

COMPETITIVE INTENSITY AND ATTRACTIVENESS OF THE US COTTON SECTOR II

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by

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Abstract

Cotton is one of the most important textile fibers in the world, produced in about 80 countries around the world. But, the attractiveness of cotton in global textile markets is being challenged by a number of factors. The US cotton sector specifically is faced with unique competitive forces which are threatening its place in the global textile markets. In this context, this paper analyzes the threat posed by the synthetic fibers industry to global cotton markets. Our study analyzes the global supply and demand of synthetic textile fibers in comparison with that of cotton textile fibers. This paper also analyzes the global macroeconomic factors that impact the production and consumption of cotton and synthetic fibers. The study also includes a review of the economics of synthetic fibers in comparison with that of cotton fiber. The analysis is done by reviewing the literature about the cotton and synthetic fiber sectors in various countries as well as the authors' own observations and discussions with people in those sectors in some countries. The results show that synthetic fibers have surpassed cotton in terms of production and consumption in all the global markets and they continue to grow at healthy rates. The decreasing raw material price for synthetic fibers is also helping them to become more competitive relative to cotton in many product markets. In this background, we conclude that the cotton sector worldwide must innovate, create new products with better characteristics and focus marketing efforts to meet the needs of consumers in developing countries.

Introduction

Cotton is one of the most important textile fibers in the world, produced in about 80 countries around the world. China, India and the US are the leading producers of cotton accounting for two-thirds of the total world production, and US being the leading exporter of cotton, contributing about a third of total world exports. It is a very important commodity to agricultural economies of various countries providing livelihood to millions of people directly. But, cotton is losing its attractiveness in the global textile markets. The US cotton sector specifically is faced with unique competitive forces, which are threatening its place in global textile markets. Since the advent of synthetic fibers, they have been used as substitutes for cotton and lately the threat from synthetic fibers to cotton has increased significantly. In addition, the cotton sector in the US is also facing threats from various other quarters. Threats that come from competition from the emerging or potential new entrants in global cotton markets, the bargaining power of buyers/importers of cotton and the bargaining power of input suppliers to cotton sector such as seed and chemical suppliers. In this context, it is necessary to analyze the competitive forces/threats faced by the US cotton sector to understand their impact on its performance in the future. The analysis of the competitive forces and the threats posed by them is done the Porter's five-force framework, Figure 1 (Porter, 2008).

The Porter's framework based upon the structure-conduct-performance paradigm in industrial organizational economics helps in analyzing the level of competition within an industry and competitive strategy development. The five forces of competition that the US cotton sector faces are characterized by, the threat from existing major cotton exporters such as India and Brazil, the threat from new entrants or smaller players like West African and Central Asian countries, the threat from substitutes for cotton, the bargaining power of buyers like China and the bargaining power of suppliers of inputs to cotton cultivation. Our previous research and associated presentations have covered threats faced by US cotton sector from other cotton exporters like India, emerging cotton

growers like some African countries, and bargaining power of importing countries like China.

In this paper, we focus on the threat posed by the synthetic fibers to global cotton markets. As the worldwide consumption of synthetic fibers exceeds the consumption of cotton, it is important to understand the factors that impact buyers' propensity to substitute synthetics for cotton and identify favorable trends associated with cotton in the future. The markets in China and India have been analyzed along with that of the US with respect to the micro and macro economic factors that will impact the production and consumption of synthetic fibers. The study also aims to understand the economics of synthetic fibers and compare it with economics of cotton fiber. An understanding of the relative economics of the two helps in developing competitive strategies for the cotton sector. A review of literature about cotton and synthetic fiber sectors in various countries as well as the authors' own observations and discussions with industry experts in countries like India and China is reported. Many experts have emphasized that the cotton sector worldwide has to innovate, create new products, new ideas and new technologies to deliver value to the cotton consumer (Lyon, 2014). The findings of our study will help in mapping a path forward for ideas aimed at keeping cotton as a favorable choice in the competition from synthetic fibers.

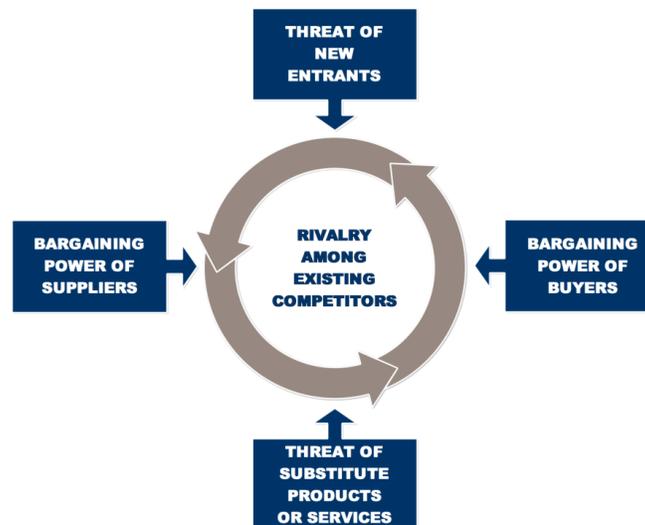


Figure 1: Porter's Five-Force Analysis

In the following section, a discussion is provided about the threats from various synthetic fibers. A brief analysis of strengths and opportunities are provided where possible. The last section provides the conclusions of the analysis.

Results and Discussion

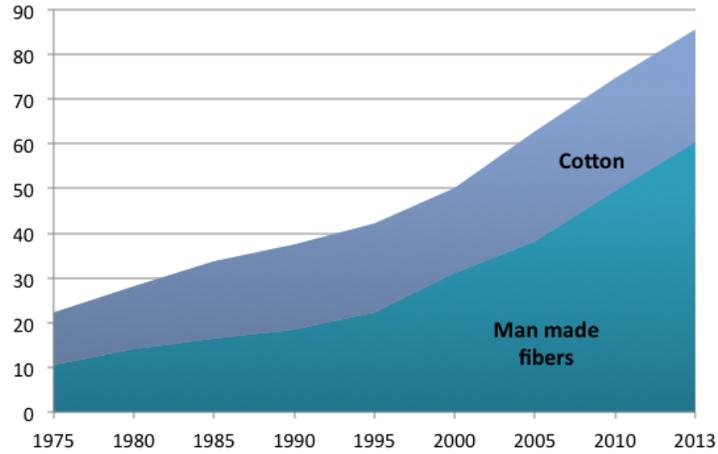
The production of textile materials has undergone many changes since the inception of textile industry. Natural fibers like cotton, wool and silk maintained their dominance until 1930s after which synthetic fibers also became important. During the 1960s, synthetic fibers swept the global textile markets and their dominance has prevailed (Textile World, 2015). The production of cotton in relation to synthetic fibers¹ is shown in Figures 2 and 3. The share of cotton in world fiber consumption has also declined (Figure 3). The textile industry around the world has introduced synthetic fibers into products that have traditionally been considered cotton products, in large part to mitigate the volatility in cotton prices. As the consumers have accepted this change, it is felt that the manufacturers may be reluctant to add more cotton back into these products (International Ag Trade Report, 2012).

We focus on the competition posed to cotton by various synthetic fibers. The important synthetic fibers that are considered in this study are Polyester fibers, Polyamide fibers (Nylon), Acrylic Polypropylene fibers, Cellulosic fibers and others. The compositions of the various fibers in the total synthetic fiber production in 2013 are provided in Figure 4. Polyester is the most dominant of the man-made fibers constituting almost three fourths of the total man-made fibers followed by cellulosic fibers. According to the United Nations, the world per capita production of man-made fibers reached 12.35

¹ In this study, man-made fibers include Polyester, Nylon, Acrylic, cellulosic fibers and other fibers. The term synthetic fiber is used to indicate all the above fibers except cellulosic fiber. As some of the figures have information about cellulosic fibers as well, the title of those figures is mentioned as man-made fibers though the paper focuses upon synthetic fibers.

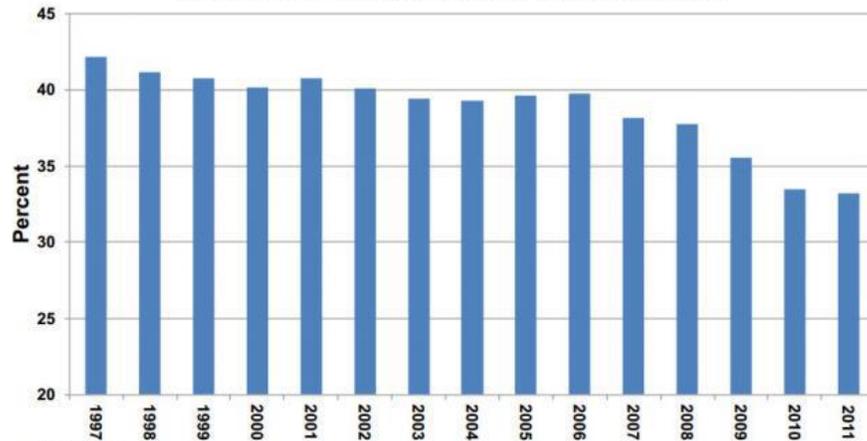
pounds per person in 2000, after more than three percent growth rate during 1995-2000 period, and continued to increase (Textile World, 2004).

Figure 2: World Production of Cotton and Man-Made Fibers (million MT)



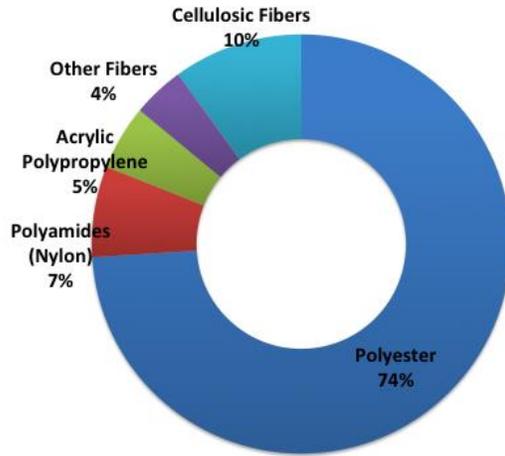
Source: PCI Fibres, ICAC, IVC ev

Figure 3: Cotton Share of Total World Fiber Consumption



Source: FAS, USDA 2012

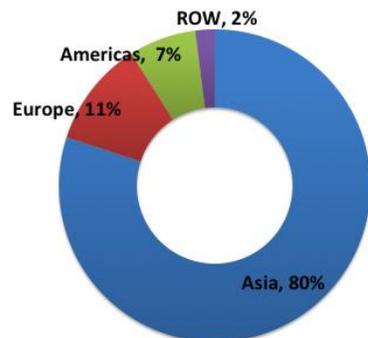
Figure 4: Composition of Man-Made Fibers, 2013



Source: PCI Fibres, IVC ev

Most of the production of the man-made fibers takes place in Asia followed by Europe and USA as seen in the Figure 5. Asian countries like China, S. Korea and India have built large export businesses by vertically integrating fiber, fabric and garment manufacturing industries thereby attaining logistic and other supply chain efficiencies (Mills 2011, Qin 2014). Attractive wages and less stringent environmental regulations than in the US has helped in the establishment of the man-made fiber industry in Asia.

Figure 5: Regional Man-Made Fiber Production, 2013



Source: PCI Fibres, IVC ev

The outlook for major synthetic fibers is summarized below.

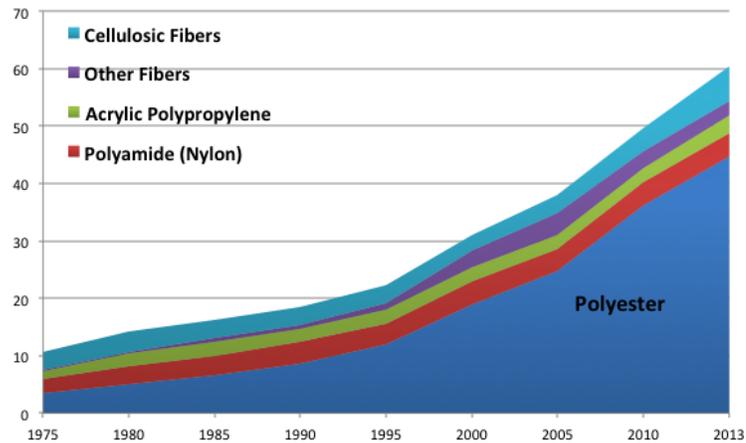
Polyester

The world production of Polyester has grown by more than 7% in the last five years, with most of the growth happening in China. The production in China constitutes almost 65% of the total global production with the total of Asia accounting for about 90% of global production (Mills, 2011). The growth rate of polyester is more than the average growth rate of all other man-made fibers. Almost 3 million metric tons of capacity has been established in China during 2014 alone (Kim, 2015). Countries like South Korea and India have also increased their capacity in the last few years, which is leading to overcapacity in the industry. It is observed that the capacity utilization is less than 70 percent on a global level in the polyester sector. It has also led to decreased profit margins in polyester industry, which is calling for capacity rationalization in various countries. But, due to the increased substitution of cotton by Polyester, it is expected that polyester production is going to grow at 6 percent per annum over the next ten years (Kim, 2015). The limited growth rate of cotton due to high prices (see figure 7) in recent years and fluctuating policies in various countries also contributed to increased polyester use as a substitute for cotton. For example in the active wear market, which is the fastest growing segment in US apparel market (NPD Report, 2014), the cotton active wear is being replaced by polyester and nylon active wear. This is attributed to problems in cotton active wear relative to polyester such as wrinkling, fading and stretchability.

Polyester is also now being considered to be more environmentally sustainable when Life Cycle Assessment (LCA) methodology is taken into consideration. For example, analysis by Kalliala and Nousiainen (1999) found that though cotton fiber production consumes about 40% less energy than polyester fiber in its production, the overall energy use during the life of a cotton product is much higher than the mixed fabrics (50% cotton 50% polyester). This is attributed to higher durability and lower laundry energy requirements during the usage phase of the mixed product. In addition

improved technology pertaining to usage of recycled PET and plant based feedstock for polyester production is being developed (Swift 2014, Uytvanck 2014). This will likely lead to more emphasis on the environmental sustainability of polyester products may create potential competition for cotton acreage in many countries.

Figure 6: World Production of Man-Made Fibers (million MT)



Source: PCI Fibres, IVC ev

The recent dip in the petroleum prices is also impacting the polyester and other synthetic fiber prices, leading to more competition for cotton. As seen in figure 7 below, the producer price index of polyester fiber (which is made from PET- polyethylene terephthalate, a derivative of oil) closely moves with the crude oil prices. Ibanez and Townsend (2015) concluded that if oil prices are around \$50 per barrel, polyester prices will be 25% lower than 2014. As seen in table 1 below, the price of polyester has decreased by almost a third during the period 2013-15 in China, which is the biggest producer of polyester in the world. Even though the price of cotton has fallen during the same period (see table 1 and figure 8), polyester clearly became more competitive compared to cotton. It is expected that there will be little reason for polyester prices to increase as petroleum prices are expected to remain low in the future and given the existing overcapacity in the polyester manufacturing sector.

Figure 7: Producer Price Index of polyester fibers (1989=100) in comparison with the price of crude oil

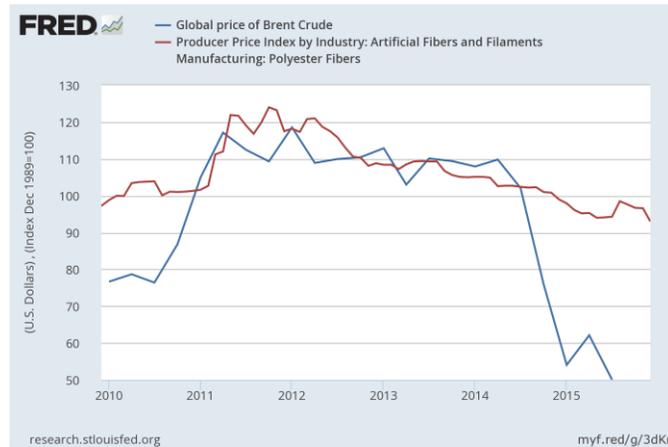


Figure 8: Producer Price Index of Synthetic fibers in comparison with Cotton Fabrics (1982=100)

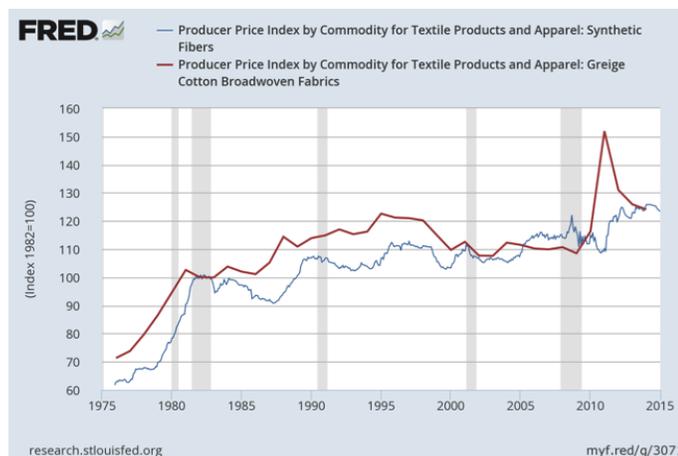


Table 1: Comparison of Fiber Prices (c/lb)

Fiber	Type	Dec-13	Dec-14	Dec-15
Cotton	Cotlook A Index	90	69	71
Polyester	150 Den POY US Delivered	112-118	100-109	94-100
	China (C&F)	63-65	52-54	41-45
Nylon	40 Den Tex US Delivered	365-380	365-380	365-370
	70 Den Weaving Asia (C&F)	153-159	143-148	102-104
Viscose	1.5 Den China (C&F)	77-79	72-76	82-84
Spandex	40 Den, Warp-kni US Delivered	400-480	420-505	420-505
	China	351-377	323-351	241-283

Source: PCI Fibres, ICAC, IVC ev, Author's own calculations

Nylon

Nylon is the oldest synthetic fiber, and is used in various products. The carpet industry is one of the largest users of nylon and it accounts for almost 18 percent of total global usage. Nylon is also being used in various other products like airbags, heavy-duty tires, hosiery and swimwear. However, polyester is now being substituted for nylon in many products such as carpets, tires and many woven industrial apparel. The higher price of nylon relative to polyester is the leading reason for its substitution (see table 1). However, despite these trends it is expected that nylon could grow at a potential growth rate of 1-2 percent per annum through 2025 due to increased demand from markets in China and India (Qin, 2014).

Acrylic fibers

The production of Acrylic fibers is located mostly in China and it has remained stable in the last few years. Polyester is the major competitor to Acrylics due to its lower price, but acrylic fibers are being increasingly used as substituted for wool. The unique chemical resistance of Acrylic fibers finds many uses in water and gas filtration devices thereby finding place in clean water and air initiatives. Acrylic fiber production is expected to grow at an annual rate of 1-2 percent through 2025 due to weak supplies of wool and better manufacturing practices and technologies (Qin, 2014).

Cellulosic fibers

Production of Cellulosic fibers is growing as it is increasingly being used as a substitute for cotton in apparel and home textiles and also due to high usage in nonwovens (Hammerle, 2011). Cellulosic fibers had a steady decline during 1980-2000 period, but recovered after that period due to demand from Chinese markets. It is expected to grow at an annual rate of up to 5 percent through 2025 driven by demand in Chinese market (Qin 2014, Mills 2011).

Conclusions

As observed in our analysis, the threat from synthetic fibers is significant for cotton and may play an important role in defining cotton's future. As mentioned by Lyon (2014), in order to meet the competition from the synthetic fibers, the cotton sector worldwide has to innovate, create new products, new ideas and new technologies to deliver value to the cotton consumer. There is lot of scope for improving the per-capita consumption of cotton in developing countries to levels that are on par with developed countries. The apparel needs of increasing global population especially in the developing countries and their rising purchasing power gives ample scope for increasing the usage of cotton by capturing the 'cotton' needs and 'denim' potential among younger population. Marketing cotton apparel as a 'necessity' rather than a 'luxury' product as it is done in many developing countries presently can also increase the demand for cotton. This can be done through innovative promotion campaigns and creating new cotton products which have characteristics like easiness of washing, anti-wrinkling, better stretching ability, shorter drying times, etc. By improving on the above characteristics, cotton can be made into much more environmentally sustainable product by reducing the energy requirements during its 'usage' phase of its life cycle and bring it closer to the energy requirements of polyester and other synthetic fibers in their 'usage' phase. It is also important to provide superior customer service for consumers while they are purchasing cotton apparel with the help of value chain members through better online shopping experience, etc. The returns from these value added services in cotton markets can be considerable and may create more demand for cotton fabrics.

This study reveals that more work is needed to explore the economics of alternative avenues to stimulate the demand for cotton and understand the competitive forces driving the market beyond traditional supply and demand balances. Additional analytical work to identify the key component of consumer demand for apparel and other products where synthetic fibers are being substituted for cotton is needed. Analysis of how the transportation, handling and merchandising elements of the value chain can better serve consumers in developing countries should be explored. Increasingly the

industry will be faced with allocating scarce resources for research and development among competing needs to enhance and maintain the overall health of the cotton sector. Research emphasis on how to improve the marketing system will likely play an increasingly important role in order for the industry to benefit from the results of research in other areas such as production efficiency.

Acknowledgements

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