Business Models for Competitive Success in the United States Textile Industry

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ABSTRACT

Intensifying global competition is threatening the survival of the U.S. textile industry. We provide insight into the competitive challenges faced by this declining industry and propose strategic responses to this dynamic economic environment. An ordered logit model provides estimates of how certain strategic decisions impact levels of firm performance. The findings indicate that a composite variable comprising market share and economies of scale positively impacts firm success; but not as significantly as a composite variable of managerial excellence and product differentiation. This research provides empirical support for the role of agency of managerial choice in determining performance outcomes.

Key words: competition, ordered logit, performance, strategy, textiles

The essence of formulating competitive strategy is relating a company to its environment. ...the best strategy for a given firm is ultimately a unique construction reflecting its particular circumstances.

--Michael Porter (*Competitive Strategy*, p. 3)

I. Strategic Challenges in a Declining Industry

Competition in mature industries is characterized by its intensity, even to the point of being considered cutthroat. If this type of competition can be defined by such factors as subnormal earnings over a considerable period of time, excess capacity, a lowered pricing structure, and significant import penetration (Reynolds, 1940), then the current industrial environment for U.S. textile manufacturers fits this description. While firms competing in declining industries face particular challenges as to the nature of competition and the availability of strategic alternatives, the literature of strategic management suggests that even in declining industries, opportunities exist for high financial returns given the selection of appropriate strategies (Hamermesh and Silk, 1979; Porter, 1980).

A fundamental purpose of strategic management is to develop a comprehensive blue print of business activity as well as a format by which business success might be measured. The primary objective of the firm is superior financial performance via a competitive advantage in the marketplace through the development of distinctive or unique capabilities (Hunt and Morgan, 1995). The business model of the firm is how the firm is organized to develop this competitive capability (Best, 2001). In the context of strategic management, the

business model may be described as the combination of firm level structures and strategies appropriate for a given industrial environment. As misalignment between structure and strategy is recognized, the strategic plan may need to be revised to account for unanticipated developments or dynamic economic conditions. Strategic management then, might be described as the managerial equivalent of the scientific method—one starts with a hypothesis, which is tested in action, and revised as necessary (Magretta, 2002). By evaluating how the strategic decisions of firms affect their financial performance, insight may be gained as to the "best management practices" for firms in specific economic environments.

The problem of strategic choice in declining industries has not been a topic of considerable research, despite the need for competent management in environments of significantly declining demand (Harrigan, 2003). Our purpose is to evaluate firm business models in a declining industry in order to relate them to their respective financial outcomes. By this analysis we hope to identify strategies that are more likely to produce successful financial outcomes in declining industries.

II. Environment, Strategy, and Performance

Building upon the organization-environment-effectiveness paradigm of Downey and Ireland (1979), the conceptual framework of this study may be represented as a flow of factors that impact organizational performance (Figure 1). In the model the relationship between a specific firm's business model and its external environment will impact the financial performance of the firm. Following is a discussion of how each of the three main components of the framework will be integrated and analyzed to better understand the role and impact of each.

Figure 1. Relationship between Environment, Strategy, and Performance
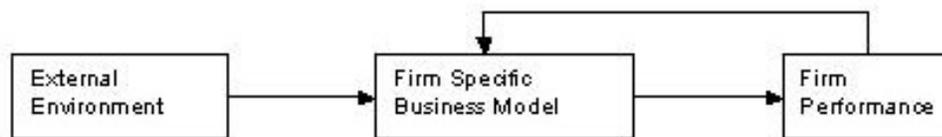
External Environment
The influence of external environmental factors on the nature of competition in industries is commonly portrayed by the life cycle model. The life cycle model illustrates industry or product from birth to death with sales defining inflection points between stages. The basic tenet of the theory behind the model is that the nature of competition will shift as an industry goes through its life cycle (Porter, 1980). Competition in the maturing phase of industry evolution is typified by stagnant or declining demand (Hamermesh and Silk, 1979; Harrigan and Porter, 1983), increasing competition as market share can only be gained at the expense of others (Hamermesh and Silk, 1979), and fierce price warfare due to exit barriers, falling sales, and over-capacity (Harrigan and Porter, 1983).

The reference to life cycle theory is not meant to indicate that industry or organizational change is predestined (Stubbart and Smalley, 1999). As portrayed by the organizational life cycle of Figure 2, stages are not "…rigidly programmed and infallibly predictable" (Stubbart/ and

Smalley, 1999, p. 282). Rather, consistent with much of the literature of strategic management, the model emphasizes the role of context and managerial initiative. The model adds the dimension and possibility of organizational revitalization to the fourth stage, often portrayed in other life cycle models only according to firm or industry decline. The path of the organization is not predetermined and organizational leadership can create conditions that facilitate transformation, survival, and growth.

Figure 2. The Organizational Life Cycle
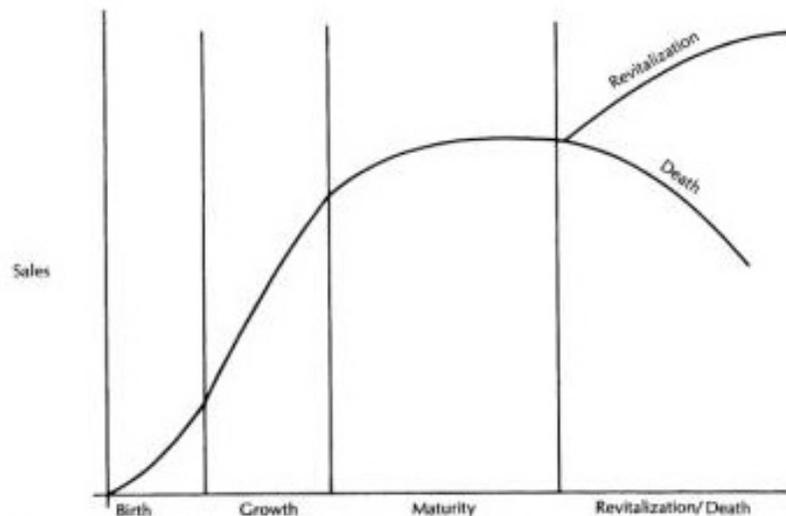
Source: Baliga and Hunt (1988), p. 131

Business Models
As defined above, a firm's business model is the combination of firm level structures and strategies appropriate for a given industrial environment which impact financial returns. A firm's strategic choice of business model construction is designed to position it in response to a changing environment. Organizational decision makers design business models in the expectation that strategic choices have consequences for performance.

In his study of competitive strategy, Porter (1985) contends that a firm is successful as it is able to deliver value for a customer in one of two ways: "…offering lower prices than competitors for equivalent benefits or providing unique benefits that more than offset a higher price" (p. 3). Concentration on one of these two generic strategies (low cost or differentiation) is crucial to a firm's ability to achieve a competitive advantage. But strategic selection is not enough. Successful performance depends on successful implementation and successful implementation depends on a firm's capabilities to carry out its strategic intent while matched to its environmental context.

Strategic choice should enable a firm to consolidate "…technologies and production skills into *competencies* that empower individual businesses to adapt quickly to changing opportunities" (Prahalad and Hamel, 1990, p. 81). A firm's core competence may be defined as doing something well in comparison to competitors that is especially difficult to copy and that makes an important competitive difference. The development of

core competencies is a key source of competitive advantage.

Firm Performance
As Venkatraman and Ramanujam (1986) observe, "…performance improvement is at the heart of strategic management" (p. 801). While business firms are often compared in terms of economic performance (profits, sales, market share, productivity, debt ratios, stock prices, etc.), these figures represent only one component of organizational performance. As Figure 3 demonstrates, the domain of the performance construct may be shown to exist on several levels: 1) financial performance, 2) financial and operational performance, and 3) organizational effectiveness.

Figure 3. Conceptual Domain of Business Performance

Domain of financial performance

Domain of financial and operational

Domain of organizational effectiveness
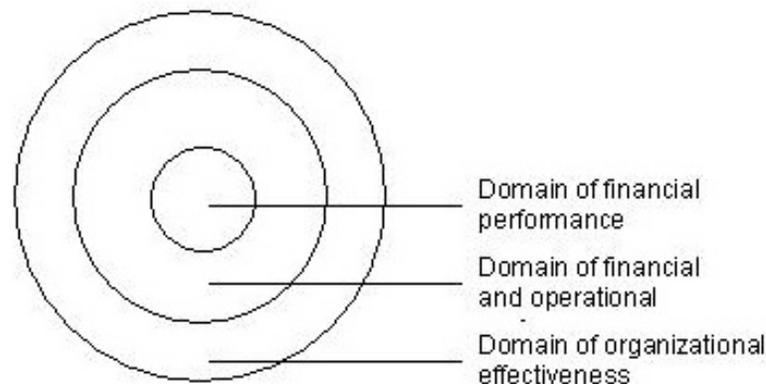
Source: Venkatraman and Ramanujam (1986), p. 803

Financial Performance
Financial performance represents the narrowest conception of business performance. Such financial indicators as sales growth, profitability ratios, earnings per share, etc. reflect an achievement of or provide a comparison between the economic goals of firms. A primary concern of the strict financial approach as a measure of firm performance is that an examination of the drivers of financial ratios may not be equivalent to an examination of the drivers of value creation (Hawawini,Subramaniam, and Verdin, 2003).

Financial and Operational Performance
A broader concept of performance includes nonfinancial indicators in addition to financial indicators. This allows an introduction of such additional measures as market share, new product introduction, product quality, manufacturing value-added and technological efficiency. These indicators may provide additional insight into "…key operational success factors that might *lead* to financial performance" (Venkatraman and Ramanujam, 1986, p. 804, italics in original).

Organizational Effectiveness
A broader conceptualization of firm performance is organizational effectiveness.

This construct encompasses the previous two and adds to the discourse perspectives of goal attainment, strategic systems, strategic constituencies, and competing values (Hunt, 1991). This research is concerned with organizational effectiveness as it relates to achieving a standard of performance that will provide a sustainable competitive position in the industry. We operationalize firm performance in terms of organizational effectiveness: how well a firm compares with rivals in the industry, a concept at the foundation of competitive advantage (Cameron, 1986). Therefore, firm performance encompasses financial indicators but goes beyond them to include non-financial factors that indicate sustainability and competitive viability.

Industry versus Firm Effects
The dynamic relationship between industrial environment, the business model of a particular firm, and financial performance has been the focus of many researchers in business and economics for a number of years. But a central issue is whether firm performance is more influenced by the market (or industrial environment as in Industrial Organization theory) or management (firm level effects per the theories of Strategic Management and the resource-based view).

Researchers have produced disparate results in their studies of whether markets or management dominate in explaining firm performance. Variations in findings may be due to such factors as the time period in which data were gathered, differences in estimation methods, and assumptions regarding relevant variables (Roquebert, Phillips, and Westfall, 1995). Significant support for the premise that "…variance within industries is greater than variance across industries" (Roquebert, Phillips, and Westfall, 1995, p. 662) can be found in the work of Rumelt (1991), McGahan and Porter(1997), and Mauri and Michaels (1998). These studies provide evidence that strategic management theory has an important role to play in explanations of firm performance.

Feedback
An important component of Figure 1 is a feedback loop from performance back to the business model. This reflects the dynamism of the model as strategy is revised due to unfulfilled organizational goals or evolving competitive conditions. Andrews (1980) suggests that strategy, and by extension, a firm's business model, are "…not as a concept complete and static but as an organizational process forever in motion, never ending" (p. 162). Strategy formulation is a "process of organization" comprised of recognizing and reconciling uncertain environmental opportunities, clarifying corporate capabilities, allocating scarce resources, accounting for personal values, and allowing emerging aspirations to social responsibility (p. 163).

Summary
The conceptual model presented here is designed to reflect many of the theories and constructs of the strategic management discipline: that through managerial initiative, creativity, and deliberate choice, the opportunity exists for organizational revitalization. This research is designed to test whether the industry environment is deterministic in the selection of apposite strategies in declining industries or as Porter suggests, either generic strategy (low-cost or differentiation) may lead to successful business outcomes.

III. Empirical Model

Theoretically, this paper is based on the premise that a causal relationship exists between a firm's business model in a declining industry and sustainable performance. The empirical model is designed to estimate the effect of specific firm strategies, capabilities, and structures on firm performance. The verification of a statistical correlation between strategic choice and organizational performance will identify managerial practices that are more likely to produce successful financial outcomes in declining industries.

Our study focused on U.S. firms that compete in the initial phase of the textile production process: the transformation of raw cotton into cotton yarns. The firms observed are the top 29 U.S. companies in terms of raw cotton usage from 1999 to 2003. Also considered are two regional firms not in the top 30 but of particular interest to the researchers due to geographical proximity. These firms cumulatively account for 92% of U.S. raw cotton consumption. Of these 31 firms, 5 are publicly held, 1 is a cotton producer-owned cooperative, and 25 are privately held companies.

A Qualitative Response Model
This study sought to estimate the probability firm performance based on the impact of firm level structures and competitive strategies. The dependent variable is a discrete outcome (the firm is classified according to a definition or rating of performance), so conventional regression methods are inappropriate. In such cases, qualitative response models may be used that are based on maximum likelihood estimators rather than linear regression methods (Greene, 2000).

Ordered logit and probit models are widely used as a framework for analyzing responses such as those described here (Greene, 2000). The method is similar to that of other researchers in strategic management who have analyzed how firm specific factors influence strategic management decisions and performance (Putsis and Bayus, 1999; Day and Van den Bulte, 2002; Simoes and Crespo, 2002; Cranfield and Magnusson, 2003; de Cerio, 2003; Richter and Schmidt, 2005). In many studies using multinomial dependent variables with an intrinsic order, estimation using logit or probit procedures have been utilized (Cranfield and Magnussen, 2003; de Cerio, 2003). We had no *a priori* reasons for choosing logit over probit estimation, but probit coefficients are generally regarded as more difficult to interpret (Garson, 2006). We utilized the logit model in order to gain the broadest,

most meaningful interpretation of the results possible.

The Dependent Variable
The dependent variable is firm performance. Measures of performance are often difficult to determine in cases where financial information is limited. Other studies have used only two possible firm outcomes: survival and exit, an approach that seems unsatisfactory since many current U.S. textile firms may be continuing to operate even with poor financial returns. Therefore, in our study, a textile firm's financial performance is classified according to three possible discrete and ordered values:

- '0'—failed. The firm has ceased processing cotton and exited the industry;
- '1'—surviving. The firm is continuing operations, but its financial returns are not such as to set it apart as successful compared to the rest of the industry. This includes cases where high exit costs prohibit industry departure even though financial returns are poor, those operating in bankruptcy protection, firms just emerging from bankruptcy, or those continuing to survive by selling off assets;
- '2'—successful. The firm is continuing operations and is earning financial returns that are seen by observers as superior compared to rivals in the industry.

Explanatory Variables
Explanatory variables in the model include those discussed previously as contributing to competitive advantage[1]. Each firm is rated according to whether it has achieved competitive competence in areas relevant to each generic strategy. Competence in low cost production was measured by the firm's production costs relative to industry rivals. Since economies of scale may contribute positively to production efficiency, a

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[1] Due to small sample size (n=31), the number of variables considered was kept intentionally small.

measure of firm size was included in the model. Competence in product differentiation was measured by the ability of the firm to earn a price premium. A measure of firm management was included in the model in order to capture the role professional, well-respected leadership plays in firm performance regardless of strategic direction. A high rating in any of these categories is expected to contribute positively to organizational effectiveness.

Given the nature of the variables just described, it may be possible that firm performance can be explained by an even smaller number of variables than originally specified. This is based on the expectation that there exist strong intercorrelations among the variables. Exploratory factor analysis was used to discover patterns of relationships present among the variables of the model and the degree to which observed variables might be explained in terms of a smaller number of variables or factors.

Data Collection
Each firm was surveyed according to the competitive variables described above which are hypothesized to impact organizational performance (a copy of the survey is available from the authors on request). The relatively large number of privately-held firms presented specific challenges. It was anticipated that problems would arise gaining insider access to sensitive financial and performance data as well as competitive strategies. Even if such information was available, the situation increased the risk of measurement error that may be attributed to varying accounting and information sharing procedures (Dess and Robinson, 1984). Therefore the decision was made to rely on expert industry informants or raters for data gathering. Following the principles of Chen, Farh, and MacMillan (1993), we employed three outside experts to assess strategic characteristics of textile firms.

In addition to the opinions of expert raters, multiple data sources such as industry communications, websites, business periodicals, and independent business

financial rating services were used to validate information received by the experts and to fill in gaps of information when the experts either doubted their level of knowledge in a specific area or lacked information about a specific company. The intent was to improve data reliability about each firm by employing at least two different raters and using multiple data sources.

Measuring Performance
Each firm in the study was identified according to a basic level of firm performance. Firm performance ratings were collected from third party sources according to the following procedure. After first determining whether a given firm was still in business or not (performance level 0 or 1), successful firms in the surviving category were classed. This was done according to a combination of independent measures of financial performance, moves to expand and modernize plant capacity, and ratings of superior performance by respected business publications. Five firms meeting these standards were classed as having performance level 2. The ratings or opinions of raters were not used to classify firm performance but were used to confirm information gathered about each firm.

IV. Data Analysis and Findings

The following steps were used to empirically verify the relationship between a firm's business model and its level of performance.

Step 1. | Collect data using multiple sources. Collection of survey data from multiple sources establishes both a ranking of a given firms level of performance but also a measure of strategic competency relative to rivals in the industry.

Step 2. | Use factor analysis to reduce the number of variables. Preliminary exploratory analysis on the variables constructed and measured in Step 1 confirms construct validity and

discovers intercorrelations that exist between the variables. This step is designed to reduce the number of variables in the original data set to a smaller number of factors that may explain the preponderance of firm performance.

Step 3. Estimation of an ordered logit model. Estimation of an ordered logit model tests the effects of the factors identified in Step 2 (as well as any independent effects that may be added back in) on successful performance in a declining industry.

Step 4. Estimate probabilities of various levels of firm performance. From the ordered logit procedure, it is possible to estimate the probability that a firm, given its specific characteristics and strategic competencies, will achieve a specific level of firm performance. This step will report the probabilities as well as an evaluation of the model's goodness of fit.

Exploratory Factor Analysis
In the construct of the variables and in the design of the survey, i seemed likely that several of the variables and measures were attempts to assess the same characteristics but from slightly different perspectives. Factor analysis, specifically, principal component analysis, was used to analyze our survey data to explore patterns of intercorrelations among the variables in an attempt to obtain a reduced set of variables to explain performance. Results are reported in Table 1.

Table 1. Results of Factor Analysis

	Variables	Factor 1	Factor 2
1	Price Premium	0.86224	0.08346
2	Management	0.84077	0.31661
3	Market Share	0.09580	0.93918
4	Cost of Production	0.56213	0.70487
Eigenvalues		1.7755039	1.4891024

Our original model contained 4 variables and 31 observations. The factor procedure identified the close correlation that exists between the variables Price Premium and Management (Factor 1) as well as the close correlation between Market Share and Cost of Production (Factor 2). These findings indicate that professional management and a well-respected industry reputation correlate strongly with the ability of a firm to earn a price premium for its product. Additionally, it is not surprising that the larger firms also tend to have the lowest costs of production.

Given the results of the principal component analysis above, it is possible to operationalize these factors by creating new variables that serve as measures of these critical components. A linear combination of the variables that loaded heavily on each factor was used to create two new variables (Wuensch, 2004). We labeled the first factor 'Effectiveness' in that these characteristics relate strongly to the efforts of the firm to create a competitive advantage in areas related to superior product value and effective managerial capabilities. We named the second factor 'Efficiency' since it related to the efforts of firms to create value by offering products at a lower cost through economies of size and cost of production advantages.

The Ordered Logit Procedure
Ordered logit regression enables us to identify the marginal effects of each

explanatory factor on the ordered levels of firm performance. The parameter estimates for Effectiveness and Efficiency show both to be positively correlated to operational performance in declining industries (see Table 2). By exponentiating the parameter estimates, we can find the proportional odds ratios, or point estimates, of each independent variable on firm performance[2]. The point estimate of the Effectiveness factor is 7.501 which means that the odds of moving up from one performance category to the next (0 to 1 or 1 to 2) increases 7.501 times with a one unit increase in the firm's Effectiveness rating, other variables held constant. The point estimate of Efficiency is 1.157, which shows that the odds of improved firm performance increase 1.157 times with a one unit increase in the measure of Efficiency, *ceteris paribus*. The Effectiveness factor was found to have both a stronger impact on performance than Efficiency and stronger statistical significance as well. The marginal statistical significance of the Efficiency parameter indicates that its usage in the calculation of probability estimates of performance should be used with caution, even though the sign of the coefficient is as expected.

Estimated Probabilities of Firm Performance Further meaning of the coefficients can be gained by estimating the probability of a firm's performance given ratings of each firm's Effectiveness and Efficiency measures. Table3 reports the probability estimates of each level of firm performance generated by the model. Overall, the logit model correctly predicted 71 percent of the firms in our study (22 of 31). Model performance was strongest for the successful firms where 80 percent (4 of 5) were correctly classified. The second group in

terms of goodness of fit was the failed performance category where 73 percent (11 of 15) were correctly identified. The surviving group had the lowest number of correctly predicted firms by our model with an accuracy measure of 64 percent (7 of 11).

Perhaps even more interesting than the correctly identified firms in Table III are those whose predicted performance places them in another category. Especially for those firms still in operation, this analysis may serve as an indicator of future performance given present strategic strengths, weaknesses, and competitive capabilities. For example, company number 3 in the successful performance category has a very high rating for Efficiency but low Effectiveness scores. This indicates that the success of the firm is related more to its relatively large size and cost of production efficiencies than managerial capability or product reputation. The predicted performance of this firm in our model would move it down from successful to surviving, possibly indicating it to be the weakest performer of the successful group. Similar observations of firms in the surviving group may reveal those firms that are most likely to go out of business given the current intensity of competitive conditions.

V. Conclusion

This study was designed to shed more light on the relationship between a firm's business model and its operational performance in the U.S. textile industry. These findings may be applicable to firms facing similar competitive pressures in other industries. We have identified areas of competence which might serve as predictors of firm performance and sustainability. Those firms that possess these characteristics would be expected to outperform rivals in their respective industries. The survival or failure of firms lacking these competitive capabilities may also be estimated.

Several key findings emerged from this study. First, we found general support for

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[2] An odds ratio =1 indicates that the independent variable has no effect on the dependent variable. An odds ratio > 1 means an increase in the independent variable improves firm performance while an odds ratio < 1 means the variable is a detriment to performance. The larger the odds ratio is above 1, the more effect the independent variable has.

the hypothesis that the industrial environment does not define a single strategy for successful performance in a declining industry. Either of Porter's generic strategies (low-cost or differentiation) proved to produce successful outcomes. Three of the five successful firms had higher scores for a low-cost strategy compared to a differentiation strategy. The other two successful firms had higher scores for differentiation relative to their low-cost strategy measures. The importance of achieving strategic core competence is shown to have a strong effect on competitively viable performance regardless of which generic strategy is chosen.

Two factors identified by principal component analysis were shown to contribute to successful firm performance in a declining industry. The first and most statistically significant factor is comprised of firm attributes that relate to competence in management and the ability to earn a price premium for one's product. The

second factor that served as an indicator of successful performance is made up of two measures related to economies of size and production efficiency: a competitive advantage related to cost of production and earned market share. While the effect of this factor on performance was less significant, both in terms of marginal effects as well as statistical significance, it does lend support to the hypothesis that larger firms are more likely to be successful (or at least survive longer) in declining industries.

The goal of this research effort was to identify strategic choices that might lead to successful performance in competitive environments. It is hoped that insight gained will help firms navigate through what Prahalad and Hamel term this "competitive milieu" where "…the need for strategic thinking and behavior among managers has never been more urgent" (1994, p. 6).

Table 2. Results of Ordered Logit Regression

Parameter	Df	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept 2	1	-16.4956	4.5338	13.2379	0.0003
Intercept 1	1	-13.2396	3.9201	11.4067	0.0007
Effectiveness	1	2.0150	0.6236	10.4415	0.0012
Efficiency	1	0.1459	0.1162	1.5773	0.2092
Likelihood Ratio Test of regression coefficients =0				23.2668	<0.0001

Effect	Odds Ratio Estimate
Effectiveness	7.501
Efficiency	1.157

Table 3. Estimated Probabilities of Firm Performance

Company	Performance	Effectiveness	Efficiency	Z	P(Y=0)	P(Y=1)	P(Y=2)
1	2	8.00	12.34	17.92	0.01	0.18	0.81
2	2	8.00	5.06	16.86	0.03	0.38	0.59
3	2	6.67	13.50	15.40	0.10	0.65	0.25
4	2	8.67	4.22	18.08	0.01	0.16	0.83
5	2	7.33	19.13	17.57	0.01	0.24	0.75
6	1	7.00	3.65	14.64	0.20	0.67	0.13
7	1	7.00	4.19	14.72	0.19	0.67	0.14
8	1	6.00	3.61	12.62	0.65	0.33	0.02
9	1	6.33	8.96	14.07	0.30	0.62	0.08
10	1	7.00	14.22	16.18	0.05	0.53	0.42
11	1	6.33	5.54	13.57	0.42	0.53	0.05
12	1	5.67	4.10	12.02	0.77	0.22	0.01
13	1	6.00	3.78	12.64	0.65	0.33	0.02
14	1	7.50	4.37	15.75	0.08	0.60	0.32
15	1	6.67	5.30	14.21	0.28	0.63	0.09
16	1	6.33	3.30	13.24	0.50	0.46	0.04
17	0	6.33	4.54	13.42	0.45	0.50	0.04
18	0	4.67	2.96	9.84	0.97	0.03	0.00
19	0	4.67	4.04	9.99	0.96	0.04	0.00
20	0	6.50	4.67	13.78	0.37	0.57	0.06
21	0	5.50	5.49	11.88	0.80	0.20	0.01
22	0	3.00	2.62	6.43	1.00	0.00	0.00
23	0	4.00	2.90	8.48	0.99	0.01	0.00
24	0	6.00	6.68	13.06	0.54	0.43	0.03
25	0	6.00	3.52	12.60	0.65	0.33	0.02
26	0	5.33	3.07	11.19	0.89	0.11	0.00
27	0	5.67	3.23	11.89	0.79	0.20	0.01
28	0	6.33	6.86	13.76	0.37	0.57	0.06
29	0	5.00	5.09	10.82	0.92	0.08	0.00
30	0	8.00	9.69	17.53	0.01	0.25	0.74
31	0	5.33	8.95	12.05	0.77	0.22	0.01

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Appendix

Table A.I. Variable Names and Definitions

Variables	Variable definition	Expected sign
Dependent Variable		
PERF_i	Represents financial performance ratings of the firm: 0 = the firm has ceased business operations, 1 = the firm is continuing operations with poor to average industry performance (survival), and 2 = superior industry performance.	NA
Independent Variables		
Firm ratings	Likert scale rating of firm strategic competency by industry experts	
COP	Cost of production relative to rivals	+
PP	Ability to receive price premiums	+
MGT	Well managed and professional relative to rivals	+
SHARE	Market share based on number of bales of cotton processed	+