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Measuring Competition for Textiles: Does the United States Make the Grade?

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Abstract

Increasing competition from foreign manufacturers threatens the viability of textile producers in the United States. This paper evaluates the U.S. competitive position in the cotton yarn segment using established quantifiable measures and provides an overall competitive assessment. The measures employed show the United States to be at a relative competitive disadvantage when compared to major international producers of cotton yarn. However, the margin of this competitive disadvantage is shown to be relatively small and in some cases, decreasing.

Keywords: competition, cotton, international trade, textiles

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We can only become more competitive if we know how competitive we actually are and what constrains or enhances our efforts.
—Johan van Rooyen

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 the entire labor intensive cut-and-sew apparel segment has responded to these competitive forces by moving production facilities overseas. The impact on less labor intensive industry segments, such as the textile products sector, 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 which initially transforms raw cotton into cotton yarn. By offering an appraisal of the current competitiveness of U.S. cotton yarn producers, we are able to both evaluate their current effectiveness in meeting the challenges of this evolving competitive landscape as well as gain insight into possible managerial imperatives in such an economic context.

Figure 1 provides a simple schematic of the textile and apparel industry as raw cotton is processed into finished goods. The textile industry has experienced a recent migration, especially to Asian countries, which seems 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, 1998).

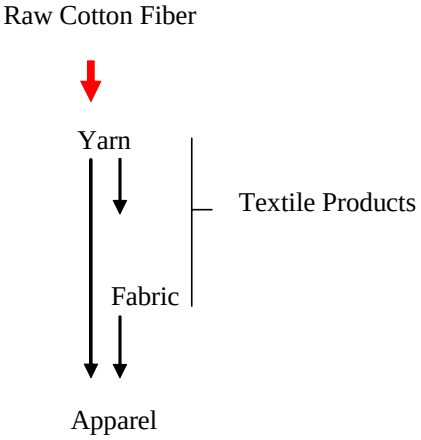

Figure 1. Transforming Fiber into Finished Goods
Source: MacDonald, 1998

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The consequences of the movement of virtually all textile production to developing countries will alter the structure of the global textile industry. With the further elimination of quota protection for U.S. producers, trade barriers are falling and competitive forces are intensifying. 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 may be seen as a competitive appraisal of the U.S. cotton yarn industry. It evaluated the competitiveness of U.S. manufacturers relative to international rivals by analyzing the current competitive state of this industry and by identifying competitive trends. The two research methods used in this analysis were based on:

1. a comparison of objective measures of market share of textile products and
2. a price-based comparison of goods offered in the market place.

These two methods were intended to provide different perspectives on the issue of textile industry competitiveness. Following is an explanation of the competitive measures used in this analysis followed by a discussion of possible implications of these findings.

Revealed Comparative Advantage

A key aspect of evaluating whether a producer of a given good is competitive in its market offering depends on both a definition and measure of the term competitiveness. Drescher and Maurer (1999) cite Bellendorf's definition of competitiveness as the ability of firms and industries "…to protect and/or improve their position in relation to competitors which are active in the same market" (p. 162). This definition is consistent with that of Sharples (1986) and Kennedy and Rosson (2002) who define competitiveness as the ability to achieve market share. The producer who attains a market share for its product is by definition competitive. A product for which market share is increasing can be said to be increasing in competitiveness and, conversely, a product is regarded as decreasing in competitiveness if the market share for that product is in decline. In the following discussion, market share will both define competitiveness and serve as its primary measure.

In studies such as this, the terms comparative advantage and competitive advantage are often used interchangeably. For the purposes of this analysis, comparative advantage will refer to that situation of unrestricted free markets of Adam Smith and David Ricardo, in which resources are allowed free flow to their most efficient and productive uses. Competitive advantage explains trade as it exists in the real world. This includes the influence of trade barriers, exchange rate variation, product differentiation, and other factors which Ricardian comparative advantage does not consider. "Competitive advantage therefore reflects real

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business opportunities within current policy and price distortions" (van Rooyen, Esterhuizen, and Doyer, 2000, p.4).

Market share as an empirical measure of competitiveness is founded on the performance of a given product in the marketplace. Since the focus of this paper is the global marketplace, export shares will be used as indicators of international competitiveness. These relative shares will be analyzed for the clues they may provide as to how and in which direction the competitiveness of a given industry may be changing (Drescher and Maurer, 1999). Balassa (1965) asserts that an analysis of the trade performance of individual countries would indicate the comparative advantage one nation holds over others in the marketing of manufactured goods. This analysis is based on a comparison of "…the relative shares of a country in the world exports of individual commodities and indicating changes in relative shares over time" (Balassa, p.105). Thus, comparative advantage as described by Balassa is consistent with the concept of competitiveness used here. Direct observation of trade performance may then reveal comparative advantage (competitiveness) in the production of that commodity. Balassa introduces an index called "Revealed Comparative Advantage" (RCA) as a means of measuring comparative advantage.

Method of Analysis

The export based RCA index used here is based on an application of Balassa's RCA by Leishman, Menkhaus and Whipple (2000) and is calculated in three steps:

1. Calculate a country's market share of exports of a specific good: divide a country's exports of a good by world exports of that good.

2. Calculate a country's market share in the export of all manufactured goods: divide a country's exports of all manufactured goods by the combined world exports of all manufactured goods.

3. Divide the market share of exports of a certain good (step 1) by the market share in the export of all manufactured goods (step 2). Multiply this number by 100 to yield the current RCA index.

The higher the RCA, the greater importance of that good relative to all manufactured exports. For example, an index value of 120 indicates that a country's exports of that good for a given year are 20% higher than its share in total world exports of all manufactured goods; an index value of 80 reveals that a country's exports for a given good are 20% lower than its share of world exports of all manufactured goods.

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Data

Export data for textile yarn, fabric, etc.(SITC Rev. 3 code 65) and all manufactured goods (SITC Rev. 3 code 6) were gathered for years 1989 through 2005 for the major textile producing nations of China, India, Pakistan, the United States, and Turkey. These nations are ranked as the top 5 in the world according to the production of yarn (Textile Statistics). Figures are available online from the Comtrade database of the United Nations Statistics Division. Data were not consistently available prior to 1989 and trade statistics were not reported for all nations for all years even in the time frame reported here. Data tables are located in the Appendix, Tables A.1-A.3.

Results

As can be seen in Figure 2, in 2004 China led these selected nations in the total value of manufacturing exports and textile exports. The U.S. is second followed by India, Turkey, and Pakistan. As a percentage of all manufacturing exports, textile exports account for the smallest percentage in the U.S. (15%) and virtually all of Pakistani manufacturing exports (92%).

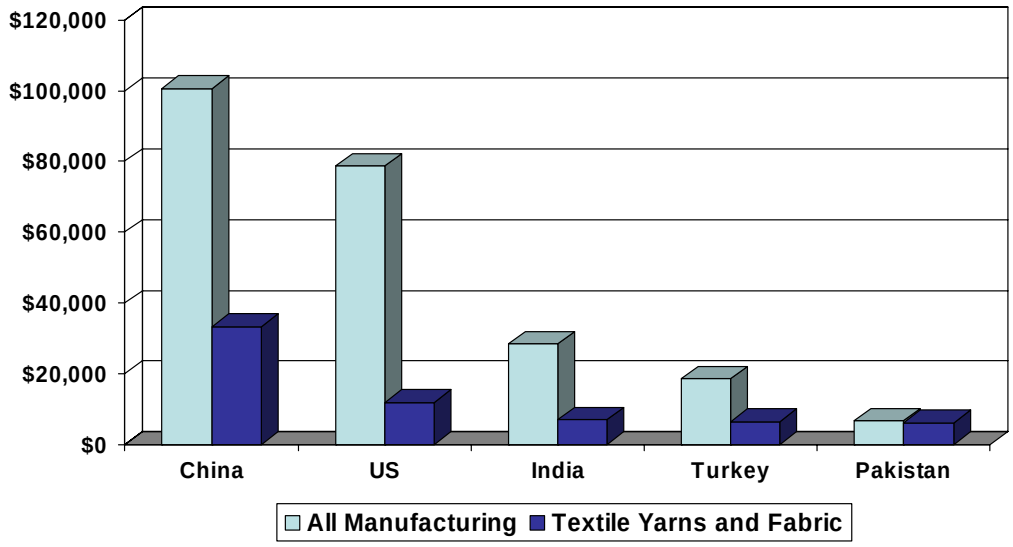

Figure 2. Dollar Value of Exports, 2004
Source: United Nations Statistics Division-Comtrade Database

RCA index values for each of these nations are shown in Figure 3. Not surprisingly, the data indicate that the United States has the lowest RCA among the textile producers reported here. However, the U.S.'s RCA has shown a slight up trend since hitting a low in 1995. The exports of U.S. yarn and fabric was 13 percent lower than that of all U.S. manufacturing exports in 1989, the RCA fell to a low of 68 in 1995 (32 percent below all manufacturing exports), and climbed back to 95 in

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2004 and 91 in 2005, almost on par with U.S. market share in the export of all manufactured goods. Pakistan's RCA is trending significantly higher, especially in the last few years. The other nations all hold relative competitive advantages in yarn and fabrics with calculated values all clustering around 200.

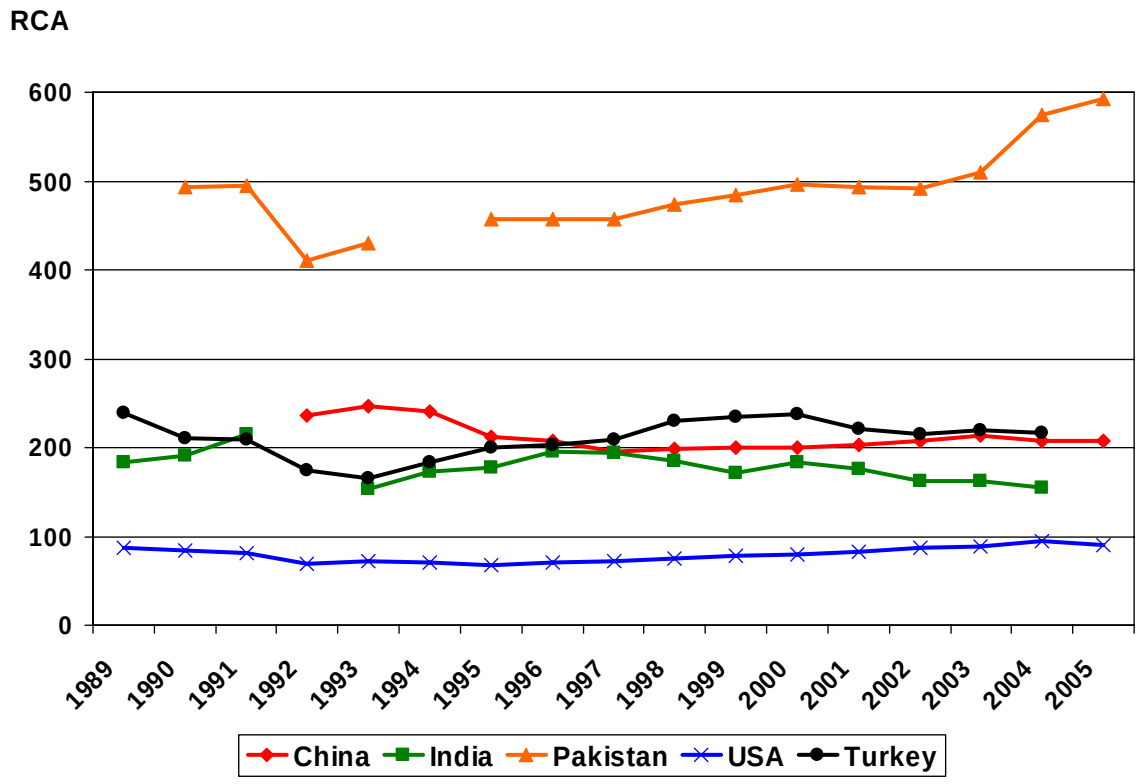

Figure 3. Revealed Comparative Advantage for Textile Trade

From this analysis, two points seem particularly pertinent. First, the export market share of textile products, as a percentage of all manufacturing exports, is much higher in China, India, Pakistan, and Turkey than in the United States. While this result is expected, by using Balassa's RCA, this identified competitive advantage may be quantified and trends analyzed. It would appear that these nations are committed to the development of the textile component of their respective economies and are capitalizing on competitive advantages they may possess.

Second, the U.S. textile sector is no worse off than the rest of the U.S. manufacturing industry. While the RCA had slipped well below the rest of manufacturing sector in the early to mid-nineties, it has regained market share in the last few years to be on par with the rest of the industry.

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Price Difference

In the attempt to determine a country's ability to compete in global markets, bilateral price comparisons across nations represent another 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 et al., 1991).

At the time of this writing, the United States is the highest priced producer of cotton yarns compared to Pakistan, India, Turkey, and Indonesia (see Table 1). As referenced in the previous section, these nations represent 4 of the 5 largest competitors in the cotton yarn industry[1]. While a simple comparison of domestic prices may be interesting, these prices become more relevant as indicators of competitiveness only when transportation costs between countries are added to the domestic prices. Figure 4 shows how the price of 20-count cotton yarn has compared in the U.S, Pakistan, India, Turkey, and Indonesia from January 2001 to August 2006. This figure shows that the U.S. price has declined from $3.40 per kilogram to $2.65, a 22 percent price decline. The average international price as of August 2006 (U.S. excluded) is $2.20, $0.45 below the U.S. price. The decline in the U.S. price and gradual increases elsewhere has created some price convergence, but the U.S. remains priced above the rest of the international market[2].

Table 1. Domestic Yarn Prices, $U.S. per kg, 20-count, August 2006

Country	Price	Ratio of U.S. Price
	$/kg	
Pakistan	1.93	.7283
India	2.00	.7547
USA	2.65	1.0000
Turkey	2.62	.9887
Indonesia	2.26	.8528

Source: Cotton Outlook

1 Absent from this comparison is China. Cotton Outlook, the primary source of this yarn price information, reports prices on the basis of significant export volume and the reliability of price information in any particular country. At the time of this writing, this list did not include any price information from China.

2 The authors recognize that prices reported in this time frame are sporadic confounding a thorough analysis of a price trend. Data, time, and cost constraints limit further collection of price data at this time. Additionally, it is important to verify that the price convergence demonstrated is not due solely to a fluctuation in currency exchange rates. Exchange rate history is included in the Appendix, Table A.4 and Figure A. 1, for the currencies of Pakistan, India, Turkey, and Indonesia, relative to the U.S. dollar. The table shows that real currency exchange rates were stable or declining over this time period. This supports the contention here that the observed convergence of prices represents a real, as opposed to a nominal, trend and increasing price competitiveness of U.S. cotton yarn.

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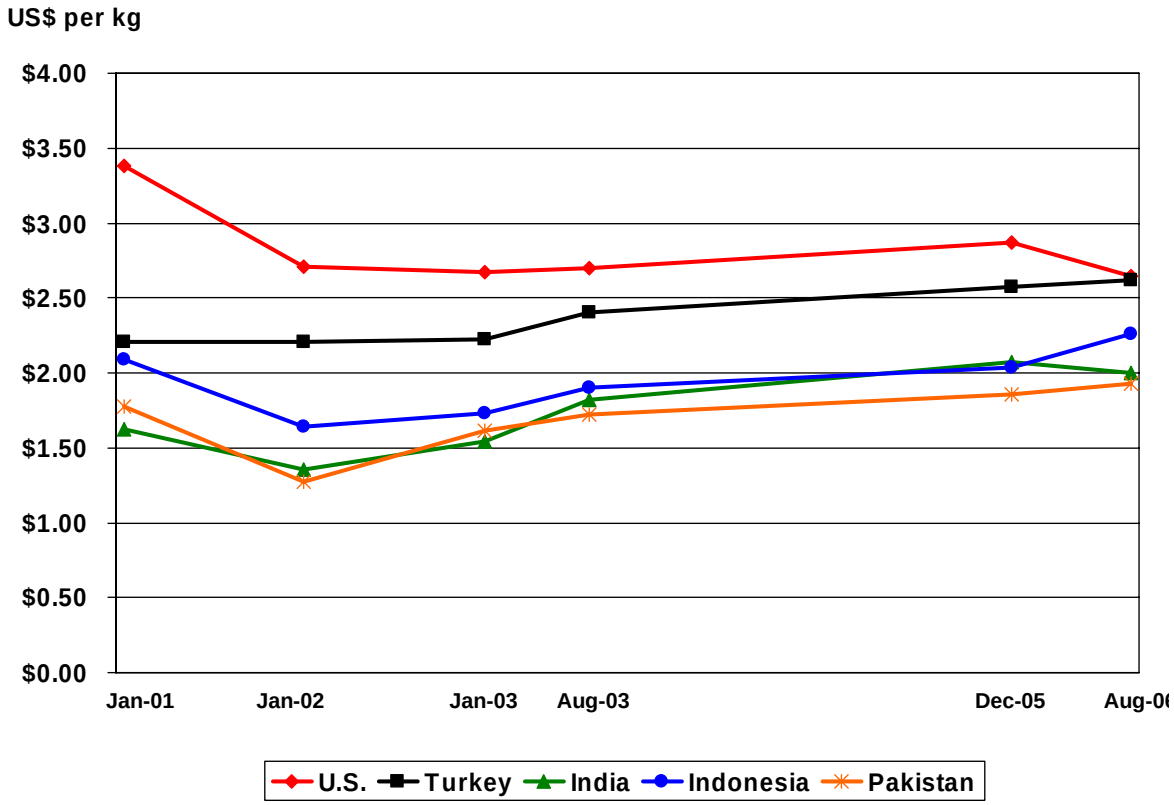

Figure 4. 20-count Cotton Yarn Prices
Source: Cotton Outlook

To allow for the transportation adjustment of the prices in Table 1, a calculation is made for a bilateral price difference. Hayes et al. refer to this as a "tariff equivalent" or "price wedge" as it represents the amount of protection domestic producers of a good enjoy based on the cost of transporting foreign produced goods into a domestic market.

However, the term "tariff equivalent" is commonly used in the context of international trade to refer to the concept of tarrification where "…quotas and other non-tariff barriers to trade were to be converted in tariff equivalents and then bound" (Morath and Sheldon, 1999, p. 2). To avoid confusion, the tariff equivalent of Hayes et al. will be referred to as a "price difference" (PD). Competitiveness of nations will be measured by estimating their respective price differences for cotton yarn.

The calculation of the price difference 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 PD. The rates used for this study are based on publicly available shipping quotations for dry ocean

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freight port to port. No adjustments are made for inland freight costs (see Appendix Table A.5). However the calculated PD here does not explicitly include tariff and quota restrictions. This is a pure market-based comparison. PD does reveal the amount of tariff that an importing country would need to impose if it wished to equate world prices to those of its domestic market.

A PD 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.

$$(1) \qquad \frac{\text{PD} = \text{Price in B} - (\text{Price in A} + \text{transportation to B}) \times 100}{(\text{Price in A} + \text{transportation to B})}$$

A negative PD indicates that the domestic price is lower than adjusted import prices. A country with negative PD's with other trading nations would not be a major export market for other producers. Positive PD'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, PD's are calculated here for U.S. yarn exports to nations with important textile and apparel manufacturing industries (see Table 2). Of course the higher U.S. price reported in Table 1 relative to each of these potential export markets will result in negative PD's. Figure 5 illustrates these relative PDs and the degree to which the PD or price wedge is closing for the time period reflected here. While U.S. yarn manufacturers are at competitive price disadvantage, the relative proportion of this gap is closing. For the prices reported, the United States has seen its average PD for 20-count yarn go from -47 to -24, an approximate 50 percent competitive price improvement.

Table 2. U.S. Price Difference, 20-count yarn

	January 2001	January 2002	January 2003	August 2003	December 2005	August 2006
			Percent			
Turkey	-38.00	-23.64	-22.22	-16.79	-15.85	-7.56
India	-55.92	-55.08	-48.07	-39.24	-34.60	-32.10
Indonesia	-42.49	-44.68	-40.84	-35.69	-34.71	-22.18
Pakistan	-51.57	-57.74	-45.71	-42.58	-41.24	-34.47

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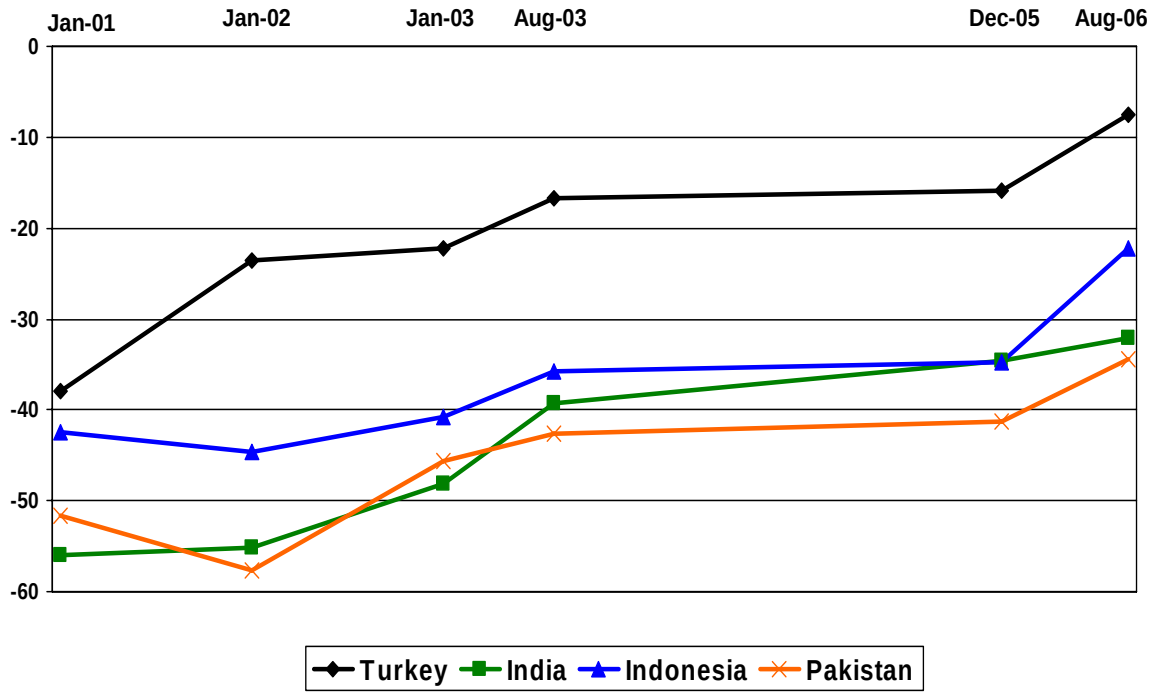

Figure 5. U.S. Price Differences, 20-count yarn

Given that China is the world's largest manufacturer of apparel (U.S. Trade Commission), this method may 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 20-count carded cotton yarn reported for China of $2.30/kg in August 2006 (CNCotton.com, 2006) and the price of U.S. carded 20s of $2.65/kg (from Table 1), and a weighted average container shipping rate from the USDA Ocean Rate Bulletin, China's PD with U.S. producers can be calculated as:

$$(2) \qquad \frac{PD = 2.35 - (2.65 + .12) \ X\ 100 = -15.16.}{(2.65 + .12)}$$

This PD estimates a 15 percent price-based advantage for domestic producers of cotton yarn in China over competitors from the United States, approximately 10 percentage points better than the average reported for other major textile producing nations.

Conclusions

As is evident from the information presented here, the United States fails to make the competitive grade in several categories but by margins which are narrowing. While the Revealed Comparative Advantage index indicates that the United States is lagging behind China, India, Turkey, and Pakistan in terms of market share in

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exports of yarn, fabric, etc., the U.S. textile industry has made gains in market share over the last two years and is currently performing on a market-share based par with the rest of the U.S. manufacturing sector. However, the elimination of trade barriers may further erode the competitive ability of U.S. textile producers to the degree that trade is constrained by quotas and tariffs under the Multi Fibre Arrangement (MFA). Without the insulation from competition by protectionist barriers (with the expiration of MFA in January 2005), a truer picture of the relative competitive advantage of the U.S. textile manufacturer should emerge. Price-based measurements of competition show that the price of U.S. produced yarn is such that it is not profitable for overseas producers to import U.S. cotton yarn. However, yarn price declines over the past three years have reduced the amount by which these producers have a competitive advantage over United States producers. This disadvantageous price difference is based on the fact that the U.S. price for cotton yarn remains above its major rivals, but trends indicate this gap has closed significantly with some of the world's leading textile and apparel producers.

Strategic Implications

These findings may have several implications for managers of U.S. textile companies. First, textile companies seem to be faring about as well as other U.S. manufacturers in terms of export market share, but these findings are for a time period in which protectionist policies were still in place. The U.S. textile industry has historically been one of the most heavily protected sectors of the U.S. economy. Textiles have been excluded from many of the post-World War II GATT and WTO negotiations "…because the subject was considered too sensitive in the United States" (Grennes 1990, p. 3). While the last 50 years have seen trade barriers fall for the rest of the manufacturing sector, U.S. textile producers have continued to rely on a system of quotas and tariffs to insulate them from competitive forces. Under the auspices of the Uruguay Round Agreement on Textiles and Clothing, all textile and apparel quotas were abolished on January 1, 2005 with the expiration of the Multi-Fiber Arrangement (MFA). "After decades of protectionist exceptions, textile trade finally will be subject to the same rules that govern international trade in other manufactured products" (Ikenson, 2003, p. 1). With an RCA of less than 100 with trade protection in place, it seems likely that this measure will fall as trade restrictions are removed completely. This will provide additional impetus for the industry to devise effective competitive strategies in order to survive.

Second, trends suggest that at least in terms of one potentially viable strategy, low cost competition, U.S. firms are responding to this competitive challenge. While the U.S. continues to be at a competitive price disadvantage compared to major international rivals, the differences are narrowing significantly. If industry consolidation, technical efficiency, or other means to lower costs can be achieved, the price difference may narrow to such a degree as to allow the U.S. to compete in the cotton yarn export market.

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A strategy of product differentiation in the cotton yarn industry might be difficult given the generic commodity-like nature of the product. But advantages in areas such as dependability and speed of delivery, operational flexibility in production lines, rapid response to changing consumer tastes and fashion trends, as well as an innovative and high-quality product line might carve out a profitable niche for U.S. textile manufacturers.

U.S. textile manufacturers have a long history of adapting to challenging economic conditions. During the U.S. Civil War, one textile mill still in operation today, survived by supplying uniforms to the Confederacy while making tents for the Union. Such innovative and cooperative enterprises might be will suited to the current situation. U.S. producers might leverage their expertise in marketing and distribution and high-end products while allowing partners in Asia or elsewhere produce the bulk of low-cost goods.

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Appendix: A

Table A.1. Export data for all manufactured goods, trade value, $U.S. million

Selected Classification: SITC Rev.3

Selected Commodities: 6 (Manufactured Goods)

Selected Reporters: all

Selected Years: 1989-2001

Selected Partners: all

Selected Trade Flows: Export

	World	China	India	Pakistan	USA	Turkey
1989	$349,743		$6,440		$27,243	$3,385
1990	$382,667		$6,364	$3,018	$33,698	$3,833
1991	$352,829		$6,415	$3,516	$37,778	$3,705
1992	$428,683	$16,135		$3,886	$38,173	$4,139
1993	$548,793	$16,392	$8,873	$3,793	$39,161	$4,466
1994	$625,276	$23,218	$10,508		$43,995	$5,661
1995	$774,868	$32,240	$12,121	$4,577	$53,463	$6,217
1996	$771,608	$28,498	$12,266	$5,245	$55,763	$6,538
1997	$800,968	$34,433	$13,147	$4,902	$62,277	$7,796
1998	$787,059	$32,477	$12,418	$4,557	$61,804	$7,767
1999	$775,754	$33,262	$15,215	$4,491	$62,157	$7,588
2000	$842,201	$42,546	$17,262	$4,820	$71,990	$8,146
2001	$835,084	$43,813	$16,180	$4,857	$66,658	$9,453
2002	$859,296	$52,954	$19,898	$5,205	$65,058	$10,496
2003	$1,005,716	$69,018	$23,203	$6,501	$67,688	$13,205
2004	$1,257,996	$100,646	$28,376	$6,647	$78,713	$18,587
2005	$1,133,051	$129,121		$7,813	$89,179	

Source: United Nations Statistics Division-Comtrade Database

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Table A.2. Export data for textile yarn, fabric, etc., trade value $U.S. million

Selected Classification: SITC Rev.3
Selected Commodities: 65 (Textile yarns, fabric, etc.)
Selected Reporters: all
Selected Years: 1989-2001
Selected Partners: all
Selected Trade Flows: Export

	World	China	India	Pakistan	USA	Turkey
1989	$57,599		$1,947		$3,897	$1,331
1990	$68,477		$2,180	$2,663	$5,039	$1,440
1991	$64,926		$2,530	$3,200	$5,610	$1,429
1992	$96,475	$8,583		$3,590	$5,889	$1,619
1993	$118,032	$8,699	$2,917	$3,507	$6,025	$1,592
1994	$132,268	$11,818	$3,829		$6,592	$2,194
1995	$157,374	$13,918	$4,358	$4,256	$7,372	$2,527
1996	$158,424	$12,112	$4,936	$4,919	$8,008	$2,722
1997	$164,565	$13,828	$5,242	$4,608	$9,187	$3,352
1998	$156,789	$12,817	$4,558	$4,302	$9,205	$3,549
1999	$151,817	$13,043	$5,087	$4,258	$9,504	$3,478
2000	$159,494	$16,135	$5,998	$4,532	$10,952	$3,672
2001	$157,631	$16,825	$5,375	$4,525	$10,473	$3,943
2002	$161,034	$20,562	$6,028	$4,790	$10,664	$4,244
2003	$182,959	$26,900	$6,846	$6,030	$10,886	$5,262
2004	$201,583	$33,428	$7,009	$6,125	$11,989	$6,428
2005	$173,518	$41,050		$7,087	$12,379	

Source: United Nations Statistics Division-Comtrade Database

Table A.3. Calculated RCA Indices.

	China	India	Pakistan	USA	Turkey
1989		184		87	239
1990		191	493	84	210
1991		214	495	81	210
1992	236		411	69	174
1993	247	153	430	72	166
1994	241	172		71	183
1995	213	177	458	68	200
1996	207	196	457	70	203
1997	195	194	458	72	209
1998	198	184	474	75	229
1999	200	171	484	78	234
2000	200	183	496	80	238
2001	203	176	494	83	221
2002	207	162	491	87	216
2003	214	162	510	88	219
2004	207	154	575	95	216
2005	208		592	91	

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Table A.4. Exchange Rate History, Real Values, National Currency per US Currency

	Pakistan	India	Turkey	Indonesia
Date	Rupee per $US	Rupee per $US	Lira per $US 100	Rupiah per 1/100 $US
Jan-01	58.86	46.91	57.98	91.36
Feb-01	59.71	47.26	64.67	92.71
Mar-01	60.45	47.27	77.05	96.88
Apr-01	61.00	47.30	88.10	106.36
May-01	62.37	47.33	79.26	106.14
Jun-01	64.07	46.92	82.48	105.38
Jul-01	64.24	46.29	87.47	97.37
Aug-01	63.77	45.97	90.00	80.46
Sep-01	64.00	46.79	89.75	84.60
Oct-01	61.98	47.20	91.84	91.07
Nov-01	60.51	46.21	83.39	93.44
Dec-01	60.01	46.25	76.82	91.21
Jan-02	59.95	46.92	68.81	88.29
Feb-02	59.52	47.59	67.36	86.16
Mar-02	58.95	47.69	66.92	83.53
Apr-02	59.07	48.05	64.09	80.25
May-02	59.58	47.81	67.43	76.86
Jun-02	59.23	47.42	73.48	73.88
Jul-02	58.48	46.76	78.54	75.31
Aug-02	58.07	46.42	76.34	74.79
Sep-02	57.82	46.29	74.41	74.90
Oct-02	57.73	46.14	72.34	76.55
Nov-02	57.32	45.94	68.28	74.06
Dec-02	57.17	46.08	66.33	71.86
Jan-03	57.05	46.18	67.85	71.09
Feb-03	57.02	46.22	65.55	71.56
Mar-03	57.20	46.19	65.40	72.45
Apr-03	56.74	45.22	62.40	71.07
May-03	56.80	44.82	56.53	67.73
Jun-03	56.95	44.23	53.88	66.37
Jul-03	56.55	43.78	54.02	65.43
Aug-03	56.41	43.62	52.61	66.54
Sep-03	56.40	43.54	51.64	65.94
Oct-03	55.39	42.73	52.91	65.54
Nov-03	54.62	42.66	53.54	65.27
Dec-03	54.51	42.72	51.92	65.04

Source: ERS

Table A.5. Shipping rates, from foreign port to port of Los Angeles.

	Evergreen	Maersk-Sealand	K-Line	kilograms	shipping/kg
Turkey		$3,592.79		19500	$0.18
India	$5,759.00			19500	$0.30
Indonesia	$4,959.00		$3,950.00	19500	$0.25
Pakistan	$5,759.00			19500	$0.30

Source: Online response from various shipping companies

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