THE EFFECTS OF INDIVIDUAL CROP PAYMENTS ON THE COST OF FOOD

by

NICOLE A. PETER

B.S., Kansas State University, 2004

A THESIS

Submitted in partial fulfillment of the requirements

for the degree

MASTER OF AGRIBUSINESS

Department of Agricultural Economics

College of Agriculture

KANSAS STATE UNIVERSITY

Manhattan, Kansas

2014

Approved by:

Major Professor
Dr. Hikaru Hanawa Peterson

ABSTRACT

This thesis focuses on the question of the effect of commodity pricing and Federal programs on the cost of food in the United States. For many decades the debate around subsidy payments has been argued in the halls of Congress and in farm fields across the country. Corn, wheat, and soybeans are the three largest crops subsidized in the United States today; arguably, the prices of these crops are influenced by subsidy payments. The goal of this thesis is to determine the effects of the prices of the top three subsidized crops on the thrifty market basket for families for four published by the USDA, factoring in transportation costs, market spread, agricultural technology advancements, and market value share. Previous studies have focused on direct subsidy payments as a whole and their aggregate influence on the price of food. This paper builds on the past studies by evaluating the effects of crop-specific programs on the cost of food.

Econometric regression analysis was used to analyze the data gathered to support or refute the hypothesis that commodity prices and Federal payments do influence the cost of food. Initially data were gathered from January 1960 to December 2012. The data were adjusted for inflation using the Producer Price Index and Consumer Price Index where appropriate. After multiple attempts of modeling it was discovered that data from 1960 to 1970 needed to be discarded due to the difference in the market basket price calculations from the rest of the series. Furthermore, the model was adjusted based on the presence of multicollinearity, and the Hildreth-Lu Method was utilized to correct for the autocorrelation in error.

The regression results illustrated that the only commodity of the three considered in the study that had a positive and statistically significant impact on the cost of food over the sample period was corn (p-value = 0.005). The coefficients on wheat and soybean prices were statistically insignificant. The historical fuel price had the expected positive sign and was statistically significant. The agricultural technology factor was not significant. The results also suggested that the cereal grains supply chain has significantly increased the cost of food. Both the cereal grain farm value share and the retail-to-farm spread for cereal grains were statistically significant (p-value < 0.000) with positive coefficients. The price spread of fruit was statistically significant, (p-value = 0.000), but the farm value was not. The regression results were initially surprising for the crop price variables. The overall analysis supports previous studies that crop subsidies alone may not have impacted food prices per se, but biofuel policies may have had unintended consequences. Crop-specific results provide more information to consider when discussing The Farm Bill and the implications of such a complicated and omnibus piece of legislation.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGMENTS

The author wishes to express sincere appreciation to the Master of Agribusiness program director, Dr. Allen Featherstone, Ms. Deborah Kohl and Ms. Mary Bowen for their assistance with my degree program. I would like to say a special thank you to my Major Professor Dr. Hikaru Hanawa-Peterson for encouraging me and helping me through the entire and difficult thesis process. I also appreciate all of my committee members Dr. Sean Fox, Dr. Arlo Biere, and Dr. Christine Wilson for their input and direction on this project. I would like to thank the entire Kansas State University faculty who contributed to my education both undergraduate and graduate.

I would like to express sincere gratitude to my husband for his encouragement and support throughout the entire Master of Agribusiness program. I truly appreciate my parents for their availability to me while working to complete the degree program as well as encouragement throughout the process. I want to say Thank You to my sister and friends for giving me a place to stay and study while on campus in Manhattan. I also owe a great deal of appreciation to Mary Lou Peter for giving me feedback on my thesis and always having a enough time to read through each revision. I also want to thank my dear friends of Martin Farms, especially Shar Armbruster, who allowed me a shoulder, an ear, and most importantly always something to laugh about. Lastly, I want to thank Liberal comic Bill Maher and Chef Tom Colicchio for helping to inspire the idea for my thesis topic.

CHAPTER I: INTRODUCTION

1.1 Research problem and Question

Many governments have historically played a part in providing food for the people through policies for food producers. Countries around the world have stock piled grain for times of need and distributed to the people as they see fit. Many leaders, with intelligence and foresight realized that passing out grain, rice, and other staples to hungry people would help thwart rebellion. Today, while some governments still use food as a way to rule the people, many democracies have turned to governmental policy to guide the food supply. While a strong army is regarded as national security, a diverse and well-developed agriculture system is regarded as food security (Imhoff 2012). The Department of Agriculture in the United States is tasked with supporting the formation of an abundant food supply and ensuring that all citizens receive basic nutrition. One form of governmental nutrition support is overseeing the spending and budget of the Farm Bill. The following Figures, 1.1 and 1.2 show how The Farm Bill spends one tax dollar by averaging spending over several distinct appropriations from 2002-2012. Figure 1.2 shows the difference in spending if nutrition programs, such as food stamps are taken out.

Figure 1.1: Nutrition, Farm and Conservation Spending (Portion of US$1)

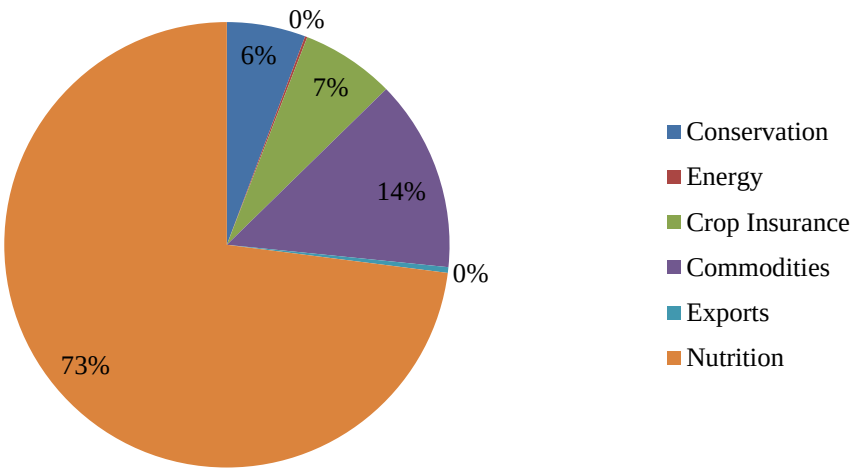
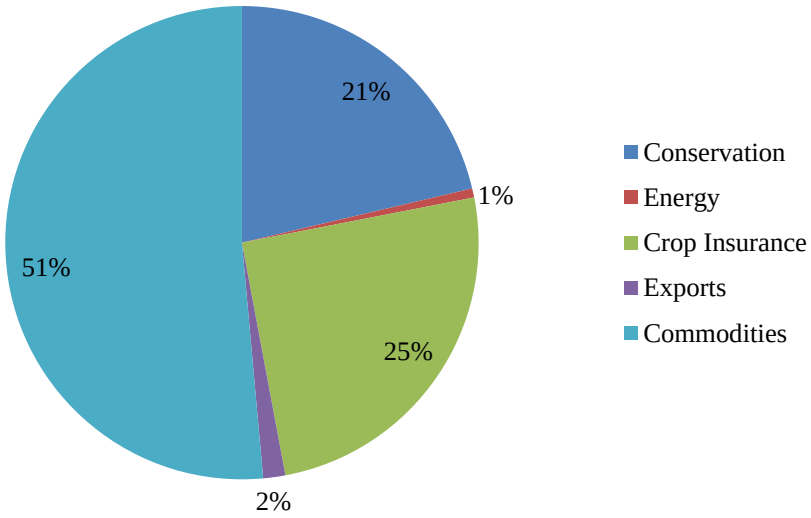


Figure 1.2: Farm and Conservation Spending (Portion of US$1)



The first Farm Bill was drafted and passed the United States during The Great Depression. Farming communities were more common than they are today and food shortages were normal in the average home when the first Farm Bill was passed. Today, however, America is an agricultural leader and innovator, and the corporate farm structure

is growing while the family farm is decreasing. The U.S. Census still identified over 2 million farms, but 90 percent of the nation's farm output comes from only 300,000 mostly large scale, highly mechanized operations (Imhoff 2012). To help supplement and encourage the farming sector, The Farm Bill provides complex and expensive subsidies to certain commodity crops. The bi-products of these crops, which are converted to cheap nutritionally empty calories, are often blamed for the growing obesity in Americans.

There is a wide belief that unhealthy food is cheap and widely available because of the subsidy payments given to producers of commodity crops. Critics of The Farm Bill argue that corn is overproduced thus making high fructose corn syrup (HFCS) cheap and widely available. In turn, food manufactures use HFCS to produce cheap, unhealthy food. The healthy and fresh options of fruits and vegetables, in turn is a much smaller sector when looking at government payments. The question this thesis seeks to address is this: Do Farm Bill subsidy policies, which impact the price of commodity crops, significantly affect the cost of food. While the price of raw inputs is substantial in setting finished product price, there are other factors, such as fuel price, which can affect price and these variables are explored as well.

1.2 Research Objectives

The specific objectives of this thesis are as follows:

i. Determine the effects, if any, the price of corn, wheat, and soybeans have on the cost of food.

ii. Determine the effects, if any, other variables, including fuel cost, agriculture technology advancements, and marketing margin have on the cost of food.

iii. Evaluate and provide a conclusion for the estimated results.

1.3 Scope of Study

The study examined data from 1960 through 2010. The USDA Market Baskets consist of a suggested consumption pattern consisting of quantities of each of the 58 food categories, for each of the 15 age-gender groups. In the design of The Thrifty Food Plan, foods were converted into corresponding form of purchasable foods (Carlson, et al. 2007). After researchers obtained quantities of food consumed in the 58 categories, they converted them to an equivalent amount of food ingredients that could be purchased and then collapsed them into a simplified group of 29 food categories. These individual baskets are then combined to form a household market basket.

Since the Market Baskets are formed by the USDA and based on the most recent nutritional guidelines, they arguably are the most appropriate measure of the cost of food to use as a dependent variable. Of course, there are many factors that affect the cost of food thus the study includes fuel prices, producer price index, consumer price index, the market spread for bakery and cereal products, fresh fruits, and fresh vegetables. The study will take these factors into consideration.

1.4 Thesis Outline

This thesis is organized into five chapters. The remainder of this chapter presents the background of the study including a history the nation's Farm Bills and The USDA's Market Baskets. Chapter two provides an overview of associated literature. Chapter three provides a discussion of the hypothesis as well as a description of the data and models used. Chapter four presents the results, and chapter five draws conclusions from the study.

1.5 The Farm Bill

Before 1932 the responsibility of public food assistance belonged to local governments and charities. The first effort to close the gap between surplus crops and hungry Americans was the Federal Surplus Relief Corporation which was created as part of the Agricultural Adjustment Act in 1933 (Imhoff 2012). Since 1933 there have been many critics against the omnibus Farm Bill and the amount of influence it has had on food prices, obesity rates, and the food supply. The research can be broken down into two categories, those with the opinion that the historical farm bills have negatively impacted the cost of nutritious food and Americans' waistlines and those that are convinced the Farm Bill has had very little influence on any of these issues (see chapter 2).

Every five to seven years, the elected officials in Washington D.C. draft, debate, and vote on an enormous piece of legislation covering food and farming. The official name varies from one legislation to the next, such as the Farm Security and Rural Investment Act of 2002, or the Food, Conservation, and Energy Act of 2008; however it is typically referred to as the Farm Bill. Typically, the general title of any new farm bill is telling in both what is significant in the bill and in what the authors want the general population to think is significant (Harris, et al. 2008). The Farm Bill covers a multitude of nutrition and dietary programs regulated by the Government of the United States as well as the allocation of subsidy payments for crops and crop insurance. The Farm Bill determines the school lunch program, the allocation of funds for food stamps, the regulatory rules governing the production of meat, and most important what crops the government will support and, in turn, which kinds of foods will be plentiful and cheap. In recent years this translates into an abundance of corn and soybeans, or rather, an abundance in added sugars (from corn) and fat (from soybeans) in the marketplace (Imhoff 2012). A consumer searching for healthy,

nutritious, and fresh choices will find that one dollar in the low calorie fresh produce section will provide very little compared to the high and empty calorie snack and soda aisle.

The 1996 Farm Bill, The Federal Agricultural Improvement and Reform (FAIR) Act, allowed farmers the freedom to produce whatever crops they desired assuming that if the crops they produced did not produce a net profit, then the farmers would produce something different and more profitable. Based on the laws of supply and demand politicians assumed that eventually, prices would raise, due to low supply, and those who did plant a low supply crop would be profitable. This assumption was incorrect, and individual farmers did not collectively make decisions to grow crops based on market supply and demand. Instead, farmers made individual decisions to plant more of the same crops to make up for low prices and continued to plant familiar crops. Two other changes with unintended consequences were eliminating land set-aside requirements and the grain reserve program. By eliminating the benefits of having idle land, farmers harvested an extra 15 million acres of corn and soybeans between 1995 and 1997 (Imhoff 2012). Having surplus production and no grain reserve program meant the market was flooded with excess crops and prices drastically fell. Poor prices drove farmers to plant even more acres to try and earn more money to make up for low prices which forced prices down even further. This domino effect continued until Congress established disaster payments to help farm incomes which became permanent in the 2002 Farm Bill.

The 2002 Farm Bill, named the Farm Security and Rural Investment Act, became the most unrestrained farm bill to date. Farmers were eligible to receive direct payments just for owning land with crop production history. The disaster payments that started in the

late 1990's became part of the budget in 2002 and became counter-cyclical payments that fluctuate depending on global market prices. The other two types of payments that were available to farmers were direct fixed payments and marketing loans. Like counter-cyclical payments, direct payments were not tied to production. Both of these payments were based on a mathematical formula involving acres and historical yields (Mittal 2002). The positive aspects of the 2002 Farm Bill included the Farmers' Market Nutrition Program, mandatory country of origin labeling for all meats and produce, and a doubling of the annual funding for the Community Food Projects.

The Farm Security and Rural Investment Act was criticized for being skewed towards a narrow group of crops and the districts who grew those crops. For example, between 1995 and 2010 nearly 70 percent of commodity subsidy payments went to the production of only five crops, corn, cotton, wheat, rice, and soybeans (Imhoff 2012). This left farmers of fruits, vegetables, and nuts left out in the cold without a penny of aid. It was argued that Americans need affordable access to many nutrition sources and not just grains and the byproducts they produce, such as corn syrup.

After the 2002 Farm Bill, national attention turned from crop subsidies to the growing nutrition and obesity crises. The number of Americans affected by food insecurity[1] was growing and nutrition programs were requesting more government aid. The 2008 farm bill, known as the Food, Energy, and Conservation Act, highlighted the fact that food stamps and other government regulated food programs are part of the farm bill. According to the Train the Trainer proceedings prepared by for the National Extension office, "Food" refers to the importance of the consumers; "Conservation" calls attention to the importance

[1] Food insecurity refers to the USDA's classification for households that frequently experience hunger to varying degrees.

of the environment, and “Energy” calls attention to concerns over current high gas and food prices. The nutrition section of the 2008 farm bill increased the food purchasing ability of low income families, accounted for child care costs in calculating food assistance, and strengthened assistance for food banks. Fortunately for specialty crop farmers, growers of fruits, nuts, and vegetables, the new bill provided more fresh fruits and vegetables to school children. According to the Senate Agriculture, Nutrition, and Forestry Committee there was a tremendous expansion to the fresh fruit and vegetable program. The bill provided funds to distribute more fresh fruits and vegetables to low-income children in schools.

While the 2008 farm bill did have a greater focus on nutrition and the need for improved food policy, it still did little to positively change subsidy payments, crop protection plans, and marketing efforts. The bill maintained the ability of support for wealthy farmers while giving political acceptability for domestic food price increases. Critics of the bill felt there was little reform and even less budgetary savings. The bill also showed a lack of attention to the World Trade Organization compliance concerns centered on fair pricing and trade practices. Unfortunately incentives were still considered to be provided for only a small number of producers and agribusinesses which highlights the problems of distributional inequity in farm programs and ownership (Harris, et al. 2008).

Beginning in 2010 the Obama Administration began providing input to Congress regarding the contents of a new farm bill. This administration supported building a better safety net for farmers and families, while also building a much more comprehensive policy. However, the 2008 farm bill had to be extended to cover the end of 2012 through the beginning of 2014. In February President Obama signed the 2014 farm bill, The Agriculture Act of 2014, into law. It is a five-year farm bill that is designed to reform

agricultural policy, reduce the deficit, and grow the economy. The reforms include repealing direct payments and limiting producers to risk management tools that offer protection only when they suffer significant losses. Payment limits have been reduced in the new bill and eligibility rules were tightened.

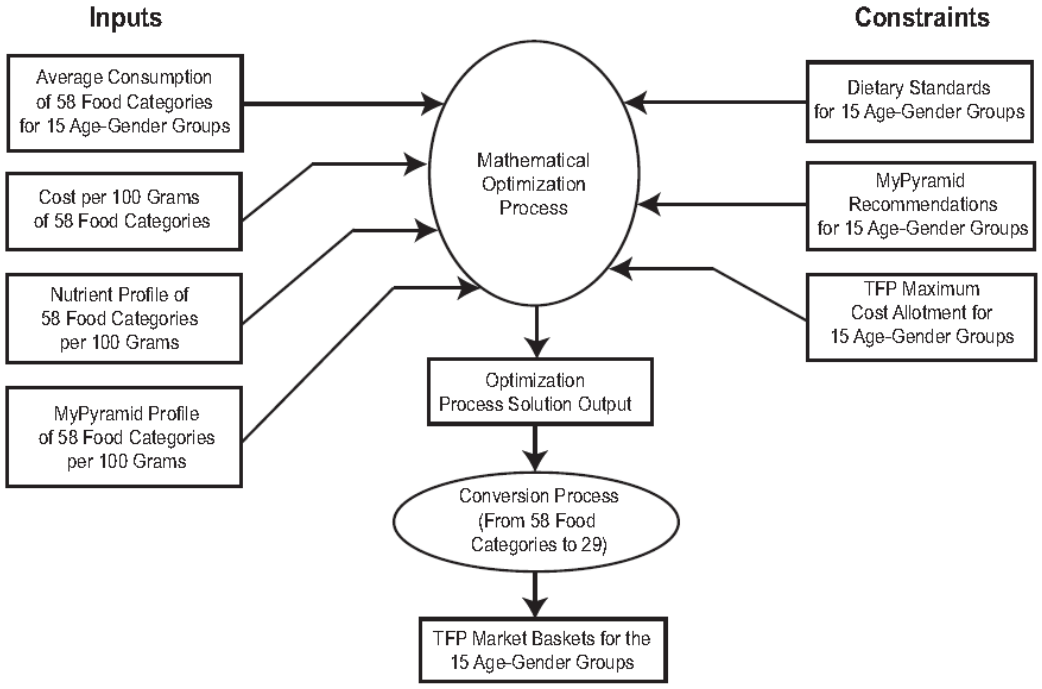
The current Secretary of Agriculture, Tom Vilsack, made the following statement on passage of the Agricultural Act of 2014: “Today's action will allow the proud men and women who feed millions around the world to invest confidently in the future. Our communities will have additional support to attract new economic opportunity and create jobs. During difficult times, children, working families, seniors and people with disabilities will have access to nutritious food. The potential of new products, treatments and discoveries will be strengthened through new agricultural research. Renewed conservation efforts will protect our fields, forests and waters creating new tourism options. This legislation is important to the entire nation.”

It appears that providing access to affordable and healthy food remained a top goal of the 2014 farm bill, similar to the 2008 farm bill. The Congressional Budget Office (CBO) has projected that the new bill will spend $956 billion over the next 10 years, with $756 billion for nutrition assistance and $200 billion for agriculture (Johnson 2014). Proponents of the farm bill will disagree that previous farm bills have made access to healthy nutritious foods difficult. Opponents have argued that excessive payout to grain producers over the history of farm bills has decreased access to healthy and nutritious foods. The 2014 farm bill does seem to note the importance of healthy food and increases the emphasis of eating fruits and vegetables.

1.6 USDA Market Baskets

According to the USDA website, market baskets are monthly publications that list the average cost of a nutritious diet at four different cost levels: The Thrifty, Low-Cost, Moderate-Cost, and Liberal cost. The Thrifty Food Plan is the basis for maximum SNAP (Supplemental Nutrition Assistance Program) allotments also known as food stamps. The cost of the remaining plans increases as noted by their names. All four plans are published for families and individuals at various ages and gender. The current thrifty food plan was updated in 2006 and was based on the 2005 Dietary Guidelines for Americans as well as the 2005 My Pyramid Food Guidance System. The plan used prices that low-income people paid for food. The latest data on food consumption, nutrient content, and food prices, the 2001-2002 Food Price Database, were used to compile the data as well. The plan offers a more realistic reflection of the time available for food preparation, especially with increased expectations for work in assistance programs (Carlson, et al. 2007). Figure 1.3 gives a visual depiction of all the inputs and constraints that are used to determine the market basket for the Thrifty Food Plan.

Figure 1.3: Market Basket Inputs and Constraints



The model shown in Figure 1.3 yielded a suggested consumption pattern, consisting of quantities of each of the 58 food categories, for each of the 15 age-gender groups. Each consumption pattern met model constraints for dietary standards and cost levels (Carlson, et al. 2007). For the design of the Thrifty Food Plan, the USDA's Center for Nutrition Policy and Promotion (CNPP) converted foods and amounts consumed into the appropriate, corresponding form and quantity of purchasable foods. This plan serves as a national standard for a nutritious diet at a minimal cost. The following three graphs depict the percentage of cost in each food category of the Thrifty food plan.

Figure 1.4: Percent of Food Category Spend in Thrifty Food Plan (Children)

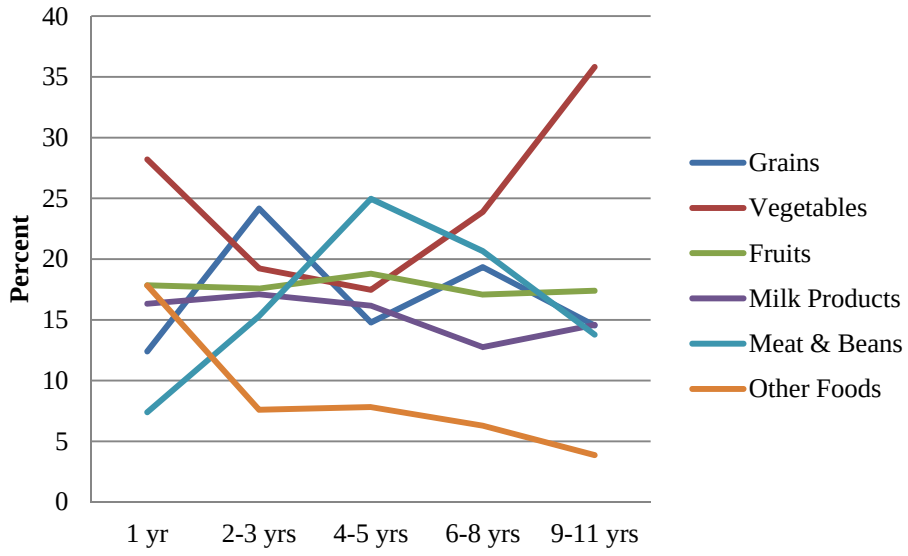


Figure 1.5: Percent of Food Category Spend in Thrifty Food Plan (Males)

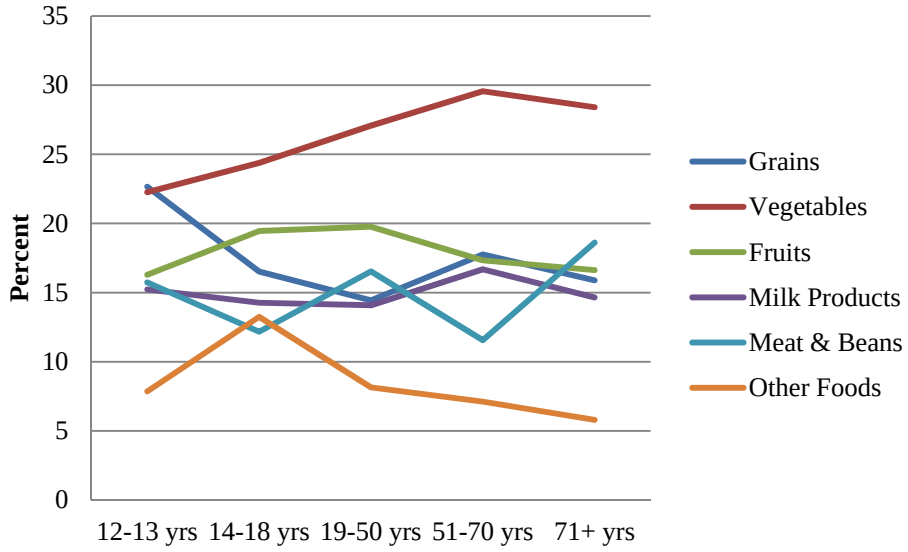
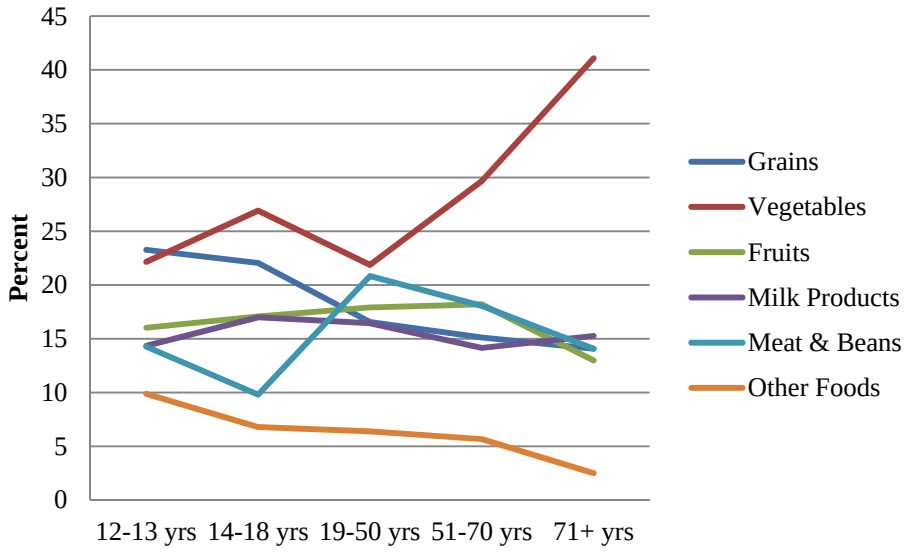


Figure 1.6: Percent of Food Category Spend in Thrifty Food Plan (Females)



As shown in the graphs, market baskets are broken down by Children, Males, and Females. The family market baskets when published (Figure 1.7) are a combination of family sizes and spending levels.

Since 1894 the U.S. Department of Agriculture (USDA) has been publishing information on the quantity of foods purchasable at a relatively economical price level. The data correspond to known nutrient standards for the average American male undertaking moderate physical work. In the 1920's, research demonstrated the presence and importance of minerals and vitamins in food and diet. Basic food plans were developed from this knowledge that was adequate in nutrients, moderate in cost, and satisfying in flavor. These plans provided Americans with practical and economical advice on healthy eating (Carlson, et al. 2007). In the 1930's the USDA developed four nutritious food plans at different cost levels for families with varying income. At that time the plans were called The Restricted Food Plan for Emergency Use, The Minimum-Cost Food Plan, The Moderate-Cost Food Plan, and the Liberal-Cost Food Plan. The two lower-cost food plans were used in programs for low-income families affected by the Depression. By the 1940's the model

was changed and only three food plans were published. The two lower income plans were combined into one plan known as the Low-Cost Food Plan.

In 1964, with the introduction of The Food Stamp Program Act, the Economy Food Plan was developed as a nutritionally adequate diet for short-term or emergency use. Priced lower than the Low-Cost Food Plan, the Economy plan was used as the basis for the maximum allotment of food stamps. In 1975, the Economy Food Plan was replaced by the Thrifty Food Plan, which represented a completely new set of market baskets but at the same minimal-cost as the Economy Plan (Carlson, et al. 2007). As a new plan, the Thrifty Food Plan represented a minimal cost diet based on up-to-date dietary recommendations, food composition data, food habits, and food price information. The next revision came in 1983 after the USDA published the 1977-1978 Nationwide Food Consumption Survey and again in 1999 with the publication of the 1989-1991 Continuing Survey of Food Intakes by Individuals and the 1989-1991 Food Price Database (Carlson, et al. 2007). The latest revision, 2006, captures important changes in food composition data, eating patterns, and price information that have occurred since 1989-1991.

The Thrifty Food Plan market basket is important in providing a national standard of how a nutritious household diet can be purchased on a limited budget (Figure 1.7). Past research has found that most low-income families, as well as non-low-income families, do not consume a healthful diet (Basiotis, et al. 2002). Therefore, the Thrifty Food Plan market baskets are helpful guides in educational programs and as useful references for policies that assist low-income families in planning a budget for their food expenditures. The data behind the Thrifty Food Plan proves it is possible to eat a nutritious diet at the maximum allotment. However most food stamp recipients do not receive the maximum allotment

allowed. Benefits gradually decline with increases in income, and recipients are expected to supplement their food stamps with income in order to spend the necessary amount to have a nutritious diet (Carlson, et al. 2007).

Figure 1.7: Official USDA Thrifty Food Plan Example

Official USDA Food Plans: Cost of Food at Home at Four Levels, U.S. Average, December 2013[1]

Age-gender groups	Weekly cost[2]				Monthly cost[2]			
	Thrifty plan	Low-cost plan	Moderate-cost plan	Liberal plan	Thrifty plan	Low-cost plan	Moderate-cost plan	Liberal plan
Individuals[3]								
Child:								
1 year	21.40	28.70	32.50	39.60	92.60	124.30	140.90	171.80
2-3 years	23.40	29.80	36.10	43.90	101.60	129.20	156.30	190.10
4-5 years	24.50	30.90	38.30	46.70	106.20	134.00	165.90	202.20
6-8 years	31.20	43.10	52.30	61.70	135.30	186.60	226.70	267.30
9-11 years	35.40	46.80	60.60	70.50	153.50	202.80	262.40	305.40
Male (M):								
12-13 years	38.00	53.70	67.40	79.00	164.80	232.70	292.00	342.10
14-18 years	39.00	54.60	69.50	79.40	169.20	236.40	300.90	344.00
19-50 years	42.20	54.30	68.30	83.70	182.70	235.50	295.80	362.90
51-70 years	38.40	51.30	63.90	76.90	166.30	222.30	276.80	333.20
71+ years	38.80	50.90	63.10	77.80	168.10	220.50	273.30	337.20
Female (F):								
12-13 years	38.10	46.40	55.80	68.30	164.90	201.00	241.80	295.80
14-18 years	37.30	46.50	56.30	69.20	161.80	201.50	243.90	299.90
19-50 years	37.50	47.20	58.30	74.50	162.50	204.40	252.80	322.60
51-70 years	37.00	46.10	57.40	68.80	160.30	199.60	248.60	298.30
71+ years	36.10	45.70	56.70	68.20	156.60	198.10	245.60	295.60
Families								
Family (M&F) of 2:[4]								
19-50 years	87.60	111.70	139.30	174.00	379.70	483.90	603.50	754.10
51-70 years	82.90	107.10	133.40	160.30	359.30	464.00	577.90	694.70
Family of 4:								
Couple (M&F), 19-50 years and children—								
2-3 and 4-5 years	127.60	162.30	201.00	248.70	552.90	703.10	870.90	1077.80
6-8 and 9-11 years	146.30	191.40	239.50	290.40	633.90	829.30	1037.70	1258.20

[1]The Food Plans represent a nutritious diet at four different cost levels. The nutritional bases of the Food Plans are the 1997-2005 Dietary Reference Intakes, 2005 Dietary Guidelines for Americans, and 2005 MyPyramid food intake recommendations. In addition to cost, differences among plans are in specific foods and quantities of foods. Another basis of the Food Plans is that all meals and snacks are prepared at home. For specific foods and quantities of foods in the Food Plans, see *Thrifty Food Plan, 2006* (2007) and *The Low-Cost, Moderate-Cost, and Liberal Food Plans, 2007* (2007). All four Food Plans are based on 2001-02 data and updated to current dollars by using the Consumer Price Index for specific food items.

[2]All costs are rounded to nearest 10 cents.

[3]The costs given are for individuals in 4-person families. For individuals in other size families, the following adjustments are suggested: 1-person—add 20 percent; 2-person—add 10 percent; 3-person—add 5 percent; 4-person—no adjustment; 5- or 6-person—subtract 5 percent; 7- (or more) person—subtract 10 percent. To calculate overall household food costs, (1) adjust food costs for each person in household and then (2) sum these adjusted food costs.

[4]Ten percent added for family size adjustment.

CHAPTER II: LITERATURE REVIEW

While Americans seemingly enjoy the most affordable food supply in the world, the price gap is growing between nutrient-rich foods and foods that are energy-dense but nutrient-poor. For example, a study conducted by Monsivais, Mclean and Drewnowski (2010) of U.S. food price data to show that fruits and vegetables have increased in price over time to a greater extent than other food groups. On the other hand, a study conducted by Alston, Sumner, and Vosti (2008) concluded that U.S. farm policies have generally had small and mixed effects on farm commodity prices. This means that the policies have had even smaller and mixed effects on the relative prices of more-and less-fattening foods.

2.1 Cheap Food Policy

Critics of the Farm Bill use the term “cheap food policy” to describe the platforms that pay farmers for producing crops. They feel the payments encourage surplus supplies of certain crops, thus promoting cheap prices of food ingredients that are used in the production of fattening foods. Miller and Coble (2006) discuss how cheap food policy is consistently promoted by proponents of commodity programs as a benefit and consequently a justification. They argue that production resources in agriculture impede advancements in other sectors of the economy because they remain dedicated to the production of crops covered by the commodity programs. To clear the market of the over production, equilibrium prices must fall. In other words, an effective cheap food policy will mean lower farm-level prices for raw commodities which equates to less expensive food at the retail level.

However, by allowing the cheap food policy gains to producers in the short run, subsidy payments are offset because of the agricultural sector adjusting land values. This means the short term gains from direct payments do not make up for the inflated land

prices that have to be paid to acquire acreage. Since the value of land is mostly based on the income it can generate, subsidy payments that increase producer income will increase the land value as well. Therefore, as land prices increase the total cost of production increases and new entrants face higher prices and lessees experience higher rents on ground they are leasing (Miller and Coble 2006). Their study examined whether direct payments to producers contribute significantly to the proportion of disposable income devoted to food expenditures. Independent variables included technology advancements, consumer income, price spreads, and direct subsidy payments. The study found that consumer income was the only variable significant at the 1% level. Their model did not find that direct payments significantly impacted the affordability of food in the aggregate.

2.2 Price Disparity in Healthful Foods

Monsivais, Mclain, and Drewnowski (2010) reviewed whether the cost of more nutritious foods increased disproportionately over a four-year period relative to less nutritious foods. The study directly addressed energy density (calories per gram) and nutrient density (nutrients per calorie) of foods, transcending the need to assign foods into groups. The authors argue that there is a growing price disparity between nutrient-dense foods and less nutritious options. They hypothesize that cost may pose a barrier to the adoption of healthier diets and so limit the impact of dietary guidance. The foods in the study, nutrient dense foods, were described as foods that provided relatively more nutrients per calorie, enabling consumers to satisfy nutrient requirements without exceeding daily energy needs. While the 2005 Dietary Guidelines for Americans does not identify specific items, whole grains, lean meats, fruits, and vegetables are recognized as nutrient dense foods.

The authors priced 378 foods from three supermarkets in the Seattle metropolitan area over a four-year time span. For each food, price was adjusted for food energy taking into account the edible portion. The study found that foods with the lowest energy density rose in price by an average of 41%, while the highest energy dense foods rose in price by 12.2%. When studying nutrient density, the study found that foods with the lowest amount of nutrient density rose in price by 16.1% and the foods in the highest quintile of nutrient density had an average increase of 29.2% during the same time period. There were limitations to the study including the restricted geographical area where prices were obtained and each food and beverage price did not take into account sales prices or other shopping strategies that can help consumers control spend.

The study concluded that the sharp increase observed for nutrient rich foods relative to other less nutritious foods indicates that economic constraints may pose a barrier to a healthful diet (Monsivais, Mclain and Drewnowski 2010). The study highlighted the examination that needs to be done on food policy to determine the effect policy has on the affordability of nutritious food. The authors suggested that combining retail price data collected by the Department of Labor with nutrient databases maintained by the Department of Agriculture, could lead to a data driven system that could guide food and nutrition policy.

2.3 Farm Subsidies and Obesity

In an examination by Alston, Sumner, and Vosti (2008), the links between farm programs and farm commodity prices in the United States are reviewed to determine the implications of farm policy-induced commodity –price changes for food prices, and obesity rates. Motivation for the study was obtained by the rise in obesity rates around the world, not just in the United States. Author Michael Pollan is quoted as saying “when food is

abundant and cheap, people will eat more of it and get fat. Since 1977, an American's average daily intake of calories has jumped by more than 10 percent. Those 200 or so extra calories have to go somewhere. But the interesting question is, where, exactly, did all those extra calories come from in the first place? And the answer takes us back to the source of all calories: the farm." Comments like this have led to several studies trying to find a correlation between subsidized crops and the availability of nutritious foods.

The authors explore if farm subsidy payments have caused farm commodities that are important ingredients to produce fattening foods significantly more abundant and cheap. Second, they examine if lower commodity prices caused by farm subsidies have resulted in significantly lower costs to the food industry, cost savings that were passed on to consumers in the form of lower prices of relatively fattening food. Lastly, they argue if consumption has changed significantly in response to policy induced changes in the relative prices of more- versus less- fattening foods.

The study used Table 2.1, to reinforce their argument. The table, created by the Australian Bureau of Agriculture and Resource Economics (ABARE) quantified the likely effects of U.S. farm subsidies (including import tariffs) being phased out over 10 years. The table shows that eliminating existing farm programs would have a very modest effect on farm prices and production of the main food commodities. The authors concluded from the data that overall the effects of U.S. farm subsidies on commodity prices are mixed and mostly modest.

Table 2.1: Consequences in 2016 from a complete elimination of U.S. Commodity Protection and Subsidy Policies

	Output	Price
	Percent Difference From Baseline	
Soybeans	-2.86	-1.14
Wheat	-7.58	1.52
Maize (Corn)	-3.79	0.26
Rice	-11.71	-3.87
Cane and Beet	-33.31	-15.3
Fruit and Vegetables	4.42	-5.16
Beef Cattle	1.44	-3.31
Pigs and Poultry	0.41	-0.01
Milk	-0.45	-0.01

Source: (Alston, Sumner and Vosti 2008)

Alston, Sumner, and Vosti (2008) also state that farm commodities as ingredients only represent a small share, 20%, of the cost of retail food products, and even less for soda and meals away from home. Soda and fast food are both often implicated in the rise of obesity. The study concludes that U.S. farm programs have had negligible effects on prices paid by consumers for food and thus negligible influence on dietary patterns and obesity. They cite arguments and evidence to show the commodity programs are ineffective, wasteful, and unfair but there is no conclusive evidence that they can be linked to obesity. Subsidy policy is complex and influences production costs, production, commodity prices, and farm income but not obesity.

2.4 Summary of the Literature Review

In summary, several studies have been conducted to try and understand the effects direct payments have on food costs. In the studies listed above, different factors were used to try and examine what influences the cost of food and how that relates to obesity, a growing problem in the United States. Since the United States government recommends people what to eat through the food pyramid and governmental nutritionists, it makes sense that they would also be at the forefront of making those foods affordable and attainable. Miller and Coble (2006) looked at how direct payments effect the affordability of food at the retail level by considering the percent of disposable income that was spent on food and direct payment figures that were paid to producers. The other two studies listed discuss food policy, obesity, and the cost of nutrient-dense foods. The limits of these papers were the geographic limitations of the study conducted by Monsivais, Mclain, and Drewnowski (2010) and the challenges of discerning quantitative effects in the study by Alston, Sumner, and Vosti (2008).

All three though were analyzed for pieces that could help this thesis. The question this thesis tries to answer is whether or not the answer of direct payments helps or hinders the cost of the nation's food supply, by utilizing crop prices instead of direct subsidy payments which can be combined with other non-food supply factors. This thesis also ignores the inferences made by the media which links subsidies to the rising obesity rates.

CHAPTER III: MODEL AND DATA

This section presents a discussion of the model and data used in the analysis. The first section provides a description of what is conceptually expected to impact the cost of food. The second section will give a description of the data used in the model to measure the conceptualized factors.

3.1 Factors Affecting Food Prices

Historically, food prices were set by consumers and farmers coming together directly and negotiating prices based on supply and demand. Occasionally this still happens at local farmers' markets but most foods move through a complex supply chain network before being offered at a retail store for consumers to purchase. The item seen on the grocery shelf is often a conglomeration of many inputs used to produce a retail product. Thus, it is not surprising that the price of bread in a bakery is much higher than the price farmer's received for the wheat in the bread. There is, however, a strong interest by farmers, policy-makers, and consumers in the connection between farm prices received for commodities and the retail prices charged for food (Tomek and Robinson 2003).

The principal objective of this thesis was to determine the effect of subsidized crops on the cost of food. Corn, soybeans, and wheat were the top three crops receiving direct payments from 1995 to 2012 according to the Environmental Working Group's website, thus they were determined to be likely to have the most impacts on the cost of food.

Secondly, it is obvious that transportation and technology are factors that influence the cost of food. In order to get a raw agricultural product from farm to fork, it requires transportation to get it there. Transport is required from the farm to a storage location, from storage to a processor or manufacturing plant, from manufacturing and processing to

another storage warehouse, and lastly from a warehouse to a retail store where it is made available to consumers. While some foods may have less transportation steps than what is described above, many have even more.

Technology is more difficult to define but has certainly had an impact on the production of food. Farming practices have improved over time to the point that satellite imaging can be used to tell a farmer how much to water an individual section of land for maximum output of the crop. Due to these advancements agricultural technology must be factored into the model as a variable affecting the cost of food.

The price difference between farm products and food bought by consumers is referred to as marketing margin (Tomek and Robinson 2003). There are two commonly used measures for marketing margin: farm to retail price spreads and farm value share. Price spreads are calculated by the U.S. Department of Agriculture, which first makes comparisons for individual foods and groups them into market baskets. Estimates are then made of the cost components of the basket, such as labor and packaging, and these estimates are combined and reported as an index of price spreads for a fixed market basket of foods. Farm-retail price spreads are calculated for selected foods produced from farm commodities of domestic origin. The foods used in the computation tend to be common products where the computations can rely on readily available prices. Furthermore, the retail prices are from precisely defined products, so the estimated spread is not influenced by changes in the product's characteristics.

The farmer's share of the consumer's dollar, or farm value share, is a reflection of changing prices of the various inputs used in producing and marketing the retail products that are included in the fixed market basket of foods included in the price spread

calculations. Since nonfarm input prices have tended to increase relative to commodity prices, the relative importance of the farm commodity's value in retail product tends to decrease (Tomek and Robinson 2003). Indeed, the farm value of food has been decreasing over time (Figure 3.3).

One cause of this is the increased processing that is added by food retailers (Nestle 2002). For example, in 1998, only 20% of the retail cost of food was returned to the producers (Nestle 2002). Nestle goes on to explain that the percentage returned is also unequally distributed. She reports that producers of eggs, beef, and chicken receive fifty percent to sixty percent of the retail cost of food, whereas producers of vegetables receive as little as five percent. In Nestle's book, *Food Politics*, she explains that once foods get to the supermarket, the proportion represented by the farm value declines further in proportion to the extent of processing. For example, the farm value of frozen peas is thirteen percent, canned tomatoes nine percent, and oatmeal seven percent.

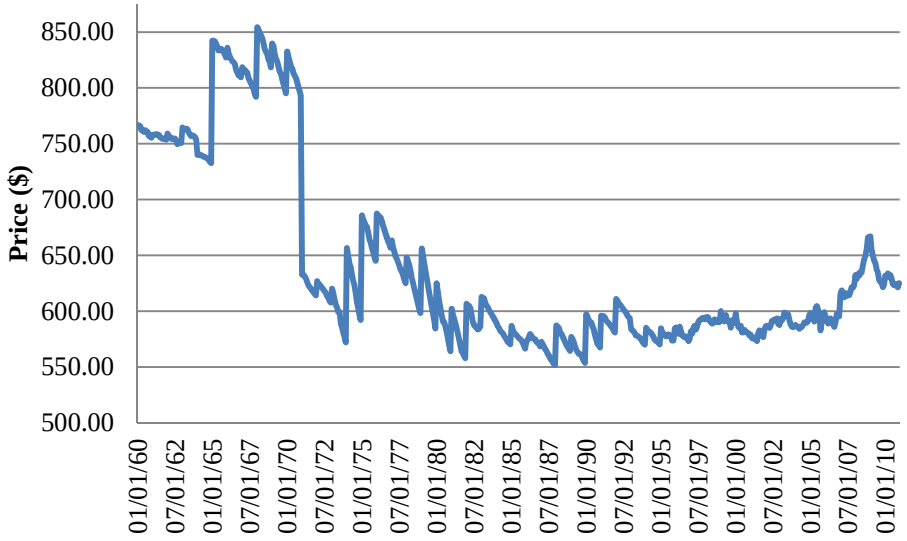
3.2 Dependent Variable Description

The cost of food is the variable of interest in the study because of the popularity in current debates around nutrition and the root cause of obesity. The variable is obtained from the USDA's published Thrifty Food Plan market basket. The data from the Thrifty Plan was chosen because compared to reported consumption it contains more vegetables (137 percent), milk products (125 percent), fruits (115 percent), and grains (16 percent); the same amount of meat and beans; and less other foods, such as fats, oils, and sweets. Having more vegetables, fruits, and milk products and less of other foods such as fats, oils, and sweets, in the Thrifty market basket are not surprising; because, the Thrifty plan represents a nutritious diet (Carlson, et al. 2007). The Healthy Eating Index, an indicator of overall quality of American's diet, shows that most people, particularly low-income Americans,

need to improve their diet (Basiotis, et al. 2002). Of the four market baskets the Thrifty Plan is designed to be the most nutritious for the smallest amount of money. Figure 3.1 depicts a graph of nominal Market Basket prices for a family of four from January 1960 to December 2013.

Past studies have compared similar factors that are examined in this thesis. Foods chosen for their nutrient levels were chosen and pricing in a small area of the country were examined over time (Monsivais, Mclain and Drewnowski 2010) . Direct government payments on the affordability of food using the ratio of dollar expenditures on food to disposable income have been used to determine if direct payments have an effect on food (Miller and Coble 2006). Lastly, studies have compared obesity rates to farm policy to attempt a linkage between farm subsidies and the relatively cheap and unhealthy foods readily available in the United States (Alston, Sumner and Vosti 2008). None of the past studies reviewed used the USDA Market Basket prices as a dependent variable.

Figure 3.1: Monthly Real Thrifty Market Basket Prices Family of 4 (1960-2013)

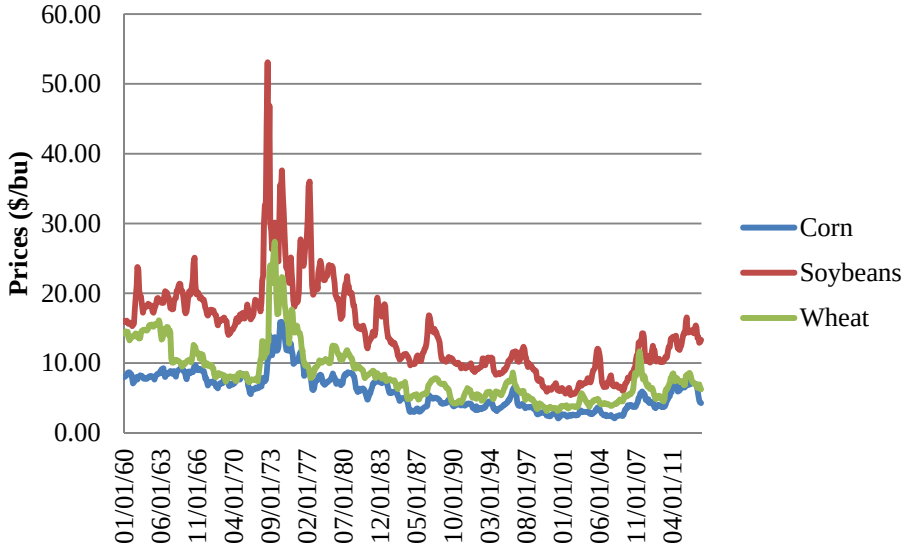


3.3 Independent Variable Descriptions

Factors affecting food price were identified as subsidized crop prices, transportation, technology, and marketing margin. This thesis will consider corn price, soybean price, and wheat price as prices of subsidized crops, fuel price as transportation, agricultural productivity index as technology, and price spreads and farm value shares for cereal grains and fruit as measures of marketing margin. The variables are discussed in turn below.

Commodity Prices - Average historical farm prices were obtained from the University of Illinois Farm Doc Website. The tool on the website provided historical average prices for corn, wheat, and soybeans paid to farmers. These three crops were chosen because according to the Environmental Working Group (EWG), these were the top three grain crops receiving subsidy payments from 1995 to 2012. The prices used in the model were adjusted for inflation, and the variables are expected to have positive effects on the cost of food as well. As the prices farmers are paid for the crops increases the prices consumers pay for the food will increase as well.

Figure 3.2: Real Historical Commodity Prices – Corn, Soybeans, Wheat (1960-2013)

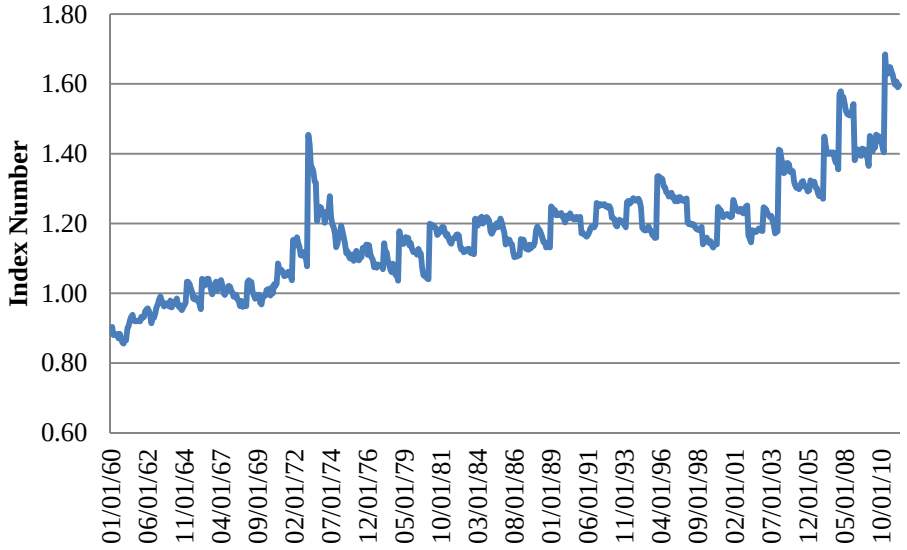


Fuel Prices - The model includes retail motor gasoline on highway fuel prices from 1960 provided by the United States Energy Information Administration. The increasing cost of fuel over the past few decades has impacted the cost of farm inputs, the cost of raw material inputs for food manufactures, and the cost of transporting finished goods to retail locations. As such, it is hypothesized fuel prices will have a positive impact on the cost of food. The data available included annual averages from 1960 to 1975 and monthly averages from 1976 to 2013; the Energy Information Administration did not report monthly fuel prices until 1976, only annual data was available. The fuel prices used in the model were adjusted for inflation using the Consumer Price Index. Figure 3.3 is a visual depiction of historical fuel prices. In 2001 there is a dramatic increase in fuel prices which continues throughout the decade.

Figure 3.3: Real Fuel Prices (1960-2012)

Agriculture total factor productivity – This variable is used as a measure of changes in technology since 1960. Higher productivity is expected to promote the affordability of food because it lowers production costs and equilibrium prices (Miller and Coble 2006). Thus, advances in technology have a negative impact on the cost of food as improvements should make food more affordable. According to the statistics, growth in farm sector output was due almost entirely to productivity growth over the past seventy years (United States Department of Agriculture 2013). The data for this variable was obtained from the Economic Research Service of the USDA. This variable was only available on an annual basis. Figure 3.4 gives a visual depiction of how technology has impacted the cost of finished foods over time.

Figure 3.4: Real Total Factor Productivity Index - Agriculture (1960-2011)



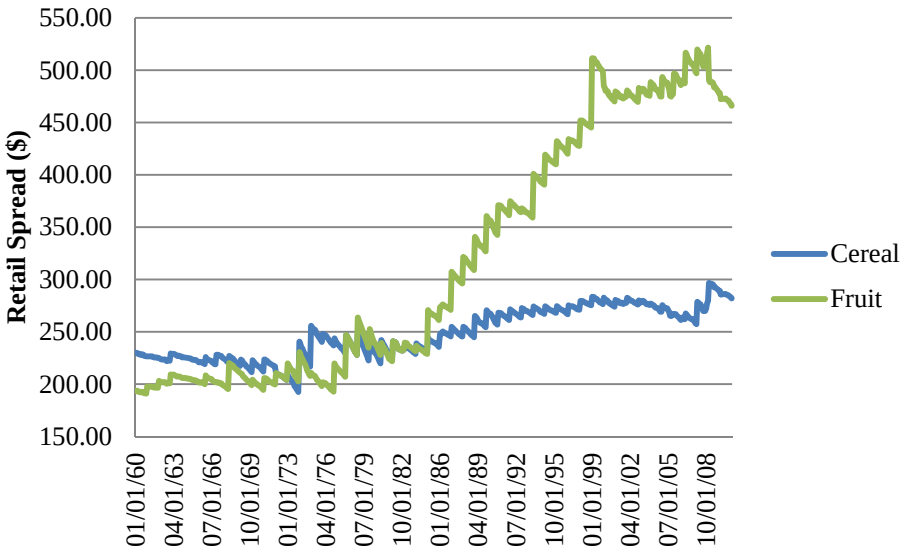
Agricultural total factor productivity was adjusted for inflation into 2013 terms using the monthly Producer Price Index (PPI) for finished consumer foods. PPI is used because it measures price changes over time paid to domestic producers for their output. It measures price change from the perspective of the seller. The PPI collects data for almost every industry in the goods-producing sector of the economy (United States Department of Agriculture, Food Price Outlook 2014). Data for the variable were obtained from the United States Department of Labor, Bureau of Labor Statistics.

Farm to Retail Price Spread - Price spread is the difference between the price received by producers and that paid by consumers. This model uses price spreads for selected food groups: cereals and fresh fruit. Price spread for vegetables was also considered but was too correlated with that of fresh fruit to jointly include in the analysis. Producer-to-consumer price spreads may increase or decrease over time with changes in the mix and prices of services required to transform raw agricultural commodities into consumer food products. Trends therefore reflect a variety of underlying economic conditions, including changes in the technology used to process and distribute food as well

as changes in the price of inputs, such as labor and energy (Economic Research Service 2012).

According to Tomek and Robinson (2003), there is a strong interest by farmers, policy-makers, and consumers in the connection between farm prices for commodities and the retail price for food. Since the technology regarding fruit handling and processing has not changed much relative to other food categories that are much more processed, like grains, it is hypothesized that this variable will be negative for fruit and positive for cereals. Both farm to retail spreads were adjusted for inflation using the Consumer Price Index. Figure 3.5, which illustrates annual price spread, shows that fruit spread has increased dramatically when compared to cereal grains spread over the same time period.

Figure 3.5: Real Farm to Retail Spreads – Fruit and Cereal Grains (1960-2010)



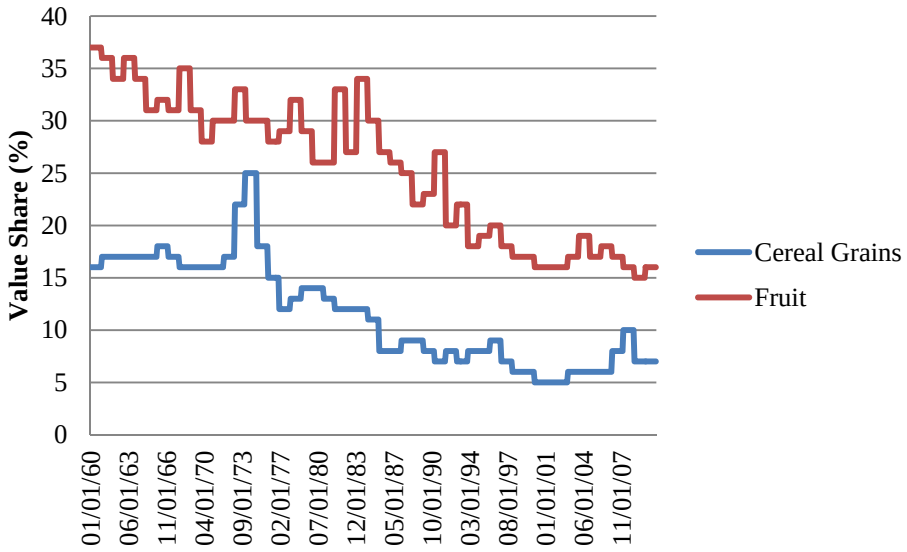
Farm Value Share – The model also includes farm value share which represents the percentage paid for the raw farm product relative to the total food price. The farm value share has mostly declined over time as rising farm productivity has held down farm prices, while rising food processing and transportation costs have raised retail prices. Thus, retail

prices have grown at a faster pace than farm prices. Increases in these marketing input costs that occur past the farm gate, such as labor, packaging, and transportation, have a greater effect on retail prices than do fluctuations in farm prices that producers receive for their raw farm products (University of Manitoba 1999). Figure 3.6 shows that farm value share has been decreasing over the past four decades while the price has increased over the same time period. The USDA has reported that the farm-to-retail price spread has increased at a greater annual rate than the farm value nearly every year for the past decade.

A negative coefficient on the fruit farm value variable is expected because the amount consumers are paying has increased even though the proportion of the consumer's dollar producers receive has decreased. Fruit production and marketing have also relatively stayed the same over the sample period. Fruit has a much shorter shelf life than cereal grains which can be held in storage for years and still processed for usage. This means that some efficiencies have been made in getting fruit from the farm to retail more quickly but growing, picking, and handling a piece of fruit have mostly remained the same.

Cereal grains on the other hand have had quite a bit of technology added to their processing. Flour mills are now built to run lights out, which means no one needs to even be in the building to run the mill. Flour can be milled from a wheat kernel now with very little human help. Corn processors can extract many different commodities from a kernel of corn and ethanol producers are another large piece of technological impact on the production of cereal grains. This leads to the conclusion that technological advances in the cereal grains handling and processing could result in a positive coefficient on the farm value share.

Figure 3.6: Farm Value Shares – Cereal Grains and Fruits (1960-2010)



3.4 Data Anomalies

The objective of this thesis is to utilize a regression model to determine whether average monthly prices of corn, wheat, and soybeans are statistically significant to the cost of food. The analysis will make quantitative estimates of economic relationships between the dependent variable of market basket prices and the independent variables of fuel, agricultural factor productivity, market value share, retail price spreads, and commodity prices. To do this effectively, we need to account for some anomalies in the data that are due to changes in how the variables were measured.

A dummy variable was used to account for the shifts that occurred when nutritional guidelines were updated in 2009. In addition, the data showed that a larger jump in price occurred every December to January versus the other month to month costs from 1971 to 2010. While there was no published explanation on why this seasonal regularity was observed, a second dummy variable was specified to help indicate the shift in prices that occurred every January. All of the data were adjusted for inflation using the Producer Price

Index and Consumer Price Index where appropriate. In sum, the following model will be used to determine the effects of the variables:

$$\text{Cost of Food}_t = f(RCORNP_t, RSOYP_t, RWHEATP_t, RFUEL_t, RAGPROD_t, RSPREAD\_C_t, RSPREAD\_F_t, FVS\_C_t, FVS\_F_t, , D09_t, DJAN_t)$$

where RCORNP, RSOYP, RWHEATP are the real prices paid for corn, soybeans, and wheat over the sample period, RFUEL is the real cost of fuel over the sample period, RAGPROD is the real technology in agriculture productivity factor over the sample period, RSPREAD_C and RSPREAD_F are the real farm to retail spread for cereal grains and fruit, FVS_C and FVS_F are the farm value share for cereal grains and fruit, D09 is the dummy variable for the new food guidelines that impacted the market basket cost in 2009, and DJAN is the dummy variable for the new year of market baskets over the sample period. Table 3.1 gives a description of each variable and the source of the data.

Table 3.1: Variable Definitions and Sources

Variable	Definition	Source	Information
Cost of Food	Market Basket Prices for Family of Four	http://www.cnpp.usda.gov/USDAFoodCost-Home.htm ; historical data provided by Mark Lino, Economist, USDA	1960-1970, monthly data for 3 plans, 1971-2013, monthly data for 4 plans
D09	Equals 1 for observations starting 2009; 0 otherwise		
DJAN	Equals 1 for January; 0 otherwise		
FVS_C	Farm Value Share for Cereal Grains	USDA Economic Research Service http://ers.usda.gov/data-products/price-spreads-from-farm-to-consumer.aspx#25657; historical data provided by Hayden Stewart, USDA, and Howard Elitzak, Economist , USDA	1960-2010, annual data
FVS_F	Farm Value Share for Fruit	USDA Economic Research Service http://ers.usda.gov/data-products/price-spreads-from-farm-to-consumer.aspx#25657; historical data provided by Hayden Stewart, USDA and Howard Elitzak, Economist , USDA	1960-2010, annual data
RAGPROD	Total Factor Productivity	http://www.ers.usda.gov/data-products/agricultural-productivity-in-the-us.aspx	1960-2011, annual data
RCORNP	Real Corn Price	Farmdoc University of Illinois http://www.farmdoc.illinois.edu	1960-2013, monthly data
RFUEL	Fuel Price	U.S. Department of Energy - http://www.eia.gov/beta/MER/index.cfm?tbl=T09.04#/?f=M&start=197301&end=201312&charted=10-11 ; https://www1.eere.energy.gov/vehiclesandfuels/facts/2012_fotw741.html	1960-1975, annual data, 1976-2013, monthly data
RSOYP	Real Soybean Price	Farmdoc University of Illinois http://www.farmdoc.illinois.edu	1960-1975, annual data
RSPREAD_C	Real Farm to Retail Spread for Cereal Grain	USDA Economic Research Service http://ers.usda.gov/data-products/price-spreads-from-farm-to-consumer.aspx#25657; historical data provided by Hayden Stewart, USDA and Howard Elitzak, Economist , USDA	1960-2010, annual data

Variable	Definition	Source	Information
RSPREAD_F	Real Farm to Retail Spread for Fruit	USDA Economic Research Service http://ers.usda.gov/data-products/price-spreads-from-farm-to-consumer.aspx#25657; historical data provided by Hayden Stewart, USDA and Howard Elitzak, Economist , USDA	1960-2010, annual data
RWHEATP	Real Wheat Price	Farmdoc University of Illinois http://www.farmdoc.illinois.edu	1960 – 1975, annual data

CHAPTER IV: EMPIRICAL RESULTS

4.1 Empirical Methods

Econometric methods were employed in the analyses of the data for this thesis. A regression analysis was performed to determine if there was a relationship between the cost of food in the Market Basket for a family of four and the price of corn, wheat, and soybeans. All econometric and statistical analyses were conducted using the analytical software Minitab release 16.

Initially, data from 1960 to 2013 was considered. As preliminary regressions were run, it became obvious that the three market basket structure versus four, which started in 1971, was too different and did not produce a model that was a good fit to the data. Variables that were relevant to the four basket structure were available and relevant versus the three basket structure. Before dropping the first decade's data a dummy variable was used to attempt to explain the difference in values. The dummy variable did not help the model and the decision was made to drop the first decade from the study. Table 4.1 shows the variable summary statistics of variables that were used in the regression.

To address the autocorrelation in errors suggested by the Durbin-Watson statistics value in the preliminary analysis, the lagged market basket variable was initially added as an explanatory variable. This helped a little, but most model variables lost their explanatory power and a great deal of auto correlation was still present. This led to using the Hildreth-Lu method to account for the auto correlation in the data. Using the Hildreth-Lu method greatly increased the R-squared value also, which meant a better fit of the data to the model.

Table 4.1: Variable Summary Statistics

Variable	Period	Unit	Adjustment	Mean	Std Dev	Minimum	Maximum	N
Cost of Food[1]	1971-2010	Dollars	Deflated[7]	599.78	28.01	551.78	687.39	479
RCORNP[2]	1971-2010	$/bushel	Deflated[7]	5.36	2.77	2.06	15.87	479
RSOYP[2]	1971-2010	$/bushel	Deflated[7]	13.68	7.16	5.40	53.08	479
RWHEATP[2]	1971-2010	$/bushel	Deflated[7]	7.52	4.01	3.12	27.38	479
RFUEL[3]	1971-2010	$/gallon	Deflated[7]	2.35	0.64	1.36	4.47	479
RAGPROD[4]	1971-2010	Price Index	Deflated[8]	1.22	0.11	1.04	1.58	479
RSPREAD_C[5]	1971-2010	Dollars	Deflated[7]	255.49	22.24	192.54	296.66	479
RSPREAD_F[5]	1971-2010	Dollars	Deflated[7]	350.48	112.47	192.82	521.57	479
FVS_C[6]	1971-2010	Percent		10.13	4.65	5.00	25.00	479
FVS_F[6]	1971-2010	Percent		23.28	6.00	15.00	34.00	479

[1]The monthly cost of a nutritious diet at the thrifty food plan level

[2]U.S. monthly average commodity prices received

[3]Average Annual Retail Price of Gasoline

[4]Price indices and implicit quantities of farm output and inputs for the United States

[5]The spread between the retail price and farm value represents charges for processing and marketing

[6]Farm value is based on prices farmers received for commodities within a market basket of food

[7]Deflated into 2013 Dollars using the Consumer Price Index

[8]Deflated into 2013 Dollars using the Producer Price Index for Consumer Goods

4.2 The Estimated Model

The following is the regression equation for the market basket for a family of four:

$$\text{Cost of Food}_t = 16.41 + 2.61\ \text{RCORNP}_t - 0.118\ \text{RSOYP}_t - 0.439\ \text{RWHEATP}_t + 4.59\ \text{RFUEL}_t - 1.46\ \text{RAGPROD}_t + 1.88\ \text{RSPREAD\_C}_t - 0.224\ \text{RSPREAD\_F}_t + 1.90\ \text{FVS\_C}_t - 0.115\ \text{FVS\_F}_t + 2.35\ \text{D09}_t - 31.38\ \text{DJAN}_t + e_t$$

Table 4.2 presents the full results of the regression analysis and can be analyzed for interpretation. Elasticities were computed at the 2013 sample averages.

Table 4.2: Regression Results

Variable	Coef	SE Coef	t-Stat	p-Value	Elasticity
Constant	16.412	2.388	6.870	0.000	N/A
RCORNP	2.603	0.922	2.820	0.005	0.017
RSOYP	-0.118	0.189	-0.630	0.532	-0.002
RWHEATP	-0.439	0.413	-1.060	0.288	-0.004
RFUEL	4.586	1.722	2.660	0.008	0.022
RAGPROD	-1.463	9.647	-0.150	0.879	-0.003
RSPREAD_C	1.882	0.084	22.310	0.000	0.855
RSPREAD_F	-0.224	0.030	-7.420	0.000	-0.168
FVS_C	1.902	0.536	3.550	0.000	0.021
FVS_F	-0.115	0.306	-0.370	0.708	-0.003
D09	2.349	0.761	3.090	0.002	N/A
DJAN	-31.383	5.673	-5.530	0.000	N/A
S	5.39102				
R-Square	66.0%				
Adj. R-Square	65.2%				
Number of Obs.	478				
Rho Value	0.9				

4.3 Interpretation of the Estimation Results

In general, the R squared value of 66% and the adjusted R squared value of 65.2% suggest we can conclude that the overall model is a good fit. The Hildreth-Lu method found the optimal rho value as 0.9 which corrected for auto correlation. Overall the model results did not prove the entire set of hypotheses correct, but it did not disprove all hypotheses either. The regression results show that the price of corn did in fact have a positive and statistically significant impact on the cost of food over the sample period. The model results overall add an interesting theory to the debates and conversations around Federal payments and commodity prices.

Corn, Soybean, and Wheat Prices – The prices paid for these three commodities were the variables of the most interest in the model. The hypothesis of subsidies having a statistically significant effect on the cost of food was being examined by the outcome of these three variables. Running the model demonstrated that only corn has had a positive and statistically significant impact on the cost of food. Both wheat and soybeans were negative and statistically insignificant. The wheat and soybeans results support the study conducted by Alston, Sumner, and Vosti (2008) which stated that U.S. farm programs have had negligible effects on prices paid by consumers for food. It also supported the study from Miller and Coble (2006) that found payments to farmers do not significantly influence the affordability of retail food products.

I believe the reason soybeans proved to be statistically insignificant is due to the fact that nearly all soybeans in the United States are crushed, a process that separates the soybean into two distinct products: soybean oil and soybean meal. The first product is primarily used for edible purposes while very little of the second product is used directly for humans. Since the oil is the primarily manufactured for edible purposes and is typically

used as an ingredient rather than a retail product that would be included in the market basket it had a negative coefficient. The human grade oil business is also very competitive, canola, corn, coconut and olive oil are all competing against each other which could be another reason for the statistically insignificant coefficient.

The reason for the statistically insignificant coefficient on wheat could be similar to soybeans in that wheat milling byproducts are sold to animal feed manufacturers at very small margins. Secondly, the raw commodity of flour is primarily bagged in small retail sized bags and sold as a consumer packaged good. The flour that is sold to companies to be used in their products is also an added ingredient, like soy oil, and would not be directly seen in the market basket.

The impact of corn price is interesting to examine, for every dollar that is added to the price of corn, the cost of food in the market basket increases by $2.60, holding everything else constant. Evaluated at the 2013averages, the impact in elasticity terms suggest that 1% increase in corn prices increases the cost of food by 0.017%, which is not very elastic. This outcome is interesting because, historically, farmers have been eligible to receive direct payments just for owning land with a production history. Direct payments have not been tied to production they have been linked to acres owned and historical yields. These payments encourage farmers to plant more than the market demands which should drive prices down; however as shown in Figure 4.1 corn prices have been trending upwards nominally. (The trend in real terms is depicted in Figure 3.2.)

Corn production has been increasing since 1975 as shown in Figure 4.2. Figure 4.3 depicts the dramatic increase of corn usage for biofuels since approximately 2004. Figure 4.3 also depicts a major difference corn has from both soybeans and wheat. The use of corn

is divided among animal feed, human food, and biofuel production, making it a much more dynamic commodity than soybeans or wheat. Not only are the byproducts of corn processing used for animal feed, the byproducts of ethanol production are also used in animal feed formulation. With all of these industries pulling from the same resource, it is obvious why both production and price have increased. Further, as long as corn farmers were being encouraged to try and yield more on less productive ground and receive direct payments for their efforts, the subsidies are also a factor. The newest Farm Bill, The Agriculture Act, has been written to help reign in these types of behaviors. Thus, it is unclear if this trend will continue. It is also unclear if the expiration of ethanol subsidies will have an impact corn's piece of the cost of food puzzle.

Figure 4.1: Nominal Corn Pricing (1960-2013)

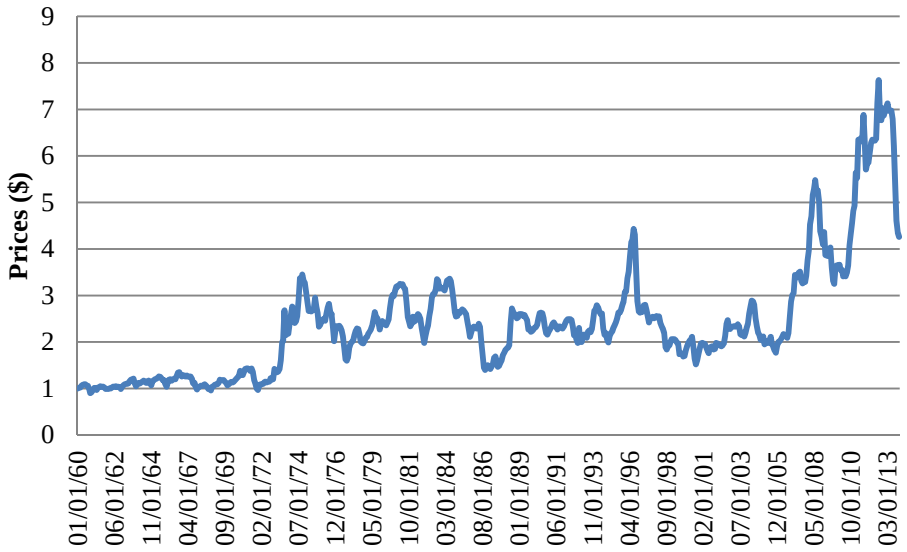


Figure 4.2: Historical Annual Corn Production (1975-2013)

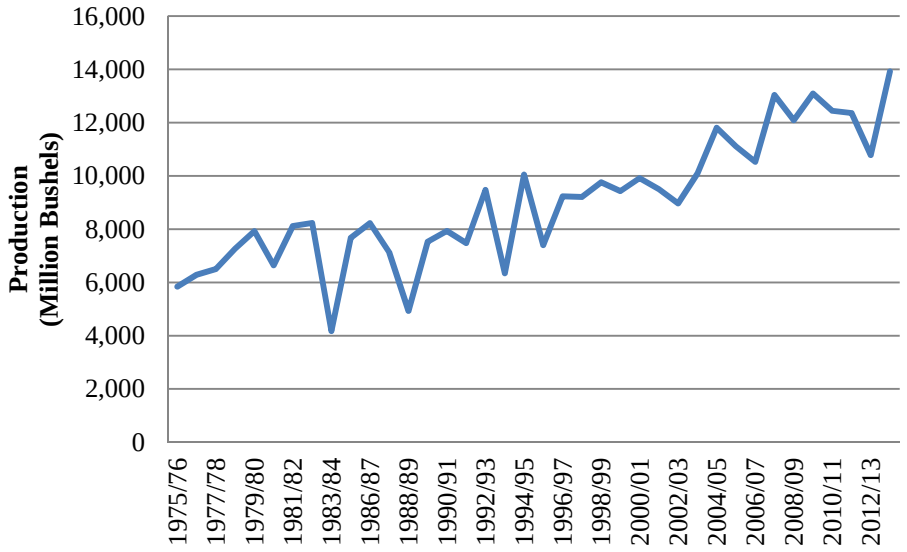
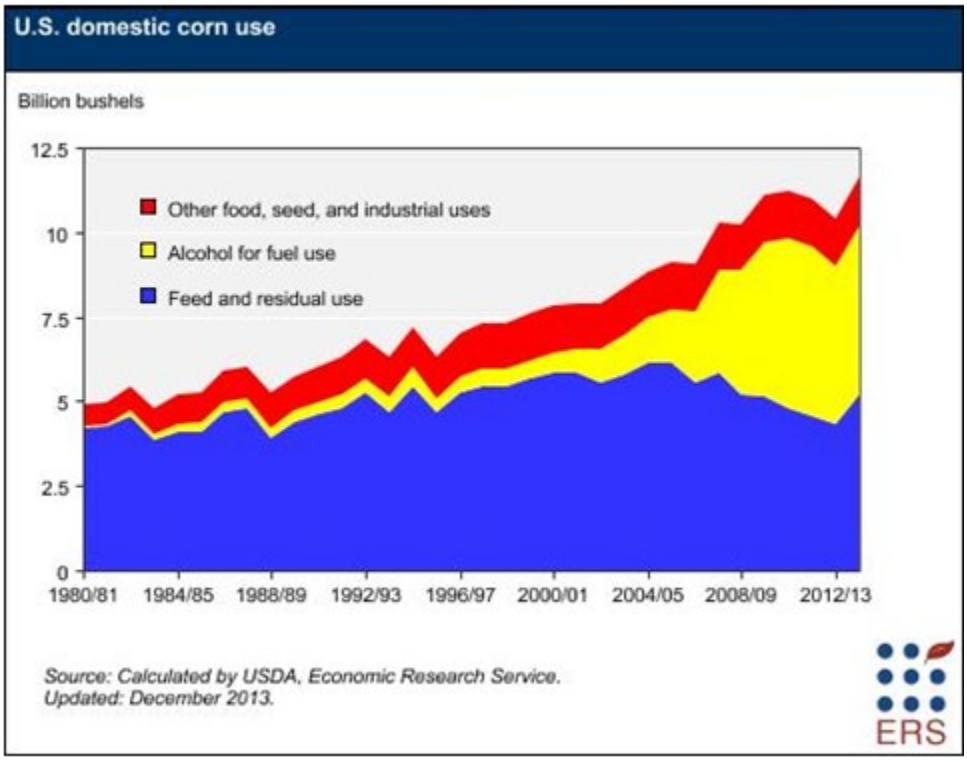


Figure 4.3: U.S. Domestic Corn Use



Fuel Price – The fuel price variable had a positive and statistically significant coefficient, as predicted. It seems reasonable to believe that as the cost of fuel increases the cost of food would increase as well. Transportation costs must be applied several times from production on the farm through the supply chain to a retail environment. The model shows that fuel price is positive and statistically significant at the 95% confidence interval. Further, fuel had the second largest elasticity measurement which was 0.022. Cost of food proved to be inelastic to the fuel price, where a 1% increase in fuel price will increase the food cost by 0.022%, holding everything else constant. Perhaps since humans have to eat to survive, it seems reasonable to conclude that the cost of fuel is absorbed through the supply chain so that we get our food from farm to fork.

Agricultural Productivity Index – The variable for the effect of technology on agriculture was statistically insignificant with a negative coefficient and a p-value of 0.879. The impact of agricultural technology was predicted to be negative because it was hypothesized that as technology increases, efficiencies increase and it should cost less to produce food. This is congruent with the Economic Research Service report that it is widely agreed that increased productivity is the main contributor to economic growth in U.S. agriculture. Technology and scientific advancements have positively contributed to record yields, drought resistant crops, and satellite technology advising watering patterns. The negative coefficient, albeit statistically insignificant, shows that the cost of food is being reduced by the advancements.

Farm to Retail Price Spread – The farm to retail price spread was predicted to be negative for fruit and positive for cereal grains. The model proved both of these hypotheses correct. Both variables were also statistically significant with low p-values. The coefficient

for the cereal grain variable was 1.882 with a t-stat of 22.310 and a p-value of 0.000. The positive sign on this coefficient demonstrates that price spread influences the cost of food across the market baskets in the sample period of time. This could be due to the increased amount of technology that is applied to the production of cereal grains and their processing. Also of note is the price spread for cereal grains is estimated with the largest elasticity, 0.855. This was the closest elasticity measurement to one but was still measured as inelastic. This means that a 1% increase in the price spread between cereal grain farmers and the price paid by consumers leads to a 0.855% increase in the cost of food, holding everything else constant. This demonstrates how the cost of processing is added to the retail product for consumers to pay.

In contrast, the impact of fruit price spread was small and negative. The coefficient of -0.224 means that for every one dollar increase in farm to retail price spread the market basket price decreases by $0.224. In elasticity terms, a 1% increase in fruit price spread decreases the market basket price by 0.17% .

Farm Value Share – The farm value share was predicted to be negative for fruit and positive for cereal grains. Both of these variables came out as expected. The fruit variable was statistically insignificant (p-value = 0.708) while the cereal variable was statistically significant. The statistically insignificant coefficient on the farm value share for fruit suggests that food basket prices were not correlated in any meaningful way with the share of retail value received by fruit farmers during the sample time period.

The cereal grain variable had a much larger positive coefficient of 1.902, a large t-stat of 3.55 and a p-level of 0.000. This means that cereal grains are statistically significant. Farm value share is expected to have a larger and positive coefficient because cereal grain

prices are subsidized by the government. It is expected when crops are subsidized the farm value share will be larger than food that is not being subsidized by direct payments. This variable also lends itself to the disparity cereal grains and fruits and vegetables. Cereal grains being available for multiple uses such as, animal food, human food, and biofuel advancement is a much more diverse and profitable horizon then apples and broccoli. Food cost was inelastic to the farm value share for cereal grains with the elasticity of 0.021. The inelasticity is again not surprising because people have to eat and the amount of retail cost that is going to farmers is typically unknown so it would be expected to have a small elasticity.

Dummy Variables - The model used two dummy variables which were both statistically significant. The first dummy variable was used to help indicate the shift in data that occurred in 2009 when the new food pyramid and nutrition guidelines were published. Interestingly, the model showed that the change in nutrition guidelines increased the cost of the market basket by $2.35 all other factors held constant. The second dummy variable was used to help indicate the shift in prices that occurred every January when a new year signaled a larger increase in prices than what was published on a monthly basis each previous year.

CHAPTER V: CONCLUSION

As the effects of subsidies will continue to be debated and the omnibus farm bills will continue to be written every five years, the true impact of direct payments on the cost of food will also continue to be examined. Obesity is a growing concern among health care professionals and the cause of many chronic diseases. Food insecurity is an obstacle that threatens 15.9 million children in the United States every day (America 2014). When people in the community do not have enough food to get through a day, it costs us all. Children may struggle to learn and workers may be less productive. What do all of these growing social issues have in common—food.

This thesis shines a light on a possible cause of increased food costs, soaring corn prices, as well as other variables that are also statistically and economically significant to the cost of food. The model showed that fuel, farm to retail price spread for cereal grains and fruit, and farm value share of cereal grains were all statistically significant. None of the variables were elastic but the cost of food was the most elastic with respect to changes in the price spread of cereal grains.

The study used the Thrifty Plan market basket prices to measure the cost of food. The limitation of using the market basket data include the fact that many people do not take the dietary recommendations from the government and plan their grocery shopping trips. They purchase based on likes and dislikes, easy and quick preparation methods, price, packaging, and number of calories. Many people have their own budget that they shop with and use individual criteria in buying food rather than purchasing according to what the market basket suggests they buy. Another limitation of the study was the fact that marketing margins for dairy products and meat products, which are included in the market

basket, were not included in the model. Since the model did not explain thirty four percent of the cost of food, it can be concluded that some of that thirty four percent could have been explained if dairy products and meat products were included in the data set. These variables were left out because of the separate subsidies that cover milk and influence the dairy industry, and likely multicollinearity that would have occurred by including protein sources that feed off of the grain commodities being studied, specifically corn, ethanol by-products, and soybean meal.

The sample period analyzed in this thesis ends in 2010. Thus, it falls short of addressing recent events. Ethanol subsidies were phased out after 2010 and a new farm bill was signed in 2014. Both of these events could lead to a different conclusion if included in a similar study.

Based on the findings of my study, I conclude that corn will be the pivotal subsidized crop moving forward. As prices continue to rise, production will expand to meet the prices and eventually the seeming corn bubble will burst. It may not be any time soon but eventually as auto makers continue to research sources of cheap and environmentally friendly fuel sources and the market adjusts, the interest in corn may decrease. I do think that direct payments to farmers have had an influence on the cost of food including some unintended consequences, but perhaps some of the effects will be reversed with the Agriculture Act of 2014.

Regardless, United States citizens are beginning to see the value in smart and informed food and agriculture policy decisions. The Farm Bill sets the rules of the game, influencing not only what we eat, but who grows it, under what conditions, and how much it costs. While conducting the research for this thesis, it became clear to me that support for

the agricultural sector should be decoupled from nutrition guidelines for food stamps. The connection between the two is natural, but trying to design legislation that addresses public assistance and supporting farmers is cumbersome and difficult. Instead of reviewing this omnibus legislation every five to seven years, it seems that it would be prudent to decouple the issues into two categories and review each separately more frequently, like every four years. This would allow for better planning and discussion around each issue.

REFERENCES

Alston, Julian M., Daniel A. Sumner, and Stephen A. Vosti. *Farm subsidies and obesity in the United States: National evidence and international comparisons.* Article, Davis: University of California-Davis, 2008.

Basiotis, P. Peter, Andrea Carlson, S. A. Gerrior, WenYen Juan, and Mark Lino. *The Healthy Eating Index: 1999-2000.* CNPP-12, United States Department of Agriculutre, Center for Nutrition Policy and Promotion, 2002.

Carlson, Andrea, Mark Lino, WenYen Juan, Kenneth Hanson, and P. Peter Basiotis. *Thrifty Food Plan, 2006.* Center for Nutrition Policy and Promotion, U.S. Department of Agriculture, 2007.

—. *Cost of Food at Home.* n.d. http://www.cnpp.usda.gov/USDAFoodCost-Home.htm (accessed January 23, 2014).

Environmental Working Group. *EWG Farm Subsidies.* 2012. http://farm.ewg.org/region.php?fips=00000 (accessed January 25, 2014).

—. *EWG Farm Subsidies.* 2007-2012. http://farm.ewg.org/progdetail.php?fips=00000&progcode=total_dp&regionname=theUnitedStates (accessed March 2012).

Feeding America. *Child Hunger Facts.* 2014. http://feedingamerica.org/how-we-fight-hunger/advocacy-public-policy.aspx (accessed March 5, 2014).

—. *Food Price Outlook.* January 24, 2014. http://www.ers.usda.gov/data-products/food-price-outlook.aspx (accessed January 26, 2014).

Harris, Wes, Brad Lubben, James Novak, and Larry Sanders. "The Food, Conservation, and Energy Act of 2008 Summary and Possible Consequences." *Extension National Farm Bill Train the Trainer.* Kansas City, 2008. 49.

Illinois, University of. *Farmdoc Webinars.* n.d. http://www.farmdoc.illinois.edu/manage/index.asp (accessed February 23, 2014).

Imhoff, Daniel. *Food Fight.* Second. Healdsburg, California: Watershed Media, 2012.

Investopedia. *Consumer Price Index.* n.d. http://www.investopedia.com/terms/c/consumerpriceindex.asp (accessed January 2014).

Johnson, Andrea. "Seventy Nine Percent of 2014 farm bill goes to nutrition assistance." *Sioux City Journal.* February 18, 2014. http://siouxcityjournal.com/lee-wire/seventy-nine-percent-of-farm-bill-goes-to-nutrition-

assistance/article_a83d99a8-a485-59db-b25b-e25fda6a0b4f.html (accessed February 22, 2014).

Miller, J. Corey, and Keith H Coble. *Cheap Food Policy: Fact or Rhetoric?* Thesis, Science Direct, 2006.

Mittal, Anuradha. "Food First." *Food First.* July 8, 2002. http://www.foodfirst.org/node/52 (accessed February 12, 2013).

Monsivais, Pablo, Julia Mclain, and Adam Drewnowski. *The rising disparity in the price of healthful foods: 2004-2008.* Article, Seattle: University of Washington, 2010.

Nestle, Marion. *Food Politics.* University of California Press, 2002.

Office of Energy Efficiency & Renewable Energy. *Vehicle Technologies Office.* n.d. http://energy.gov/eere/vehicles/vehicle-technologies-office (accessed February 23, 2014).

Pollan, Michael. "The Way We Live Now: The (Agri)Cultural Contradictions of Obesity." *The New York Times Magazine*, October 12, 2003.

Senate Agriculture, Nutrition, and Forestry Committee. "Farm Bill: Investments for the Future." 2008.

Tomek, William G., and Kenneth L. Robinson. *Agricultural Product Prices.* Vol. Fourth Edition. Ithaca, New York: Cornell University Press, 2003.

United States Department of Agriculture. *Agriculture Productivity in the U.S.* n.d. http://www.ers.usda.gov/data-products/agricultural-productivity-in-the-us.aspx (accessed January 23, 2014).

United States Department of Agriculture, Economic Research Service. *Agricultural Productivity.* December 6, 2013. http://www.ers.usda.gov/topics/farm-economy/agricultural-productivity.aspx (accessed January 21, 2014).

United States Department of Agriculture, Economic Research Service. *Price Spreads from Farm to Consumer.* November 2013. http://ers.usda.gov/data-products/price-spreads-from-farm-to-consumer.aspx#25657 (accessed February 23, 2014).

United States Department of Agriculture, Economic Research Service. *Price Spreads from Farm to Consumer.* July 5, 2012. http://www.ers.usda.gov/data-products/price-spreads-from-farm-to-consumer/summary-findings.aspx (accessed February 23, 2014).

United States Department of Agriculture. *Food Plans: Cost of Food.* December 18, 2013. http://www.cnpp.usda.gov/USDAFoodPlansCostofFood.htm (accessed January 25, 2014).

United States Department of Energy. *Total Energy*. n.d. http://www.eia.gov/beta/MER/index.cfm?tbl=T09.04#/?f=M&start=197301&end=201312&charted=10-11 (accessed February 23, 2014).

United States Department of Labor, Bureau of Labor Statistics. *Producer Price Index.* February 19, 2014. http://www.bls.gov/news.release/ppi.toc.htm (accessed February 23, 2014).

University of Manitoba. *Declining farm value share of the food dollar.* 1999. http://www.umanitoba.ca/afs/agric_economics/ardi/farm_value.html (accessed February 2014).

APPENDIX: DATA

Date	PPI	CPI	Corn Prices	Soybean Prices	Wheat Prices	Fuel Prices	Ag Tech	Family 4
01/01/71	43.40	39.90	1.42	2.86	1.40	0.36	0.23	107.6
02/01/71	44.00	39.90	1.43	2.92	1.41	0.36	0.23	107.6
03/01/71	44.20	40.00	1.43	2.91	1.39	0.36	0.23	107.6
04/01/71	44.20	40.10	1.41	2.80	1.40	0.36	0.23	107.6
05/01/71	44.60	40.30	1.38	2.85	1.43	0.36	0.23	107.6
06/01/71	44.90	40.50	1.43	2.98	1.46	0.36	0.23	107.6
07/01/71	44.60	40.60	1.36	3.18	1.34	0.36	0.23	107.6
08/01/71	44.80	40.70	1.19	3.09	1.28	0.36	0.23	107.6
09/01/71	44.40	40.80	1.11	2.95	1.26	0.36	0.23	107.6
10/01/71	44.40	40.90	1.00	2.96	1.30	0.36	0.23	107.6
11/01/71	44.70	41.00	0.97	2.84	1.31	0.36	0.23	107.6
12/01/71	45.40	41.10	1.08	2.93	1.34	0.36	0.23	107.6
01/01/72	45.80	41.20	1.09	2.92	1.33	0.36	0.26	110.1
02/01/72	46.50	41.40	1.09	3.00	1.34	0.36	0.26	110.1
03/01/72	46.10	41.40	1.10	3.20	1.34	0.36	0.26	110.1
04/01/72	45.50	41.50	1.13	3.37	1.36	0.36	0.26	110.1
05/01/72	46.10	41.60	1.15	3.35	1.38	0.36	0.26	110.1
06/01/72	46.60	41.70	1.13	3.32	1.33	0.36	0.26	110.1
07/01/72	47.60	41.80	1.14	3.34	1.32	0.36	0.26	110.1
08/01/72	47.50	41.90	1.15	3.36	1.51	0.36	0.26	110.1
09/01/72	47.70	42.10	1.22	3.26	1.73	0.36	0.26	110.1
10/01/72	47.20	42.20	1.19	3.13	1.89	0.36	0.26	110.1
11/01/72	47.90	42.40	1.20	3.38	1.97	0.36	0.26	110.1
12/01/72	49.00	42.50	1.42	3.95	2.38	0.36	0.26	110.1
01/01/73	50.80	42.70	1.39	4.11	2.38	0.36	0.36	112.9
02/01/73	51.70	43.00	1.35	5.49	1.97	0.36	0.36	112.9
03/01/73	54.10	43.40	1.37	6.04	2.06	0.36	0.36	112.9
04/01/73	54.30	43.70	1.42	6.14	2.15	0.36	0.36	112.9
05/01/73	54.70	43.90	1.61	8.27	2.15	0.36	0.36	112.9
06/01/73	55.90	44.20	1.99	10.00	2.43	0.36	0.36	112.9
07/01/73	56.10	44.20	2.03	6.69	2.47	0.36	0.36	112.9
08/01/73	61.20	45.00	2.68	8.99	4.45	0.36	0.36	112.9
09/01/73	60.20	45.20	2.15	5.81	4.62	0.36	0.36	112.9
10/01/73	59.20	45.60	2.17	5.63	4.22	0.36	0.36	112.9
11/01/73	59.30	45.90	2.18	5.14	4.20	0.36	0.36	112.9
12/01/73	60.10	46.30	2.39	5.65	4.78	0.36	0.36	112.9
01/01/74	62.80	46.80	2.59	5.87	5.29	0.39	0.38	131.0
02/01/74	64.40	47.30	2.76	6.07	5.52	0.39	0.38	131.0
03/01/74	63.50	47.80	2.68	5.96	4.96	0.39	0.38	131.0
04/01/74	62.90	48.10	2.41	5.15	3.98	0.39	0.38	131.0
05/01/74	62.60	48.60	2.45	5.21	3.52	0.39	0.38	131.0
06/01/74	60.60	49.00	2.57	5.13	3.57	0.39	0.38	131.0
07/01/74	63.50	49.30	2.91	6.11	4.04	0.39	0.38	131.0
08/01/74	64.70	49.90	3.37	7.55	4.24	0.39	0.38	131.0

Date	PPI	CPI	Corn Prices	Soybean Prices	Wheat Prices	Fuel Prices	Ag Tech	Family 4
09/01/74	65.10	50.60	3.30	7.32	4.32	0.39	0.38	131.0
10/01/74	66.10	51.00	3.45	8.17	4.85	0.39	0.38	131.0
11/01/74	68.40	51.50	3.32	7.44	4.87	0.39	0.38	131.0
12/01/74	67.80	51.90	3.27	7.03	4.65	0.39	0.38	131.0
01/01/75	68.30	52.30	3.07	6.30	4.11	0.53	0.39	152.9
02/01/75	67.70	52.60	2.86	5.72	3.95	0.53	0.39	152.9
03/01/75	66.60	52.80	2.67	5.31	3.65	0.53	0.39	152.9
04/01/75	67.50	53.00	2.68	5.60	3.69	0.53	0.39	152.9
05/01/75	68.50	53.10	2.66	5.00	3.47	0.53	0.39	152.9
06/01/75	69.60	53.50	2.68	4.90	2.92	0.53	0.39	152.9
07/01/75	71.30	54.00	2.72	5.28	3.33	0.53	0.39	152.9
08/01/75	71.00	54.20	2.95	5.80	3.89	0.53	0.39	152.9
09/01/75	71.90	54.60	2.76	5.32	4.11	0.53	0.39	152.9
10/01/75	72.30	54.90	2.62	4.92	4.02	0.53	0.39	152.9
11/01/75	71.60	55.30	2.33	4.45	3.58	0.53	0.39	152.9
12/01/75	71.60	55.60	2.37	4.28	3.41	0.53	0.39	152.9
01/01/76	70.90	55.80	2.44	4.46	3.43	0.61	0.38	163.5
02/01/76	69.70	55.90	2.48	4.50	3.66	0.60	0.38	163.5
03/01/76	69.10	56.00	2.50	4.46	3.65	0.59	0.38	163.5
04/01/76	70.50	56.10	2.46	4.52	3.50	0.59	0.38	163.5
05/01/76	70.80	56.40	2.61	4.87	3.43	0.60	0.38	163.5
06/01/76	70.10	56.70	2.74	6.16	3.46	0.62	0.38	163.5
07/01/76	70.20	57.00	2.82	6.73	3.33	0.62	0.38	163.5
08/01/76	68.60	57.30	2.64	6.07	2.97	0.63	0.38	163.5
09/01/76	68.80	57.60	2.60	6.65	2.88	0.63	0.38	163.5
10/01/76	68.50	57.90	2.33	5.90	2.59	0.63	0.38	163.5
11/01/76	68.00	58.10	2.02	6.11	2.46	0.63	0.38	163.5
12/01/76	69.80	58.40	2.24	6.56	2.39	0.63	0.38	163.5
01/01/77	70.10	58.70	2.34	6.81	2.43	0.63	0.39	166.0
02/01/77	71.60	59.30	2.34	7.06	2.47	0.64	0.39	166.0
03/01/77	72.30	59.60	2.35	7.83	2.43	0.64	0.39	166.0
04/01/77	72.80	60.00	2.31	9.05	2.37	0.65	0.39	166.0
05/01/77	74.20	60.20	2.25	9.24	2.19	0.66	0.39	166.0
06/01/77	73.60	60.50	2.12	8.13	2.03	0.67	0.39	166.0
07/01/77	74.30	60.80	1.88	6.52	2.04	0.67	0.39	166.0
08/01/77	73.70	61.10	1.63	5.48	2.13	0.67	0.39	166.0
09/01/77	73.80	61.30	1.60	5.17	2.16	0.67	0.39	166.0
10/01/77	73.80	61.60	1.67	5.28	2.30	0.67	0.39	166.0
11/01/77	73.90	62.00	1.88	5.61	2.46	0.66	0.39	166.0
12/01/77	74.60	62.30	1.97	5.68	2.47	0.67	0.39	166.0
01/01/78	75.50	62.70	2.00	5.75	2.53	0.65	0.42	173.2
02/01/78	77.30	63.00	2.03	5.53	2.59	0.65	0.42	173.2
03/01/78	77.30	63.40	2.15	6.20	2.67	0.65	0.42	173.2
04/01/78	79.10	63.90	2.24	6.49	2.82	0.65	0.42	173.2
05/01/78	79.90	64.50	2.29	6.77	2.82	0.66	0.42	173.2
06/01/78	80.90	65.00	2.28	6.69	2.81	0.66	0.42	173.2

Date	PPI	CPI	Corn Prices	Soybean Prices	Wheat Prices	Fuel Prices	Ag Tech	Family 4
07/01/78	81.40	65.50	2.16	6.40	2.81	0.67	0.42	173.2
08/01/78	79.60	65.90	2.01	6.21	2.88	0.68	0.42	173.2
09/01/78	80.90	66.50	1.98	6.20	2.92	0.69	0.42	173.2
10/01/78	82.00	67.10	1.97	6.26	2.99	0.69	0.42	173.2
11/01/78	81.80	67.50	2.02	6.41	3.04	0.70	0.42	173.2
12/01/78	83.30	67.90	2.09	6.49	3.01	0.71	0.42	173.2
01/01/79	85.00	68.50	2.11	6.58	2.99	0.72	0.49	191.6
02/01/79	86.90	69.20	2.18	6.99	2.99	0.73	0.49	191.6
03/01/79	87.20	69.90	2.22	7.16	2.97	0.76	0.49	191.6
04/01/79	87.70	70.60	2.27	7.06	3.01	0.80	0.49	191.6
05/01/79	87.30	71.40	2.35	7.06	3.20	0.84	0.49	191.6
06/01/79	86.20	72.20	2.49	7.36	3.72	0.90	0.49	191.6
07/01/79	86.70	73.00	2.64	7.36	3.89	0.95	0.49	191.6
08/01/79	86.40	73.70	2.54	7.07	3.74	0.99	0.49	191.6
09/01/79	88.00	74.40	2.51	6.81	3.87	1.02	0.49	191.6
10/01/79	87.50	75.20	2.41	6.35	3.98	1.03	0.49	191.6
11/01/79	88.80	76.00	2.27	6.30	3.94	1.04	0.49	191.6
12/01/79	89.50	76.90	2.38	6.27	3.81	1.07	0.49	191.6
01/01/80	89.40	78.00	2.45	6.39	3.74	1.13	0.49	207.8
02/01/80	89.50	79.00	2.39	6.20	3.78	1.21	0.49	207.8
03/01/80	90.10	80.10	2.40	5.94	3.64	1.25	0.49	207.8
04/01/80	88.80	80.90	2.36	5.63	3.58	1.26	0.49	207.8
05/01/80	89.50	81.70	2.42	5.76	3.69	1.27	0.49	207.8
06/01/80	89.90	82.50	2.49	5.91	3.69	1.27	0.49	207.8
07/01/80	93.20	82.60	2.73	6.75	3.81	1.27	0.49	207.8
08/01/80	95.10	83.20	2.92	7.18	3.94	1.27	0.49	207.8
09/01/80	95.40	83.90	3.01	7.59	3.99	1.26	0.49	207.8
10/01/80	95.60	84.70	2.99	7.68	4.19	1.25	0.49	207.8
11/01/80	96.00	85.60	3.10	8.18	4.32	1.25	0.49	207.8
12/01/80	96.20	86.40	3.19	7.80	4.22	1.26	0.49	207.8
01/01/81	96.80	87.20	3.19	7.80	4.21	1.30	0.57	223.8
02/01/81	96.90	88.00	3.22	7.50	4.17	1.38	0.57	223.8
03/01/81	97.40	88.60	3.25	7.59	4.09	1.42	0.57	223.8
04/01/81	97.20	89.10	3.24	7.60	4.07	1.41	0.57	223.8
05/01/81	97.50	89.70	3.24	7.40	3.95	1.40	0.57	223.8
06/01/81	97.90	90.50	3.17	7.05	3.70	1.39	0.57	223.8
07/01/81	99.40	91.50	3.14	7.13	3.62	1.38	0.57	223.8
08/01/81	98.90	92.20	2.87	6.71	3.62	1.38	0.57	223.8
09/01/81	98.80	93.10	2.55	6.21	3.65	1.38	0.57	223.8
10/01/81	98.00	93.40	2.45	6.06	3.77	1.37	0.57	223.8
11/01/81	97.50	93.80	2.34	6.04	3.85	1.37	0.57	223.8
12/01/81	97.60	94.10	2.39	6.00	3.80	1.37	0.57	223.8
01/01/82	98.90	94.40	2.54	6.13	3.78	1.36	0.57	244.1
02/01/82	99.60	94.70	2.44	6.04	3.70	1.33	0.57	244.1
03/01/82	99.20	94.70	2.46	5.99	3.67	1.28	0.57	244.1
04/01/82	100.30	95.00	2.55	6.17	3.68	1.23	0.57	244.1

Date	PPI	CPI	Corn Prices	Soybean Prices	Wheat Prices	Fuel Prices	Ag Tech	Family 4
05/01/82	101.20	95.90	2.60	6.27	3.64	1.24	0.57	244.1
06/01/82	101.60	97.00	2.57	6.12	3.39	1.31	0.57	244.1
07/01/82	100.50	97.50	2.50	5.99	3.26	1.33	0.57	244.1
08/01/82	100.20	97.70	2.30	5.59	3.34	1.32	0.57	244.1
09/01/82	100.20	97.70	2.15	5.22	3.38	1.31	0.57	244.1
10/01/82	99.40	98.10	1.98	5.06	3.43	1.30	0.57	244.1
11/01/82	99.30	98.00	2.13	5.34	3.48	1.28	0.57	244.1
12/01/82	99.60	97.70	2.26	5.46	3.51	1.26	0.57	244.1
01/01/83	99.70	97.90	2.36	5.56	3.57	1.23	0.56	255.7
02/01/83	100.70	98.00	2.56	5.66	3.57	1.19	0.56	255.7
03/01/83	100.70	98.10	2.71	5.82	3.66	1.15	0.56	255.7
04/01/83	101.40	98.80	2.95	6.09	3.75	1.22	0.56	255.7
05/01/83	101.30	99.20	3.03	6.06	3.73	1.26	0.56	255.7
06/01/83	100.70	99.40	3.04	5.90	3.50	1.28	0.56	255.7
07/01/83	100.60	99.80	3.13	6.27	3.34	1.29	0.56	255.7
08/01/83	100.60	100.10	3.35	7.57	3.61	1.29	0.56	255.7
09/01/83	101.50	100.40	3.32	8.28	3.65	1.27	0.56	255.7
10/01/83	101.70	100.80	3.15	7.96	3.60	1.26	0.56	255.7
11/01/83	101.00	101.10	3.17	7.81	3.54	1.24	0.56	255.7
12/01/83	101.90	101.40	3.15	7.75	3.48	1.23	0.56	255.7
01/01/84	105.00	102.10	3.15	7.85	3.50	1.22	0.63	256.5
02/01/84	106.00	102.60	3.11	7.28	3.40	1.21	0.63	256.5
03/01/84	106.70	102.90	3.21	7.68	3.49	1.21	0.63	256.5
04/01/84	105.80	103.30	3.32	7.83	3.63	1.23	0.63	256.5
05/01/84	104.80	103.50	3.34	8.12	3.66	1.24	0.63	256.5
06/01/84	104.50	103.70	3.36	7.99	3.46	1.23	0.63	256.5
07/01/84	106.20	104.10	3.30	6.95	3.29	1.21	0.63	256.5
08/01/84	105.70	104.40	3.12	6.50	3.43	1.20	0.63	256.5
09/01/84	105.30	104.70	2.90	6.09	3.43	1.20	0.63	256.5
10/01/84	104.60	105.10	2.65	6.07	3.43	1.21	0.63	256.5
11/01/84	104.90	105.30	2.55	6.01	3.45	1.21	0.63	256.5
12/01/84	105.50	105.50	2.56	5.82	3.38	1.19	0.63	256.5
01/01/85	105.60	105.70	2.64	5.91	3.38	1.15	0.61	264.4
02/01/85	106.30	106.30	2.62	5.77	3.38	1.13	0.61	264.4
03/01/85	105.60	106.80	2.67	5.88	3.38	1.16	0.61	264.4
04/01/85	105.00	107.00	2.70	5.88	3.43	1.21	0.61	264.4
05/01/85	104.00	107.20	2.68	5.70	3.30	1.23	0.61	264.4
06/01/85	103.60	107.50	2.64	5.62	3.09	1.24	0.61	264.4
07/01/85	104.60	107.70	2.60	5.42	2.93	1.24	0.61	264.4
08/01/85	103.70	107.90	2.44	5.10	2.89	1.23	0.61	264.4
09/01/85	102.50	108.10	2.29	4.99	3.01	1.22	0.61	264.4
10/01/85	103.40	108.50	2.11	4.85	3.10	1.20	0.61	264.4
11/01/85	104.80	109.00	2.21	4.92	3.22	1.21	0.61	264.4
12/01/85	106.10	109.50	2.29	5.01	3.25	1.21	0.61	264.4
01/01/86	106.10	109.90	2.33	5.16	3.19	1.19	0.59	268.5
02/01/86	104.90	109.70	2.32	5.18	3.16	1.12	0.59	268.5

Date	PPI	CPI	Corn Prices	Soybean Prices	Wheat Prices	Fuel Prices	Ag Tech	Family 4
03/01/86	104.80	109.10	2.29	5.23	3.28	0.98	0.59	268.5
04/01/86	104.90	108.70	2.30	5.23	3.37	0.89	0.59	268.5
05/01/86	106.00	109.00	2.39	5.25	3.01	0.92	0.59	268.5
06/01/86	106.10	109.40	2.32	5.19	2.47	0.96	0.59	268.5
07/01/86	108.20	109.50	2.00	5.11	2.25	0.89	0.59	268.5
08/01/86	109.60	109.60	1.73	4.99	2.26	0.84	0.59	268.5
09/01/86	109.10	110.00	1.45	4.85	2.28	0.86	0.59	268.5
10/01/86	109.40	110.20	1.40	4.55	2.30	0.83	0.59	268.5
11/01/86	109.20	110.40	1.47	4.64	2.43	0.82	0.59	268.5
12/01/86	109.10	110.80	1.50	4.67	2.49	0.82	0.59	268.5
01/01/87	108.00	111.40	1.48	4.70	2.53	0.86	0.61	271.9
02/01/87	108.30	111.80	1.42	4.69	2.58	0.91	0.61	271.9
03/01/87	108.10	112.20	1.47	4.73	2.57	0.91	0.61	271.9
04/01/87	109.20	112.70	1.52	4.90	2.63	0.93	0.61	271.9
05/01/87	110.60	113.00	1.66	5.20	2.66	0.94	0.61	271.9
06/01/87	110.60	113.50	1.69	5.36	2.45	0.96	0.61	271.9
07/01/87	110.90	113.80	1.60	5.25	2.31	0.97	0.61	271.9
08/01/87	109.50	114.30	1.47	5.02	2.35	1.00	0.61	271.9
09/01/87	110.50	114.70	1.49	5.02	2.54	0.99	0.61	271.9
10/01/87	109.70	115.00	1.55	5.04	2.62	0.98	0.61	271.9
11/01/87	109.80	115.40	1.61	5.36	2.69	0.98	0.61	271.9
12/01/87	108.90	115.60	1.72	5.63	2.70	0.96	0.61	271.9
01/01/88	110.50	116.00	1.77	5.73	2.75	0.93	0.64	290.4
02/01/88	109.40	116.20	1.83	5.96	2.79	0.91	0.64	290.4
03/01/88	110.10	116.50	1.86	6.05	2.74	0.90	0.64	290.4
04/01/88	110.30	117.20	1.88	6.39	2.79	0.93	0.64	290.4
05/01/88	111.20	117.50	1.94	6.98	2.97	0.96	0.64	290.4
06/01/88	112.30	118.00	2.41	8.18	3.37	0.96	0.64	290.4
07/01/88	113.60	118.50	2.72	8.50	3.50	0.97	0.64	290.4
08/01/88	113.60	119.00	2.65	8.33	3.61	0.99	0.64	290.4
09/01/88	115.10	119.50	2.60	7.93	3.74	0.97	0.64	290.4
10/01/88	114.60	119.90	2.58	7.53	3.84	0.96	0.64	290.4
11/01/88	114.90	120.30	2.51	7.43	3.88	0.95	0.64	290.4
12/01/88	115.10	120.70	2.53	7.53	3.94	0.93	0.64	290.4
01/01/89	116.70	121.20	2.60	7.69	4.02	0.92	0.72	298.1
02/01/89	117.20	121.60	2.59	7.41	4.03	0.93	0.72	298.1
03/01/89	118.30	122.20	2.60	7.51	4.07	0.94	0.72	298.1
04/01/89	117.70	123.10	2.56	7.29	4.03	1.07	0.72	298.1
05/01/89	119.10	123.70	2.58	7.20	4.01	1.12	0.72	298.1
06/01/89	118.60	124.10	2.52	7.05	3.85	1.11	0.72	298.1
07/01/89	119.00	124.50	2.47	6.83	3.78	1.09	0.72	298.1
08/01/89	118.70	124.50	2.27	6.07	3.74	1.06	0.72	298.1
09/01/89	118.50	124.80	2.29	5.70	3.72	1.03	0.72	298.1
10/01/89	119.50	125.40	2.22	5.55	3.75	1.03	0.72	298.1
11/01/89	120.10	125.90	2.24	5.66	3.72	1.00	0.72	298.1
12/01/89	121.10	126.30	2.27	5.64	3.79	0.98	0.72	298.1

Date	PPI	CPI	Corn Prices	Soybean Prices	Wheat Prices	Fuel Prices	Ag Tech	Family 4
01/01/90	123.90	127.50	2.31	5.65	3.71	1.04	0.74	324.6
02/01/90	124.60	128.00	2.32	5.56	3.56	1.04	0.74	324.6
03/01/90	124.40	128.60	2.37	5.65	3.48	1.02	0.74	324.6
04/01/90	123.20	128.90	2.51	5.82	3.49	1.04	0.74	324.6
05/01/90	124.50	129.10	2.62	5.97	3.40	1.06	0.74	324.6
06/01/90	124.20	129.90	2.63	5.88	3.08	1.09	0.74	324.6
07/01/90	124.90	130.50	2.62	5.97	2.79	1.08	0.74	324.6
08/01/90	124.90	131.60	2.51	6.00	2.58	1.19	0.74	324.6
09/01/90	124.20	132.50	2.32	5.99	2.46	1.29	0.74	324.6
10/01/90	124.60	133.40	2.19	5.88	2.43	1.38	0.74	324.6
11/01/90	125.00	133.70	2.16	5.78	2.39	1.38	0.74	324.6
12/01/90	124.20	134.20	2.22	5.72	2.40	1.35	0.74	324.6
01/01/91	124.80	134.70	2.27	5.71	2.42	1.25	0.72	342.2
02/01/91	124.60	134.80	2.32	5.65	2.42	1.14	0.72	342.2
03/01/91	125.20	134.80	2.39	5.76	2.53	1.08	0.72	342.2
04/01/91	125.30	135.10	2.42	5.77	2.60	1.10	0.72	342.2
05/01/91	125.80	135.60	2.38	5.67	2.65	1.16	0.72	342.2
06/01/91	125.30	136.00	2.31	5.56	2.55	1.16	0.72	342.2
07/01/91	124.50	136.20	2.27	5.36	2.50	1.13	0.72	342.2
08/01/91	123.30	136.60	2.33	5.66	2.63	1.14	0.72	342.2
09/01/91	122.70	137.00	2.33	5.64	2.80	1.14	0.72	342.2
10/01/91	123.00	137.20	2.31	5.48	3.07	1.12	0.72	342.2
11/01/91	123.00	137.80	2.29	5.48	3.25	1.13	0.72	342.2
12/01/91	122.30	138.20	2.33	5.45	3.44	1.12	0.72	342.2
01/01/92	122.50	138.30	2.40	5.54	3.54	1.07	0.76	360.1
02/01/92	123.40	138.60	2.46	5.59	3.78	1.05	0.76	360.1
03/01/92	123.30	139.10	2.49	5.67	3.72	1.06	0.76	360.1
04/01/92	122.80	139.40	2.48	5.66	3.65	1.08	0.76	360.1
05/01/92	123.10	139.70	2.49	5.87	3.64	1.14	0.76	360.1
06/01/92	123.10	140.10	2.47	5.94	3.43	1.18	0.76	360.1
07/01/92	122.80	140.50	2.33	5.59	3.15	1.18	0.76	360.1
08/01/92	123.40	140.80	2.15	5.40	3.01	1.16	0.76	360.1
09/01/92	123.30	141.10	2.16	5.36	3.20	1.16	0.76	360.1
10/01/92	123.80	141.70	2.05	5.26	3.22	1.15	0.76	360.1
11/01/92	123.40	142.10	1.98	5.36	3.29	1.16	0.76	360.1
12/01/92	124.20	142.30	2.30	5.61	2.96	1.14	0.76	360.1
01/01/93	124.30	142.80	2.03	5.58	3.37	1.12	0.74	355.5
02/01/93	124.50	143.10	2.00	5.56	3.33	1.11	0.74	355.5
03/01/93	124.80	143.30	2.10	5.65	3.30	1.10	0.74	355.5
04/01/93	126.50	143.80	2.16	5.73	3.26	1.11	0.74	355.5
05/01/93	126.90	144.20	2.14	5.81	3.11	1.13	0.74	355.5
06/01/93	125.40	144.30	2.09	5.90	2.84	1.13	0.74	355.5
07/01/93	125.00	144.50	2.22	6.56	2.85	1.11	0.74	355.5
08/01/93	125.40	144.80	2.25	6.56	2.96	1.10	0.74	355.5
09/01/93	125.70	145.00	2.21	6.21	3.10	1.09	0.74	355.5
10/01/93	125.40	145.60	2.28	6.01	3.25	1.13	0.74	355.5

Date	PPI	CPI	Corn Prices	Soybean Prices	Wheat Prices	Fuel Prices	Ag Tech	Family 4
11/01/93	126.60	146.00	2.45	6.32	3.47	1.11	0.74	355.5
12/01/93	127.20	146.30	2.67	6.64	3.63	1.07	0.74	355.5
01/01/94	127.00	146.30	2.70	6.72	3.58	1.04	0.79	364.9
02/01/94	126.70	146.70	2.79	6.71	3.60	1.05	0.79	364.9
03/01/94	127.50	147.10	2.74	6.73	3.70	1.05	0.79	364.9
04/01/94	127.10	147.20	2.65	6.57	3.56	1.06	0.79	364.9
05/01/94	126.60	147.50	2.60	6.77	3.43	1.08	0.79	364.9
06/01/94	125.90	147.90	2.61	6.72	3.21	1.11	0.79	364.9
07/01/94	126.20	148.40	2.29	5.92	3.04	1.14	0.79	364.9
08/01/94	126.60	149.00	2.16	5.58	3.25	1.18	0.79	364.9
09/01/94	126.30	149.30	2.19	5.47	3.57	1.18	0.79	364.9
10/01/94	126.10	149.40	2.06	5.30	3.76	1.15	0.79	364.9
11/01/94	126.90	149.80	1.99	5.36	3.75	1.16	0.79	364.9
12/01/94	128.60	150.10	2.13	5.41	3.74	1.14	0.79	364.9
01/01/95	127.90	150.50	2.19	5.47	3.69	1.13	0.75	375.10
02/01/95	128.40	150.90	2.23	5.40	3.61	1.12	0.75	373.20
03/01/95	128.70	151.20	2.30	5.51	3.52	1.12	0.75	373.90
04/01/95	128.70	151.80	2.36	5.55	3.48	1.14	0.75	374.40
05/01/95	128.00	152.10	2.42	5.56	3.67	1.20	0.75	374.40
06/01/95	127.40	152.40	2.51	5.68	3.84	1.23	0.75	375.30
07/01/95	128.50	152.60	2.63	5.90	4.10	1.20	0.75	376.80
08/01/95	128.80	152.90	2.63	5.83	4.26	1.16	0.75	376.90
09/01/95	130.10	153.10	2.69	5.98	4.53	1.15	0.75	376.30
10/01/95	129.90	153.50	2.79	6.16	4.72	1.13	0.75	375.30
11/01/95	131.10	153.70	2.87	6.40	4.81	1.10	0.75	375.80
12/01/95	131.00	153.90	3.07	6.76	4.88	1.10	0.75	383.40
01/01/96	130.70	154.70	3.09	6.78	4.83	1.13	0.86	386.00
02/01/96	130.70	155.00	3.37	7.00	4.98	1.12	0.86	384.40
03/01/96	132.00	155.50	3.51	7.00	5.07	1.16	0.86	384.30
04/01/96	131.20	156.10	3.85	7.43	5.32	1.25	0.86	390.00
05/01/96	131.50	156.40	4.14	7.69	5.75	1.32	0.86	387.90
06/01/96	133.60	156.70	4.20	7.41	5.25	1.30	0.86	386.20
07/01/96	133.90	157.00	4.43	7.62	4.73	1.27	0.86	386.50
08/01/96	135.30	157.20	4.30	7.82	4.57	1.24	0.86	386.30
09/01/96	135.60	157.70	3.56	7.79	4.37	1.23	0.86	388.10
10/01/96	136.60	158.20	2.88	6.94	4.17	1.23	0.86	388.80
11/01/96	136.10	158.70	2.66	6.90	4.10	1.25	0.86	387.80
12/01/96	135.50	159.10	2.63	6.91	4.06	1.26	0.86	390.10
01/01/97	134.10	159.40	2.69	7.13	4.02	1.26	0.84	395.4
02/01/97	133.80	159.70	2.65	7.38	3.89	1.26	0.84	394.8
03/01/97	135.20	159.80	2.79	7.97	3.93	1.24	0.84	398.5
04/01/97	134.30	159.90	2.80	8.23	4.10	1.23	0.84	400.1
05/01/97	135.20	159.90	2.69	8.40	4.08	1.23	0.84	397.7
06/01/97	134.00	160.20	2.56	8.16	3.52	1.23	0.84	400.5
07/01/97	134.00	160.40	2.42	7.52	3.23	1.21	0.84	403.8
08/01/97	134.90	160.80	2.50	7.25	3.56	1.25	0.84	405.9

Date	PPI	CPI	Corn Prices	Soybean Prices	Wheat Prices	Fuel Prices	Ag Tech	Family 4
09/01/97	134.70	161.20	2.52	6.72	3.66	1.28	0.84	407.2
10/01/97	135.10	161.50	2.54	6.49	3.58	1.24	0.84	408.8
11/01/97	134.60	161.70	2.51	6.86	3.54	1.21	0.84	409.4
12/01/97	134.40	161.80	2.52	6.72	3.44	1.18	0.84	408.8
01/01/98	133.10	162.00	2.56	6.69	3.32	1.13	0.79	410.60
02/01/98	133.60	162.00	2.55	6.57	3.27	1.08	0.79	410.80
03/01/98	133.40	162.00	2.55	6.40	3.33	1.04	0.79	410.40
04/01/98	133.80	162.20	2.41	6.26	3.18	1.05	0.79	408.70
05/01/98	133.60	162.60	2.34	6.26	3.06	1.09	0.79	408.90
06/01/98	133.80	162.80	2.28	6.16	2.77	1.09	0.79	408.60
07/01/98	134.70	163.20	2.19	6.14	2.56	1.08	0.79	410.30
08/01/98	135.20	163.40	1.89	5.43	2.38	1.05	0.79	412.80
09/01/98	135.40	163.50	1.84	5.25	2.39	1.03	0.79	411.80
10/01/98	135.50	163.90	1.91	5.18	2.77	1.04	0.79	412.30
11/01/98	134.90	164.10	1.93	5.39	2.95	1.03	0.79	413.30
12/01/98	134.50	164.40	2.00	5.37	2.86	0.99	0.79	413.70
01/01/99	135.60	164.70	2.06	5.32	2.84	0.97	0.76	421.20
02/01/99	134.10	164.70	2.05	4.80	2.73	0.96	0.76	415.60
03/01/99	134.70	164.80	2.06	4.61	2.65	0.99	0.76	417.70
04/01/99	133.40	165.90	2.04	4.63	2.62	1.18	0.76	417.80
05/01/99	134.50	166.00	1.99	4.50	2.49	1.18	0.76	422.10
06/01/99	135.10	166.00	1.97	4.44	2.50	1.15	0.76	419.00
07/01/99	134.60	166.70	1.74	4.19	2.22	1.19	0.76	419.80
08/01/99	135.90	167.10	1.75	4.39	2.53	1.26	0.76	420.70
09/01/99	136.70	167.80	1.75	4.57	2.58	1.28	0.76	418.60
10/01/99	135.80	168.10	1.69	4.48	2.57	1.27	0.76	424.20
11/01/99	135.40	168.40	1.70	4.45	2.66	1.26	0.76	423.00
12/01/99	135.60	168.80	1.82	4.43	2.52	1.30	0.76	424.60
01/01/00	135.00	169.30	1.91	4.62	2.51	1.30	0.83	431.60
02/01/00	136.00	170.00	1.98	4.79	2.54	1.37	0.83	427.70
03/01/00	136.00	171.00	2.03	4.91	2.59	1.54	0.83	427.20
04/01/00	137.30	170.90	2.03	5.00	2.57	1.51	0.83	426.00
05/01/00	138.20	171.20	2.11	5.19	2.59	1.50	0.83	428.20
06/01/00	137.60	172.20	1.91	4.93	2.50	1.62	0.83	426.40
07/01/00	137.50	172.70	1.64	4.53	2.32	1.59	0.83	427.70
08/01/00	137.20	172.70	1.52	4.45	2.40	1.51	0.83	429.40
09/01/00	137.40	173.60	1.61	4.59	2.43	1.58	0.83	430.30
10/01/00	138.00	173.90	1.74	4.45	2.68	1.56	0.83	430.80
11/01/00	138.20	174.20	1.86	4.55	2.82	1.56	0.83	430.80
12/01/00	137.90	174.60	1.97	4.78	2.87	1.49	0.83	430.30
01/01/01	138.60	175.60	1.98	4.68	2.84	1.47	0.86	433.40
02/01/01	140.00	176.00	1.96	4.46	2.83	1.48	0.86	432.00
03/01/01	141.10	176.10	1.96	4.39	2.87	1.45	0.86	432.00
04/01/01	141.80	176.40	1.89	4.22	2.86	1.56	0.86	432.50
05/01/01	142.30	177.30	1.82	4.33	2.98	1.73	0.86	435.90
06/01/01	142.00	177.70	1.76	4.46	2.74	1.64	0.86	434.20

Date	PPI	CPI	Corn Prices	Soybean Prices	Wheat Prices	Fuel Prices	Ag Tech	Family 4
07/01/01	141.40	177.40	1.87	4.79	2.63	1.48	0.86	439.00
08/01/01	142.60	177.40	1.90	4.85	2.74	1.43	0.86	440.70
09/01/01	142.90	178.10	1.91	4.53	2.85	1.53	0.86	439.40
10/01/01	142.20	177.60	1.84	4.09	2.87	1.36	0.86	439.80
11/01/01	140.70	177.50	1.85	4.16	2.87	1.26	0.86	436.40
12/01/01	140.40	177.40	1.98	4.20	2.88	1.13	0.86	441.50
01/01/02	141.10	177.70	1.97	4.22	2.87	1.14	0.81	444.20
02/01/02	142.30	178.00	1.93	4.22	2.83	1.13	0.81	445.40
03/01/02	143.40	178.50	1.94	4.38	2.87	1.24	0.81	445.80
04/01/02	139.20	179.30	1.91	4.47	2.83	1.41	0.81	447.20
05/01/02	139.40	179.50	1.93	4.64	2.81	1.42	0.81	449.40
06/01/02	139.80	179.60	1.97	4.88	2.92	1.40	0.81	452.50
07/01/02	139.80	180.00	2.13	5.35	3.21	1.41	0.81	454.10
08/01/02	139.30	180.50	2.38	5.53	3.63	1.42	0.81	455.80
09/01/02	138.70	180.80	2.47	5.39	4.21	1.42	0.81	455.80
10/01/02	139.20	181.20	2.34	5.20	4.38	1.45	0.81	458.50
11/01/02	139.20	181.50	2.28	5.46	4.25	1.45	0.81	455.40
12/01/02	139.50	181.80	2.32	5.46	4.06	1.39	0.81	455.40
01/01/03	142.00	182.60	2.33	5.51	3.89	1.47	0.87	461.50
02/01/03	142.30	183.60	2.34	5.55	3.70	1.64	0.87	463.20
03/01/03	142.80	183.90	2.33	5.59	3.55	1.75	0.87	465.40
04/01/03	144.00	183.20	2.34	5.82	3.37	1.66	0.87	467.50
05/01/03	144.60	182.90	2.38	6.07	3.33	1.54	0.87	466.60
06/01/03	145.20	183.10	2.34	6.09	3.08	1.51	0.87	465.80
07/01/03	144.90	183.70	2.17	5.82	2.95	1.52	0.87	467.50
08/01/03	146.30	184.50	2.15	5.68	3.35	1.63	0.87	465.80
09/01/03	148.00	185.10	2.20	6.06	3.39	1.73	0.87	464.20
10/01/03	151.00	184.90	2.12	6.60	3.44	1.60	0.87	461.90
11/01/03	150.10	185.00	2.20	7.05	3.61	1.54	0.87	461.90
12/01/03	150.30	185.50	2.31	7.17	3.68	1.49	0.87	464.10
01/01/04	148.10	186.30	2.39	7.35	3.68	1.59	1.03	466.70
02/01/04	148.40	186.70	2.61	8.28	3.77	1.67	1.03	466.70
03/01/04	150.70	187.10	2.75	9.28	3.83	1.77	1.03	467.10
04/01/04	152.70	187.40	2.89	9.62	3.88	1.83	1.03	466.70
05/01/04	155.50	188.20	2.87	9.56	3.82	2.01	1.03	469.80
06/01/04	155.00	188.90	2.79	9.08	3.55	2.04	1.03	471.80
07/01/04	152.30	189.10	2.51	8.46	3.37	1.94	1.03	473.70
08/01/04	152.20	189.20	2.34	6.83	3.27	1.90	1.03	475.80
09/01/04	152.70	189.80	2.20	5.84	3.36	1.89	1.03	477.00
10/01/04	155.10	190.80	2.15	5.56	3.43	2.03	1.03	479.70
11/01/04	154.70	191.70	2.05	5.36	3.46	2.01	1.03	483.20
12/01/04	154.90	191.70	2.04	5.45	3.40	1.88	1.03	487.50
01/01/05	154.20	191.60	2.12	5.57	3.43	1.82	1.00	488.80
02/01/05	155.40	192.40	1.95	5.42	3.36	1.92	1.00	487.50
03/01/05	156.30	193.10	2.02	5.95	3.42	2.07	1.00	488.80
04/01/05	156.30	193.70	2.00	6.03	3.35	2.28	1.00	487.70

Date	PPI	CPI	Corn Prices	Soybean Prices	Wheat Prices	Fuel Prices	Ag Tech	Family 4
05/01/05	156.70	193.60	1.98	6.20	3.31	2.22	1.00	497.40
06/01/05	155.50	193.70	2.03	6.58	3.23	2.18	1.00	499.20
07/01/05	154.40	194.90	2.11	6.84	3.20	2.32	1.00	499.30
08/01/05	154.00	196.10	1.95	6.15	3.24	2.51	1.00	497.30
09/01/05	155.80	198.80	1.90	5.77	3.35	2.93	1.00	493.90
10/01/05	155.80	199.10	1.82	5.67	3.43	2.79	1.00	501.70
11/01/05	156.30	198.10	1.77	5.62	3.47	2.34	1.00	503.10
12/01/05	157.50	198.10	1.92	5.77	3.54	2.19	1.00	505.80
01/01/06	157.10	199.30	2.00	5.88	3.52	2.32	1.00	506.20
02/01/06	153.80	199.40	2.02	5.67	3.66	2.31	1.00	502.10
03/01/06	154.40	199.70	2.06	5.57	3.79	2.40	1.00	501.40
04/01/06	154.80	200.70	2.11	5.52	3.81	2.76	1.00	505.70
05/01/06	154.20	201.30	2.17	5.68	4.09	2.95	1.00	509.30
06/01/06	156.10	201.80	2.14	5.61	4.01	2.92	1.00	506.80
07/01/06	156.40	202.90	2.14	5.61	3.89	3.00	1.00	509.60
08/01/06	158.30	203.80	2.09	5.23	3.91	2.99	1.00	509.10
09/01/06	159.20	202.80	2.20	5.24	4.06	2.59	1.00	510.30
10/01/06	158.40	201.90	2.54	5.52	4.59	2.27	1.00	514.00
11/01/06	157.90	202.00	2.87	6.07	4.59	2.24	1.00	514.30
12/01/06	160.10	203.10	3.01	6.18	4.51	2.33	1.00	515.50
01/01/07	161.10	203.44	3.05	6.38	4.54	2.27	1.15	533.60
02/01/07	163.90	204.23	3.44	6.87	4.71	2.29	1.15	538.50
03/01/07	166.30	205.29	3.43	6.95	4.75	2.59	1.15	536.90
04/01/07	166.80	205.90	3.39	6.88	4.89	2.86	1.15	537.60
05/01/07	166.80	206.76	3.49	7.13	4.88	3.13	1.15	543.10
06/01/07	166.30	207.23	3.51	7.51	5.03	3.05	1.15	542.10
07/01/07	166.40	207.60	3.32	7.56	5.17	2.96	1.15	543.90
08/01/07	166.30	207.67	3.26	7.72	5.64	2.78	1.15	543.80
09/01/07	168.40	208.55	3.29	8.18	6.75	2.79	1.15	549.20
10/01/07	169.70	209.19	3.29	8.36	7.65	2.79	1.15	554.20
11/01/07	169.50	210.83	3.43	9.41	7.36	3.07	1.15	558.30
12/01/07	172.20	211.45	3.76	10.00	7.74	3.02	1.15	561.70
01/01/08	174.50	212.17	3.97	9.96	7.93	3.05	1.35	571.8
02/01/08	173.60	212.69	4.53	11.70	9.98	3.03	1.35	570.2
03/01/08	176.00	213.45	4.70	11.50	10.60	3.26	1.35	576.2
04/01/08	175.50	213.94	5.15	12.00	10.00	3.44	1.35	576.2
05/01/08	177.60	215.21	5.28	12.10	8.87	3.76	1.35	582.6
06/01/08	180.00	217.46	5.48	13.20	7.62	4.07	1.35	588.3
07/01/08	181.00	219.02	5.24	13.30	7.16	4.09	1.35	598.7
08/01/08	181.30	218.69	5.26	12.80	7.64	3.79	1.35	602.8
09/01/08	181.50	218.88	5.02	10.70	7.43	3.70	1.35	605.8
10/01/08	180.70	217.00	4.37	9.94	6.67	3.17	1.35	606.2
11/01/08	179.80	213.15	4.26	9.38	6.28	2.15	1.35	604.9
12/01/08	177.70	211.40	4.10	9.24	5.97	1.69	1.35	600.8
01/01/09	177.70	211.93	4.36	9.97	6.21	3.05	1.21	602.50
02/01/09	175.00	212.71	3.87	9.55	5.79	3.03	1.21	594.30

Date	PPI	CPI	Corn Prices	Soybean Prices	Wheat Prices	Fuel Prices	Ag Tech	Family 4
03/01/09	173.80	212.50	3.86	9.12	5.70	3.26	1.21	588.70
04/01/09	175.90	212.71	3.85	9.79	5.74	3.44	1.21	585.20
05/01/09	174.00	213.02	3.97	10.70	5.84	3.76	1.21	583.90
06/01/09	176.10	214.79	4.03	11.40	5.67	4.07	1.21	583.40
07/01/09	173.50	214.73	3.60	10.80	5.13	4.09	1.21	581.10
08/01/09	173.90	215.45	3.33	10.80	4.83	3.79	1.21	577.00
09/01/09	173.90	215.86	3.25	9.75	4.48	3.70	1.21	576.40
10/01/09	175.60	216.51	3.61	9.44	4.47	3.17	1.21	577.40
11/01/09	176.90	217.23	3.65	9.53	4.79	2.15	1.21	575.50
12/01/09	179.80	217.35	3.59	9.80	4.85	1.69	1.21	577.90
01/01/10	180.10	217.47	3.66	9.79	4.92	2.73	1.28	585.60
02/01/10	180.90	217.25	3.55	9.41	4.73	2.66	1.28	583.60
03/01/10	185.60	217.31	3.55	9.39	4.70	2.78	1.28	587.10
04/01/10	184.20	217.38	3.41	9.47	4.42	2.86	1.28	586.20
05/01/10	184.10	217.30	3.48	9.41	4.33	2.87	1.28	585.80
06/01/10	179.50	217.29	3.41	9.45	4.17	2.74	1.28	582.60
07/01/10	180.50	217.68	3.49	9.79	4.50	2.74	1.28	579.30
08/01/10	180.10	218.01	3.65	10.10	5.44	2.75	1.28	579.20
09/01/10	181.90	218.28	4.08	9.98	5.83	2.70	1.28	580.90
10/01/10	182.10	219.02	4.32	10.20	5.87	2.80	1.28	582.20
11/01/10	183.90	219.54	4.55	11.10	6.13	2.85	1.28	581.50
12/01/10	186.00	220.44	4.82	11.60	6.45	2.99	1.28	587.40

Date	Farm Value Share - Cereals	Farm Value Share - Fruit	Farm to Retail Spread - Cereals	Farm to Retail Spread - Fruit
01/01/71	16.00	30.00	38.00	35.00
02/01/71	16.00	30.00	38.00	35.00
03/01/71	16.00	30.00	38.00	35.00
04/01/71	16.00	30.00	38.00	35.00
05/01/71	16.00	30.00	38.00	35.00
06/01/71	16.00	30.00	38.00	35.00
07/01/71	16.00	30.00	38.00	35.00
08/01/71	16.00	30.00	38.00	35.00
09/01/71	16.00	30.00	38.00	35.00
10/01/71	16.00	30.00	38.00	35.00
11/01/71	16.00	30.00	38.00	35.00
12/01/71	16.00	30.00	38.00	35.00
01/01/72	17.00	30.00	37.00	37.00
02/01/72	17.00	30.00	37.00	37.00
03/01/72	17.00	30.00	37.00	37.00
04/01/72	17.00	30.00	37.00	37.00
05/01/72	17.00	30.00	37.00	37.00
06/01/72	17.00	30.00	37.00	37.00
07/01/72	17.00	30.00	37.00	37.00
08/01/72	17.00	30.00	37.00	37.00
09/01/72	17.00	30.00	37.00	37.00
10/01/72	17.00	30.00	37.00	37.00
11/01/72	17.00	30.00	37.00	37.00
12/01/72	17.00	30.00	37.00	37.00
01/01/73	22.00	33.00	38.00	40.00
02/01/73	22.00	33.00	38.00	40.00
03/01/73	22.00	33.00	38.00	40.00
04/01/73	22.00	33.00	38.00	40.00
05/01/73	22.00	33.00	38.00	40.00
06/01/73	22.00	33.00	38.00	40.00
07/01/73	22.00	33.00	38.00	40.00
08/01/73	22.00	33.00	38.00	40.00
09/01/73	22.00	33.00	38.00	40.00
10/01/73	22.00	33.00	38.00	40.00
11/01/73	22.00	33.00	38.00	40.00
12/01/73	25.00	33.00	38.00	40.00
01/01/74	25.00	30.00	48.00	46.00
02/01/74	25.00	30.00	48.00	46.00
03/01/74	25.00	30.00	48.00	46.00
04/01/74	25.00	30.00	48.00	46.00
05/01/74	25.00	30.00	48.00	46.00
06/01/74	25.00	30.00	48.00	46.00
07/01/74	25.00	30.00	48.00	46.00
08/01/74	25.00	30.00	48.00	46.00

Date	Farm Value Share - Cereals	Farm Value Share - Fruit	Farm to Retail Spread - Cereals	Farm to Retail Spread - Fruit
09/01/74	25.00	30.00	48.00	46.00
10/01/74	25.00	30.00	48.00	46.00
11/01/74	25.00	30.00	48.00	46.00
12/01/74	25.00	30.00	48.00	46.00
01/01/75	18.00	30.00	57.00	47.00
02/01/75	18.00	30.00	57.00	47.00
03/01/75	18.00	30.00	57.00	47.00
04/01/75	18.00	30.00	57.00	47.00
05/01/75	18.00	30.00	57.00	47.00
06/01/75	18.00	30.00	57.00	47.00
07/01/75	18.00	30.00	57.00	47.00
08/01/75	18.00	30.00	57.00	47.00
09/01/75	18.00	30.00	57.00	47.00
10/01/75	18.00	30.00	57.00	47.00
11/01/75	18.00	30.00	57.00	47.00
12/01/75	18.00	30.00	57.00	47.00
01/01/76	15.00	28.00	59.00	48.00
02/01/76	15.00	28.00	59.00	48.00
03/01/76	15.00	28.00	59.00	48.00
04/01/76	15.00	28.00	59.00	48.00
05/01/76	15.00	28.00	59.00	48.00
06/01/76	15.00	28.00	59.00	48.00
07/01/76	15.00	28.00	59.00	48.00
08/01/76	15.00	28.00	59.00	48.00
09/01/76	15.00	28.00	59.00	48.00
10/01/76	15.00	28.00	59.00	48.00
11/01/76	15.00	28.00	59.00	48.00
12/01/76	15.00	28.00	59.00	48.00
01/01/77	12.00	29.00	61.00	55.00
02/01/77	12.00	29.00	61.00	55.00
03/01/77	12.00	29.00	61.00	55.00
04/01/77	12.00	29.00	61.00	55.00
05/01/77	12.00	29.00	61.00	55.00
06/01/77	12.00	29.00	61.00	55.00
07/01/77	12.00	29.00	61.00	55.00
08/01/77	12.00	29.00	61.00	55.00
09/01/77	12.00	29.00	61.00	55.00
10/01/77	12.00	29.00	61.00	55.00
11/01/77	12.00	29.00	61.00	55.00
12/01/77	12.00	29.00	61.00	55.00
01/01/78	13.00	32.00	66.00	66.00
02/01/78	13.00	32.00	66.00	66.00
03/01/78	13.00	32.00	66.00	66.00
04/01/78	13.00	32.00	66.00	66.00

Date	Farm Value Share - Cereals	Farm Value Share - Fruit	Farm to Retail Spread - Cereals	Farm to Retail Spread - Fruit
05/01/78	13.00	32.00	66.00	66.00
06/01/78	13.00	32.00	66.00	66.00
07/01/78	13.00	32.00	66.00	66.00
08/01/78	13.00	32.00	66.00	66.00
09/01/78	13.00	32.00	66.00	66.00
10/01/78	13.00	32.00	66.00	66.00
11/01/78	13.00	32.00	66.00	66.00
12/01/78	13.00	32.00	66.00	66.00
01/01/79	14.00	29.00	73.00	77.00
02/01/79	14.00	29.00	73.00	77.00
03/01/79	14.00	29.00	73.00	77.00
04/01/79	14.00	29.00	73.00	77.00
05/01/79	14.00	29.00	73.00	77.00
06/01/79	14.00	29.00	73.00	77.00
07/01/79	14.00	29.00	73.00	77.00
08/01/79	14.00	29.00	73.00	77.00
09/01/79	14.00	29.00	73.00	77.00
10/01/79	14.00	29.00	73.00	77.00
11/01/79	14.00	29.00	73.00	77.00
12/01/79	14.00	29.00	73.00	77.00
01/01/80	14.00	26.00	81.00	84.00
02/01/80	14.00	26.00	81.00	84.00
03/01/80	14.00	26.00	81.00	84.00
04/01/80	14.00	26.00	81.00	84.00
05/01/80	14.00	26.00	81.00	84.00
06/01/80	14.00	26.00	81.00	84.00
07/01/80	14.00	26.00	81.00	84.00
08/01/80	14.00	26.00	81.00	84.00
09/01/80	14.00	26.00	81.00	84.00
10/01/80	14.00	26.00	81.00	84.00
11/01/80	14.00	26.00	81.00	84.00
12/01/80	14.00	26.00	81.00	84.00
01/01/81	13.00	26.00	90.00	89.00
02/01/81	13.00	26.00	90.00	89.00
03/01/81	13.00	26.00	90.00	89.00
04/01/81	13.00	26.00	90.00	89.00
05/01/81	13.00	26.00	90.00	89.00
06/01/81	13.00	26.00	90.00	89.00
07/01/81	13.00	26.00	90.00	89.00
08/01/81	13.00	26.00	90.00	89.00
09/01/81	13.00	26.00	90.00	89.00
10/01/81	13.00	26.00	90.00	89.00
11/01/81	13.00	26.00	90.00	89.00
12/01/81	13.00	26.00	90.00	89.00

Date	Farm Value Share - Cereals	Farm Value Share - Fruit	Farm to Retail Spread - Cereals	Farm to Retail Spread - Fruit
01/01/82	12.00	33.00	97.00	97.00
02/01/82	12.00	33.00	97.00	97.00
03/01/82	12.00	33.00	97.00	97.00
04/01/82	12.00	33.00	97.00	97.00
05/01/82	12.00	33.00	97.00	97.00
06/01/82	12.00	33.00	97.00	97.00
07/01/82	12.00	33.00	97.00	97.00
08/01/82	12.00	33.00	97.00	97.00
09/01/82	12.00	33.00	97.00	97.00
10/01/82	12.00	33.00	97.00	97.00
11/01/82	12.00	33.00	97.00	97.00
12/01/82	12.00	33.00	97.00	97.00
01/01/83	12.00	27.00	99.00	100.00
02/01/83	12.00	27.00	99.00	100.00
03/01/83	12.00	27.00	99.00	100.00
04/01/83	12.00	27.00	99.00	100.00
05/01/83	12.00	27.00	99.00	100.00
06/01/83	12.00	27.00	99.00	100.00
07/01/83	12.00	27.00	99.00	100.00
08/01/83	12.00	27.00	99.00	100.00
09/01/83	12.00	27.00	99.00	100.00
10/01/83	12.00	27.00	99.00	100.00
11/01/83	12.00	27.00	99.00	100.00
12/01/83	12.00	27.00	99.00	100.00
01/01/84	12.00	34.00	104.00	103.00
02/01/84	12.00	34.00	104.00	103.00
03/01/84	12.00	34.00	104.00	103.00
04/01/84	12.00	34.00	104.00	103.00
05/01/84	12.00	34.00	104.00	103.00
06/01/84	12.00	34.00	104.00	103.00
07/01/84	12.00	34.00	104.00	103.00
08/01/84	12.00	34.00	104.00	103.00
09/01/84	12.00	34.00	104.00	103.00
10/01/84	12.00	34.00	104.00	103.00
11/01/84	12.00	34.00	104.00	103.00
12/01/84	12.00	34.00	104.00	103.00
01/01/85	11.00	30.00	110.00	122.00
02/01/85	11.00	30.00	110.00	122.00
03/01/85	11.00	30.00	110.00	122.00
04/01/85	11.00	30.00	110.00	122.00
05/01/85	11.00	30.00	110.00	122.00
06/01/85	11.00	30.00	110.00	122.00
07/01/85	11.00	30.00	110.00	122.00
08/01/85	11.00	30.00	110.00	122.00

Date	Farm Value Share - Cereals	Farm Value Share - Fruit	Farm to Retail Spread - Cereals	Farm to Retail Spread - Fruit
09/01/85	11.00	30.00	110.00	122.00
10/01/85	11.00	30.00	110.00	122.00
11/01/85	11.00	30.00	110.00	122.00
12/01/85	11.00	30.00	110.00	122.00
01/01/86	8.00	27.00	116.00	128.00
02/01/86	8.00	27.00	116.00	128.00
03/01/86	8.00	27.00	116.00	128.00
04/01/86	8.00	27.00	116.00	128.00
05/01/86	8.00	27.00	116.00	128.00
06/01/86	8.00	27.00	116.00	128.00
07/01/86	8.00	27.00	116.00	128.00
08/01/86	8.00	27.00	116.00	128.00
09/01/86	8.00	27.00	116.00	128.00
10/01/86	8.00	27.00	116.00	128.00
11/01/86	8.00	27.00	116.00	128.00
12/01/86	8.00	27.00	116.00	128.00
01/01/87	8.00	26.00	121.00	146.00
02/01/87	8.00	26.00	121.00	146.00
03/01/87	8.00	26.00	121.00	146.00
04/01/87	8.00	26.00	121.00	146.00
05/01/87	8.00	26.00	121.00	146.00
06/01/87	8.00	26.00	121.00	146.00
07/01/87	8.00	26.00	121.00	146.00
08/01/87	8.00	26.00	121.00	146.00
09/01/87	8.00	26.00	121.00	146.00
10/01/87	8.00	26.00	121.00	146.00
11/01/87	8.00	26.00	121.00	146.00
12/01/87	8.00	26.00	121.00	146.00
01/01/88	9.00	25.00	126.00	159.00
02/01/88	9.00	25.00	126.00	159.00
03/01/88	9.00	25.00	126.00	159.00
04/01/88	9.00	25.00	126.00	159.00
05/01/88	9.00	25.00	126.00	159.00
06/01/88	9.00	25.00	126.00	159.00
07/01/88	9.00	25.00	126.00	159.00
08/01/88	9.00	25.00	126.00	159.00
09/01/88	9.00	25.00	126.00	159.00
10/01/88	9.00	25.00	126.00	159.00
11/01/88	9.00	25.00	126.00	159.00
12/01/88	9.00	25.00	126.00	159.00
01/01/89	9.00	22.00	137.00	176.00
02/01/89	9.00	22.00	137.00	176.00
03/01/89	9.00	22.00	137.00	176.00
04/01/89	9.00	22.00	137.00	176.00

Date	Farm Value Share - Cereals	Farm Value Share - Fruit	Farm to Retail Spread - Cereals	Farm to Retail Spread - Fruit
05/01/89	9.00	22.00	137.00	176.00
06/01/89	9.00	22.00	137.00	176.00
07/01/89	9.00	22.00	137.00	176.00
08/01/89	9.00	22.00	137.00	176.00
09/01/89	9.00	22.00	137.00	176.00
10/01/89	9.00	22.00	137.00	176.00
11/01/89	9.00	22.00	137.00	176.00
12/01/89	9.00	22.00	137.00	176.00
01/01/90	8.00	23.00	147.00	196.00
02/01/90	8.00	23.00	147.00	196.00
03/01/90	8.00	23.00	147.00	196.00
04/01/90	8.00	23.00	147.00	196.00
05/01/90	8.00	23.00	147.00	196.00
06/01/90	8.00	23.00	147.00	196.00
07/01/90	8.00	23.00	147.00	196.00
08/01/90	8.00	23.00	147.00	196.00
09/01/90	8.00	23.00	147.00	196.00
10/01/90	8.00	23.00	147.00	196.00
11/01/90	8.00	23.00	147.00	196.00
12/01/90	8.00	23.00	147.00	196.00
01/01/91	7.00	27.00	154.00	213.00
02/01/91	7.00	27.00	154.00	213.00
03/01/91	7.00	27.00	154.00	213.00
04/01/91	7.00	27.00	154.00	213.00
05/01/91	7.00	27.00	154.00	213.00
06/01/91	7.00	27.00	154.00	213.00
07/01/91	7.00	27.00	154.00	213.00
08/01/91	7.00	27.00	154.00	213.00
09/01/91	7.00	27.00	154.00	213.00
10/01/91	7.00	27.00	154.00	213.00
11/01/91	7.00	27.00	154.00	213.00
12/01/91	7.00	27.00	154.00	213.00
01/01/92	8.00	20.00	160.00	221.00
02/01/92	8.00	20.00	160.00	221.00
03/01/92	8.00	20.00	160.00	221.00
04/01/92	8.00	20.00	160.00	221.00
05/01/92	8.00	20.00	160.00	221.00
06/01/92	8.00	20.00	160.00	221.00
07/01/92	8.00	20.00	160.00	221.00
08/01/92	8.00	20.00	160.00	221.00
09/01/92	8.00	20.00	160.00	221.00
10/01/92	8.00	20.00	160.00	221.00
11/01/92	8.00	20.00	160.00	221.00
12/01/92	8.00	20.00	160.00	221.00

Date	Farm Value Share - Cereals	Farm Value Share - Fruit	Farm to Retail Spread - Cereals	Farm to Retail Spread - Fruit
01/01/93	7.00	22.00	166.00	224.00
02/01/93	7.00	22.00	166.00	224.00
03/01/93	7.00	22.00	166.00	224.00
04/01/93	7.00	22.00	166.00	224.00
05/01/93	7.00	22.00	166.00	224.00
06/01/93	7.00	22.00	166.00	224.00
07/01/93	7.00	22.00	166.00	224.00
08/01/93	7.00	22.00	166.00	224.00
09/01/93	7.00	22.00	166.00	224.00
10/01/93	7.00	22.00	166.00	224.00
11/01/93	7.00	22.00	166.00	224.00
12/01/93	7.00	22.00	166.00	224.00
01/01/94	8.00	18.00	171.00	250.00
02/01/94	8.00	18.00	171.00	250.00
03/01/94	8.00	18.00	171.00	250.00
04/01/94	8.00	18.00	171.00	250.00
05/01/94	8.00	18.00	171.00	250.00
06/01/94	8.00	18.00	171.00	250.00
07/01/94	8.00	18.00	171.00	250.00
08/01/94	8.00	18.00	171.00	250.00
09/01/94	8.00	18.00	171.00	250.00
10/01/94	8.00	18.00	171.00	250.00
11/01/94	8.00	18.00	171.00	250.00
12/01/94	8.00	18.00	171.00	250.00
01/01/95	8.00	19.00	176.00	269.00
02/01/95	8.00	19.00	176.00	269.00
03/01/95	8.00	19.00	176.00	269.00
04/01/95	8.00	19.00	176.00	269.00
05/01/95	8.00	19.00	176.00	269.00
06/01/95	8.00	19.00	176.00	269.00
07/01/95	8.00	19.00	176.00	269.00
08/01/95	8.00	19.00	176.00	269.00
09/01/95	8.00	19.00	176.00	269.00
10/01/95	8.00	19.00	176.00	269.00
11/01/95	8.00	19.00	176.00	269.00
12/01/95	8.00	19.00	176.00	269.00
01/01/96	9.00	20.00	181.00	285.00
02/01/96	9.00	20.00	181.00	285.00
03/01/96	9.00	20.00	181.00	285.00
04/01/96	9.00	20.00	181.00	285.00
05/01/96	9.00	20.00	181.00	285.00
06/01/96	9.00	20.00	181.00	285.00
07/01/96	9.00	20.00	181.00	285.00
08/01/96	9.00	20.00	181.00	285.00

Date	Farm Value Share - Cereals	Farm Value Share - Fruit	Farm to Retail Spread - Cereals	Farm to Retail Spread - Fruit
09/01/96	9.00	20.00	181.00	285.00
10/01/96	9.00	20.00	181.00	285.00
11/01/96	9.00	20.00	181.00	285.00
12/01/96	9.00	20.00	181.00	285.00
01/01/97	7.00	18.00	187.00	295.00
02/01/97	7.00	18.00	187.00	295.00
03/01/97	7.00	18.00	187.00	295.00
04/01/97	7.00	18.00	187.00	295.00
05/01/97	7.00	18.00	187.00	295.00
06/01/97	7.00	18.00	187.00	295.00
07/01/97	7.00	18.00	187.00	295.00
08/01/97	7.00	18.00	187.00	295.00
09/01/97	7.00	18.00	187.00	295.00
10/01/97	7.00	18.00	187.00	295.00
11/01/97	7.00	18.00	187.00	295.00
12/01/97	7.00	18.00	187.00	295.00
01/01/98	6.00	17.00	193.00	312.00
02/01/98	6.00	17.00	193.00	312.00
03/01/98	6.00	17.00	193.00	312.00
04/01/98	6.00	17.00	193.00	312.00
05/01/98	6.00	17.00	193.00	312.00
06/01/98	6.00	17.00	193.00	312.00
07/01/98	6.00	17.00	193.00	312.00
08/01/98	6.00	17.00	193.00	312.00
09/01/98	6.00	17.00	193.00	312.00
10/01/98	6.00	17.00	193.00	312.00
11/01/98	6.00	17.00	193.00	312.00
12/01/98	6.00	17.00	193.00	312.00
01/01/99	6.00	17.00	199.00	359.00
02/01/99	6.00	17.00	199.00	359.00
03/01/99	6.00	17.00	199.00	359.00
04/01/99	6.00	17.00	199.00	359.00
05/01/99	6.00	17.00	199.00	359.00
06/01/99	6.00	17.00	199.00	359.00
07/01/99	6.00	17.00	199.00	359.00
08/01/99	6.00	17.00	199.00	359.00
09/01/99	6.00	17.00	199.00	359.00
10/01/99	6.00	17.00	199.00	359.00
11/01/99	6.00	17.00	199.00	359.00
12/01/99	6.00	17.00	199.00	359.00
01/01/00	5.00	16.00	204.00	350.00
02/01/00	5.00	16.00	204.00	350.00
03/01/00	5.00	16.00	204.00	350.00
04/01/00	5.00	16.00	204.00	350.00

Date	Farm Value Share - Cereals	Farm Value Share - Fruit	Farm to Retail Spread - Cereals	Farm to Retail Spread - Fruit
05/01/00	5.00	16.00	204.00	350.00
06/01/00	5.00	16.00	204.00	350.00
07/01/00	5.00	16.00	204.00	350.00
08/01/00	5.00	16.00	204.00	350.00
09/01/00	5.00	16.00	204.00	350.00
10/01/00	5.00	16.00	204.00	350.00
11/01/00	5.00	16.00	204.00	350.00
12/01/00	5.00	16.00	204.00	350.00
01/01/01	5.00	16.00	210.00	359.00
02/01/01	5.00	16.00	210.00	359.00
03/01/01	5.00	16.00	210.00	359.00
04/01/01	5.00	16.00	210.00	359.00
05/01/01	5.00	16.00	210.00	359.00
06/01/01	5.00	16.00	210.00	359.00
07/01/01	5.00	16.00	210.00	359.00
08/01/01	5.00	16.00	210.00	359.00
09/01/01	5.00	16.00	210.00	359.00
10/01/01	5.00	16.00	210.00	359.00
11/01/01	5.00	16.00	210.00	359.00
12/01/01	5.00	16.00	210.00	359.00
01/01/02	5.00	16.00	214.00	364.00
02/01/02	5.00	16.00	214.00	364.00
03/01/02	5.00	16.00	214.00	364.00
04/01/02	5.00	16.00	214.00	364.00
05/01/02	5.00	16.00	214.00	364.00
06/01/02	5.00	16.00	214.00	364.00
07/01/02	5.00	16.00	214.00	364.00
08/01/02	5.00	16.00	214.00	364.00
09/01/02	5.00	16.00	214.00	364.00
10/01/02	5.00	16.00	214.00	364.00
11/01/02	5.00	16.00	214.00	364.00
12/01/02	5.00	16.00	214.00	364.00
01/01/03	6.00	17.00	218.00	376.00
02/01/03	6.00	17.00	218.00	376.00
03/01/03	6.00	17.00	218.00	376.00
04/01/03	6.00	17.00	218.00	376.00
05/01/03	6.00	17.00	218.00	376.00
06/01/03	6.00	17.00	218.00	376.00
07/01/03	6.00	17.00	218.00	376.00
08/01/03	6.00	17.00	218.00	376.00
09/01/03	6.00	17.00	218.00	376.00
10/01/03	6.00	17.00	218.00	376.00
11/01/03	6.00	17.00	218.00	376.00
12/01/03	6.00	17.00	218.00	376.00

Date	Farm Value Share - Cereals	Farm Value Share - Fruit	Farm to Retail Spread - Cereals	Farm to Retail Spread - Fruit
01/01/04	6.00	19.00	220.00	388.00
02/01/04	6.00	19.00	220.00	388.00
03/01/04	6.00	19.00	220.00	388.00
04/01/04	6.00	19.00	220.00	388.00
05/01/04	6.00	19.00	220.00	388.00
06/01/04	6.00	19.00	220.00	388.00
07/01/04	6.00	19.00	220.00	388.00
08/01/04	6.00	19.00	220.00	388.00
09/01/04	6.00	19.00	220.00	388.00
10/01/04	6.00	19.00	220.00	388.00
11/01/04	6.00	19.00	220.00	388.00
12/01/04	6.00	19.00	220.00	388.00
01/01/05	6.00	17.00	225.00	403.00
02/01/05	6.00	17.00	225.00	403.00
03/01/05	6.00	17.00	225.00	403.00
04/01/05	6.00	17.00	225.00	403.00
05/01/05	6.00	17.00	225.00	403.00
06/01/05	6.00	17.00	225.00	403.00
07/01/05	6.00	17.00	225.00	403.00
08/01/05	6.00	17.00	225.00	403.00
09/01/05	6.00	17.00	225.00	403.00
10/01/05	6.00	17.00	225.00	403.00
11/01/05	6.00	17.00	225.00	403.00
12/01/05	6.00	17.00	225.00	403.00
01/01/06	6.00	18.00	227.00	422.00
02/01/06	6.00	18.00	227.00	422.00
03/01/06	6.00	18.00	227.00	422.00
04/01/06	6.00	18.00	227.00	422.00
05/01/06	6.00	18.00	227.00	422.00
06/01/06	6.00	18.00	227.00	422.00
07/01/06	6.00	18.00	227.00	422.00
08/01/06	6.00	18.00	227.00	422.00
09/01/06	6.00	18.00	227.00	422.00
10/01/06	6.00	18.00	227.00	422.00
11/01/06	6.00	18.00	227.00	422.00
12/01/06	6.00	18.00	227.00	422.00
01/01/07	8.00	17.00	232.00	448.00
02/01/07	8.00	17.00	232.00	448.00
03/01/07	8.00	17.00	232.00	448.00
04/01/07	8.00	17.00	232.00	448.00
05/01/07	8.00	17.00	232.00	448.00
06/01/07	8.00	17.00	232.00	448.00
07/01/07	8.00	17.00	232.00	448.00
08/01/07	8.00	17.00	232.00	448.00

Date	Farm Value Share - Cereals	Farm Value Share - Fruit	Farm to Retail Spread - Cereals	Farm to Retail Spread - Fruit
09/01/07	8.00	17.00	232.00	448.00
10/01/07	8.00	17.00	232.00	448.00
11/01/07	8.00	17.00	232.00	448.00
12/01/07	8.00	17.00	232.00	448.00
01/01/08	10.00	16.00	252.00	470.00
02/01/08	10.00	16.00	252.00	470.00
03/01/08	10.00	16.00	252.00	470.00
04/01/08	10.00	16.00	252.00	470.00
05/01/08	10.00	16.00	252.00	470.00
06/01/08	10.00	16.00	252.00	470.00
07/01/08	10.00	16.00	252.00	470.00
08/01/08	10.00	16.00	252.00	470.00
09/01/08	10.00	16.00	252.00	470.00
10/01/08	10.00	16.00	252.00	470.00
11/01/08	10.00	16.00	252.00	470.00
12/01/08	10.00	16.00	252.00	470.00
01/01/09	7.00	15.00	268.00	443.00
02/01/09	7.00	15.00	268.00	443.00
03/01/09	7.00	15.00	268.00	443.00
04/01/09	7.00	15.00	268.00	443.00
05/01/09	7.00	15.00	268.00	443.00
06/01/09	7.00	15.00	268.00	443.00
07/01/09	7.00	15.00	268.00	443.00
08/01/09	7.00	15.00	268.00	443.00
09/01/09	7.00	15.00	268.00	443.00
10/01/09	7.00	15.00	268.00	443.00
11/01/09	7.00	15.00	268.00	443.00
12/01/09	7.00	15.00	268.00	443.00
01/01/10	7.00	16.00	265.00	438.00
02/01/10	7.00	16.00	265.00	438.00
03/01/10	7.00	16.00	265.00	438.00
04/01/10	7.00	16.00	265.00	438.00
05/01/10	7.00	16.00	265.00	438.00
06/01/10	7.00	16.00	265.00	438.00
07/01/10	7.00	16.00	265.00	438.00
08/01/10	7.00	16.00	265.00	438.00
09/01/10	7.00	16.00	265.00	438.00
10/01/10	7.00	16.00	265.00	438.00
11/01/10	7.00	16.00	265.00	438.00
12/01/10	7.00	16.00	265.00	438.00