RELEVANCE OF PRICE INFORMATION TO THE COTTON INDUSTRY

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Abstract

An understanding of the role of price information to the cotton industry is not widespread, despite its relative importance. This paper examines the role of price information to the efficient operation of the cotton industry, the objective being to demonstrate the implications of incorrect price information. Examples from previous research and case studies on variety selection, ginning, contracting, and mill purchasing are used to show that incorrect price information can have implications on both the operational and pricing efficiency of the cotton market. Incorrect price information also has implications for broader issues such as trade, international competitiveness and government policy.

Introduction

All segments of the cotton industry are directly or indirectly affected by cotton price. Cotton producers look at the price of cotton (or what they perceive the price to be at harvest) in making decisions about which variety to plant, how much production inputs to apply, whether or not to forward contract or hedge, and even how to gin the cotton. Merchants/Shippers examine the price being offered by mills to determine what they can pay for the producers' cotton to fill mill orders. Textile mills use the prices of cotton to determine what types and how much cotton to purchase to produce given yarns and fabrics. Even support industries such as seed companies, chemical manufacturers, etc., are affected by the price of cotton.

Buying and selling cotton was a lot less complicated in the recent past, although it was, perhaps, riskier. There were fewer quality designations to contend with, but the quality designations that were present were much less accurate. At present, High Volume Instrument (HVI) grading is the standard in the United States (U.S. Dept. of Ag., 1993) and is being adopted in many other countries. HVI has increased the number of objective, reproducible quality designations given to each bale of cotton, which has greatly increased the number of potential quality combinations that a bale or lot of cotton can have (there are now over 800,000 potential combinations using the quality designations reported by USDA). Increased measurement precision of cotton lint characteristics has enhanced the efficiency of the market, in general, by providing market participants with more accurate information on the quality of cotton. However, increased information on quality has not improved the information available in the market on prices of different quality combinations of cotton.

The objective of this paper is to demonstrate the relevance of accurate price information to the cotton industry. The paper presents a brief description of the role of prices in the marketplace, a summary of existing price information, followed by case studies and research results to demonstrate how price information affects decisions. Finally, some conclusions will be offered.

The Role of Prices in the Cotton Market

Prices are the guiding force in any commodity market. Price signals direct activities in the market so that resources are allocated to their best end-use. Figure 1 shows the general flow of price signals in a cotton market. Part of the price signals come from the textile mill level because that is the point where the end-use value of the cotton is determined. This is the "demand" determined component of the price. Textile mills must determine what products to produce according to what textile products the consumers demand. Once the mill has decided what to produce, they purchase the range of cotton qualities needed to produce the end product(s), realizing that some qualities are more efficient than others in different processes. Each quality has a *use-value* to the textile mill, which is driven by how that cotton quality affects the end product (yarn or fabric). The combination of the values of each cotton quality attribute represents the use-value of a particular quality of cotton.

The process would be greatly simplified if each mill could merely determine the use-value of each quality of cotton, then offer that value as a price. However, market operations are more complex. The *market demand* is an aggregation of the individual textile mills' demands. Each mill may be producing a different end product, using different spinning technologies, or both. This means that the individual mills' use-values, and thus, demands for cotton quality attributes will differ, resulting in an array of potential prices.

On the other side of the market is the *availability*, or supply, of the fiber attributes. Availability of fiber, and the attributes embodied within the fiber, can be affected by many things, some under the control of farmers and ginners (e.g., varieties planted, cultural practices, lint cleaning, etc.) and some are random (e.g., weather related forces). When the set of both supply and demand forces merge in the market, the result is a "price structure," which is most often viewed as (1) a

"base" price (price for color grade 41, staple 34, leaf grade 4, micronaire 3.5-4.9, and 24 and 25 grams/tex strength), and (2) an array of quality premiums and discounts around that base price.

How does *price information* fit into all of this? Part of the answer is that these prices (especially the premiums and discounts) are not known with certainty. That is, the values for the qualities are not observable in the market. The market does price *cotton*, but the values of the individual fiber attributes are hidden within these prices. All the participants in the value chain rely on external information (e.g., the DSCQ or CCC loan schedule) on prices, premiums, and discounts on which to base decisions. The interaction of supply and demand generates a price structure, but information on that price structure must be derived or estimated. Thus, the accuracy of the information is important to decision-makers within the cotton marketing system.

The complexity of the grading and pricing systems in cotton makes it difficult to discern what prices for various qualities are today, much less in the future. The intertwined complexities of grading and pricing prevent most from knowing what prices were yesterday. Price (and particularly premium and discount) information is important because it allows participants in the cotton market to observe what has been happening in the market to form expectations and make decisions. If that information is not available, participants have little knowledge about the values of cotton of different qualities, and thus are more likely to make errors in decisions.

Price Information

There are currently two widely available sources of price information to the cotton industry. The Daily Spot Cotton Quotations (DSCQ), published daily for seven designated market regions by the Agricultural Marketing Service, USDA is one source (U.S. Dept. of Ag., Daily Issues). The other is the Commodity Credit Corporation's (CCC) loan schedule. The CCC loan schedule is formulated by averaging the first seven months of the marketing year of the DSCQ with the previous year's CCC loan schedule (U.S. Dept. of Ag., 1992). Given this relationship, the two sources of price information are related, and the premiums and discounts from the DSCQ do not deviate significantly from those of the CCC loan schedule (Hudson, Ethridge, and Chen). This relationship between the DSCQ and CCC loan schedule makes the premium/discount structure in the loan schedule change relatively little over time.

The price information provided by the DSCQ have been shown to be inaccurate for the Southwest region (Hudson, Ethridge, and Brown), which has led to substantial differences between the CCC loan schedule and market premiums and discounts (Carr and Ethridge) (there is currently no evidence on other regions because objective measurements of other regions have not been made).

Hudson, Ethridge, and Brown found that the DSCQ did not represent the producer market in the Southwest in terms of level of prices, structure of premiums and discounts, and day-to-day movement of prices. Carr and Ethridge found, after adjusting the CCC loan schedule with market premiums and discounts rather than the DSCQ, that the actual CCC loan schedule deviated significantly from the market-adjusted loan schedule, especially in the lower qualities of cotton.

The first requirement for the efficient operation of the cotton market has been fulfilled, that being that price information is being provided to the market. However, the research results presented above indicate that the information that is being provided is incorrect. Does it matter? The answer to this question is "yes." If market participants are utilizing this information to make decisions, they are making incorrect decisions. If the market participants are not utilizing this information to make decisions, they are making decisions in the absence of information which can also lead to incorrect decisions. This creates both operational and pricing inefficiencies in the market. That is, producers (both cotton and textile) cannot optimize with respect to revenues and costs (operational inefficiency). The marketing system is also unable to efficiently allocate different qualities of cotton to their optimal end-use (pricing inefficiency).

Examples of Importance of Price Information

The importance of price information, as a conceptual problem has been addressed (Hudson, Ethridge, and Segarra). This section provides some empirical examples that demonstrate the relevance of price information across many industry segments. What follows is based on empirical research and case studies, but is not an exhaustive listing of all the potential impacts. Rather, this collection of empirical examples is provided to illustrate the breadth of impacts of incorrect price information.

Variety Selection/Plant Breeding
Beddow, Elam, and Lopez have developed a system that facilitates the evaluation of cotton genotypes based on lint and seed revenues, allowing lint to be valued using either the CCC loan schedule or the DPES measures of prices and quality premiums and discounts (in the Texas-Oklahoma markets). Using variety data from the 1992-1994 period (Gannaway et al.), 1994 prices from the two sources (Hudson and Ethridge; U.S. Dept. of Ag., 1994), and comparing two specific irrigated cultivars--Ranger BB-53 and Paymaster HS-200--in the Lubbock area, the two sets of price information lead to different conclusions about the most profitable variety. In this instance, the DPES (market) premiums and discounts show that Ranger BB-53 provides greater revenue than does Paymaster HS-200 (by $3.16/acre), while the CCC loan schedule shows Paymaster HS-200 to have the greater revenue (by $11.99/acre).

Which is correct? The DPES has been documented to be the most accurate indicator of the structure of *market* prices

developed to date (Brown et al.; Brown and Ethridge; Hudson, Ethridge, and Brown). The CCC loan provides the premiums and discounts applied to the cotton for cotton relinquished to government ownership, yet many buyers and sellers *assume* that the loan structure is a reasonably accurate indicator of the market price structure. The reason for this assumption is not clear, but likely relates to the long-term reliance of the market on the loan and the general familiarity with the loan; since the loan schedule is fixed, stable, and known before-the-fact, it is easy to use.

It should be noted, however, that these two sources of information do not always differ. The same analysis as above was conducted for the Halfway growth area, but showed that the market and loan schedule produced the same rankings for the varieties; this is because the performance of the varieties differs between the locations.

Gin Lint Cleaning

An important decision the producer faces is how aggressively to lint clean the cotton. Procedures were developed to determine the optimum number of lint cleanings in stripper-harvested cotton (Bennett, Misra, and Brashears). These models were then applied using three alternative estimates of price structures for the 1995 crop--the DPES, DSCQ, and CCC loan schedule--for six irrigated varieties of cotton, each with early, mid, and late-season harvest (Misra et al.).

Results show that the optimal number of lint cleanings differ substantially depending on the price structure assumed for the cotton. The market (DPES) price structure indicated that one lint cleaning was optimal in all of the situations analyzed, and that a second lint cleaning reduced producers' income by an average $4.50/bale of cotton. The DSCQ price structure indicated that two or three lint cleanings was optimal in 50% of the situations and the CCC loan schedule indicated more than one lint cleaning was optimal in 83% of the situations analyzed. Consequently, *assuming* a structure that deviated from the market leads to both a loss of income to farmers and the creation of inefficiencies in mill processing.

Contracting

The following is not a research example, but is an instance of a producer's decision regarding forward contracting his 1997 crop which serves to illustrate the implications of incorrect information in a situation normally encountered by cotton producers. In mid-March, 1997, a producer in West Texas was considering an offer to contract his 1997 crop at 70 cents/pound, base quality. At that point, December, 1997 futures market prices were at about 78 cents/pound. The producer noted the basis of 8 cents/pound and concluded that the offer price was too low.

How did the producer arrive at this conclusion? He compared the previous year's December futures prices as the market approached delivery to the base prices reported in the DSCQ; these are shown in Table 1. The basis between those two prices was 3.9 cents/pound. He reasoned that the price

(basis) he was being offered by the merchant was too small (large). However, the actual average base price received by producers in the West Texas market during that period was 63.39 cents/pound for base quality and 63.88 cents/pound was the average price across all qualities. Thus, the actual basis was about 9 cents/pound. The producer then concluded that the contract he was being offered was "fair" once he had knowledge of the actual basis. If this producer had not sought out the correct information, he would have foregone the contract. The central issue in this example is that even those who devote substantial effort to marketing may make poor decisions if their market information is incorrect.

Textile Mills' Purchasing Decisions

This case relates to the purchasing of cotton for manufacturing and the effects of a lack of market premium/discount information, or outdated information, rather than misinformation. Research on the premiums and discounts paid for cotton fiber attributes by textile mills over the 1992-1994 period (Chen, Ethridge, and Fletcher) showed, among other things, that mills were paying the highest prices for cotton with 3.3-3.4 micronaire in the Southwest production region (but not from the other production regions). These results were available to the participants in the study (about 40% of U.S. mill use of cotton) in 1994, and were presented at the Beltwide Cotton Conferences (Chen and Ethridge) and the Engineered Fiber Selection System Conference (Ethridge, Chen, and Hudson) in 1995. Early in 1997, the analysis was updated using 1994-1996 data. One of the findings was that the highest valued micronaire for Southwest cotton had shifted to about 4.8, which appeared to be a drastic shift from previous results.

Subsequent discussions with several cotton buyers for mills revealed what had likely happened. Buyers *assumed*, based on the information that they had, that the higher micronaire cotton was lower in price, so individual buyers began to shift their quality specifications. However, as many of them shifted, they (unknowingly) bid up the price of higher micronaire cotton from the Southwest region, which seems to explain the large shift in micronaire values. First, this illustrates how dynamic the markets for fiber properties can be, and how important it can be for buyers and sellers in the market to operate with price and price differential information that is as accurate and current as possible. Second, it illustrates how an absence of price differential information can produce pricing anomalies.

Broader Implications

The impacts of incorrect price information are not limited to the examples stated above. Price information also has impacts on broader issues such as trade/international competitiveness and policy. These issues are less apparent to individual producers, merchants, or textile manufacturers, but the effects are equally relevant; they affect everyone in the industry.

The competitiveness of U.S. cotton and textile producers is an important determinant of global trade flows of cotton and textiles. Consider, for example, the competitiveness of U.S. textiles in the global market and the textile exports that result. Textile producers in developing countries typically have a competitive advantage over U.S. producers in terms of labor costs, while U.S. textile firms have an advantage in terms of processing speed and efficiency, based in part on information technology, including HVI. The productivity of U.S. firms is dependent on the accuracy of information on the quality of the cotton being processed, which results in strict cost control. If information on the cost of the cotton fiber attributes to be processed is inaccurate, it reduces processing efficiency, raises costs, and can reduce the competitiveness of U.S. textile manufacturers.

An example of the potential impacts of incorrect price information through policy may be understood by considering the Step 3 mechanism within the competitiveness provisions of the 1996 Cotton Program. Imports of cotton lint into the U.S. are quota controlled. If the *spot quotation* price of U.S. cotton stays above the "world price" (the A-Index, which is also a quotation and not an actual price) by a designated amount for a specified period of time, imports of cotton are allowed. The purpose of this mechanism is to allow U.S. textile mills to stay competitive with textile mills around the world in terms of the purchase price for cotton by limiting the price spread between U.S. and other countries' cotton. However, if the quotation price is different from the market price, the import trigger mechanism fails to operate as the policy intended. In short, incorrect price information affects how the Step 3 mechanism is applied, which, in turn, affects cotton imports, U.S. cotton prices, and many other aspects of the U.S. cotton industry.

Conclusions

This paper addresses the relevance of price information to the cotton industry by showing the effects of price information using both research results and case studies. The cases described in this paper represent selected illustrations of the many effects of price information. Producers need accurate price information to make production and marketing decisions. In turn, these decisions have impacts on groups such as plant breeders, ginners, etc. The importance of price information is not limited to the cotton production sector. Merchants have a stake in accurate price information to be able to effectively fill orders and demands by textile mills. Textile mills need accurate information to be able to minimize costs while producing products demanded by consumers. The more decision-makers know about the market situation, the more likely they will make correct decisions. Thus, the accuracy of the information they are provided is important to these decisions.

Acknowldegements

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Table 1. DPES Estimated Average Producer and Base Prices, Average DSCQ Base Price, and Average December Futures Price for November 1 through December 6[1], 1996.

Source	Average Price
DPES[2]--All Qualities	63.88
DPES[2]--Base	63.39
DSCQ[3]--Base	68.85
December Futures	72.75

[1] Last Trading Day of December, 1996 contract.
[2] Source: Daily Price Estimation System, Texas Tech University, Daily Reports.
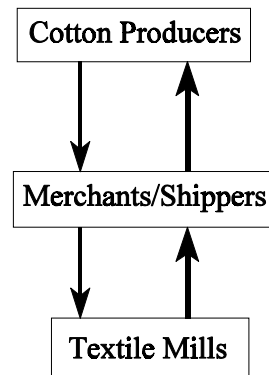[3] Source: U.S. Dept. of Ag. "Daily Spot Cotton Quotations." USDA/AMS, Daily Issues.

Figure 1. General Flow of Price Information through the Market Channel.