



# Apples to **Twinkies**

Comparing Federal Subsidies of **Fresh Produce** and **Junk Food**



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of Fresh Produce and Junk Food

MassPIRG Education Fund

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# Executive Summary

America is facing an obesity epidemic—one that’s hitting children especially hard. Childhood obesity rates have tripled over the last three decades, with one in five kids aged 6 to 11 now obese. These increases in obesity rates will translate into kids who are at greater risk for heart disease and diabetes, undermining the health of our country and driving up medical costs by hundreds of billions of dollars.

The rise in childhood obesity has many causes, but one of the most important is the increased prevalence of high-fat, heavily sweetened junk food. And shockingly, American taxpayers are spending billions to subsidize junk food ingredients, making the problem worse.

Between 1995 and 2010, American taxpayers spent over \$260 billion in agricultural subsidies. Most subsidies went to the country’s largest farming operations, mainly to grow just a few commodity crops, including corn and soybeans. While dairy and livestock production also receive some federal support, it is these commodity crops that get the lion’s share of the subsidies.

Most of these commodity crops are not simply eaten as-is. Among other uses, food manufacturers process them into additives like high fructose corn syrup and vegetable oils that provide a cheap dose of sweetness and fat to a wide variety of junk food products. Thus, Americans’ tax dollars are directly subsidizing junk food ingredients.

- Between 1995 and 2010, \$16.9 billion in tax dollars subsidized four common food additives—corn syrup, high fructose corn syrup, corn starch, and soy oils (which are frequently processed further into hydrogenated vegetable oils).
- Outside of commodity crops, other agricultural products receive very little in federal subsidies. Since 1995, taxpayers spent only \$262 million subsidizing apples, which is the only significant federal subsidy of fresh fruits or vegetables.
- If these agricultural subsidies went directly to consumers to allow them to purchase food, each of America’s

144 million taxpayers would be given \$7.36 to spend on junk food and 11 cents with which to buy apples each year—enough to buy 19 Twinkies but less than a quarter of one Red Delicious apple apiece.

The fact that so many tax dollars are being wasted on junk food demonstrates the need to reform national agricultural subsidies and end this wasteful spending.

# Apples to Twinkies

## Introduction

The U.S. is right now in the throes of a public health crisis. But rather than one caused by pathogens like viruses or bacteria, which, while often terrifying, can at least be understood and quarantined, we now face a different kind of epidemic—a sudden, dramatic rise in obesity across the country, whose impact on our health, and especially the health of our children, is devastating.

The status quo is already intolerable. Childhood obesity rates in the U.S. have more than tripled in the past 30 years.<sup>1</sup> Almost one in five children aged 6 to 11 is now obese. The consequences are not simply expanded waistlines, as obesity harms the health of those it affects. Obese children have arteries so thick, they resemble those of 45-year-olds, putting them at greatly increased risk of heart disease.<sup>2</sup> Seventy percent of obese 5- to 17-year-olds show one of the risk factors for heart disease.<sup>3</sup> Obese children are also twice as likely to develop diabetes as their normal-weight peers.<sup>4</sup> The obesity-fueled

increase in childhood diabetes rates is particularly harrowing—Type 2 diabetes, the variety linked to obesity, has for many years been called “adult-onset diabetes.” With one third of American children born in 2000 on-track to develop that form of the disease, that label is no longer remotely accurate.<sup>5</sup>

Dollars don’t fully capture the scale of this crisis, but they can at least suggest its outlines: \$150 billion a year is spent on obesity and its related co-morbidities, a value that has doubled over the last decade.<sup>6</sup> A recent study found that obesity-related conditions account for 7 to 11 percent of states’ total health spending.<sup>7</sup>

And it’s going to get worse: without significant policy changes, projections suggest that by 2030, half of Americans will be obese, and we will be spending an additional \$66 billion a year in medical costs as a result.<sup>8</sup>

The obesity epidemic has many causes, but one of the simplest is also among the most significant: junk food. Between 1977 and 1994, Americans increased their daily caloric intake by 206 calories.<sup>9</sup> Almost all

of that increase is due to snacking, meaning that we are eating more frequent or higher-calorie snacks.<sup>10</sup> Indeed, snacking currently accounts for 27% of the calories American children eat each day.<sup>11</sup>

There are many reasons behind the increased production and consumption of junk food. Some are simply due to consumer taste and technological innovation. But our own government policy is also responsible for promoting obesity-fueling empty calories. The fact is, even as nutritionists and researchers tell us to cut down on junk food in order to end the childhood obesity epidemic, federal agricultural policy is busily making the problem worse.

## Federal Agricultural Policy Has Lost Its Way

When federal support for American agriculture began in the 1930s, it was aimed at helping small family farms, many of which were struggling as the economic catastrophe of the Great Depression and the environmental catastrophe of the Dust Bowl caught American farmers in a perfect storm.

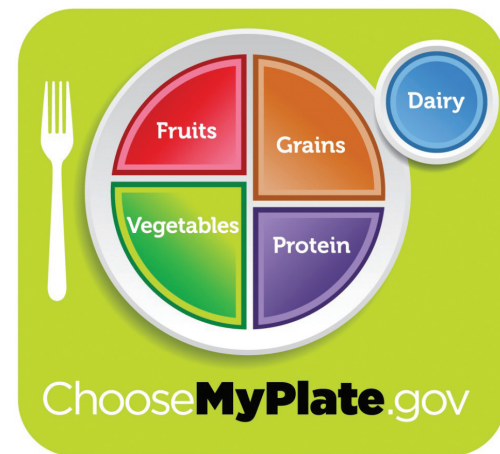
Decades later, these programs have become ensconced as a permanent part of the policy landscape. And while they'd originated as rescue programs to help small, family-owned farmers keep their doors open, they've been reshaped into subsidies that primarily benefit the country's largest farming operations.

Since 1995, taxpayers have spent over \$260 billion on agricultural subsidies. Reflecting the political clout of the biggest producers, the lion's share of the dollars go to a very small number of large operations—roughly 74% of subsidies go to 4% of U.S. farmers.<sup>12</sup> Ironically, the large

producers who are the disproportionate recipients of subsidies may then use the dollars they receive from the federal government to buy out the smaller farms around them, meaning that the subsidies can be actively harmful to small family farmers.<sup>13</sup>

The difference between which foods are subsidized and which nutritionists recommend for a healthy diet is stark. The U.S. Department of Agriculture (USDA), which both administers subsidies and makes nutritional recommendations on what constitutes a healthy diet, recently replaced the longstanding “food pyramid” with a new “food plate,” which graphically demonstrates what a balanced meal should look like.<sup>14</sup> But while USDA's plate shows that servings of fruits and vegetables should be equal in size to those of grains and proteins, USDA distributes considerable federal financial support for the latter, and virtually none for the former.

Figure 1. USDA Food Plate



*USDA's recommendations for a healthy diet include a substantial role for fresh fruits and vegetables, but none for junk food.*

There are a dizzying variety of subsidy programs—market loans, crop insurance, direct payments—but by far the lion's

share of taxpayer dollars go to subsidizing a few commodity crops. Of the \$260 billion spent since 1995, a full \$77 billion went to subsidize corn; wheat and cotton growers received just over \$30 billion apiece; soybeans were subsidized to the tune of \$24 billion. Other big-ticket items include rice, sorghum (a type of grass frequently used as livestock fodder), peanuts, barley, tobacco, and livestock and dairy production. Non-crop-specific disaster relief and conservation programs make up most of the remaining spending, with other sectors of the agricultural economy receiving virtually no subsidies.<sup>15</sup>

Commodity crops are not unhealthy in and of themselves. But most of the corn and soybeans we grow do not go to Americans' plates as-is. For example, only about 1% of U.S.-produced corn is the sweet corn that is usually directly eaten by humans.<sup>16</sup> Instead, most commodity crops are fed to livestock, turned into biofuels, or processed into additives like high fructose corn syrup or hydrogenated vegetable oils.

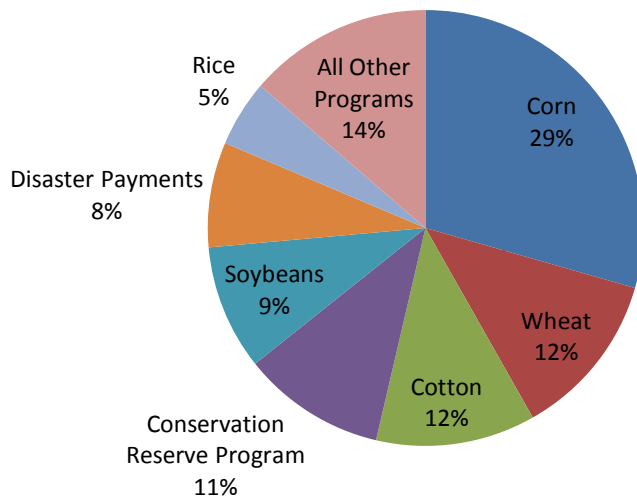
In contrast, apples are the only fresh fruit or vegetable receiving significant federal subsidies. Since 1995 the entire complex of federal agricultural programs has spent only \$262 million on apples, and even this modest support is an overstatement of the subsidies going to *fresh* apples—some of the apple crop is itself processed into forms like apple juice or applesauce which in turn may be sweetened with high fructose corn syrup.<sup>17</sup>

Indeed, federal subsidies create very strong perverse incentives discouraging farmers from growing fresh fruits and vegetables: growers of corn or wheat who also use the land to raise produce can see their subsidies revoked and face further penalties.<sup>18</sup>

## Federal Subsidies for Junk Food Ingredients

Perhaps the greatest example of how U.S. farm policy has lost its way is the fact that

**Figure 2. U.S. Agricultural Subsidies, 1995-2010**



*Major U.S. Agricultural Subsidy Programs, 1995-2010. Source: Environmental Working Group, 2011 Farm Subsidy Database.*



many subsidized crops are processed into common junk food ingredients. A substantial portion of the corn grown in the U.S. is turned into high fructose corn syrup (HFCS) and corn starch, carbohydrates with no nutritional value. Soybeans are ground up, with the meal going to feed cows, and the liquid skimmed off and turned into fat-based additives like partially hydrogenated vegetable oil. When taxpayers subsidize these commodity crops, they subsidize junk food ingredients as well.

Take the Twinkie: of its 37 ingredients, at least 14 of them are made with federal subsidies, including corn syrup, high fructose corn syrup, corn starch, and vegetable shortening.<sup>19</sup> Twinkies are sweet, fatty, and calorie-rich but utterly lacking in nutritional value. And they're cheap, too, in part because consumers have already made a down payment on many of the ingredients with their tax dollars.

But the Twinkie hardly stands alone: high fructose corn syrup can be found in cookies, candies, and cakes, but also soda, bread, ketchup, yogurt, salad dressing, and sauces.<sup>20</sup> Vegetable oils and shortening derived from soy are also ubiquitous in processed food products.

As discussed above, taxpayers have shelled out \$260 billion since 1995 in agricultural subsidies. However, not all of this spending goes directly to unhealthy food. Some of the subsidy payments go to crops that are not used in junk food (or are not even food at all, in the case of cotton). And not all corn or soy grown with the assistance of federal subsidies is processed into junk food ingredients.

At the same time, this system of subsidies shovels massive amounts of money at commodity crops, some of which are processed into junk food.

To estimate how many taxpayer dollars are directly supporting junk food production, this report analyzes tax spending on four “empty calorie” ingredients that are almost pure sugar, fat, or carbohydrate, with very limited nutritional value: corn syrup, high fructose corn syrup, and corn starch, all derived from corn, and soybean oil.<sup>21</sup>

### **Subsidies for Corn Syrup, High Fructose Corn Syrup, and Corn Starch**

High fructose corn syrup is a corn-derived sweetener that is used as a replacement for sugar in many foods, because it is somewhat cheaper. Biologically, it is almost indistinguishable from ordinary table sugar, containing roughly equal parts fructose and glucose.<sup>22</sup> Ordinary corn syrup, or dextrose, is a sweetener that is primarily glucose, with a much lower fructose content. Corn starch is, simply enough, made by processing corn to remove everything but the starch. It is a pure carbohydrate, used as a thickening agent in foods.

A substantial portion of the corn produced in the U.S. is processed into these additives. According to USDA, since 1995, the nation grew 181.1 billion bushels of corn. 13.0 billion of those bushels were processed into some form of corn sweetener, while a further 4.3 billion bushels were turned into corn starch.<sup>23</sup> Thus, over this time period, approximately 9.7% of all American corn was turned into junk food ingredients.

Subsidy databases show that since 1995, \$77.1 billion in taxpayer dollars have supported the growing of corn.<sup>24</sup> Therefore, 9.7% of this total, or \$7.5 billion, has gone directly to corn-based sweeteners and corn starch (with \$5.5 billion supporting production of corn sweeteners, and \$2 billion for corn starch).

## Industry Defenses of HFCS

The corn-growing industry has engaged in a public relations campaign in recent years aimed at rehabilitating the increasingly-tattered image of high fructose corn syrup. Their campaign, which has included several prominent television ads, makes several claims defending the additives, but none of their arguments paint HFCS as anything but unhealthy:

- 1) **“It’s made from corn”**: it is certainly the case that HFCS is manufactured using corn as the raw ingredient. But the nutritional value of the end product has much less to do with its starting point than how it is manufactured—and here, the HFCS production process concentrates the sweetest, least-healthy portions of the corn and disposes of all of the rest.
- 2) **“It’s nutritionally the same as sugar”**: as discussed in the main text, HFCS is a mixture of fructose and glucose, much like ordinary table sugar. In HFCS, the two molecules are not chemically bound together, while in sugar they are; still, this biochemical distinction does not appear to make any nutritional difference. With that said, there are some varieties of HFCS that contain a higher concentration of harmful fructose than ordinary sugar, and some studies have shown that consuming very large quantities of HFCS poses more of a health hazard than consuming an equivalent amount of ordinary sugar.<sup>25</sup>
- 3) **“Like sugar, it’s fine in moderation”**: a true statement. But as the rise in junk food production and the obesity epidemic show, neither HFCS nor sugar are being consumed in moderation. Because HFCS is a cheap, ubiquitous ingredient, it’s used in high concentrations in many foods, and Americans are eating too much of it.

## Subsidies for Soy Oils

While corn commonly shows up in American supermarkets, in both processed and non-processed forms, soybeans have a much less ubiquitous presence on retail shelves. Yet they are a major recipient of federal agricultural subsidies, to the tune of \$24.3 billion since 1995.<sup>26</sup>

When soybeans are processed, they are crushed, yielding both oils and ground soy meal. The meal is primarily used as animal feed, while the resulting oils are processed, sold directly as vegetable oil and used as additives in other foods. When a nutrition label lists “vegetable oil” or “vegetable

shortening” as an ingredient, very often that vegetable is soy. In fact, soybean oil accounts for roughly two thirds of all edible oils eaten in the United States.<sup>27</sup>

Soy oil, as a pure fat, is often added to processed foods to make them better-tasting. Vegetable oils and shortening show up in Twinkies, cakes, cookies, crackers, fish sticks, margarine, breakfast cereals, and many other snack foods.<sup>28</sup>

Determining the percentage of the soybean crop that is processed into junk food ingredients is more complex than it is for corn, because the same soybeans are processed into both meal and oils.

However, USDA data breaks down the value of the yearly soybean crop that is attributable just to soy oils, rather than the value of the meal or hulls. Since 1995, 38.9% of the value of the soybean crop has come from oils.<sup>29</sup>

Taxpayers have spent \$24.3 billion subsidizing the production of soybeans since 1995. Thus, \$9.44 billion in taxpayer dollars over that time period has gone to soy oils that are turned into hydrogenated vegetable oils and other junk food additives.

Between these four ingredients—corn syrup, high fructose corn syrup, corn starch, and soy oils—taxpayers have paid \$16.9 billion supporting junk food since 1995.

## Apples to Twinkies

This significant public expenditure on unhealthy additives is a counterproductive use of taxpayer dollars, and reflects our skewed agricultural policy priorities. The perversity of these subsidies can be clearly seen by examining how much federal support goes to what most nutritionists recognize as the healthiest category of foods: fresh fruits and vegetables.

Only one of the top twenty federal subsidy programs directly supports a fresh fruit or vegetable: apples.<sup>30</sup> It comes in at number 19 on the list: since 1995 the entire complex of federal agricultural programs has spent only \$262 million on apples, a fraction of the taxpayer dollars going to junk food.

As discussed above, in the sixteen years between 1995 and 2010, taxpayers spent \$16.9 billion subsidizing junk food ingredients; they spent \$262 million on apples (or \$1.06 billion and \$16.4 million per year, respectively). These payments went to the farming companies that grew

the crops, of course, but it's possible to illustrate our nation's priorities by seeing what our agricultural subsidies would buy each taxpayer.

If these agricultural subsidies went directly to consumers to allow them to purchase food, each of America's 144 million taxpayers would be given \$7.36 to spend on junk food and 11 cents with which to buy apples each year.<sup>31</sup> As discussed above, Twinkies provide a perfect illustration of the junk food heavily subsidized by our food policy; the Red Delicious can serve as a representative of the other varieties of apple. Using average prices for these two foods, this would be enough to get 19 free Twinkies<sup>32</sup>—but less than a quarter of an apple.<sup>33</sup> And these numbers add up—the taxpayers in each of America's largest cities are collectively shelling out for millions of Twinkies each year, but many fewer apples.<sup>34</sup>

## Conclusion

Billions of dollars in subsidies have been spent over the past decades to support junk food ingredients. This distressing outcome doesn't simply reflect an overall policy of massive support for the entire agricultural sector; instead, it's the result of a conscious policy that directs subsidies to commodity crops that are more likely to be processed into food additives.

This wasteful spending not only squanders taxpayer dollars: by fueling the crisis of childhood obesity, the subsidies damage our country's health and increase the medical costs that will ultimately need to be paid to treat the effects of the obesity epidemic. Taxpayers are paying for the privilege of making our country sick.

Subsidies to large agribusinesses are egregious enough on their own; the fact that the subsidies go to junk food adds

insult to injury. At a time when government spending is coming under increased scrutiny, policy-makers should take a hard

look at what our agricultural policy says about our priorities, and take a stand for children's health.

**Table 1. Apples and Twinkies Purchasable with Federal Subsidies, by Major U.S. City**

City	State	Population	Share of Junk Food Subsidies	# Twinkies	Share of Apple Subsidies	# Apples
New York	New York	8,175,133	\$28,044,146	73,800,383	\$433,891	842,506
Los Angeles	California	3,792,621	\$13,010,286	34,237,594	\$201,291	390,857
Chicago	Illinois	2,695,598	\$9,247,035	24,334,303	\$143,067	277,801
Houston	Texas	2,099,451	\$7,202,000	18,952,632	\$111,427	216,363
Philadelphia	Pennsylvania	1,526,006	\$5,234,843	13,775,902	\$80,992	157,266
Phoenix	Arizona	1,445,632	\$4,959,126	13,050,331	\$76,726	148,983
San Antonio	Texas	1,327,407	\$4,553,564	11,983,064	\$70,451	136,799
San Diego	California	1,307,402	\$4,484,939	11,802,471	\$69,390	134,737
Dallas	Texas	1,197,816	\$4,109,013	10,813,192	\$63,573	123,444
San Jose	California	945,942	\$3,244,979	8,539,418	\$50,205	97,486
Jacksonville	Florida	821,784	\$2,819,065	7,418,592	\$43,616	84,691
Indianapolis	Indiana	820,445	\$2,814,472	7,406,504	\$43,545	84,553
San Francisco	California	805,235	\$2,762,295	7,269,197	\$42,737	82,985
Austin	Texas	790,390	\$2,711,370	7,135,185	\$41,950	81,455
Columbus	Ohio	787,033	\$2,699,854	7,104,880	\$41,771	81,109
Fort Worth	Texas	741,206	\$2,542,648	6,691,180	\$39,339	76,387
Charlotte	North Carolina	731,424	\$2,509,092	6,602,874	\$38,820	75,378
Detroit	Michigan	713,777	\$2,448,555	6,443,567	\$37,883	73,560
El Paso	Texas	649,121	\$2,226,758	5,859,890	\$34,452	66,897
Memphis	Tennessee	646,889	\$2,219,101	5,839,741	\$34,333	66,667
Baltimore	Maryland	620,961	\$2,130,157	5,605,678	\$32,957	63,994
Boston	Massachusetts	617,594	\$2,118,607	5,575,282	\$32,778	63,647
Seattle	Washington	608,660	\$2,087,960	5,494,631	\$32,304	62,727
Washington	District of Columbia	601,723	\$2,064,163	5,432,008	\$31,936	62,012
Nashville	Tennessee	601,222	\$2,062,444	5,427,485	\$31,910	61,960
Denver	Colorado	600,158	\$2,058,794	5,417,880	\$31,853	61,851
Louisville	Kentucky	597,337	\$2,049,117	5,392,414	\$31,703	61,560
Milwaukee	Wisconsin	594,833	\$2,040,527	5,369,809	\$31,570	61,302
Portland	Oregon	583,776	\$2,002,597	5,269,993	\$30,984	60,162
Las Vegas	Nevada	583,756	\$2,002,529	5,269,812	\$30,983	60,160
Oklahoma City	Oklahoma	579,999	\$1,989,641	5,235,896	\$30,783	59,773
Albuquerque	New Mexico	545,852	\$1,872,502	4,927,637	\$28,971	56,254
Tucson	Arizona	520,116	\$1,784,217	4,695,307	\$27,605	53,602
Fresno	California	494,665	\$1,696,909	4,465,550	\$26,254	50,979
Sacramento	California	466,488	\$1,600,250	4,211,184	\$24,759	48,075
Long Beach	California	462,257	\$1,585,736	4,172,989	\$24,534	47,639
Kansas City	Missouri	459,787	\$1,577,263	4,150,692	\$24,403	47,384
Mesa	Arizona	439,041	\$1,506,095	3,963,409	\$23,302	45,246
Virginia Beach	Virginia	437,994	\$1,502,504	3,953,957	\$23,246	45,138
Atlanta	Georgia	420,003	\$1,440,787	3,791,545	\$22,291	43,284
Colorado Springs	Colorado	416,427	\$1,428,520	3,759,263	\$22,102	42,916
Omaha	Nebraska	408,958	\$1,402,898	3,691,837	\$21,705	42,146
Raleigh	North Carolina	403,892	\$1,385,519	3,646,104	\$21,436	41,624
Miami	Florida	399,457	\$1,370,306	3,606,067	\$21,201	41,167
Cleveland	Ohio	396,815	\$1,361,242	3,582,217	\$21,061	40,895
Tulsa	Oklahoma	391,906	\$1,344,402	3,537,901	\$20,800	40,389
Oakland	California	390,724	\$1,340,348	3,527,231	\$20,737	40,267
Minneapolis	Minnesota	382,578	\$1,312,403	3,453,693	\$20,305	39,427
Wichita	Kansas	382,368	\$1,311,683	3,451,798	\$20,294	39,406
Arlington	Texas	365,438	\$1,253,606	3,298,963	\$19,395	37,661

# Endnotes

1 Obesity is defined by having a Body Mass Index of over thirty (BMI is calculated by dividing weight, in kilograms, by the square of height, in meters). A male at the average American height of 5'10" is obese if he weighs more than 210 pounds; for a woman at the average American height of 5'4", obesity sets in at weights above 175 pounds. See the World Health Organization, Information Sheet on Obesity and Overweight, at <http://www.who.int/dietphysicalactivity/publications/facts/obesity/en/>; Wikipedia, *Human Height*, at [http://en.wikipedia.org/wiki/Human\\_height#Average\\_height\\_around\\_the\\_world](http://en.wikipedia.org/wiki/Human_height#Average_height_around_the_world).

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10 *Id.*

11 Chris Fleming, *Study Showing Rise in Snacking by Children Generates Discussion*, Health Affairs Blog, Mar. 3, 2010, at <http://healthaffairs.org/blog/2010/03/03/study-showing-rise-in-snacking-by-children-generates-discussion/>.

12 Environmental Working Group, 2011 Farm Subsidy Database, at <http://farm.ewg.org>. Ten percent of subsidy recipients collected 74% of

the subsidies, but because the U.S. Department of Agriculture reports that 62% of American farmers don't pocket a dollar in federal subsidies, in effect only 4% of farmers are being paid almost three quarters of the total subsidies.

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15 2011 Farm Subsidy Database.

16 USDA Economic Research Service, *Corn Prices Near Record High, but What About Food Costs?*, Amber Waves, Feb. 2008, at <http://www.ers.usda.gov/AmberWaves/February08/Features/CornPrices.htm>.

17 2011 Farm Subsidy Database.

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19 The full list includes wheat flour, corn syrup, HFCS, vegetable shortening, animal shortening, eggs, dextrose, "modified cornstarch," corn flour, soy protein isolate, soy flour, corn dextrin, soy lecithin, and cornstarch. Laura Coffey, *37 Ingredients Twinkie Eaters Ingest*, MSNBC, at <http://today.msnbc.msn.com/id/38872091/ns/today-food/t/ingredients-twinkie-eaters-ingest/>.

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21 This conservative definition underestimates federal support for junk food. Wheat flour, which may be processed and "enriched", is used in a large number of such products. Similarly,

dairy subsidies support the production of milk, eggs, and cheese, which may be used as junk food ingredients. Even for the crops we do examine, we do not fully capture how much is going to junk food – corn chips and corn puffs, for example, include more corn-based ingredients than just processed corn starch and sweeteners.

22 Gary Taubes, *Is Sugar Toxic?*, N.Y. Times Magazine, Apr. 17, 2011, at <http://www.nytimes.com/2011/04/17/magazine/mag-17Sugar-t.html?pagewanted=all>. However, some studies have suggested that consuming high fructose corn syrup rather than sugar may lead to increased weight gain. See, e.g., Hilary Parker, *A Sweet Problem: Princeton Researchers Find that High Fructose Corn Syrup Prompts Considerably More Weight Gain*, princeton.edu, Mar. 22, 2010, at <http://www.princeton.edu/main/news/archive/S26/91/22K07/>.

23 USDA Economic Research Service, *Sugar and Sweeteners: Recommended Data, Table 27: U.S. Use of Field Corn, by Crop Year*. Because this data set is arranged in "crop years" stretching from September of one year through August of the next, we started our count in the 1995/96 crop year. Available at <http://www.ers.usda.gov/Briefing/Sugar/Data.htm>.

24 2011 Farm Subsidy Database.

25 See Note 22, above.

26 2011 Farm Subsidy Database.

27 Kayla Hedrick, *"Low-Lin" Oil Helps Keep Us Healthier and Profitable*, unitedsoybean.org, Jan. 19, 2011, at <http://unitedsoybean.org/topics/consumer/low-lin-soybean-oil-helps-keep-us-healthy-and-farmers-profitable>.

28 Many soy oils undergo a process called hydrogenation before being used in food products. Hydrogenation is a process that can help protect oils from spoilage and improve their taste, as well as making them semisolid. However, partial hydrogenation also increases the concentration of trans fatty acids in the oil, and consumption of trans fats has been shown to increase the risk of heart disease. Due to these health concerns, food processors have been decreasingly relying on partial hydrogenation of soy oils. *Id.*; Wikipedia, *Hydrogenation*, at <http://en.wikipedia.org/wiki/Hydrogenation>.

29 USDA Economic Research Service, *Oil Crops Yearbook 2011*, Table 9: Soybeans:

Monthly Value of Products Per Bushel of Soybeans Processed, and Spot Price Spread, U.S., 1990/91 -2009/10. To account for the impact of inflation, the average share of the price since 1995 is weighted by the total soybean production in a given year, which may be found in Table 2: Soybeans: Acreage Planted, Harvested, Yield, Production, Value, and Loan Rate, U.S., 1960-2010. *Available at* <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1290>.

30 Federal farm policy does include disaster relief payments that go to owners of orchards and other fruit-growing trees in the event that a natural disaster damages their crop; due to the non-recurrent, random nature of these payments, we do not include them in our analysis. Number twenty on the list are subsidies for growing sugar beets, a tuber; however, sugar beets are cultivated to be processed into sugar, not to be eaten directly. 2011 Farm Subsidy Database.

31 Internal Revenue Service, *Tax Stats at a Glance*, FY 2009, at <http://www.irs.gov/taxstats/article/0,,id=102886,00.html>.

32 If bought in larger quantities, the per-unit cost of a Twinkie is roughly \$.38. *See, e.g.*, this Amazon.com product listing: <http://www.amazon.com/Hostess-Twinkies-Sponge-Creamy-Filling/dp/B004ZXYHHA>.

33 Bureau of Labor Statistics, Series APU0000711111, lists the price per pound of a Red Delicious apple as \$1.374 as of July 2010. *See* <http://www.bls.gov/data/#prices>. Livestrong.com lists the average weight of a Red Delicious apple about 6 ozs, or 3/8 of a pound, meaning each apple would cost 51.5 cents. *See* <http://www.livestrong.com/article/303353-calories-in-one-red-delicious-apple/>.

34 List of cities and population from Wikipedia, *List of United States Cities by Population*, at [http://en.wikipedia.org/wiki/List\\_of\\_United\\_States\\_cities\\_by\\_population](http://en.wikipedia.org/wiki/List_of_United_States_cities_by_population). Note that while the previous sentence breaks down subsidies per taxpayer, the chart does so on an overall population basis. Per the U.S. Census, American population is 309 million. *See* <http://quickfacts.census.gov/qfd/states/00000.html>.