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Analyzing Agribusiness Competitiveness: The Case of the United States Sugar Industry

ABSTRACT: The U.S. sugar industry has historically been insulated from volatilities in the world sugar market through the use of an import quota. Recent occurrences in the international agricultural policy arena have brought the need to examine the competitiveness of the United States sugar industry to the fore. Developments with respect to international agricultural policies, combined with a restructuring of United States domestic agricultural policy will undoubtedly reshape the environment in which the U.S. Sugar industry operates. This paper seeks to answer how the various regions and sectors will be able to compete in the world market. This paper starts by outlining an analytical framework to examine the impact of various sources that influence competitiveness in the sugar industry and identify several indicators of competitiveness.

Both cane and beet sugar are harvested in the United States with combined production placing it among the world's top producing nations (USDA-FAS, 1997). U.S. sugarcane is grown in Florida, Louisiana, Texas, and Hawaii. Sugarbeets are grown in 14 states, with Minnesota, Idaho and California leading production (USDA-ERS, various issues). To a large extent, sugar is either consumed in the country where it is produced under government pricing schemes or exported from one country to another under prearranged agreements (Hannah and Spence, 1997). Sugar that is not produced under these conditions is freely traded. The free, or residual, market for sugar is typically 20-25% of world production (Hannah and Spence, 1997). This implies that a small increase in world sugar production results in a proportionately large increase in the free market supply of sugar, contributing to the historic volatility of world sugar prices.

The U.S. sugar industry has historically been insulated from volatilities in the world sugar market through the use of an import quota. As a result, the domestic price of sugar in the United States has been supported at levels above the world price. In addition to providing benefits to domestic sugarcane and sugarbeet producers, this policy has served to provide gains to producers of substitute products, such as high-fructose corn syrup.

Recent occurrences in the international agricultural policy arena have brought the need to examine the competitiveness of the United States sugar industry to the fore. Developments with respect to international agricultural policies, such as the North American Free Trade Agreement (NAFTA, USDA-FAS, 1998) and the Uruguay round of the General Agreement on Tariffs and Trade (GATT) with the resulting World Trade Organization (WTO, USDA-FAS, 1994), combined with a restructuring of United States domestic agricultural policy (Young and Westcott, 1996) will undoubtedly reshape the environment in which the United States sugar industry operates.

These sectors will be affected by changes in U.S. agricultural policy necessary to comply with commitments made in the Uruguay round of GATT (USDA-FAS, 1994). This agreement calls for the replacement of the current U.S. sugar import quota with a tariff that provides the same initial level of protection. The initial tariff, equal to 17 cents/lb, will be reduced to 14.45 cents/lb by the year 2000. Additional provisions call for market access to be increased by establishing a tariff-rate quota of 1,139,195 tons for sugar effective in the first year of the agreement. In addition, the Section 22 fee of 1 cent/lb for refined sugar and syrups will be reduced by the minimum required 15% over 6 years. These actions all serve to increase world access to the U.S. market.

Given these potential changes, how are the various regions and sectors of the U.S. sugar industry positioned to compete in the world market? This paper seeks to answer this question. Section 1 outlines an analytical framework to examine the impact of various sources that influence competitiveness in the sugar industry and identify several indicators of competitiveness. Section 2 utilizes these indicators in order to determine the competitive position of the four sugarcane states, namely Florida, Louisiana, Texas, and Hawaii, and an aggregate sugarbeet sector. The last section provides several implications for the sugar industry as it prepares to compete in this new policy environment.

1. ANALYTICAL FRAMEWORK

Agribusiness competitiveness has become a topic of much discussion in both the popular press and in academic literature. Yet even though the term competitiveness is used in many circles, it remains an ambiguous concept. What is meant by the term competitiveness? More importantly, what are the factors that contribute to the competitiveness of agricultural industries? This article provides an overview of

the appropriate measures of competitiveness. Primary sources of competitiveness will be outlined and their implications for United States agriculture discussed.

Competitiveness has been addressed from a number of different perspectives (Kennedy, Harrison, Kalaitzandonakes, Peterson, and Rindfuss, 1997). Some have defined competitiveness as the ability to sustain an acceptable growth rate and real standard of living (Landau, 1992). This definition is linked to a nation's employment and, consequently, the standard of living of its citizens. However, the level of national employment, growth of employment, and the standard of living in an economy depend on the competitiveness of firms within the country. Analyzing a nation's competitiveness requires that the underlying factors that influence the competitiveness of individual firms and industries be examined (Porter, 1990). Consequently, this paper defines competitiveness as the ability of a business to profitably create and deliver value at prices equal to or lower than those offered by other sellers in a specific market.

Agribusinesses become more competitive through cost leadership and/or product differentiation (Porter, 1980). More specifically, technology, attributes of purchased inputs, product differentiation, production economies, and external factors are the primary sources of competitiveness (Harrison and Kennedy, 1997). Each of these factors affect a firm's costs and the degree to which it can differentiate its products. These sources also affect profits and market share.

1.1. Technology

Cost advantage can be achieved through proprietary technologies that affect the productivity of labor and capital. The development and adoption of these technologies affect the firm in several ways. The impact of employing new methods depends, to a large extent, on firm behavior and industry structure. For example, a productivity-enhancing technology enables the firm to lower production costs. Other technologies allow the firm to increase its quality of output given an initial set of inputs.

Suppose a technology is developed, such as a new fertilizer application technique or a hybrid plant variety, that increases yields in the sugar industry. Upon adoption of this new method the producer could apply the same amount of inputs as before, resulting in increased production levels. On the other hand, an appropriate reduction in the amount of inputs applied will result in production levels equal to those achieved with the old technology. In either case, per unit costs of production decrease. This method is classified as a productivity-enhancing technology.

Consider another example. Suppose that a method is developed that allows sugar processors to enhance the quality attributes of their final product. Application of this new technique permits the firm to differentiate its product by creating superior quality. Given this increase in product quality, one would expect that consumers will be willing to pay more for this product. However, unlike the produc-

tivity-enhancing technology, the processor may also incur increased costs associated with this higher quality level.

These examples illustrate the primary differences between productivity-enhancing and quality-enhancing technologies. A technology is *productivity-enhancing* if its adoption enables the firm to decrease its costs per unit of output. On the other hand, a technology is *quality-enhancing* if its adoption enables the firm to increase quality per unit of input. Despite the inclination to categorize technology as either productivity-enhancing or quality-enhancing, there are many technologies that cannot be pigeonholed into just one classification. The existence of technologies that are both productivity- and quality-enhancing, combined with the effects of firm behavior, imply that cost and quality factors both affect firm competitiveness.

1.2. Input Costs

Costs are also influenced by the price, quality, and dependability of purchased inputs. This is one of the most direct and obvious sources of competitiveness. Even so, it is difficult for a firm to attain an advantage in this area. To illustrate this point, consider two sugar mills. Suppose sugarcane composes the same share of production inputs for two companies and that the cost of sugarcane declines. This decrease in the cost of inputs affects both firms in the same way. However, it does not change either firm's cost of production relative to the other. To gain a competitive edge, a firm must lower input costs relative to those incurred by rival firms.

1.3. Production Economies

Production efficiency can be improved through scale economies and broadening the scope of production. A firm's efficiency increases when its output is adjusted in a way that decreases average costs of production. For example, one of the arguments for the efficiency of the United States meat packing industry is its evolution from a large number of medium sized packers to an industry where a few large firms control most of the market. The increased size of these firms reduces total costs through a greater division of labor, resulting in increased competitiveness.

Economies can also be achieved by broadening the scope of products that a firm produces. The firm's scope can be adjusted to produce a wide variety of products that are close substitutes in the production process. An example of this would be the diversification of a producer of cola products to include other soft drinks. Expansion of its product line in this manner would allow the firm to utilize excess capacity. Thus, economies of scope permit the firm to spread the cost of its fixed assets over additional lines.

1.4. Product Quality and Enterprise Differentiation

Product differentiation refers to the degree in which products of competing sellers substitute for one another in consumption. Many agribusiness firms differenti-

ate their products from those of their competitors in order to increase market share and develop consumer loyalty. A primary way in which firm's differentiate their products is by providing superior product quality. Research and development, quality control, and the use of higher quality inputs are among the sources that affect product quality. Another factor that affects a firm's competitiveness is enterprise differentiation, which refers to the firm's ability to distinguish itself from rivals. By providing superior services, firms can enhance the reputation of their company and product lines.

1.5. Advertising and Promotion

Brand advertising and other promotional strategies influence the consumer's perception of a product, thus increasing their demand. A successful advertising strategy establishes a barrier to market entry by creating brand loyalty. This loyalty is based on the customer's perception that the preferred product conveys greater value relative to close substitutes. Brand loyalty allows a firm to pursue one of two strategies. The firm can sell the same amount of its product at prices higher than competitors, or it can sell more of its product at prices equal to competitors. In either case, demand for the firm's product increases, as does its relative competitiveness in the market.

1.6. External Factors

There are a number of external factors that influence the competitiveness of agribusiness firms and industries. A variety of government policies can affect an industry's competitiveness in both domestic and international markets. For example, government policies that subsidize the production of raw agricultural commodities directly affect the prices that food processors pay for inputs. Lower priced inputs lead to lower costs for the downstream firms and an increase in their competitiveness relative to foreign rivals.

Government policies also affect an agribusiness firm's ability to obtain world market share. For example, government export subsidies lower the world price at which domestic industries are willing to sell various quantities of their product. This acts to expand the subsidized industry's world market share. Macro-economic variables, such as exchange rates, consumer incomes, and population growth also influence the competitiveness of the firm. For example, a devaluation of the U.S. dollar has the effect of lowering the price of U.S. goods in foreign markets. Although individual firms have little influence on the exchange rate, they benefit from increased profits and market share. Thus, government policies and other factors beyond the firm's control impact competitiveness.

1.7. Indicators of Competitiveness

Technology, Input Costs, Production Economies, Product Quality and Enterprise Differentiation, Advertising and Promotion, and other External Factors are

all sources that influence competitiveness. These sources can be grouped into two categories: those that affect the firm's relative cost of production and those that affect the quality, or perceived quality, of its product and/or business enterprise. As the firm gains advantage in the various sources of competitiveness, relative market share and profits increase. In situations where a firm is able to decrease production costs or improve its products relative to other firms in the industry, market share will increase.

The ability of existing firms to profitability gain and maintain market share indicates that they possess a competitive advantage. Yet knowledge of a firm's profitability and/or market share does not provide information regarding any single source of competitiveness. For example, an increase in the profitability of a state's sugar industry may indicate an increase in competitiveness, but it does not indicate whether this is a result of decreased cost, increased quality, or a devaluation of the U.S. dollar. Similarly, a firm's relative advantage in any particular source of competitiveness does not guarantee profitability or a sustained share of the market. For example, cost reducing technologies that adversely affect product quality may not necessarily increase competitiveness. This implies that the measures and indicators to be used must be chosen based on the individual circumstances of the firm.

There may not be any one "best" measure of competitiveness. Market share and profitability provide useful insight into the overall competitiveness of a firm. At the same time, the individual sources of competitiveness provide information with respect to the firm's relative strengths and weaknesses. When utilized separately, these tools provide a useful indication of the competitive position of the business. However, when used together these measures provide information regarding the firm's current position in the market, indicate the relative strengths to be maintained and exploited, and identify the relative weaknesses that are a prime area for improvement. The above mentioned framework will be used to examine the factors that affect competitiveness levels within the U.S. sugar industry as well as specific measures of competitiveness.

Table 1. Productivity Indicators in the U.S. Sugar Industry, 1981-92 Average

	<i>Sugar Cane</i>				<i>Sugarbeets</i>
	<i>Florida</i>	<i>Louisiana</i>	<i>Texas</i>	<i>Hawaii</i>	<i>U.S.</i>
	<i>Pounds per Acre</i>				
Raw Sugar Per Acre	7456.2	5187.5	5592.5	22886.2	702.6
	<i>Pounds Raw Sugar per Ton of Sugarcane/Sugarbeets</i>				
Extraction Rate	228.7	213.8	183.8	241.0	250.7
	<i>1000 Tons of Raw Sugar per Mill/Plant</i>				
Plant Size	208.08	32.45	94.47	70.96	86.16

Source: USDA-ERS, Sugar and Sweetener Situation and Outlook, Various Issues

Table 2. Cost of Production in the U.S. Sugar Industry, 1981-92 Average

	<i>Sugar Cane</i>				<i>Sugarbeets</i>
	<i>Florida</i>	<i>Louisiana</i>	<i>Texas</i>	<i>Hawaii</i>	<i>U.S.</i>
	<i>Cents per Pound of Raw Sugar</i>				
Cane/Beet Production	13.82	11.80	14.94	13.53	14.32
	<i>Dollars per Acre</i>				
Cane/Beet Production	1023.81	604.57	806.16	3082.28	90.52
	<i>Cents per Pound of Raw Sugar</i>				
Cane/Beet Processing	6.72	8.59	10.61	11.34	12.77
	<i>Cents per Pound of Raw Sugar Excluding Credits</i>				
Total Costs	20.54	20.25	25.51	24.79	27.09
	<i>Cents per Pound of Raw Sugar Including Credits</i>				
Total Costs	19.56	19.40	24.06	23.22	23.63

Source: USDA-ERS, Sugar and Sweetener Situation and Outlook, Various Issues

2. COMPETITIVENESS OF THE UNITED STATES SUGAR INDUSTRY

The examination of various productivity indicators provides information with respect to technology and product quality. Table 1 presents a comparison of production and processing yields between U.S. sugar producing regions. Of particular interest, Hawaii possesses an advantage with respect to pounds of raw sugar per acre due to its unique production practices. Comparisons among the other sugar producing states show that Florida has a yield advantage over Louisiana and Texas.

With respect to extraction rates, measured in pounds of sugar per ton of sugarcane or sugarbeets, Hawaii once again leads the sugarcane producing states followed by Florida, Louisiana, and then Texas. In addition to providing information regarding the technology employed by the processing sector, the extraction rate is influenced by the quality of sugarcane or sugarbeets provided by the producer.

Another underlying factor that influences competitiveness is cost of production. This indicator provides information that incorporates costs of inputs, technology, and other factors that influence the firm's cost structure. Table 2 provides several comparisons among regions, including costs of production, costs of processing, and total costs.

Examining costs of production, measured in cents per pound of raw sugar, Louisiana has the lowest cost of production at 11.80, followed by Florida, Hawaii, sugarbeet producers, and Texas. Viewing costs from a per acre standpoint, Louisiana leads the sugar cane producers, followed by Texas, Florida, and then Hawaii. However, it must be kept in mind that because of differences in Hawaii's production practices versus other states, their cost per acre information does not provide

Table 3. Comparison of Costs of Production and Processing—1981-92 Average

	Sugar Cane				Sugarbeets
	Florida	Louisiana	Texas	Hawaii	U.S.
A. PRODUCTION COSTS (Cents per Pound)					
Variable Cash Expenses	8.71	5.77	10.02	9.68	6.48
Fixed Cash Expenses	1.81	1.26	1.65	1.27	2.84
Capital Replacement	0.36	1.61	0.55	0.67	1.27
Operating Capital	0.36	0.41	0.53	0.41	0.26
Non-land Capital	0.38	0.46	0.12	0.49	0.35
Net Land Return	2.40	1.93	1.93	1.01	2.33
Unpaid Labor	0.00	0.46	0.18	0.00	0.79
Total Production Costs	13.82	11.80	14.94	13.53	14.32
B. PROCESSING COSTS (Cents per Pound)					
Variable Cash Expenses	4.97	6.25	6.77	8.82	8.89
Fixed Cash Expenses	1.22	1.73	3.09	1.66	1.64
General & Administrative	0.53	0.61	0.74	0.87	0.74
Total Processing Costs	6.72	8.59	10.61	11.34	12.77 ^(a)
Total Production and Processing	20.54	20.25	25.51	24.79	27.09
Total Credits	0.98	0.85	1.45	1.66	3.46
Net Production and Processing Costs	19.56	19.40	24.06	23.22	23.63

Source: USDA-ERS, Sugar and Sweetener Situation and Outlook, Various Issues

(a) Total processing costs for sugarbeets includes the cost of drying beet pulp.

for a good comparison. Similarly, the cost per acre for sugarbeets cannot be easily compared with the cost of producing sugarcane.

When reviewing these costs of production it is beneficial to examine the various cost factors. Table 3 shows the cost factors of production. Louisiana's low variable and fixed cash expenses clearly contribute to their advantage in cost of production. Variable cash expenses are composed of purchased inputs such as fertilizer, fuel, pesticides, equipment rental, and cane. Factors that influence these costs include whether land and equipment are leased or owned and debt repayment arrangements. This implies that fixed cash expenses are higher in regions where land rents are higher. Another factor that influences this is contractual arrangements between the producer and processor with regards to leasing arrangements. For example, in some regions processors may contract with producers to grow sugarcane or beets on land that is either leased or owned by the processor. Hence, Louisiana's ability to coordinate inputs efficiently and/or purchase them at a lower cost contributes to its advantage in this area.

In contrast to Louisiana's low cost of production, it appears that high variable cash expenses add to Texas' high cost of production. Custom harvesting is more prevalent in Texas than in Louisiana and more hired labor is used in Texas. Texas also has higher irrigation costs relative to Louisiana.

Costs of processing, measured in cents per pound of raw sugar, show Florida with a clear advantage (6.72) followed by Louisiana, Texas, and Hawaii. Process-

Table 4. Measures of Competitiveness in the Sugar Industry, 1981-92 Average

	<i>Sugar Cane</i>				<i>Sugarbeets</i>
	<i>Florida</i>	<i>Louisiana</i>	<i>Texas</i>	<i>Hawaii</i>	<i>U.S.</i>
	<i>Percent</i>				
Market Share	22.91	10.61	1.48	14.87	50.13
	<i>Cents per Pound of Raw Sugar</i>				
Producer Profits	-1.20	1.65	1.07	-1.69	2.17
	<i>Cents per Pound of Raw Sugar</i>				
Processor Profits	3.11	0.42	-3.67	-.06	-2.80
	<i>Cents per Pound of Raw Sugar</i>				
Total Profits	1.91	2.07	-2.60	-1.75	-0.63
	<i>Dollars per Plant</i>				
Total Profits	5067.70	1119.58	-6190.07	-4494.21	-6911.60

Source: USDA-ERS, Sugar and Sweetener Situation and Outlook, Various Issues

ing costs for sugarbeets are nearly twice those of Florida. Examining the cost factors of processing show Florida with an advantage in each of the three areas: variable cash expenses; fixed cash expenses; and general and administrative costs. Florida's advantage may be associated, in part, with economies of size. For example, as shown in Table 1, tons of sugar processed per mill is more than double that for each of the other sugarcane producing states.

Combining the stages of production and processing gives an overall indicator of competitiveness within regions. Total combined costs are presented in Table 2 in cents per pound of raw sugar, both before and after credits are accounted for. Louisiana has the lowest overall cost followed closely by Florida. Total cost excluding credits shows Hawaii, Texas, and Beets in third, fourth, and fifth position respectively. When credits are accounted for, the sugarbeet industry moves into fourth followed by Texas.¹

2.1. Measures of Competitiveness

As indicated by the framework presented earlier, two of the main measures of competitiveness are market share and profits. These two measures serve to combine the factors that influence competitiveness into an aggregate measure that shows the viability of an industry in a particular market. Table 4 presents a comparison of market share among the five regions, in addition to producer and total profits measured in cents per pound of raw sugar, and total profits per plant.

The market share indicator shows that the raw sugar market is split evenly between sugarcane and sugarbeets. Of the sugarcane producers, Florida has the largest share, followed by Hawaii, Louisiana, and Texas. It is important to keep in

mind that there are many constraints that may keep one region from increasing its market share beyond a certain level, such as land suitable for sugarcane production or government policies. Although Hawaii had an average market share of approximately fifteen percent during the 1981-92 period, it should be noted that their market share has gradually declined from a high of 19.15 percent in 1983 to a low of 8.74% in 1992 (USDA-ERS, various issues). In addition, although Hawaii's cost of production has remained relatively stable at approximately 10 cents per pound, its cost of processing has gradually increased from 10 cents per pound to 14 cents per pound during the period under analysis. Possible causes for this increase in processing costs include increased opportunities for labor and greater competition for land.

Producer profit shows that sugarbeet producers made an average of 2.17 cents/lb of raw sugar during the 1981-92 period, followed by sugarcane producers in Louisiana, Texas, Florida, and Hawaii. It is interesting to note that Florida and Hawaii showed negative profits, which may be due to the level of vertical integration or corporate farming. As the involvement of a firm increases throughout the sugar industry, this diversification may increase their likelihood of suffering a loss in one sector in order to attain greater overall profits.

Table 2 also shows that the Florida sugarcane processing sector makes, on average, 3.11 cents/lb of raw sugar produced, followed by Louisiana, Hawaii, Sugarbeets, and Texas. Similarly, the measure of total profits per plant show Florida leading in profitability with \$5067.70 per plant, followed by Louisiana, Hawaii, Texas, and the U.S. sugarbeet industry. Combined production and processing profits show the Louisiana sugar industry makes, on average, 2.07 cents/lb of raw sugar produced, followed by Florida, Sugarbeets, Hawaii, and Texas. Florida's relative advantage in processing efficiency and Louisiana's relative advantage in production and disadvantage in processing could be associated with industry structure. In 1992 Florida's processing sector produced twice the sugar of Louisiana with approximately one-third the number of plants (USDA-ERS, various issues). This highlights the differences in industry structure among the states and the potential for attaining competitive advantage through economies of size.

3. IMPLICATIONS FOR AGRIBUSINESS

In order to determine the competitive position of various regions and sectors of the U.S. sugar industry, this paper has developed an analytical framework to describe the impact of various sources that influence competitiveness in the sugar industry. Several indicators of competitiveness were also identified. The paper utilized these indicators in order to determine the competitive position of four sugarcane states and the sugarbeet sector. Given this analysis, what implications can be gathered by the United States' sugar industry as it prepares to compete in a new policy environment?

One significant implication of this research relates to the lowering of U.S. sugar protection through the GATT/WTO. During the time period from 1981 to 1992 the average world price of raw sugar was 9.12 cents/lb (USDA-ERS, various issues). The replacement of U.S. import quotas with a seventeen cent import tariff would have resulted in a U.S. domestic sugar price of 26.12 cents/lb. Given the net cost of production and processing shown in Tables 2 and 3, a tariff of this level would provide profits of at least two cents/lb for each region. However, when the tariff is reduced to 14.45 cents/lb, as it will be by the year 2000 (USDA-FAS, 1994), the average U.S. domestic price drops to 23.57 cents/lb. This reduces profit margins by 2.67 cents/lb and raises questions as to the viability of sugar production in certain regions. Therefore, if sugar producing regions in the United States are to remain competitive in this new policy environment, they must maintain and enhance their ability to produce sugar at costs competitive with the rest of the world. This is critical for both the production and processing sectors.

The results of this research provide information that can be utilized in the development of state and/or regional strategic competitiveness plans. For example, this analysis indicates that individual states could strategically position themselves by directing resources toward enhancing the cost-competitiveness of their sugar processing sector, while other states might better focus their energies on enhancing the competitiveness of their production sector. A concerted effort to maintain production competitiveness while increasing processor competitiveness, or vice versa, throughout the sugar industry will help strengthen the ability of individual states to compete as domestic markets become increasingly global.

This analysis offers implications for both agricultural producers, and agribusiness processors regarding business structure. Producers and processors must evaluate opportunities to attain economies of size within the industry. For example, sugar producers should consider possibility of forming new processing cooperatives, and/or merge existing cooperatives in order to gain economies of size in the processing sector, thereby decreasing costs, and ensuring the overall viability of the sugar production sector in their region.

By becoming party to international agricultural trade agreements, countries are now limited as to the type and amount of agricultural protection available to support the agricultural sector. Policy-makers are concerned with developing competitiveness at the national, regional, state, or local levels, providing profits to producers and agribusiness, and providing the consumer with an affordable supply of high quality sugar with a minimal amount of government expenditure. Given the new constraints on the policy process, as government officials choose policies that best achieve these goals, we suggest strategic plans be developed based on the relative levels of competitiveness identified in this paper. One example might involve Land Grant Universities implementing research and extension programs intended to assist the management of sugar producing cooperatives and/or private sugar mills in evaluating new types of organizational structures intended to

improve processing efficiencies. Possible business structures include strategic alliances, mergers, new generation cooperatives, and limited liability corporations. This use of strategic planning could also be used in the development of production and processing technologies that will provide the greatest benefits to the sugar industry.

In their book *The Discipline of Market Leaders*, Treacy and Wiersema (1995) identify operational excellence, product leadership, and customer intimacy as the three disciplines through which a firm can deliver customer value. Given the current situation of the U.S. sugar industry, this paper has focused on operational excellence through the identification of cost measures. Although sugar is typically viewed as an undifferentiated commodity, making product leadership a difficult task, firms can achieve differentiation through the use of customer intimacy. Premium service and timely delivery are two strategies through which a firm can differentiate itself from the competition. Regardless of the discipline chosen, firms must focus on and develop their comparative strengths in order to achieve competitive advantage.

This analysis has provided a view of the relative levels of competitiveness within the United States sugar industry. This type of analysis offers several indications as to areas in which sugar producers, processors, and policy-makers could enhance the competitiveness of the industry. Agribusiness economists, researchers, and managers must develop new and better techniques that not only present and quantify measures of competitiveness, but also identify strategies that result in optimal competitiveness levels. Although the optimal competitiveness level is an elusive target, analyses of the type suggested will help achieve the policy environment and managerial focus necessary to maintain and increase the competitiveness of the United States sugar industry.

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NOTE

1. Credits represent the value of by-products resulting from sugarcane/sugarbeet processing. Credits can be thought of as increasing the value of production or decreasing the cost of producing raw sugar. The latter approach is adopted here.

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