2004 BELTWIDE COTTON CONFERENCES, SAN ANTONIO, TX – JANUARY 5-9

COST COMPETITION FOR U.S. TEXTILES: WILL YARN FOLLOW THE NEEDLE?

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Abstract

Increasing competition from foreign manufacturers threatens the viability of textile producers in the United States. The purpose of this paper is to establish quantifiable measures by which the competitiveness of the U.S. textile industry may be judged. This provides a means by which the current competitive status of the U.S. textile industry may be compared to major foreign producers and will provide important tools for understanding and evaluating international competitiveness. Not surprisingly, the measures employed show the United States to be at a relative competitive disadvantage when compared to major international producers of cotton yarn such as China, India, Indonesia, Pakistan, and Turkey. However, the margin of this competitive disadvantage is shown to be relatively small. U.S. metrics of competition are trending towards price parity and are virtually equivalent with major competitors in terms of costs of production.

Introduction

The textile industry is affected by a drastically changing economic environment as global free trade initiatives provide for unrestricted competition. U.S. textile manufacturers face an industry environment in which low cost imports and the elimination of trade barriers decrease domestic profitability. Almost all of the labor intensive cut-and-sew apparel segment, "the needle" in industry vernacular, have responded to these competitive forces by moving production facilities overseas. The impact on less labor intensive industry segments remains unclear.

The purpose of this study is to better understand the competitive position of the U.S. cotton textile industry in relation to international rivals. The primary focus of this analysis will be on that portion of the industry that initially transforms raw cotton into yarns and fabrics. Figure 1 depicts the basic elements of the textile production process from the beginning phase of raw cotton processing through the creation of these textile products and ultimate end uses such as apparel, floor coverings, and household furnishings. The textile industry has experienced a recent migration, especially to Asian countries, which seem to be following a discernable pattern. First, developing countries are able to attract labor intensive cut and sew apparel industries using imported fabric from developed countries. Fabric production soon follows using imported yarn. Finally, a yarn industry emerges in the developing country based on the importation of raw fiber (MacDonald).

The consequences of the movement of virtually all textile production to developing countries will alter the structure of the global textile industry. The purpose of this paper is to appraise the current competitiveness of U.S. yarn producers and evaluate their potential in meeting the challenges of this evolving competitive landscape. This paper accomplishes this analysis by comparing the competitive advantage or disadvantage of the U.S. relative to other nations producing cotton yarns. With the further elimination of quota protection for U.S. producers at the end of 2004, trade barriers will fall and free market competitive forces will increase. Analysis of U.S. competitiveness will provide those with an interest in the viability of domestic yarn manufacturing with a key indicator of whether this industry as a whole may follow the needle overseas or whether a future remains for core aspects of this industry in the United States.

This study evaluates the competitiveness of U.S. manufacturers of cotton yarn products compared to international rivals by analyzing the current competitive state of this industry and by identifying competitive trends. This will be accomplished by means of a price-based comparison of goods offered in the market place, a comparison of costs of production between major market participants, and an evaluation of the efficiencies/inefficiencies associated with the transport of initially processed textile products in contrast to the shipment of raw cotton.

Tariff Equivalents

In the attempt to determine a country's ability to compete in global markets, bilateral price comparisons across nations represent one method of measuring competitiveness among international industry participants. A comparison of the price of goods plus transportation costs to major ports can reveal those nations which are more likely to import goods as opposed to those who will likely supply a particular market (Hayes, Green, Jensen, and Erbach).

Table 1 provides a comparison of domestic prices for average quality, ring spun, carded cotton yarn, yarn counts 20 and 30 for Pakistan, India, the United States, Turkey, and Indonesia. These prices are reported in U.S. dollars per kilogram and as a ratio of the U.S. price. This table shows that the highest prices for these particular yarns are in the United States. While in-

teresting, these prices become relevant as indicators of competitiveness only when transportation costs between countries are added to the domestic prices. Trends in yarn prices and the relationship of these prices among these producers are illustrated in Figures 2 and 3. These figures show the overall decline in cotton yarn prices over the last two years and how the U.S. has remained the producer with the highest domestic price. However, the price decline has been the greatest for U.S. producers resulting in some convergence of yarn prices.

To allow for the transportation adjustment of the prices in Table 1, a calculation is made for a bilateral tariff equivalent (Hayes, Green, Jensen, and Erbach). This tariff equivalent (TE) is also referred to as a "price wedge" as it represents the amount of protection provided to domestic producers based on the cost of transporting foreign produced goods into a domestic market. Competitiveness of nations will be measured by estimating this TE or price wedge.

The calculation of TE's takes into account the impact of monetary policies that contribute to fluctuations in currency exchange rates and expresses the price competitiveness among producers that exists at a given point in time. Of course, shipping rates play a large role in the calculation of a TE. The rates used for this study are based on publicly available shipping quotations for dry ocean freight port to port. No adjustments are made for inland freight costs.

A TE for cotton yarn for a given nation is calculated by combining the domestic yarn price in country A with the transportation costs from country A to country B and comparing this cost to the price of yarn in country B. The difference between the price of yarn in country B and the price of a comparable product from country A being sold in B (adjusted for transportation costs) is expressed as a percentage of the delivered price.

$$TE = \frac{\text{Price in B} - (\text{Price in A} + \text{transportation to B})}{(\text{Price in A} + \text{transportation to B})} \times 100$$

A negative TE indicates that the domestic price is lower than adjusted import prices. A country with negative TE's with other trading nations would not be a major export market for other producers. Positive TE's indicate the likelihood of a country serving as an export market for other producers since its domestic price is greater than the price of delivered imported goods. As an example, TE's are calculated here for the U.S. market and are reported in Table 2. The positive TE's calculated indicate that the United States is a profitable export market for Pakistan, India, and Indonesia, and to a lesser extent, Turkey. Conversely, with its higher relative yarn prices, the United States will have a negative TE for each country in this analysis.

For the most recent prices reported, the United States has an average TE for 20-count yarn of 22.69%. This represents the equivalent tariff that would need to be instituted to equate domestic U.S prices with those of the international competitors for which prices are available. For 30-count yarn, the average TE for the U.S. is even higher at 32.74%. Figures 4 and 5 reflect the decline in U.S. TE's over the last two years, particularly in 20-count yarn from Turkey.

From the data presented, the U.S. is most likely to serve as an export market for international yarn producers. However, as illustrated by Figures 4 and 5, there has been a substantial decline in the TE's of each country in this study since January 2001. This would indicate that while the U.S. remains a lucrative export market, the price wedge between these competitors has declined dramatically, especially in the case of 20-count yarn. As trade limiting quotas are reduced, TE's provide an indication of those nations that may by competitively positioned to capture significant portions of the U.S. cotton yarn market.

Given that China's is the world's largest manufacturer of apparel ("Assessment of the Economic Effects on the United States of China's Accession to the WTO"), this method can be used to measure the price competitiveness which exists between U.S. produced cotton yarn and cotton yarn in the domestic Chinese market. Using prices for 30 count carded cotton yarn reported for China of $2.35/kg at the end of September 2003 ("Cotton Yarn Prices in China"), the price of U.S. carded 30s in August 2003 of $3.20/kg (Table 1), and a weighted average container shipping rate from the USDA Ocean Rate Bulletin, China's TE with U.S. producers can be calculated:

$$TE = \frac{2.35 - (3.20 + .12)}{(3.20 + .12)} \times 100 = -29.22.$$

This TE estimates a 29% price-based advantage for domestic producers of cotton yarn in China over competitors from the United States.

Cost of Production Comparison

To understand the global dynamics of the textile industry requires an examination of the relative costs of production of major competitors. Such a cost of production (COP) comparison is an important gauge of competitiveness and is useful for gaining insight into the relative competitiveness of U.S. manufacturers (Barkema, Drabenstott, and Tweeten). Of interest here, is a

comparison of the costs different countries have in the components of a specific yarn production process. Whether this segment of the U.S. textile industry survives may center on the ability of domestic processors to offset the lower labor costs of overseas producers with comparative advantages the U.S. may still hold in other areas of yarn manufacture.

This analysis will compare the costs associated with the major components of ring spun yarn production by utilizing data from the *International Production Cost Comparison 2003* provided by the International Textile Manufacturers Federation (ITMF). The countries included in this survey include Brazil, China, India, Italy, Korea, Turkey, and the United States. This comparison will indicate the sources of differences in COP's for each country and identify the forces which shape competitiveness in this industry (Fang and Fabiosa). Two comparisons will be reported here. The first will be between each nation's manufacturing costs associated with the ring spinning process. The second comparison will include these same elements but additionally incorporate the cost of cotton.

Manufacturing Costs 2003

The comparison of manufacturing costs can be seen in Table 3 and Figure 6. As expected, the cost of labor in the manufacturing process is highest in the developed nations of Italy and the United States, accounting for 39 and 34 percent of manufacturing costs respectively, compared to 4 percent of costs in China and India and 5 percent in Brazil. The waste component in U.S. production is, along with India, the lowest reported. Power costs are lower in the U.S. than any rival other than Brazil. The costs associated with auxiliary material (spare parts, lubricants, cleaning materials, maintenance work, etc.) are virtually the same for each country. Depreciation costs are lower in India and China followed by Brazil. Interest costs are lowest in China followed by Korea and the U.S. For all manufacturing costs, the lowest reported ($U.S. per kilogram) is in China (1.08) followed by India (1.20), Korea (1.28), Brazil (1.31), Turkey (1.44), the U.S. (1.60), then Italy (2.17).

Given the current interest in the competitive rivalry between the U.S. and China, the results indicate that the lower costs in the U.S. for power and an advantage in the efficiency of production (lower costs for waste) are not sufficient to keep pace with the lower labor and depreciation costs in China.

Total Costs

The total cost comparison can be found in Table 4 and figure 7. Inclusion of the cost component associated with raw materials, in this case cotton, alters, and especially narrows, the results reported for manufacturing costs alone. The U.S. enjoys a substantial advantage in the procurement costs of cotton over each competitor except India. Given that an average 50 percent of the cost of producing ring spun yarn is associated with raw materials, this results in the U.S. becoming much more competitive. India is the producing nation with the lowest overall costs (2.45), then Brazil (2.61), Korea (2.68), China (2.76), Turkey (2.85), the U.S. (2.86), and Italy (3.59).

Evaluation

The results of this analysis show that the cost of producing ring spun cotton yarn in the United States is 15% higher than India, 9% higher than Brazil, 6% higher than Korea, 3% higher than China, virtually the same as Turkey, and 25% lower than Italy. It would appear that U.S. producers of ring spun cotton yarn have costs of production that are only marginally higher than those of its fiercest rivals. In comparison with Chinese producers, the U.S. is shown to possess a competitive advantage in terms of costs associated with waste and raw material procurement that practically offset China's advantage of lower labor and capital costs. It should be noted that the costs surveyed for this comparison are for a single, specific yarn production process. Other processes may result in different results than those of this study. However, based on these results, if the United States is losing trade to Chinese producers, it may be due to factors other than those that relate to the recovery of the costs of production. This may suggest that yarn products are being offered for sale at below the costs of production.

Shipping Efficiencies of Cotton and Yarn

The United States has become the world's largest exporter of raw cotton, supplying the raw material for textile producers around the world. However, cotton, as the raw material for ring spun yarn, has an estimated waste component of 18% (Simonton). While some of this waste is recoverable, a cost must still be incurred with its shipment as a component of raw cotton. Yarn, the product of the initial phase of cotton processing for textiles, is virtually 100% useable and thus incurs no expense as regards the cost of transporting a waste component.

The question arises as to the efficiency gained in the shipment of yarn as opposed to raw cotton. To gauge the relative efficiency of shipping each product, a comparison will be made between the cost of shipping raw cotton and cotton yarn to the largest overseas importers of U.S. upland cotton. Mexico, the single largest importer of U.S. upland cotton, is not included in this comparison as it has an inherent advantage in transportation of products due to its geographic proximity to the United States. This analysis will include the next five largest importers of U.S. cotton for the 2003 marketing year: China, Turkey, Indonesia, Thailand, and Taiwan (U.S. Export Sales). The cost of transporting the waste component of cotton in the ring spinning process will be calculated to demonstrate the amount this adds to the cost of production of ring spun yarn for the

textile manufacturer who utilizes imported cotton. Conversely, this will represent a cost savings to the manufacturer who can rely on domestic supplies of raw materials.

The shipping costs used for this analysis are for average container rates for 19.5 kiloton dry, forty foot containers published by USDA (Ocean Rate Bulletin), with the exception of the rates to Turkey which were obtained by a private industry source. No differential for freight rates between raw cotton and cotton yarn are used here as the container requirements and capacities for compressed cotton are assumed to be the same as those required for the transportation of cotton yarn. An additional cost of yarn shipping would likely be in the area of cargo insurance since the value per container would be higher for yarn as opposed to raw cotton, but this difference is not used for these calculations.

Table 5 reports the results of these calculations. Shipping costs add from between $14 and $29 per bale to the cost of imported cotton and the shipping cost of waste in terms of costs per bale ranges from $2.40 to $4.97. In additional costs per kilogram of yarn, the shipment of the waste component of raw cotton adds from $0.0134 to $0.0278 to the cost of ring spun yarn production for the overseas manufacturer who must rely on imports of raw materials.

As an example, for a yarn producer in Indonesia who receives a price of $1.90 per kilogram of 20-count yarn (Table 1), the shipment of the waste component associated with raw cotton adds $.0214 to the cost of yarn production Table 5), an increase of approximately 1%. From this perspective alone, an apparel manufacturer operating in raw cotton importing countries such as Indonesia, China, Turkey, etc. would save 1% in his/her cost of production by utilizing imported yarn from the United States rather than imported U.S. cotton which must be transformed into yarn. These calculations are applicable only for the waste component of ring spinning and do not consider the cost of waste which would continue to be incurred in latter stages of the textile production process.

Conclusions

The measures of competitiveness identified above provide empirical and quantifiable insight as to the competitive status of U.S. yarn producers who must compete in a global marketplace. The tools of this analysis are not without limitations, but do allow for some conclusions to be drawn as to the challenges facing the U.S. textile industry as it continues on its journey into a new competitive landscape.

Discussion

The purpose of comparing measures of competitiveness is to reveal, from an international perspective, the competitive advantage one nation may have over others in the production of textile products. The importance of this issue stems not only from the current financial stress of U.S. producers, but also from the pending elimination of trade protection for U.S. manufacturers at the end of 2004. In such a dynamic economic environment, measures of a nation's competitive position are of increasing importance. As is evident from the information presented here, the United States is not in a strong competitive position in several areas but only by margins that are narrow in most cases and narrowing in others.

Price-based measurements of tariff equivalency show that the price of U.S. produced yarn is such that it is profitable for overseas producers to export here, but that yarn price declines over the past three years have reduced the amount by which these producers have a competitive advantage over United States producers. China has a significant advantage over U.S. manufacturers of cotton yarn based on a TE of -29%.

In terms of cost of production, the United States is only marginally higher than producers who are generally regarded as possessive of advantages in manufacturing for which we cannot compete, namely the cost of labor. As shown, the U.S. has advantages in other areas that offset most of the advantage gained by cheap labor in competitor countries.

This study does show a consistent competitive advantage for the U.S. textile producer in the area of raw material procurement. This advantage will be of increasing consequence as the gap between the U.S. and international rivals in the areas of cost of production and yarn price continues to narrow. The cost savings associated with the shipment of yarn over raw cotton are especially significant for competitors with costs of production that are virtually equivalent.

Implications

The purpose of this study is to better understand the competitive state of the U.S. textile industry in the context of a global marketplace. The results indicate that while the U.S. producer is currently at a competitive disadvantage with his/her international rivals, this margin of competitive disadvantage is generally thin. Macroeconomic shocks such as fluctuating currency

exchange rates and changes to trade agreements affecting tariffs and quotas quickly and radically affect the world textile trade. In light of the competitive challenges it currently faces, how can the U.S. textile industry respond? Such a response may take several forms:

- Tariffs and quotas—enforcement of current agreements and/or continued protection against cheaper imports. While the U.S. is lowering tariffs and quotas for many textile imports, many nations continue to employ barriers against U.S. products;
- Monetary policy—issues related to exchange rate movement significantly impact the differences in prices between domestic and foreign goods. A weaker dollar relative to foreign currencies would make U.S. products for export relatively cheaper;
- Production costs—while labor costs in the U.S. are not likely to decline significantly, this disadvantage may be offset in other areas such as worker productivity, costs of capital, technological innovation, and production efficiency;
- Pricing structure—recognizes that U.S. profit margins may decline as competition increases due to falling prices. An additional concern is that foreign producers of textile products may be offering products at prices below their cost of production in order to capture market share; or
- U.S. industry exit—firms relocating or discontinuing yarn production and diverting resources away from textile production.

A consideration of these and other options will define the cost of improving U.S. competitiveness. Whether these costs are too high and by whom they should be borne are questions that remain to be answered. Some would suggest that the U.S. has lost whatever comparative advantage it may have held in the production of textile products and that the pragmatic thing to do in light of current events is to let the industry go:

> A more enlightened approach would be to recognize the great historic contribution of the cotton textile industry to the region, figuratively pat it on the rump, and wish it farewell as it moves on to do its service for some other part of the world.
>
> --Richard A. Stanford

Others feel the competitive playing field is temporarily skewed to favor foreign producers and that the domestic textile industry can respond if given adequate resources and support. Given that the United States is the world's largest retail market and that the domestic textile industry is the most reliable supplier, retailers and consumers alike want a healthy domestic textile industry and do not want to be dependent on foreign goods (U.S. Textile Industry in Decline). This position is advocated by such spokespersons as the former Chairman of the American Textile Manufacturers Institute and President of the Plains Cotton Cooperative Association:

> The American textile industry's ongoing economic crisis clearly indicates that our government must take steps to restore equitable conditions of competition for U.S. textile manufacturers….
>
> --Van May

The foregoing analysis of competition in the textile industry is presented to inform this discussion and provide insight as to some of the factors that drive competition and make one country more competitive in the world market than another. This report provides objective measures by which this competitive advantage may be demonstrated and evaluated.

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Table 1. Domestic Yarn Prices, $U.S. per kg.

Country	price ($/kg)	ratio of U.S. price
Yarn Count 20's		
Pakistan	$1.72	63.70
India	$1.82	67.41
USA	$2.70	100.00
Turkey	$2.40	88.89
Indonesia	$1.90	70.37
Yarn Count 30's		
Pakistan	$2.18	68.13
India	$2.04	63.75
USA	$3.20	100.00
Turkey	$2.45	76.56
Indonesia	$1.98	61.88

Source: *Cotton Outlook*, Volume 81 No. 31. August 1, 2003.

Table 2. U.S. Tariff Equivalent.

January 1, 2001	U.S.	Pakistan	India	Indonesia	Turkey
20's	-	62.50	76.04	44.44	41.17
30's	-	58.02	61.34	53.60	48.84
January 1, 2002					
20's	-	72.61	64.24	43.39	13.19
30's	-	56.22	62.69	53.92	24.11
January 1, 2003					
20's	-	39.79	45.11	34.85	11.05
30's	-	34.35	39.82	45.07	21.18
August 1, 2003					
20's	-	33.66	27.36	25.58	4.48
30's	-	29.03	36.75	43.50	21.67

Table 3. Manufacturing Costs 2003: Ring Spun Yarn, $U.S. per kg. of yarn, (% of total costs).

	Brazil	China	India	Italy	Korea	Turkey	USA
Waste	0.19	0.31	0.17	0.23	0.22	0.22	0.17
	(14%)	(29%)	(14%)	(10%)	(17%)	(16%)	(11%)
Labor	0.06	0.04	0.05	0.85	0.21	0.13	0.55
	(5%)	(4%)	(4%)	(39%)	(16%)	(9%)	(34%)
Power	0.11	0.23	0.30	0.37	0.17	0.25	0.16
	(8%)	(21%)	(25%)	(17%)	(13%)	(17%)	(10%)
Auxiliary Material	0.11	0.11	0.11	0.12	0.11	0.11	0.12
	(9%)	(10%)	(9%)	(6%)	(9%)	(8%)	(8%)
Depreciation	0.36	0.29	0.25	0.43	0.44	0.52	0.46
	(28%)	(27%)	(21%)	(20%)	(34%)	(36%)	(29%)
Interest	0.48	0.10	0.32	0.17	0.13	0.21	0.14
	(36%)	(9%)	(27%)	(8%)	(11%)	(14%)	(8%)
Total Manufacturing Costs	1.31	1.08	1.20	2.17	1.28	1.44	1.60

Source: *International Production Cost Comparison 2003.*

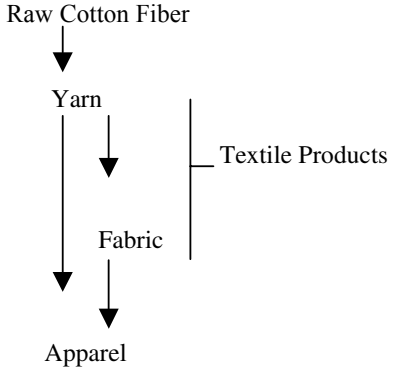
Table 4. Total Costs 2003: Ring Yarn, $U.S. per kg. of yarn, (% of total costs).

	Brazil	China	India	Italy	Korea	Turkey	USA
Waste	0.19	0.31	0.17	0.23	0.22	0.22	0.17
	(7%)	(11%)	(7%)	(6%)	(8%)	(8%)	(6%)
Labor	0.06	0.04	0.05	0.85	0.20	0.13	0.55
	(2%)	(2%)	(2%)	(24%)	(8%)	(4%)	(19%)
Power	0.11	0.23	0.30	0.37	0.17	0.25	0.16
	(4%)	(8%)	(12%)	(10%)	(6%)	(9%)	(6%)
Auxiliary Material	0.11	0.11	0.11	0.12	0.11	0.11	0.12
	(4%)	(4%)	(5%)	(3%)	(4%)	(4%)	(4%)
Capital (Dep. & Int.)	0.84	0.39	0.57	0.60	0.57	0.73	0.60
	(32%)	(14%)	(23%)	(17%)	(21%)	(26%)	(21%)
Raw Material	1.30	1.68	1.25	1.42	1.41	1.41	1.26
	(50%)	(61%)	(51%)	(40%)	(53%)	(49%)	(44%)
Total Yarn Costs	2.61	2.76	2.45	3.59	2.68	2.85	2.86

Source: *International Production Cost Comparison 2003.*

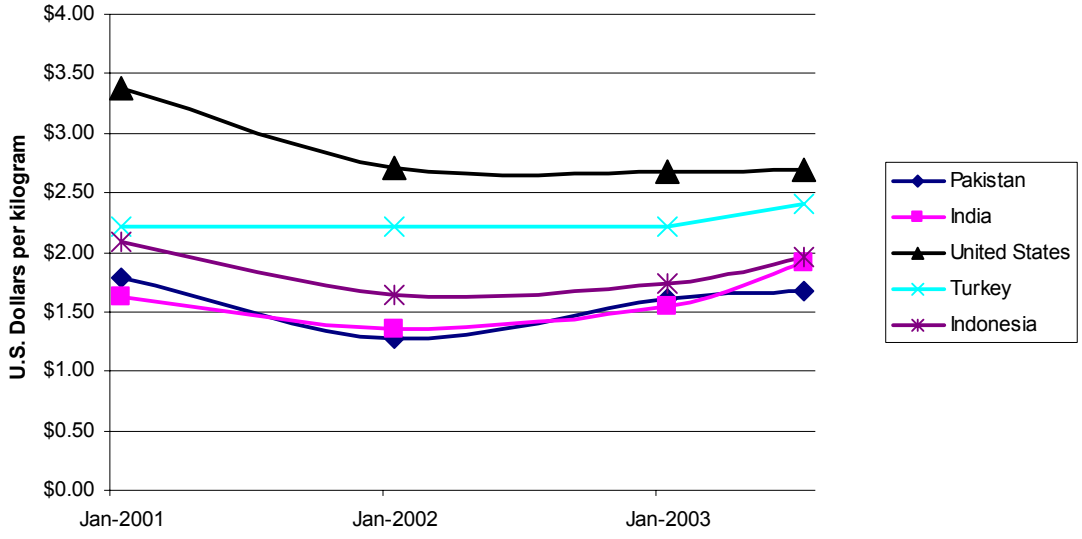
Table 5. Shipping Costs of Cotton Waste for Ring Spun Yarn, $US.

	China	Turkey	Indonesia	Thailand	Taiwan
2003 cotton imports (000's bales)	1758.5	1452.2	747.3	529.3	465.3
Ocean freight container rate	$2282.00	$1194.00	$1897.00	$2470.00	$1985.00
Shipping cost per bale	$26.85	$14.05	$22.32	$29.06	$23.35
Shipping cost of waste per bale	$4.60	$2.40	$3.82	$4.97	$4.00
Shipping cost of waste to the importer per kilogram of yarn	$0.0257	$0.0134	$0.0214	$0.0278	$0.0223



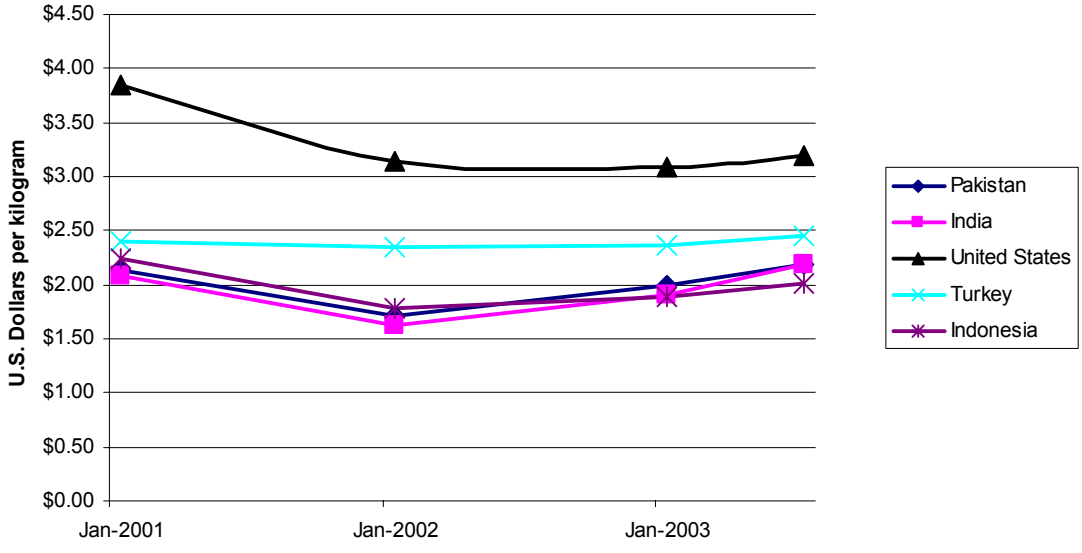
Source: MacDonald

Figure 1. Transforming Fiber into Finished Goods.



Source: *Cotton Outlook*

Figure 2. Cotton yarn prices, 20-count, 2001-2003.



Source: Cotton Outlook

Figure 3. Cotton yarn prices, 30-count, 2001-2003.

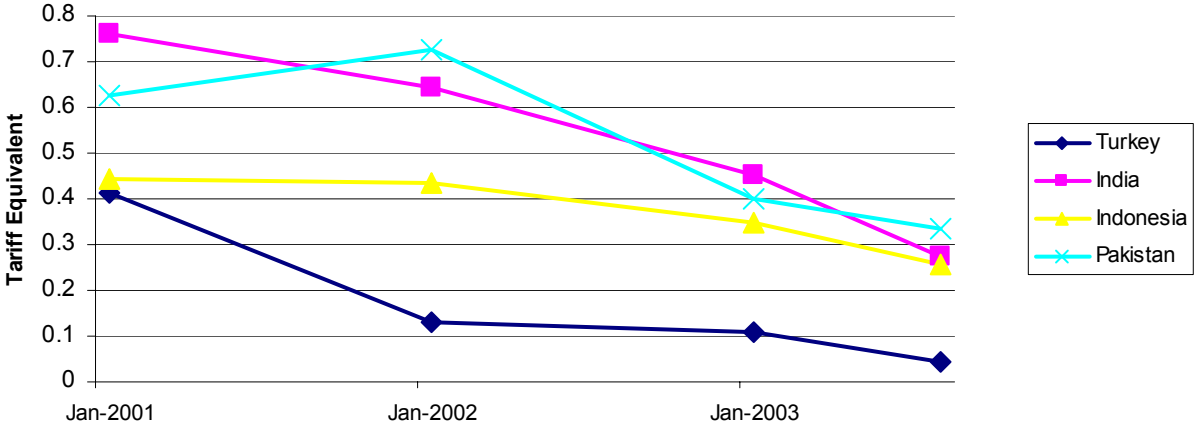


Figure 4. U.S. Tariff Equivalents, 20-count yarn.

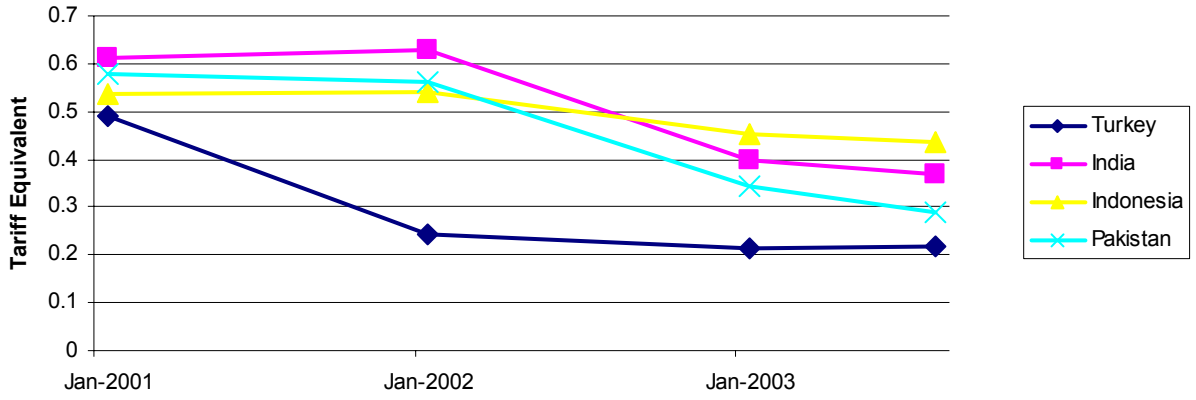
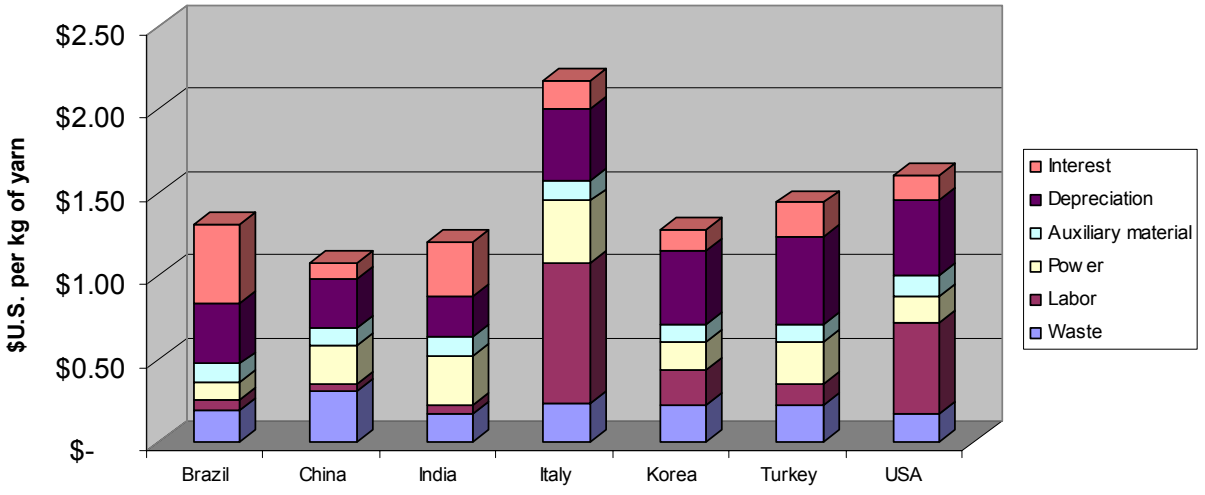
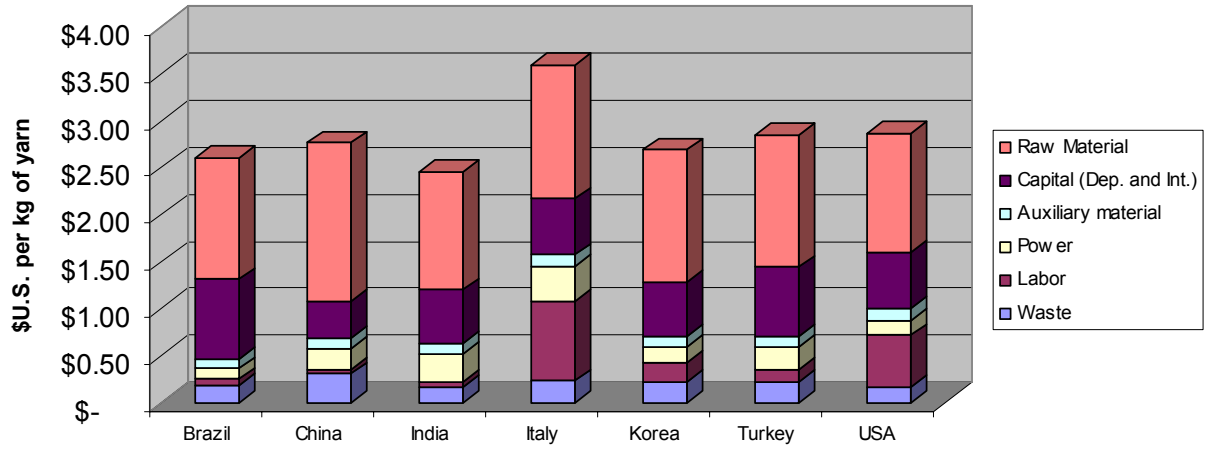


Figure 5. U.S. Tariff Equivalents, 30-count yarn.



Source: *International Production Cost Comparison 2003*

Figure 6. Manufacturing Costs 2003: Ring Spinning.



Source: *International Production Cost Comparison 2003*

Figure 7. Total Costs 2003: Ring Spun Yarn.