | 10%         | 12%         | 12%         | N/A         | 118%                    |
| 3152   | Cut and Sew Apparel Mfg. | 48%         | 52%         | 54%         | 58%         | 60%         | N/A         | 25%                     |
| 3159   | Accessories              | 48%         | 49%         | 51%         | 55%         | 55%         | N/A         | 14%                     |

Source: U.S. Department of Commerce, Annual Survey of Manufactures, and U.S. Imports and Exports of Merchandise Trade (as reported by the U.S. International Trade Commission)

Table I-10 shows trends in shipments, imports, exports, apparent consumption, and imports as a percent of apparent consumption for footwear manufacturing (NAICS 3162). From 1997 to 2001, U.S. shipments of footwear decreased 17 percent. During the same time period, U.S. apparent consumption of footwear rose five percent. Imports as a percentage of apparent consumption rose from 78 percent to 83 percent, representing a six percent change over the five

year period. Increases in imports account for the decreasing U.S. shipment values. Footwear is relatively labor intensive, and for the most part, does not require skilled labor, which makes it more cost effective to produce abroad.

| <b>Table I-10. U.S. Shipments, Import, Exports, and Apparent Consumption of Footwear Manufacturing, NAICS 3162, 1997-2001 (\$ Millions)</b> |             |             |             |             |             |                                 |
|---|-------------|-------------|-------------|-------------|-------------|---------------------------------|
|   | <b>1997</b> | <b>1998</b> | <b>1999</b> | <b>2000</b> | <b>2001</b> | <b>Percent Change 1997-2001</b> |
| <b>U.S. Shipments</b>   | 4,211       | 3,764       | 3,797       | 3,760       | 3,511       | -17%                            |
| <b>U.S. Imports</b>   | 13,372      | 13,345      | 13,628      | 14,497      | 14,890      | 11%                             |
| <b>U.S. Exports</b>   | 465         | 422         | 391         | 360         | 364         | -22%                            |
| <b>U.S. Apparent Consumption</b>  | 17,118      | 16,687      | 17,034      | 17,897      | 18,037      | 5%                              |
| <b>Imports as % of Apparent Consumption</b>   | 78%         | 80%         | 80%         | 81%         | 83%         | 6%                              |

Source: U.S. Department of Commerce, Annual Survey of Manufactures, and U.S. Imports and Exports of Merchandise Trade (as reported by the U.S. International Trade Commission)

## **B. The Health of the U.S. Textile and Apparel Industries**

In this section, several measures are used to assess the health of the textile and apparel industries. First, we consider the economic well-being of the industries' firms, measured here by the aggregate current profitability of the industries, their profitability outlook, and other financial measures. In addition to financial measures, this analysis will consider non-financial metrics of industry health, including employment and operating establishments, relative prices, capacity utilization, and productivity. The analysis suggests that there are significant differences between the textile and apparel industries, and between subsectors within each industry, on many of the metrics cited.

### **B.1 Financials: Industry Comparisons**

The three subsectors examined in this report -- apparel, textiles, and footwear -- represent the high-, low-, and mid-range of financial health when compared with all other consumer cyclical sectors. Table I-11 provides relevant statistics for all of the consumer cyclicals, as well as two groups of publicly traded, foreign-owned textile and apparel firms. The data underlying this section of the analysis are drawn from publicly available financial information sources. In section B.2, data collected through the BIS survey of textile and apparel firms are used as the basis for additional financial analysis.

| <b>Table I-11. Financial Ratios (12 months to 8/1/2003)<sup>4</sup></b> |                     |                         |                      |                         |                              |   |
|---|---------------------|-------------------------|----------------------|-------------------------|------------------------------|---|
|   | <b>Gross Margin</b> | <b>Operating Margin</b> | <b>Profit Margin</b> | <b>Return on Assets</b> | <b>Long-term Debt/Equity</b> | <b>Sales/Employee (avg. for industry)</b> |
| <b>U.S. Industries</b>  |                     |                         |                      |                         |                              |   |
| <b>Consumer Cyclical</b>  |                     |                         |                      |                         |                              |   |
| <b>Apparel/Accessories</b>  | 44.12               | 13.5                    | 8.3                  | 13.4                    | 0.33                         | \$146.56                                  |
| Appliance/Tool  | 30.42               | 7.3                     | 4.2                  | 5.2                     | 2.94                         | \$180.62                                  |
| Audio/Video Equipment   | 25.73               | 7.9                     | 5.1                  | -15.1                   | 0.47                         | \$258.18                                  |
| Auto/Truck Manufacturing  | 19.37               | 2.3                     | 1.4                  | 1.0                     | 2.11                         | \$511.27                                  |
| Auto/Truck Parts  | 21.88               | 7.9                     | 4.8                  | 5.9                     | 0.65                         | \$186.74                                  |
| <b>Footwear</b>   | 40.42               | 9.8                     | 6.4                  | 11.4                    | 0.15                         | \$344.15                                  |
| Furniture/Fixtures  | 30.31               | 9.5                     | 5.3                  | 6.6                     | 0.57                         | \$145.59                                  |
| Jewelry/Silverware  | 31.38               | 10.5                    | 6.1                  | 7.5                     | 0.19                         | \$229.85                                  |
| Photography   | 34.15               | 6.8                     | 4.5                  | 5.4                     | 0.47                         | \$236.99                                  |
| Recreational Products   | 40.68               | 16.1                    | 10.3                 | 12.7                    | 0.27                         | \$262.08                                  |
| <b>Textiles-Non-Apparel</b>   | 16.76               | 6.2                     | 3.6                  | 5.8                     | 0.53                         | \$161.59                                  |
| Tires   | 20.66               | 3.3                     | -0.3                 | 0.5                     | 2.21                         | \$165.23                                  |
| <b>Comparative Industries</b>   |                     |                         |                      |                         |                              |   |
| Iron and Steel  | 11.22               | 3.0                     | 1.8                  | 2.4                     | 0.61                         | \$320.48                                  |
| Chemicals Manufacturing   | 36.74               | 11.6                    | 7.0                  | 5.5                     | 0.77                         | \$289.56                                  |
| Airlines  | 25.94               | 4.5                     | 3.7                  | 3.3                     | 1.94                         | \$179.81                                  |
| Aerospace/Defense   | 15.99               | 4.8                     | 2.3                  | 2.5                     | 0.91                         | \$237.42                                  |
| <b>International Industries</b>   |                     |                         |                      |                         |                              |   |
| International Textile   | 20.7                | 5.9                     | 3                    | N/A                     | N/A                          | \$325.00                                  |
| International Apparel   | 38.7                | 8.9                     | 5.4                  | N/A                     | N/A                          | \$181.00                                  |

Source: Multex Investor Financial Services Data

### B.1.a. Profitability

Gross margin is calculated by subtracting the cost of goods sold from net sales, then dividing by net sales. During the most recent 12-month reporting period, U.S. apparel firms generated the highest gross margins (44.12 percent) among the sectors examined here, surpassing the gross margins of international apparel firms (38.7 percent). The U.S. footwear sector also reported high gross margins (40.42 percent), surpassed only by the apparel sector and recreational products (40.68 percent) sector. The textile industry produced the lowest gross margins (16.76 percent) among the consumer cyclicals, and its gross margins were lower than those of foreign-owned textile firms (20.7 percent).

<sup>4</sup> Table I-11 reflects the standard analysis used to compare industry financial health and includes only publicly traded companies. As such, the data does not necessarily correlate with survey results which include a significant number of privately-held traded companies.

The next measure of profitability is the operating margin. This ratio is similar to the gross margin, but it includes the cost of labor, which accounts for a large share of total expenses, especially in labor-intensive industries. The apparel industry's operating margins (13.46 percent) topped those of most other industries, with the exception of recreational products (16.14 percent). The textile industry was in the lower tier of industries examined with an operating margin of 6.18 percent. Only auto/truck manufacturing and tire manufacturing in the consumer cyclical sector reported lower percentages. International textile firms as a group reported even lower operating margins of 5.9 percent, according to company financial reports. Footwear producers generated operating margins of 9.8 percent, ranking in the mid-range among consumer cyclical industries.

Profit margin is the key profitability ratio. It captures non-operating expenses such as taxes and interest payments and represents the industry's actual earnings. Again, the apparel industry ranked near the top of the sector, with a profit margin of 8.3 percent. It is second only to the recreational products industry (10.3 percent). Footwear producers, with a profit margin of 6.4 percent, ranked in the mid-range of consumer cyclical industries, and textiles (3.6 percent) ranked in the lowest tier of consumer cyclicals. Both the textile and apparel industries surpassed their foreign competitors in this key profitability metric, with a 0.6 percent and nearly 3.0 percent lead respectively. However, financial data for U.S. firms include earnings from foreign operations.

#### **B.1.b. Return on Assets**

Return on assets (ROA) is an indicator of both profitability and efficiency. Industries that use their assets (such as capital equipment, plant facilities, and cash-on-hand) most efficiently will tend to generate higher ROAs than competing industries. With respect to this indicator, the apparel industry is the most efficient among consumer cyclicals with a ROA of 13.4 percent. Footwear producers also rank high with a ROA of 11.4 percent. The U.S. textile industry (5.8 percent) is the least healthy of the three industries discussed in this report. Nonetheless, the ROA of this industry segment exceeds those of the four non-consumer cyclical industries shown in Table I-11.

### **B.1.c. Debt-to-Equity**

Long-term debt in relationship to stockholders' equity is a measure of how well the industry is leveraged over the longer-term (usually more than one year). The higher the ratio, the more vulnerable the industry is to an extended downturn. The footwear industry's debt (0.15 percent) is the lowest of all the industries examined in this report. With the exception of tire manufacturers and auto/truck makers, the textile industry has one of the higher levels of debt, but it is still small compared with those of the aerospace and airlines industries. Apparel producers' average debt-to-equity ratio of 0.33 percent is in the mid-range of consumer cyclical industries.

### **B.1.d. Overall Comparison**

Of the three industries examined for this report, the apparel industry ranks at or near the top of the consumer cyclical sector in terms of profitability and the efficient use of assets. The footwear industry ranks in the mid-range of the consumer cyclical sector in terms of most of the key financial metrics, and the industry maintains a low debt position. The textile industry ranks in the bottom tier of the consumer cyclical sector with a lower profit margin and above average debt. In the comparison of company financial reports, U.S. counterparts maintained higher levels of profitability than overseas manufacturers. Again, U.S. financial reporting includes earnings from foreign operations.

## **B.2 Financials: BIS Survey Results**

This section analyzes key financial metrics for approximately 500 U.S. textile- and apparel-related firms that provided complete responses to the BIS Industry Survey. These companies included not just textile and apparel product manufacturers, wholesalers, and retailers, but also producers of related machinery and equipment, dyes, and chemicals, as well as service providers, such as warehouse operations, software developers, and logistics support.

Table I-12 shows the distribution of firms in the survey by firm size based on 2002 sales. Most U.S. firms are small, as more than two-thirds of all firms in the sample reported annual sales below \$50 million. However, large firms produce a significant share of total output: two percent of all responding firms produce more than half of total output (measured by 2002 sales); 32 percent of responding firms, with annual sales exceeding \$50 million, accounted for 93 percent of the total 2002 sales in the sample.

| <b>Table I-12. Distribution by Sales of Survey Respondents</b> |                         |                              |
|--|-------------------------|------------------------------|
| <b>Firm's Annual 2002 Sales</b>                                | <b>Percent of Firms</b> | <b>Percent of 2002 Sales</b> |
| Less than \$50 million   | 68%                     | 7%                           |
| Between \$50M and \$100M                                       | 14%                     | 7%                           |
| Between \$100M and \$500M                                      | 13%                     | 19%                          |
| Between \$500M and \$1B  | 3%                      | 15%                          |
| Greater than \$1B  | 2%                      | 52%                          |

Source: U.S. DOC/BIS Industry Survey Data

Table I-13 provides ratios for firms responding to the survey with annual sales exceeding \$50 million and separate ratios for firms with annual sales below \$50 million.

| <b>Table I-13. Financial Ratios: All Survey Respondents by Size</b> |                                  |              |              |              |
|---|----------------------------------|--------------|--------------|--------------|
|   | <b>1999</b>                      | <b>2000</b>  | <b>2001</b>  | <b>2002</b>  |
| <b>Gross Margin</b>   |                                  |              |              |              |
| Sales > \$50 million  | 25.4%                            | 27.1%        | 25.0%        | 27.6%        |
| Sales < \$50 million  | 22.2%                            | 22.9%        | 22.0%        | 23.4%        |
| <b>All Firms</b>  | <b>25.2%</b>                     | <b>26.8%</b> | <b>24.8%</b> | <b>27.3%</b> |
| <b>Operating Margin</b>   |                                  |              |              |              |
| Sales > \$50 million  | 6.5%                             | 7.9%         | 5.3%         | 7.0%         |
| Sales < \$50 million  | 3.9%                             | 4.4%         | 1.6%         | 2.6%         |
| <b>All Firms</b>  | <b>6.3%</b>                      | <b>7.6%</b>  | <b>5.1%</b>  | <b>6.7%</b>  |
| <b>Inventory Processing Period (Days)</b>                           |                                  |              |              |              |
| Sales > \$50 million  | 81                               | 86           | 76           | 75           |
| Sales < \$50 million  | 83                               | 83           | 88           | 94           |
| <b>All Firms</b>  | <b>84</b>                        | <b>90</b>    | <b>79</b>    | <b>79</b>    |
| <b>Capital Expenditures/Sales</b>                                   |                                  |              |              |              |
| Sales > \$50 million  | 6.2%                             | 5.4%         | 4.6%         | 4.9%         |
| Sales < \$50 million  | 4.2%                             | 3.2%         | 3.0%         | 2.6%         |
| <b>All Firms</b>  | <b>6.9%</b>                      | <b>6.1%</b>  | <b>5.4%</b>  | <b>5.7%</b>  |
| <b>Interest Coverage Ratio</b>                                      |                                  |              |              |              |
| Sales > \$50 million  | Data not collected for 1999-2001 |              |              | 3.52         |
| Sales < \$50 million  |                                  |              |              | 13.10        |
| <b>All Firms</b>  |                                  |              |              | <b>9.45</b>  |

Source: U.S. DOC/BIS Industry Survey Data

The data reveal that the gross and operating margins for large firms are higher than those for smaller firms. Typically, larger firms have some operating advantages over smaller firms in the same industry, with cost efficiencies gained through higher output. Firms of all sizes experienced a slight improvement in profitability between 2001 and 2002.

The inventory processing period for small firms increased in the 1999-2002 period. In contrast, the inventory processing period for large firms has improved substantially in the last few years, potentially indicating a focus on inventory management.

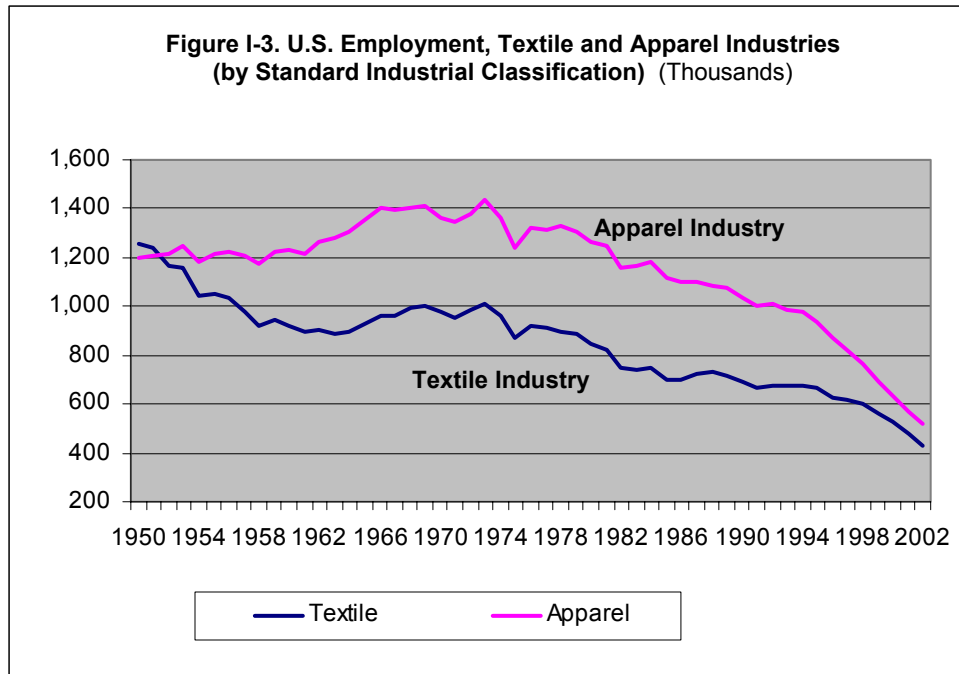
The survey data also indicate that larger firms consistently invest a larger percentage of sales back into the business than do smaller firms. For example, in 2002 firms with annual sales exceeding \$50 million spent 4.9 percent of annual sales in capital expenditures, whereas firms

with annual sales below \$50 million spent only 2.6 percent of sales in capital expenditures. Additionally, large firms increased their investment rate from 4.6 percent in 2001 to 4.9 percent in 2002, whereas small firms reduced their investment rate from three percent in 2001 to 2.6 percent in 2002. Capital investment is an important factor related to health, and the declining rate of investment by small firms is a negative indicator.

The interest coverage ratio is an important metric, as it indicates the ability of firms to make interest payments on their outstanding debt. Based on survey data shown in Table I-13, the larger firms, with annual sales exceeding \$50 million, have a low coverage ratio and more difficulty in meeting debt obligations. In contrast, smaller firms have a much higher interest coverage ratio, suggesting lower debt consumption, and are therefore more likely to make interest payments on their debt.

### **B.3 Other Measures of Industry Health**

While profitability is seen as the key measure of industry health, other metrics can also serve as indicators of the well-being of an industry. These other metrics include employment and operating establishments, relative prices, and plant capacity and capacity utilization.



Source: U.S. Department of Labor, Bureau of Labor Statistics

### **B.3.a. Employment and Plant Closings**

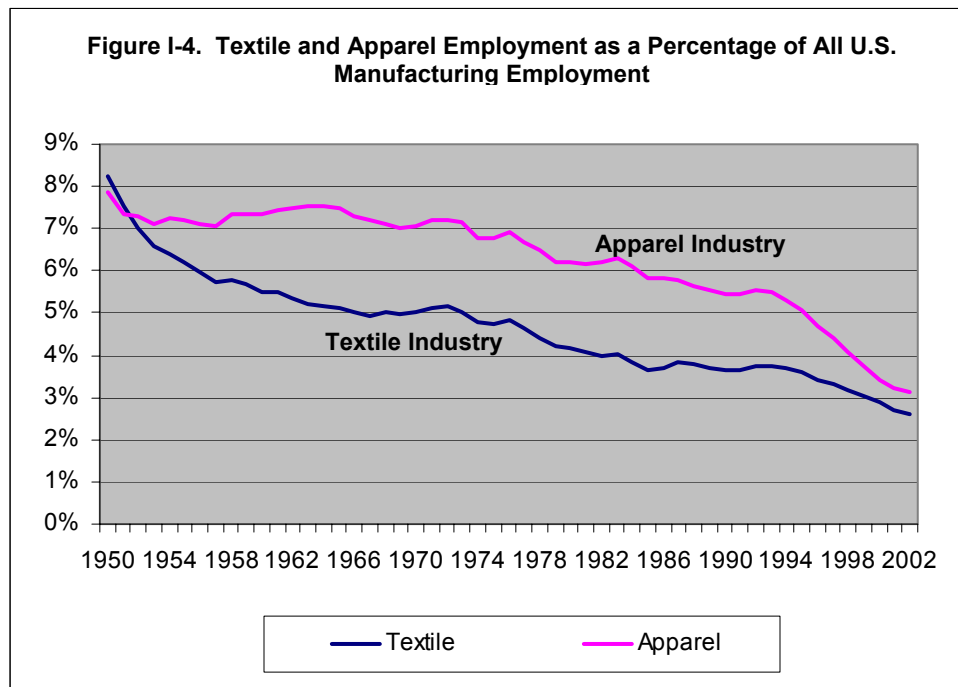
U.S. textile and apparel employment has declined significantly over time, as evidenced in Figure I-3. Employment in the textile industry peaked in 1950 at more than 1.2 million workers. Apparel employment peaked in the early 1970s at more than 1.4 million employees. Table I-14 provides detailed information about total manufacturing employment as well as employment in the textile and apparel industries.

In 1950, there were an estimated 15 million manufacturing workers (see Table I-14) in the United States, according to the U.S. Department of Labor. By 1980, manufacturing employment increased by 33 percent to 20 million workers. During this same period, textile employment decreased by 33 percent to about 848,000 workers, while apparel employment increased by five percent to 1.26 million workers. By 2002, total U.S. manufacturing employment declined to 16.7 million, still higher than the 1950 total. In contrast, by 2002 the number of textile workers had declined to 431,800, a decrease of more than 60 percent since 1950, and the number of apparel workers had fallen to 520,800, a decline of more than 56 percent since 1950.

| <b>Table I-14. Employment for All Manufacturing, Textiles, and Apparel, 1950-2002 (by SIC)</b><br>(in millions except as noted) |             |             |             |                      |                      |                      |
|---|-------------|-------------|-------------|----------------------|----------------------|----------------------|
|   | <b>1950</b> | <b>1980</b> | <b>2002</b> | <b>% Δ 1950-1980</b> | <b>% Δ 1980-2002</b> | <b>% Δ 1950-2002</b> |
| <b>Mfg. Workers</b>   | 15.0        | 20.0        | 16.7        | +33%                 | -16.5%               | +11.3%               |
| <b>U.S. Textile</b>   | 1.26        | .85         | .43         | -33%                 | -49.1%               | -64%                 |
| <b>Apparel</b>  | 1.2         | 1.3         | .52         | +5%                  | -58.8%               | -56.6%               |

Source: U.S. Department of Labor, Bureau of Labor Statistics

Textile and apparel employment as a percentage of total U.S. manufacturing employment has also declined steadily over time (see Figure I-4). In 1950, textile and apparel workers accounted for 8.24 percent and 7.89 percent of all manufacturing jobs, respectively. By 2002, textile and apparel workers made up 2.58 percent and 3.11 percent of all manufacturing employees, respectively. In 2002, employment in the combined textile and apparel industry was 5.70 percent of all U.S. manufacturing employment, a decline from 16.13 percent in 1950. The decrease in textile and apparel employment was greater than the decrease in manufacturing employment as a whole over the same time period.



Source: U.S. Department of Labor, Bureau of Labor Statistics

For comparison, while the textile and apparel industries together employed nearly 1 million workers in 2001, the computer and electronic product manufacturing industry employed 1.6 million workers; the electrical equipment, appliance, and component manufacturing industry

employed 556,000 workers; and the aerospace products and parts manufacturing industry employed 443,000 workers in the same year.

During the last few years, the U.S. textile and apparel industries have experienced a continued reduction in operating establishments and job losses. Table I-15 shows Bureau of Labor Statistics data on the declining number of U.S. textile and apparel establishments from 1997 through 2001.<sup>5</sup>

| <b>Table I-15. U.S. Textile, Apparel, and Footwear Establishments, 1997-2001</b> |               |               |               |               |               |
|--|---------------|---------------|---------------|---------------|---------------|
|  | <b>1997</b>   | <b>1998</b>   | <b>1999</b>   | <b>2000</b>   | <b>2001</b>   |
| <b>United States</b>   | <b>32,298</b> | <b>32,705</b> | <b>32,008</b> | <b>29,712</b> | <b>30,020</b> |
| North Carolina   | 2,021         | 1,947         | 1,897         | 1,846         | 1,823         |
| South Carolina   | 827           | 838           | 821           | 783           | 814           |
| Georgia  | 1,334         | 1,259         | 1,224         | 1,152         | 1,137         |
| Alabama  | 682           | 661           | 624           | 605           | 554           |
| Virginia   | 444           | 428           | 397           | 383           | 388           |
| Tennessee  | 654           | 603           | 577           | 556           | 518           |
| New York   | 5,120         | 4,933         | 4,702         | 4,326         | 4,325         |
| Missouri   | 401           | 397           | 407           | 403           | 366           |
| Pennsylvania   | 1,408         | 1,383         | 1,335         | 1,293         | 1,372         |
| California   | 7,483         | 8,457         | 8,291         | 6,951         | 7,124         |
| Other  | 13,332        | 13,182        | 13,068        | 12,707        | 12,971        |

Source: U.S. Department of Labor, Bureau of Labor Statistics

Job losses have closely tracked the operating establishment data, as shown in Table I-16.

| <b>Table I-16. U.S. Textile, Apparel, and Footwear Employment Levels, 1997-2001</b> |                  |                  |                  |                  |                |
|---|------------------|------------------|------------------|------------------|----------------|
|   | <b>1997</b>      | <b>1998</b>      | <b>1999</b>      | <b>2000</b>      | <b>2001</b>    |
| <b>United States</b>  | <b>1,479,164</b> | <b>1,393,517</b> | <b>1,278,752</b> | <b>1,191,710</b> | <b>985,665</b> |
| North Carolina  | 229,468          | 216,086          | 196,032          | 179,876          | 150,182        |
| South Carolina  | 105,712          | 98,713           | 89,854           | 85,012           | 72,559         |
| Georgia   | 142,338          | 137,878          | 131,102          | 125,648          | 102,553        |
| Alabama   | 78,333           | 73,682           | 67,109           | 62,777           | 54,608         |
| Virginia  | 53,367           | 49,229           | 42,827           | 36,037           | 29,363         |
| Tennessee   | 59,073           | 52,727           | 44,251           | 39,228           | 29,887         |
| New York  | 107,223          | 101,430          | 91,743           | 83,038           | 72,260         |
| Missouri  | 21,472           | 19,581           | 16,029           | 13,780           | 10,535         |
| Pennsylvania  | 66,595           | 63,681           | 58,368           | 54,454           | 46,930         |
| California  | 179,183          | 174,519          | 169,203          | 166,531          | 140,623        |
| Other   | 502,995          | 469,672          | 430,602          | 399,783          | 323,095        |

Source: U.S. Department of Labor, Bureau of Labor Statistics

<sup>5</sup> The reduction in establishments reflects data provided by the Bureau of Labor Statistics on the number of work sites in a particular industry. Establishments include manufacturing plants, subsidiary service centers, corporate offices, R&D centers, distribution and retail sites, and other associated locations.

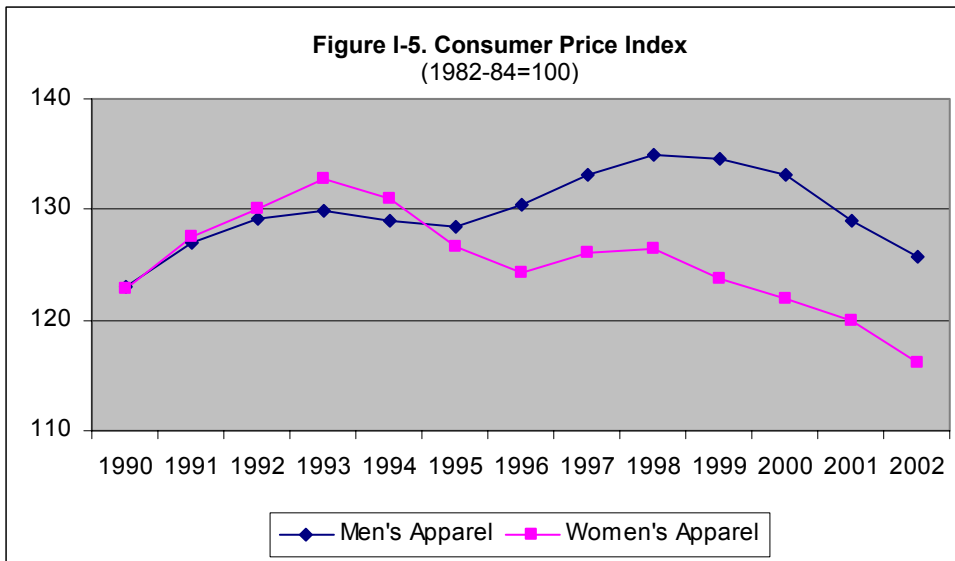
Table I-17 compares the change in the unemployment rate over this period for several states with significant textile and apparel industries.

| <b>Table I-17. State Unemployment Rates, 1997 and 2003</b> |               |               |
|--|---------------|---------------|
|  | <b>Jan 97</b> | <b>Jun 03</b> |
| North Carolina   | 3.8%          | 6.6%          |
| South Carolina   | 5.5%          | 6.6%          |
| Alabama  | 5.1%          | 5.7%          |
| Pennsylvania   | 5.2%          | 5.7%          |
| Georgia  | 4.7%          | 4.9%          |
| California   | 6.7%          | 6.7%          |
| New York   | 6.4%          | 6.1%          |
| Tennessee  | 5.6%          | 5.3%          |
| Virginia   | 4.3%          | 3.8%          |
| <b>National Average</b>                                    | <b>5.3%</b>   | <b>6.4%</b>   |

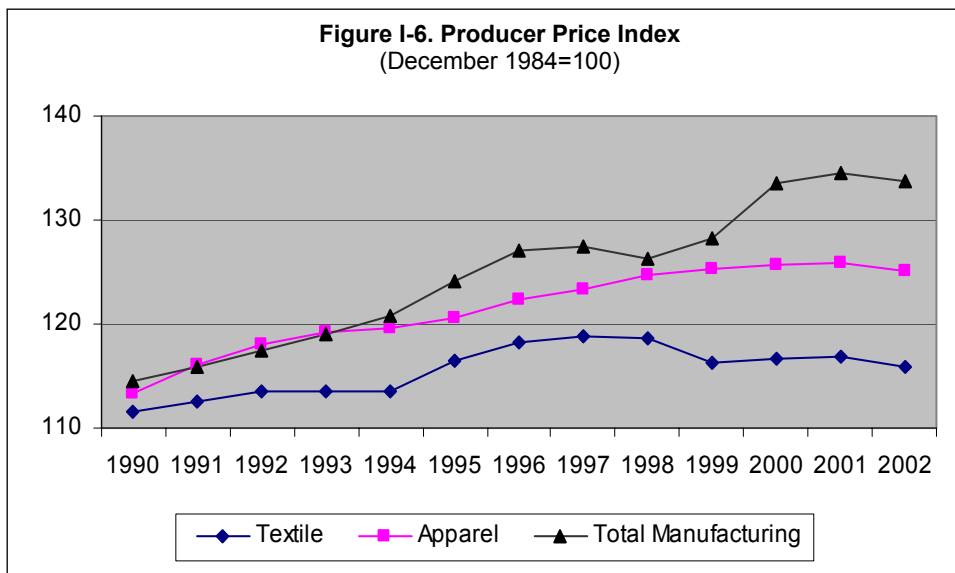
Source: U.S. Department of Labor, Bureau of Labor Statistics

### **B.3.b. Relative Prices**

The producer price index (PPI) measures the selling price received by domestic producers for their output. The consumer price index (CPI) measures the prices paid by consumers for a representative basket of goods and services. Figures I-5 and I-6 show the CPI and PPI since 1990, respectively. The figures show that the PPI has increased at a faster rate than the CPI. From 1990 to 2002, the PPI for textiles, apparel, and all manufacturing increased by approximately four percent, ten percent, and 17 percent, respectively. In contrast, over the same period, the CPI for men's apparel increased by about two percent, whereas the CPI for women's apparel *decreased* by five percent. The increase in the PPI during 1999 and 2001 for apparel and textile producers, coupled with the sharply declining CPI, indicates that these two sectors have experienced severe pricing pressures.



Source: U.S. Department of Labor, Bureau of Labor Statistics



Source: U.S. Department of Labor, Bureau of Labor Statistics

### B.3.c. U.S. Production Capacity and Capacity Utilization

Tracking the decline in employment and the number of textile and apparel plants is the number of machines in use in the textile and apparel industries. Textile machinery in place in the United States decreased significantly from 1992 to 2002 (see Table I-18). For example, the average number of shuttle looms declined from 30,865 in 1992 to 1,949 in 2002, a 93.7 percent decrease. Part of this decline is due to the replacement of shuttle looms by shuttleless looms; shuttleless looms operate at higher speeds with reduced noise levels and handle fabric in wider width.

However, even the number of shuttleless looms in place declined over the period; the average number in 1992 was 65,442, and 39,472 in 2002, a decrease of 39.7 percent.

The number of loom hours operated is also considered here (see Table I-18). The total number of hours that shuttle looms operated in 1992 was 204.7 million; in 2002 it had decreased 93.4 percent to 13.5 million. The total number of hours shuttleless looms operated decreased 48.8 percent in that ten-year time period.

| Year | Avg. Looms in Place (Number) |             | Loom Hours Operated (Thousands) |             |
|------|------------------------------|-------------|---------------------------------|-------------|
|      | Shuttle                      | Shuttleless | Shuttle                         | Shuttleless |
| 1992 | Avg. 30,865                  | 65,442      | 204,744                         | 479,508     |
| 2002 | 1,949                        | 39,472      | 13,468                          | 245,491     |

Source: U.S. Department of Commerce, Bureau of the Census, "MQ313T"

In addition to lower capacity, the utilization of remaining capacity has dropped, which indicates U.S. firms are responding to declining market forces. In its monthly report, "Industrial Production/Capacity Utilization," the Federal Reserve provides data on the industrial production index, which measures the level of output in the industrial sector of the economy. The index provides information on the overall level of resource utilization in the economy. Between 1995 and 2002, the overall industrial production index increased from 87.8 to 111.7 (see Table I-19). However, the production index for textile and textile product mills decreased during this time

| Year | Industrial Production Index, 1992 = 100 |                                 | Capacity Utilization |                                 |
|------|---|---------------------------------|----------------------|---------------------------------|
|      | All Manufacturing                       | Textile & Textile Product Mills | All Manufacturing    | Textile & Textile Product Mills |
| 1995 | 87.8                                    | 96.7                            | 82.9%                | 88.5%                           |
| 2002 | 111.7                                   | 82.4                            | 73.4%                | 73.6%                           |

Source: Federal Reserve, "Industrial Production/ Capacity Utilization"

period, from 96.7 to 82.4. Also, during this same period, U.S. capacity utilization decreased to 73.4 percent for manufacturing and to 73.6 percent for textile and textile product mills. The rise in output paired with the decline in capacity utilization likely reflects the more efficient use of manufacturing capacity.

Table I-18 highlights the drop in the number of looms in place in the United States. Table I-20 highlights the relative position of the United States compared to other major manufacturers.

| <b>Table I-20. Textile Machinery in Place 2001 (Thousands)</b> |                      |                           |                      |
|--|----------------------|---------------------------|----------------------|
| <b>Country/Region</b>  | <b>Ring Spindles</b> | <b>Shuttle-less Looms</b> | <b>Shuttle Looms</b> |
| United States  | 2,379.0              | 42.8                      | 2.1                  |
| Canada   | 300.0                | 3.1                       | 0.0                  |
| Mexico   | 3,500.0              | 14.5                      | 35.0                 |
| Other North America  | 1,089.0              | 5.5                       | 13.0                 |
| <b>Total North America</b>                                     | <b>7,268.0</b>       | <b>65.9</b>               | <b>50.1</b>          |
| <b>Total South America</b>                                     | <b>8,993.0</b>       | <b>53.6</b>               | <b>126.8</b>         |
| Western Europe   | 5,598.7              | 50.1                      | 9.1                  |
| Eastern Europe   | 8,383.7              | 169.5                     | 24.5                 |
| Turkey   | 5,737.1              | 16.0                      | 30.0                 |
| <b>Total Europe</b>  | <b>19,719.5</b>      | <b>235.6</b>              | <b>63.6</b>          |
| Bangladesh   | 2,469.0              | 3.2                       | 4.7                  |
| China  | 35,483.9             | 82.9                      | 578.4                |
| India  | 38,091.3             | 11.8                      | 129.4                |
| Indonesia  | 8,500.0              | 27.0                      | 200.0                |
| Iran   | 2,075.0              | 14.5                      | 12.0                 |
| Japan  | 3,432.0              | 18.9                      | 29.6                 |
| South Korea  | 1,757.1              | 1.8                       | 0.0                  |
| Pakistan   | 8,756.0              | 17.5                      | 10.1                 |
| Taiwan   | 2,550.2              | 20.8                      | 1.2                  |
| Thailand   | 3,586.8              | 52.0                      | 78.2                 |
| Uzbekistan   | 1,440.0              | 25.8                      | 0.0                  |
| Other Asia/Oceania   | 4,721.5              | 29.7                      | 46.5                 |
| <b>Total Asia/Oceania</b>                                      | <b>112,862.8</b>     | <b>305.8</b>              | <b>1,090.2</b>       |
| Egypt  | 2,600.0              | 3.9                       | 5.0                  |
| Other Africa   | 4,262.8              | 13.4                      | 71.8                 |
| <b>Africa</b>  | <b>6,862.8</b>       | <b>17.3</b>               | <b>76.8</b>          |
| <b>World</b>   | <b>155,706.1</b>     | <b>678.3</b>              | <b>1,407.6</b>       |

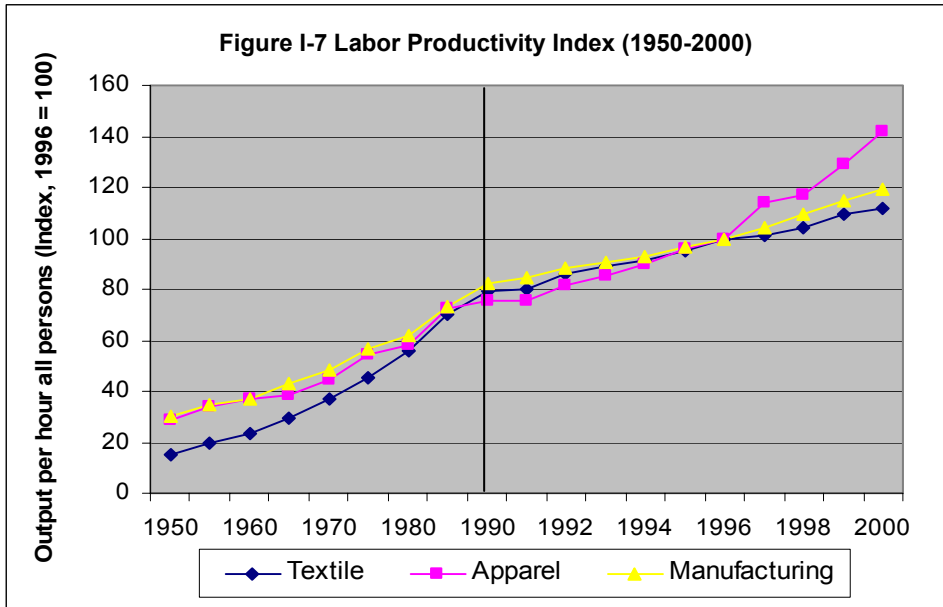
Source: International Textile Manufacturers Federation Short Staple Sector Only

According to this data, the U.S. share of ring spindles is 1.5 percent, shuttleless looms 6.3 percent, and shuttle looms 0.1 percent. Note the large share of machinery in place in both China and India in contrast to the rest of the world; these countries account for about one-half of all ring spindles and shuttle looms.

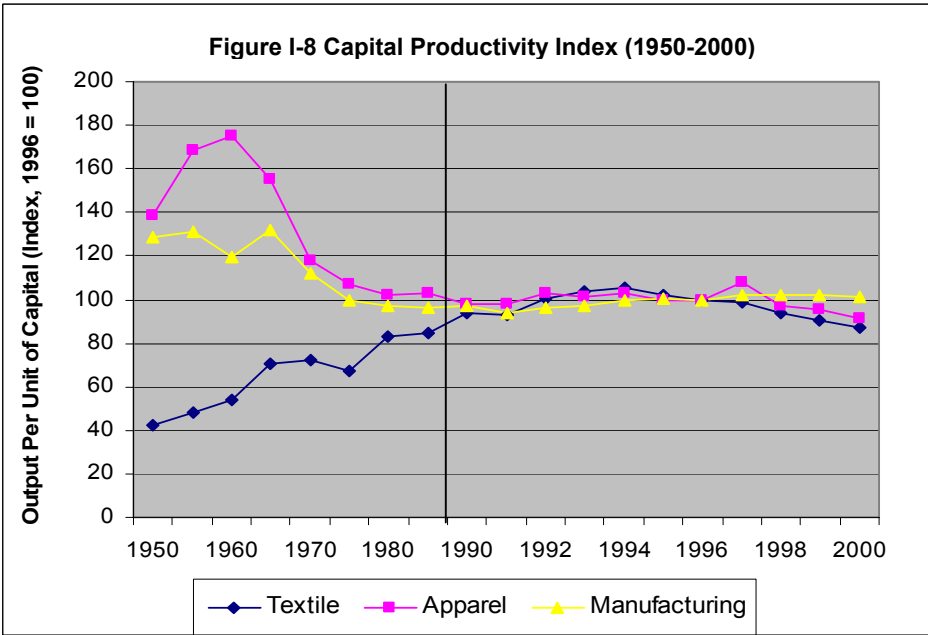
### **B.3.d. Productivity**

Productivity is an additional metric of industry health. The following indexed figures (see Figures I-7 and I-8) present productivity data on a five-year basis from 1950 to 1990 and on a yearly basis from 1990 to 2000. These figures also present total manufacturing output as well as output for the textile and apparel industries individually.

Labor productivity (defined as output per hour, all persons) has been steadily increasing since 1950, with apparel showing the greatest gains in recent years. Increased labor productivity is consistent with capital investments and with improved efficiencies in production. Since 1990, textile and apparel capital productivity has been steady and has even declined in the last few



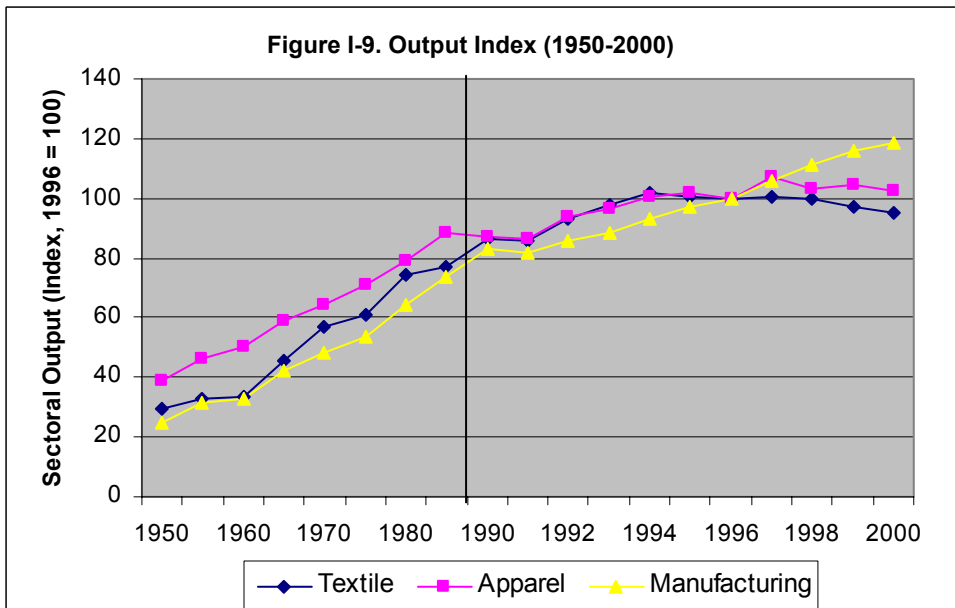
Source: U.S. Department of Labor, Bureau of Labor Statistics



Source: U.S. Department of Labor, Bureau of Labor Statistics

years. While capital productivity<sup>6</sup> for manufacturing and apparel has declined since the 1950s, textile capital productivity has increased since the 1950s. This indicates that the industries are working to respond to competitive pressures, with some success.

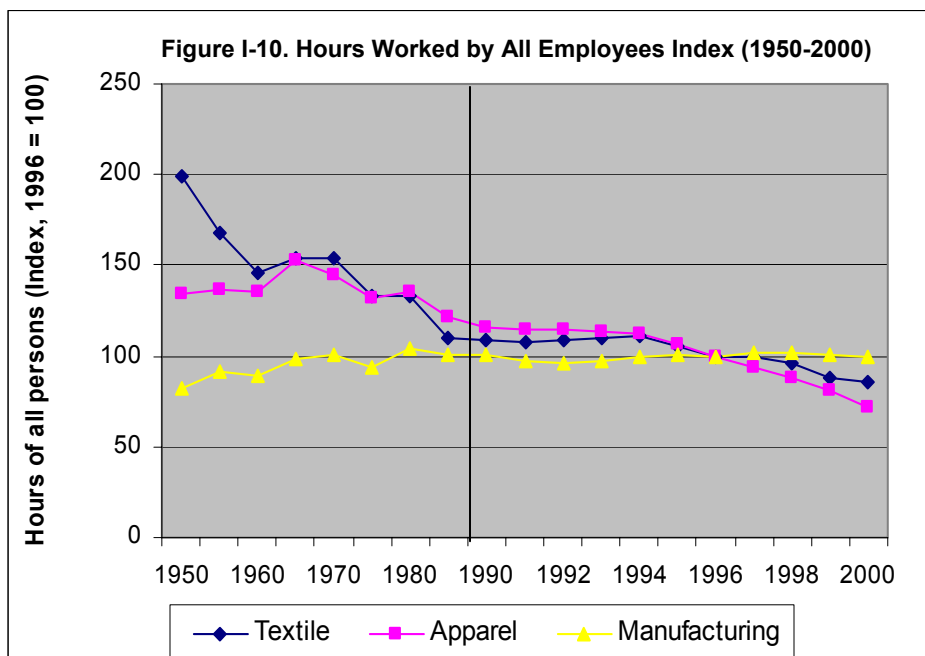
<sup>6</sup> Capital productivity is defined as output per unit of capital service. A unit of capital service is amount of services delivered from a stock of capital that has been created from capital investments over a period of time.



Source: U.S. Department of Labor, Bureau of Labor Statistics

Another way to view the productivity changes is to look at output and employment. Figure I-9 shows how the output index for the textile, apparel, and manufacturing sectors has been increasing since the 1950s. Though textiles and apparel have tapered off since the mid-1990s, manufacturing has continued to rise.

Figure I-10 shows that the hours worked by all employees have stayed fairly stable for manufacturing. Hours worked for both textiles and apparel have declined greatly since 1950 and



Source: U.S. Department of Labor, Bureau of Labor Statistics

continued a slow decline through 2000. This decline, together with output changes shown in Figure I-9, reflects high productivity increases.

### **C. The Competitiveness of the U.S. Textile and Apparel Industries**

For the purpose of this study, the competitiveness of a domestic industry is measured by its ability to produce and sell goods and services in the international economy, in relation to domestic and foreign competitors. Unlike industry health, where one can make absolute statements such as “an industry with current negative profits and negative growth prospects is unhealthy,” the notion of competitiveness is always relative.

As defined here, health and competitiveness are very different concepts: an industry can be healthy and at the same time non-competitive, as could be the case for a heavily subsidized or protected industry. Similarly, an industry can be competitive and unhealthy. For example, if an industry from a given country outsells foreign competitors and gains world market share, but does so without obtaining adequate sustainable profits, then the industry would be competitive but not healthy. Firms in an industry may pursue such a revenue-maximizing goal rather than a profit-maximizing goal for strategic reasons.

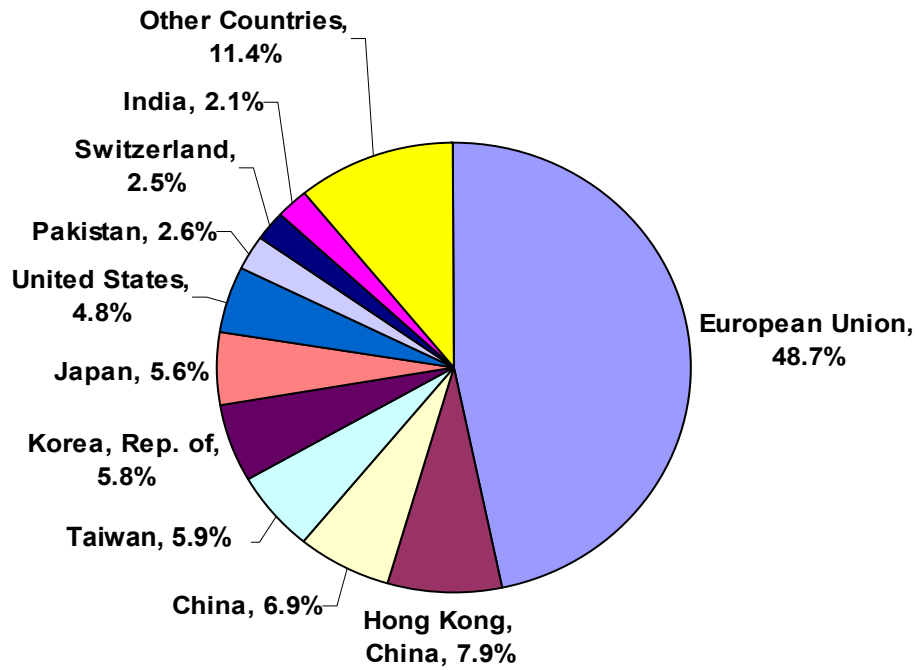
This section assesses the competitiveness of the U.S. textile and apparel industries, relative to their competitors abroad. Also discussed is the U.S. share of global textile and apparel exports, which – albeit still relatively small – has increased since 1990. It then looks at various factors, ranging from labor costs to access to technology, which determine the competitiveness of the U.S. textile and apparel industries relative to their international competitors. The section concludes that in several key areas the U.S. textile and apparel industries are quite competitive, although it notes that on two factors – productivity-adjusted labor costs and environmental regulation – the United States lags behind many competitors. Because labor costs constitute a significant share of overall production costs for these industries, the impact of this input is disproportionately larger than other measures of competitiveness.

## **C.1 U.S. Share of Global Textile and Apparel Trade**

Although aggregate exports of U.S. textiles and apparel have decreased in the past few years (see Chapter I.A.6 above), the World Trade Organization reports that the United States increased its share of total global textile and apparel exports between 1990 and 2001 (see Figures I-11 through I-14). U.S. textile exports captured 7.1 percent of the global export market in 2001, up from 4.8 percent of world exports in 1990. This increase is due in large part to the movement of supply following textile manufacturing offshore. These exports include semi-finished product exported for further processing, the finished product of which may be imported back to the United States. U.S. apparel exports also grew as a percentage of world apparel exports over the period, from 2.4 percent to 3.6 percent, a 50 percent increase, for similar reasons.

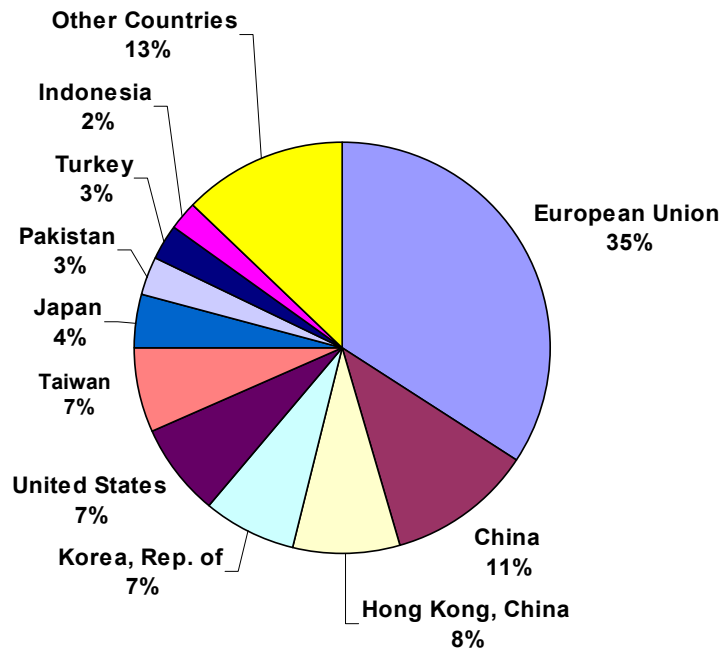
Between 1990 and 2001, China's share of world exports of both textiles and apparel increased, according to the World Trade Organization. Its share of textile exports grew from 6.9 percent in 1990 to 8.3 percent in 2001, while its share of world clothing exports nearly doubled, from 8.9 percent to 18.8 percent over the period. Hong Kong's share of world textile exports grew slightly between 1990 and 2001, from 7.9 percent to 8.3 percent. Its share of world apparel exports fell over the period, from 14.3 percent to just over 12 percent. South Korea's exports demonstrated a similar pattern. At the same time, the European Union lost export market share in both textiles and apparel.

**Figure I-11. World Textile Exports, 1990**



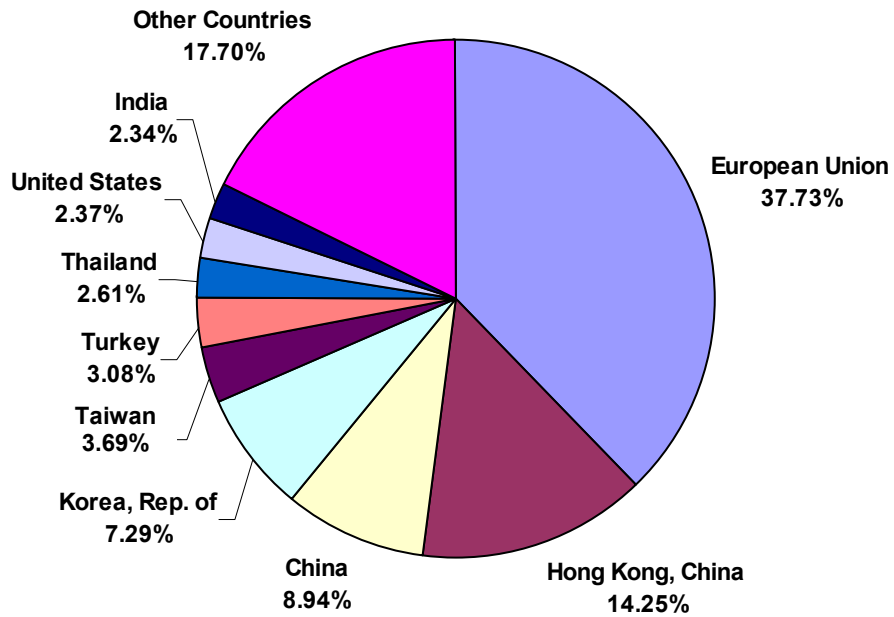
Source: World Trade Organization

**Figure I-12. World Textile Exports, 2001**



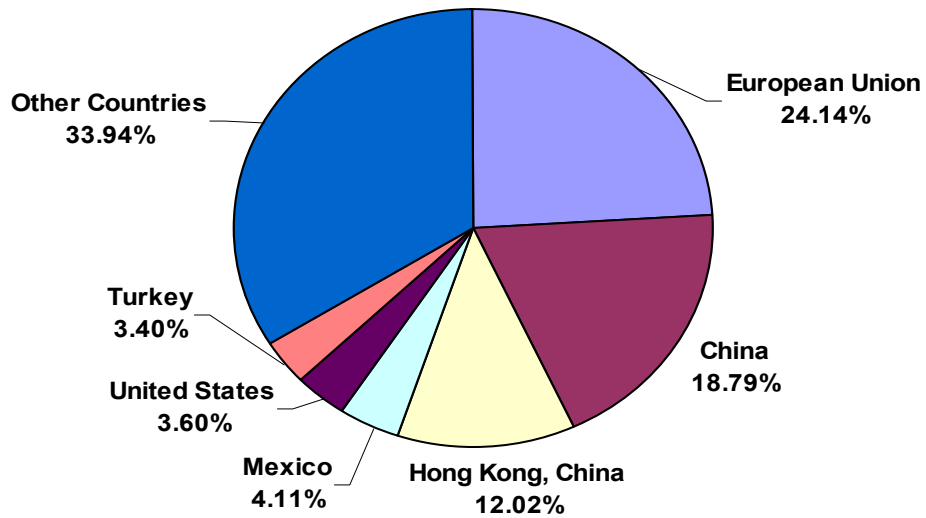
Source: World Trade Organization

**Figure I-13. World Clothing Exports, 1990**



Source: World Trade Organization

**Figure I-14. World Clothing Exports, 2001**



Source: World Trade Organization

## C.2 Competitiveness Scorecard

As defined above, competitiveness is the ability of U.S. firms to produce and sell goods in relation to their international competitors. In this section, a comparison is made of competitiveness factors applicable to all manufacturing industries for various countries (see Table I-21). This comparison provides a business context for assessing the competitive atmosphere of the textile and apparel industries.

| Table I-21. Ranking by Competitive Factors |                                   |               |                          |                   |                   |                     |                          |
|--|-----------------------------------|---------------|--------------------------|-------------------|-------------------|---------------------|--------------------------|
| Country                                    | Rank                              |               |                          |                   |                   |                     |                          |
|  | Productivity-Adjusted Labor Costs | Human Capital | Available Infrastructure | Technology Access | Financial Markets | Business Regulation | Environmental Regulation |
| Canada                                     | N/A                               | 2             | 2                        | 3                 | 3                 | 7                   | 12                       |
| China                                      | 2                                 | 12            | 9                        | 10                | 10                | 6                   | 5                        |
| El Salvador                                | 4                                 | 11            | 11                       | 9                 | 9                 | N/A                 | 2                        |
| Hong Kong                                  | 8                                 | 7             | 3                        | 7                 | 2                 | 1                   | 6                        |
| India                                      | 1                                 | 8             | 12                       | 8                 | 7                 | 9                   | 3                        |
| Italy                                      | 10                                | 6             | 7                        | 6                 | 6                 | 11                  | 7                        |
| Japan                                      | N/A                               | 4             | 4                        | 2                 | 8                 | 2                   | 10                       |
| South Korea                                | 6                                 | 3             | 6                        | 5                 | 5                 | 5                   | 8                        |
| Mexico                                     | 3                                 | 9             | 10                       | 11                | 11                | 10                  | 4                        |
| Taiwan                                     | 7                                 | 5             | 5                        | 4                 | 4                 | 3                   | 9                        |
| Turkey                                     | 5                                 | 10            | 8                        | 11                | 12                | 8                   | 1                        |
| USA  | 9                                 | 1             | 1                        | 1                 | 1                 | 4                   | 11                       |

Source: Jones (2003), Cornelius (2003) and Strategic Resources, Inc. (SRI)

- Productivity adjusted labor costs are measured in labor costs per worker-minute. By adjusting for productivity, a comparison of labor costs for countries with different productivity levels is possible. In this factor, the United States is among the least competitive of the nations analyzed, ranking ninth out of the ten countries with data available. India, China, and Mexico rate the highest in this category.
- The human capital factor is a measure of the set of skills that enhance the productivity of a workforce. Here, the United States and Canada rank first and second, indicating the high skill level present in the workforces in these countries. By comparison, the workforces in China and El Salvador are the least skilled.
- The available infrastructure is defined as the set of facilities and installations that improve the ability of an industry in a given country to operate more efficiently; it is the context within which manufacturing industries operate in each country. Once again, the

United States and Canada are ranked highest, as would be expected given the high level of development in these two nations. India and El Salvador are at the bottom of the list.

- Technology access is the local (in-country) availability of applied scientific or specialized knowledge applicable to manufacturing. The United States again rates highest, followed by Japan and Canada. The countries with the least access to applied or specialized knowledge are Mexico and Turkey.
- The accessibility of local sources of financing was also reviewed for this comparison. Here, the United States, Hong Kong, and Canada were all highly rated. Access to financing is most difficult for firms operating in Mexico and Turkey.
- The set of governmental rules or laws that have an impact on business operations was also compared for the textile- and apparel-producing countries listed. Here, firms in Hong Kong, Japan, and Taiwan enjoy an advantage. The United States was ranked fourth on this factor. The two countries where such regulations have the most impact on businesses are Italy and Mexico.
- Finally, the countries were compared by the environmental regulations under which local companies operate. Here, the United States ranked 11<sup>th</sup> out of 12 countries listed. Companies in Turkey, El Salvador, and India enjoy an advantage with regard to this factor.

It should be noted that the United States ranks at the top in nearly every category, except for productivity-adjusted labor costs and environmental regulations. China, India, Mexico, and El Salvador rank near the bottom in many categories, except for productivity-adjusted labor costs, where they have an advantage, and lower costs due to less stringent environmental regulations.

#### **D. New Market Strategies**

Some textile and apparel firms have responded to what they consider to be the realities of the global market. During site visits conducted by BIS researchers, one firm reported that it had “reinvented” itself when the “realities of the global shift in textile production seemed evident.” The firm’s CEO told the BIS research team that in the mid 1980s, the “road to global

overcapacity in the textile industry had already begun.” Survival “depended on our firm developing a strategy of exiting the commodity business, buying a brand name [one of its branded customers], and producing an end product.”

Other evidence suggests that some U.S. firms in the textile and apparel industries are pursuing new market strategies. These strategies fall into two major categories: (1) a shift in market focus and (2) increased product differentiation.

### **D.1 Shift in Market Focus**

Traditionally, textile firms sell to apparel firms, which in turn sell to retailers. This is the textile-apparel-retail channel. Some firms are shifting away from this traditional channel in an attempt to directly reach the end-customer. For example, some textile firms are selling home furnishings such as sheets and towels directly to the retailer, and other textile firms are selling industrial products such as car seat covers, rugs, and carpets to firms in other sectors. The industry has shifted away from the predominant textile-apparel-retail model to sell to these three different channels.

During a site visit by the BIS research team, one firm said it is marketing some of its niche products directly to consumers through internet marketing. This company said it has also undertaken “co-branding with apparel producers” to make consumers aware that its proprietary products are available only on certain branded merchandise, a process it refers to as “pull-through” marketing.

The BIS industry survey provided additional support for the current shift in market focus. For example, firms indicated that they have begun to exploit the potential of e-commerce through their corporate websites. Firms emphasized that e-commerce would help them to deal directly with their ultimate customers rather than through the traditional textile-apparel-retail channel.

The survey also indicated that textile and apparel firms are turning more and more to niche markets to remain competitive. Textile and apparel firms mentioned table cloths, wall tents, and storm water filtration fabrics as just a few of the new markets they were pursuing. These firms noted that the main factor driving this shift to niche products was a desire to identify specialty markets where foreign competition had yet to make a significant domestic impact. Thus, niche

markets could enhance firms' survivability as they are currently less vulnerable to foreign competition than traditional textile and apparel markets.

## **D.2 Product Differentiation**

One of the main reasons for the overall decline in shipments and employment in the U.S. textile and apparel industries is the lack of product differentiation, which prevents U.S. firms from raising their prices and improving their profitability. Pricing flexibility is limited in these industries because many textile products are by nature commodity type items, which are subject to intense price competition.

Some U.S. firms seek to differentiate their products by making them available in smaller volumes and with shorter lead times ("quick response"), according to survey responses. In practice, U.S. firms are setting up overseas operations for large volume production and U.S.-based operations for quick response. In some cases, retailers are pushing their U.S. suppliers to produce in smaller volume with shorter lead times in order to improve their own inventory and sales efficiencies.

The BIS industry survey supports the growing importance of the "quick response" production approach. Textile and apparel firms repeatedly mentioned the goal of manufacturing their products with shorter lead times. Textile and apparel firms also noted that they have invested in high-speed production machinery as well as automating other aspects of the production process in order to accomplish this goal. Thus, in today's competitive marketplace, firms understand how urgent it is to deliver their products on time or ahead of schedule. As noted above, one of the essential ways in which a firm can distinguish itself from the competition is through its ability to accelerate delivery.

## **E. Summary**

- In general, U.S. textile and apparel production as measured by the value of industry shipments has declined substantially over the past five years. However, significant variation exists within industries, with production decreasing by 40 percent or more in

certain subsectors (e.g., thread, knit fabrics, and women's footwear) but holding steady or increasing in other subsectors (e.g., certain home furnishings and industrial products).

- Analysis of industry financial data reinforces the conclusion that substantial differences exist between and within the industries. Whether measured by profitability, return-on-assets, or debt-to-equity ratios, the textile industry is in relatively weak health, while the apparel industry is in relatively good health, compared to other U.S. consumer cyclical industries, comparable non-cyclical industries, and the textile and apparel industries abroad. Data also suggest that health varies based on firm size, with larger firms (those with more than \$50 million in 2002 sales) reporting higher profitability ratios than smaller firms.
- Alternative, non-financial metrics of industry health, such as employment and establishment closings, suggest overall weakness, with employment declining from 1997 to 2001 and a reduction in the number of textile and apparel establishments. These job losses and establishment reductions appear to be heavily concentrated in a few states. Examination of an extended period reveals substantial diminution in employment in the textile and apparel industries more generally. Declines in relative prices of textile and apparel output and in capacity utilization are consistent with this development. However, the period also shows substantial increases in productivity.
- The industry as a whole appears to be competitive in the global market, although U.S. textile and apparel production is shrinking in many subsectors and certain sectors are relatively unhealthy. Although still small, the U.S. share of the global textile and apparel market (as measured by the U.S. share of total world exports) has grown over the past decade. A review of various competitiveness factors suggests that the United States ranks high among all nations in various measures of competitiveness such as human capital, infrastructure, technology access, and financial markets, lagging behind only in productivity-adjusted labor costs and costs associated with environmental regulation.

- The foregoing suggests, and interview and site visit evidence confirms, that U.S. textile and apparel firms are increasingly focusing on higher value-added products in niche markets. These firms find that the products are less labor intensive, more profitable, and more competitive in international markets. This trend is supplemented by new marketing and production techniques (e.g., seeking to market to the end-customer directly and producing some or all items at off-shore affiliates).

## II. Contribution of the U.S. Textile and Apparel Industries to the U.S. Economy

This chapter discusses the contributions made to the U.S. economy by the textile and apparel industries. It reviews the industries' contribution to U.S. Gross Domestic Product (GDP), their contributions to other industries, their contributions to U.S. employment, and finally their contributions to research and development (R&D).

### A. Direct Economic Contribution

For more than half a century, the textile and apparel industries have made important but steadily declining contributions to the U.S. GDP. Figure II-1 and Table II-1 indicate the percentage contributions to GDP by these two industries. Textile industry contributions peaked in 1948, reaching approximately 1.95 percent of GDP. The apparel industry's peak contribution occurred in 1947 and 1948, when it contributed 1.36 percent to GDP each year. By contrast, in 2001 the textile and apparel industries contributed 0.22 percent and 0.23 percent of GDP, respectively. Until 1954, textiles contributed more to GDP than apparel. Starting in 1956, a reversal occurred when apparel's contribution to GDP exceeded that of textiles, a condition that remains today.

Figure II-1. Textile and Apparel Contribution to GDP 1947-2001

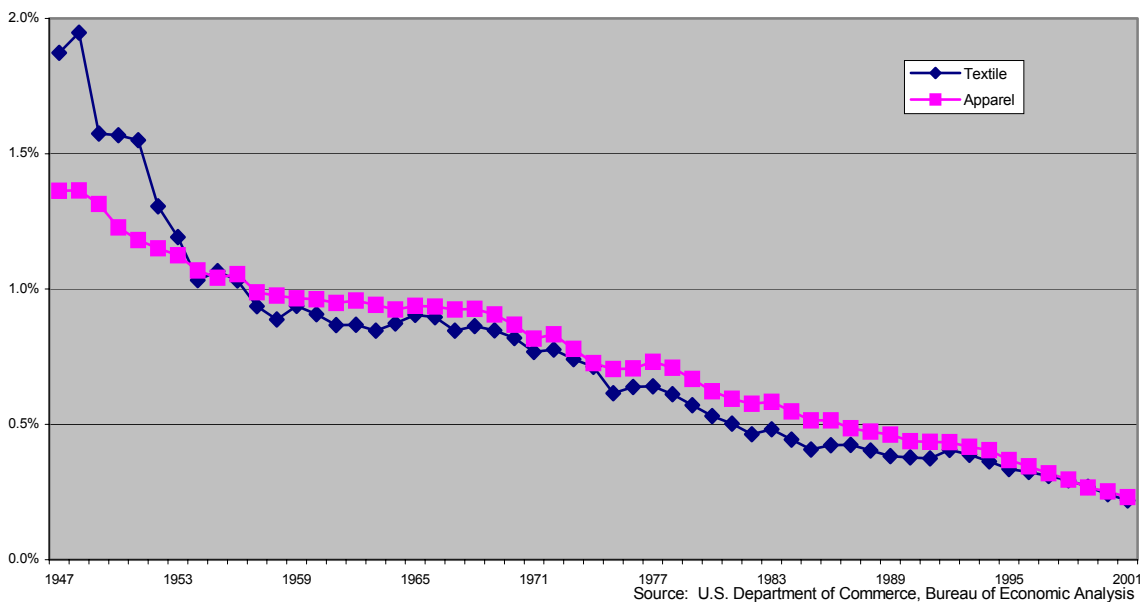


Table II-1 also compares the percentage contribution to GDP for all manufacturing, the production of non-durable goods (food, gasoline, coal, and other), the individual contributions of textiles and apparel, and their combined contribution. The combined contribution to GDP of the textile and apparel industries declined from 2.80 percent in 1950 to 0.45 percent in 2001. The percentage change in contribution has been much greater for the textile and apparel industries than for manufacturing overall or even all non-durable goods. Since 1950 (see Table II-2), manufacturing's contribution to GDP has declined by 50.6 percent, while the combined textile and apparel contribution to GDP has declined by 83.9 percent.

| <b>Table II-1. Percentage of GDP</b> |                      |                     |                |                |                                     |
|--------------------------------------|----------------------|---------------------|----------------|----------------|-------------------------------------|
| <b>Year</b>                          | <b>Manufacturing</b> | <b>Non-durables</b> | <b>Textile</b> | <b>Apparel</b> | <b>Combined Textile and Apparel</b> |
| 1950                                 | 28.59%               | 12.98%              | 1.57%          | 1.23%          | 2.80%                               |
| 1960                                 | 27.03%               | 11.35%              | 0.91%          | 0.96%          | 1.87%                               |
| 1970                                 | 24.03%               | 9.92%               | 0.82%          | 0.87%          | 1.69%                               |
| 1980                                 | 21.01%               | 8.47%               | 0.53%          | 0.62%          | 1.15%                               |
| 1990                                 | 17.93%               | 7.82%               | 0.38%          | 0.44%          | 0.82%                               |
| 2000                                 | 15.47%               | 6.45%               | 0.24%          | 0.25%          | 0.49%                               |
| 2001                                 | 14.11%               | 6.05%               | 0.22%          | 0.23%          | 0.45%                               |

Source: U.S. Department of Commerce, Bureau of Economic Analysis

| <b>Table II-2. Change in Percentage of GDP Since 1950</b> |                     |                |                |                                     |
|---|---------------------|----------------|----------------|-------------------------------------|
| <b>Manufacturing</b>                                      | <b>Non-durables</b> | <b>Textile</b> | <b>Apparel</b> | <b>Combined Textile and Apparel</b> |
| -50.6%  | -53.4%              | -86.0%         | -81.2%         | -83.9%                              |

Source: U.S. Department of Commerce, Bureau of Economic Analysis

## **B. Impacts on Other Industries**

### **B.1 The Multiplier Effect of the Textile and Apparel Industries**

The textile and apparel industries are linked to many other sectors in the economy. Generally speaking, they have a backward link to the industries that supply their raw materials and a forward link to industries that deliver the final goods to consumers. When the textile and apparel industries grow, they provide an economic stimulus for many other sectors of the economy. The impact of such stimulus is captured in industry multipliers generated by the Department of Commerce's Bureau of Economic Analysis (BEA). The BEA computes industry multipliers to measure the total economic impact, direct and indirect, of a particular industry. For 1999, the most recent year for which this data is available, the industry multipliers are as they appear in Table II-3, below.

| <b>Industry</b>                              | <b>Percent of GDP</b> | <b>Total Industry Multiplier</b> |
|--|-----------------------|----------------------------------|
| Agricultural                                 | 0.4%                  | 2.31                             |
| Manufacturing                                | 18.1%                 | 2.26                             |
| Construction                                 | 9.1%                  | 2.08                             |
| Transportation, communication, and utilities | 6.7%                  | 1.91                             |
| Services                                     | 25.5%                 | 1.70                             |
| Trade  | 12.8%                 | 1.59                             |
| Finance, insurance, and real estate          | 17.5%                 | 1.53                             |
| Other  | 10.0%                 | 1.15                             |

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Annual Input-Output Model 1999

The manufacturing industry, for example, has a multiplier of 2.26. This means that a \$1 increase in manufactured goods production directly and indirectly benefits economic performance by \$2.26. As shown in Table II-3, manufacturing industries, given their many stages of production, provide higher multiplier effects than services industries.

Table II-4 shows the top 15 segments of all industries with the highest multipliers as of 1999. Four textile and apparel segments are included in this top 15 list. The largest of these segments, in terms of its contribution to GDP, is the apparel segment, which has a multiplier of 2.55.

| <b>Rank</b> | <b>Industry Segment</b>                                 | <b>Percent of GDP</b> | <b>Total Segment Multiplier</b> |
|-------------|---|-----------------------|---------------------------------|
| 1           | Gas production and distribution (utilities)             | 0.4%                  | 3.20                            |
| 2           | Metal containers  | 0.0%                  | 2.95                            |
| 3           | Petroleum refining and related products                 | 0.8%                  | 2.92                            |
| 4           | Livestock and livestock products                        | 0.0%                  | 2.89                            |
| 5           | Motor vehicles (passenger cars and trucks)              | 2.8%                  | 2.88                            |
| 6           | <b>Footwear, leather, and leather products</b>          | <b>0.0%</b>           | <b>2.78</b>                     |
| 7           | Food and kindred products                               | 3.3%                  | 2.62                            |
| 8           | <b>Apparel</b>  | <b>0.5%</b>           | <b>2.55</b>                     |
| 9           | Computer and office equipment                           | 0.6%                  | 2.51                            |
| 10          | Crude petroleum and natural gas                         | -0.6%                 | 2.50                            |
| 11          | <b>Broad and narrow fabrics, yarn, and thread mills</b> | <b>0.0%</b>           | <b>2.47</b>                     |
| 12          | <b>Miscellaneous textile goods and floor coverings</b>  | <b>0.1%</b>           | <b>2.46</b>                     |
| 13          | Truck and bus bodies, trailers, & motor vehicles parts  | 0.2%                  | 2.45                            |
| 14          | Plastics and synthetic materials                        | 0.1%                  | 2.42                            |
| 15          | Primary nonferrous metals manufacturing                 | -0.1%                 | 2.40                            |

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Annual Input-Output Model 1999

## B.2 Specific Contributions to Other Industries

Table II-5 shows how the products of the textile and apparel industries are used by many other U.S. industries. Shown in the left column are the industry segments that make the most use of textile and apparel products. Each segment shown spends more than \$250 million annually on textile and apparel products.

Clearly, the heaviest users of textile and apparel products are the textile and apparel industries themselves. Excluding these sectors, the top five industry segments that are heavy users of textile and apparel products are motor vehicles, furniture and fixtures, rubber and miscellaneous plastics, health services, and new construction.

To understand how the table data functions, consider the motor vehicle segment. This industry segment is one of the heaviest users of textile and apparel products, as it spends \$8.3 billion on these products. This amount is further broken down by category: the motor vehicle segment uses \$143 million from the “broad and narrow fabrics, yarn and thread mills” sector; \$1.43 billion from the “miscellaneous textile goods and floor coverings” sector; \$7 million from the apparel sector; \$6.76 billion from the “miscellaneous fabricated textile products” sector; and \$3 million from the “footwear, leather, and leather product” sector.

| <b>Table II-5. Industry Segments Using Textile and Apparel Products (1999)</b> |  |  |                |  |  |  |
|--|--|--|----------------|--|--|--|
| (\$ Millions)  |  |  |                |  |  |  |
| <b>Main Industry Segments Using Textile and Apparel Products</b>               | <b>Sectors of the Textile and Apparel Industries Supplying to the Main Industry Segments</b> |  |                |  |  | <b>Total Supplied by the Textile and Apparel Sectors</b> |
|  | <b>Broad and narrow fabrics, yarn/thread mills</b>   | <b>Miscellaneous textile goods and floor coverings</b> | <b>Apparel</b> | <b>Miscellaneous fabricated textile products</b> | <b>Footwear, leather, and leather products</b> |  |
| Apparel  | 14,204   | 43   | 11,550         | 2,515  | 374  | 28,685   |
| Various fabricated textile products  | 6,797  | 1,720  | 667            | 335  | 518  | 10,037   |
| Broad and narrow fabrics, yarn, and thread mills                               | 9,745  | 76   | 38             | 0  | 0  | 9,859  |
| Motor vehicles (cars and trucks)   | 143  | 1,432  | 7              | 6,761  | 3  | 8,345  |
| Furniture/fixtures   | 2,541  | 1,939  | 4              | 24   | 54   | 4,562  |
| Miscellaneous textile goods and floor coverings                                | 3,584  | 653  | 0              | 2  | 0  | 4,240  |
| Rubber, various plastics products  | 1,317  | 1,692  | 12             | 5  | 0  | 3,026  |
| Footwear, leather, leather products  | 260  | 172  | 5              | 0  | 2,218  | 2,655  |

| <b>Table II-5. Industry Segments Using Textile and Apparel Products (1999)</b> |  |  |                |  |  |  |
|--|--|--|----------------|--|--|--|
| (\$ Millions)  |  |  |                |  |  |  |
| <b>Main Industry Segments Using Textile and Apparel Products</b>               | <b>Sectors of the Textile and Apparel Industries Supplying to the Main Industry Segments</b> |  |                |  |  | <b>Total Supplied by the Textile and Apparel Sectors</b> |
|  | <b>Broad and narrow fabrics, yarn/thread mills</b>   | <b>Miscellaneous textile goods and floor coverings</b> | <b>Apparel</b> | <b>Miscellaneous fabricated textile products</b> | <b>Footwear, leather, and leather products</b> |  |
| Health services  | 40   | 58   | 791            | 1,058  | 30   | 1,978  |
| New construction   | 0  | 1,363  | 0              | 503  | 0  | 1,866  |
| Personal and repair services (non auto)  | 160  | 41   | 460            | 371  | 261  | 1,294  |
| Scientific and control instruments   | 388  | 764  | 26             | 1  | 0  | 1,179  |
| Other ag. products   | 490  | 278  | 0              | 389  | 0  | 1,156  |
| Paper and allied products, except containers                                   | 139  | 871  | 7              | 3  | 0  | 1,019  |
| Wholesale trade  | 179  | 69   | 357            | 310  | 9  | 923  |
| Maintenance and repair construction  | 0  | 542  | 0              | 286  | 0  | 827  |
| Miscellaneous manufacturing  | 466  | 22   | 234            | 24   | 48   | 793  |
| Hotels and lodging   | 8  | 16   | 68             | 691  | 4  | 786  |
| Retail trade   | 66   | 50   | 47             | 49   | 257  | 469  |
| Amusements   | 120  | 14   | 148            | 62   | 99   | 442  |
| Educational, social services, membership organizations                         | 104  | 9  | 68             | 96   | 113  | 391  |
| Other transportation equipment   | 0  | 91   | 0              | 269  | 0  | 360  |
| Aircraft and parts   | 127  | 16   | 8              | 177  | 1  | 329  |
| Automotive repair and services   |  | 59   | 73             | 193  | 2  | 327  |
| Federal Gov. enterprises   | 13   | 1  | 2              | 230  | 66   | 312  |
| Eating and drinking places   | 0  | 38   | 8              | 250  | 2  | 297  |
| General industrial machinery and equipment                                     | 0  | 262  | 1              | 0  | 0  | 263  |
| Livestock and livestock products   | 0  | 195  | 0              | 0  | 57   | 252  |

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Annual Input-Output Model 1999

### **B.3 Contribution to Critical Infrastructure**

The textile and apparel industries contribute to other critical industrial sectors that support the U.S. infrastructure. The list of critical industries below is taken from the 2001 Department of Commerce report, “The Effect of Imports of Iron Ore and Semi-Finished Steel on the National Security.” Table II-6 shows the contribution of the textile and apparel industries to the critical

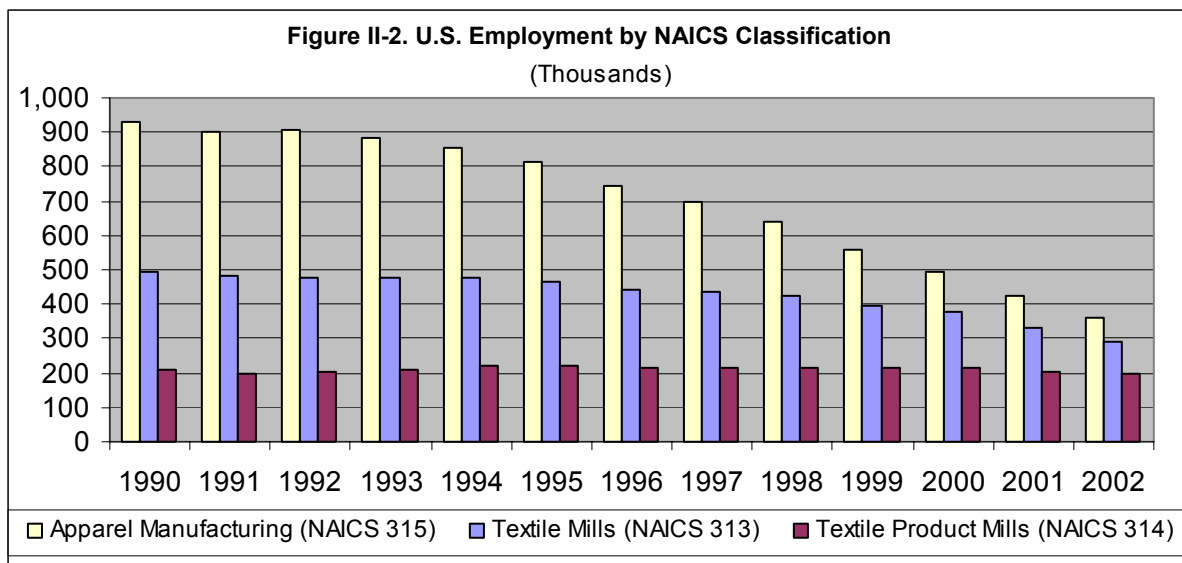
sectors listed. The sectors that are most dependent on textile and apparel products are motor vehicles, rubber products, and health services.

| <b>Table II-6. Use of Textile and Apparel Products by Critical Infrastructure Industries (1999)</b> |  |                         |
|---|--|-------------------------|
| <b>Sectors Using Textile/Apparel Products</b>   | <b>Use of Textile and Apparel Products (\$ Millions)</b> | <b>Percent of Total</b> |
| Motor vehicles (passenger cars and trucks)  | 8,345  | 9.4%                    |
| Rubber and miscellaneous plastics products  | 3,026  | 3.4%                    |
| Health services   | 1,978  | 2.2%                    |
| New construction  | 1,866  | 2.1%                    |
| Maintenance and repair construction   | 827  | 0.9%                    |
| Other transportation equipment  | 360  | 0.4%                    |
| Aircraft and parts  | 329  | 0.4%                    |
| Water transportation  | 188  | 0.2%                    |
| Finance   | 168  | 0.2%                    |
| Communications, except radio and TV   | 161  | 0.2%                    |
| Pipelines, freight forwarders, and related services   | 92   | 0.1%                    |
| Truck/bus bodies, trailers, and motor vehicles parts  | 92   | 0.1%                    |
| Insurance   | 40   | 0.0%                    |
| Motor freight transportation and warehousing  | 39   | 0.0%                    |
| Ordnance and accessories  | 36   | 0.0%                    |
| Railroads and related services, passenger ground transportation                                     | 30   | 0.0%                    |
| Air transportation  | 20   | 0.0%                    |
| Engines and turbines  | 10   | 0.0%                    |
| Computer and data processing services   | 8  | 0.0%                    |
| Electric services (utilities)   | 4  | 0.0%                    |
| Crude petroleum and natural gas   | 2  | 0.0%                    |
| Petroleum refining and related products   | 1  | 0.0%                    |
| Gas production and distribution (utilities)   | 1  | 0.0%                    |
| Audio, video, and communication equipment   | 1  | 0.0%                    |
| Water and sanitary services   | 0  | 0.0%                    |
| Radio and TV broadcasting   | 0  | 0.0%                    |
| Metal containers  | 0  | 0.0%                    |
| Computer and office equipment   | 0  | 0.0%                    |
| <b>Subtotal – Critical Infrastructure Industries</b>  | <b>17,622</b>  | <b>19.8%</b>            |
| <b>Total - All Industries</b>   | <b>89,060</b>  | <b>100.0%</b>           |

Source: BIS Analysis of U.S. Department of Commerce, Bureau of Economic Analysis Annual Input-Output Use Table for 1999

### C. Contribution to Employment

Another measure of the contribution of the textile and apparel industries to the economy is the employment levels. Figure II-2 shows employment by North American Industry Classification System (NAICS) code for textile mills (NAICS 313), textile product mills (NAICS 314), and apparel manufacturing (NAICS 315). Employment in apparel manufacturing declined by 61.5 percent between 1990 and 2002, from 929,100 workers to 357,600. Textile mills saw employment drop by 40.4 percent between 1990 and 2002 from 491,800 to 293,200. Employment in textile product mills (NAICS 314) declined by only 6.3 percent since 1990, from 209,300 to 196,200.



Source: U.S. Department of Labor, Bureau of Labor Statistics

Textile and apparel employment is concentrated in only a few states. According to 2001 Bureau of Labor Statistics (NAICS data), 49.3 percent of all textile employment is located in three states, and 46.8 percent of all apparel employment is located in three states, with North Carolina in the top three on both industry lists. The top ten states in each industry represent 77.8 percent of textile employment and 76.6 percent of apparel employment.

In the U.S. textile- and apparel-related industries, women dominate the workforce, accounting for nearly 68 percent of textile, apparel, and furnishings machine operators and more than 77 percent of textile sewing machine operators in 2002. Workers of Hispanic origin also represent a strong presence in these industries, accounting for almost 35 percent of textile, apparel, and

furnishings machine operators and more than 42 percent of textile sewing machine operators in 2002.

## **D. Contribution to U.S. Research and Development**

The textile and apparel industries also contribute to the economy in terms of ancillary benefits to other industries derived from R&D spending on the development of new textile and apparel products and manufacturing processes. Textile- and apparel-related research is being carried out in several fields including information technology, biotechnology, nanotechnology, manufacturing technology, and sustainable alternatives to petrochemical-based raw materials.

Textile- and apparel-related R&D seeks to introduce new products or to increase productivity. For instance, in the case of information technology, the industry is exploring the development of “smart garments” featuring electrical circuits and sensors, which can be used for added-value fashion and advanced medical diagnostics. Similarly, nanotechnology is now being used to combine the properties of natural fibers with those of synthetics.

While it is difficult to quantify the benefits to other industries from textile- and apparel-related R&D efforts, it is possible to gauge the amount spent on such research and development from responses to the BIS survey. The data in Table II-7 indicate that the industries have put a substantial, albeit declining, amount of spending into R&D, from \$442.8 million in 1999 to \$336.3 million in 2003, for a total of \$1.9 billion over the 1999-2003 period.

| <b>Table II-7. Textile and Apparel-Related R&amp;D Spending, 1999-2003 (\$ Thousands)</b> |             |             |             |             |             |              |
|---|-------------|-------------|-------------|-------------|-------------|--------------|
|   | <b>1999</b> | <b>2000</b> | <b>2001</b> | <b>2002</b> | <b>2003</b> | <b>Total</b> |
| <b>Total Spending</b>   | 442,804.7   | 397,780.3   | 385,772.4   | 371,607.4   | 336,265.7   | 1,934,230.5  |
| <b>Government Grants</b>  | N/A         | N/A         | N/A         | N/A         | N/A         | 12,944.5     |
| <b>Cooperative R&amp;D</b>  | N/A         | N/A         | N/A         | N/A         | N/A         | 23,171.9     |

Source: U.S. DOC/BIS Industry Survey Data

In addition, survey data indicate that supplementing the industries’ investment were government (federal/state/local) R&D grants totaling \$12.9 million between 1999 and 2003. These grants were used for computer systems development, electronic textiles, and competitive enhancement initiatives.

Firms also provided information about R&D activities such as product development/process refinement or improvement conducted in cooperation with other businesses, government, or universities. For 1999-2003, firms invested more than \$23 million in such efforts. The projects included product development, fabric shrinkage control, dyeing, improved thermal and wicking characteristics, and stain resistance.

## **E. Summary**

- The combined contribution of the U.S. textile and apparel industries to the U.S. gross GDP declined from 2.80 percent in 1950 to 0.45 percent in 2001 – making it an increasingly small part of the overall U.S. economy. However, these industries do have higher than average multiplier effects.
- The contribution of the textile and apparel industries to U.S. employment has decreased over time but remains significant, with the industries employing over 800,000 workers. A large portion of that workforce today is made up of women and minorities and is heavily concentrated in the Southeast. Labor productivity has been steadily increasing since 1950, consistent with capital investment outlays and improved efficiencies in production.
- The textile and apparel industries make contributions through R&D expenditures that may have ancillary benefits to the U.S. economy, although it is difficult to quantify those benefits. R&D appears to be focused principally on the creation of new products and manufacturing processes for commercial and defense applications. This research supports several other fields, including information technology, biotechnology, and nanotechnology.



### **III. Contribution of the U.S. Textile and Apparel Industries to the U.S. Armed Forces**

This chapter examines the contribution of the U.S. textile and apparel industries to the U.S. Armed Forces. There are two sections to this chapter. The first considers the contribution of the textile and apparel industries in meeting the regular needs of the DoD. The second section considers the contribution of these industries in meeting DoD's *surge* requirements. Surge demand by DoD is triggered by escalated efforts, such as the recent operations in Afghanistan and Iraq. This chapter analysis relies on information provided by DoD's Defense Logistics Agency (DLA),<sup>7</sup> as well as data collected in the BIS survey.

#### **A. Contribution to the U.S. Armed Forces**

##### **A.1 Total Contribution to the Department of Defense**

In Fiscal Year 2001, the total amount of textile and apparel products directly consumed by DoD amounted to almost \$1.3 billion. This represents one percent of the \$132 billion of U.S. textile and apparel shipments for that year and includes only products classified under Federal Supply Classification Codes (FSC) 83 (Textiles, Leather, Furs, Apparel & Shoe Findings; Tents) and 84 (Clothing, Individual Equipment & Insignia). DoD expenditures on textile and apparel products as a percent of total U.S. shipments since 1997 are shown in Table III-1.

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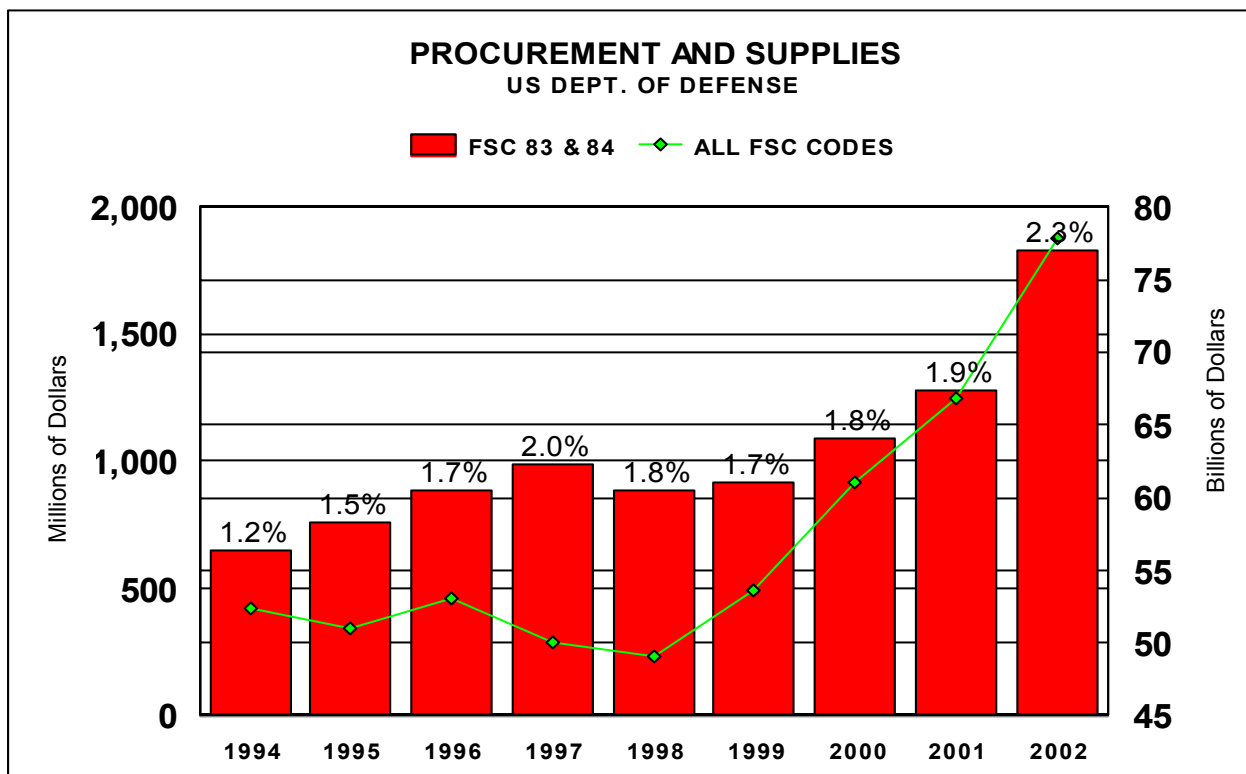
<sup>7</sup> DoD purchases textile and apparel items principally through DLA's Defense Supply Center Philadelphia (DSCP).

| Table III-1. DoD Expenditures as a Percentage of Total U.S. Shipments<br>(\$ Thousands) |                |                     |            |             |   |  |
|---|----------------|---------------------|------------|-------------|---|--|
| Year  | U.S. Shipments |                     |            |             | DoD Expenditures<br>on Textiles, Textile<br>Products and<br>Apparel | DoD<br>Expenditures as<br>% of Total U.S.<br>Shipments |
|   | Textiles       | Textile<br>Products | Apparel    | Total       |   |  |
|   | (\$)           | (\$)                | (\$)       | (\$)        | (\$)  |  |
| 1997  | 58,707,401     | 31,051,835          | 68,018,116 | 157,777,352 | 991,044   | 0.6%   |
| 1998  | 57,415,758     | 31,136,672          | 64,931,989 | 153,484,419 | 883,519   | 0.6%   |
| 1999  | 54,306,467     | 32,689,157          | 62,305,193 | 149,300,817 | 921,191   | 0.6%   |
| 2000  | 52,112,118     | 33,654,181          | 60,338,991 | 146,105,290 | 1,089,056   | 0.7%   |
| 2001  | 45,680,697     | 31,970,642          | 54,598,294 | 132,249,633 | 1,278,166   | 1.0%   |
| 2002  | N/A            | N/A                 | N/A        | N/A         | 1,816,237   | N/A  |

Source: U.S. Department of Commerce, Census Bureau

Figure III-1 shows the share of total DoD expenditures accounted for by textile and apparel items since 1994. In Fiscal Year 2002, expenditures by DoD on textiles and apparel increased to \$1.8 billion from \$1.3 billion in the previous fiscal year, a 38 percent increase. However, total DoD expenditures also increased significantly from Fiscal Year 2001 to 2002, primarily because of

Figure III-1. Textile and Apparel Share of DoD Expenditures



Source: U.S. Department of Defense, Werner International

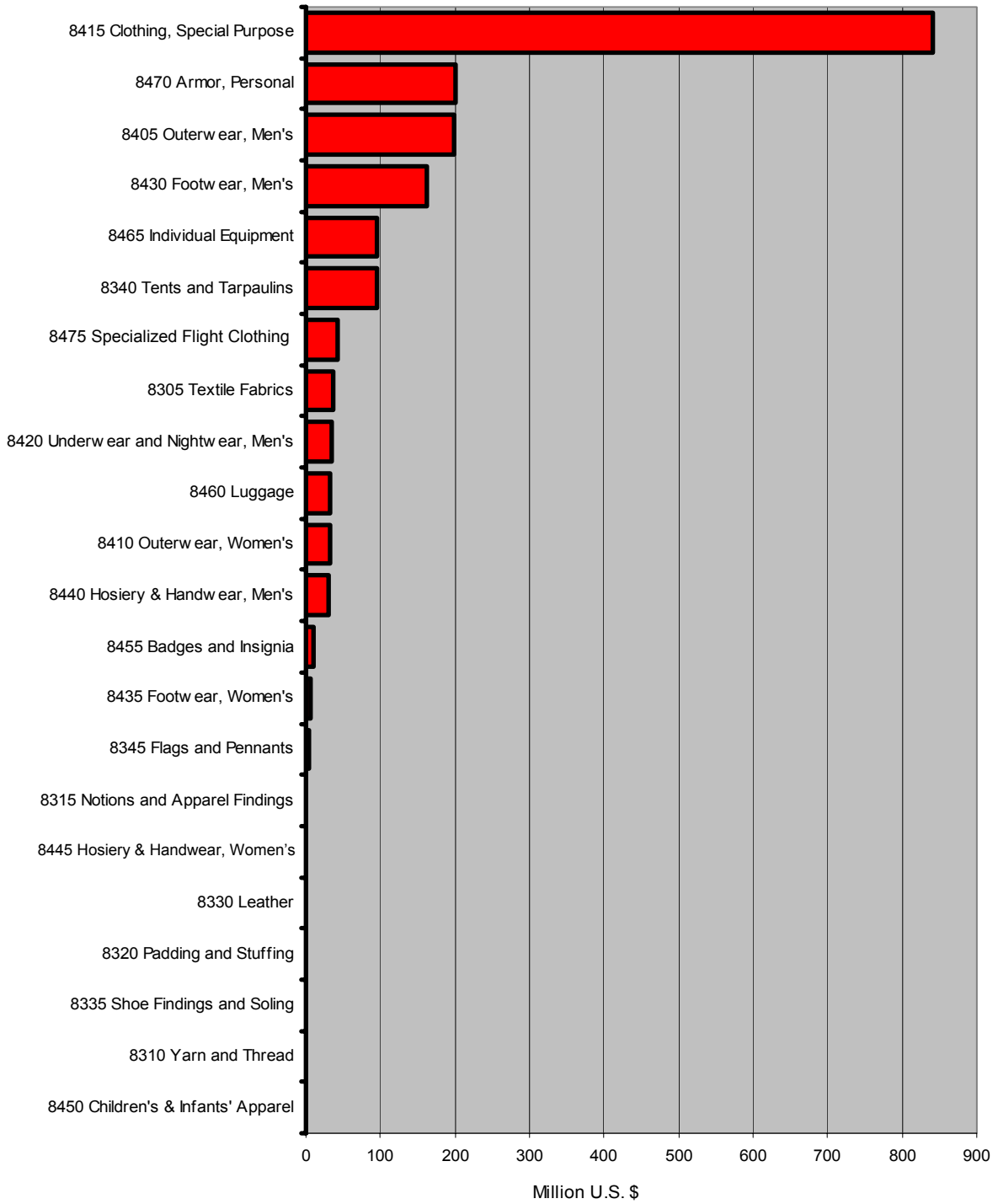
preparations and support for Operations Enduring Freedom and Iraqi Freedom. As illustrated in Figure III-1, expenditures on textiles and apparel by DoD as a percent of total DoD expenditures were 2.3 percent for fiscal year 2002, up from 1.9 percent in the previous fiscal year.

## **A.2 Details of Department of Defense Textile and Apparel Procurement**

The top three apparel products consumed by DoD, which account for over two-thirds of all DoD consumption, are special purpose clothing, personal armor, and men's outerwear, each contributing 46 percent, 11 percent, and 11 percent respectively, of total DoD direct expenditures on textiles and apparel. Figure III-2 shows consumption of all categories of textile and apparel items by the armed forces.

Section A.1 above considered only direct DoD expenditures on textile and apparel categories (FSC codes 83 and 84). DoD also makes direct purchases of products in other product categories (other FSC codes) that include significant quantities of textile and apparel items as inputs but also include significant components that are not textile and apparel items and were therefore excluded from the discussion in Section A.1. For example, the "Floor Coverings" category includes not only carpets but also hard floorcoverings. Table III-2 shows these additional product categories. If these additional categories were considered in their entirety, "textile and apparel items" would account for 2.55 percent of the total DoD procurement budget.

**Figure III-2. Consumption by the U.S. Armed Forces of Textiles and Apparel**



Source: U.S. Department of Defense

| <b>Table III-2. DoD Direct Spending in All Textile and Apparel Products (FY 2002)</b> |                                |                          |
|---|--------------------------------|--------------------------|
| <b>FSC Codes</b>  | <b>Product Category</b>        | <b>DoD Spending (\$)</b> |
| <b>83</b>   | Textiles                       | 138,932,182              |
| <b>84</b>   | Clothing                       | 1,688,195,902            |
| <b>1540*</b>  | Gliders                        | 3,195,958                |
| <b>1670*</b>  | Parachutes etc.                | 125,873,975              |
| <b>4020*</b>  | Fiber Rope, Cordage, Twine     | 4,610,096                |
| <b>6510*</b>  | Surgical Dressing Material     | 4,149,694                |
| <b>6532*</b>  | Hospital and Surgical Clothing | 425,149                  |
| <b>7210*</b>  | Household Furnishings          | 63,820,421               |
| <b>7220*</b>  | Floor Coverings                | 18,015,117               |
| <b>7230*</b>  | Draperies, Awnings, and Shades | 3,658,254                |
| <b>Total Above</b>  |                                | <b>2,050,876,748</b>     |
| <b>% of total expenditure</b>   |                                | <b>2.6%</b>              |

Source: U.S. Department of Defense

\* The portion of textile content in each item cannot be discretely ascertained from available data.

In addition, textile and apparel products are incorporated into many other products used by DoD. This includes, for example, items such as: (1) fibers used in aircraft; (2) textiles used in tire cord, tubes, and hosing; (3) textiles used in motor vehicles and boats, such as seats, safety belts, and airbags; (4) textiles used in machinery and equipment such as conveyor belts and filters; (5) textiles used in construction; (6) textiles used in furniture, such as seat covers and seat backing; (7) textiles used in books; and (8) textiles used in cleaning equipment such as mops and sponges. Textiles and apparel constitute only a very small percentage of the overall value of these products, are often incorporated in the lower tiers of the production process, and are not specifically captured by publicly available information or BIS survey data. As such, gauging the value of textiles and apparel indirectly consumed by DoD through procurement of these goods is very difficult.

### **A.3 The Procurement Process**

The bulk of textile and apparel items acquired by DoD are acquired through DLA. DLA is a “combat support” agency, providing supplies and materials to the U.S. Military Departments as needed. DLA has five business units to provide services associated with the acquisition, distribution, maintenance, and disposal of parts and supplies. DSCP is the DLA business unit (or

“inventory control point”) for four commodity groups: clothing and textile, food and related equipment, medical material, and general and industrial products and services. DSCP sells to the U.S. Military Services, as well as to some federal, state, and local entities.

In Fiscal Year 2002, DSCP had \$7.8 billion in sales, \$1.5 billion of which was clothing and textile related. The clothing and textile commodity group is managed by DSCP through its Clothing and Textile Directorate (C&T). C&T supplies more than 8,000 different items (30,000 line items after factoring in individual sizes).

In addition to the purchase of finished products, DoD also buys fabric directly from the textile industry. Contractors then utilize the fabric to manufacture end items. This procedure results in substantial savings due to discounts on large volume purchases and produces an end product of uniform quality.

#### A.4 Analysis of Suppliers

Table III-3 shows the locations of suppliers that sold the most textiles and apparel items (by value) to DoD in Fiscal Year 2002. The state of Texas was the largest source, with 12 percent of the total.

| <b>Table III-3. DoD Textile and Apparel Procurement by State (FY 2002)</b> |                            |                         |
|--|----------------------------|-------------------------|
| <b>State</b>   | <b>Total (\$ Millions)</b> | <b>Percent of Total</b> |
| Texas  | \$224.7                    | 12%                     |
| Tennessee  | \$157.0                    | 9%                      |
| Kentucky   | \$124.2                    | 7%                      |
| North Carolina   | \$111.6                    | 6%                      |
| Alabama  | \$108.0                    | 6%                      |
| All States   | \$1,681.3                  | 92%                     |
| All other sources  | <b>\$1,827.1</b>           | <b>N/A</b>              |

Source: U.S. Department of Defense

Table III-4 shows the largest suppliers to DoD, based on public data available from the DoD through its Directorate for Information Operations and Reports.<sup>8</sup> The largest private military

<sup>8</sup> <http://web1.whs.osd.mil/peidhome/peidhome.htm>

**Table III-4. Suppliers to the U.S. Armed Forces, Largest Suppliers, Distribution of Suppliers  
FY 2002**

|                                     | Location | Dollar Value |  | Location | Dollar Value |
|-------------------------------------|----------|--------------|--|----------|--------------|
| <b>1) Textile Fabrics</b>           |          |              | <b>6) Underwear &amp; Nightwear , Men</b>      |          |              |
| Burlington Performance Wear         | VA       | 15,623,390   | Campbellsville Apparel Co                      | KY       | 11,458,695   |
| Burlington Industries Inc           | NC       | 10,895,478   | Union Underwear Co Inc                         | KY       | 5,939,313    |
| Burlington Industries Inc           | VA       | 1,658,560    | Jenson Promotional Items Inc                   | NC       | 4,241,648    |
| Duracote Corp                       | OH       | 746,862      | National Industries for the Blind              | MS       | 3,672,000    |
| Draperly Corp. of America, Inc      | NJ       | 413,835      | Jockey International Inc                       | KY       | 1,820,000    |
| Narricot Industries Inc             | VA       | 267,528      |  |          |              |
| TOTAL                               |          | 36,587,993   | TOTAL  |          | 33,860,734   |
| <b>2) Tents and Tarpaulins</b>      |          |              | <b>7) Footwear, Men</b>                        |          |              |
| Camel Manufacturing Co              | TN       | 17,066,244   | Belleville Shoe Mfg Co                         | IL       | 44,435,171   |
| AC Inc                              | AL       | 15,568,822   | Wolverine Worldwide Inc                        | MI       | 28,475,850   |
| Alaska Industrial Resources         | AK       | 8,528,873    | Wellco Enterprises Inc                         | NC       | 19,885,764   |
| B & B Manufacturing Inc             | HI       | 6,855,197    | Altama Delta Corp                              | TN       | 17,052,742   |
| Alaska Industrial Resources         | AK       | 1,911,814    | Munro & Company Inc                            | AR       | 11,884,087   |
| American Spacer Frame Fabricator    | FL       | 1,853,520    |  |          |              |
| TOTAL                               |          | 95,471,603   | TOTAL  |          | 161,514,965  |
| <b>3) Outerwear Men</b>             |          |              | <b>8) Footwear Women</b>                       |          |              |
| ORC Industries Inc                  | WI       | 31,703,371   | Capps Shoe Co Inc                              | VA       | 3,314,550    |
| American Apparel Inc                | AL       | 29,058,655   | New Balance Athletic Shoe Inc                  | MA       | 2,926,267    |
| Propper International Sales Inc     | PR       | 12,856,555   |  |          |              |
| Rutterrex Inc                       | LA       | 9,714,894    | TOTAL  |          | 5,632,229    |
| New Maryland Clothing Mfg Inc       | MD       | 6,137,672    |  |          |              |
| TOTAL                               |          | 199,471,603  | <b>9) Hosiery, Handwear, Clothing Accy</b>     |          |              |
| <b>4) Outerwear Women</b>           |          |              | Special T Hosiery Mills, Inc                   | NC       | 8,747,885    |
| Derossi & Son Co Inc                | NJ       | 9,990,113    | Singer Hosiery Mills, Inc                      | NC       | 4,651,899    |
| Propper International Inc           | PR       | 2,861,439    | SAMCO  | NY       | 3,265,208    |
| Federal Prison Industries Inc       | SC       | 2,120,389    | Travis Assn for the Blind                      | TX       | 2,961,561    |
| Sam Bonk Uniform Cap Inc            | NY       | 1,499,947    | Mauney Hosiery Mills Inc                       | NC       | 1,892,985    |
| VGS Inc                             | OH       | 1,830,793    |  |          |              |
| TOTAL                               |          | 31,711,677   | TOTAL  |          | 5,632,229    |
| <b>5) Clothing, Special Purpose</b> |          |              | <b>10) Armor Personal</b>                      |          |              |
| Propper International Inc           | PR       | 51,685,949   | Point Blank Body Armor Inc                     | FL       | 70,406,426   |
| DJ Manufacturing Co Inc             | PR       | 42,116,949   | Armor Works LLC                                | AZ       | 23,570,707   |
| Golden Manufacturing Co Inc         | MS       | 40,698,709   | Simula Safety Systems Inc                      | AZ       | 22,793,390   |
| American Apparel Inc                | AL       | 38,125,242   | Ceradyne Inc                                   | CA       | 20,224,566   |
| Creative Apparel Association        | ME       | 26,776,181   | Men-eng Systems Inc                            | CA       | 11,941,603   |
| TOTAL                               |          | 841,954,653  | TOTAL  |          | 200,489,461  |
|                                     |          |              | <b>11) Special Flight Clothing &amp; Acce.</b> |          |              |
|                                     |          |              | Creative Apparel Assoc                         | ME       | 18,449,984   |
|                                     |          |              | Gentex Corp                                    | PA       | 11,643,341   |
|                                     |          |              | Derm Buro Inc                                  | FL       | 2,265,813    |
|                                     |          |              | TOTAL  |          | 42,794,106   |

Source: U.S. Department Of Defense

apparel supplier is Puerto Rico-based Propper International, with \$67.4 million in contracts for Fiscal Year 2002. The largest textile fabric supplier is Burlington Performance Wear of Virginia, with \$15.6 million in contracts in the same fiscal year.

In addition to private U.S. firms, several other organizations are DoD-preferred suppliers. U.S. government agencies are required to consider the government supply sources listed in the

Federal Acquisition Regulations (FAR)<sup>9</sup> when acquiring supplies and services (FAR Part 8). Significant government supply sources are (in descending order of priority):

- Agency inventories;
- Excess from other agencies;
- Federal Prison Industries, Inc. (UNICOR);
- Products available from the Committee for Purchase from People who are Blind or Severely Disabled;
- Wholesale supply sources, such as stock programs of the General Services Administration, the DLA, the Department of Veterans Affairs, and military inventory points;
- Mandatory Federal Supply Schedules;
- Optional use Federal Supply Schedules; and
- Commercial sources (including educational and nonprofit institutions).

The basis for DoD’s implementation and supplementation of the FAR regarding “Required Sources of Supplies and Services” is available at Defense Federal Acquisition Regulation Supplement (DFARS)<sup>10</sup> Part 208.

Federal Prison Industries is the largest military apparel supplier among the sources other than industry, with \$44.7 million in contracts for 2003 to date. The National Center for Employment of the Disabled is second, with \$44.5 million in contracts in the current fiscal year. Goodwill Industries and the National Industries for the Blind are also significant apparel producers.

## **B. U.S. Armed Forces Surge Requirements**

DoD includes a “surge option clause” in a growing number of procurement contracts in order to ensure access to increased production in a short period of time when needed. Sharp increases in production may be required to support mobilization efforts by the U.S. armed forces.

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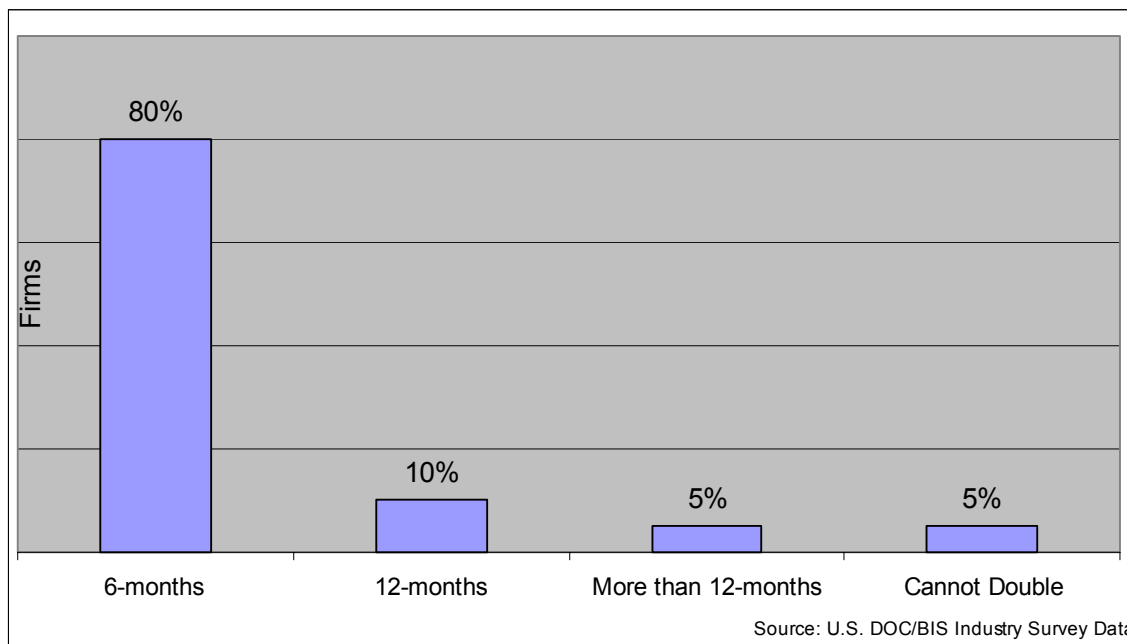
<sup>9</sup> The Federal Acquisition Regulations are codified at 48 CFR Ch. 1.

<sup>10</sup> The DFARS is found at 48 CFR Ch. 2.

Specifically, under surge conditions, firms can be asked to increase their production within 90 days of notification by 50 percent above the maximum amount specified in their contract. According to information provided by the DLA for this study, DoD suppliers of textiles and apparel have a strong capability to meet surge requirements, as evidenced during Operation Enduring Freedom and Operation Iraqi Freedom.

Thirty-nine percent of firms that responded to the BIS survey supplied products to the defense sector during 2002. To assess their ability to surge productions, firms were also asked if they could double their monthly output of defense-related textile and apparel items within six months, 12 months, or some longer period. Of the 195 firms who replied to this question, 155 of them (or 80 percent) stated that they could double production within six months; 175 (or 90 percent) answered that they could double production within 12 months. Ten firms (or about five percent) reported that it would take them longer than 12 months to double capacity. The average time required for these ten firms was 26 months. The remaining ten firms stated that they could not double output in any amount of time. The results are summarized in Figure III-3.

**Figure III-3. Surge Production Capabilities of Surveyed Firms Supplying DoD**



Firms were also asked about what barriers they would encounter in doubling their production. The results are presented in Table III-5.

| <b>Table III-5. Difficulties Firms Experience in Doubling U.S. Textile and Apparel Production</b> |   |
|---|---|
| <b>Percent of Respondents</b>   | <b>Primary Delay Factors</b>                            |
| 18.5%   | Delays in Delivery of Domestic-Sourced Raw Materials    |
| 16.1%   | Labor Shortages   |
| 14.9%   | U.S.-Sourced Raw Material Shortages/Non-Availability    |
| 13.4%   | Plant Space/Capacity                                    |
| 11.6%   | New Machinery Delivery Lead-times                       |
| 11.3%   | Access to Capital                                       |
| 4.8%  | Delays in Foreign-Sourced Raw Materials                 |
| 4.5%  | Foreign-Sourced Raw Material Shortages/Non-Availability |
| 3.9%  | Other Reasons   |
| 1.2%  | Labor Agreements  |

Source: U.S. DOC/BIS Industry Survey Data

The main barriers impeding production increases are limitations in domestic inputs, including domestic raw materials and additional labor. A smaller number of respondents (4.8 percent) indicated that they would encounter difficulties or delays in obtaining foreign-sourced materials. Respondents also indicated that plant space, new machinery lead times, and access to capital could constrain their ability to expand production.

### **C. Summary**

- As measured by DoD consumption, the U.S. textile and apparel industries made relatively small contributions to the U.S. armed forces. DoD direct and indirect procurement of textile and apparel items, or items that consist significantly of textiles and apparel, constituted less than three percent of total DoD procurement.
- The textile and apparel industries’ “contribution” to the Armed Forces can also be measured by the industries’ ability to meet surge production requirements in times of mobilization. The data suggest that the textile and apparel industries have excellent surge

production capabilities, with 80 percent of survey respondent firms currently supplying DoD reporting the ability to double production in six months.



## **IV. Dependency on Foreign Sources for Critical Textile-and Apparel-Related Material and Potential Threats to National Security**

This chapter examines whether the United States is increasing its dependency on foreign sources for critical textile- and apparel-related materials. The chapter first defines the term “critical textile- and apparel-related material.” It then examines the dependency of U.S. private companies on foreign sources for such materials. Next, it considers the dependency of DoD on foreign sources for such materials. Finally, the chapter will present a discussion of potential threats to internal security from increased foreign sourcing and dependency. For the purposes of this chapter, foreign dependency is defined as a lack of an adequate domestic source of critical textile- and apparel-related materials.

The findings presented here rely on information from the BIS survey, DoD procurement data, and interviews with DoD, industry associations, and individual textile and apparel companies.

### **A. Defining Critical Textile- and Apparel-Related Materials**

Neither the Omnibus Appropriations Act of 2003, nor the accompanying Conference Report that directed this study, defines the term “critical textile- and apparel-related materials.”

In the absence of such a definition, this study defines “critical textile- and apparel-related materials” to mean those textile-related items (including inputs) necessary for the production of textiles and apparel that are critical to the ability of the U.S. armed forces and the U.S. economy to function. This definition is generally consistent with the responses received from parties surveyed. Table IV-1 summarizes those responses.

| <b>Table IV-1. Feedback on Definition of Critical Textile- and Apparel-Related Materials</b> |  |  |
|--|--|--|
| <b>Respondent</b>  | <b>Concept of Criticality</b>  | <b>Examples</b>  |
| Defense Logistics Agency (DLA)   | Maintains a list of “go to war” critical items.  | Chemical suits (VF Suit), chemical gloves, bullet-proof “sapi” vests, and tents.   |
| <b>Industry Associations</b>   |  |  |
| American Apparel and Footwear Association  | No explicit definition.  | <u>Products critical to the U.S. Armed Forces:</u> many fabrics including cotton, synthetic, and Kevlar, as well as items such as leather (shoe soles), findings, and trimmings.   |
| American Manufacturing Trade Action Coalition  | No explicit definition.  | <u>Products critical to the U.S. economy:</u> None, as all products have close substitutes.<br><u>Products critical to the U.S. Armed Forces:</u> coated fabrics (used for woven textiles), ballistic materials, chemicals, and finishings.  |
| American Textile Manufacturers Institute (ATMI)  | No explicit definition.  | <u>Products critical to the U.S. economy:</u> those used in air and water filters, surgical and medical items, highway stabilization materials, and many transportation products such as those used in fan belts, upholstery, floor and head coverings, hood and trunk liners, and tire fabrics.<br><u>Products critical to the U.S. Armed Forces:</u> fabric used in advanced avionics, parachutes, gun belts, chemical warfare uniforms, tents, bed linens, blankets and anything worn by members of the Armed Forces. |
| <b>Individual Companies (Representative Responses)</b>                                       |  |  |
| Company A  | High performance/specialty fibers and the raw materials/technology needed for their manufacture. | Kevlar, Spectra, fiberglass fibers, some nylon fibers, composite materials.  |
| Company B  | Advanced or specialty fibers and materials.  | Acetate fiber, dyes, linings, and specialty fibers such as Nomex (fire resistant fabric) and Kevlar (used in bullet proof vests).  |
| Company C  | No explicit definition.  | Chemical suits (the lining of the suit is made by a German company), and nylon (no longer made in the United States).  |

Source: Defense Logistics Agency and Industry Interviews

## **B. Dependencies of U.S. Firms on Foreign Sources**

The BIS survey asked firms to identify the most important goods and/or services obtained from foreign sources for the manufacture of their products. Of the 380 firms reporting foreign sources of textile and apparel inputs (e.g., machinery, fabric, yarn, fiber, and services), 104 (or 27 percent) reported they were not dependent on any foreign sources for these inputs. That is, they believed that adequate supplies of these goods and services existed in the United States, but they purchased them offshore.

The remaining 276 (or 73 percent) reporting firms indicated they were dependent on foreign sources for at least one good or service. However, this number may be slightly overstated. Eighty-two firms provided additional comments in response to this question. Twenty-seven of these incorrectly interpreted the idea of dependency, indicating that U.S. suppliers were in fact available, but domestic materials were typically more expensive than foreign alternatives. This was often the case for suppliers of apparel and shoes. However, most of the remaining firms indicated only one foreign source could supply their needs. This was most often the case with textile and apparel machinery.

Table IV-2 lists the top ten foreign sources reported in the survey and the number of responses citing each source. The second column shows both the number and the percentage of firms that procure an important input to production from a given foreign source. Germany and China were the top two sources with Italy and Japan next on the list.

| <b>Table IV-2. Foreign Sources and Dependencies for the U.S. Textile and Apparel Industries</b> |  |   |                       |
|---|--|---|-----------------------|
|   | <b>Responses</b>   |   |                       |
| <b>Country</b>  | <b>Number Indicating Foreign Sourcing (% of Responses)</b> | <b>Of those, the Number Indicating Dependency</b> | <b>Dependency (%)</b> |
| Germany   | 241 (13%)  | 121   | 50%                   |
| China   | 215 (11%)  | 104   | 48%                   |
| Italy   | 134 (7%)   | 80  | 60%                   |
| Japan   | 126 (7%)   | 66  | 52%                   |
| Taiwan  | 96 (5%)  | 37  | 39%                   |
| Mexico  | 90 (5%)  | 31  | 34%                   |
| South Korea   | 88 (5%)  | 36  | 41%                   |
| India   | 73 (4%)  | 38  | 52%                   |
| Switzerland   | 65 (3%)  | 42  | 65%                   |
| France  | 58 (3%)  | 36  | 62%                   |
| Other   | 699 (37%)  | 309   | 44%                   |
| <b>Total</b>  | <b>1885</b>  | <b>900</b>  | <b>48%</b>            |

Source: U.S. DOC/BIS Industry Survey Data

The last two columns show the number and the percentage of responses indicating a dependency on a given foreign source. Overall, actual dependency was reported for 48 percent of all foreign purchases of textile and related inputs, services, and goods. While this percentage was generally

found to be representative across suppliers, the source countries on which U.S. producers were most dependent were Switzerland (65 percent), France (62 percent), and Italy (60 percent).

Looking only at the products and services for which firms claim they are dependent on foreign sources reveals important differences across countries (see Table IV-3). The numbers in the table indicate the foreign source of an item, by percentage. For example, 74 percent of respondents who depend on foreign sources of machinery listed Germany as a source. Again, companies could list more than one source country for a given item.

Switzerland, Germany, Japan, Mexico, France, and Italy were mentioned most often as sources that U.S. firms depend on for textile and apparel machinery and parts. The United States maintains solid trade relationships with these countries, so interruption of supply is only a small possibility.

| <b>Table IV-3. Materials and Services for Which the U.S. is Dependent on Foreign Sources</b> |                  |  |                                |                               |
|--|------------------|--|--------------------------------|-------------------------------|
| <b>Country</b>   | <b>Machinery</b> | <b>Production, Labor, Assembly, and Services</b> | <b>Fiber, Fabric, and Yarn</b> | <b>Raw Materials and Dyes</b> |
| Switzerland  | 86%              | 0%   | 7%                             | 7%                            |
| Germany  | 74%              | 1%   | 17%                            | 7%                            |
| Japan  | 64%              | 5%   | 17%                            | 15%                           |
| Mexico   | 61%              | 0%   | 35%                            | 3%                            |
| France   | 61%              | 3%   | 28%                            | 8%                            |
| Italy  | 55%              | 19%  | 20%                            | 6%                            |
| South Korea  | 14%              | 28%  | 53%                            | 6%                            |
| Taiwan   | 11%              | 43%  | 38%                            | 8%                            |
| China  | 4%               | 59%  | 28%                            | 10%                           |
| India  | 3%               | 34%  | 47%                            | 16%                           |
| Other  | 24%              | 37%  | 31%                            | 8%                            |
| <b>Total</b>   | <b>38%</b>       | <b>26%</b>                                       | <b>28%</b>                     | <b>8%</b>                     |

Source: U.S. DOC/BIS Industry Survey Data

China, Taiwan, and India are the principal sources of dependency for production, labor, assembly, and services. South Korea, India, and Taiwan were mentioned most often as sources on which the United States depends for fabric, fiber, and yarn sourcing. Finally, India, Japan, and China achieved the highest dependency ranking for dye and raw materials sources. For some of these countries, the possibility exists for an interruption of supply. However, the items

sourced from these countries are also fungible; that is, they can easily be replaced by similar items from other foreign sources.

### C. Department of Defense’s Dependency on Foreign Sources

By virtue of the legal restrictions to be discussed in Chapter V, DoD purchases a very small amount of textile and apparel products directly from other countries. In Fiscal Year 2002, DoD purchased slightly more than \$4 million in textile and apparel items from foreign sources, out of a total of \$1.8 billion budgeted for textile and apparel purchases. Thus, the percentage of these purchases from foreign sources by DoD was only 0.23 percent for Fiscal Year 2002.

Considering the data for multiple years as shown in Table IV-4, no discernible trend or substantial increase in DoD purchases of textiles and apparel from foreign sources can be seen.

| <b>FY</b> | <b>All Foreign Purchases*<br/>(dollars)</b> | <b>Textiles and Clothing Foreign Purchases<br/>(dollars)</b> | <b>Percentage of Textile and Clothing Purchases from Foreign Sources</b> | <b>Total Textile and Clothing Purchases**<br/>(dollars)</b> | <b>Total DoD Procurement Actions***<br/>(dollars)</b> |
|-----------|---|--|--|---|---|
| 2002      | 7,011,394,000                               | 4,252,000  | 0.23%  | 1,827,128,000   | 170,800,000,000                                       |
| 2001      | 5,305,460,000                               | 7,574,000  | 0.59%  | 1,278,166,000   | 154,100,000,000                                       |
| 2000      | 5,813,401,000                               | 3,236,000  | 0.29%  | 1,089,056,000   | 143,000,000,000                                       |
| 1999      | 5,425,632,000                               | 1,441,000  | 0.15%  | 921,191,000   | 135,100,000,000                                       |
| 1998      | 4,226,980,000                               | 759,000  | 0.08%  | 883,519,000   | 128,800,000,000                                       |
| 1997      | 4,610,240,000                               | 737,000  | 0.01%  | 991,044,000   | 130,300,000,000                                       |
| 1996      | 4,304,727,000                               | 8,652,000  | 0.20%  | 883,255,000   | 128,200,000,000                                       |

\* Totals include purchases with foreign concerns/entities for supplies, services, fuel, and construction.  
 \*\* FSC 83 (Textiles) & FSC 84 (Clothing)  
 \*\*\* Includes Supplies and Equipment; Research, Development, Test & Evaluation; and Other Services and Construction.

Source: U.S. Department of Defense

As discussed in Chapter III, DLA maintains a list of critical textile and apparel products needed for the operational readiness of U.S. Armed Forces; Table IV-5 lists these 25 product categories. According to information provided by DoD, virtually all of these critical items are manufactured in the United States. In a few isolated cases – anti-G garments, helmets, body armor, chemical warfare protective clothing, straps, slings, and harnesses, or textile components thereof – items

are purchased from sources outside the United States. In these cases, an exception or a waiver under the Berry Amendment would apply. As such, DoD believes that it is not dependent on foreign sources for any of these critical items.

| <b>Table IV-5. Clothing and Textile Critical Products Categories</b> |                                 |
|--|---------------------------------|
| Anti-G Garments  | Helmets, Caps, Hats, & Berets   |
| Bags & Packs   | Identification Tags & Necklaces |
| Belts, Suspenders, & Vests   | Insect Protective Items         |
| Body Armor   | Liners & Hoods                  |
| Boots, Socks, & Overshoes  | Ponchos                         |
| Canteens & Cups  | Shirts & Jerseys                |
| Cases, Covers, & Carriers  | Sleeping Bags & Mats            |
| Chemical Protective Items  | Straps, Slings, & Harnesses     |
| Coats, Jackets, & Parkas   | Tents                           |
| Coveralls & Overalls   | Toxicological Protective Items  |
| Gloves & Mittens   | Trousers                        |
| Goggles  | Underwear                       |
| Headbands, Scarves, & Masks  |                                 |

Source: Defense Logistics Agency

The BIS survey results tend to confirm this assessment because the collected data did not indicate dependencies on foreign sources or an increase in dependencies on foreign sources for these or other items. However, the survey results also suggest that, more broadly, many of those companies supplying textile and apparel items to DoD believe that they are in fact dependent on foreign sources for one or more inputs into their various production lines (potentially not affecting DoD product supply). Out of 145 firms that reported sales to DoD in 2002, 106 or (73 percent) responded that they were dependent on foreign sources for at least one good or service. Thirty-nine firms (or 27 percent) responded that they were not dependent on any foreign sources for any input or services. These proportions are similar to the percentages for all textile and apparel firms (discussed above).

The responses of 17 firms that derive more than 50 percent of their sales from DoD were also examined. Half of these firms stated they were dependent on foreign inputs; these firms said they relied primarily on machinery, equipment, and parts from Germany and Japan. These results are consistent with results for all textile and apparel firms (discussed above). Moreover, some of the products deemed critical by DLA may depend on foreign inputs and foreign-made machinery for their manufacture. One example cited by respondents is that the materials used in the manufacture of chemical suits require key inputs of German and Japanese origin.

For certain textile and apparel inputs (including cotton and other natural fiber products, woven silk or woven silk blends, spun silk yarn for cartridge clothing, synthetic fabric or coated synthetic fabric canvas products, and wool), off-shore purchases require either an exemption or a waiver from the Berry Amendment (discussed in detail in Chapter V). An increase in the number of waivers from the Berry Amendment over time would be consistent with increased dependencies on foreign sources for such components.

However, some of the components that are foreign-sourced by textile and apparel manufacturers selling to DoD are not included on the list of items in the Berry Amendment. These include dyes and chemicals used in the production process. They do not constitute more than 50 percent of the item's value and, therefore, do not fall under Buy American restrictions (also discussed in Chapter V). However, they are still vital to the production of the end item, and lack of access to foreign sources of these inputs could interfere with production for DoD.

#### **D. Potential Threats to Internal Security from Foreign Sourcing and Dependency**

Based on the information above, BIS has considered what potential threats to internal security exist because of increased foreign sourcing and dependency.

For the purposes of this study, a threat to internal security is defined as a vulnerability that has a significant and disruptive effect on the U.S. economy as a whole, a significant segment of the economy, or on military readiness. As described earlier, the study noted, according to DLA officials, that the United States is not dependent on any foreign source for any products considered to be critical. However, BIS survey data indicate that foreign-made machinery and foreign inputs are required for the manufacture of some of these critical items.

Certain items that are integral to the manufacture of textile products are not available from U.S. sources, according to respondents to the BIS survey. Most important among these is production machinery. Although some basic machinery such as warping, slashing, dyeing, and sewing machines are still in production in the United States, the machinery for large-volume, production line operations (looms, spinning frames, and carding equipment) are principally available from foreign manufacturers located in Germany, Japan, Switzerland, Belgium, and France.

Therefore, U.S. textile and apparel assembly line operations are somewhat dependent on machinery from manufacturers in these countries. However, because these countries have healthy and market-driven economies and maintain friendly bilateral relations with the United States, the United States is not likely to be at risk of losing access to machinery suppliers in these countries. Further, many of the foreign suppliers have set up assembly operations in the United States in order to be closer to their U.S. customers. Also noteworthy is the current domestic over-capacity in the textile and apparel industries, which would enable U.S. firms to meet critical textile-related needs even if access to foreign-manufactured machinery were cut off.

In addition to machinery dependency, many survey respondents that sell to DoD said they were dependent on foreign sources for a variety of inputs, such as certain fibers and yarns, specialty chemicals, and other basic inputs. Most of these items are considered “commodity-type” products because of their widespread global availability. Most of these non-machinery dependencies are either sourced in countries that maintain a friendly bilateral relationship with the United States or are available from multiple foreign sources.

## **E. Summary**

- This study defines “critical textile- and apparel-related materials” to mean those textile-related items (including inputs) necessary for the production of textiles and apparel that are critical to the ability of the U.S. armed forces and the U.S. economy to function. This definition is generally consistent with the responses received from parties surveyed.
- Of the surveyed firms that indicated a reliance on foreign sources of textile and apparel inputs, 73 percent reported that they were dependent on foreign sources for at least one good or service. However, almost half of these firms acknowledged that domestic firms produce the goods and services currently obtained from foreign sources but that the foreign source was relied upon because of lower costs.
- Those firms that indicated a reliance on foreign sources of textile and apparel inputs for which there is no adequate domestic alternative exists, noted three categories of inputs: (1) textile and apparel manufacturing machinery and parts (principally obtained from

Switzerland, Germany, and Japan); (2) production, labor, assembly, and services (principally obtained from China, Taiwan, India and South Korea); and (3) raw inputs such as fabric, fiber, and yarn sourcing (principally obtained from South Korea, India, and Mexico). Items in the second and third categories can often be obtained from alternative sources abroad (e.g., labor can be obtained in China *or* Taiwan *or* India), while items in the first category (machinery and parts) are more often available only from a single source.

- By virtue of statutory restrictions (the Berry Amendment and the Buy American Act), DoD directly purchases only very small amounts of foreign textile and apparel (approximately 0.23 percent of total DoD expenditures on textiles and apparel). Further, DoD maintains a list of “critical” textile and apparel items, all of which must and can be sourced domestically. Accordingly, strong evidence shows that DoD is not dependent on foreign sources for its textile and apparel needs.
- However, of the 145 firms responding to the BIS survey that indicated that they sell to DoD, 106 also indicated they were dependent on a foreign source for some input to production. Primary product dependencies included machinery, equipment, and parts manufactured in Western Europe or Japan, or dyes and chemicals used in the production process. The Berry Amendment and Buy American restrictions do not apply to machinery on which the products DoD buys are made; nor do chemicals and dyes account for a large enough percentage of the total value of the textile and apparel items purchased to invoke such restrictions.
- The greatest foreign dependency appears to be on foreign-manufactured textile- and apparel-related manufacturing equipment. The “threat” posed by this dependency is mitigated by the facts that (1) the countries producing this equipment are close U.S. allies, and (2) domestic over-capacity currently exists in the textile and apparel industries, enabling U.S. firms to meet critical textile-related needs even if access to foreign-manufactured machinery were cut off. U.S. textile and apparel manufacturers also currently rely on foreign sources for other inputs, including labor and raw materials.

While the countries from which these inputs are obtained pose more complex security issues for the United States, the threat posed by this reliance is lessened by the fact that these inputs can commonly be obtained from more than one source.

## **V. Department of Defense Enforcement of Berry Amendment and Other Buy American Restrictions**

This chapter examines whether DoD is effectively enforcing statutory requirements (under the Berry Amendment and the Buy American Act) that require the U.S. government, and in particular, DoD, to procure generally only U.S. manufactured textiles and apparel.

### **A. The Berry Amendment and Buy American Restrictions**

The Berry Amendment was originally enacted in 1941, and it was effectively reiterated as a part of each subsequent defense appropriations act until it was codified as 10 U.S.C. 2533a in 2002 by section 832 of Public Law 107-107. Regarding purchases of textile and apparel items, the Berry Amendment requires that funds made available to DoD may not be used to purchase clothing; tents, tarpaulins, or covers; cotton and other natural fiber products, woven silk or woven silk blends, spun silk yarn for cartridge cloth, synthetic fabric or coated synthetic fabric (including all textile fibers and yarns that are for use in such fabrics), canvas products, or wool (whether in the form of fiber or yarn or contained in fabrics, materials, or manufactured articles); or items of individual equipment manufactured from or containing such fibers, yarns, fabrics, or materials unless it is grown, reprocessed, reused, or produced in the United States. That is, covered end items, components, and materials purchased with funds made available to DoD must be produced wholly in the United States. The Berry Amendment is implemented through the Defense Federal Acquisition Regulation Supplement (DFARS) at Subpart 225.7002.<sup>11</sup>

The Berry Amendment contains several exceptions, including acquisitions that are at or below the simplified acquisition threshold and those items purchased outside the United States in support of combat operations.

In addition, waivers to Berry Amendment restrictions on foreign purchases are permitted if the Secretary concerned determines that items grown, reprocessed, reused, or produced in the United

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<sup>11</sup> The DFARS is found at 48 CFR Ch. 2.

States cannot be acquired as and when needed in a satisfactory quality and sufficient quantity at U.S. market prices. However, waivers are uncommon. Waiver decisions may be made by the Under Secretary of Defense (Acquisition, Technology and Logistics), the Secretary of the Army, the Secretary of the Navy, or the Secretary of the Air Force without re-delegation.

The Buy American Act (41 U.S.C. 10a) establishes a preference for purchases of domestic end products (i.e., supplies produced in the United States substantially from components produced in the United States) valued in excess of the micro-purchase threshold for use within the United States. Under the regulation, an end product is considered manufactured in the United States if the cost of its qualifying country components and its components that are mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. The component test is applied for end products, not for the individual components themselves. The Buy American Act applies to all federal agencies as implemented through the Federal Acquisition Regulation (FAR) at FAR Subpart 25.1<sup>12</sup> and, for DoD, at DFARS Subpart 225.1. Exceptions, detailed at FAR Subpart 25.103 may be granted for the public interest, domestic non-availability, unreasonable cost, and resale.

As explained in detail by the FAR and DFARS as noted above, the Berry Amendment and Buy American Act are separate and distinct domestic preference requirements. They differ with regard to their scope, threshold, exceptions, and waiver authority. Generally, the Berry Amendment conveys stronger requirements for purchases of domestic textile and apparel products.

## **B. Industry Survey Responses**

BIS asked firms to indicate whether or not they believe that DoD is effectively enforcing the Berry Amendment and the Buy American restrictions. Only firms that sell to DoD responded: survey results appear in Table V-1.

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<sup>12</sup> The Federal Acquisition Regulations are codified at 48 CFR Ch. 1.

| <b>Table V-1. Enforcement of Berry Amendment and Buy American Restrictions</b>             |  |     |
|--|--|-----|
| Survey Question  | Survey Response<br>(Response of firms for which question was applicable) |     |
|  | Yes  | No  |
| Do you believe the Berry Amendment restrictions are being effectively enforced by the DoD? | 68%  | 32% |
| Do you believe the Buy American restrictions are being effectively enforced by the DoD?    | 72%  | 28% |

Source: U.S. DOC/BIS Industry Survey Data

Of the 185 firms responding that the Berry Amendment is applicable to their business, 125 firms (or 68 percent) replied that DoD is effectively enforcing the amendment. Of the 184 firms responding that Buy American restrictions are applicable to their business, 132 (or 72 percent) replied that DoD effectively enforces the restrictions.

**B.1 Berry Amendment Responses**

The 60 firms that responded that DoD was not effectively enforcing the Berry Amendment were then asked to provide specific examples of inadequate enforcement. Some firms indicated that it was difficult for them to provide specific examples because of their role in the production chain. Several of these firms mentioned that their belief was based on information appearing in the media, information provided by industry associations, third-party comments, and hearsay.

Firms that responded that DoD was not effectively enforcing the Berry Amendment were also asked to describe any actions they had taken to bring the lack of enforcement to the attention of the proper government agency or industry associations. Nearly half of these firms had taken no action, although a small number of them indicated that they would have filed a complaint if they knew what steps should be taken to file one. The other half reported having complained to DoD, the Defense Supply Center in Philadelphia, and Congressional representatives about Berry Amendment enforcement issues.

**B.2 Buy American Act Responses**

The 52 firms that responded that DoD did not effectively enforce Buy American restrictions were asked to provide specific examples of inadequate enforcement. As with the Berry Amendment, it could be difficult for firms low in the supply base to determine if the Buy American restrictions are being effectively enforced. The results, as shown in Table V-2,

indicate that 41 firms (79 percent of those firms indicating ineffective enforcements) did not provide a specific example supporting that belief. The other 11 firms (21 percent) did cite specific examples of garments made overseas and of the use of foreign raw materials in the manufacture of goods supplied to the military.

Some of these firms expressed concerns that the Buy American regulations are difficult to understand. Others expressed doubt that the government can enforce the restrictions, citing the absence of public proceedings to verify that materials used in goods purchased by the government are in fact of U.S. origin.

| <b>Table V-2. Specific Examples of Inadequate Enforcement of Buy American Restrictions</b> |   |                |
|--|---|----------------|
| <b>Examples</b>  | <b>Firms that Replied that Buy American Restrictions are NOT effectively enforced</b> | <b>Percent</b> |
| Provided a specific example  | 11  | 21%            |
| No specific example  | 41  | 79%            |

Source: U.S. DOC/BIS Industry Survey Data

## **C. Interviews and Site Visits**

### **C.1 Industry Interviews and Site Visits**

BIS sought to complement the survey findings through on-site and telephone interviews. Companies interviewed included apparel suppliers to the armed forces, specialized military suppliers, and textile manufacturers. Both large and small companies were contacted.

During the site visits, all firms were asked the same questions about qualifying products under the Berry and Buy American restrictions and about obtaining waivers. The overwhelming majority of firms interviewed stated that because of extremely strong foreign competition in the commercial textile and apparel industries, U.S. defense suppliers are increasingly dependent on regulations such as the Berry Amendment for their survival.

Firms also often reported during the interviews that the process required to qualify products for compliance with the Berry Amendment and Buy American restrictions is straightforward. Most respondents also indicated that it is very difficult, or virtually impossible, to obtain a waiver for the Berry Amendment or Buy American restrictions. A textile firm dealing with high technology

fibers and products did have experience with seeking a waiver, and said that obtaining a waiver was nearly impossible. The apparel firms interviewed reported that waivers are not generally a concern for them because a waiver will normally have been sought by either a government procurement office or a textile firm for a particular textile fiber or component to be used by the apparel firm in a final product.

## **C.2 Department of Defense Interviews**

Interviews with DoD personnel indicated that at the departmental and service levels, the Berry Amendment is being effectively enforced. Officials at both DoD Acquisition Offices and at DLA/DSCP said the process for granting waivers is very stringent. As mentioned earlier, waivers may only be granted by the Secretary of Defense, the Under Secretary of Defense for Acquisition, Technology, and Logistics, or the secretaries of the Military Departments now, and that authority cannot be re-delegated. Products purchased must be certified by the supplying company to be in compliance with the Berry Amendment for the article and for components separately purchased. These interviews revealed that some units deployed for training might purchase some bulk supplies or equipment through local outlets (for items such as work gloves), without regard to their country of origin due to expediency and perhaps in ignorance of Berry Amendment requirements by the procurement officials at the unit level. Respondents also said they were working to develop language changes to the amendment that would make requirements clearer to procurement officials at unit levels.

In February 2003, the U.S. General Accounting Office (GAO) reported (GAO-03-440) that the DLA had properly implemented “Best Value”<sup>13</sup> contracting for textiles and apparel items, confirming the results of the interviews conducted with DoD personnel. Officials interviewed said they had received no direct complaints about possible violations of the Berry Amendment, but in affirmation of the results of the BIS Survey (see B.1 above), mentioned they had received

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<sup>13</sup> Best Value is a process used by the U.S. government in competitive and negotiated contracting to select the most advantageous offer by evaluating and comparing factors in addition to cost or price. It allows offerors the flexibility to select their best proposal strategy through tradeoffs which may be made between the cost and non-cost evaluation factors. It should result in an award that will give the government the greatest or best value for its money. It is the preferred source selection methodology, having received renewed emphasis since Executive Order 12931 was issued on October 13, 1994. The executive order directs executive agencies to "place more emphasis on past performance and promote best value rather than simply low cost in selecting sources for supplies and services."

secondary information that some firms felt competitors had won contracts by using materials or components supplied by foreign sources. By statute, the channel for submitting complaints is through the GAO, and DoD and DLA officials said that none have been forwarded to them by GAO.

The Defense Logistics Agency is performing a separate study of the Berry Amendment, which will be completed in late 2003.

#### **D. Berry Amendment Waivers**

Table V-3 lists the waivers to the Berry Amendment currently in effect for textile and apparel products.

| <b>Table V-3. Waivers to the Berry Amendment Currently in Effect</b> |                      |
|--|----------------------|
| <b>Textile and Apparel Products</b>                                  | <b>Contract Year</b> |
| F-22 Advanced Technology Anti-G Suit                                 | date uncertain       |
| Cambrele   | 2001                 |
| Canvas, Goat Hair  | 2001                 |
| Cationic-Dyeable Polyester Tow                                       | 2002                 |
| COTS - Medical/Surgical Items  | 2001                 |
| Modacrylic Fiber   | 2002                 |
| Nylon 210 Denier High Tenacity                                       | 2003                 |
| Poromeric Material   | 2002                 |
| Rayon Yarn   | 2001                 |
| Textile-Related Components for Navy Aircrew Common Ejection Seat     | 2003                 |

Source: U.S. Department of Defense

Table V-4 shows the total number of waivers granted since 1998. It also details the number of waivers granted each year. Since 1998, a total of 36 textile- and apparel-related waivers have been granted. Note the decrease in the number of waivers granted from 2001 to 2002.

| <b>Table V-4. Waivers to the Berry Amendment since 1998</b> |                  |                            |
|---|------------------|----------------------------|
| <b>Year</b>   | <b>All Items</b> | <b>Textile and Apparel</b> |
| 1998  | 4                | 1                          |
| 1999  | 7                | 3                          |
| 2000  | 16               | 5                          |
| 2001  | 8                | 8                          |
| 2002  | 5                | 4                          |
| 2003  | 2                | 2                          |
| Exact Date Unknown  | 18               | 13                         |
| <b>Total</b>  | <b>60</b>        | <b>36</b>                  |

Source: U.S. Department of Defense

## E. Summary

- Statistics provided by DoD suggest that DoD is granting very few waivers of the Berry Amendment restrictions. These statistics were confirmed by interviews with industry.
- More than two-thirds of firms supplying DoD consider DoD enforcement of the Berry Amendment and other Buy American Restrictions to be effective. Most of the remaining one-third disagree but cannot provide specific examples of ineffective enforcement.
- Both industry and DoD employees interviewed indicated that certain clarifications to regulations implementing the Berry Amendment and Buy American restrictions might enhance understanding of the restrictions both within service personnel and by industry.

