The *Journal of Cotton Science* 2:68-76 (1998)
http://journal.cotton.org, © The Cotton Foundation 1998

CONTEMPORARY ISSUES

Cotton Market Price Information: How it Affects the Industry

Don Ethridge* and Darren Hudson

INTERPRETIVE SUMMARY

Prices guide the production, marketing, and consumption of cotton. Knowledge of prices by buyers and sellers is essential for effective decision-making. However, cotton prices are not known with certainty because of the diversity of quality attributes and end-uses. There are more than 800 000 potential quality combinations of cotton based on the quality designations recognized by the U.S. Department of Agriculture (USDA). Each quality can potentially have a different price. In practice, participants in the cotton market rely on price information that is generated externally (i.e., generated by someone else). Knowledge of the "structure" of the price—the general level of price and the differences for different qualities (premiums and discounts)—is an integral part of the decision-making process.

The USDA provides price, premium, and discount information to the cotton market on a daily basis in the form of the daily spot cotton quotations (DSCQ). The Commodity Credit Corporation's (CCC) loan schedule has also historically served as a basis for price information for the cotton industry. However, the DSCQ has been shown not to represent producer market prices, premiums, and discounts in the Southwestern cotton markets, and there is increasing evidence that they do not represent prices at the mill-level of the cotton market. Because of the formulation of the CCC loan schedule, the errors in the DSCQ affect the loan schedule as well. Thus, it appears that the price information provided to the market is not accurate.

The question becomes, "Does it really matter?" The answer to that question is "yes." If cotton producers do not possess correct information about quality differentials (premiums and discounts), they are more likely to make incorrect decisions. For example, previous research indicates that in 1995 one lint cleaning for stipper-harvested cotton was optimal in all cases analyzed (six varieties across three harvest dates) when market premiums and discounts were used, while the DSCQ and the CCC loan schedule indicated that two or more cleanings were optimal in 50% or more of the cases. More than one lint cleaning cost producers an average of $4.50/bale. Discrepancies can also occur in variety selection. The CCC loan schedule and market premiums and discounts show differences in rankings of varieties on the basis of returns per acre. Marketing decisions on matters such as contracting are also affected by incorrect price information.

The impacts of incorrect price information are not limited to the cotton production sector. Textile mill buying behavior is affected as well. Analysis of textile mill purchases showed over the 1992–1994 period that the highest priced micronaire for Southwest cotton was in the 3.3 to 3.4 range. Updated analysis (1994–1996) showed that the highest price micronaire was 4.8. This shift was caused, at least in part, by the *perception* that the higher micronaire was less expensive. The shift in buying behavior represents rational decisions in the absence of information. Had mills possessed timely and accurate information, they could have seen that the shift to the higher micronaire was shifting the demand structure for micronaire and increasing the price of higher micronaire cotton. The loss in efficiency associated with these types of incorrect decisions can increase costs, reduce

D. Ethridge, Dep. of Agricultural and Applied Economics, Texas Tech University, Lubbock, TX 79409-2132; and D. Hudson. Dep. of Agricultural Economics, Mississippi State University, Box 9755, Mississippi State, MS 39762. Paper no. CER-97-17, Dep. of Agricultural and Applied Economics, Texas Tech University. Received 15 Aug. 1997. *Corresponding author (ethridge@ttu.edu).

Abbreviations: CCC, Commodity Credit Corporation; DPES, daily price estimation system; DSCQ, daily spot cotton quotations, EFS, engineered fiber selection; HVI, high volume instrument; VMP, value of the marginal product.

incomes, and reduce the international competitiveness of the U.S. cotton/textile industry.

The examples provided in this paper demonstrate that incorrect price information (and the lack of price information) has an impact on such diverse issues as variety selection, ginning, contracting, and mill-buying behavior. The implication of these examples is that correct price information is relevant to everyone in the industry. Recognition of the role of price information in the cotton industry is essential for the efficient operation of the market. The cotton industry is rapidly moving into the information age. Techniques and technology for generating and rapidly disseminating accurate information now exist to move cotton market information into the information age as well.

ABSTRACT

Price information is relevant to all sectors and participants in the cotton industry, but understanding of the roles of price information by industry is not widespread. This paper examines the role of prices and price information in the operation of the cotton industry. More specifically, the objective is to demonstrate the implications of incorrect price information on the efficiency of the cotton and textile sectors. Research examples and case studies are used to demonstrate the implications of incorrect price information on different segments of the cotton industry. These case studies and results from previous research indicate that incorrect information can affect both the operational and pricing efficiency in the cotton market. These are examined with cases from variety selection, ginning, contracting, and mill purchasing. Incorrect price information also has an impact on broader issues such as trade, international competitiveness, and government policy.

Prices influence production, marketing, and consumption decisions in the cotton market. Each participant in the marketing system (i.e., cotton producers, merchants/shippers, and textile manufacturers) must have knowledge of prices to make effective decisions. Not too long ago, buying and selling cotton was much less complicated, although perhaps riskier, than it is today. There were fewer quality designations to contend with, which meant much less complexity in pricing cotton of different qualities. However, quality designations that were present were less accurate, which introduces its own complexities.

Today, high volume instrument (HVI) grading is the standard in the USA (USDA, 1993) and is being adopted in many other countries. HVI has expanded the number of quality designations given to a bale of cotton, which has permutated the potential combinations of qualities that a bale or lot of cotton can have (there are now more than 800 000 potential combinations). The increased precision in measurement of cotton lint characteristics has increased the efficiency of the market in general by providing market participants with more accurate information on quality. It has not, however, improved the information available in the market on prices of different quality combinations of cotton. In fact, the increased intricacy of the grading system has increased the complexity of cotton pricing and market price information.

The combined complexity of the grading and pricing systems in cotton makes it difficult to ascertain the prices for the various quality combinations. In fact, the complexity of the grading and pricing system prevents most market participants from knowing what the prices, premiums, and discounts were yesterday. Price (including 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. In the absence of that information, participants have little knowledge about values of cotton of different qualities, and are thus subject to a higher probability of error in making decisions.

The purpose of this paper is to examine the relevance of price information to the cotton industry. Because price information is important to the entire cotton industry, the following discussions, intended for a general audience, are framed in terms to which each segment of the cotton industry can relate. The first section uses economic reasoning to demonstrate the relevance of price information (and incorrect price information) in production, consumption, and marketing decisions. The second section uses previous research and case studies for different segments of the industry to illustrate some of the implications of incorrect price information. Finally, some conclusions are offered.

How Prices Guide Consumption, Marketing, and Production

Price signals originate, in part, at the mill level because this is the point where the end-use value of the cotton is determined. This is the "demand" determined component of the price. Mills must determine what products to produce according to consumer demands for textile products. Once this determination has been made, they purchase the range of cotton qualities needed to produce the end product(s). Some qualities are more efficient than others in different processes, but there is at least a range of qualities of cotton that can be effectively substituted. Each of the attributes (color, strength, length, etc.) has a *use-value* to the mill. Economists recognize this as the value marginal product (VMP) of the fiber attribute, or the individual firm's demand for the attributes, which varies as the amount of the attribute used in the mix varies. Fiber attributes are generally hypothesized to exhibit diminishing marginal productivity. That is, each attribute (e.g., strength) has a value to the textile mill in the production of yarn, but its additional value diminishes as the amount of the attribute increases. The combination of the values of each quality attribute in yarn production represents the use-value of a particular quality of cotton (cotton with a particular combination of fiber attributes).

It would be simple 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 substantially more complex. The *market demand* is an aggregation of the demands of individual textile manufacturer's demands. Individual firms are producing different end products. These firms need different fiber attributes and use various technologies (e.g., ring vs. rotor spinning), which value fiber attributes differently. Aggregation (combination) of individual firms' demands for attributes results in a set of market demands for these fiber attributes, which are all interrelated because the performance of most attributes in the manufacturing process depends on how they are combined with other attributes. For example, if $S_y = f(S_f, L_f, M_f)$, where S_y is yarn strength, S_f is fiber strength, L_f is fiber length, and M_f is micronaire, then S_f, L_f, and M_f may be interactive in the production of yarn strength.

On the other side of the market is the *availability*, or supply, of the fiber attributes. Availability of fiber, and the attributes of the fiber, can be affected by many things, some under the control of farmers and ginners (e.g., varieties planted, cultural practices, and lint cleaning) and some are random variables (e.g., weather-related forces). The use-value of an attribute to the textile mill represents an upper-bound on the price a mill would be willing to pay for an attribute, but market supply conditions often determine that the attribute can be purchased for less.

When the complex set of both supply and demand forces merge in the market, the result is a "price structure," which is most often viewed in operational terms by the buyers and sellers of cotton as (i) a "base" price (price for color grade 41, staple 34, leaf grade 4, micronaire 3.5–4.9, and 24 and 25 g/tex strength), and (ii) an array of quality premiums and discounts around that base price.

Given the general perspective of how prices are established, what is the relevance of price information? 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 prices *cotton*, but the values of the fiber attributes are hidden within these prices. All participants in the value chain rely on external information on prices, premiums, and discounts on which to base decisions. The interaction of supply and demand naturally generates the price structure, but specific information about that price structure must be derived (estimated). The value of market information is well understood, having been the object of study since Stigler's groundbreaking work in 1961 (Stigler, 1961). Most of the literature on the value of information, however, *assumes* that the information available to market participants is *correct*. What if the information is incorrect/inaccurate? How does it affect individual decisions and market behavior?

There are currently two sources of widely available price information for the cotton industry. One is the DSCQ, published by the Agricultural Marketing Service (USDA, Daily Issues). The DSCQ is produced daily for each of seven designated market regions. The other is the Commodity Credit Corporation's (CCC) loan schedule. The CCC loan schedule is formulated by

averaging the first 7 mo of the marketing year of the DSCQ with the previous year's CCC loan schedule (Acting Director, Cotton, Grain, Rice Support Division, personal communication). Thus, the two sources of price information are related. The premiums and discounts from the DSCQ do not deviate significantly from those of the CCC loan schedule (Hudson et al., 1996b), making the premium/discount structure in the loan schedule change relatively little over time.

The DSCQ price information has been shown to be inaccurate for the Southwest Region (Hudson et al., 1996a), which has led to substantial differences between the loan schedule and the market (Carr and Ethridge, 1996). There is currently no evidence of the accuracy of the DSCQ in other production regions because objective measurements of the price structure have not been made. Hudson et al. (1996a) found that the DSCQ did not represent the producer market in terms of level of prices, structure of premiums and discounts, or day-to-day movement of prices. Carr and Ethridge (1996) found, after adjusting the CCC loan schedule with market premiums and discounts, that the actual CCC loan schedule deviated significantly from a "market-adjusted" loan schedule, especially in the lower qualities of cotton.

These results are important because they show that the sources of price information that are available to the market do not accurately represent *market* prices. But does it matter? What difference does it make if the reported prices are wrong? The answer to the first question is "yes." If market participants are using this information to make decisions, they are making incorrect decisions. This creates both operational and pricing inefficiencies in the market. That is, producers cannot optimize with respect to revenues and costs (operational inefficiency). This applies to both cotton and textile producers. The marketing system is also unable to efficiently allocate different qualities of cotton to their optimal end-uses (pricing inefficiency).

Inaccuracies have direct implications for the operational and pricing efficiency of the cotton market (Hudson et al., 1997). To explain the general impact of inaccuracies, assume that a farmer has made a decision to plant cotton. Once that decision has been made, the farmer must make the decision about how much input to use based on how that input affects production (marginal physical product), the price of that input, and the price of cotton (in this example, the "input" is the combination of all inputs in cotton production, and is labeled I in Fig. 1). If there was no difference in price on the basis of quality (i.e., no premiums and discounts) and the price of the input was *r*, the optimal decision for the producer would be to use the input at a rate of I_1 in Figure 1; this is given by the intersection of the value marginal product curve with the input price, where the value marginal product is the price of cotton multiplied by the marginal product of *I*. This says that the value of the last unit of the input used in the production of cotton will equal what that unit cost the farmer. Thus, profit will be maximized with respect to input use.

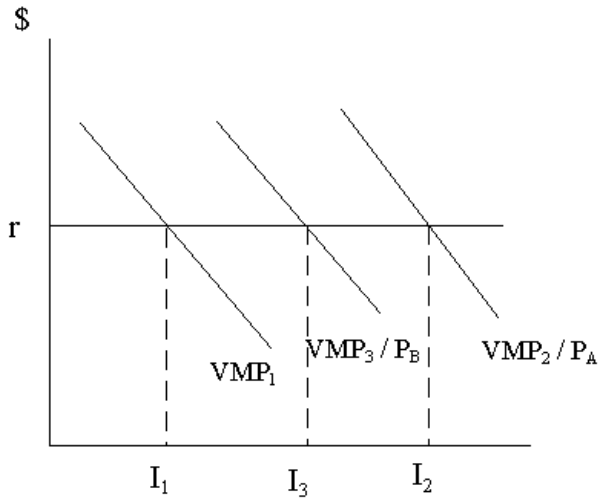

Fig. 1. Impacts of a quality premium on the optimal input usage decision of a cotton producer.

If a quality premium of size A were available in the market, this would increase the effective price of cotton to the producer to P_A if he/she could improve quality. To do this, a higher level of input would have to be used to achieve that improvement (e.g., different ginning practices, different seed varieties, etc.). Assuming that the producer *knew* this quality premium in the market, the optimal decision to maximize profits would be to increase the usage of the input to I_2.

Because these premiums are not directly observable in the market, the farmer must rely on external information on which to base the input decision. If that information is incorrect and reports a smaller premium of size B (price P_B), the farmer

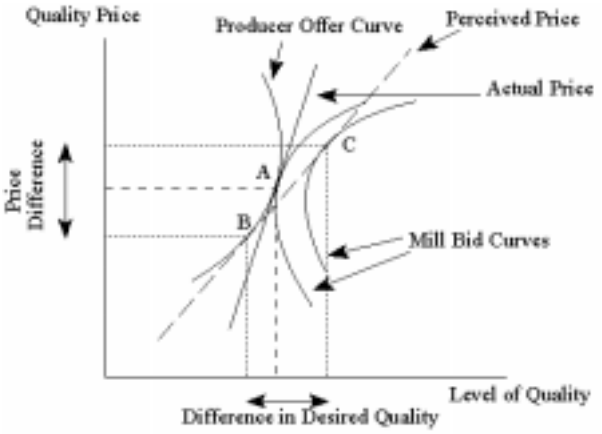

Fig. 2. Effects of incorrect price information on market exchange and pricing efficiency.

would "under-use" the input, thereby reducing income and producing cotton of less quality than dictated by the market premium of A. This process also works in reverse for discounts and is applicable to textile mill use decisions as well.

The implication of this conceptual analysis is that price information, including incorrect price information, has an impact on the operation of the entire industry. The analysis above illustrates the implications in terms of operational efficiency, but incorrect price information has implications for pricing efficiency as well. Figure 2 conceptually shows the interface between the textile mill component of the market and the cotton producer component in the exchange of a particular quality of cotton. The market with perfect price information will equate the mills' willingness to pay for that quality (the "bid curve") with the producers' willingness to produce that quality (the "offer curve") at a point A in Figure 2 (Rosen, 1974). The result is an optimal exchange of that quality at an optimal price.

If the incorrect market price information showed a different price structure for that quality (the "perceived" price line), however, a non-optimal result would follow. The *perceived* price structure would guide producers to produce a different level of that quality (point B) than is demanded by the mills (point C), leading to a disequilibrium in price and quantity for that quality attribute. This result is exacerbated when trade-offs between qualities are possible (Hudson et al., 1997). Via this mechanism, incorrect price information generates operating inefficiency for both farmers and mills.

Empirical Studies

The empirical evidence on these impacts of price information and misinformation is limited, but that which exists is consistent with the concepts above. Some of the evidence presented is based on empirical research and some relies on case studies. In this section, evidence relating to four industry functions is provided—on variety selection, ginning, contracting decisions, and mill-purchasing decisions. It is important to note that these are merely illustrative, not an exhaustive listing, of the ways that price information and its reliability impact the economic performance of the cotton/textiles industry complex.

Variety Selection/Plant Breeding

A system developed by Beddow et al. (1997) facilitates the evaluation of cotton genotypes based on lint and seed revenues. The model allows lint to be valued using either the CCC loan schedule or the daily price estimation system, DPES (Brown et al., 1995), measures of prices and quality premiums and discounts in the Texas-Oklahoma markets. The DPES is an econometric price estimation system for the Texas and Oklahoma markets (Brown et al., 1995). Using variety data from 1992 to 1994 (Gannaway et al., 1995), 1994 prices from the two sources (Hudson and Ethridge, 1995; Acting Director, Cotton, Grain, and Rice Support Division, personal communication), and comparing two specific 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 $7.81/ha or $3.16/acre) while the CCC loan shows Paymaster HS-200 to have the greater revenue (by $29.63/ha or $11.99/acre).

Which one is correct? The DPES has been documented to be the most accurate indicator of the structure of *market* prices developed to date (Brown and Ethridge, 1995; Hudson et al., 1996a). The CCC loan provides the premiums and discounts applied to the cotton for cotton relinquished to government ownership, yet many buyers and sellers in the market *assume* that the loan structure is a

reasonably accurate indicator of market price structure. The rationale for this assumption is unclear, but it likely relates to the long-term reliance of the market on the loan and people's familiarity with the loan; since the loan schedule is fixed, stable, and known before-the-fact, it is easy to use. However, the DSCQ and the loan deviate from the market, at least in the Texas-Oklahoma markets (Carr and Ethridge, 1996). Thus, reliance on it as a market indicator can lead to the wrong conclusions about relative profitability of varieties, as illustrated above.

The different sources of price information do not always indicate different optimal variety choices, however. The same analysis as above conducted at Halfway, TX, showed that the market and the loan schedule produced the same ranking for the varieties; this is because of the performance of the varieties differs between the two locations.

Gin Lint Cleaning

One important decision in ginning is how aggressively to clean lint cotton. Bennett et al. (1997) developed procedures to determine optimum number of gin lint cleanings in stripper-harvested cotton using both GINQUAL (Barker et al., 1991) and GINMODEL (Gillis et al., 1995). Misra et al. (1997) applied the models using three alternative estimates of price structures for the 1995 crop—the DPES, the DSCQ, and the CCC loan. They analyzed six irrigated varieties of cotton, each with early, mid-, and late-season harvest, for a total of 18 situations.

Results show that prescriptions for lint cleaning differ substantially depending on the price structure assumed for the cotton. The DPES (market) 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 of $4.50/bale of cotton. It also results in "over-ginned" (too aggressively cleaned) cotton for textile manufacturers, thereby reducing the efficiency in the textile mill. 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 in 83% of the situations analyzed. Consequently, *assuming* a structure that deviated from the market led to both a loss of income to farmers and the creation of inefficiencies in mill processing.

Table 1. Daily price estimation system (DPES) estimated average producer and base prices; daily spot cotton quotations (DSCQ) base price; and December, 1996 futures prices ($/kg) for November through December, 1996.

Date	Average producer price†	DPES base price†	1996 December futures price‡	DSCQ base price‡
1 Nov. 1996	1.40	1.37	1.59	1.54
4 Nov. 1996	1.40	1.39	1.66	1.52
5 Nov. 1996	1.40	1.37	1.59	1.51
6 Nov. 1996	1.42	1.36	1.57	1.51
7 Nov. 1996	1.36	1.40	1.57	1.53
8 Nov. 1996	1.39	1.36	1.57	1.51
11 Nov. 1996	1.37	1.38	1.56	1.51
12 Nov. 1996	1.30	1.34	1.55	1.46
13 Nov. 1996	1.38	1.31	1.56	1.47
14 Nov. 1996	1.40	1.40	1.59	1.50
15 Nov. 1996	1.40	1.37	1.57	1.49
18 Nov. 1996	1.41	1.40	1.59	1.51
19 Nov. 1996	1.41	1.39	1.59	1.51
20 Nov. 1996	1.41	1.39	1.59	1.51
21 Nov. 1996	1.42	1.41	1.64	1.51
22 Nov. 1996	1.42	1.39	1.62	1.52
25 Nov. 1996	1.41	1.42	1.61	1.52
26 Nov. 1996	1.42	1.42	1.62	1.51
27 Nov. 1996	1.44	1.42	1.65	1.52
2 Dec. 1996	1.45	1.44	1.66	1.54
3 Dec. 1996	1.42	1.42	1.64	1.54
4 Dec. 1996	1.39	1.47	1.61	1.54
5 Dec. 1996	1.42	1.42	1.63	1.53
6 Dec. 1996§	1.46	1.43	1.65	1.53
Avg.	1.35	1.34	1.54	1.45

† Source: Daily Price Estimation System. Daily reports. Texas Tech University.

‡ Source: U.S. Dept of Ag. daily issues. Daily spot cotton quotations. Agricultural Marketing Service.

§ Last day of trading for December contract.

Contracting

The following evidence is not a research example, but is an instance of a producer's decision regarding forward contracting of his 1997 crop. In mid-March, 1997, a producer in west Texas was considering an offer to contract his 1997 crop at $1.54/kg (70 cents/lb), base quality. At that point in time, December 1997 futures market prices were about $1.72/kg (78 cents/lb). The producer noted the basis of 18 cents/kg (8 cents/lb) and concluded that the offer price was too low.

What was his assessment based on? He compared the previous year's December futures market 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 9 cents/kg (4 cents/lb). Thus, he reasoned, the price (basis) he was being offered by the merchant was too small (large). However, the actual base prices received by producers in the west Texas market during that period were $1.34/kg for base quality (column 2, Table 1) and $1.35/kg across all qualities (column 1, Table 1). Thus, the actual basis was about 20 cents/kg (9 cents/lb). Consequently, the producer decided that the contract he was being offered was "fair" once he had knowledge of the actual market prices, but if he had not sought out the correct information, he would have foregone the contract based on information that he *assumed* to be accurate. Most farmers, even those who devote substantial effort to marketing, may make poor marketing decisions if their market information is inaccurate, and merchants may fail to establish needed contracts because of that information.

Textile Manufacturers' Purchasing Decisions

This situation deals with the impact of the absence of market price information rather than the impact of misinformation. This case relates to the purchasing of cotton for manufacturing and the effects of a lack of market premium/discount information, or perhaps outdated information.

Research on the premiums and discounts paid for cotton fiber attributes by textile mills over the 1992–1994 period (Chen et al., 1997) showed, among other things, that mills were paying the highest prices for 3.3 to 3.4 micronaire for cotton from 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, 1996) and the Engineered Fiber Selection System Conference (Ethridge et al., 1995) 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.

Subsequent discussions with several cotton buyers for mills revealed what had likely happened. Buyers *assumed*, based on the information 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 (down) the price of higher (lower) micronaire cotton from the Southwest region, which seems to explain the large shift in micronaire values. On one hand, 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 current as possible. On the other hand, it illustrates how an absence of price differential information can produce pricing anomalies.

This example represents a rational economic response *in the absence of information*. That is, had these mills had accurate, current price information, they would have seen that the price of the higher micronaire was increasing, thus leading to a rationing of that level of micronaire (i.e., as the price increased, fewer mills would have purchased that micronaire, leading to a stabilization of price between higher and lower micronaire cotton). If the mills had "perfect" price information, they would have continued to purchase the lower priced (higher level) micronaire up to the point where the price difference (discount) between the micronaire levels equaled the loss in processing efficiency from the higher micronaire level (marginal benefit equals the marginal cost).

Implications Beyond These Examples

The effects 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. Although much less apparent to individual producers, merchants, or textile manufacturers, the effects on these broader issues are equally relevant; they affect everyone in the industry.

CONCLUSIONS

The role of price information has long been a subject of study in economics. This paper demonstrates its relevance 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, directly and indirectly, have impacts on groups such as plant breeders and ginners, and vice versa. The importance of price information, however, is not limited to the 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 price 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 that correct decisions will be made, but the information must be accurate to be of benefit to decision makers.

The "global economy", including the cotton industry, has entered the information age (witness this electronic journal). Cotton marketing is increasingly done electronically. Computer and satellite communications are commonplace. Paper warehouse receipts will soon be obsolete. The Engineered Fiber Selection (EFS) System will soon have a standardized electronic mill contract. Despite the rapid movement of most phases of the cotton industry into the information age, price reporting has not substantially changed. The technology exists and analytical techniques are available to improve the accuracy and timeliness of price reporting (Brown et al., 1995), and the benefits to the industry are potentially large.

ACKNOWLEDGMENTS

The authors thank Sukant Misra, Emmett Elam, Randy Boman, and three anonymous reviewers for comments and suggestions on the manuscript.

REFERENCES

Barker, G., R. Baker, and J. Laird. 1991. GINQUAL: A cotton processing quality model. Agric. Systems 35 (1):1–20.

Beddow, J., E. Elam, and M. Lopez. 1997. The cotton wizard: A quantitative decision tool for cotton variety selection. p. 1585–1590. *In* P. Dugger and D.A. Richter (ed.) Proc. Beltwide Cotton Conf., New Orleans, LA. 6–10 Jan. 1997. Natl. Cotton Council Am., Memphis, TN.

Bennett, B., S. Misra, and A. Brashears. 1997. Lint cleaning of stripper-harvested cotton for maximizing producer net returns. Appl. Eng. Agric. 13(4):459–463.

Brown, J., and D. Ethridge. 1995. Functional form model specification: An application to hedonic pricing. Agric. Res. Econ. Rev. 24(2):166–173.

Brown, J., D. Ethridge, D. Hudson, and C. Engels. 1995. An automated econometric approach for estimating and reporting daily cotton market prices. J. Agric. Appl. Econ. 27 (2):409–422.

Carr, C., and D. Ethridge. 1996. Evaluation of CCC loan premiums and discounts for the Texas and Oklahoma cotton market. Dep. of Agric. and Appl. Econ., Texas Tech Univ., CER-96-3, Lubbock, TX.

Chen, C., and D. Ethridge. 1996. Valuation of cotton characteristics by U.S. textile manufacturers. p. 427–431. *In* P. Dugger and D.A. Richter (ed.) Proc. Beltwide Cotton Conf., Nashville, TN. 9–12 Jan. 1996. Natl. Cotton Council Am., Memphis, TN.

Chen, C., D. Ethridge, and S. Fletcher. 1997. Textile manufacturers' market valuation of cotton fiber attributes. J. Agric. Appl. Econ. 29 (1):185–195.

Cotton Division. 1993. The classification of cotton. USDA-AMS Agric. Handb. 566. Agric. Mktg. Serv., Washington, DC.

Ethridge, D., C. Chen, and D. Hudson. 1995. Market valuation of cotton quality attributes in the U.S. p. 133–151. *In* Anonymous (ed.) Proc. Cotton Incorporated Eighth Annual Engineered Fiber Selection System Conf., Memphis, TN. 12–14 June 1995. Cotton Inc., Raleigh, NC.

Gannaway, J., D. Owens, J. Moore, K. Hake, C. Stickler, M. Murphy, L. Schoenhals, and J. Coss. 1995. Cotton performance tests in the Texas high plains and trans-pecos area of Texas: 1994. Tech. Rep. 95-3.Texas A&M Univ. Agric. Res. and Ext. Ctr., Lubbock, TX.

Gillis, M., S. Fuller, R. Childers, C. Parnell, Jr., and S. Wyarlagadda. 1995. Cotton gin plant compliance with air pollution regulations in Texas: Effects on plant costs and returns. p. 399–406. *In* D.A. Richter and J. Armour (ed.) Proc. Beltwide Cotton Conf., San Antonio, TX. 4–7 Jan. 1995. Natl. Cotton Council Am., Memphis, TN.

Hudson, D., and D. Ethridge. 1995. Texas-Oklahoma producer cotton market summary: 1994/95. Rep. T-1-411. College of Agric. Sci. and Natl. Res., Texas Tech Univ., Lubbock.

Hudson, D., D.Ethridge, and J. Brown. 1996a. Producer prices in cotton markets: Evaluation of reported price information accuracy. Agribusiness: An Intl. J. 12(4):353–362.

Hudson, D., D. Ethridge, and C. Chen. 1996b. Producer prices received and mill prices paid for quality in southwest cotton: Similarities and differences. p. 437–439. *In* P. Dugger and D.A. Richter (ed.) Proc. Beltwide Cotton

Conf., Nashville, TN. 9–12 Jan. 1996. Natl. Cotton Council Am., Memphis, TN.

Hudson, D., D. Ethridge, and E. Segarra. 1997. A note on price information in commodity markets with evidence from the cotton market. CER-97-11. Dep. of Agric. and Appl. Econ., Texas Tech Univ., Lubbock.

Misra, S., D. Ethridge, D. Hudson, and B. Bennett. 1997. The importance of accurate price information. *In* Anonymous (ed.) Proc. Cotton Incorporate 10th Annual Engineered Fiber Selection System Conf., Greenville, SC. 12–14 June 1997. Cotton Inc., Raleigh, NC.

Rosen, S. 1974. Hedonic prices and implicit markets: Product differentiation in pure competition. J. Polit. Econ. 82:34–55.

Stigler, G. 1961. The economics of information. J. Polit. Econ. 69:213–225.