

Commentary on 2006 U.S. Department of Commerce report entitled "Employment Changes in U.S. Food Manufacturing: The Impact of Sugar Prices"¹

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Executive Summary

In 2005, the U.S. Department of Commerce was tasked with producing a study on the impact of the U.S. sugar program on jobs. Their report (released in 2006 and referred to hereafter as the Commerce Report) presented several findings that are still referenced in discussions and commentaries concerning U.S. sugar policy. Some of these findings were not derived by the Department of Commerce, and are incorrectly adapted from another study, ignoring important caveats highlighted by the authors of that study. Other findings provided in the Commerce Report are erroneous, or are used to establish a causal link between sugar prices and jobs lost, where none appears to exist. In general, conclusions drawn in this report are unreliable as a basis on which to inform policy debate.

1. The claim that eliminating the current U.S. sugar program would result in only 2,260 jobs lost in the U.S. sugar industry is incorrect. This figure is not calculated by Commerce, but rather taken from an old study. Furthermore, the Commerce Report ignores important caveats in the original study that suggest the potential job loss could be far greater. Using figures from the very same sources that the Commerce Report draws on leads to an estimated job loss that is 35 times the 2,260 lost jobs mentioned in the Commerce Report.
2. The food manufacturing industry employs over a million people, but only a fraction of those jobs are in industries that use sugar to any significant extent. The claim that sugar prices potentially affect tens of thousands of jobs in Sugar Containing Product (SCP) industries, many of whose input costs are insignificantly affected by sugar prices, is thus greatly overstated.
3. The claim that the price of sugar has been a primary driver of job losses in the SCP industries is not substantiated by evidence provided in the Commerce Report. Many SCP industries have seen job growth, and both SCP and non-SCP industries have experienced job losses driven by higher productivity in the U.S. and lower labor costs abroad.

¹ This commentary was prepared in September 2012 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.

4. The claim that the U.S. sugar program saves sugar industry jobs at a cost of over \$800,000 per job has no basis, and comes from an incorrect interpretation of earlier studies. A more accurate figure would be closer to 1% of this cost.
5. The claim that three jobs are lost in the confectionery industry for every job saved in the U.S. sugar is erroneously inferred from connecting unrelated and incorrect data. The ratio should be flipped. More jobs are saved than lost, if any are lost at all, by the U.S. sugar program.

Overview of Commerce Report

In 2005, the U.S. Department of Commerce was tasked (connected with the appropriations bill) with reporting on jobs lost as a result of the differential between U.S. and world sugar prices, focusing on the most recent five-year period. The report, which was published in 2006, compiles findings based on reviewing existing studies, conducting some limited data analysis, and reviewing corporate press releases. The overall conclusion of the study is that there have been significant job losses in the sugar containing products (SCP) industry, and these are attributable to the U.S. sugar program since companies are relocating production outside the U.S. to take advantage of the lower world sugar price. Furthermore, the study claims that relatively few jobs are being saved in the U.S. sugar industry, and at a high cost.

While the Commerce Report does insert occasional caveats to warn the reader about the difficulty in validating some of the results, it does not go nearly far enough to recognize and report numerous issues with the reliability of the findings they report.

Key Concerns with the Commerce Report's Research and Findings

There are numerous issues that diminish the validity of conclusions drawn in the Commerce Report. Each of the following issues is expanded upon in a subsequent section of this commentary.

1. The Commerce Report grossly understates the number of U.S. sugar industry jobs that could be lost if the U.S. sugar program were to be eliminated. Rather than calculating this number directly, they cite a figure from an old study, and ignore important caveats in the study that suggest the job loss figure could be far higher. This erroneous job loss figure underlies key conclusions of the Commerce Report, including the cost per sugar industry job saved, and the tradeoff between saving jobs in the sugar industry versus the SCP industry.
2. Job losses have occurred in many segments of the food manufacturing industry, but not in a consistent fashion that links job losses to sugar prices. Sugar content as a percentage of total material cost is much lower than cited in the Commerce Report for the SCP industry. Grouping segments of the SCP industry by amount

of sugar used doesn't lead to a conclusion that higher sugar content is correlated with a higher probability of job loss.

3. Job losses in the SCP food manufacturing industry are driven by many factors, most notably increases in productivity over time and dramatically lower cost of labor in various foreign locations such as Mexico. The Commerce Report relies on corporate press releases announcing plant closures, and this is an unreliable way to measure net job changes in the industry and the rationales for companies' decisions.
4. The claim that the U.S. sugar program saves sugar industry jobs at a cost of over \$800,000 per job has no basis, and comes from an incorrect interpretation of earlier studies. A more accurate figure would be closer to 1% of this cost.
5. The claim that three jobs are lost in the confectionery industry for every job saved in the U.S. sugar industry is erroneously inferred from connecting unrelated and incorrect data. The ratio should be flipped. More jobs are saved than lost, if any are lost at all, by the U.S. sugar program.

Many More than 2,260 Jobs Are at Risk of Being Lost in the U.S. Sugar Industry

The following statement can be found on page 4 of the Commerce Report (in the Executive Summary): *“Studies suggest that the U.S. sugar program helps to maintain approximately 2,260 of these sugar industry jobs, many of which are growing and harvesting jobs, at an annual cost per job saved of \$826,000.”*

Since these numbers figure prominently in the Commerce Report, and underlie the Report's key conclusions, it is important to go back to the original studies from which these figures are obtained. The footnoted studies are: “Measuring the Costs of Protection in the United States” (Hufbauer and Elliott, 1994, hereafter referred to as HE1994) and “Fruits of Free Trade” (in Federal Reserve Bank of Dallas 2002 Annual Report, hereafter referred to as FRBD2002). There are several important factors to consider about these studies that affect the validity of the numbers the Commerce Report cites. The “cost per job saved” figure will be discussed later in this commentary. For now, the focus will be on the number of jobs “maintained” by the U.S. sugar program.

First, it should be noted that FRBD2002 does not obtain this number from its own research. Rather, their report simply cites (on page 24) that their figures (in Exhibit 11) come from the HE1994 study. Thus, it is not really “studies” that suggest these numbers, but rather just the single HE1994 study.

Second, HE1994 is an outdated study (now out of print), which is based on 1990 figures, many years before the five-year period that the U.S. Department of Commerce was tasked to study.

Third, HE1994 is not specifically about the sugar industry, but rather about 21 different industries. There is little detail about the sugar industry in the report. The authors base their results on a model that is common in structure for all the industries they examine despite a lack of commonality in trade policies that affect these various industries.

Fourth, the Commerce Report fails to mention that in Table 1.3 of HE1994 (page 13), the authors specifically point out that they are tracking *only* production jobs in the sugar industry. There is no clear indication that this includes jobs “many of which are growing and harvesting jobs,” as the Commerce Report claims. In examining only a portion of the employment in the sugar industry, HE1994, and thus the Commerce Report, are under-reporting the potential job loss in the industry overall.

Fifth, in addition to leaving out a large segment of the U.S. sugar industry, HE1994 also base the 2,260 job loss estimate on predicting that only 18.6% of production workers - roughly one out of five or six workers - would lose their jobs if the U.S. sugar program were to be eliminated. This job loss estimate is based on their result that domestic output would drop by only 18.6% (from 6.319 to 5.143 million short tons at that time). If the U.S. sugar program were unilaterally eliminated, while policies in other countries continue to drive the world price to an artificially low level (often below the average worldwide cost of production), it is doubtful that U.S. sugar production would fall by only around 20%. This moderate drop is based on what appear to be unrealistic assumptions built into the HE1994 model, using theoretical supply curves that ignore important forces affecting the world market price.

Sixth, the HE1994 study contains two sections entitled “Qualifications to the Model” and “Extensions to the Model”. These contain important caveats about the limitations of their core model and the results they report. One issue that they pursue in greater detail is to note that eliminating policies that protect the industries they examine would also lead to “ancillary job losses,” that is, lost jobs that are indirectly supported by the industries they examine. While admitting that these are rough estimates, they estimate for the sugar industry that an additional 7,493 jobs could be lost on top of the 2,260 direct jobs lost. This ratio of more than 3.3 times is roughly consistent with multipliers typically used to assess total jobs supported by an industry relative to direct employment.

According to the U.S. International Trade Commission, there were on average close to 59,000 jobs in the sugar industry during 1997-2002 (the period analyzed in the Commerce study).² This number is consistent with LMC’s more recent survey-based estimate of 40,000 direct jobs (given job losses in the industry over the past decade), and another more than 100,000 indirect and induced jobs supported by the industry (i.e., employment multipliers close to three).³ These estimates far exceed what HE1994 assumes, presumably because both growing and processing jobs are considered

² Based on the 3rd and 4th updates of “The Economic Effects of Significant U.S. Import Restraints” (USITC).

³ LMC International, “The Economic Importance of the Sugar Industry to the U.S. Economy – Jobs & Revenues,” August 2011.

(approximately 42,000 on average for the former, and 17,000 on average for the latter, during 1997-2002). Furthermore, the USITC estimates that 34% of the growing jobs and 25% of the processing jobs in the industry would be lost if the U.S. sugar program were eliminated (based on their 2002 forecast). These figures would translate into more than 18,500 direct jobs eliminated. Applying HE1994's own multiplier of 3.3 to the USITC direct job loss figure, the additional ancillary job losses would be about 61,000, leading to a total of 79,500 jobs lost.

Thus, the very same sources utilized in the Commerce Report can be used to conclude that job losses from removal of the U.S. sugar program could be 35 times greater than the 2,260 lost jobs highlighted in that report.

This large magnitude of potential job losses is consistent with the recent experience in Europe following reform of the European Union's sugar policy in 2006. 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.

Relatively Few Food Manufacturing Jobs Are Affected by Sugar Prices

There are over one million jobs in the food manufacturing industry. Sugar is one of the inputs used to manufacture many food products. The Commerce Report delineates between Sugar Containing Product (SCP) food manufacturing industries and non-SCP industries. The premise for this bifurcation is to point out that since a significant percentage of employment in food manufacturing is in industries where sugar is used as an input, the price of sugar could conceivably affect jobs in those particular industries.

The 2002 Economic Census provides the total cost of materials used in each industry in 2002. It also provides a breakdown of the costs of various categories of materials, including the cost of sugar. Exhibit 1 of this commentary shows the cost of sugar as a percentage of the total cost of materials in all industries in which some sugar use is reported. These percentages are much lower than the ones shown in Table 1 of the Commerce Report, apparently using the same data source, but with the Commerce Report focusing only on "raw materials" (though in the text it states that they "calculated the cost share of sugar as a percentage of total material inputs on a value basis from 2002 Census data").

Note in Exhibit 1 that there are only five industries for which cost due to sugar content is more than 5% of the total cost of materials. These include: Breakfast cereal manufacturing (12.5%), Chocolate and confectionery manufacturing from cacao beans (11.6%), Non-chocolate confectionery manufacturing (10.1%), Confectionery manufacturing from purchased chocolate (9.2%), and Frozen cakes, pies and other

pastries manufacturing (6.5%). Furthermore, these figures represent the cost of sugar as a percentage of material costs only. The impact of sugar prices on total costs and prices of SCP products would be much smaller since there are many other significant costs including labor, benefits, transportation, and general and administrative expenses.

According to recent data provided by the National Confectioners Association (www.candyusa.com), confectionary companies spent over \$4 Billion in 2010 on commodities, which is only about 13% of reported sales of \$29.4 Billion. Out of the \$4 Billion spent on commodities, \$1.3 Billion was attributed to the cost of sugar. Thus, the cost of sugar was only approximately 4% of revenue. In other words, for every \$1 of confectionery product sold, only about 4 cents is attributable to the cost of sugar, another 9 cents for other commodity costs, and the remaining 87 cents is due to other costs as well as the companies' profit margins. For the other SCP industries that have much lower sugar content in their total material cost, the percentage cost attributable to sugar would be very low.

Turning now to employment figures, the number of jobs in 2002 in the five food manufacturing industries shown to have at least 5% of material cost due to sugar was 95,561 (according to BLS statistics). While this is a significant number of jobs, it is not clear that any of these jobs have been affected by the price of sugar, among the many other possible factors driving these companies' cost structures. During the 1997-2002 period the Commerce Report examines, three of these five industries lost jobs (Cereal, Non-chocolate confectionery, and Confectionery from purchased chocolate), but the other two (Chocolate and confectionery from cacao beans, and Frozen cakes/pies/pastries) gained jobs. Cereal Manufacturing, which has the highest content of sugar in its total materials, and Frozen cakes have both increased jobs since 2002.

Out of the eight SCP industries with between 1-5% sugar content out of total materials (see Exhibit 1), which employed a total of 283,398 workers in 2002, six added jobs while only two lost jobs during 1997-2002. The other ten SCP industries, whose products have less than 1% sugar content, employed a total of 471,834 workers in 2002, and seven of these ten industries lost jobs. This last group, with the least amount of sugar content out of SCP industries, had the most consistent job loss across industries.

While overall SCP food industries shed jobs during the 1997-2002 period, this was also the case for non-SCP food industries if one leaves aside animal slaughtering and processing, a large industry that experienced robust job growth during that particular period.

Considering this evidence, it is hard to see any clear link between sugar prices and jobs. Food manufacturing industries have been losing jobs, but this is happening across many food product segments, and in no consistent fashion that would support causality between sugar prices and job losses.

Job Losses in Food Manufacturing are Due to Various Factors

Decreases in employment in food manufacturing have been driven in large part by increasing productivity as well as relocation of facilities abroad. The Commerce Report focuses only on the latter, and more specifically on supporting the notion that sugar prices are driving offshore production in SCP industries. This appears to be overstated for the following reasons.

Productivity in the food manufacturing sector (NAICS 311) increased on an annual basis by an average of 2.7% during 1997-2002 (BLS statistics for Output per Person). Productivity in the Sugar and Confectionery Product Manufacturing (NAICS 3113) industry was even higher at an average of 3.4% during this period. These productivity gains help to augment profitability, and potentially to lower prices for consumers, but they can also drive down employment, and this effect was likely magnified for the confectionary industry.

Production location decisions are driven by many potential factors. These include: the costs of labor, 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.

While the particular mix of factors will differ for each company in the SCP industry that may relocate its production abroad, labor costs typically play a very prominent part in driving manufacturing to particular countries, such as Mexico. According to BLS statistics for hourly compensation costs for production workers across the world, the average hourly compensation during 1997-2002 in the Food, Beverage and Tobacco Product Manufacturing industry (NAICS 311-312) was \$16.97 in the U.S. and \$1.77 in Mexico. 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 even greater than the tenfold difference for the larger industry group.

The Commerce Report bases its assessment that sugar prices are driving relocation of businesses abroad on company press releases announcing these decisions. This type of descriptive evidence needs to be handled with some degree of skepticism. It is unlikely that companies will readily point to cheaper foreign labor as the reason for laying off U.S. workers. Similarly, companies will not generally disclose that they are pursuing supply chain strategies that are designed to reduce taxes paid to the U.S. government.

Furthermore, the press release evidence provided is one-sided, in that the Commerce Report discusses only jobs lost and not jobs added. As companies compete in a particular industry, some companies' operations will contract, while others will expand, or a changing mix of products within a company will result in specific plants closing down while others open up. The net impact on employment is what needs to be measured, and this can only be gauged by examining both positive and negative changes.

Cost of Preventing Job Losses in the Sugar Industry a Fraction of Figure Claimed

The “cost per job saved” figure cited in the Commerce Report has its origin in the Hufbauer and Elliott (HE1994) study. In that study, they estimate two values: a national consumer gain per job lost of \$600,177 and a net national gain per job lost of \$256,966. The former focuses simply on the potential benefit to consumers of lower prices, while the latter attempts to capture the net welfare benefits for the whole U.S. economy.

To calculate the benefit to consumers, it appears that HE1994 assumes that SCP companies pass on their entire cost savings from lower sugar prices to their customers. This assumption abstracts from the reality of how SCP companies, and retail companies such as supermarkets, price products. Historical pricing data does not support such pass-through pricing behavior, and thus it is unclear whether consumers would see much, if any, of the benefit from reduced sugar prices. So, the consumer gain per job lost figure is quite speculative.

Focusing on the net national gain per job lost figure, there are two key factors that need to be considered. First, the authors of HE1994 point out (on page 25) that their base model, from which the \$256,966/job figure is obtained, ignores the important effect that eliminating the U.S. sugar program would have on increasing the world market price of sugar, given the large size of the U.S. market. Modifying their model accordingly, they re-estimate the net national welfare gain to be \$383 Million (rather than \$673 Million). The Commerce Report ignores this important modification to the HE1994 findings.

Second, as mentioned earlier, the assumed number of “jobs saved” in HE1994 of 2,260 is grossly underestimated by ignoring a large portion of the U.S. sugar industry, and by assuming that production would drop by a relatively modest amount if the U.S. sugar program were to end. Furthermore, as HE1994 points out, the ancillary employment effects may be more than three times as large as the direct employment effects.

Using HE1994’s revised \$383 Million net national welfare figure, which may well be high, and assuming that 40,000 direct, indirect and imputed jobs may be saved through the U.S. sugar program (based on arguments made earlier), the national cost per job saved would be less than \$10,000, or around 1% of the figure cited in the Commerce Report.⁴

⁴ The \$826,000 figure cited in the Commerce Report comes directly from the Federal Reserve Board of Dallas (FRBD2002) report, not from HE1994. However, FRBD2002 cite Table 1.3 of HE1994 as the source of their data in Exhibit 11. It is unclear what modifications FRBD2002 has made to the computation of this number to make it higher than the \$600,177 figure in HE1994.

No Basis for Claim That Three Confectionery Jobs Lost for Every Sugar Job Saved

The Commerce Report lists as one of its key findings that “For each one sugar growing and harvesting job saved through high U.S. sugar prices, nearly three confectionery manufacturing jobs are lost.” It appears that this ratio is obtained by combining two figures that come from different time periods, are estimated in very different ways, and are both incorrect. The Commerce Report estimates 6,400 domestic confectionery jobs have been lost based on reviewing press reports since 2000 (presumably until 2005 since it mentions “over the past five years”). This number is then compared against the 2,260 sugar jobs lost taken from HE1994.

The Commerce Report does hedge by saying that “these figures are rough estimates and should be viewed as illustrative of the impacts of the sugar program.” However, based on the job figures discussed in earlier sections of this commentary, it appears that the ratio would be flipped in that many more jobs are saved by continuation of the U.S. sugar program than would be gained in SCP industries if the sugar program were eliminated. Furthermore, the likelihood of jobs being lost if the sugar program were terminated appears to be much higher than the possibility of regaining U.S. jobs from abroad and preventing further foreign relocations that are driven by so many other factors than just sugar prices.

Concluding Remarks

Taken together, these numerous concerns with the findings of the Commerce Report call into question the validity of all the Report’s conclusions. The Commerce Report should not be relied upon as a basis on which to inform policy debate on the U.S. sugar program.

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Exhibit 1 – Cost of Sugar as Percentage of Total Material Cost for SCP Industries

NAICS ID	NAICS Classification	Sugar / Total Material (% cost)
311230	Breakfast cereal manufacturing	12.50%
311320	Chocolate & confectionery manufacturing from cacao beans	11.60%
311340	Nonchocolate confectionery manufacturing	10.10%
311330	Confectionery manufacturing from purchased chocolate	9.20%
311813	Frozen cakes, pies, and other pastries manufacturing	6.50%
311812	Commercial bakery product manufacturing	4.60%
311821	Cookie and cracker manufacturing	4.40%
311822	Flour mixes and dough manufacturing from purchased flour	3.50%
311999	All other food manufacturing	2.60%
311520	Ice cream and frozen dessert manufacturing	2.50%
311514	Dry, condensed, and evaporated dairy product manufacturing	1.40%
311930	Flavoring syrup and concentrate manufacturing	1.20%
311941	Mayonnaise, dressing, other prepared sauce manufacturing	1.00%
311511	Fluid milk manufacturing	0.70%
311811	Retail bakery product manufacturing	0.70%
311942	Spice and extract manufacturing	0.60%
311420	Canned fruits and vegetables	0.60%
31141	Frozen food manufacturing	0.40%
311211	Flour milling	0.30%
311111	Dog and cat food manufacturing	0.20%
311919	Other snack food manufacturing	0.10%
311119	Other animal food manufacturing	0.10%
311513	Cheese manufacturing	0.02%

Source: 2002 Economic Census