THE EFFECTS OF RAW FIBER PRICES ON MILL AND RETAIL DEMAND D. McLaren Cotton Incorporated Raleigh, NC

Introduction

The objective of this research was to identify price elasticity in the demand for cotton at the textile mill and the role of the substitutability of polyester. Do low polyester prices cause the fiber to become more competitive to cotton? The question was raised when polyester prices began falling to record lows after the currency crisis in Southeast Asia began. As currencies in the region fell, exports from those countries became relatively inexpensive. In addition, Indonesia had just installed enough polyester production capacity to become a net exporter. A glut in polyester precursors was causing softness in polyester prices, something that appeared to be a longer-term effect rather than few weeks of inventory clearance. In exploring the effects of the prices, more questions have arisen than have been answered.

It should first be noted that a correlation exists between cotton and polyester prices, as depicted in Figure 1. While cotton prices are more fluid, polyester prices to seem to follow along the same path. Polyester prices appear to be more producer-driven than cotton prices. This has to do with industry structure: where cotton is traded in a competitive market, polyester fits more of a monopolistic competition model. Polyester price changes appear to have a three-month lag from cotton price changes. In other words, at .738, the correlation is strongest between polyester prices and cotton prices when the lag is incorporated.

So what about the substitutability of polyester for cotton at the mill? At any given moment, a textile mill is unlikely to be using 100% of its production capacity. In fact, 85% is more the norm. That means that 15% of the machinery is available to recalibrate to the specifications for polyester when cotton prices become too high. Most likely, the blend of yarn will be changed rather than a complete switch from cotton to polyester or vice-versa. Evidence shows that not much switching does occur and that perhaps it is more likely that the source of product will be changed than the product itself. Looking at U.S. imports of yarns composed of more than 85% cotton makes this a little clearer. Between September 1997 and September 1998, cotton yarn prices for export from Malaysia dropped from \$4.02 to \$3.73 per kilogram and a 174.9% increase in U.S. imports of cotton yarn from Malaysia was seen. During the same period, cotton yarn prices for export from Brazil increased from

Reprinted from the *Proceedings of the Beltwide Cotton Conference* Volume 1:315-317 (1999) National Cotton Council, Memphis TN \$3.48 to \$3.53 per kilogram and a drop in imports from Brazil of 40.3% was experienced.

Data Analysis

For analysis of the retail market, data were compiled from a long-standing panel survey conducted by the NPD group. For mill consumption behavior, data from the U.S. Bureau of the Census were studied. Price information was collected from Cotton Outlook, the USDA and the New York Cotton Exchange.

Correlation of the data shows that cotton's share at the retail market, mill cotton consumption and cotton prices have no significant relationship, either positive or negative. Milldelivered cotton prices and cotton's share at the retail market revealed a correlation of -.05, while mill-delivered cotton prices and mill cotton consumption showed a correlation of .02. A similar pattern is true for polyester. Polyester prices and mill polyester consumption revealed a correlation of -.21. Also, there appears to be no offsetting factor when it comes to polyester and cotton consumption. In other words, drops in polyester consumption are not accompanied by rises in cotton consumption and drops in cotton consumption are not accompanied by rises in polyester consumption. The correlation between cotton consumption and polyester consumption at the mill level is .295. This does not, however, address the use of inventory management.

A regression model of cotton consumption, retail market share lagged six months and mill-delivered cotton prices was attempted, but proved inconclusive. The same held true for polyester consumption, retail market share lagged six months and polyester prices. Table 1 shows the results of the regression.

Given the weak statistical results, one must consider that factors other than price are driving the demand for polyester and cotton and that they are, perhaps, not perfect substitutes for each other. The fact that polyester and cotton prices tend to move together suggests some substitutability, but this is being masked by other behavior in the market.

Discussion

Why would changes in polyester and cotton fiber prices not have a substantial effect on which fiber the mills choose to run? First of all, calibration of machines has opportunity and real costs associated with it. As mentioned previously, not all machines are in use all of the time, so some small amount of switching may occur. It is more likely that the changes will be small blend changes rather than a complete switch from one fiber to another. Mills can adjust their 50-50 blend to a 48-52 blend without having to label their product differently, for example. A consumption-smoothing effect is also evident. If price changes are seen as temporary shocks, consumption continues as normal. Inventory can be used for immediate consumption needs and purchases of raw fiber can be delayed for a short amount of time. Because it is nearly impossible to determine the status of companies' raw fiber stocks, this becomes a difficult part of the analysis. Inventory can be held at the mill or by the merchant or cooperative, making the tracking of purchasing behavior by mills extremely difficult as none of the parties involved in the transactions is likely to divulge the level of inventory being held. Also, as inventory is being used and new purchases dwindle, perceived weaker demand causes prices to fall. Thus, anticipated shocks become almost undetectable.

If changes in prices do not cause a shifting between fibers, the profit margins at the mill level become more volatile. As is evident in the industry today, textile mills that are able to survive swings in raw fiber prices are the ones that endure. The industry structure has moved towards larger firms that can absorb price shocks.

Switching between the sources of fibers is more visible than switching between fibers. U.S. imports of cotton yarns provide a good example. Table 2 shows the changes in import behavior in September 1998 compared with one year previously. In addition to the obvious price advantage in cotton yarn from Malaysia, the Asian currency crisis had weakened the Malaysian Ringgit, making the country's exports relatively cheaper to foreign buyers.

The most obvious conclusion is that the market for raw fibers is consumer-driven. Cotton Incorporated's Lifestyle MonitorTM tracks consumer attitudes and provides some insight into the behavior of the retail market. With 20,000 interviews in the database and 4,200 telephone interviews conducted per year on a national sample of people between the ages of 16 to 70 years old, the survey covers a number of key points affecting the retail market.

When asked what information is important to know before purchasing an item of clothing, 70% of the respondents listed price as the most important. Fabric content was the second most important piece of information, with 49% of respondents. Overwhelmingly, consumers appear to believe that better quality garments are made from natural fibers. Among those responding that they would be willing to pay a higher price for a natural fiber, 76% said that they would pay more for a cotton garment. Cotton is also listed as the fiber best suited for today's fashions. Charts 1 to 4 show the responses to the survey questions.

Given the results of this analysis, one should consider that factors other than price sensitivity drive the decision to produce textiles of a particular fiber. Inventory can play a part in purchases of raw fiber, but are too difficult to track accurately. Other explanatory factors of textile mill's raw fiber purchasing behavior are consumer preferences over time, recessions in the economy and the capital position of firms. Do low polyester prices cause competition for time on the cotton spinning system? From evidence in the U.S., it appears not.

References

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Polyester and cotton prices move together



Figure 1

Table 1

1	Cotton			
	Consumption			
	and			
		R-Square	SE	Significance
	Mill-Delivered Cotton Price	0.205	0.512	0.03
	Cotton's Share at Retail*	0.076	3.3423	0.203
	Polyester			
	Consumption			
	and			
		R-Square	SE	Significance
	Polyester Price	0.169	5735.092	0.051
	Polyester's Share at Retail*	0.005	2.054	0.758

* Lagged six months



Chart 1





Chart 2

Are You Willing To Pay More For A Natural Fiber Such As Cotton, Wool or Silk?



Chart 3

Thinking About Today's Fashions, What Fiber Or Material Do You Think Is Best Suited For Those Fashions?



Chart 4