

Economic Effects of U.S. Sugar Policy

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Table of Contents

Executive Summary	6
Section 1 - Introduction	9
Section 2 - Impact of U.S. Sugar Policy on Jobs Supported by the Sugar Industry.....	10
Number of jobs supported by the sugar industry	10
Government estimates of sugar jobs exclude much of industry	10
LMC job estimates incorporate important multiplier effects	11
Recent USITC job estimates based on incomplete BLS data	12
Sugar jobs during peak season much higher than yearly averages	13
LMC estimate of jobs supported by sugar industry is the most accurate	14
Sugar industry employment and real sugar prices have fallen together	14
What could happen in the future if there are lower U.S. sugar prices	15
Section 3 - Impact of U.S. Sugar Policy on SCP Industry Jobs	17
Most sugar containing products contain relatively little sugar	17
Sugar responsible for small fraction of total value of SCP products	19
Job losses in SCP industries comparable to those in non-SCP industries	19
Sugar prices not correlated with employment changes in SCP industries	23
Other material costs more likely than sugar prices to affect job losses	25
Productivity gains in SCP industries associated with job losses	27
Higher wages and benefits create pressure on SCP employment	28
Additional factors to consider regarding SCP production location decisions	30
Section 4 - Impact of U.S. Sugar Policy on SCP Companies	31
Value of products shipped has increased significantly	31
Examining a portfolio of large U.S. SCP companies	32
SCP companies have experienced high revenue growth	34
SCP companies have high profitability, even when sugar prices rise	35
SCP companies have high Returns on Equity	37
SCP companies have low risk and low cost of capital	38
SCP companies have impressive Total Shareholder Return	40
Future expectations look promising for SCP companies	41
Section 5 - Impact of Wholesale Sugar Prices on Consumers	42

Retail SCP prices have risen much faster than the wholesale sugar price	42
Retail SCP prices do not appear to depend on the wholesale sugar price	42
Retail prices don't typically fall when the wholesale sugar price decreases	44
Similar claims of pass-through to consumers not borne out in Europe	45
Section 6 - Conclusions	46
References and Sources of Data	47

List of Tables and Figures

Figure 2.1 – Seasonality in Employment: Monthly Employment Divided by Yearly Average, 2011: Average Annual Sugar Job Figures Understate Jobs During Peak Periods	13
Figure 2.2 – Changes in Real Sugar Prices and Sugar Employment: Sugar-Producing Jobs Drop with Sugar Prices.....	15
Table 3.1 – Cost of Sugar as Percentage of Total Material Cost for SCP Industries...	18
Table 3.2 – Change in Employment by Occupation in Sugar and Confectionery Manufacturing (NAICS 3113)	28
Figure 3.1 – Cumulative Percentage Change in Employment in Food Manufacturing Industry (2006-2011): SCP Jobs Up, Non-SCP Jobs Down	20
Figure 3.2 – Cumulative Percentage Change in Employment in Food Manufacturing Industry (2001-2011): SCP and Non-SCP Job Loss About the Same	21
Figure 3.3 – Cumulative Percentage Change in Employment in Food Manufacturing Industry (1991-2011): Adjusted for Animal Slaughtering and Processing, Non-SCP Job Loss Greater than SCP Job Loss	22
Figure 3.4 – Annual Percentage Changes in U.S. Refined Sugar Price and SCP Industries Employment: No Relationship Between Sugar Price and SCP Jobs	23
Figure 3.5 – Annual Percentage Change in U.S. vs. World Refined Sugar Price Differential and Annual Percentage Change in SCP Industries Employment: No Relationship Between U.S.-World Sugar Price Differential and SCP Jobs	24
Figure 3.6 – Cumulative Percentage Change in U.S. vs. World Refined Sugar Price Differential and Cumulative Percentage Change in SCP Industries Employment: No Long-Term Relationship Between U.S.-World Sugar Price Differential and SCP Jobs	25
Figure 3.7 – Cumulative Percentage Change in Cocoa Bean and U.S. Refined Sugar Price and Cumulative Percentage Change in Chocolate Confectionery Industries Employment: Cocoa Prices More Important Than Sugar Prices	26

Figure 4.1 – Strong Growth in Total Value of Shipments from Confectionery and Other Major SCP Sectors: All Sweetened-Product Output Up 40%, Candy Output Up 34%, since 1997; Growth Strong During 2001-2011 High-Sugar-Price Period	32
Figure 4.2 – Large SCP Companies’ Revenue Growth Outstrips U.S. Nominal GDP Growth, Even with Rising U.S. Wholesale Refined Sugar Prices (2004-2012)	34
Figure 4.3 – Net Margins of SCP Companies and Food Processing Industry: SCP Companies Are More Profitable	35
Figure 4.4 – Net Margins of SCP Companies vs. U.S. Wholesale Refined Sugar Price: Profits Rise with Sugar Prices in Recent Years	36
Figure 4.5 – Return on Equity of Companies in SCP Portfolio, Food Processing Industry and U.S. Stock Market: SCP Companies Have Highest ROE	37
Figure 4.6 – Measuring Volatility -- Average Standard Deviations of Companies in SCP Portfolio, Food Processing Industry, and U.S. Stock Market: SCP Companies Least Volatile	38
Figure 4.7 - Measuring Risk -- Average Betas of Companies in SCP Portfolio, Food Processing Industry, and U.S. Stock Market: SCP Companies Least Risky	39
Figure 4.8 – Measuring Total Stock Returns -- Percentage Appreciation of SCP Company Portfolio vs. S&P Index and Refined Sugar Prices (Jan. 2000 – Feb. 2013): SCP Companies’ Returns Far Outstrip S&P Index; Sugar Prices Not a Factor	40
Figure 5.1 – Thirty-Five Year Growth in Prices for Retail Refined Sugar and Retail Sugar Containing Products Compared to Growth in Wholesale Retail Sugar Price: Retail Prices Rise Even When Wholesale Prices Fall	43
Figure 5.2 – Fifteen Year Growth in Prices for Retail Refined Sugar and Retail Sugar Containing Products Compared to Growth in Wholesale Retail Sugar Price: Retail Prices Rise Even When Wholesale Prices Fall	44
Figure 5.3 – Price Changes Over the Most Recent Two Years for Retail Refined Sugar and Retail Sugar Containing Products, Compared to the Sharp Drop in the Wholesale Retail Sugar Price: Retail Prices Rise Even When Wholesale Prices Fall	45

Executive Summary¹

This report provides evidence to debunk common misconceptions regarding the economic impact of U.S. sugar policy on employment and prices. Critics of the current policy claim that it sustains very few jobs in the sugar industry, while causing much larger job losses in industries that manufacture sugar containing products (SCPs), and hurting consumers through high prices for SCPs. Detailed analysis of evidence from a wide range of sources supports starkly different conclusions.

The sugar industry supports roughly 142,000 jobs. Lower estimates provided by the Bureau of Labor Statistics (and used by the U.S. International Trade Commission) exclude large fractions of the sugar industry and ignore important multiplier effects. The linkage between sugar industry employment and sugar prices is indisputable, and thus a large number of sugar jobs would be lost if current U.S. sugar policy were significantly modified or rescinded.

Job losses in SCP industries have been comparable to those in non-SCP industries over the past two decades. Furthermore, the evidence shows that sugar prices are not correlated with employment changes in SCP industries. Employment decreases in confectionery industries are associated with higher productivity, particularly in non-production occupations, and are related to higher wages and benefits in this sector.

The SCP industry has been faring very well under current U.S. sugar policy. SCP companies have experienced strong revenue growth over time. These companies have high profitability and high Returns on Equity, even when sugar prices increase. Coupled together with low risk and therefore a low cost of capital, SCP companies have generated impressive Total Shareholder Return since 2000, and their stocks are priced to reflect strong expectations for the future.

Retail SCP prices have risen much faster than the U.S. wholesale sugar price. Furthermore, retail SCP prices do not appear to depend on the wholesale sugar price, and don't typically fall when the sugar price decreases.

The general conclusion of this study is that, based on the evidence presented, U.S. sugar policy has not inflicted hardship on the U.S. SCP industry. The industry is thriving, and job losses in this industry over the past two decades are no worse than in non-SCP food manufacturing industries. Rather, they reflect productivity gains and other factors unrelated to sugar prices. Furthermore, if U.S. sugar policy were to be altered in any significant way, a large number of jobs supported by the sugar industry

¹ This report was prepared in April 2013 for the American Sugar Alliance. Professor Triantis served as the Chair of University of Maryland's Finance Department from 2006-2011. His research has been featured in *Business Week*, *CFO* magazine, *Financial Times*, *New York Times*, and the *Wall Street Journal*. He has consulted on a variety of issues to Fortune 500 companies, as well as to government and multinational organizations.

would be lost, and there is no evidence that consumers would benefit through lower SCP prices.

The preceding conclusions are based on systematic analysis of a broad spectrum of empirical data. Some examples of specific findings follow.

- **Sugar share of product cost.** The cost of sugar constitutes, on average, only 4% of the cost of producing a confectionery product. For sweetened products with a smaller sugar component, the sugar-cost share is even less.
- **Lack of passthrough.** Over time, retail sugar and sugar-containing product (SCP) prices have risen much more rapidly than producer prices for sugar. Furthermore, when producer prices fall, there is no evidence that food manufacturers and retailers pass any of their savings from lower sugar prices along to consumers.
 - In the past 35 years, since 1978, wholesale refined sugar prices have risen just 50%. However, retail refined sugar prices have risen 180% and highly sweetened product categories have had price increases in the 220-300% range.
 - Over the past two years, wholesale refined sugar prices have fallen by about 50%. Retail refined sugar and sweetened-product prices have not fallen at all, but rather have risen by 2-10%.
- **Sugar jobs.** The number of jobs in sugar production has dropped by roughly 40% over the past two decades.
 - The sugar-producer job loss is not surprising, since the price they receive for their sugar in real terms -- the wholesale refined sugar price corrected for inflation -- has dropped about 50% since 1990.
- **SCP sales.** Sugar-containing product sales, overall, have increased by 40% over the past 15 years, as the industry has continued to expand and increase productivity.
 - The confectionery portion of SCP sales is up 35%.
- **SCP jobs.** BLS data reveal that from 2006 to 2011, the number of jobs in the production of sugar-containing products (SCPs) rose by 0.4%, while the number of jobs in the manufacturing of food products that do *not* use sugar fell by 3%. These findings disprove claims by sugar policy critics that jobs in SCP production are declining and jobs in non-SCP food production are rising.
 - Much of the SCP job growth occurred during the 2010-2011 period when U.S. sugar prices were temporarily unusually high.
- No statistical link could be found between an earlier period of SCP-production job losses and either changes in the domestic sugar price or changes in the gap between U.S. and world sugar prices.
 - With SCP sales rising, job loss in that sector reflects productivity gains.

- The percentage of SCP-production job loss in management and sales is double that of jobs in production over the past two decades.
- Over the most recent decade, SCP-sector wages are up 39% and benefits are up 45%. In contrast, U.S. wholesale refined sugar prices are now just at the average levels of the 1980's and 1990's.
- Regarding drivers of corporate decisions to locate operations in the United States or Mexico, U.S. average hourly compensation is nearly six times that of Mexico and the U.S. marginal corporate tax rate is 33% higher.
 - Mexican sugar prices, meanwhile, have generally been close to, and in some years higher than, U.S. sugar prices.
- **SCP companies' financial performance.** An analysis of 10 large U.S. publicly held companies that produce highly sweetened products revealed those companies to be flourishing -- extremely profitable, low in risk, and with very promising expectations by investors. This is in sharp contrast with claims by sugar policy critics that these companies are struggling financially.
 - **Share prices** of these 10 large publicly held SCP companies shot up more than 300% from 2000 to 2013, compared to an almost flat S&P index during that period.
 - **Revenues** grew by 45% between 2004 and 2012, 50% higher than the growth rate for the rest of the U.S. economy during this period.
 - **Net profit margins** for these companies during 2004-2012 were 17% higher than the average for all U.S. public companies, and 60% higher than the average for the food processing industry.
 - The recent increase in sugar prices apparently did not harm SCP companies' net margins. In fact, the correlation between sugar prices and profit margins is not negative, but rather positive – profits have recently risen even with the spikes in sugar prices.
 - **Return on Equity** of the 10 large SCP companies averaged 47% higher than that of the overall food-processing industry and 115% higher than that of the total U.S. economy during 2004-2012.
 - Two measures show the SCP companies to be far less risky than other stocks during 2004-2012:
 - The average **standard deviation** measure of volatility for the SCP companies was just 42% of the food-processing industry average and only 32% of the total U.S. stock market.
 - Similarly, the average **beta** measure of systematic risk for the SCP companies was just 60% of the food-processing industry average and only 41% of the total U.S. stock market.

Section 1 – Introduction

This report analyzes specific economic effects of U.S. sugar policy. Critics of the current sugar policy claim that it sustains very few jobs in the sugar industry, while causing much larger job losses in industries that manufacture sugar containing products (SCPs), and hurting consumers directly through higher prices for SCPs. This report seeks to set the record straight on these issues by laying out facts regarding the sugar and SCP manufacturing industries. The study compiles a wide range of economic evidence drawn from data provided by the U.S. Departments of Agriculture, Commerce and Labor, and other private and public research institutions, and analyzes financial data from publicly traded U.S. companies.

In Section 2, I examine different estimates of jobs supported by the sugar industry. I highlight why some frequently cited estimates significantly underestimate the number of jobs supported by the industry, and thus minimize the large job losses that would occur if the current U.S. sugar policy were significantly modified or rescinded.

Section 3 examines employment changes in SCP and non-SCP manufacturing industries. The relationship between sugar prices and employment in SCP industries is also empirically analyzed. Other potential determinants of job losses, including productivity gains, higher wages and benefits, and increases in other material costs are investigated as well.

Section 4 examines the financial performance of the SCP industry in the presence of the U.S. sugar policy. Various financial performance metrics are analyzed, including revenue growth, profitability, Return on Equity, risk, Total Shareholder Return, and market expectations of future financial performance.

Section 5 examines whether retail prices of sugar and sugar containing products track the wholesale price of sugar. Specifically, it investigates whether retail prices fall when the wholesale price of sugar decreases. This provides indication of whether potential decreases in prices from changes in U.S. sugar policy would be passed on to consumers, or would simply increase profit margins for SCP producers and retailers.

The general conclusion of this study is that, based on the evidence presented, U.S. sugar policy has not inflicted hardship on the U.S. SCP industry. The industry is thriving, and job losses in this industry over the past two decades are no worse than in non-SCP food manufacturing industries. Rather, they reflect productivity gains and other factors unrelated to sugar prices. Furthermore, if U.S. sugar policy were to be altered in any significant way, a large number of jobs supported by the sugar industry would be lost, and there is no evidence that consumers would benefit in the form of lower SCP prices.

Section 2 - Impact of U.S. Sugar Policy on Jobs Supported by the Sugar Industry

One of the key benefits of U.S. Sugar Policy on the U.S. economy has been the ability to limit job losses at a time of high unemployment. While employment in sugar production and manufacturing has declined significantly over the past two decades, as will be detailed below, the sugar sector still supports a large number of jobs that would be at high risk of disappearing if the current U.S. sugar policy were to be rescinded.

Number of jobs supported by the sugar industry

To capture the extent of jobs supported by the industry, I consider various sources of information, including employment data from the Bureau of Labor Statistics (BLS), the Census Bureau, the U.S. International Trade Commission (USITC), and LMC International.

The most comprehensive studies on employment in the sugar sector have been conducted by LMC International.² The most recent study was completed in August 2011, and prior studies were done in 1994 and 2001. These studies cover the U.S. sugarcane and sugarbeet industries, including both farming (field/production) and manufacturing (factory). Through their detailed methodology from different sources, including surveys, LMC derives that there are a total of roughly 142,000 jobs supported by the sugar sector.

Government estimates of sugar jobs exclude large fractions of industry

BLS's Quarterly Census of Employment and Wages (QCEW) collects data from quarterly tax reports submitted to state workforce agencies by employers (related to unemployment insurance). As a result, it excludes certain categories of individuals, specifically "proprietors, the unincorporated self-employed, unpaid family members, and certain farm and domestic workers".³ These exclusions are very important for farming, and lead to significantly downward biased employment figures for the sugar industry. The exclusions are particularly problematic for estimating jobs in sugarbeet farming, which is a much more fragmented subsector with a large number of smaller farms, virtually all of which are family supported.⁴ The fact that the BLS data includes only 300 establishments in sugarcane farming

² LMC International is a privately-owned independent economic and business consultancy focused on the global agribusiness sector.

³ Source: <http://data.bls.gov/cgi-bin/print.pl/cew/cewbultn11.htm> (BLS).

⁴ Information provided by the American Sugarbeet Growers Association.

(11193) and 293 establishments in sugarbeet farming (111991) suggests that many of the thousands of farms are not being picked up by the QCEW.^{5,6}

According to the USDA's National Agricultural Statistics Services' (NASS) Farm Labor Survey (FLS) "hired farmworkers (including agricultural service workers) make up a third of all those working on farms; the other two-thirds are self-employed farm operators and family members. The majority of hired farmworkers are found on the nation's largest farms, with sales over \$500,000 per year."⁷ In 2001, the last year for which self-employed and unpaid labor statistics can be found on the NASS website, survey data shows 1,559,800 self-employed farm workers, and 490,000 unpaid workers, versus 873,300 hired labor, indicating more than two-thirds are self-employed or do not receive direct wages or salary. This is consistent with the employment findings of LMC, which are significantly higher than what the BLS reports based on wage and salaried employees.

There is also evidence that suggests that the BLS statistics may understate employment even in the sugar manufacturing sector (i.e., the non-farming sector of the industry). The Department of Commerce Census Bureau provides employment statistics for non-farming industries through its County Business Patterns (CBP) data series. For sugar manufacturing (NAICS 31131) in 2010 (the last year for which this data is available at this time), the employment statistics given are 10.7% higher than the BLS QCEW figures for 2010.⁸ The CBP data are based on employment recorded in mid-March rather than the yearly average, as is the case for the BLS data. However, since employment in March in the sugar industry is below the yearly average (as discussed below), this suggests that the BLS employment figures for sugar manufacturing may understate actual employment by even more than 10.7%.

LMC job estimates incorporate important multiplier effects

Another key consideration in understanding the impact of the U.S. sugar sector on the overall U.S. economy is that there is a much broader ripple effect due to the sugar industry. There are thousands of jobs associated with the sugar supply chain (suppliers, construction, transportation, communication, energy, financial services,

⁵ Source: <http://www.bls.gov/cew/ew11table2.pdf>

⁶ The BLS estimates that there are roughly 800,000 self-employed individuals in agriculture, and another roughly 100,000 unpaid family workers. In addition, in the category of Wage and Salary Agricultural Workers, the BLS estimates that 200,000 are excluded from their data, compared to the 1.2 million that are included. These BLS statistics appear to significantly underestimate the number of self-employed farm workers compared to the more comprehensive NASS agricultural survey data discussed below.

⁷ Source: <http://www.ers.usda.gov/topics/farm-economy/farm-labor/background.aspx#Numbers>.

⁸ Source: <http://www.census.gov/econ/cbp/>.

etc.), which are referred to as indirect jobs, as well as jobs supported by purchases made by employees in the sugar sector, referred to as induced jobs. The U.S. Department of Commerce recognizes these important multiplier effects and estimates multipliers for different industries using their Regional Input-Output Modeling System (RIMS II).

The LMC job estimates incorporate these multipliers, while the BLS estimates do not. LMC uses state-based Department of Commerce RIMS multipliers, which indicate indirect and induced jobs within a state from direct employment in that same state. These multipliers are close to 4 on average, but differ across sugar sectors and across states. However, given the regional nature of these multipliers, they likely understate somewhat the full multiplier effect given that both indirect and induced jobs may result in other states as well.

A 2012 North Dakota State University (NDSU) study focuses on a specific and important geographic segment of U.S. sugarbeet production and processing, located in the Minnesota and North Dakota region.⁹ This study estimates that sugarbeet processing cooperatives and marketing alliances in this region employs an equivalent of 2,473 full-time workers, but indirectly supports an additional 18,830 equivalent full-time jobs in this tri-state region alone, leading to an effective multiplier close to 8, far higher than that estimated by the Department of Commerce. As with the Department of Commerce RIMS multiplier, the NDSU study employs an input-output analysis. This suggests that the total jobs supported by the U.S. sugar sector could even exceed the figure reported in the LMC study.

Recent USITC job estimates based on incomplete BLS data

USITC includes employment statistics for the sugar sector in its periodic updates of “The Economic Effects of Significant U.S. Import Restraints.” The employment figures provided are drawn principally from the BLS data discussed above. In its studies prior to 1997, no production/farming employment data is provided. For the 3rd and 4th updates that cover the 1997-2002 period, the USITC began using data from LMC International for sugarcane and sugarbeet farming. Beginning with the 5th update, however, USITC began using data from the BLS not only for manufacturing (milling and refining), but also for production. Presumably, this was due to the fact that after the 2001 study, LMC data was not available until very recently (the 2011 study).

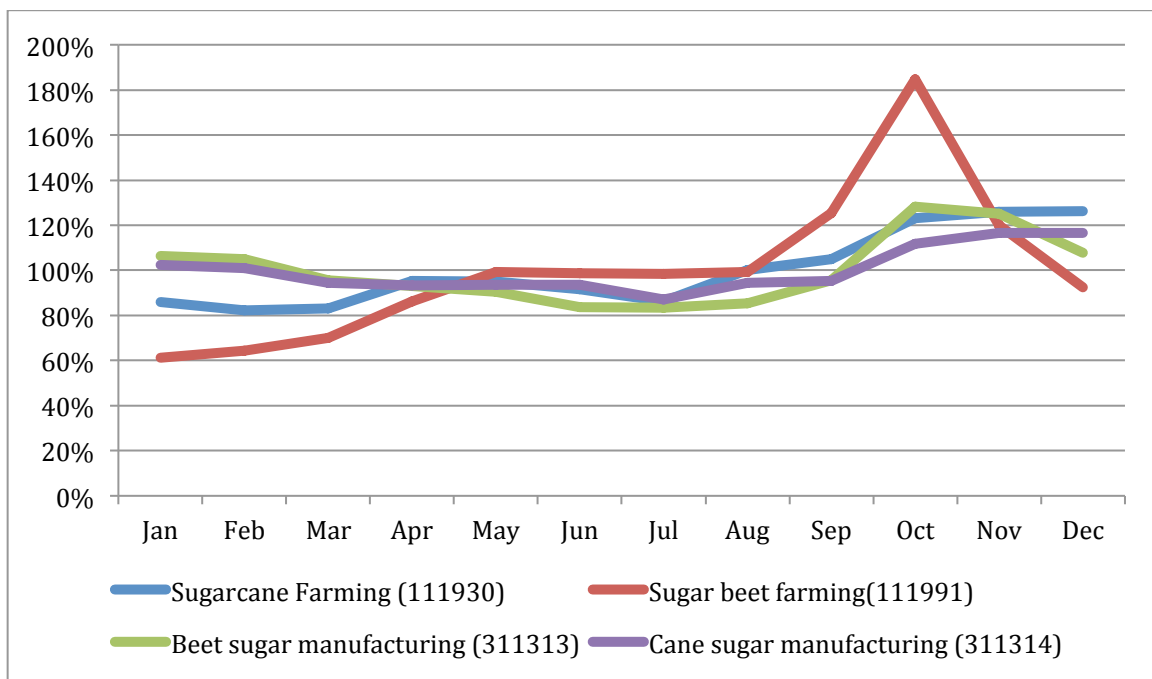
Since USITC attempts to predict impacts of changing U.S. sugar policy using the incomplete BLS data, subject to the missing elements detailed above, their conclusions on jobs lost are downward biased and unreliable.

⁹ Source: Agribusiness and Applied Economics Report No. 688, “Economic Contribution of the Sugarbeet Industry in Minnesota and North Dakota”, February 2012 (by Dean A. Bangsund, Nancy M. Hodur and F. Larry Leistritz).

Sugar jobs during peak season much higher than yearly averages

Another factor to consider in evaluating the contribution of U.S. sugar jobs to the U.S. economy is that some of the employment in the sugar industry is seasonal. Thus, the average number of jobs discussed above understates the number of individuals who would be affected by disruption to sugar policy. The job losses that would occur during the peak parts of the season would be much higher than the average number over the year. For instance, as shown in Figure 2.1 for the 2011 calendar year, the peak employment for sugarbeet farming was 85% higher than the average for the year.¹⁰ Peak employment relative to the 2011 yearly average was 128% for beet sugar manufacturing, 126% for sugarcane farming, and 134% for cane sugar manufacturing. The number of individuals that would be impacted by disruptions to the U.S. sugar sector would thus be significantly larger than the yearly averages would indicate.

Figure 2.1 – Seasonality in Employment: Monthly Employment Divided by Yearly Average, 2011: Average Annual Sugar Job Figures Understate Jobs During Peak Periods



Source: BLS QCEW Monthly Employment.

¹⁰ Source: data.bls.gov.

LMC estimate of jobs supported by sugar industry is the most accurate

Taking all the issues discussed above into consideration, it is clear that the recent estimate by LMC of roughly 142,000 jobs supported by the sugar sector is the most accurate estimate available. It captures self-employed and unpaid family workers, which is particularly important in assessing jobs in production. Furthermore, it incorporates the effect of multipliers to capture the ripple effects of industry jobs on the rest of the economy. Given other factors noted above, it is possible that the true multiplier effects may be even somewhat higher than assumed by LMC.

Sugar industry employment and real sugar prices have fallen together

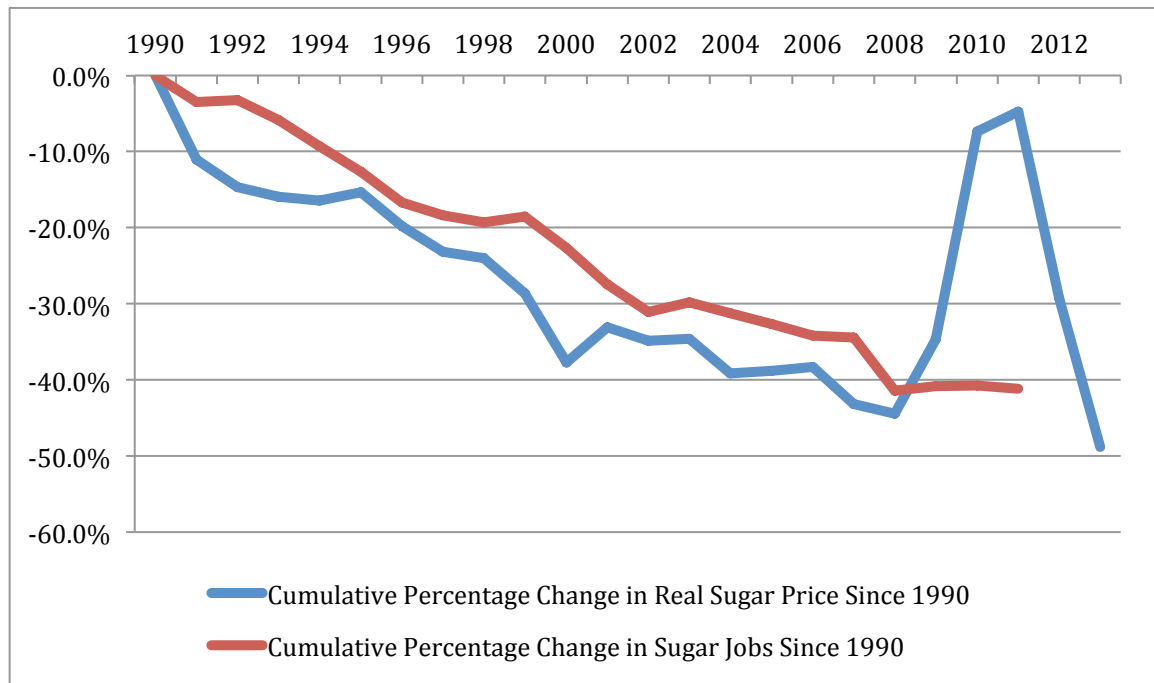
The number of jobs supported by sugar production and manufacturing has declined significantly over the past two decades. While the BLS employment data is incomplete, as described above, it is the only annual time series of data available on the sugar industry, and thus we use these figures as a gauge of the percentage decline in employment in the industry. Figure 2.2 shows that during each of the past two decades, jobs in the sugar sector declined by 20%, leading to a cumulative 40% loss over the past two decades. A drop of 40% is also found based on the more comprehensive LMC data between their 2011 and 1994 studies, covering roughly the same time period.

Some of the decline in jobs can be attributed to productivity increases, as in other industries. However, the drop in employment has largely been driven by the closures and contractions of many farms and manufacturing facilities over the past two decades. The lost jobs have resulted from decreased profitability in these operations, as the average price level of sugar in the U.S. has remained relatively flat over this period while costs of production and manufacturing have consistently increased over time. Looked at another way, the price of sugar in the U.S. in *real* terms, as shown in Figure 2.2,¹¹ has decreased dramatically, by nearly 50%, over the past two decades.

Employment in the sugar industry and real sugar prices have thus followed a joint downward trend over the past two decades. This is particularly true during the period 1990-2002 where the U.S. sugar price in real terms fell by approximately 35% and sugar jobs declined by almost the same amount. Since 2002, both the real sugar price and sugar jobs have continued declining, but with a less steep gradient. Based on the most recent data available for sugar jobs, Figure 2.2 illustrates that as sugar prices temporarily increased during the 2009-2011 period, sugar jobs stabilized, further evidence of the link between sugar prices and employment in the sugar industry.

¹¹ The real price level for sugar is obtained by deflating the average nominal price of U.S. raw sugar (Contract No. 14) for each calendar year by the corresponding year's CPI level, using the BLS CPI Yearly Average for Urban Consumers All Items.

Figure 2.2 – Changes in Real Sugar Prices and Sugar Employment: Sugar-Producing Jobs Drop with Sugar Prices



Sources: BLS QCEW (Employment for NAICS 111930, 111991, 311311, 311312, 311313); BLS CPI Yearly Average for Urban Consumers All Items; USDA ERS Sugar and Sweeteners Yearbook Table 4 (US Raw Price, Contract No. 14, Calendar Year Average; 2013 price based on average of January and February).

What could happen in the future if there are lower U.S. sugar prices

Looking forward, the effects of altering current U.S. sugar policy on sugar prices in the U.S., and on employment supported by the industry, are hard to predict with any precision. Since this policy has been in place for many years, it is hard to determine exactly what consequences would result from such a large disruption in policy. Some researchers have attempted to forecast these effects using simulated models. While these models are highly complex, they are still quite incomplete, and require a large number of input assumptions that are difficult to accurately estimate, thus leading to dubious conclusions.

An alternative economic research methodology involves observing a similar experiment in a related setting. The recent sugar policy reform in the European Union in 2006 provides the closest evidence. According to Chatenay (2012), sugar production plummeted following the large drop in wholesale sugar prices in the EU, and as a result, he estimates 120,000 jobs have been lost (20,000 direct and 100,000 indirect), and the number of European sugarbeet growers has decreased from 300,000 to 160,000. This experience highlights that a change in sugar policy can have a dramatic negative effect on employment supported by the sugar industry.

Given the historical link between profitability of operations and employment in the sugar industry in the U.S, and the recent experience in Europe, it is thus reasonable to expect that any disruption to U.S. sugar policy that will result in a decrease in the price of sugar will result in the loss of a large fraction of the roughly 142,000 jobs supported by the sugar industry.

Section 3 - Impact of U.S. Sugar Policy on SCP Industry Jobs

Many food products contain sugar, and the food manufacturing sectors that produce such products are often referred to as Sugar Containing Products (SCP) industries. In this section, I analyze the extent to which sugar is a significant input material in various SCP sectors, the job losses in SCP vs. non-SCP food manufacturing industries, the effect of sugar prices on losses of SCP jobs, and other factors that have contributed to SCP job loss.

Most sugar containing products contain relatively little sugar

SCP industries vary greatly in terms of the importance of sugar as an input material, as shown in Table 3.1. The percentage figures shown are obtained by dividing the cost of sugar consumed by the industry by the total cost of materials consumed, which includes ingredients, containers, packaging materials, and other supplies. The percentages are calculated using materials consumed figures from the 2002 and 2007 Economic Census. Table 3.1 ranks industries based on their percentage sugar content using the most recent figures available.¹²

Table 3.1 shows that there are only twelve SCP industries whose products have a sugar content greater than 1% of total materials consumed, and only three of these have more than 10% sugar content. The five industries with the most sugar content in their products are Breakfast cereal manufacturing (13.2%), Non-chocolate confectionery manufacturing (11.2%), Chocolate and confectionery manufacturing from cocoa beans (10.8%), Confectionery manufacturing from purchased chocolate (9.9%), and Flour mixes and dough manufacturing (9.3%).

¹² Data is not yet available from the 2012 Economic Census.

Table 3.1 – Cost of Sugar as Percentage of Total Material Cost for SCP Industries

NAICS ID	NAICS Classification	Sugar / Total Material (% cost) 2002 Census	Sugar / Total Material (% cost) 2007 Census
311230	Breakfast cereal manufacturing	12.50%	13.16%
311340	Nonchocolate confectionery manufacturing	10.10%	11.17%
311320	Chocolate & confectionery manufacturing from cocoa beans	11.60%	10.80%
311330	Confectionery manufacturing from purchased chocolate	9.20%	9.94%
311822	Flour mixes and dough manufacturing from purchased flour	6.58%	9.27%
311813	Frozen cakes, pies, and other pastries manufacturing	6.50%	7.80%
311821	Cookie and cracker manufacturing	4.40%	7.68%
311812	Commercial bakery product manufacturing	4.60%	4.53%
311999	All other miscellaneous food manufacturing	2.60%	2.61%
311520	Ice cream and frozen dessert manufacturing	2.50%	2.49%
311514	Dry, condensed, and evaporated dairy product manufacturing	1.40%	1.48%
311942	Spice and extract manufacturing	0.60%	1.07%
311930	Flavoring syrup and concentrate manufacturing	1.20%	0.98%
311423	Dried and dehydrated food manufacturing	0.60%*	0.96%
311941	Mayonnaise, dressing, other prepared sauce manufacturing	1.00%	0.80%
311511	Fluid milk manufacturing	0.70%	0.77%
311811	Retail bakery product manufacturing	0.70%	0.70%**
311411	Frozen fruit, juice and vegetable manufacturing	0.40%*	0.69%
311421	Fruit and vegetable canning	0.60%*	0.53%
311911	Roasted nuts and peanut butter manufacturing	NA	0.50%
311111	Dog and cat food manufacturing	0.20%	0.47%
311412	Frozen specialty food manufacturing	0.40%*	0.45%
311422	Specialty canning	0.60%*	0.44%
311211	Flour milling	0.30%	0.30%**
311991	Perishable prepared food manufacturing	NA	0.21%
311119	Other animal food manufacturing	0.10%	0.13%
311919	Other snack food manufacturing	0.10%	0.10%**
311513	Cheese manufacturing	0.02%	0.04%

Source: Percentages based on Materials Consumed (sugar vs. total) from 2002 and 2007 Economic Census (Dept. of Commerce Bureau of Census).

Notes:

* 2002 estimates for 5-digit NAICS percentages are used for associated 2007 NAICS 6-digit industries.

** Details for quantity of sugar consumed in this industry was not disclosed or omitted in 2007 census, so the 2002 estimate is used.

Sugar responsible for small fraction of total value of SCP products

It is important to note that these percentage content figures represent the cost of sugar as a percentage of material costs only. The cost of manufacturing in SCP industries includes many other significant costs such as labor, benefits, transportation, and general and administrative expenses. Thus, the impact of sugar prices on total expenses is much lower than indicated by the percentage figures in Table 3.1. For instance, the most recent public data provided by the National Confectioners Association indicates that for every \$1 of confectionery product sold in 2010, only about 4 cents is attributable to the cost of sugar, another 9 cents is due to other commodity costs, and the remaining 87 cents covers other costs as well as the companies' profit margins.¹³ For other SCP industries that have much lower sugar content in their total material cost, the percentage of total cost attributable to sugar would be very low.

Note that the cost of sugar consumed as a percentage of the total material cost has increased for most SCP industries between 2002 and 2007. Yet, the price of sugar did not increase between these two points in time. In fact, the average price of U.S. wholesale refined sugar in 2007 was 25.06 cents per pound, lower than the 25.79 cent per pound average price in 2002.¹⁴ In contrast, other material costs have in general increased during this five-year period. This implies that many SCP companies have chosen to increase the percentage content of sugar in their products.

Job losses in SCP industries generally smaller than in non-SCP industries

Despite indications that SCP companies may be increasing the sugar content in some of their products, representatives of some of these industries have complained that high U.S. sugar prices have cost jobs in their industries. To investigate whether there is any validity to this claim, I first examine employment data across different sectors of the food manufacturing industry – those that use sugar vs. those that don't - to see whether there is any relationship between the consumption of sugar by the industry (and therefore implicitly the impact of sugar price) and changes in employment over time.

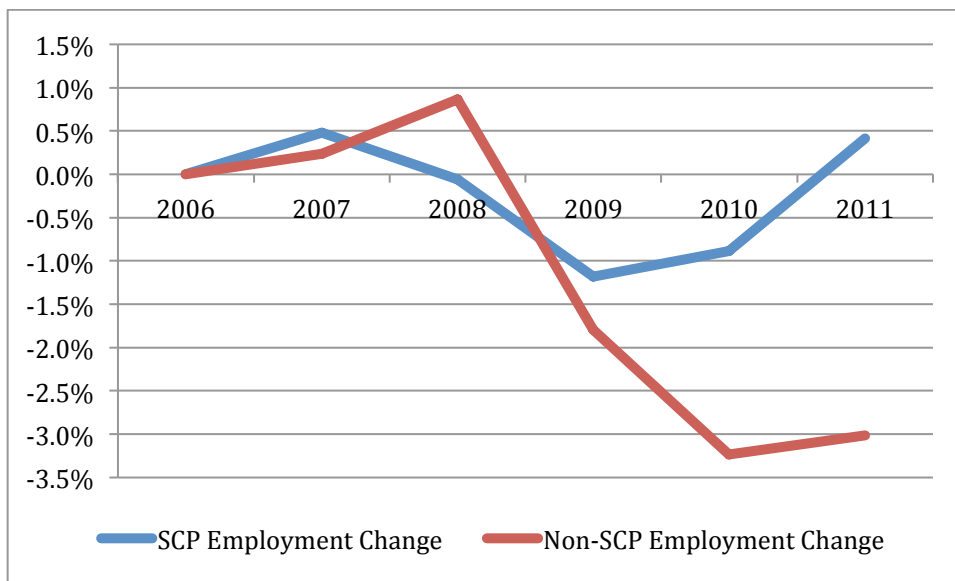
¹³ Source: www.candyusa.com. These figures appear consistent, or potentially higher, than those that can be derived from the Annual Survey of Manufacturers (ASM). Over the past fifteen years, the ratio of the Total Cost of Materials to the Total Value of Shipments has been 42% for confectionery industries (NAICS 31132-34). Since sugar is roughly 10% of the wholesale cost of materials in the confectionery industry, sugar only represents approximately 4% of these companies' revenues. Since the retail cost of these confectionery products also reflect other markups along the value chain, sugar's share of the retail cost of these products is likely smaller still.

¹⁴ Source: USDA ERS, Table 5.

Figures 3.1, 3.2, and 3.3 show the percentage decrease in jobs over the most recent 5, 10 and 20 year periods, respectively, in both SCP industries and non-SCP industries, i.e., industries that show no sugar content in their materials consumed, according to 2007 Economic Census data.¹⁵ Employment data is obtained from the BLS, with 2011 being the last year available at this time.

Figure 3.1 shows that jobs increased slightly (0.4%) in SCP industries over the 2006-2011 period, while they decreased by 3.0% over the same time period in non-SCP industries. What is particularly notable about this finding is that, due to global sugar shortages, U.S. sugar prices increased substantially during this period, from 33.1 to 56.2 cents per pound for wholesale refined sugar, and 22.1 to 38.1 for raw sugar.¹⁶ If sugar prices have an effect on employment in SCP industries, one would have certainly expected to see greater job losses as compared to non-SCP sectors of the industry during this particular time period.

Figure 3.1 - Cumulative Percentage Change in Employment in Food Manufacturing Industry (2006-2011): SCP Jobs Up, Non-SCP Jobs Down



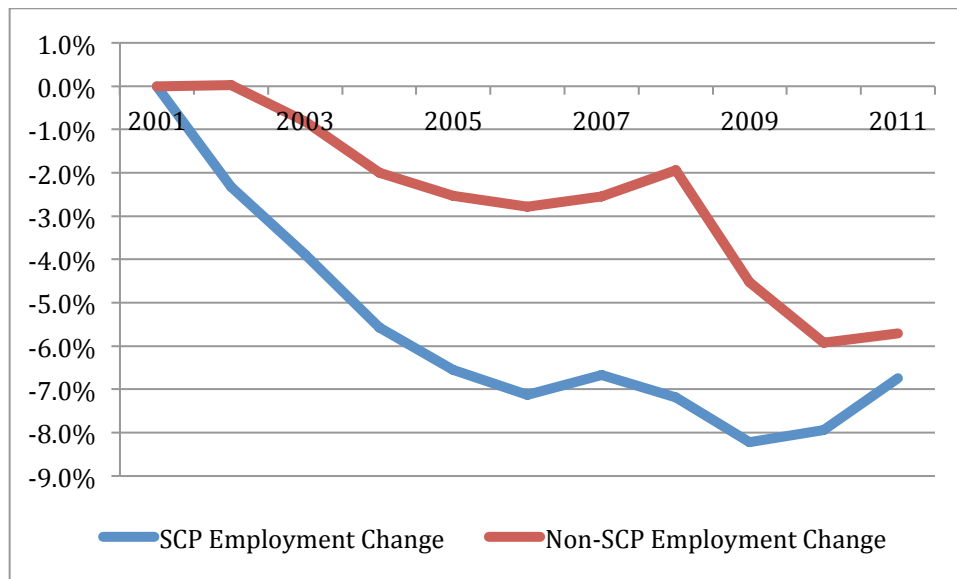
Source: BLS data for NAICS 311; industries are sorted into SCP and non-SCP based on Materials Consumed from 2007 Economic Census.

¹⁵ Beet sugar and cane sugar manufacturing/refining industries (NAICS 31131) are not included in the SCP category though (raw) sugar is the principal material consumed in the manufacturing process. This is the only industry within food manufacturing (NAICS 311) not included in either SCP or non-SCP industries. Job losses in this industry are analyzed in Section 2 of this report.

¹⁶ Source: USDA ERS Sugar and Sweetener Outlook, Tables 4 and 5.

Figure 3.2 illustrates employment changes over the past ten years. The resulting job loss appears relatively similar for SCP and non-SCP industries. Approximately 7% of SCP jobs were lost over this period, while 6% of non-SCP jobs were lost. During this period, the sector with the highest sugar content, Breakfast Cereal Manufacturing (with 13.2% sugar content in materials) only lost 1.1% of jobs, below the average job loss for non-SCP and overall food manufacturing.¹⁷ Two of the twelve industries within the SCP group that have more than 1% sugar content added jobs during the past ten years despite the overall job loss in food manufacturing. None of these findings are consistent with a hypothesis that U.S. sugar policy is contributing to job losses in SCP industries.

Figure 3.2 - Cumulative Percentage Change in Employment in Food Manufacturing Industry (2001-2011): SCP and Non-SCP Job Loss About the Same

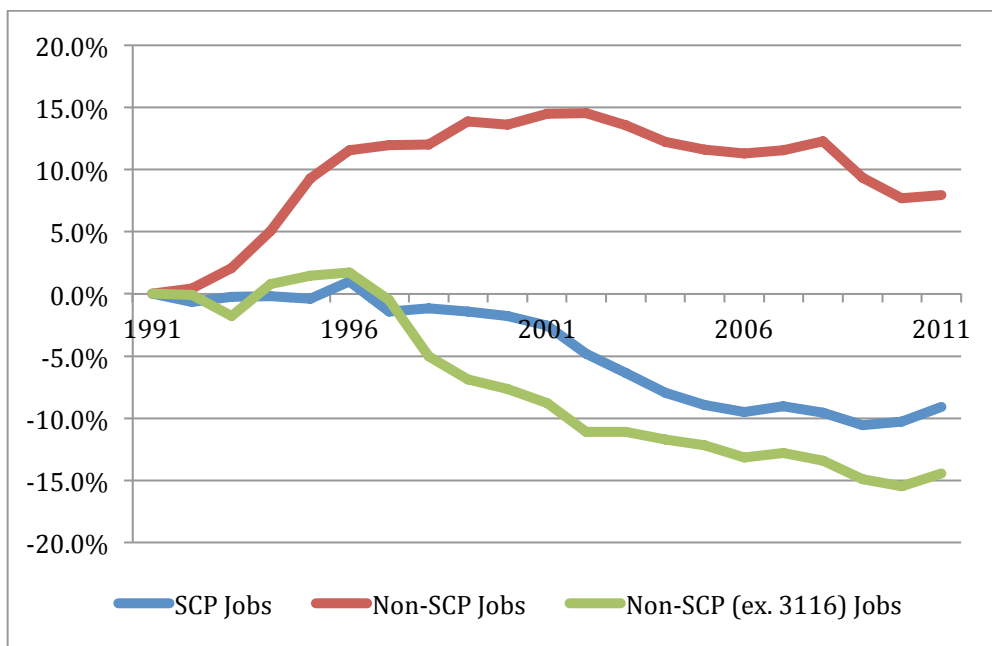


Source: BLS data for NAICS 311; industries are sorted into SCP and non-SCP based on Materials Consumed from 2007 Economic Census.

¹⁷ Source: Quarterly Census of Employment and Wages, BLS.

Figure 3.3 shows the decline in food manufacturing employment over a longer twenty-year horizon. The job losses in non-SCP industries were less significant over this period than in SCP industries. However, this is a result of the significant job growth in the Animal Slaughtering and Processing industry (NAICS 3116) during the first decade of this period (1991-2001). Taking this one industry out of the non-SCP group, the resulting job loss is larger for non-SCP than SCP industries. Again, sugar does not appear to be a factor in this long-term job loss.

Figure 3.3 - Cumulative Percentage Change in Employment in Food Manufacturing Industry (1991-2011): Adjusted for Animal Slaughtering and Processing, Non-SCP Job Loss Greater Than SCP Job Loss

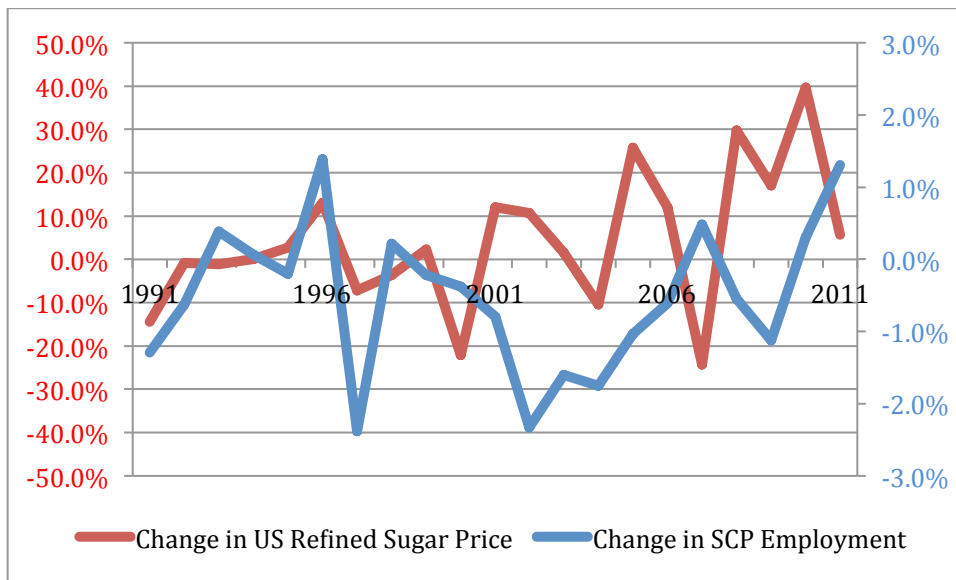


Source: BLS data for NAICS 311; industries are sorted into SCP and non-SCP based on Materials Consumed from 2007 Economic Census. NAICS 3116 is Animal Slaughtering and Processing, a large industry that experienced significant job growth during this period.

Sugar prices not correlated with employment changes in SCP industries

Figure 3.4 presents another perspective to examine whether there is any relationship between U.S. sugar prices and employment loss in the U.S. SCP industry. The figure juxtaposes the yearly percentage change in U.S. wholesale refined sugar prices (the scale is on the left vertical axis) with the yearly change in SCP employment (the scale is on the right vertical axis) over the past twenty years. There appears to be no relationship that would support a link between increases in sugar price and decreases in jobs in the SCP industry (or vice-versa). In fact, the correlation between these contemporaneous movements is slightly positive (that is, refined sugar prices and SCP-manufacturing employment rise or fall together more so than in the opposite direction), which would run counter to this claim.¹⁸ As mentioned earlier, the job gain over the most recent five-year period runs counter to the fact that SCP companies were paying higher prices for sugar in 2011 than in 2006.

Figure 3.4 - Annual Percentage Changes in U.S. Refined Sugar Price and SCP Industries Employment: No Relationship Between Sugar Price and SCP Jobs

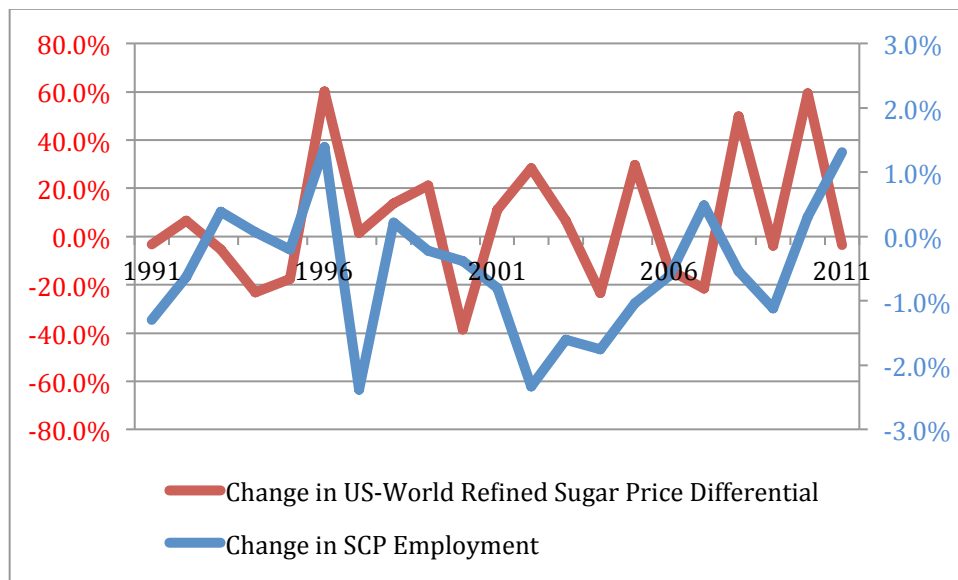


Sources: BLS QCEW; USDA ERS Sugar and Sweetener Table 5.

¹⁸ The lagged percentage changes in sugar price are also slightly positively correlated with changes in SCP employment, so there appears to be no support for a delayed effect of sugar price increases on SCP employment decrease.

It is also not the case that the differential between U.S. and world sugar prices is driving job losses. Figure 3.5 shows the percentage annual decline in SCP employment (right axis) against the annual percentage change in the U.S.-world price differential for wholesale refined sugar (left axis). Again, there is no pattern where increases in the price differential are related to contemporaneous job losses, and in fact the correlation between the two time series is slightly positive. In the two years with the highest U.S.-world price differential increases (roughly 60% increase in 1996 and 2010), SCP jobs rose rather than fell.

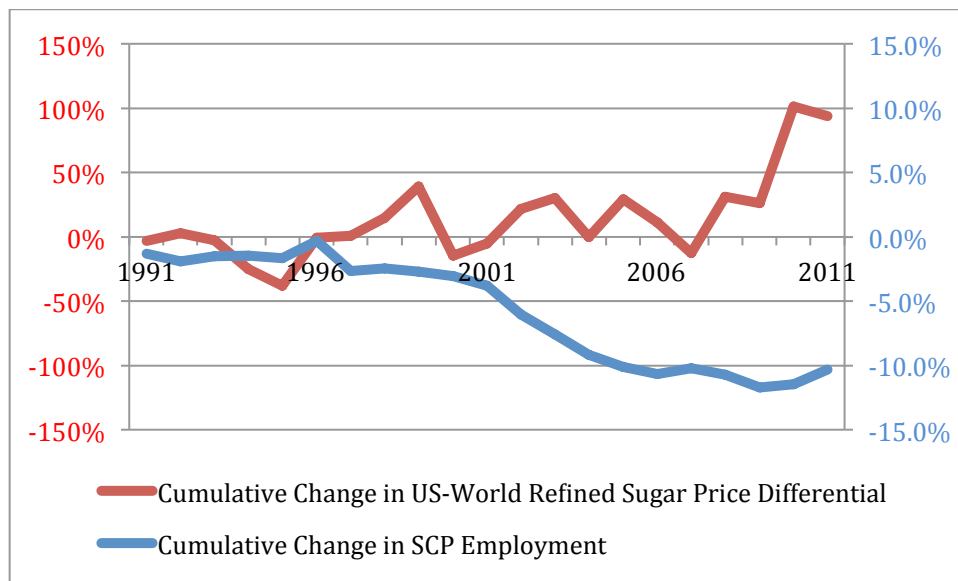
Figure 3.5 - Annual Percentage Change in U.S. vs. World Refined Sugar Price Differential and Annual Percentage Change in SCP Industries Employment: No Relationship Between U.S.-World Sugar Price Differential and SCP Jobs



Sources: BLS QCEW; USDA ERS Sugar and Sweetener Tables 2 and 5.

Figure 3.6 illustrates the effect of cumulative percentage changes in the U.S.-world refined sugar price differential against cumulative percentage changes in SCP employment. These cumulative percentage changes capture the effects over a period of time, as opposed to only the annual effect (as in Figure 3.5) which may have only a temporary impact. In other words, if it is the gradual pressure of an increased price differential, and not simply a temporary increase in the price differential, that decreases SCP jobs, this should be revealed through the relationship between the cumulative percentage changes. However, no such relationship is apparent in Figure 3.6. During the period of largest SCP job losses (2001 through 2007), the cumulative percentage change in the U.S.-world price differential is close to zero (slightly negative in fact). And, during the period of the largest gain in the U.S.-world price differential (2007 through 2011), the cumulative change in job losses was equal to zero. Thus, there is no evidence that the U.S.-world price differential has impacted jobs in the SCP industry.

Figure 3.6 - Cumulative Percentage Change in U.S. vs. World Refined Sugar Price Differential and Cumulative Percentage Change in SCP Industries Employment: No Long-Term Relationship Between U.S-World Sugar Price Differential and SCP Jobs



Sources: BLS QCEW; USDA ERS Sugar and Sweetener Tables 2 and 5.

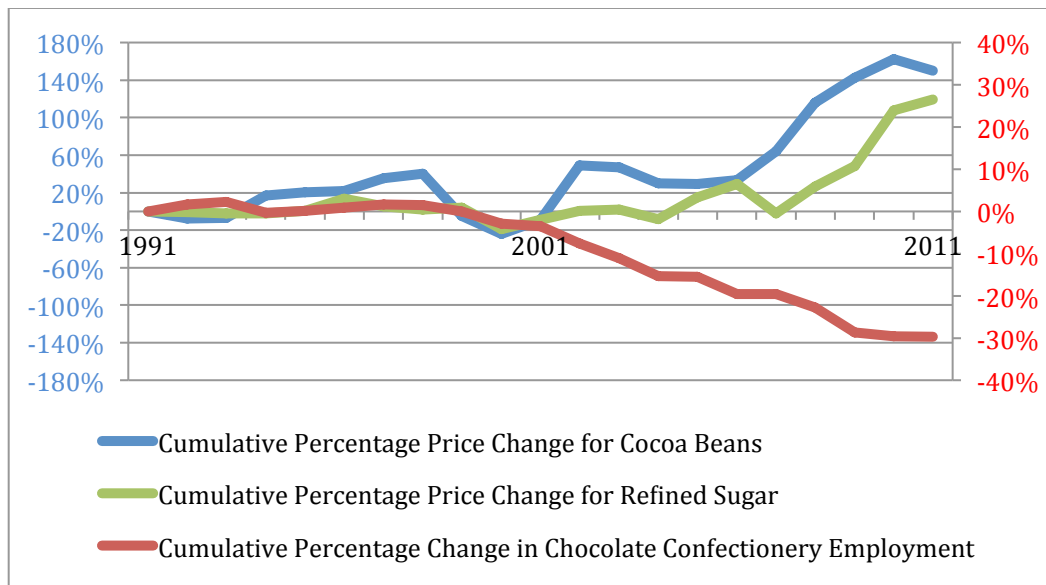
Other material costs more likely than sugar prices to affect job losses

Taking all this evidence together, one cannot substantiate claims that sugar prices are affecting employment in SCP industries. If material costs have led to job losses, the answer must lie elsewhere than sugar. For instance, two SCP sectors that have suffered the largest job losses are the Chocolate and Confectionery Manufacturing from Cocoa Beans (NAICS 311320) and Confectionery Manufacturing from

Purchased Chocolate (NAICS 311330) industries, and both of these industries use cocoa to a greater extent than sugar. The cocoa and cocoa-derivatives content for Chocolate and Confectionery Manufacturing is 41.9%, compared to a sugar content of 10.8%. Similarly, the cocoa-derivative content for Confectionery Manufacturing from Purchased Chocolate is 23.6%, compared to sugar content of 9.94%.¹⁹

Figure 3.7 shows the cumulative percentage decline in employment in these two industries over the past two decades, plotted against the cumulative percentage change in cocoa prices and refined sugar prices. While one cannot establish causality between cocoa price changes and employment changes, there appears to be some relationship between the two, as employment started to decline more markedly in 2001 at the same time that cocoa bean prices began their ascent towards a price level 160% higher than in 1991. In contrast, the sharpest ascent in sugar prices occurred only in the last three years of this period (from 40 to 120% higher, owing to a global sugar shortage), at a time when confectionery employment was relatively flat.

Figure 3.7 - Cumulative Percentage Change in Cocoa Bean and U.S. Refined Sugar Price (scale on left axis) and Cumulative Percentage Change in Chocolate Confectionery Industries Employment (scale on right axis): Cocoa Prices More Important Than Sugar Prices



Note: Scale on left axis for Cocoa Bean and U.S. Refined Sugar Price cumulative percentage changes. Scale on right axis for percentage change in chocolate confectionery employment. Sources: Employment from BLS QCEW (for Chocolate Confectionery industries, NAICS 31133-311133); USDA ERS Sugar and Sweetener Table 5 (U.S. refined sugar); Cocoa Beans are International Cocoa Organization cash prices (World Bank).

¹⁹ Source: 2007 Economic Census, Bureau of Census.

Interestingly, while job losses in the chocolate confectionery sectors have been higher (12.5% loss) than in any other SCP industry over the past five years, job losses in the Non-chocolate Confectionery industry (NAICS 311320), which uses more sugar per product, were rather modest (3.4% loss).²⁰ While both sugar and cocoa prices increased significantly during this period, since non-chocolate confectionery has a higher sugar content than other confectionery industries (see Table 3.1) and does not use cocoa, the differential job loss between these confectionery industries would have to be attributed to cocoa prices, not to sugar prices, if to any material cost at all. Since 2011, U.S. sugar prices have fallen about 50%.

Productivity gains in SCP industries associated with job losses

Job losses in the confectionery industry, just as in other SCP industries, are more likely to be attributable to factors other than material costs in any event. Decreases in food manufacturing employment have been driven in large part by increasing productivity, as well as relocation of facilities abroad due to labor cost differentials, and other supply chain, regulatory, and tax advantages.

Productivity in the sugar and confectionery product manufacturing sector (NAICS 311) has increased by an average of 1.2% annually during the past two decades, based on the most recent statistics (1990-2010) for BLS's Output per Person data series.²¹ This productivity gain is in line with that for food manufacturing overall (1.3% for this same period). These productivity gains help to augment profitability, and potentially to lower prices for consumers, but they frequently involve a decrease in employment, and this effect was likely magnified in the confectionery industry.

While many associate productivity gains with manufacturing activity, efficiency gains may be realized across various functional areas of an organization. Higher efficiency may result from shutting down plants and manufacturing in less costly locations, but it can also result from consolidations within the industry and leaner organizations. To analyze such changes within the confectionery industry, I examine changes in employment across different occupation types using data from the Occupational Employment Statistics (OES) Survey (from the Bureau of Labor Statistics). Data is available for the sugar and confectionery industry (NAICS 3113), rather than for the individual 5-digit industries within this sector. However, while sugar processing and refining is included in this sector, it accounts for only around 16-18% of the sector jobs, and thus the results for this sector mostly reflect trends in the confectionery industries. The most recent OES data is from 2012, and I use

²⁰ Source: Quarterly Census of Employment and Wages, BLS.

²¹ Source: Industry Labor Productivity and Costs: Percent Changes (Output per Person), Bureau of Labor Statistics.

2002 data in order to examine changes in occupational employment over the past decade.

Table 3.2 shows the changes in employment for the industry overall, as well as for occupational categories that represented at least 2% of the employees in the industry, and that in aggregate represent approximately 92% of the individuals employed in this sector. Overall employment in sugar and confectionery products has declined by 26.5% during the past decade. As discussed above, this sector has seen more job losses than other SCP industries.

Table 3.2 – Change in Employment by Occupation in Sugar and Confectionery Manufacturing (NAICS 3113)

Occupational Title	2002 Employees	2012 Employees	% Diff. 2002-2012
All Occupations	93,840	68,990	-26.5%
Management	3,960	2,370	-40.2%
Sales and Related	9,600	6,220	-35.2%
Office and Admin. Support	7,310	5,520	-24.5%
Installation, Maint., Repair	6,210	5,170	-16.7%
Production	40,030	32,940	-17.7%
Transportation	17,230	11,060	-35.8%

Source: Occupational Employment Statistics (OES) Surveys (2002 and 2012), Bureau of Labor Statistics. Estimated total employment based on survey; percent standard errors for employment similar across different occupational titles (in 4-6% range).

However, note that occupations involved directly in production, which represent close to half the workforce in this industry, have lost proportionately far fewer jobs (17.7% loss) than management and sales occupations (40.2% and 35.2%, respectively). As a result, employees in production occupations now make up 47.8% of the workforce in this industry in 2012, as opposed to 42.7% in 2002. This highlights the fact that job losses in this sector are not all associated with moving production activity abroad in order to try to capitalize on lower input costs. Companies are finding ways to realize efficiency gains across other areas of their operations, which are also resulting in fewer jobs despite higher output (which will be documented more fully in the next section of the report).

Higher wages and benefits create pressure on SCP employment

It is also interesting to note that, despite the significant loss in employment in the confectionery industry over the past decade, aggregate annual wages paid to

employees in this sector has risen over the past decade. This implies that the wage per employee must have increased significantly during this period. One way to determine this trend is by computing the ratio of Annual Payroll to Number of Employees using data from the Annual Survey of Manufacturers (ASM) and the Economic Census. For the most recent ten-year period available (2001-2011), I find that the average wage per employee in the Confectionery industries has risen by 39% during this period.

The Mean Annual Wage is also estimated by the Occupational Employment Statistics (OES) Surveys (conducted by the Bureau of Labor Statistics) for four-digit NAICS industries. Using data from the 2002 and 2012 surveys for the Sugar and Confectionery industry, I calculate that the mean annual wage in the industry has increased by 21.1% over this decade. While lower than the alternative estimate that is based on the Census Bureau data, this nevertheless still points to a significant increase in wages over this period. The OES statistics also show that while those in production occupations (approximately half of those employed in the industry) have experienced a mean annual wage increase of 18.4%, Chief Executives have seen their wages increase by 26.9%.

Benefits have also increased considerably in the Confectionery industry over recent years. Since 2002, the Annual Survey of Manufacturers and the Economic Census (in 2002 and 2007) have collected information about total benefits paid for each industry. Taking the benefits amount in each year and dividing by the number of employees in that year, the benefit per employee has increased by 45% over the nine years between 2002 and 2011 (the most recent year that this data is available).

A more detailed breakdown of benefits spending became available starting in 2007. During the most recent four years (2007 to 2011), the money spent on health benefits per employee has increased by 35% in the Confectionery industry. During this same period, defined benefit pension contributions by these companies (per employee) increased by 22%, and employer contributions for defined contribution pension plans (per employee) increased by 49%.²²

This relation between higher wages and benefits in recent years and job losses in the Confectionery industry are hard to ignore. As wages and benefits have increased so considerably, companies have cut jobs and increased productivity. Labor costs typically play a very prominent part in driving manufacturing to low-cost countries such as Mexico. According to BLS statistics for hourly compensation costs for production workers across the world, the average hourly compensation in

²² Defined benefit pension plans are managed by companies, typically through designated fund managers, and provide pension income for retirees based on a prescribed formula. Defined contribution plans are retirement accounts managed by the employee, with the employer making matching contributions into these individual accounts.

manufacturing in 2011 was \$6.48 in Mexico and \$35.33 in the U.S.²³ Buzzanell (2009) investigates this issue in much greater detail, focusing specifically on the confectionery industry, and controlling also for difference in health care costs. He finds a disparity between the costs of labor in the U.S. and Mexico that is much larger than the approximately fivefold difference in the hourly compensation rate for the larger industry group.

Additional factors to consider regarding SCP production location decisions

In addition to labor costs, production location decisions are driven by many other potential factors, including the costs of land, electricity, and other key input factors; government regulation and policies related to tax, environmental protection, and labor; and various supply chain issues including reducing transportation costs and managing the risks of supply chain disruptions. The high U.S. corporate tax rate is often blamed for production offshoring decisions. The marginal corporate tax rate in the U.S. is approximately 40%, while it is 26% in Canada, and 30% in Mexico.²⁴

Sugar prices, meanwhile, have not been a significant factor. Wholesale refined sugar prices in Mexico, for example, have generally been close to, and is some years higher than, U.S. sugar prices.²⁵

However, despite the other potential advantages, food manufacturing has still retained a strong footprint in the U.S., and this is true for SCP manufacturing as well. The ability of companies to access reliable sources of commodities has been an important factor in this regard. The cost of sugar has generally been quite stable, other than the recent few years that were highly unusual and largely driven by weather-related production problems in foreign markets. The reliability of having high quality and readily accessible sugar has been important to companies in the SCP industry given the significant financial consequences of supply chain disruptions. Chatenay (2012) identifies higher price and supply volatility as important negative consequences of the change in EU sugar policy in 2006. Similar issues could well arise here in the U.S. if the current sugar policy were to be changed.

²³ Source: Bureau of Labor Statistics, Division of International Labor Comparisons. Data for hourly compensation in food manufacturing is not available for Mexico, so the overall manufacturing figure is used for comparison sake.

²⁴ Source: KPMG Corporate Tax Rates Table (<http://www.kpmg.com/global/en/services/tax/tax-tools-and-resources/pages/corporate-tax-rates-table.aspx>).

²⁵ Source: USDA ERS Sugar and Sweetener Outlook, Tables 5 and 55.

Section 4 - Impact of U.S. Sugar Policy on SCP Companies

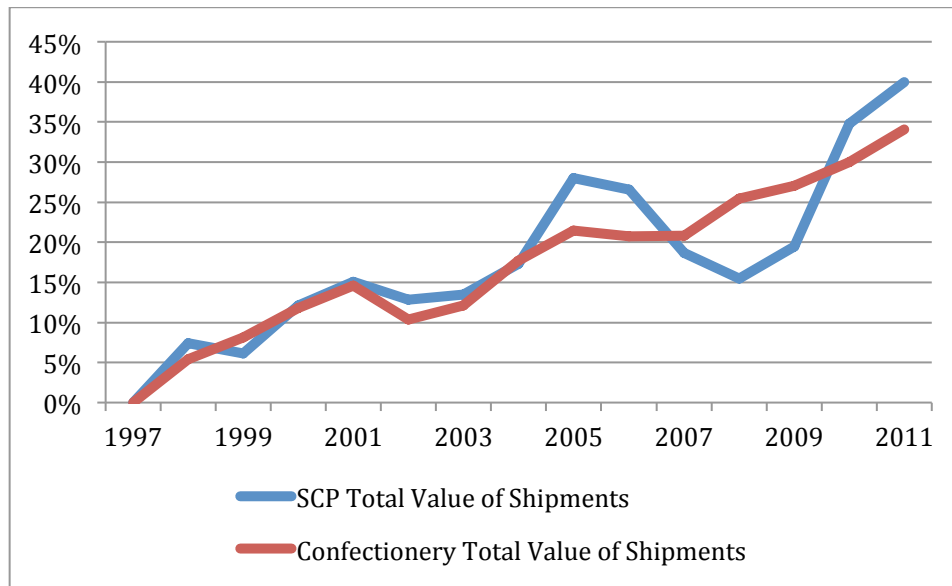
While there is no evidence linking job losses in the U.S. SCP sector to U.S. sugar policy, it is useful to also examine whether the current sugar policy has had a damaging effect to the industry in ways other than employment. I examine the change over time in financial metrics such as revenue, profitability, returns on equity, and share prices.

Value of products shipped has increased significantly

The Bureau of Census provides aggregate measures of industry growth through the Economic Census every five years, and through the Annual Survey of Manufacturers (ASM) for non-Census years. Figure 4.1 examines the growth pattern in Total Value of Shipments for the last fifteen years. I focus on the SCP sectors with the highest content of sugar (more than 3% of total material cost), which include the Confectionery manufacturing sectors (Chocolate and confectionery manufacturing from cocoa beans (31132), Confectionery manufacturing from purchased chocolate (31133), and Nonchocolate confectionery manufacturing (31134)), as well as Breakfast Cereal manufacturing (31123), Bread and bakery product manufacturing (31181), and Cookie, cracker and pasta manufacturing (31182).

As shown in Figure 4.1, the Total Value of Shipments has increased overall by 40% for SCP manufacturing over the past fifteen years. For the Confectionery industries on their own, the increase has been closer to 35%, and with a rather consistent and stable growth pattern. This strong growth is an indicator of robust financial health for these industries. It is also worth noting that sweetened-product output continued its strong rate of growth during the 2009-2011 period when U.S. wholesale refined sugar prices were unusually high, driven by global sugar shortages. U.S. sugar prices have since collapsed.

Figure 4.1 – Strong Growth in Total Value of Shipments from Confectionery and Other Major SCP Sectors: All Sweetened-Product Output Up 40%, Candy Output Up 34%, since 1997; Growth Strong During 2010-2011 High-Sugar-Price Period



Note: Confectionery Total Value of Shipments includes Chocolate and confectionery manufacturing from cocoa beans (31132), Confectionery manufacturing from purchased chocolate (31133), Nonchocolate confectionery manufacturing (31134). SCP Total Value of Shipments includes shipments from Breakfast Cereal (31123), Confectionery (31132-31134), Bread and bakery product manufacturing (31181), and Cookie, cracker and pasta manufacturing (31182).

Source: Economic Census and Annual Survey of Manufacturers.

Examining a portfolio of large U.S. SCP companies

To gain more insights into the financial performance of companies that use sugar as one of their input materials, I examine data for a few large U.S. companies in key SCP industries. There are two reasons for following this approach of focusing on some of the larger companies rather than aggregate figures or indices for these industries. First, aggregate financial data typically includes non-U.S. companies, or uses food manufacturing industry classifications that include both SCP and non-SCP companies. Second, the SCP food manufacturing industries tend to be highly concentrated, and therefore examining some of the largest companies will be very representative of overall industry performance.²⁶

²⁶ Concentration percentages are estimated by the Bureau of Census. They determine the percentage of total value of shipments in each industry that is produced by the top 4, 8, 20 and 50 largest companies. Using the 2007 Economic Census figures (the most recent available), the eight largest companies in Breakfast Cereal accounted for 92% of total shipments. Similarly, the corresponding numbers are 86% for Chocolate and Confectionery from Cocoa Beans; 73% for Confectionery

I focus on the ten largest companies in the three key SCP sectors of Confectionery, Breakfast Cereal, and Bread and Bakery Products, subject to some selection criteria discussed below. The companies are:

- Campbell Soup
- Flowers Foods
- General Mills
- Hain Celestial Group
- Hershey
- J&J Snacks
- Kellogg
- Ralcorp Holdings
- Smucker
- Tootsie Roll

Since companies don't disclose how much sugar they use relative to other materials in their products, these companies have been selected based not only on having the largest market capitalizations in their industries, but also on an analysis of the list of their food products to ensure a high degree of SCP content.²⁷ I have also excluded some major private companies such as Mars since they do not publicly disclose their financial performance. Furthermore, several companies went through significant restructurings that make it difficult to get consistent financial data over time.²⁸ These include Kraft, Mondelez, Post, and Snyder's Lance. Together, the total market capitalization of the ten companies selected is close to \$100 billion, and their annual revenues in 2012 were roughly \$60 billion.

I examine a variety of financial performance metrics for the portfolio of these ten companies. I use an equally-weighted portfolio so as not to overweight the performance of some of the larger companies in this group such as General Mills, Hershey and Kellogg.

from Purchased Chocolate; 52% for Nonchocolate Confectionery; 51% for Commercial Bakeries; and 83% for Cookies and Crackers.

²⁷ For instance, companies such as Hormel Foods and Tyson, which are sometimes classified in the Bread and Bakery Products manufacturing industry, were not included given their significant focus in the meat and poultry product markets. B&G Foods was also excluded from the group since its industry changed from Food Wholesalers to Food Processing midway during the period of analysis.

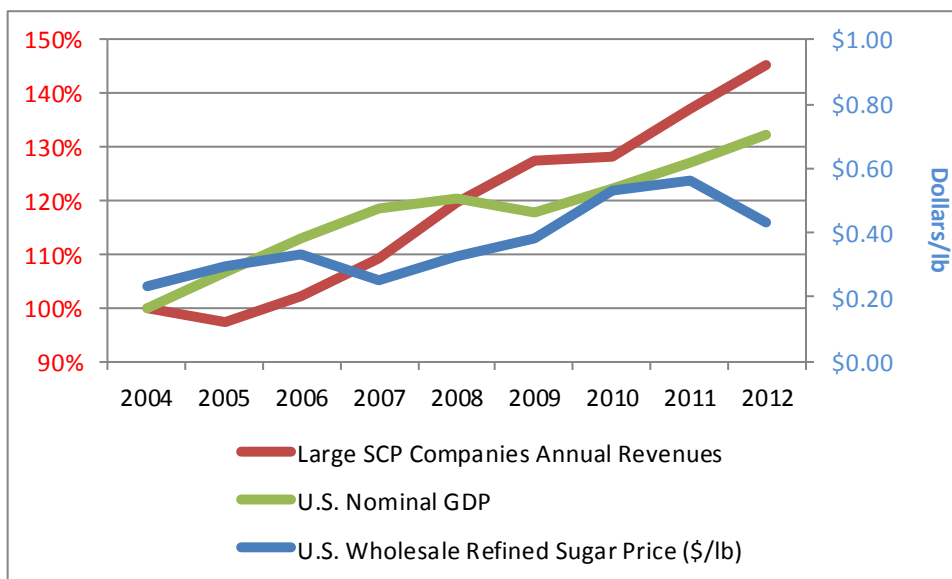
²⁸ While Ralcorp is now part of ConAgra, this acquisition was completed in January 2013, and thus does not affect the data being used for this analysis.

SCP companies have experienced high revenue growth

Figure 4.2 shows the growth in annual revenue for the portfolio of ten large SCP companies. Revenues grew approximately 45% over the eight-year period between 2004 and 2012. In contrast, nominal GDP growth in the U.S. over this same period was roughly 32%. Therefore, these SCP companies were able to grow their revenue almost 50% more than the rest of the U.S. economy during this period.

It is also interesting to compare the growth in revenues in Figure 4.2 against U.S. refined sugar prices during this period, which are shown in cents/pound on the right axis. The period of high growth in revenues occurred at a time when sugar prices rose to levels much higher than the historical average. This suggests that high sugar prices do not seem to hinder SCP companies' ability to grow their revenues faster than the economy at large.

Figure 4.2 – Large SCP Companies' Revenue Growth Outstrips U.S. Nominal GDP Growth, Even with Rising U.S. Wholesale Refined Sugar Prices (2004-2012)



Notes: Large SCP Companies' Annual Revenues and U.S. Nominal GDP are expressed in cumulative percentage change relative to 2004, shown against the left axis. U.S. Wholesale Refined Sugar Price is in cents/pound as shown on the right axis.

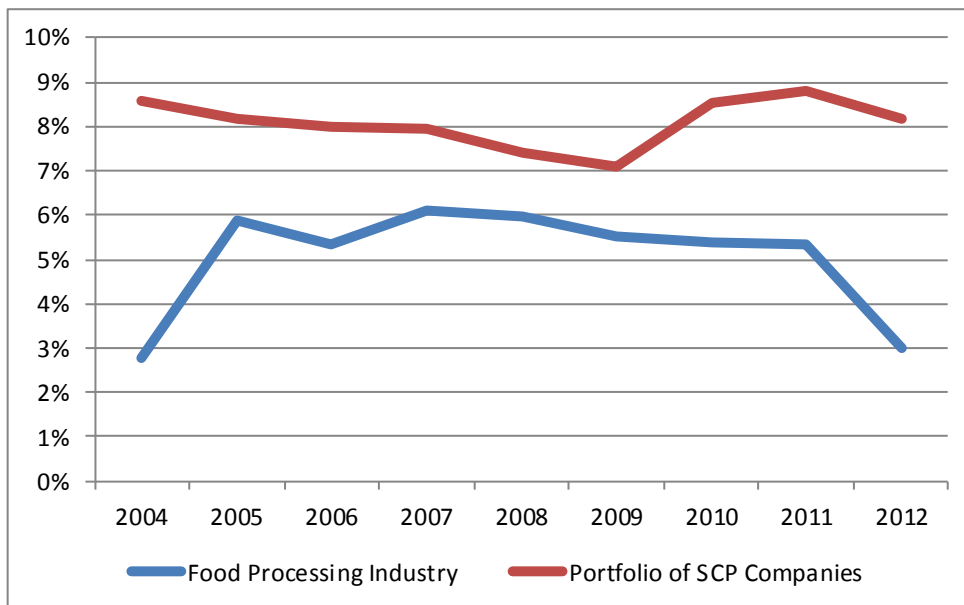
Sources: U.S. Refined Sugar Price from USDA ERS Table 5; U.S. Nominal GDP from Bureau of Economic Analysis; Annual Revenues: author's analysis from corporate 10Ks.

SCP companies have high profitability, even when sugar prices rise

While revenues may be increasing at a strong pace for SCP companies, it is also important to examine the profit earned on each dollar of revenue generated. The Net Margin measures the Net Earnings of a company divided by its revenues. This is a key measure of the profitability of companies.

Figure 4.3 shows the net margins over time for the portfolio of SCP companies, and for the food processing industry in general, over the period 2004-2012. The SCP companies appear to be highly successful at generating profits from their revenues, consistently and significantly above the food processing industry in general. The average Net Margin for the SCP portfolio companies over this recent period was 8.1% as compared to 5.0% for the food processing industry overall, and 6.9% for U.S. public companies in general.²⁹

Figure 4.3 - Net Margins of SCP Companies and Food Processing Industry: SCP Companies Are More Profitable

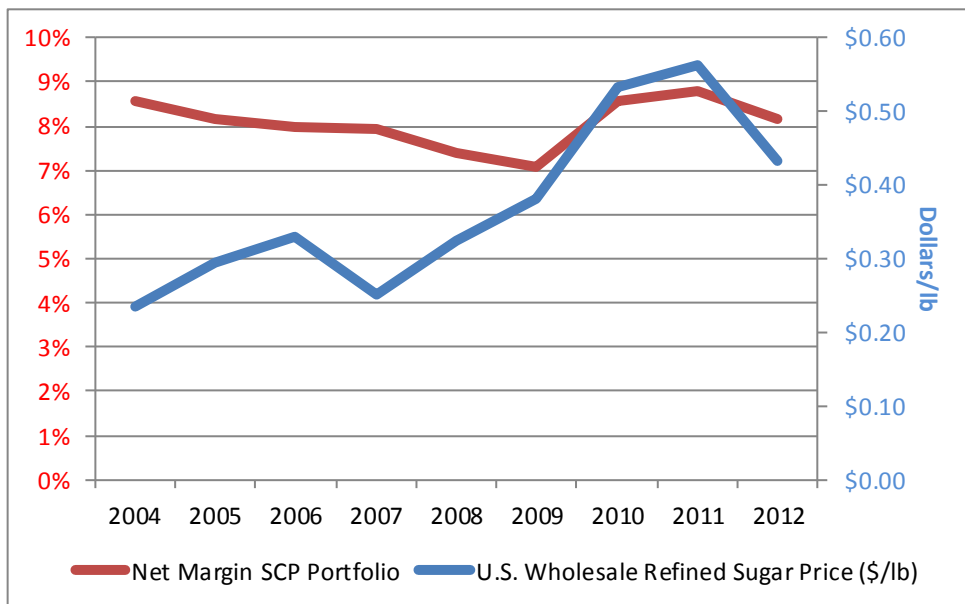


Source: www.damodaran.com.

²⁹ Net margins for the SCP companies, for the food processing industry, and for public companies overall are obtained from www.damodaran.com.

By plotting the Net Margin for the SCP company portfolio against U.S. refined sugar prices, Figure 4.4 shows clearly that recent increases in sugar prices do not seem to have any negative effect on SCP companies' net margins. In fact, the correlation between sugar prices and margins is positive, not negative – profits have risen despite increases in sugar prices during the most recent years.

Figure 4.4 – Net Margins of SCP Companies vs. U.S. Wholesale Refined Sugar Price: Profits Rise with Sugar Prices in Recent Years



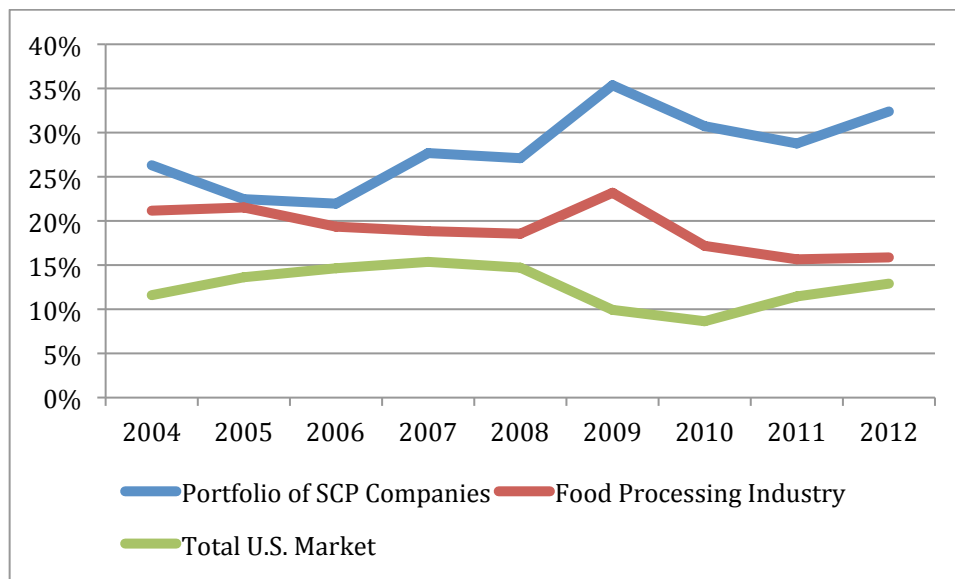
Source: U.S. Wholesale Refined Sugar Price: USDA ERS Table 5; Net Margins: www.damodaran.com.

SCP companies have high Returns on Equity

While a company with high margins is attractive to investors, shareholders also care about ensuring that the profits earned provide a good return on each dollar they invest in the company. This measure of Return on Equity (ROE) is shown in Figure 4.5 for the portfolio of SCP companies, as well as for the Food Processing industry and the U.S. stock market as a whole.³⁰

Figure 4.5 shows that while the food processing industry overall has provided a higher ROE to shareholders than the average company in the U.S. market, the portfolio of SCP companies has outperformed considerably, particularly during the most recent four year period. SCP companies' return on equity averaged 28% during the 2004-2012 period, while food processing overall averaged just 19% and the total U.S. stock market only 13%. Over the most recent four years (2009-2012), SCP companies' return on equity averaged 32%, while food processing averaged 18%, and the total U.S. stock market averaged 11%.

Figure 4.5 – Return on Equity of Companies in SCP Portfolio, Food Processing Industry and U.S. Stock Market: SCP Companies Have Highest ROE



Source: Return on Equity statistics: www.damodaran.com.

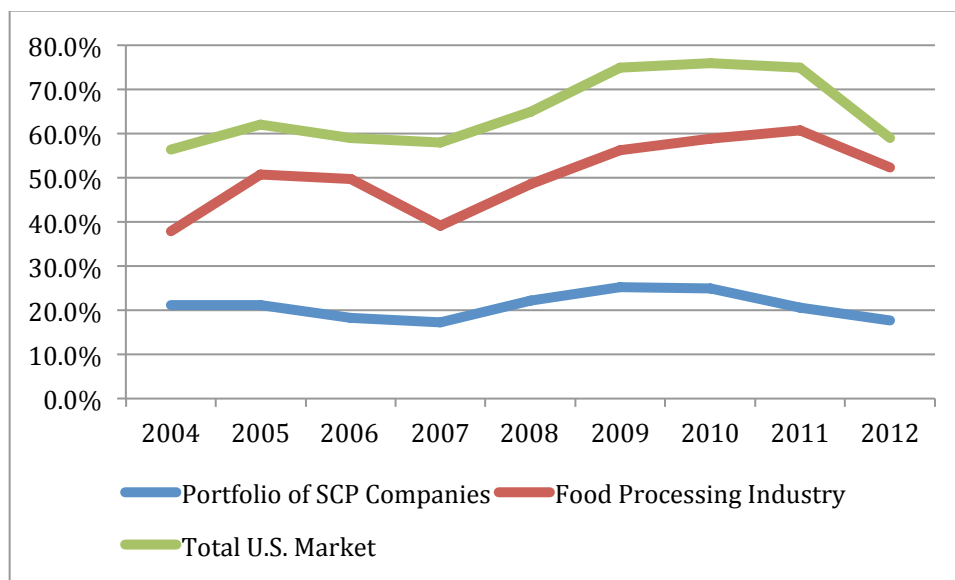
³⁰ These are all based on publicly traded companies (Source: www.damodaran.com).

SCP companies have low risk and low cost of capital

In addition to looking for a high return on equity, shareholders are also attracted to companies that have relatively low risk. While the stability of net margins and ROE over time in Figures 4.4 and 4.5 provides indication of low risk, there are specific quantitative measures that investors use to gauge risk.

The first risk measure is the standard deviation of the rate of return on a stock, also known as volatility. Figure 4.6 shows that the average volatility of the stocks in the portfolio of SCP companies is significantly lower than the average volatility of food processing stocks as well as for U.S. stocks in general.³¹ The average volatility over this period was 21% for the large SCP companies, 50% for food processing companies, and 65% for stocks in the total U.S. market.

Figure 4.6 – Measuring Volatility -- Average Standard Deviations of Companies in SCP Portfolio, Food Processing Industry, and U.S. Stock Market: SCP Companies Least Volatile



Source: Standard Deviations are from www.damodaran.com. Equally weighted averages across stocks in each group are shown.

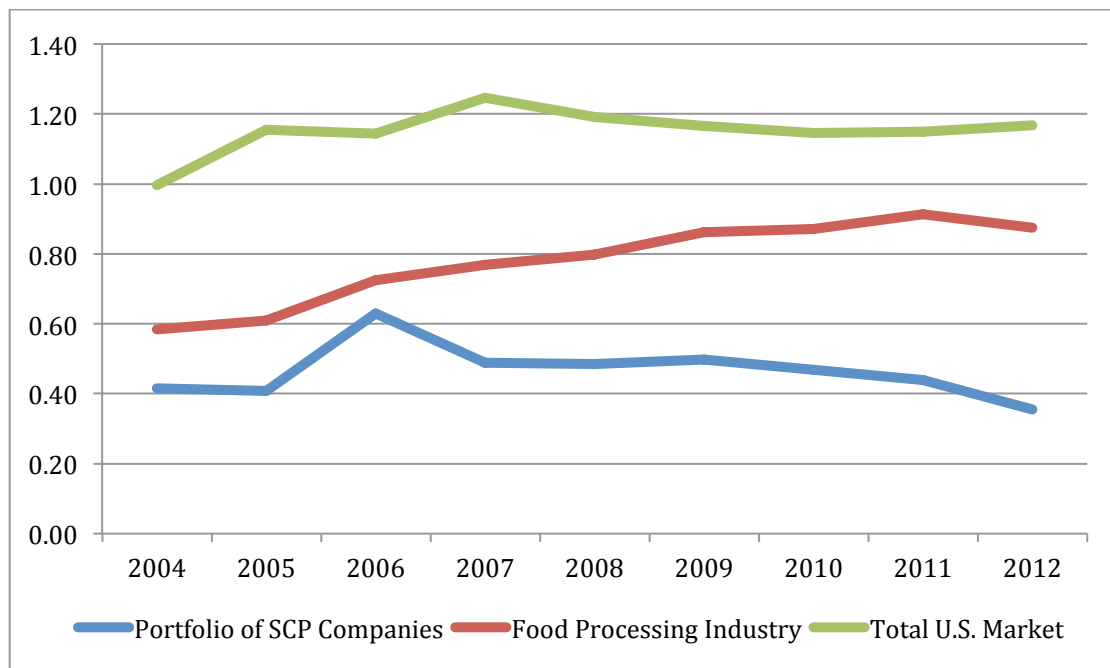
³¹ It is important to emphasize that the standard deviations shown in Figure 4.6 are the average volatilities of stocks within each category, not the standard deviations of the portfolios themselves (which would be even lower due to diversification).

The second risk measure is the beta of the stock, representing the systematic risk of the stock, which captures how closely and how much a stock moves with the overall stock market. Figure 4.7 shows that the average beta for the stocks in the portfolio of SCP companies is much lower than the average beta of food processing stocks, which in turn is significantly lower than for U.S. stocks in general. The average beta over the 2004-2012 period was .47 for the large SCP companies, .78 for food processing companies, and 1.15 for stocks in the total U.S. market.³²

Overall, it is clear that owners of these SCP companies, which include corporate insiders and large institutional investors, have enjoyed both stable and strong returns over time on their equity investment.

The low risk of the SCP companies' stocks ensures that these companies can access capital at a relatively low cost. With a beta close to 0.5, the cost of equity for these companies is currently averaging about 5-6%. This is considerably below the ROE of between 25-35% in recent years, indicating that these firms are creating considerable value for their shareholders.

Figure 4.7 – Measuring Risk -- Average Betas of Companies in SCP Portfolio, Food Processing Industry, and U.S. Stock Market: SCP Companies Least Risky



Source: Betas are 3-year regression betas from www.damodaran.com. Equally weighted averages across stocks in each group are shown.

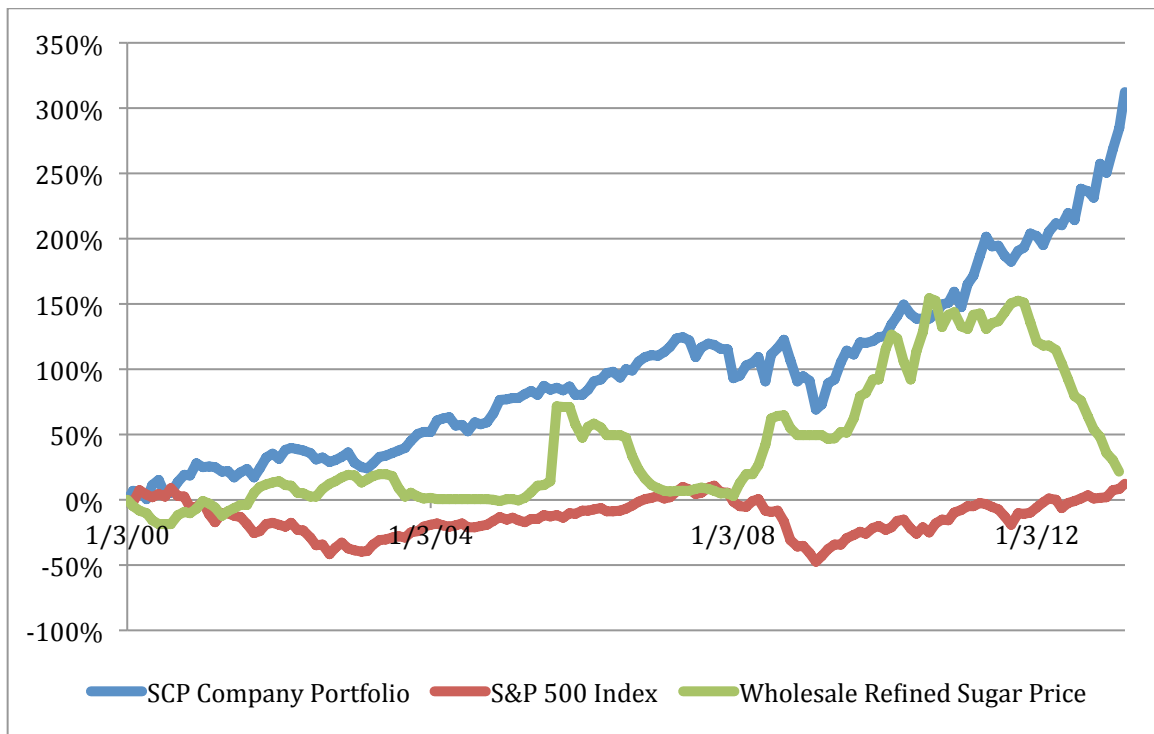
³² While the theoretical average beta for the stock market is equal to one, the beta shown in Figure 4.7 is slightly higher due to the weighting of stock betas in computing the average.

SCP companies have impressive Total Shareholder Return

Given the high growth and strong and consistent profitability of SCP companies in recent years, one would expect that this should be reflected in rising stock prices. Figure 4.8 shows that this is indeed very much the case. A portfolio invested with equal weights across the ten large SCP companies would have returned a cumulative 300% over the past 13 years. What makes this even more impressive is the fact that the S&P 500 index has only recently returned back to its level of January 2000, with a mere 13% cumulative return over this whole period, so the SCP company portfolio has greatly outperformed the benchmark index over this period.

Figure 4.8 also shows the cumulative percentage change in the U.S. refined sugar price over the same period. While over the past year sugar prices have declined at a time when the SCP company portfolio has continued to see strong returns, this portfolio also did very well while sugar prices were increasing. The correlation between monthly changes in the SCP portfolio value and monthly changes in the refined sugar price is 0.03, and not statistically significantly different from zero. In other words, the price of sugar is not a factor affecting the returns on these stocks.

Figure 4.8 – Measuring Total Stock Returns -- Percentage Appreciation of SCP Company Portfolio vs. S&P Index and U.S. Wholesale Refined Sugar Prices (Jan. 2000 – Feb. 2013): SCP Companies’ Returns Far Outstrip S&P Index; Sugar Prices Not a Factor



Sources: SCP Company Portfolio and S&P Index: Yahoo Finance Historical Data; Refined Sugar Price: USDA ERS Table 5.

Future expectations look promising for SCP companies

Shareholders appear to be putting a high value on the SCP stocks in the portfolio analyzed above. These high valuations reflect the strong expectations that investors have for these stocks. Expectations are often measured in the market by looking at multiples of value to profits. The most frequently referenced metric is the Price to Earnings (P/E) ratio. As of the end of March 2013, the average P/E ratio for the ten stocks in the SCP portfolio was 26.1. In contrast, the P/E ratio for the S&P 500 was 18.3.³³ This large differential captures that investors see higher growth and lower risk for the SCP stocks than for the market overall.

Shareholder views no doubt also reflect corporate management's views of their industries' potential. The global sales growth potential, the large profit margins, the continuous productivity improvements, and the relatively low risk that these companies are exposed to, all lead management to be confident investing in growth. This confidence is displayed in the fact that Total Capital Expenditures made by the Confectionery industries (NAICS 31132-34) in 2011 was 21% higher than in any year in the past fifteen years.³⁴ Overall, SCP companies are faring very well under current U.S. sugar policy.

³³ The P/E ratios reported are based on trailing twelve months earnings. The P/E ratios for the SCP stocks are from Yahoo Finance. The P/E ratio for the S&P 500 is from Wall Street Journal's online Markets Data Center.

³⁴ Source: Economic Census and Annual Survey of Manufacturers (1997 to 2011).

Section 5 - Impact of Wholesale Sugar Prices on Consumers

The success of SCP companies over the past few years is due in large part to continued demand for these products. In other words, SCP companies are doing very well because consumers are willing to buy their products at the prices offered in the market. Yet, some SCP industry representatives have claimed that U.S. sugar policy is harming consumers directly.

Given the high margins in the SCP industry and the resulting large shareholder returns documented above, if consumers viewed prices as being too high, SCP companies would have plenty of room to decrease prices and still maintain healthy margins, even with high worldwide sugar prices witnessed recently. The ultimate benefit to consumers would materialize, of course, only if supermarkets and other retail channels would pass on the decreases in SCP prices to consumers.

Retail SCP prices have risen much faster than the wholesale sugar price

It is instructive, however, to look directly at the relationship between the wholesale price of sugar and the retail price of sugar containing products. First, I look at a long-term trend to examine whether the change in the nominal sugar price has translated into a commensurate change in the price of retail products. For the purposes of this analysis, I look at annual average retail prices over the past thirty-five years (1978-2013) for refined sugar and various sugar containing products, as provided by the USDA ERS (based on BLS figures).

Figure 5.1 illustrates the high growth in all retail products as compared to very modest growth in the price of wholesale refined sugar. Over the thirty-five year period, the wholesale refined sugar price has only increased by about 50%, roughly 1.1% per year. In contrast, the price of retail refined sugar has increased by around 180%, the price of ice cream and related products has increased by 220%, the price of flour and prepared flour mixes has increased by 230%, and the price of bread and bakery products has increased by almost 300%.³⁵

Retail SCP prices do not appear to depend on the wholesale sugar price

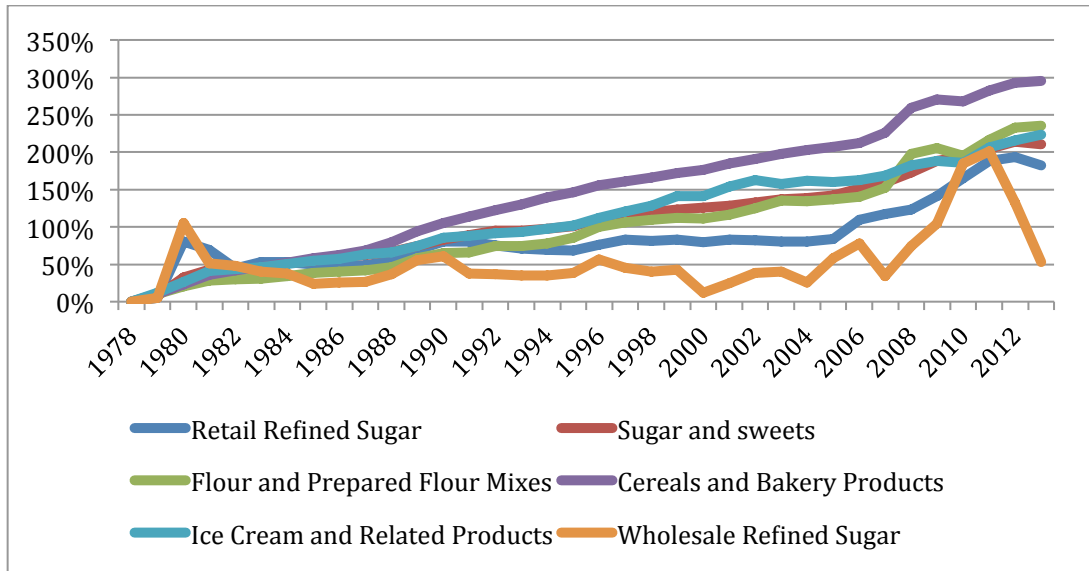
Not only have the growth differentials between the prices of wholesale refined sugar and sugar-containing retail products been dramatically large, but there is also no apparent persistent correlation between the wholesale sugar price and the prices of retail products. This is true even if one applies lagged effects. Such lagged effects could occur if the prices of retail products were changed infrequently, but it is clear

³⁵ Candy and Chewing Gum retail prices are only available from USDA ERS starting in 1998.

from the figure that these prices do indeed change over time. Lagged effects could also result if companies consistently maintained forward or futures contracts that locked in prices for longer periods of time (lower prices during a rise in sugar prices, or higher prices during a drop in sugar prices). Again, there are no statistically significant lags evident in the retail pricing data.

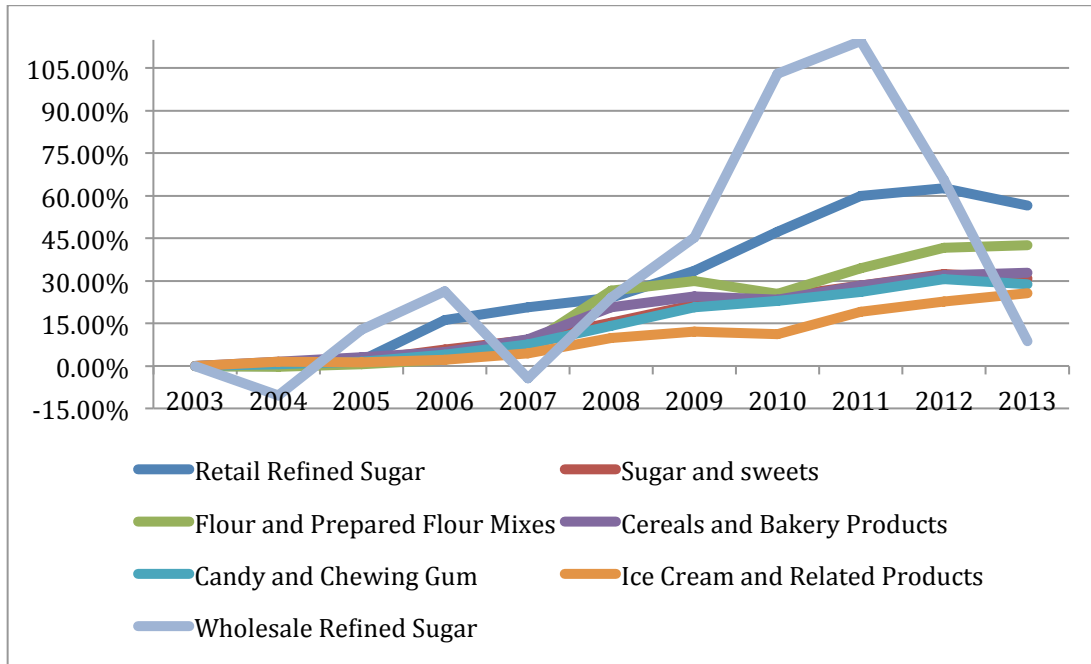
Expanding this chart to look at only the most recent decade, Figure 5.2 shows a similar result. The price of wholesale sugar has increased by only a cumulative 8.8% over this past decade (less than 1% a year), and yet the price of retail sugar and other sugar-containing products have increased by between 26-56% during this period.

Figure 5.1 – Thirty-Five Year Growth in Prices for Retail Refined Sugar and Retail Sugar Containing Products Compared to Growth in Wholesale Refined Sugar Price: Retail Prices Rise Even When Wholesale Sugar Prices Fall



Sources: USDA ERS Sugar and Sweeteners Outlook Yearbook Tables (Wholesale Refined Sugar: Table 5; Retail Refined Sugar: Table 6; all others: Table 11). Data points are average annual price, except for 2013 where February 2013 prices are used.

Figure 5.2 – Fifteen Year Growth in Prices for Retail Refined Sugar and Retail Sugar Containing Products compared to Growth in Wholesale Refined Sugar Price: Retail Prices Rise Even When Wholesale Sugar Prices Fall



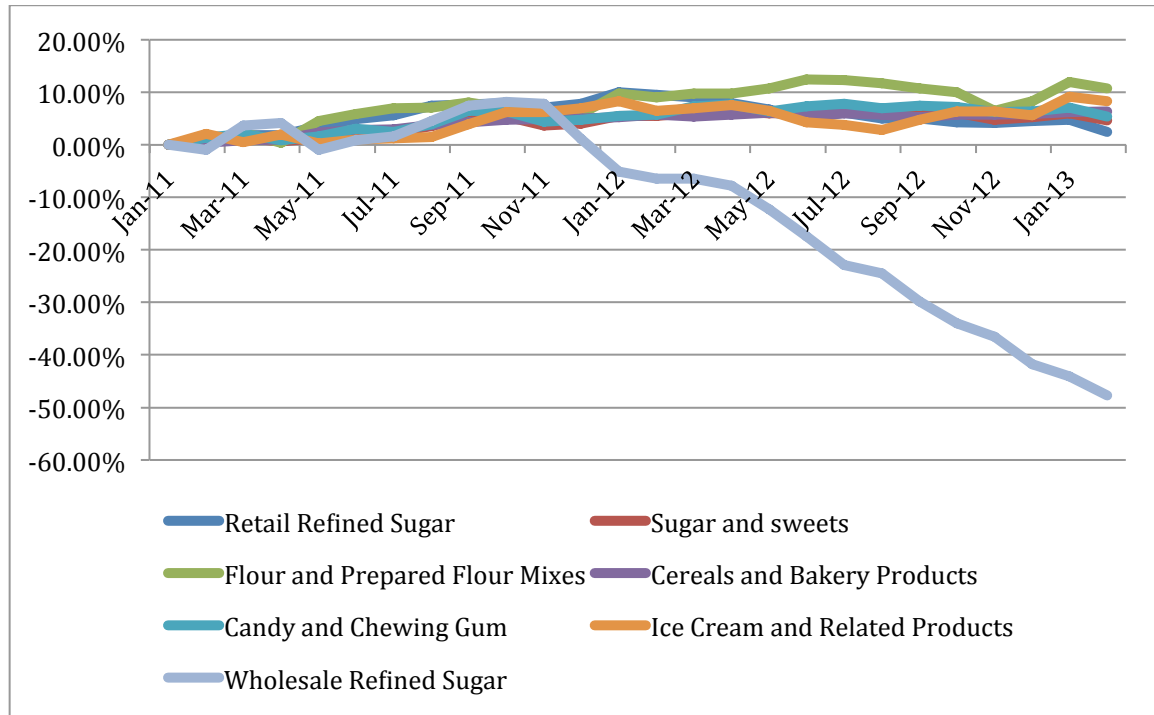
Sources: USDA ERS Sugar and Sweeteners Outlook Yearbook Tables (Wholesale Refined Sugar: Table 5; Retail Refined Sugar: Table 6; all others: Table 11). Data points are average annual price, except for 2013 where February 2013 prices are used.

Retail prices don't typically fall when the wholesale sugar price decreases

Figure 5.2 also illustrates that the price of retail sugar appears to be following the price of wholesale sugar when the price of sugar increases, albeit with a slight lag, but does not seem to trend back down with decreases in the wholesale refined sugar price. For instance, during the 2004-2007 period, the wholesale refined sugar price increased significantly and then subsequently decreased to close to the 2004 level. In contrast, the retail refined sugar price increased roughly 20% during this three year period without experiencing any declines.

The most recent two-year period is another case in point. Figure 5.3 illustrates price changes during this period using monthly prices. While the wholesale refined sugar price dropped roughly 50% during this most recent period, the prices of retail products have increased between 2 and 10%. Clearly, decreases in sugar prices have not been passed on to consumers in the form of lower retail prices for sugar containing products.

Figure 5.3 – Price Changes Over the Most Recent Two Years for Retail Refined Sugar and Retail Sugar Containing Products, Compared to the Sharp Drop in the Wholesale Refined Sugar Price: Retail Prices Rise Even When Wholesale Sugar Prices Fall



Sources: USDA ERS Sugar and Sweeteners Outlook Yearbook Tables (Wholesale Refined Sugar: Table 5; Retail Refined Sugar: Table 6; all others: Table 11). Data points are average annual price, except for 2013 where February 2013 prices are used.

Similar claims of pass-through to consumers not borne out in Europe

Interestingly, similar claims that lower sugar prices would pass through to consumers were also voiced in discussions surrounding the 2006 EU sugar policy reform. In reviewing the consequences of the policy reform in Europe, Chatenay (2012) cites a European Court of Auditors’ report that concludes that most of the cost savings due to price reductions in sugar were added to the profit margins of industrial producers rather than being passed on to the consumer. The recent evidence in the U.S. provides plenty of indication that would suggest the same multinational food corporations would repeat that behavior here in the U.S.

Section 6 – Conclusions

The analysis in this study provides support for the following conclusions.

The sugar industry supports roughly 142,000 jobs. Lower estimates provided by the Bureau of Labor Statistics (and used by the U.S. International Trade Commission) exclude large fractions of the sugar industry and ignore important multiplier effects. Sugar industry employment and sugar prices are clearly closely linked, and thus a large number of sugar jobs would be lost if current U.S. sugar policy were rescinded.

Job losses in SCP industries have been comparable to those in non-SCP industries over the past two decades. Furthermore, the evidence shows that sugar prices are not correlated with employment changes in SCP industries. Employment decreases in confectionery industries are associated with higher productivity, particularly in non-production occupations, and are related to higher wages and benefits in this sector.

The SCP industry has been faring very well under current U.S. sugar policy. SCP companies have experienced strong revenue growth over time. These companies have high profitability and high Returns on Equity, even when sugar prices increase. Coupled together with low risk and therefore a low cost of capital, SCP companies have generated impressive Total Shareholder Return since 2000, and their stocks are priced to reflect strong expectations for the future.

Retail SCP prices have risen much faster than the U.S. wholesale sugar price. Furthermore, retail SCP prices do not appear to depend on the wholesale sugar price, and don't typically fall when the sugar price decreases.

The general conclusion of this study is that U.S. sugar policy has not inflicted hardship on the U.S. SCP industry. The industry is thriving, and job losses in this industry over the past two decades are no worse than in non-SCP food manufacturing industries. Rather, they reflect productivity gains and other factors unrelated to sugar prices. Furthermore, if U.S. sugar policy were to be altered in any significant way, a large number of jobs supported by the sugar industry would be lost, and there is no evidence that consumers would benefit through lower SCP prices.

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