MOTIVATIONS AND CHALLENGES IN FARM TO SCHOOL PARTICIPATION:

NUTRITIONAL VERSUS FOOD HARDSHIP CONSIDERATIONS

by

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(Under the Direction of Cesar Escalante)

ABSTRACT

This paper explores the potential for the Georgia's public schools to participate in the Farm to School program. A survey was conducted with the Georgia Department of Education and Georgia Organics to assess the feasibility of Farm to School participation in Georgia. From the data, it was concluded that the willingness to participate exists, as well as the tools necessary for participation. What appears to be missing is the infrastructure that would allow schools to purchase food easily and frequently.

This primary dataset was then paired with secondary data from USDA and CDC to establish a correlation between Farm to School, obesity, and food hardship. The data was regressed using a PROBIT model in STATA. This study's results indicate that school districts are more influenced by food hardship considerations than nutritional issues (such as obesity) in deciding to participate in the Farm to School program.

INDEX WORDS: Farm to School, local food program, federal food programs, obesity, nutrition programs, PROBIT analysis

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DEDICATION

This culmination of my graduate career is dedicated to mom and dad, who have always patiently supported my decisions and encouraged me to keep pushing forward. There is nothing worth sharing like the love that let us share our name.

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Thank you, Dr. Escalante, for your endless support and guidance. You were a tremendous source of knowledge and encouragement. I could not have done it without you.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND AND MOTIVATION

Nutrition and good health are key factors in education and learning. Children are more focused and motivated when they receive proper nutrition. However, ensuring that school children are suitably nourished can be a daunting and costly task, especially when supplementing meals for low-income students.

Generally, low-income families experience food insecurity. Food insecurity is federally defined as "a household-level economic and social condition of limited access to food" (USDA, 2009). The first federal recognition for improvement towards nationwide food security came in 1946 with the National School Lunch Act. Congress appropriated funds at state-level in order to provide the minimum amount of nutrition to schoolchildren (USDA, 2009). The Food Stamp Act of 1964 followed, after years of a similar trial program, and the official purpose as outlined by Congress was to "provide improved levels of nutrition among low-income households" (Gunderson, 2009). Later, in 1975, after doctors and officials realized that this curriculum left many impoverished women and children hungry, the Special Supplemental Food Program for Women, Infants, and Children (WIC) was permanently established to alleviate the special needs of this socioeconomic group. Most recently, in 1992, the WIC Farmer's Market Nutrition Act passed, establishing the Farmer's Market Nutrition Program (FMNP) specifically to "provide

resources in the form of fresh, nutritious, unprepared foods (fruits and vegetables) from farmers' markets to women, infants, and children" (USDA, 2006).

From the first program in 1946, government regulated food assistance has, at its core, worked towards nourishment for those below the poverty line. Several amendments and trends have created varying immediate goals, such as strengthening the integrity of the program so as to avoid misuse of funds, while the fundamental programs themselves have remained consistent. Nevertheless, gaps remain in the system as 50.2 million people in the United States lived with food insecurity in 2009 (USDA, 2011).

However, with the establishment of FMNP, the government and the United States Department of Agriculture (USDA) recognized the importance of providing nutrition and not just supplying groceries. Established within the purpose of FMNP is the goal of education for the benefit of the recipient, the farmer, and the community as a whole. In its purpose, the WIC Farmers Market Nutrition Program asserts nutritional education as its primary goal, to "emphasize the relationship of proper nutrition to the total concept of good health, including the importance of consuming fresh fruits and vegetables" (USDA, 2006). Apparent in this statement is the moving trend toward alleviating malnutrition congruent with food insecurity. Currently, forty-five states participate in FMNP, and the National Association of State Departments of Agriculture has declared: "FMNP has proven to be a highly cost-effective means to stimulate production of locally grown fresh fruits and vegetables and encourage the growth of farmers' markets. These farmers' markets provide an important outlet for local farmers while enhancing

communities and providing consumers a wider variety of choices and greater access to local farm production" (NASDA, 2008).

The USDA has recognized that previous programs, such as WIC and SNAP have potentially reduced food insecurity, though they have failed to eliminate it. Programs such as FMNP call attention to a revolutionary approach to alleviating hunger, food insecurity, and the subsequent community-wide decline. Since farmers markets and local buying infrastructures engage members within the community and encourage producers and consumers to interact directly, they offer a holistic approach to community improvement.

Since obesity is also a rising concern in the United States, there has been a shift from simply feeding families and school children to nourishing them properly. According to the Food Action and Research Center (FRAC), "due to the additional risk factors associated with poverty, food insecure and low-income people are especially vulnerable to obesity" (2012). Therefore, government programs that focus on feeding low-income families have become more concerned with nutrition as well. Incentives, such as the EBT and SNAP's 'double dollars' allow people living on supplemental income to get double their value at farmers markets. In other words, every one dollar of supplemental income a recipient spends will count as two dollars at the local market. This is meant to encourage a greater intake of those commodities sold at local farmers markets, namely fresh produce. Ultimately, this is meant to encourage better nutrition in those below the poverty line.

In recent years, similar programs have taken grassroots approaches to this problem, slowly gaining national recognition through their success. The National Farm to School Program has grown from an estimated 6 schools in 2001 to a current estimate of 2,334 programs in operation to date. Started as a pilot program in 1996, Farm to School "is broadly defined as a program that connects schools and local farms with the objectives of serving healthy meals in school cafeterias, improving student nutrition, providing agriculture, health and nutrition education opportunities, and supporting local and regional farmers" (National Farm to School Network). Reaching beyond dietary supplement, the Farm to School Program aims to educate by engaging children within their food system. Likewise, it reaches beyond the health of the individual and undertakes an improvement on the community, farms, the environment, and the local economy as a whole.

The opportunity for local solutions to food insecurity has expanded tremendously in the past ten years as the climate surrounding local food demand and awareness has grown. The Food and Nutrition Act of 2008 authorized $5 million per fiscal year through 2012 "to support the development of community food projects" (USDA, ERS, 2009). These grants target the food needs of low-income individuals and aim to specifically increase self-reliance within low-income communities. From these grants, many tangible initiatives have taken effect since the organizations initial establishment in 1999. These programs include and are not limited to: *Fresno Fresh Access Project*, Fresno, CA; *Food Access and Food Justice in New Orleans: Rising Above the Water Line*, New Orleans, LA; *Healthy Harvest Initiative: Building Boston's Food Security from the Ground Up*, Lincoln, MA; *Appalachian FoodNet Project and Rural Food Centers Project*, Athens, OH; *Integrated Development Through Urban Agriculture*,

Holyoke, MA; *Urban Detroit Agriculture and Education Project*, Detroit, MI (USDA, ERS, 2009). These programs, which range from assessment of need projects and feasibility studies to education, implementation, and execution of new agricultural and marketing systems, display the initiative in which communities are willing to engage when presented with the right materials. There are challenges, such as procurement of land on which to grow community gardens; however, when the community as a whole meets these challenges, they serve to strengthen the community's resolve, its successes and ultimately, its economic stability. As a report by the USDA affirms, "A community food security approach to fighting food access problems is a viable way to make a difference in small, yet significant ways for those individual communities that are affected by a lack of access to food. Modest grants for communities across the Nation have given people the incentive they need to build solutions that match the needs of the community" (USDA, ERS, 2009).

The number of farmers markets has increased nationwide, while the direct consumer-to-farm dollar amount has likewise grown. As the infrastructure for local buying improves, production has responded with an increase in supply. The number of farmers markets between 1994 to 1998 grew from 1,755 to 2,756 and nearly doubled from this amount to 5,274 in 2009; meanwhile, direct-to-consumer marketing doubled from $551 million in 1997 to $1.2 billion in 2007. Direct-to-consumer sales grew from 0.3 percent of total agriculture sales in 1997 to 0.4 percent in 2007; excluding non-edible products, direct-to-consumer sales in 2007 accounted for 0.8 percent of total agricultural sales (Martinez, Hand, and DaPra, 2010). Not only do these sales benefit the consumers to which they were made, they also reflect an economic

improvement in the local community. Instead of benefiting non-local companies, the revenues from these sales directly enhance the quality of the immediate culture.

Similarly, the rate at which local buyers participate within Community Supported Agriculture (CSA's) has accelerated in the past ten years, according to the USDA's Economic Research Service (ERS). Community Supported Agriculture Community-supported agriculture "is a marketing approach whereby the farmer sells shares in the future crop of the farm to local consumers, providing the small farmer with a prepaid market, market stability, and cash-flow" (Steele, 1997). As observed by the USDA, "In 2005, there were 1,144 community-supported agriculture organizations in operation, up from 400 in 2001 and 2 in 1986, according to a study by the nonprofit, nongovernmental organization National Center for Appropriate Technology. In early 2010, estimates exceeded 1,400, but the number could be much larger" (Martinez, Hand, and DaPra, 2010). With funds for purchase coming from FMNP and education about food production increasing, these numbers are projected to continue to rise, improving local economies and closing the gap between the food secure and the food insecure.

1.2 OBJECTIVES

The objectives of this study are:

- To assess the current and future impact Farm to School has and will potentially have on the Georgia economy through schools purchase of local foods;
- To define the potential market for farmers;
- To gauge Georgia school administrators willingness to buy local food;

- To identify the level of infrastructure available within schools to prepare fresh, whole foods; and
- To determine the perceived opportunities and challenges to buying and preparing local food.

Additional objectives of this analysis are:

- To apply the primary data to preexisting secondary data in order to assess the extent to which obesity and food hardship are correlated with Farm to School participation;
- To understand the relationship between Farm to School and the perceived barriers to entry that keep schools from participating in this program; and
- To relate demographic variables, such as household income, age, and education to obesity and Farm to School, to see if well educated, more affluent areas have higher rates of participation in local buying entities and lower rates of obesity.

Since local buying and Farm to School data are limited, this paper aims to contribute to the research on this important topic. Furthermore, by relating this data to health indicators (obesity), human opinion and perception about local buying efforts (perceived barriers that face Farm to School implementation), and demographic variables (age, household income, city size, and food hardship), programs that wish to pursue Farm to School programs will have greater ammunition for funding proposals and policy makers will have more reason to implement these socially beneficial programs.

1.3 LITERATURE REVIEW

Though local food buying has gained momentum, few feasibility studies have been conducted to explore how FMNP, CSA's, and Farm to School can affect food insecurity; research is extremely limited. Though slow to gain credence initially, the local food movement is slowly becoming recognized as public and private agencies identify the potential for improved food security through local buying in addition to the economic sustainability of small farmers and local communities. However, most studies are simply willing to recognize that local food buying has potential without providing clear evidence as to how these practices have changed the landscape. This idea is too young to assert results. According to Martinez, Hand, and DaPra, the potential for local buying as a solution to food insecurity is tangible given the new infrastructure for buying. However, they note, "no study has attempted to demonstrate a clear relationship between [economic conditions, income, and poverty status], observed food security, and local food characteristics" (2010).

More common are studies that have been conducted to demonstrate how local buying affects small farmers and local communities. According to Steele, "Operators of small farms often pursue alternative agricultural enterprises to gain a competitive edge in domestic and foreign markets" (1997). Direct-to-consumer practices, such as participation in CSA's and farmers' markets, account for a larger share of sales for small farms than for medium to large sized farms, which are defined as having total farm sales greater then $50,000 and $500,000 respectively. In 2007, "produce farms engaged in local marketing made 56 percent of total agricultural direct sales to consumers, while accounting for 26 percent of all farms engaged in direct-to-consumer marketing" (Martinez, Hand, and DaPra, 2010). And while 2010 saw few

studies on how the impact of local buying affects local economies, the USDA published a report concluding, "empirical research has found that expanding local food systems in a community can increase employment and income in that community" (Martinez, Hand, and DaPra, 2010). Small farm operators, defined as having sales less than $20,000, are vital to the local economy, as they own 29 percent of the agricultural land held by farmers. Other contributions to the local economy are cited as direct sales from investment in farm machinery and other capital inputs, production of several staple commodities such as hay and tobacco, job creation due to direct labor as well as marketing activities, and tax contribution, which accounted for 18 percent of farm debt in 1994 and 24 percent of real estate and property tax within the farm sector (Steele, 1997).

King and Hand (2010) found that farmers with direct sales retain a higher percentage of the total value sold at the market. Since they do the majority of the food-to-market processes without outsourcing to a third party, they retain higher revenues on a per-unit basis. In other words, "these producers consistently retain a large percent of the retail value of their products, even after estimated marketing and processing costs are netted out." Additionally, while direct to market vendors charge an absolute higher price than mainstream vendors, those participating in farmers markets and CSA's have the ability to keep "essentially all revenue in the direct market chain retained in the local economy." This study also noted that while absolute prices are higher, they are for very small volumes of commodities and there may be a significant decrease in prices if more vendors enter the market.

While evidence regarding the National Farm to School Program is limited, there are some broad studies that suggest it may help mitigate increasing fuel costs and increase nutritional intake among children. The National Farm to School Network "in 2009 estimated that 41 states had some kind of Farm to School program, and 8,943 schools in 2,065 districts participated." The goal of this program is to strengthen the relationships between schools and farms over time, with the idea that students will be more inclined to eat food that they have seen growing in their own gardens or in fields nearby (Martinez and Hand, 2010). This may increase nutritional intake and encourage children who may not otherwise have exposure to fresh fruits and vegetable to eat healthier. This has been cited as a reason for further developing Farm to School programs (Vogt and Kaiser, 2008).

In the past ten years, research has increased to evaluate the derivatives of the local buying movement; however, as mentioned previously, there has been limited analysis of the effect direct sales have on food insecurity. This may be the case because data for direct-market sale indicators is limited.

1.4 ORGANIZATION OF THE STUDY

This thesis is four chapters. The first chapter deals with the motivation and background for the study and continued study of the Farm to School program. It follows with a second chapter on the methods of the study, which clarifies how the survey questions were developed and then interpreted into regression analysis. This chapter alternates between explanations of the approach used for survey data collection and explanations of the econometric analysis; it defines how the survey was conducted as well as what variables were chosen, and why. Chapter three

reveals the survey results as well as the regression results. Again, this chapter alternates between sections dedicated to the survey and sections dedicated to the econometric analysis. Chapter four is the concluding chapter, where implications and future research are discussed.

CHAPTER 2

METHODS

2.1 INTRODUCTION TO METHODS

Two types of studies were conducted within this paper. The first report was a survey conducted largely with the Center for Agribusiness and Economic Development at the University of Georgia and Georgia Organics to collect primary data and determine the objectives mentioned previously. The second analysis utilizes an instrumental variable probit model (IVPROBIT) and a standard probit model (PROBIT), which were used to determine the relationship between the Farm to School program, adult obesity—which served as a proxy for nutrition—and food hardship. Ultimately, the PROBIT analysis was chosen as the best model for this study. The data collected in the survey phase was used in this regression analysis.

This section will alternately describe the survey's methods and the regression's methods so as to outline in detail how data was collected and analyzed.

2.2 SURVEY METHODS

University of Georgia's Center for Agribusiness and Economic Development collaborated with the Georgia Department of Education and Georgia Organics to develop a survey that met the following objectives: first, evaluate the current and future impact Farm to School has and will potentially have on the Georgia economy through schools purchase of local foods; second, measure the potential market for farmers; third, gauge school administrators

willingness to buy local food by Georgia; forth, determine the level of infrastructure available within schools to prepare fresh, whole foods; and fifth, assess the perceived opportunities and challenges to buying and preparing local food.

The survey consisted of twenty-five questions that were used to assess the quantity of produce a school might demand as well as the school's willingness to participate in the program. Simultaneously, determining reasons against participation and barriers to entry are informative to the process of setting up infrastructure for buying by understanding what problems may have arisen in the past. For instance, a few questions addressed the current total use by public schools of fresh, frozen, and canned food. Though fresh food is the easiest for the farmer to sell, it may take time and preparation by the school in order to have it served. Therefore, it is important to know how receptive schools are to buying food in its raw state. Furthermore, schools were asked if they have tried to buy locally in the past and, if so, what were their efforts. If schools had issues with this, they could then comment in order to illustrate what problems or frustrations may have arisen during this process. Farm to School was specifically defined within the survey and participants were asked a series of questions that identified the potential barriers to entry for the program, as well as the reasons people were encouraged to engage with local buying. In order to establish what kind of market exists within Georgia, it is important to understand why people are buying and what motivates them to continue to participate in a program like Farm to School.

The questions were formatted in a multiple-choice selection with an option to write any additional comments additionally. The survey was distributed by the Department of Education

to 158 public schools in Georgia and collected 55 consistent responses. A participation incentive was provided with the potential to win a knife set in a raffle.

2.3 ECONOMETRIC ANALYSIS

Primary data collected from the survey was paired with secondary data to gain an understanding of the significant factors that dictate a county's participation in Farm to School, particularly a county's prevalence of obesity. It was hypothesized that if a county had a high level of obesity in 2008, then it would be engaged in a Farm to School program in 2011. It stands to reason that counties in Georgia are already using the Farm to School program, in conjunction with nutrition education, to combat the rising occurrence of obesity.

2.4 PROBIT ESTIMATION

This analysis employs PROBIT estimation techniques whereby the binary choice model is used to empirically identify the determinants of Farm to School participation. Following the logic mentioned above, a school has chosen to participate in Farm to School if county obesity rates are high. Therefore, we model program participation as:

$$z_i^* = \beta' x_i + \varepsilon,$$

where z_i^* is the unobservable variable, x_i is a vector representing the variables that affect likelihood of Farm to School participation, β' is a vector incorporating the corresponding parameters, and ε is assumed to have a normal distribution with mean 0 and variance 1.

The binary dependent variable can be defined as z = 1, if $z_i^* > 0$, otherwise z = 0. In this analysis, the dichotomous dependent variable takes a value of 1 if the county participates in a

Farm to School program, and a 0 if the county does not participate in a Farm to School program. It follows that:

$$\text{Prob (z = 1)} = \text{Prob } (\varepsilon > -\beta x_i)$$

$$F(\beta x_i),$$

where F is the cumulative distribution function of ε (Greene, 2003). Since a normal distribution is assumed for ε, the model's PROBIT form is estimated here. The PROBIT distribution is given by:

$$\Pr ob(y = 1) = \int_{-\infty}^{\beta' x} \varphi(t)dt,$$

where φ represents the standard normal distribution. A maximum-likelihood procedure is used to estimate the parameters of the above binary choice model. Because the estimated coefficients arising from these regressions are not marginal effects, additional calculations are necessary.

The x_i vector in this analysis is comprised of a set of proxy local buying measures that represent the extent to which counties already participate in local buying infrastructure, as well as the level to which these counties are educated; the assumption is that better-educated populations have more dollars invested in the local community as well as lower rates of obesity and therefore improved nutritional habits. The x_i vector also has a set of continuous and dummy demographic variables that discern whether Farm to School participation is significantly influenced by school size, city size, age, education, and household income.

$$\frac{\partial E[z|x_i]}{\partial x_i} = \varphi(\beta x_i)\beta$$

The PROBIT method and the IVPROBIT method were considered for this study; however, after considering both models, their goodness-of-fit and the exogeneity testing, the PROBIT model was discovered to be a better approach in determining linkages among *farmtoschool, foodhardship* and *adultobesity_08*. In a later discussion, the IVPROBIT model will be explained and the results will be presented as a means of contrast to the PROBIT results.

2.5 DATA DESCRIPTION

Four data sources were used for the econometric analysis. The first was the primary data collected from the survey; those methods were discussed previously.

The second data source was USDA's Food Environment Atlas. The Atlas contains data from several organizations and categorizes data into are three sections: food choices, health and well-being, and community characteristics. Food choices are 'indicators of the community's access to and acquisition of healthy, affordable food.' Health and well-being variables are ' indicators of the community's success in maintaining healthy diets.' Community Characteristics are 'indicators of community characteristics that might influence the food environment.' This data is meant to achieve two objectives, as defined by the Atlas: first, 'to assemble statistics on food environment indicators to stimulate research on the determinants of food choices and diet quality,' and second, to 'provide a spatial overview of a community's ability to access healthy food and its success in doing so.' This paper employs the data to meet the first objective.

The Economic Research Service acknowledges the Center for Disease Control and Prevention for providing the data on obesity, diabetes, and physical activity; the National Cancer

Institute for providing data regarding recreational activity; USDA's Agricultural Marketing Service for providing data regarding farmers' markets; USDA's Food and Nutrition Service for providing data regarding food and nutrition assistance programs; the National Farm-to-School Network for providing data regarding farm-to-school programs.

The Food Research and Action Center collected national data for food hardship, through Gallup and Gallup's Healthways Well-Being index project. This project has interviewed over one million people since 2008, and the data is measured by congressional district. To gauge food hardship, Gallup asks: 'Have there been times in the past twelve months when you did not have enough money to buy food that you or your family needed?' If respondents answered 'yes', they were included in the percentage of people within that congressional district that experience food hardship.

The Georgia Public Policy Foundation's *Report Card for Parents* gives parents an idea of how their school measures up against other schools. Data included in this report was collected from the Georgia Department of Education and is simply compiled into an easily read spreadsheet by the Public Policy Foundation.

2.6 EMPIRICAL MODEL

In this analysis, an instrumental variable probit model (IVPROBIT) was initially considered in relating Farm to School participation to obesity, food hardship, local buying indicators, and demographic variables. The IVPROBIT model uses a maximum-likelihood

estimation that fits models with dichotomous dependent variables and endogenous explanatory variables. Therefore, Farm to School participation is instrumented by obesity.

Since the relationship between the Farm to School program and the demographic variables is instrumented using obesity, two equations are estimated:

$$z_{1i}^{*} = \alpha z_{2i} + \omega W_i + \mu_i \quad (2.1)$$

$$z_{2i}^{*} = \Pi_1 W_i + \Pi_2 V_i + \nu_i \quad (2.2)$$

Where $i = 1, \ldots, N$; z_{1i}^{*} is a vector of endogenous variables; W_i is a vector of exogenous variables; V_i is a vector of instruments that satisfy conditions of instrumental exogeneity and relevance; α and ω are vectors of structural parameters; and Π_1 and Π_2 are matrices of reduced-form parameters. The z_{2i}^{*} equation is written in reduced form and both equations are estimated simultaneously using maximum-likelihood techniques. As a discrete choice model, z_{1i}^{*} is not observed because the model instead fits $z_{1i}^{*} = 1$ for $z_{1i}^{*} \geq 0$, and $z_{1i}^{*} = 0$ for $z_{1i}^{*} \leq 0$.

In this analysis, the IVPROBIT model is formulated under the assumption that participation in the Farm to School program may be motivated by obesity rates in within the county. Therefore, the obesity variable is included as the instrumental variable in the equation estimate.

2.7 SPECIFIED MODEL

Using the IVPROBIT empirical model, we can define the specific model as:

$$z_{1i}^{*} = \gamma_0 + \alpha \ln(ADULTOBESITY\_08_i) + \omega W(PV_i, DV_i) + \mu_i,$$

$$ADULTOBESITY\_08 = \Pi_1 W(PV_i, DV_i) + \Pi_2 REQ_i + v_i,$$

where z_{1i}^{*} is the same binary dependent variable in equations (2.1) and (2.2); *ADULTOBESITY_08*, the instrumented variable (z_{2i}^{*}) in this model, which is the percentage measurement of adult obesity within each county; PV_i and DV_i are the same set of program variables and demographic variables , respectively, included in equations (2.1) and (2.2) and are the exogenous variables (W_i) in this equation; REQ, consisting of *pc_college*, *averageage*, *medhhincome_log*, are the instruments (V_i) for *ADULTOBESITY_08*.

An alternative model considered in this analysis is the standard PROBIT model (as laid out in section 2.4. This model will be relied on in the event that the necessary model significance and endogeneity tests do not justify the use of IVPROBIT estimation techniques for this analysis.

The model was developed using county level data for 84 of the 159 counties in Georgia. Table 1 shows the abbreviations used in analysis as well the full description of the variables. Variable descriptions and measurements follow.

The dependent variable *(farmtoschool)* is a categorical measurement of Farm to School participation taken from the USDA Food Atlas and updated with survey data collected in 2011. The independent variables X_i in (2.1) include several program and demographic variables such as direct sales from farmers (Food Atlas); percent of total food purchased by county that is fresh,

as opposed to canned or frozen, (survey data); obstacles that schools and districts perceive as barriers to entry for the Farm to School program (survey data); full time enrollment (Georgia Report Card); percent of students that graduate from high school (Georgia Report Card); food hardship rate (FRAC); metro classification of each county (Food Atlas).

The instrumented variable in (2.2), *adultobesity_08*, was collected from the Food Atlas, while the exogenous variables capture the following demographic characteristics: percent of the county's population that has graduated from college (Georgia Report Card); average age (US Census); median household income, logged (Food Atlas).

2.8 DATA FOR ECONOMETRIC ANALYSIS

Table 1. Variables Defined

Variable Abbreviation	Definition of Variable
farmtoschool	Farm to School (F2S) participation, indicated with '0' or '1'
directsalesfromfarmers	Direct sales from farmers to consumers, measured in dollars
freshpurchase	Percentage of current total food purchase that is fresh, not canned or frozen, as indicated by schools in each county
products*	F2S barrier to entry: 'lack of products available during certain times of year' as indicated by schools in each county
producer*	F2S barrier to entry: 'lack of local producers in the area from whom to purchase' as indicated by schools in each county
safety*	F2S barrier to entry: 'Liability/farmer compliance with food safety and food handling standards'
time*	F2S barrier to entry: 'Extra time required to prepare and handle fresh produce'
staff*	F2S barrier to entry: 'Lack staffing to prep fresh

	produce/uncooked bulk meat, etc.'
fulltimeenrollment	Full time enrollment, number of students, an average among schools within each county
studentgraduationhs	Percentage of students who graduated from high school, versus those who initially started high school
foodhardship	Georgia's Food Hardship rate, by county, as measured by FRAC
metro	The metro classification of each county, as specified by USDA; measured as '1' or '0'
adultobesity_08	Adult obesity rate, 2008, as specified by USDA, measured in percentage of people that are obese per county
pc_college	Percent of people in a county who have graduated from college
averageage	Average age per county, as measured by the 2010 census
medhhincome_log	Median Household Income, measured by USDA, logged

Note: * These variables were listed as barriers to entry for the Farm to School (F2S) program in response to the question: 'Would any of the following describe an obstacle for your school or district in purchasing foods directly from local producers?' Yes = 1; No=0

Table 1 provides a list of the variables used in the econometric analysis. The dependent variable *farmtoschool* is a categorical measurement of Farm to School's presence in the county. This variable is measured in the Food Atlas and is defined as: 'counties with one or more farm-to-school programs where 1=one or more "farm-to-school" programs, and 0=otherwise. These programs include: direct sourcing from local producers, local sourcing through the Department of Defense procurement system (known as "DOD Fresh"), school gardens, farm tours, farm-related nutrition education or other classroom activities, and school menus and snacks highlighting locally-sourced or locally-available foods.' The Food Atlas data was collected in 2010 and updated with the survey data. Using USDA's data, the '0' was changed to a '1' (no to

a yes) if a school reported that it had participated in local buying efforts. However, a '1' was not changed to a '0'. The reason being, if USDA already had catalogued one or more schools in a county participating, one school in the survey reporting that they did not participate in Farm to School did not negate the participation of other schools in that area.

The independent variables X_i include the following production and program variables: *Directsalesfromfarmers* is measured by USDA as 'value of direct farm sales in the county divided by the residents of the county, in thousands of dollars.' Data was collected by USDA from the 2007 Agriculture Census; population data was taken from the U.S. Census Bureau. It is hypothesized that counties that have higher dollar sales from farmers directly are more willing to participate in a Farm to School program and have lower rates of obesity.

Freshpurchase is the percentage of total food bought by the school or district that is fresh, not canned or frozen. It was quantified by primary data collected from the survey cited in the study previously defined. If schools use a higher percentage of fresh food, they may be more willing to purchase their cafeteria food locally.

Products, producer, safety, time, and *staff* are defined as Farm to School's barriers to entry as perceived by the school district. In total, there were twelve barriers to entry listed in the survey; these five were the most cited in answer to the question: 'would any of the following describe an obstacle for your school or district in purchasing foods directly from local producers?' *Products* refers to the response: 'lack of products available during a certain time of year.' *Producer* refers to the response: 'lack of local producers in the area from whom to

purchase.' *Safety* refers to the response: 'liability/farmer compliance with food safety and food handling standards.' *Time* refers to the response: 'extra time required to prepare and handle fresh food.' *Staff* refers to the response 'lack staff to prepare fresh produce, uncooked bulk meat, etc.' These responses were measured as binary numbers, whereby '0' indicated a 'no' response and '1' indicated a 'yes' response.

Demographic and structural variables are also included: *fulltimeenrollment* (Georgia Report Card), as measured by the Georgia Department of Education's numbers for average full time enrollment of high school students by district. It is hypothesized that schools with higher enrollment have greater funds and resources for local procurement.

Studentgraduaionhs is the percentage of the population that has graduated from high school (Georgia Report Card). Also collected by the Georgia Department of Education, this variable measures the percentage of students who actually graduate from high school, versus those who initially enroll. In other words, 'the graduation rate reflects the percentage of students who entered ninth grade in a given year and were in the graduating class four years later.' It would stand to reason that a higher percentage of students who graduate from high school indicates a greater likelihood that those counties will participate in Farm to School. This could hold not only because the population is better educated, but also because their parents are more well-educated and more invested in the education of their children. This may indicated that they are concerned with their children's well-being and are more invested in their nutritional education as well.

The food hardship index, *foodhardship,* was taken from the 'Food Hardship Rate in Georgia' as prepared by the Food Research and Action Center. *Foodhardship,* as mentioned previously, is measured as a percentage of the population that answered 'yes' to the following question: 'Have there been times in the past twelve months when you did not have enough money to buy food that you or your family needed?' It was theorized that counties with higher participation in the Farm to School program have lower rates of food hardship. This is based upon they hypothesis that there is greater access to local foods; therefore, low-income families can readily access food through the community, especially with programs in place such as the Food Stamp program, which doubles dollars at the farmer's markets. Furthermore, counties with lower *foodhardship* have lower levels of *obesity* and greater participation in *farmtoschool*, which promotes nutrition and healthy eating. However, this could also be correlated with *medhouseholdincome_log*, since households with greater income tend to have more education about nutrition and therefore better, and more regular, eating habits.

The metro index indicating an urban or rural area, *metro,* was measured in '2000 [as a] classification of counties by metro or nonmetro definition, where 1=metro county; 0=nonmetro county. Metropolitan (metro) and nonmetropolitan (nonmetro) areas are defined by the Office of Management and Budget (OMB). Under the 2003 classification, metro areas are defined for all urbanized areas regardless of total area population. Outlying counties are also classified as metro if they are economically tied to the central counties, as measured by the share of workers commuting on a daily basis to the central counties. Nonmetro counties are outside the boundaries of metro areas and have no cities with 50,000 residents or more.'

Adultobesity_08 was taken from the USDA's *Food Environment Atlas*. As mentioned previously, the *Food Atlas* collected this data from the Center for Disease Control. As defined by the *Food Atlas,* 'body mass index (weight [kg]/height [m]^2) was derived from self-report of height and weight.' *Adultobesity_08* is measured by the county's 'estimates of age-adjusted percentage of persons age 20 and older who are obese, where obesity is Body Mass Index (BMI) greater than or equal to 30 kilograms per meters squared. The prevalence of diagnosed diabetes and selected risk factors by county was estimated using data from CDC's Behavioral Risk Factor Surveillance System (BRFSS) and data from the U.S. Census Bureau's Population Estimates Program.' It was hypothesized that counties that experience high levels of obesity in 2008 would engage in a Farm to School program, in order to mitigate rising levels of obesity. *Adultobesity_08* is used to instrument the effect that the Farm to School program has upon nutrition within the county. It stands to reason that counties with greater access to local foods have lower rates of obesity and ultimately, better nutrition.

Pc_college was measured by the Georgia Department of Education and prepared by the Georgia Public Policy Foundation and presented in the *Georgia Report Card*. As defined by the *Georgia Report Card,* 'this indicates the percentage of high school graduates who go to college. This data is provided by the Governor's Office of Student Achievement and includes technical colleges, two-year colleges and four-year colleges and universities both in Georgia and out of state.' It stands to reason that counties that are more well-educated (i.e. counties that have a higher percentage of students who go to college) have less food hardship, less obesity, and greater participation in health-promoting programs, such as Farm to School.

Averageage is the average age of the population, by county. The U.S. Census Bureau collects this information and defines age, 'for the most recent decennial census, was the length of time in completed years that a person had lived as of Census Day--April 1, 2010. The Census Bureau's national surveys compute age as of the interview date.' Age was tested to see if there an older population constituted higher levels of participation in Farm to School; the reason being, the older population would work to implement programs that would better educate and improve the nutritional future of the youth.

Medhhincome_log is an 'estimate of median household income.' The data source is the Census Bureau, Small Area Income and Poverty Estimates—2008 data. The variable was logged in order to scale it with the other data, making for a more accurate analysis. A greater median household income may indicate a higher participation in Farm to School, a lower rate of obesity, and a lower rate of obesity. Generally speaking, households with greater income have more time and money to spend on proper food and nutrition education.

2.9 SURVEY DATA

This survey was conducted using the website www.surveymonkey.com. The survey ran from February 2011 until July 2011, when it was officially closed. At that time, data results were assimilated and emailed in an Excel format using the software provided by the website.

From the responses received, there were a few questions that were answered multiple times by the same respondent. The responses were reviewed in detail and, if more than one response was given, the most recent response was accepted as the true answer.

Of the 93 respondents who identified themselves, most listed their title as one of the following: School Nutrition Director, Student Nutrition Program Supervisor, Director, Manager, Child Nutrition Director, Food Service Director, System Manager, Director of School Nutrition and Wellness, and Food Service Supervisor. In other words, respondents were mainly those who oversee food buying and or administration, and have control of how the district deals with distributors and buyers.

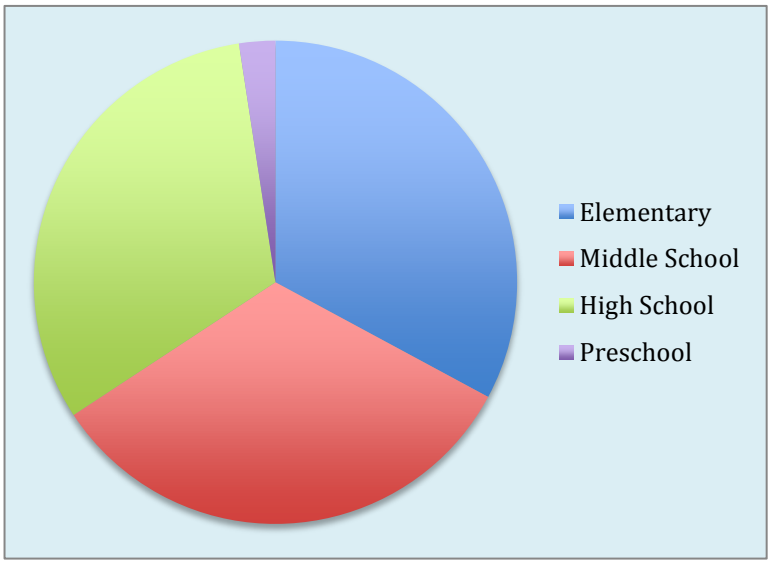
CHAPTER 3

RESULTS

3.1 SURVEY RESULTS

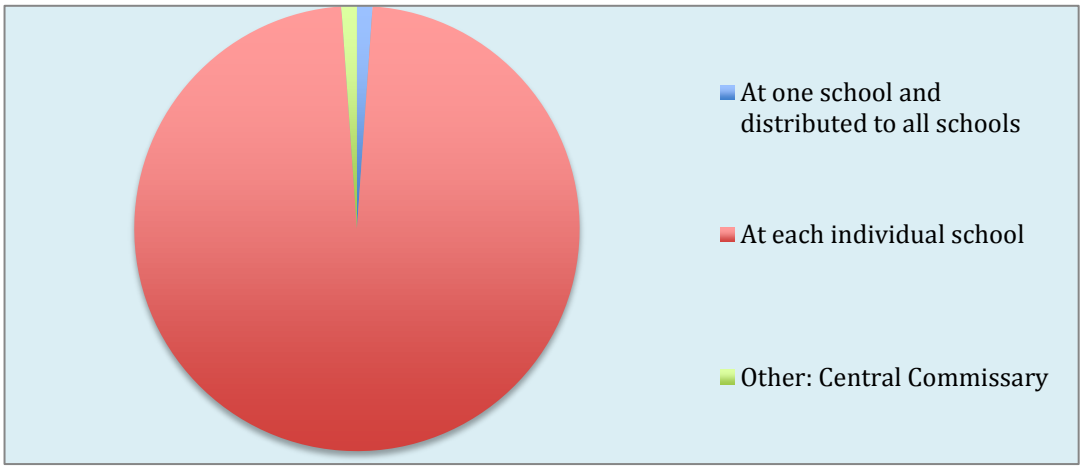
In this section, the more salient issues covered in the survey are discussed. Specifically, this section highlights certain questions and their respective responses that are relevant to the issue of Farm to School participation. There were 55 consistent responses to the survey questions, meaning that 55 people answered all the questions in the survey. However, there were 95 respondents to several of the questions; though not all 95 people answered every question.

Question # 3: What is the age group of the children attending this school or the schools in your district? (Please select all that apply).

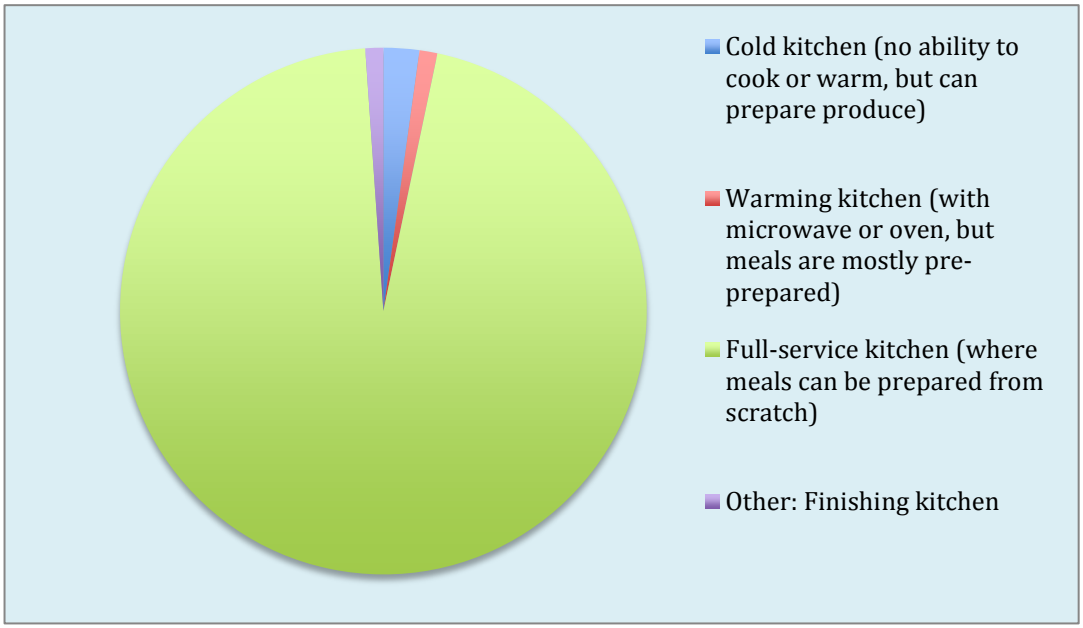


Elementary	95
Middle School	95
High School	92
Preschool	7

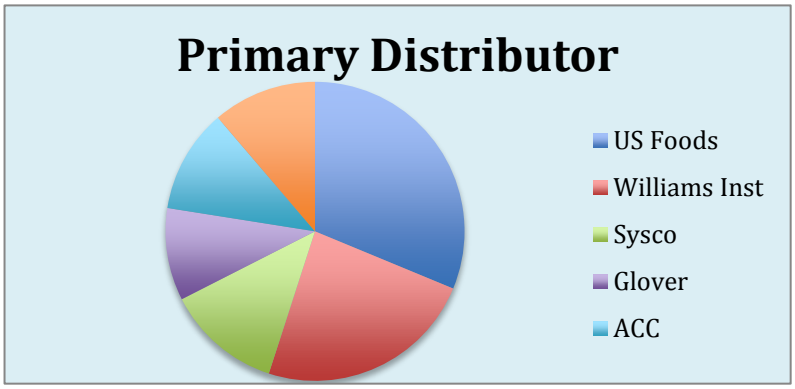
Question #5: Where are the majority of the meals prepared? (Please check one)



Question #6: Which of the following typifies the kitchens in the district or at the school you represent?



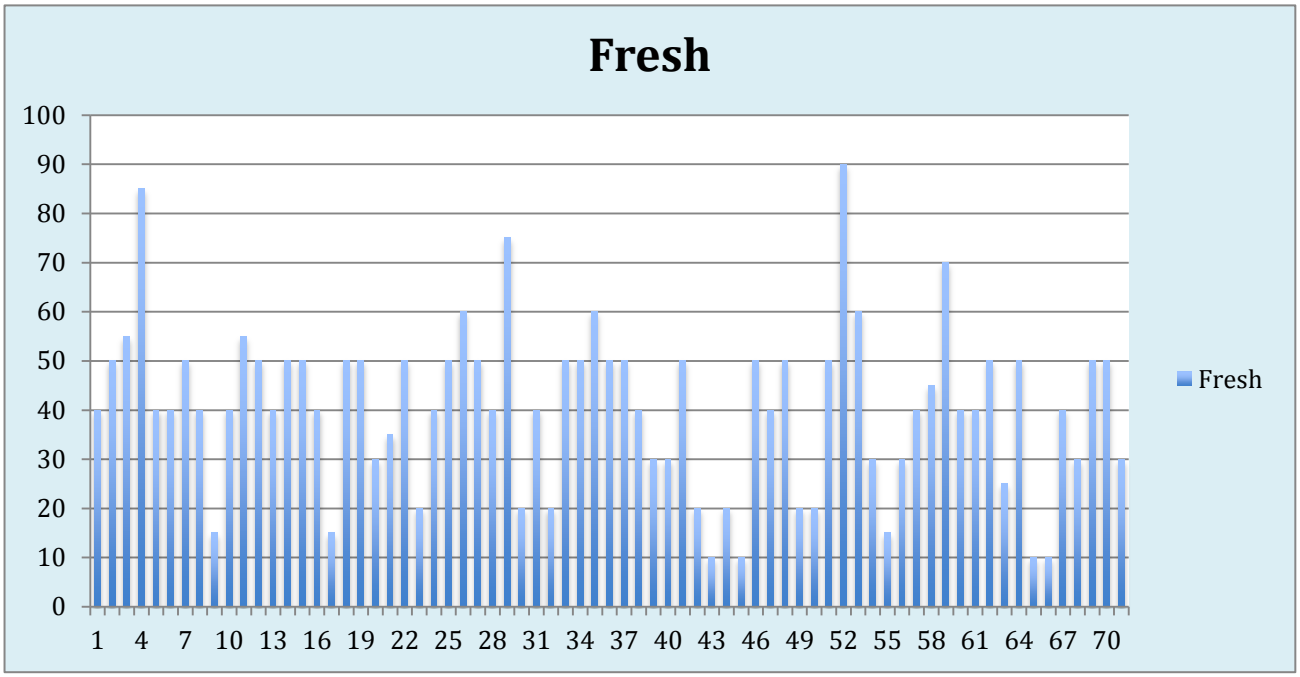
Question #7: From which food distributors does your school or district purchase food? (Please list distributors.



Question #8: How does your institution determine who provides food to your school or district? (Please check one.)

Bid	79
Contract	0
Other: RTF (Request for Tender)	1

Question #11: Generally speaking, of the produce your institution currently buys, what percentage is fresh, canned, frozen or other? (Total must = 100%)



Question #13: Has your institution made any efforts to purchase local farm products for your school?

Yes	No
54	21

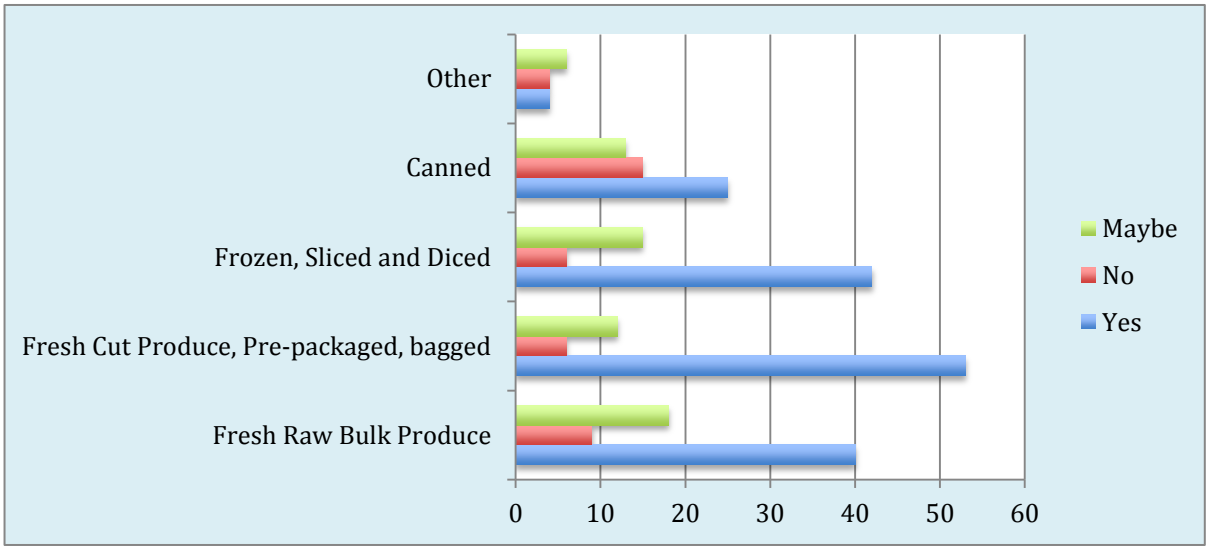
Question #14: Is your institution currently engaged in a Farm to School program?

Yes	No
18	57

Question #15: Based on the broad concept as defined, would your institution be interested in participating in a Farm to School program?

Yes	No
43	5

Question #16: Would your institution be interested in talking with local growers about purchasing fresh and frozen produce? If so, please indicate the form in which you would be interested. Please check all that apply.



Question # 17: If your institution is interested, would it prefer to work with individual growers or a group of growers (cooperative)?

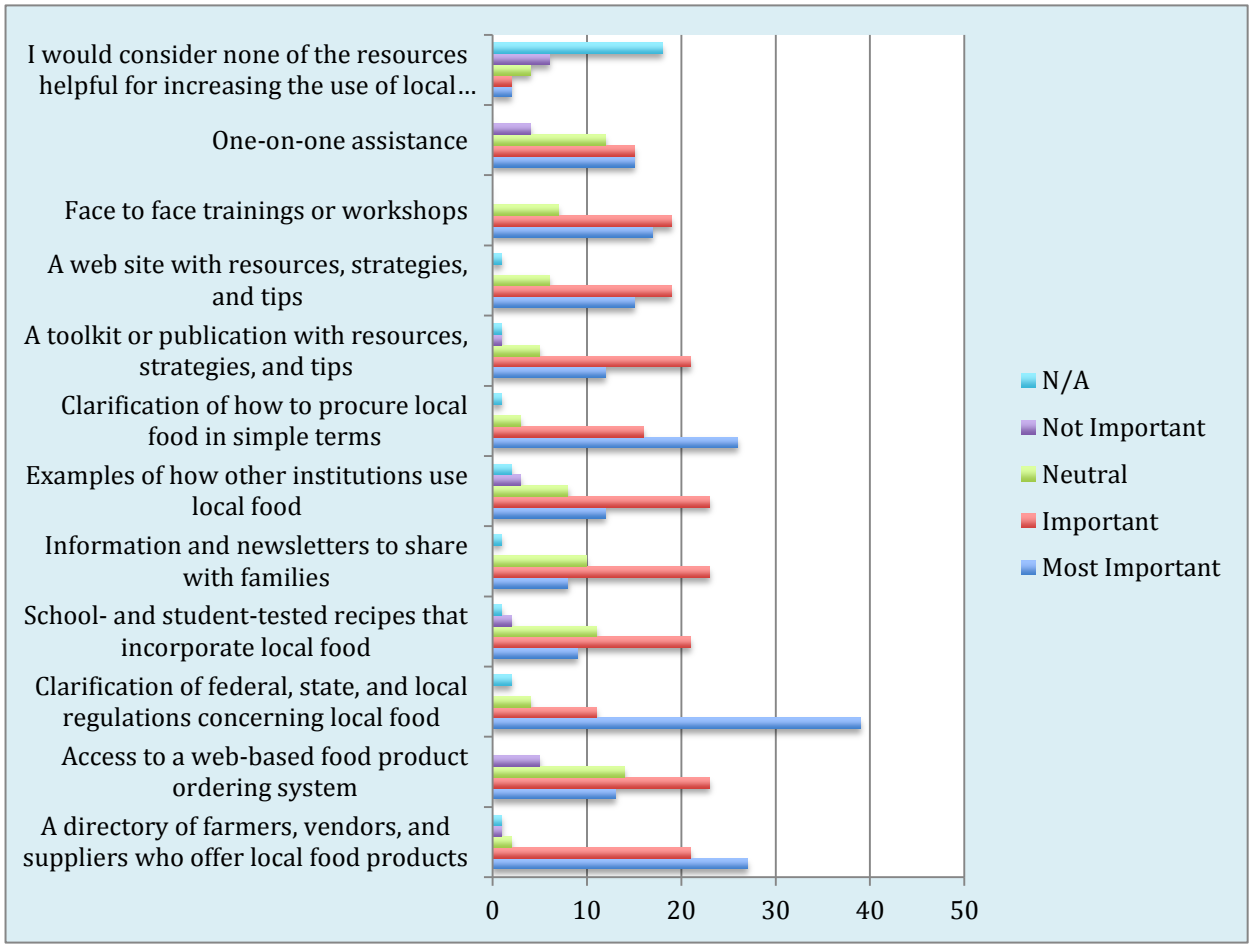
Individual	Co-Op	Distributor	No Preference
16	21	15	33

Question #18: Would your institution be willing to use an online platform (Internet-based) in order to:

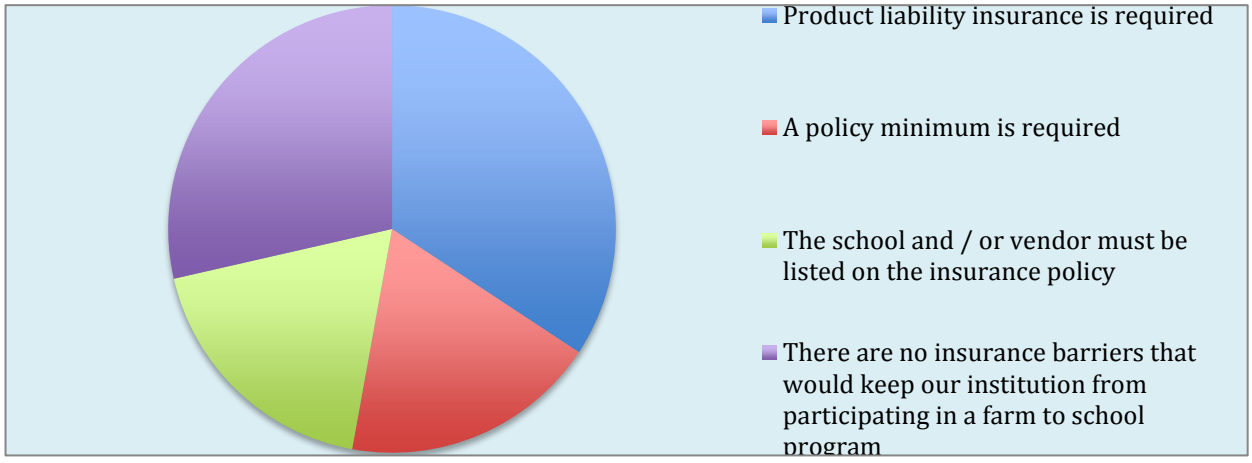
	Yes	No	Maybe
Identify Local Producers	49	6	17
Communicate with Local Producers	47	7	15
Order Fruits, Vegetables, or Other Local Products On-line	45	7	15

*It is important to note that six of the seven people who responded 'No' did so across the board.

Question #19: Would your institution consider any of the following resources helpful for increasing the use of local food in your school or district?

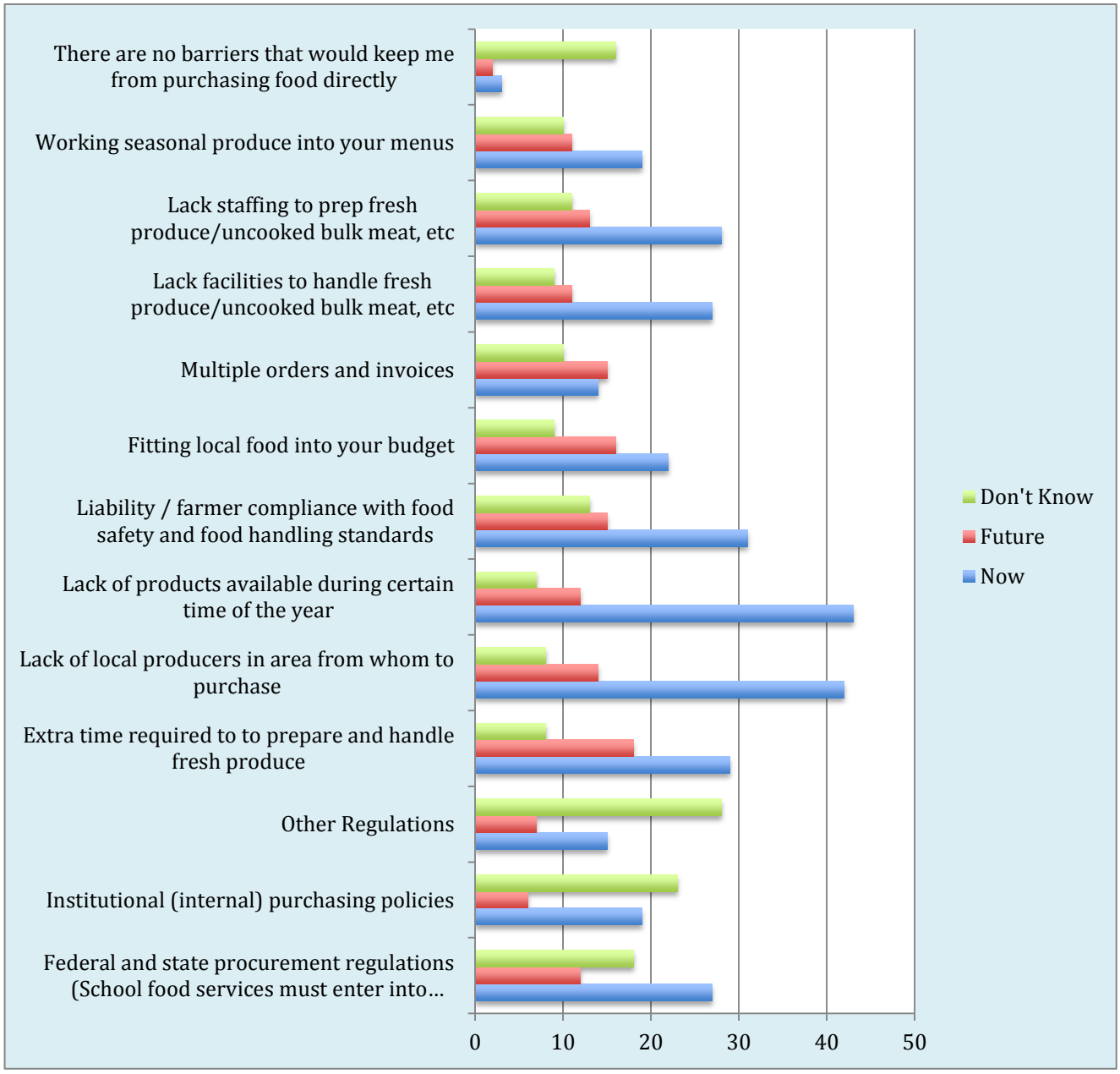


Question #20: What insurance barriers, if any, might keep your institution from participating in a Farm to School program?

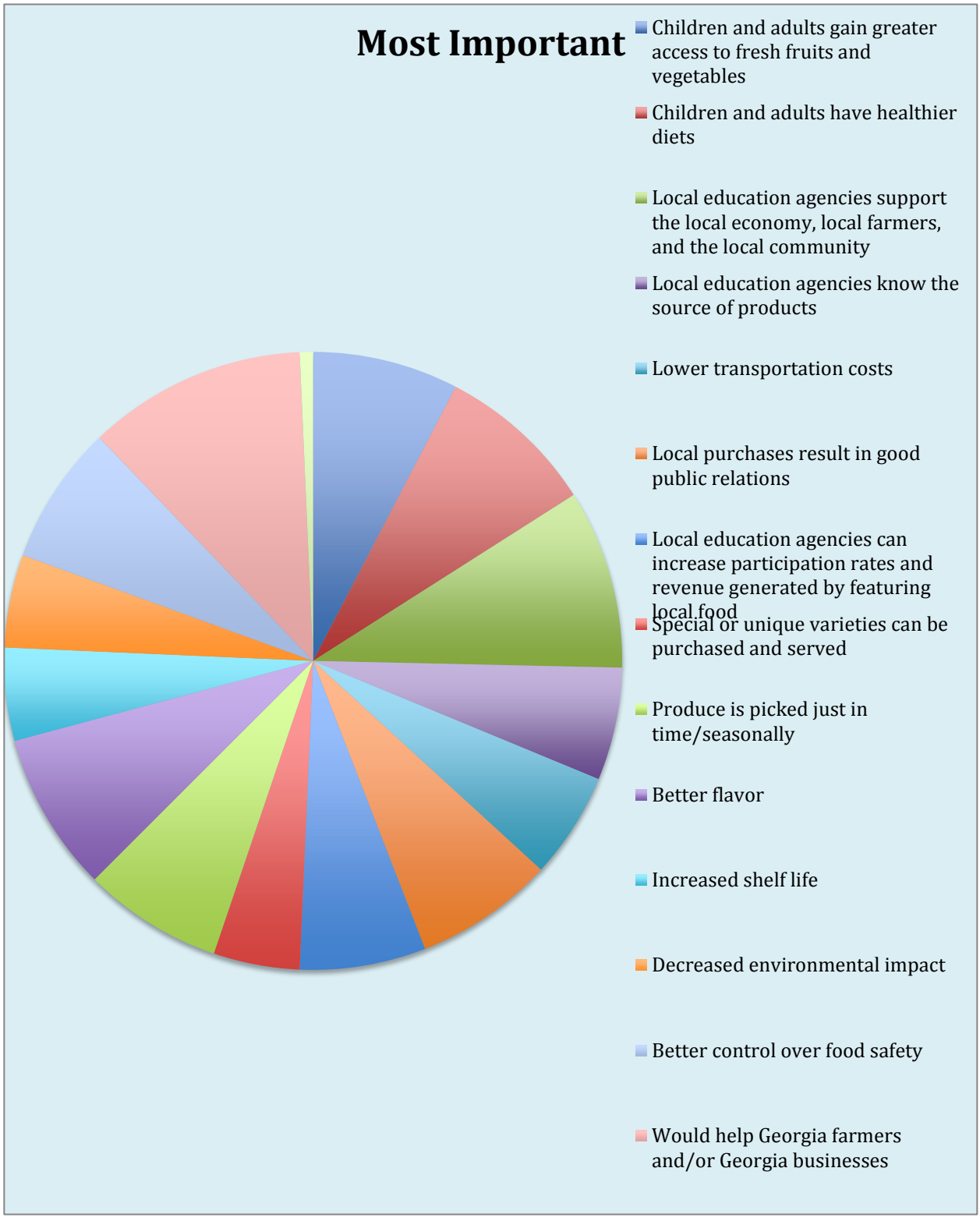


Total Responses: 58

Question #21: Would any of the following describe an obstacle for your school or district in purchasing foods directly from local producers? Indicate whether you are currently experiencing such an obstacle or whether you might anticipate to in the future. (Please check all that apply.)



Question #22: In the opinion of your institution, what are the potential benefits of serving local food in your school or district? (Please check all that apply.)



It is first important to note that, from the results presented, most of the schools remark that they have a full-service kitchen at each individual school. In other words, in each school or district, the infrastructure exists to have meals prepared from scratch. This also corresponds to the numbers that show that the majority of the schools' purchased produce is fresh, instead of canned or frozen. In other words, the majority of Georgia schools are already set up to accommodate a meal that incorporates raw, fresh produce in a full-service kitchen.

Furthermore, when asked if school administrators would be willing to talk to local farmers about buying locally, most schools indicated that they would be most interested in discussing the purchase of raw, fresh-cut, and bagged produce, instead of canned or frozen produce. Since raw, fresh-cut, and bagged produce is less labor-intensive for farmers than frozen or canned produce, this could reflect positively on the potential for farms to sell to local schools. Furthermore, since schools report to have the kind of infrastructure to prepare this kind of raw produce in their kitchens, this kind of local buying arrangement may be advantageous for both parties involved.

When asked if schools have already tried to purchase locally, 54 of 75 respondents – or 72% – answered 'yes'. Among the comments provided in this field, 19 of the 54 – or 35% – mentioned that they have purchased strawberries particularly; furthermore, some schools or districts have tried watermelons, squash, beans, peas, kiwis, apples, potatoes, lettuce, collard greens, and other fruits and vegetables within the season. Of these 54 who have purchased locally, a few have said that they get these from their current distributors. Even if US Foods or Sysco is a school or district's primary distributor, secondary distributors, including Carolina

Produce and Royal Produce have provided local produce to schools that demand this kind of purchasing. In other words, there appears to be a great deal of initiative by a few schools and districts, which hope to support the local economy and buy within the season. In fact, among the responses that address motives for buying locally, the greatest number of responses listed under 'most important' favor the motive: 'Local education agencies support the local economy, local farmers, and the local community.' In other words, the main reason why school administrators have considered buying from local farmers is because they primarily hope to support the local economy. This point is further supported by the second most popular motive in the 'most important' category: local buying 'Would help Georgia farmers and / or Georgia businesses.'

Schools that answered the question regarding obstacles to buying locally felt that there is a lack of local food supply within the school or district's region. In fact, administrators commented that, if they had tried to purchase locally and had failed it was because 'none were available in the immediate area.' Though this may be a challenge in some areas, buying locally is realistic at least within the southeastern region, if not within the state of Georgia. Therefore, it would appear that these barriers to buying locally are then perceived and it may take an improvement in the buying infrastructure to encourage some districts to purchase locally. In other words, it may take additional work by the school or district's staff to seek out farms that are willing to sell up to the administrator's needs and standards. If this process were made more seamless, for example with an internet purchasing platform, then more schools may support local economies by buying from local farms.

3.2 ECONOMETRIC ANALYSIS

Table 2 presents the results from the IVPROB analytical approach, and Table 3 presents the results from the PROB analytical approach used in this study.

Table 2. County Estimates of Obesity and Food Hardship with *farmtoschool* as Dependent Variable – IVPROBIT Model Estimation

	Farm to School	
VARIABLES	IVPROBIT[a]	Marginal Effects[a]
directsalesfromfarmers	-0.06757	0.0003
	(0.1376)	(0.0039)
freshpurchase	-0.0169	-0.022**
	(0.0036)	(0.0113)
producer	0.1994	-0.1254
	(0.5558)	(0.5363)
safety	-0.2564	-0.0833
	(0.5046)	(0.4987)
time	1.8354***	1.250*
	(0.6616)	(0.6933)
staff	-1.1247*	-0.2564
	(0.6358)	(0.6166)
adultobesity_08[b]	-0.06757	-0.5308***
	(0.1376)	(0.1829)
Constant	3.1762	
	(4.2382)	
Model's Wald χ^2	9.56	
Wald test of exogeneity	0.1908	

[a]Standard errors in parentheses
Significance levels are *** p<0.01, ** p<0.05, * p<0.1, respectively.
[b]The instruments used for adultobesity_08 are directsalesfromfarmers, freshpurchase producer safety time, staff, foodhardship, population, pc_college, averageage, and medhhincome.

Table 3. County Estimates of Obesity and Food Hardship with *farmtoschool* as Dependent Variable – PROBIT Model Estimation

	Farm to School	
VARIABLES	PROBIT[a]	Marginal Effects[a]
directsalesfromfarmers	0.0067	0.0014
	(0.0046)	(0.0092)
freshpurchase	-0.0199	-0.0041
	(0.01473)	(0.0029)
producer	0.5902	0.1282
	(0.6721)	(0.1451)
safety	-0.0467	-0.0096
	(0.5851)	(0.1214)
time	2.2706***	0.3970***
	(0.8259)	(0.1279)
staff	-1.5465**	-0.3809*
	(0.7833)	(0.1967)
pc_college	-0.0479	-0.0098
	(0.0687)	(0.0143)
averageage	0.2122*	0.0435**
	(0.1099)	(0.0222)
foodhardship	0.7483*	0.1534*
	(0.4434)	(0.0799)
adultobesity_08	0.2040	0.0418
	(0.1957)	(0.0405)
medhhincome	0.00004	9.66e-06
	(0.00004)	(0.00001)
population	9.11e-06*	1.87e-06**
	(4.92e-06)	(0.0000)
Constant	-18.1486*	
	(9.8122)	
LR chi2	19.39*	

[a]Standard errors in parentheses
Significance levels are *** p<0.01, ** p<0.05, * p<0.1, respectively.

The IVPROBIT model results indicate the model does not have significant explanatory power, with Wald χ^2 statistic of 0.79 and Prob > χ^2 of 0.6561. Meanwhile, the PROBIT model has an F-statistic of 1.38 and Prob > F of 0.2130; thus, it stands to reason that the IVPROBIT model does not have significant explanatory power. Furthermore, the Wald Test of Exogeneity

produced an insignificant χ^2 statistic that does not justify the use of instrumental variables for the obesity variable. In other words, the test result indicates that the obesity variable cannot be endogeneously determined. Since the IVPROBIT results translate to a Prob > χ^2 equal to 0.1908, the results cannot be used and instead the PROBIT model is used as the official model of this study.

Based on the summary in Table 3, the results indicate that food hardship, *foodhardship*, has a positive significant effect, though obesity is insignificant. This means that counties with higher levels of food hardship are more likely to participate in Farm to School programs. Food hardship could then potentially be a driving force for Farm to School participation. This finding is interesting and provides motivation for more specific further analyses on the specific drivers among factors related to food hardship as they can affect decisions to participate in the Farm to School program. This can be an area that future research efforts may be interested to focus on.

Looking at the marginal effects, it can be said that for every categorical increase in food hardship – which is a categorical value with 1 being low food hardship and 5 being high food hardship – there is a 15.34% (0.1534*100) increase in the probability that the county does participate in a Farm to School program. This may be an economic indicator, which means that food hardship is prevalent in low-income areas, where programs like Farm to School have already started as a supplement to free- and reduced-price lunches. It cannot be said that Farm to School is meant to alleviate food hardship within the home, but it is a good sign that schools in low-income areas are starting to implement national programs in an attempt to supplement nutrition education to those who may not otherwise receive it.

Time indicates that a school has answered 'yes' to the assertion that too much time is required to prepare fresh foods and therefore they see it as a barrier for the Farm to School program to successfully enter into their school. Since the correlation is positive, a county that has said 'yes' to this question is also likely to participate in Farm to School. This is counterintuitive to the original hypothesis that corresponds with the variable. While it is possible to show correlation, it is not possible at this time to assert causation. However, one explanation may be that those counties that already participate in Farm to School have found that too much time is required to prepare food; therefore, this may prevent schools to pursue participation in Farm to School.

Staff refers to the fact that a school cited 'extra time required to prepare and handle fresh produce' in response to the question: 'Would any of the following describe an obstacle for your school or district in purchasing foods directly from local producers.' The negative significance in this case holds with the logic that a county measured with a 'yes' or a '1' in this case would not participate in a Farm to School program. Therefore, it is likely that schools that have perceived barriers to participating in a Farm to School program will not, in fact, participate in Farm to School or try to buy produce locally.

Population refers to the size of the county's population. In this case, *population* was used instead of *metro* to gain a better understanding of how metro versus rural areas participated in local buying efforts. It stands to reason that a larger, more metropolitan area would be more likely to participate in a Farm to School program because there are generally more resources and more education available when more people are concentrated into an area. Therefore, *population*

is a potential indicator of the resources and therefore the probability that a Farm to School program exists within the area; however, the marginal effects of *population* upon Farm to School participation are minimal. This finding may therefore require a more in depth look at this particular variable in order to draw conclusive results.

Averageage indicates that counties with older populations are more likely to participate in Farm to School. This may be because older populations are more likely to realize the importance of participation in local buying programs. Older populations may better understand how important food security and nutrition are, especially for the younger population. It is, however, important to note that the marginal effects of age on Farm to School are minimal at 4.35% (0.0435*100) and therefore may not have a large effect on the extent to which schools participate in the program.

CHAPTER 4

CONCLUSIONS

4.1 SURVEY CONCLUSIONS

From the survey results, it appears that most Georgia school administrators support the idea of a Farm to School program in their district. However, the perceived barriers to buying locally are primarily the lack of supply. Since this is not the case, it may be that distribution and purchasing infrastructure need to be modified to ease the process of buying locally. While this is an undertaking, it may be a process that evolves as the motives for participating in programs like Farm to School become broader and more concrete. In other words, as motivation for local buying increases, school administrators may be more motivated to push the system so that it more readily provides local produce. Until then, it is important to recognize that the motivation for local buying exists within Georgia and a market for such trading is present. Absent from the mainstream market is the personnel to improve the system and the infrastructure to ease the process.

4.2 MODEL CONCLUSIONS

The purpose of this study was to determine the driving factors for participation in the Farm to School program, focusing on food hardship and obesity. Though it was found that obesity is an insignificant indictor, it was also found that food hardship was correlated with Farm to School participation. At this time, it is inconclusive as to why counties that have higher food hardship rates also have higher participation in Farm to School; however, it is a conclusive result

that can be motivation for future research. This is a significant finding in terms of supporting the reasoning that has been theorized as a proponent for Farm to School, though never proven. Hopefully, future studies can improve upon this finding with data that is continuing to be collected on Farm to School and other local buying infrastructures.

While the program is ideally envisioned to improve nutritional quality of food served in school cafeterias by serving fresh locally sourced foods, school districts may be motivated by food hardship considerations in their decisions to participate in the program. This may be a more significant finding since it may be more relevant for school districts to consider alleviating food hardship, with nutritional improvement (and obesity reduction) as a secondary goal. Since food hardship relates to poverty and obesity, it may be more effective to target children growing up in low-income areas. This focus on food hardship as a motivating factor to improve local buying efforts, however, may be more transferrable to other states, especially in the southeast where hardship and obesity are very prevalent concerns. For further research, it may be beneficial for similar studies to look at food hardship and obesity at the county level and in other states to see if there is a similar concern – and the motivating factor of food hardship – elsewhere.

The demographic variables appear to be less significant than expected. With the exception of population, which indicates that a larger population may mean a greater chance the county participates in Farm to School, the quality of observations available may explain this. In order to produce a more conclusive model, it may be necessary to collect data from consecutive years in order to display significance. It is this progression that is visible in national institutions such as USDA, which have begun to recognize the prospect for increasing accessibility to fresh

fruits and vegetables as a means of reducing local food insecurity. Since local buying is just beginning to be monitored in this vein, this study indicates the need for more data collection in the future. Continuing to watch the buying and selling habits within communities will not only indicate the latent potential these markets have upon food insecurity, but also upon local health, both physical and economical.

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APPENDIX

Table 4. Correlation Matrix of Variables for PROBIT model

	foodhardship	*producer*	*safety*	*time*	*staff*
foodhardship	1.0000				
producer	0.1428	1.0000			
safety	-0.1514	0.3743	1.0000		
time	-0.0224	0.2408	0.4041	1.0000	
staff	-0.0130	0.3628	0.2140	0.5042	1.0000
averageage	-0.2082	0.0242	-0.0085	-0.2358	-0.0948
population	-0.4836	-0.1292	0.0171	0.0571	0.0002
medhhincome_log	-0.6061	-0.2352	0.0220	-0.1074	-0.1308
freshpurchase	0.0191	-0.0461	0.0326	0.1883	0.1681
farmtoschool	0.0563	-0.0379	0.0581	0.2795	-0.0913
adultobesity_08	0.5998	0.1124	-0.0265	0.1534	0.0858
directsalestofarmers	-0.1269	-0.3571	0.0290	0.1190	0.0284
pc_college	-0.5009	-0.2600	-0.0865	-0.0880	-0.1640

	averageage	*population*	*medhhincome_log*	*freshpurchase*	*farmtoschool*
foodhardship					
producer					
safety					
time					
staff					
averageage	1.0000				
population	-0.3380	1.0000			
medhhincome_log	-0.0755	0.4913	1.0000		
freshpurchase	-0.1470	0.0653	0.0816	1.0000	
farmtoschool	-0.0031	0.1008	0.0195	-0.1409	1.0000
adultobesity_08	-0.2911	-0.3981	-0.5856	-0.0849	0.1006
directsalestofarmers	-0.1358	-0.0182	0.1885	0.0225	0.1350
pc_college	-0.1793	0.6511	0.8070	0.0335	0.0398