Three Essays on Factors Influencing the Demand of Local and International Food Products

by

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Abstract

This dissertation is comprised of three separate essays evaluating the demand for different food products both locally and internationally. The first essay analyzed restaurants/chefs preferences for local producer and product attributes in Alabama. The increasing number of health conscious consumers is leading a growing local food marketing trend in the United States. Consumers perceive local food to be fresher, of higher quality, good value for their money, and as a result consumers are willing to pay a premium. This demand for local food has expanded to the restaurant market and chefs are searching for local products to appeal to consumers and also for product quality and freshness. The study utilized a choice-based conjoint analysis to determine local attributes that are important to these chefs. The study found restaurants are seeking fresh/whole products that are naturally produced, for the lowest possible prices. Findings suggest there is tremendous potential for local marketing to independently owned restaurants.

The second essay utilized the differential production model to determine the impact of the tariff-only regime on EU banana imports from Latin American and African, Caribbean and Pacific (ACP) countries. Latin America and ACP are the primary suppliers of bananas to the EU, increasing competition between these regions. At the 1975 Lomé Convention ACP countries were granted preferential treatment to export bananas to the EU, creating a long-

standing dispute between the EU and Latin America. In an attempt to settle the dispute the EU implemented the tariff-only regime which is expected to significantly reduce the price of Latin bananas. This tariff-only regime is speculated to negatively affect ACP countries that are dependent on banana exports. The study found that import quantities are projected to increase from all ACP countries. However, their percentage increases are projected to be significantly lower than that of Latin American countries. Total import index elasticities found in the study indicated that an increase in total EU banana import would increase import quantities from ACP countries more than Latin countries.

The third essay examined the impact of factors that influenced consumers' view on a MarketMaker business profile. MarketMaker is a web-based direct marketing medium created with the primary purpose of providing agricultural related businesses greater access to both local and regional markets. In order to determine if businesses are benefitting from this marketing tool, the study used Negative Binomial models to determine the impact of several profile attributes on consumer traffic to a MarketMaker business profile. Results showed consumers are more likely to view profiles with the attributes social media networks, business websites and state marketing programs. One of the most influential factors was the MarketMaker business spotlight feature.

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List of Abbreviations

NRA   National Restaurant Association

USDA/ERS   U.S. Department of Agriculture/Economic Research Service

SAS   Statistical Analysis System

EU   European Union

ACP   African, Caribbean and Pacific

UK   United Kingdom

WTO   World Trade Organization

GATT   General Agreement on Tariff and Trade

FAO   Food and Agriculture Organization

ROW   Rest of the World

USDA/NASS U.S. Department of Agriculture/National Agricultural Statistics Service

INTRODUCTION

Background

The food industry is a complex system that is comprised of a diverse range of businesses operating in different markets and selling a variety of food products to meet the demand of different consumers. The food industry connects the agricultural sector, the food processing industry, and the distribution sector, which includes wholesale and retail. The ongoing growth of the global food industry is being driven not only by the increase in demand, but also by the food industry's efforts to meet changes in consumer preferences at the global, national, and local levels.   According to a report by International Merger & Acquisition Partners (2010), the global food and beverage industry was valued at US$5.7 trillion in 2008 and is expected to increase to more than US$7 trillion by 2014. Europe accounted for the largest share of the industry revenue, approximately US$1.4 trillion in 2007, while the U.S. accounted for about US$1 trillion, the second largest share. The global food products industry, which consists of agricultural products and packaged foods, was valued at US$3.2 trillion in 2008. During this period the food retail industry earned revenues of US$3.9 trillion. The food industry plays an important role of various countries' economy in terms of revenue and jobs.

Europe is the largest exporter and importer of food and drink products, with a positive trade balance of €1.1 billion in 2007. The EU food and drink industry in 2008 accounted for 2% of its total gross domestic product, 17.5% of the global export market, and consisted of 310,000 companies which provided 4.4 million jobs (CIAA 2009). According to the CIAA report, food

and beverage represented an 11% share of value added, a 13.5% share of employment and a 13.4% share of the number of companies in the EU's manufacturing industry. In 2008, EU households spent an average of 13% of their expenditure on food and non-alcoholic beverages. The complete make-up of the food supply chain accounted for more than 5% of the EU value added and 11% of employment in the EU. Of the 5% value added, food retail accounted for 30%, agriculture accounted for 24%, while food wholesale accounted for 13%.

The U.S. is the second leading exporter and importer of food and drink products in the world. They accounted for 11% of the world's total food and drink exports in 2008. Based on data from the 2007 U.S. Census Bureau survey, there were a total of 25,616 food manufacturing establishments in the U.S. that provided 1.4 million jobs and generated shipment valued at $589 billion, in 2007. Food and beverage retail stores accounted for 2.8 million jobs and generated sales valued at approximately $539 billion. There were a total of 146,000 food and beverage stores. For the same period, the wholesale food trade had fewer establishments (34,000), accounted for a significantly lower percentage of jobs (779,000), but generated higher sales dollar ($667 billion). Based on 2007 Census of Agriculture data, there were a total of 2 million farms in the U.S. Total market value of agricultural products sold during that period was approximately $297 billion, of which crops accounted for $143 billion and livestock, poultry, and their products accounted for $153 billion.

The agricultural sector is the basis of the food industry and is one of the most important sectors in the industry. Agricultural food products can either be sold fresh or manufactured as value added products. Because of the competition in the agricultural industry that results from the large number of farms, producers must select the best marketing outlet to ensure their operations' profitability. However, farmers producing commodity crops such as corn, soybeans,

etc., are generally not concerned about marketing channels as these are homogeneous products sold at one price. In order to determine the most appropriate potential marketing channels, producers must carefully evaluate options and select even before the crop is planted. Because of the variety of marketing outlets available for farming operations, a major task for the producer is evaluating the available resources and selecting a mix of marketing outlets that best suit their current farming operations. The three main distribution channels producers can utilize to sell their products are: 1) wholesale, 2) intermediate, or 3) direct-to-consumer.

Wholesale marketing is, in general, more appealing to producers with a large volume of products to sell. These products normally require very minimal processing or packaging, and quality standards for wholesale outlets are not always as strict as direct marketing channels. Upon delivery, this outlet offers a market price, which is typically significantly lower than intermediate or direct-to-consumer marketing. Profitability for wholesale marketing is based on cost savings that can be generated as a result of producing large volumes. The wholesale food industry was valued at $667 billion in 2007 and comprised of 34,000 establishments, which accounted for 779,000 jobs. Of this total, fresh fruits and vegetable wholesalers accounted for $63 billion and had a total of 5,074 fresh fruit and vegetable wholesale establishments. Meat and meat product wholesale sales accounted for $43 billion and had a total of 2,525 establishments. Fish and seafood wholesale totaled approximately $13 billion and had a total of 2,022 establishments. There were a total of 557 poultry and poultry product wholesale establishments with generated sales of approximately $17 billion. Wholesale dairy products (excluding dried or canned) sales valued approximately $54 billion from a total of 2,288 establishments. Producers who are interested in value added can benefit from selling packaged frozen food to wholesalers.

There were a total of 3,502 establishments which generated sales of approximately $85 billion for packaged frozen food.

Intermediate marketing channels involve producers selling to restaurants, grocery stores, or other retailers. These markets typically have standards similar to direct-to-consumer outlets and they pay a premium above the wholesale price. Intermediate marketing channels vary tremendously in terms of the type and quantity of products required. As a result, producers with different size operations can find intermediate outlets willing to purchase from local producers as compared to corporately owned chains. Some intermediate markets have strict product quality verification standards, necessary to protect the health of final consumers, which serve as a barrier for some producers. Food services and drinking places play an important role in intermediate marketing. Based on statistics from USDA/ERS, consumers in the U.S. spend on average, approximately 10% of their disposable personal income on food in any given year since 2000; 9.8% in 2011. Food at home sales totaled $654 billion in 2011, which is more than 5% of total disposable personal income, while food away from home totaled $589 billion. From 2001 to 2011 food at home and food away from home expenditure increased 59% and 45%, respectively. Overall food expenditure, sum of at home and away from home, increased approximately 51% over the same period. Additionally, grocery stores are the main retailers, with approximately 90,000 establishments in 2007, which generated sales valued at $487 billion. Intermediate outlets are abundant; however, in order to compete with large distributors, producers must identify a competitive advantage such as freshness, locally produced, or niche crops to appeal to the demands of this sector.

Even as the food industry is becoming more global, food markets are increasingly responding to consumer preferences at a local level (Regmi and Gehlhar 2005). There has been

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a significant increase in local food interest in the U.S. driven primarily by consumers demand. Despite the fact that local markets are growing, they account for a small share of total U.S. agricultural share. Based on 2007 Census of Agriculture data, direct-to-consumer marketing was valued at $1.2 billion in 2007, an increase from $551 million in 1997. This represents less than 1% of total agricultural sales, excluding nonedible products. The total number of farms participating in direct sales in 2007 was 136,817. Of the total sales value in 2007, 15% of farms (sales of $250,000 or more) accounted for 69% of the total value. The remaining $371 million (31%) can be attributed to smaller farms ($250,000 or less), which represent 85% of those who market directly.

There are several direct marketing outlets utilized by local farmers. These include farmers markets, community supported agriculture (CSA), on-farm sales, roadside stand, and pick-your-own. Farmers markets have been the fastest growing direct marketing channel in the U.S. The number of farmers markets in the U.S. increased from 1,755 in 1994 to 7,864 in 2012 (USDA/AMS 2012). Based on a survey of fruit and vegetable farmers in Alabama, the majority of farmers utilized this marketing channel as their primary channel because of the large volume of customers looking for a variety of food products, and who are willing to pay a premium for these products. Additionally, farmers indicated they do not have to advertise to get farmers to the markets and importantly, they develop close relationships with customers. The number of CSAs is also becoming increasingly popular; the number of CSAs has increased from 60 farms in 1990 to approximately 1400 in 2010. (Martinez et al. 2010). A CSA consists of a community of producers and consumers sharing both the risk and benefits of food production.   Although consumers share production risk, they participate in CSAs not only for fresh, high quality food products but also to support local producers (Toler et al. 2009). Other direct channels are also

becoming increasingly popular and based on Alabama farmers who indicated they utilized on-farm sales, consumers will spend more when they go directly to the farm as they, more often than not, find other products they did not intend to buy before going to the farm.

Dissertation outline

The dissertation consists of three separate essays investigating the impact of different factors influencing food demand both locally and internationally. The dissertation addresses three major questions: 1) what local producer and product attributes are preferred by restaurants in Alabama and how much are they willing to pay for these attributes? 2) What are the factors that influence EU banana imports from source-specific countries given the change in the EU banana tariff regime? 3) What are the factors that influence consumers to view a particular agricultural business profile in the MarketMaker food database?

Utilizing choice-based conjoint analysis, the first essay, "Alabama Restaurant Preferences and Willingness to Pay for Local Food: A Choice Based Approach", analyzed restaurants' preferences for local producer and product attributes levels. Local producers have access to information regarding building relationships with restaurants in order to potentially create a new market for their products. However, there is no known study that analyzed restaurants' preferences for local producer and product attributes. This study seeks to fill this gap. This essay provides significant information relevant to producers who are seeking to enter this market. Findings from the study will help producers understand Alabama restaurants as a potential marketing outlet. Producers should be able to determine whether they are capable of supplying restaurants before going to the restaurants. The study also highlights the products that restaurants currently purchase and products they are seeking but unable to source. Producers

can use this information to adjust the kind of crops they are currently growing if feasible, to gain access to this market.

The second essay, "Impact of the New Tariff-only Regime on ACP and Latin Countries" evaluated the importance of various factors including price, to determine the impact of source-specific banana import. This study utilized the differential production model to generate conditional and unconditional elasticities to determine which countries would benefit most from changes in own-price of bananas as well as changes in the prices of competing countries. The study also used the unconditional elasticities generated to calculate import quantities and market share projections, to determine who would have the most impact from the change in the EU banana import regime. The study sought to address speculations by critics about the impact of the regime on ACP countries.

The third essay, "I'D Hit That! Factors That Influence Consumers to View a Business Profile on MarketMaker was conducted to determine what factors were most important to consumers utilizing the MarketMaker database. MarketMaker is a web based marketing medium that has become one of the most extensive collections of searchable food related data in the country. Because it is difficult to determine the impact of this marketing tool on businesses' profitability in terms of sales, the number of views on each profile was used as a measure. The study utilized count data models to determine what were the major factors influencing the number of views on each profile. There has been no study of this nature done utilizing the data from this database, therefore, this study provides valuable information to current businesses utilizing the database, the MarketMaker administrators, individual states that are currently partners, states that are not yet on board with this program, and potential businesses that are currently not registered with MarketMaker.

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CHAPTER 1: ALABAMA RESTAURANT PREFERENCES AND WILLINGNESS TO PAY FOR LOCAL FOOD: A CHOICE BASED APPROACH

Introduction

Local food marketing is a growing trend throughout the United States.   Although local food is becoming increasingly popular, there is currently no standard definition of the term "local" in the United States (Lev and Gwin 2010; Onozaka et al. 2010). The U.S. Congress in the Food, Conservation, and Energy Act of 2008 defined local, for specific Federal rural development loan programs, as "any agricultural food product that is raised, produced, and distributed in (1) the locality or region in which the final product is marketed, so that the total distance the product is transported is less than 400 miles from the origin of the product, or (2) the State in which the product is produced." However, the interpretation or perceived definition of "local" is inconsistent among various consumers. Consumers identify local primarily with political boundaries and distance, (Zepeda and Li 2006; Hand and Martinez 2010) usually within a 50-100 miles radius (Brown and Miller 2008).

In recent years, the increased demand for locally produced food in the United States has been driven by increasingly health conscious consumers (Dentoni et al. 2009). Consumers perceive locally grown food to be fresher, higher quality and a good value for their money (Wolf et al. 2005; Hardesty 2008; Onozaka and McFadden 2011); therefore consumers are willing to pay a premium (Brown, 2003; Carpio and Isengildina- Massa, 2008; Loureiro and

Hine, 2002). Consumers' perception of local food being fresher and of a higher quality is however not the only reason driving their demand. Consumers also purchase locally to support local producers (whom they get to know personally), contribute to the local economy, and promote a cleaner more sustainable environment (Onozaka and McFadden 2011; Toler et al. 2009). State-based promotional programs (i.e. Alabama Grown, Fresh From Florida, Make Mine Mississippi) have also been instrumental in increasing the demand for locally produced food. The primary purpose of these programs is to increase consumer demands for products grown within a given state, but they are also designed to assist farmers with a brand that can improve their net returns. Only 23 states had state branding programs in 1995 (Patterson 2006); however, they now exist in all states.

The demand for local food has spilled over into restaurant markets and chefs are searching for local products to appeal to consumers and also for product quality and freshness (Darby et al. 2008; Montri et al. 2006). Based on a 2008 survey conducted by the National Restaurant Association (NRA), 89% of fine dining restaurants served locally produced food and approximately 90% of these restaurants believed that serving local food would become even more popular. According to USDA/ERS statistics, restaurants account for more than 70% of total food away from home expenditure, which indicates that this market represents tremendous potential for developing a sustainable network with local growers. Having an increasing number of restaurants across the U.S. interested in purchasing locally indicates an increased demand for local foods in this industry. Although restaurants/chefs show increasing interest in local food purchase, there are common uncertainties among chefs regarding food attributes (taste, quality, freshness etc.) and the type of producers they purchase from (Curtis et. al, 2008; Ernst and Woods, 2005; Curtis and Cowee, 2009). The primary purpose of this study is to determine

restaurant/chef preferences for various producer and product attributes and determine what local products are being demanded by restaurants in Alabama. The study also used descriptive statistics to; 1) identify restaurants/chefs' knowledge of food safety standards required for producers and other vendors from whom they purchase food, 2) identify challenges/barriers preventing restaurants from purchasing locally, 3) identify and compare product attributes that are important to restaurants that purchase locally versus those that do not purchase locally, in Alabama.

The food service industry represents one of the largest industries in the United States and is comprised of businesses that distribute food for both home and away-from-home consumption. From 1990 to 2009, expenditures for food consumed at home increased by approximately 99% from $305 billion to $607 billion. Food away from home expenditures increased approximately 132% from $248 billion to $574 billion over the same period. Restaurant expenditures over this period increased, by 140%, from $171 billion to $411 billion (USDA/ERS 2010a). Restaurants are retail marketing outlets that provide producers with high levels of profitability as compared to wholesale or other commercial outlets (Inwood et al. 2009). Restaurants encounter advantages and challenges with the purchase of local foods. Restaurants that buy locally produced food receive the benefits of fresher and higher quality products, meeting their consumers' demands, supporting their local economies, and supporting local farmers (Jamelske 2009). One of the major challenges faced by restaurants is the logistics of dealing with several producers to obtain an adequate variety of products they demand. This problem exists primarily as a result of a commodity-based focus on production, where producers plant large quantities of one or two products versus planting an assortment of products to fit the demands of the

restaurant. In addition to the number of farmers, restaurants/chefs also express concerns related to the purchasing process.

There is adequate information available to producers to aid in the process of better understanding the steps needed to build a good relationship with restaurants (Pepinsky and Thilmany 2004; Starr et al. 2003). Having a guideline is important as the process of selling directly to a restaurant can be challenging to small producers and will require carefully thought out strategies. Although direct-marketing agricultural products to chefs and restaurants has been studied (Kelley et al. (2001); Montri et al. (2006); Curtis and Cowee (2009) there is no known study that analyzes restaurant chef preferences for local producer attributes. This study fills this gap and provides valuable information on restaurants/chefs' preferences for local producer and product attributes in Alabama. This study utilizes conjoint analysis which is widely used and accepted as a useful tool in consumer preference and willingness to pay studies (Carlsson et al. 2007; Darby et al. 2008; Hu et al. 2009; Hu et al. 2011; Lusk et al. 2003). Conjoint analysis provides an understanding of consumers' preference structure for specified attributes of a product and is based on the idea that a consumer aggregates the individual values provided by each attribute of a product to determine the total value of the product (Hair et al. 1998).

Carlsson et al. (2007) conducted a study to determine consumers' willingness to pay for farm animal welfare. The attributes used in the study were label, feed, outdoor, transport, growth, and price. Each attributes were used for both chicken and beef products and each had different attribute levels. Each participant chose from three profiles where the third profile was an "opt-out" option. Hu et al. (2009) estimated consumers' acceptance and willingness to pay for blueberry products with nonconventional attributes. Attributes considered in their study were organic, Kentucky product, sugar-free, and price. The study used an intercept survey approach

and participants were asked to choose from three profiles, where one of the profiles was an "opt-out" choice. Hu et al. (2011) conducted a study to determine consumers' preferences for local production and other value-added label claims for a processed food product. The study considered attributes including brand, organic certification, State proud, small firm claims, regional claims, nutritional claim, and price. Each attribute had different attribute levels. The study employed a mail survey method. Darby et al. (2008), in order to determine consumers' preferences for local attributes (where the product is produced, producer, freshness, and price), conducted a face to face interview with consumers and asked them to choose between profile options. Each consumer had the choice of selecting one of two profiles but was also given the option of selecting neither. Finally, Lusk et al. (2003) estimated consumers demand for beef and cattle administered growth hormones or fed genetically modified corn. Consumers were given the choice of four quality attributes (marbling, tenderness, animal administered hormones, and animal fed genetically modified corn) and a price attribute. Price, marbling and tenderness each had three attribute levels while the remaining two quality attributes each had two levels. Similar to the previous studies, each consumer in this study were given the option of two product profiles and an "opt-out" choice.

Choice-Based Conjoint Analysis

Consumers reveal their preferences through the choices they make. It is therefore important to understand how changes in the characteristics of alternative choices affect their preference for their revealed preferred choices. While it is possible to infer consumers' partworth of attributes levels, by regressing information about the products' attribute on sales, there are several drawbacks to this approach. These disadvantages are outlined in Raghavarao et al. (2011). First, all the data required for estimation of partworths may not be available. That is,

some combinations of attribute levels may not be observed due to economic or managerial feasibility as well as not being able to control the attribute levels offered by competitors. Second, it is not possible to observe choices for alternatives that do not currently exit, and third, even when the alternatives are available for choice, consumers might not be able to select their preferred one because they cannot afford it or they may not be available at the time or place where a selection must be made. Given these reasons, studies that utilize revealed preference data usually do not provide useful information to guide development of new products and services. In order to address these shortcomings, stated preference or choice-based methods are used.

Choice-based conjoint analysis is used to estimate the value of nonmarket goods. This methodology is used to provide valuable information about the attributes and attribute levels desired by the consumer for a given product often before the product is developed or offered to consumers. Choice-based surveys ask consumers what they would be willing to pay or accept given a change in the composition of a good or product. Therefore consumers are not making behavioral changes but stating how they would behave given this change (Adamowics et al. 1994). One key challenge of choice-based analysis is determining the combination of attributes and attribute levels to present to participants (Lusk and Norwood 2005). Choice-based conjoint analysis is used in this study to examine the importance of four attributes and attribute levels of local producers. These attributes and attributes levels are outlined in Table 1.

The number of producers represents total local producers restaurant/chefs would have to purchase from to obtain the desired amount of products needed on a weekly basis. The numbers used in the study were chosen based upon survey pre-tests with restaurants that currently purchase local products. Based on pretests and previous literature, restaurants/chefs prefer

dealing with a small number of suppliers, which is a fundamental reason for purchasing from a large supplier. Large suppliers are better able to supply restaurants with the complete array of products desired. The production methods (conventional, natural and organic) were chosen because they are the most widely used by farmers and recognized by consumers. Conventional farming refers to the traditional agricultural practices, which rely on pesticides and synthetic fertilizers. Naturally grown refers to farms that do not use pesticides or other synthetic chemicals. Organic crop production refers to a system that follows specific legal guidelines by the USDA National Organic Program, where no genetically modified organisms are permitted and crops are produced without the use of synthetic pesticides or fertilizers. Processed/bagged and fresh/whole were the two product forms used, which signify the appearance of the product when delivered to the restaurant. Processed/bagged are products that are prepped by producers (chopped, bagged, etc.) while fresh/whole products are delivered to restaurants as harvested. Price was added so that restaurant/chefs willingness to pay (WTP) could be evaluated. The respondents were asked their average weekly expenditure for a basket of goods utilized in any given week. Based on the average given it was important to evaluate how much more or less than their average weekly expenditures restaurants would be willing to pay to purchase their ideal product. In addition to their average weekly expenditure restaurants were given the option of choosing 10% above or 10% below their average weekly expenditure for the same basket of goods.

As the number of factors in an experiment increases, the number of profiles in the experiment also increases (Raghavarao et al. 2011). Given the number of attribute levels in this study, there were a total of 54 (3*3*2*3) possible product combinations that could be evaluated. However, since respondents were asked to choose between two producer profile options, the full

factorial design consisted of 2,916 (54*54) possible choices. Using the full factorial design for such a large number of profiles would not be feasible, as administering such a large number of profiles would be cumbersome and costly, therefore requiring the use of a fractional factorial design. Fractional factorial designs are generated by selecting subsets of choice sets from the full factorial design. Selecting the subset to estimate is critical as this subset must allow the estimation of the three main effects (Lusk et al. 2008). The subset for this study was selected by choosing options from the full factorial design to minimize a D-efficiency criterion, which yields reliable willingness to pay estimates (Lusk and Parker 2009). A D-efficiency score of 100 indicates a balanced design and no correlation (Louviere et al. 2000). The SAS PROC PLAN procedure was used to generate the full factorial set to serve as a candidate for OPTEX procedure that is used to generate the fractional factorial (see SAS documentation for a detailed explanation). This procedure generated a total of 16 choice sets from the full factorial design. A D-efficiency score of 94.8 was generated from the SAS PROC OPTEX procedure which indicates there is very low correlation between attributes and across choice options. This was also the best design that could be obtained given the attribute levels in the study. These 16 profiles represent an orthogonal array of potential profiles to be evaluated. The 16 choice sets were divided into two blocks (block 1 and block 2) of 8 choices each as it would be complicated for respondents to effectively evaluate all 16 sets. Having only 8 choice sets makes it clearer to administer and easier for respondents to complete the survey. The 8 choice sets in each block consist of three choices for respondents to evaluate. These choices consist of two profiles with different producer and product attributes and a third choice ("I Would Select Neither Option") not to select either of the profiles if the respondent did not prefer either of the profiles. The third choice ("opt-out") was included in the study based on previous studies that this option increases

the realism of the experiment (Batsell and Louvieri 1991), enhances the theoretical validity of welfare estimates (Adamowics and Boxall 2001), and improves the statistical efficiency of the estimated choice parameters (Louviere et al 2000). Figure 1 presents an example of a choice set.

The survey participants were randomly divided in two groups, where one group completed block 1 and the other block 2. Participants were informed that these profiles were hypothetical profiles that would be used to determine their preferences for local producer attributes. They were given information that defined the attributes and the different attribute levels. They were asked to compare the features of the profiles and select their most preferred choice from each choice set.

Econometric Model

The Lancastrian consumer theory (Lancaster 1966) and the random utility theory (McFadden 1974) are the basis of the choice-based model. The Lancastrian model proposes the utilities for a good can be disintegrated into separate utilities for their component characteristics (Lancaster 1966). Random utility theory is based on the idea that consumers will select the alternative that provides the highest utility. Therefore consumers will choose an alternative if the utility provided by it is the highest among all the available choices. The utility function (equation 1) is used to represent individual i's utility associated with selecting alternative j.

$$U_{ij} = V_{ij} + \varepsilon_{ij} \qquad i = 1, 2,…,\text{N and } j = 1, 2,…,\text{J.} \qquad (1)$$

The random utility function comprises of a systematic and stochastic component, where V_{ij} is the systematic portion of the utility function, assumed to depend on the attributes of the choice option, which represents producer attributes and ε_{ij} is the random, an unobservable component

of utility. For the purpose of this study, the systematic portion of the utility function can be written as:

$$V_{ij} = \beta_1 + \beta_2 * three + \beta_3 * six + \beta_4 * nine + \beta_5 * natural \qquad (2)$$
$$+\beta_6 * organic + \beta_7 * conventional + \beta_8 * fresh$$
$$+\beta_9 * processed + \beta_{10} * avgprice + \beta_{11} * below + \beta_{12} * above + \beta_{13} * optout$$

Since individual i maximizes his/her utility by choosing the alternative that produces the highest utility, selecting alternative j indicates Uij is the highest utility attainable from the total possible choices. Therefore, the probability of choosing alternative j from a set with J possible choice options is given by:

$$Prob \{U_{ij} > U_{ik}; \quad k = 1,2,\dots,J; \quad for\ all\ k \neq j\} \qquad (3i)$$

$$Prob \{\varepsilon_{ij} - \varepsilon_{ik} > V_{ik} - V_{ij}; \quad k = 1,2,\dots,J; \quad for\ all\ k \neq j\}, \quad (3ii)$$

where $V_{ij} = X_{ij}\beta$. If ε_{ij} is independently and identically distributed and has a type 1 extreme value distribution (McFadden 1974), given by:

$$F\ \varepsilon_{ij}\ = exp\ -e^{\varepsilon_{ij}}\ , \qquad (4)$$

it follows that the difference in error terms, in equation 3, has a logistic distribution. Therefore, the consumer's probability of choosing alternative j can be represented by a multinomial conditional logit model:

$$Prob\ Y_i = j\ = \frac{e^{X_{ij}\beta_j}}{\sum_j e^{X_{ij}\beta_j}} \qquad j = 1,2,\dots,J \qquad (5)$$

where, X_{ij} are exogenous variables corresponding to producer and product characteristics and β are parameters that weight the exogenous variables used to determine utility. The likelihood of the multinomial conditional logit is given by:

$$L = \sum_{i=1}^{N} \sum_{j=1}^{M} Prob\ Y_i = j\ \delta_{ij} \qquad (6)$$

where δ_{ij}=1 if alternative j is chosen by individual i, and $\delta_{ij} = 0$ otherwise.

Multinomial logit model is the most commonly used to evaluate discrete choices. This model remains a popular choice because of its features including: its simplicity in estimation (the solution set of estimated parameters is unique); its closed-form specification, which enables easy implementation of predictive tests of changing market shares in response to scenario of changing levels of attributes without complex evaluation of integrals; the speed of delivering 'good' or 'acceptable' models on the accepted tests of model performance; and when there is very rich and highly disaggregate data on attributes of alternatives, the model is often very robust to the violation of the strong independently and identically distributed (IID) assumption imposed on a profile of unobserved effects (Louviere et al. 2000).

It is expected that the attribute "number of farmers" will have a significant inverse relationship with restaurant choices based on previous literature as well as pre-survey interviews with various restaurant chefs. The inverse relationship with number of producers suggests that restaurant preference for purchasing local food increases when there is a decrease in the number of producers required to meet their demand for products. Prior expectations were that restaurants would have a positive preference for naturally and organically produced as opposed to conventionally produced foods. This expectation is based on trends toward consumers who are more environmentally and health conscious. Based on previous studies (Chang and Zepeda 2005; Li et al. 2007) consumers' demand and willingness to pay a premium for organic food is based on different factors, including awareness of the label, price premium of these products and different demographic characteristics. Fresh/whole foods were expected to positively impact restaurant preferences since most chefs have unique methods for processing and preparing products. However, as indicated by restaurant chefs that pre-tested the survey, purchasing

fresh/whole or processed food depends on the size of the restaurants and depends on whether chefs prefer to prep the food purchased themselves or buy foods already prepped to cut down on preparation time. It is expected that restaurants will be willing to pay a premium above their current weekly food cost to purchase locally produced products. Previous literature indicates that consumers are willing to pay a significant premium and restaurants can take advantage of consumer willingness to pay by making "local" a menu choice. Having an "optout" option could be positive or negative depending on whether the participants have any interest in purchasing local foods.

Survey Data

The data for the study was collected by surveying 836 restaurants in Alabama. These restaurants are broadly distributed across the state and were randomly chosen from Alabama Restaurant and Food Service Association. The association has hundreds of restaurants listed and gives several options as to the type of restaurants to choose from. Independently owned restaurants were chosen as survey participants particularly because previous studies showed that these are the restaurants that typically have interest in purchasing local food (Curtis and Cowee, 2009; Curtis et al. 2008; Kirby 2006); however, there was no prior knowledge of the number of restaurants that purchased local products. The list of participants obtained provided emails, mailing addresses, and telephone numbers for each restaurant. However, only a small percentage (12%) of restaurants had email addresses. The study used three methods (email, mail, and telephone) to administer the survey. Although emails were not provided for all participants, surveys were first sent via email to determine the potential level of survey participation. Surveys were sent to a total of 104 restaurants with available email addresses via survey monkey. Each email had a link to the survey and a message outlining our request for participation, the purpose

of the survey and a confidentiality notice. An email was sent as a reminder to participants who did not respond within a week of the initial email. This survey method is efficient because there are no papers, postage, and mail out costs, and the response time can be reduced significantly (Dillman 2000). However, one of the major challenges associated with this method is designing the survey so it is easily understood by users even if they are not computer savvy. From the total number of emails sent, only 15 surveys were completed and returned and even fewer responded to the conjoint portion of the survey.

Surveys were then sent to participants by mail, including restaurants that did not respond to the email survey, to solicit more responses as mailing addresses were provided for all restaurants. Following Dillman, each mail out envelope contained a cover letter, a copy of the survey, and a stamped return envelope. The cover letter was limited to one page and specified survey participation request, the usefulness of the survey, a confidentiality notice and a thank you for consideration and participation. A stamped returned envelope was included as this was shown to improve the response rate. Two weeks after the first mail out, a thank you/reminder postcard was sent to participants. A second mail out envelope including cover letter, survey, and return envelope was sent to restaurants if they did not respond within a few weeks. This survey method also had its benefits and costs and yielded a higher number of responses than email. One of the benefits over the email method is that survey participants are generally more familiar with a pen a paper questionnaire (Dillman 2000). The survey questions are outlined more clearly to participants making it easier for them to go through question by question. Its major disadvantage is the higher cost associated with this method than email. A total of 89 surveys were returned with bad addresses, which was approximately 10% of the overall sample. Of the total number of mailed surveys, only 50 surveys were completed and returned.

Because of the low response rate from the email and mail methods, telephone interviews were conducted to improve the overall response rate. This method was most costly to conduct. However two of the main advantages of this method over mail and email are 1) the person administering the survey is able to explain the survey to participants and can provide an answer to any questions and concerns regarding clarity and 2) the response are more reliable as respondents do not have the option of comparing questions and altering their previous responses based on future questions. For this sample, telephone interviews were found to be the most effective method of obtaining data. After all restaurants with bad addresses and disconnected numbers were accounted for, sample size decreased to 747. There were a total of 152 responses combining all three methods which is approximately a 20% response rate. Of the 152 responses, 131 respondents completely answered the restaurant preferences portion of the survey, which were used to determine restaurant preferences for local food purchases.

The survey was segmented into four sections. Section 1 requested general background information about the restaurants, including average weekly expenses on food, location of business, years in business, etc., and whether they purchased locally or not. Section 2 was completed only by restaurants that did not purchase locally. It addressed their reasons for not participating, whether they have interest in purchasing locally, and the type of food they would like to purchase if interested. Section 3 was completed by restaurants that purchase locally. This section required information such as the methods of obtaining local foods, how they find local producers, and their opinions of the impact local food purchasing on their restaurant's profit. Section 4 addressed preferences for a number of product and producers attributes. All participants were asked to complete section 4 (the choice-based conjoint section) of the survey, which was designed to provide an indication of what restaurants are searching for in terms of

producers and their attributes. Choice-based conjoint analysis was employed to evaluate restaurant preferences for purchasing from local producers, whether they currently purchase local products or not.

Descriptive Results

Table 2 presents the averages related to background information of all restaurants. Responses show restaurants that purchase locally have been in business on average 2 years more than those that do not purchase locally. Meal prices were also found to be higher on average for restaurants that purchase locally. Breakfast prices are on average about 14% higher for restaurants buying locally and dinner prices approximately 13% higher. Lunch prices were found to be only approximately 3% different between the two types of restaurants, where prices for restaurants that purchase locally were higher. These higher prices for restaurants that purchase locally could be an indication of the higher premium consumers are willing to pay to get local food. Counter to what was expected; restaurants that purchase locally on average spend 13% less on weekly food expenses. Since local foods typically cost more, it was expected that food costs for restaurants purchasing locally, on average, would be higher than restaurants that do not purchase locally. This would suggest that purchasing directly from the producer may allow restaurants to acquire products at a lower price than purchasing from large distributors.

The survey was developed not only to identify restaurant/chefs preferences for product and producer attributes, but also to identify the overall demand for local food, barriers/challenges preventing local purchases, chefs' knowledge of the availability of locally grown foods in the state and the potential impact on restaurants profits. The key question asked to participants was whether they currently purchase locally-grown products. Of the total respondents, approximately 51% of respondents purchased locally while the remaining 49% did not (Table 3). Respondents

who did not purchase locally were asked their primary reason for not doing so. This was an indication of whether they had no interest in purchasing locally or the option was unavailable to them. Approximately 38% of respondents cited inadequate availability as the major barrier preventing local purchases. Other frequently cited barriers were inconvenience, uncertainty of where to buy, lack of knowledge of what is available locally, cost, and a small percentage make purchases solely from food distributors. Given the barriers preventing local purchases, participants who did not purchase locally were asked whether they believe buying local would impact their restaurants' profit. Forty-four percent agreed that local purchases would have a positive impact while 17% disagreed. Statistics are presented in Table 3. Local buyers were asked whether purchasing locally has had an impact on their restaurants' profit. Approximately 62% agreed and 10% disagreed, the remaining local buyers were indifferent. Non-local buyers were also asked their level of interest in promoting locally grown food on their menu or other promotional material. Approximately 81% reported they were interested while the remaining 19% had no interest. With the increased food safety concerns over the past decade, it was important to identify chef's level of awareness as it relates to this issue. Respondents were, therefore, asked how familiar they were with food safety standards required for producers and other vendors from whom they purchase food. Approximately 83% of respondents who purchase locally and 80% who do not purchase locally reported they were familiar with food safety standards. Only a small number of respondents reported they were not familiar with these standards. Producers are cautioned to take due diligence in abiding by food safety standards if they expect to sell to these restaurants.

All participants were asked to rank four different payment methods in terms of preferences for purchasing locally grown products (Figure 2). The four payment methods

include paying with cash, paying by check, paying with a credit/debit card or invoice to be paid within 30 days. Paying with check was found to be the most preferred payment option by both local (38%) and non-local (52%) buyers. Invoice to be paid within 30 days was second most preferred while paying with a credit or debit card was least preferred. Participants were asked to rate (0 not important & 10 very important) the importance of different factors (food attributes and logistics) when making a decision to purchase locally grown food. Figure 3 shows the importance of different attributes that influences local food purchase decision, local and non-local, respectively. On average, all attributes are considerably more important to non-local buyers. Non-local buyers rated consistent supply (CS), consistent quality (CQ), year-round availability (Avail), food safety (FS) and product freshness (Fresh) as very important indicated by a mean of 9 or above. Similar to non-local buyers, local buyers indicated consistent quality, food safety and product freshness as the attributes they desired most. How the product is delivered (How Del) and product packaging and labeling (P&L) were least important to both non-local and local buyers. Table 4 presents mean food attributes ratings. Although all factors are important to restaurants, some have a higher level of importance given by their mean ratings. Consistent quality (9.27), Food safety (9.10) and product freshness (9.22) were extremely important shown by their high mean values. Consistent supply was rated very important by 72% of non-local buyers, consistent quality by 80%, availability by 53%, food safety by 77%, and product freshness by 73%. For local buyers only food safety and product freshness were rated very important by more than 50% of respondents, 58% and 65% respectively. With these high ratings for the above mentioned attributes, producers must ensure they are able to provide products that meet these criteria in order to benefit from sales to local restaurants.

Figure 4 presents data on the percentage of weekly food purchased that was locally grown. Interestingly, only 10% of respondents reported that 50% or more of their weekly food purchased was locally grown. Almost three-fourths (71%) of respondents purchased less than 25% of locally grown food on a weekly basis. This information illustrates the tremendous potential for local marketing opportunities to restaurants that producers can take advantage of. Respondents who purchase locally grown foods were also asked how much of their local food is obtained from different marketing channels (Figure 5). Approximately 70% of restaurants purchase from food service suppliers. This is about 27% more than those who purchase from a direct marketing channel (farmers market or directly from a farmer (not including farmers market). This suggests there is great opportunity for producers to approach these restaurants purchasing from food service suppliers about direct local buying. About 55% and 40% of restaurants purchase from farmers markets or directly from a farmer, respectively. Only about 12% purchase from other sources including food brokers and local processors. Data also shows (not shown in figure) only 6% of restaurants purchase 100% of their locally grown food directly from a farmer. Twenty-five percent of restaurants purchase all locally grown food from a food service supplier while 9% from a farmers market. This suggests that there is a tremendous opportunity available to local producers in Alabama to sell to local restaurants.

Respondents who purchased locally grown food were asked percentage of local food delivered to restaurant versus percentage picked up by restaurant staff. Approximately 61% of respondents have the food delivered, while 31% pick food up. This information will help to make producers more aware of the added cost associated with selling directly to restaurants. Delivering products will not only result in direct transportation cost but also valuable time away from the farm to drive to and from restaurants. Cost and time are the two major challenges to

producers selling directly to restaurants. There is also the responsibility of ensuring the right products and right quantity are delivered on time. Producers can include this estimated cost into their marketing plan, which should help decide if the profit margin from selling to local restaurants would be favorable.

Figure 6 represents the most preferred attribute mix for restaurants in the sample. Based on frequency of attribute levels chosen by restaurants, it would appear restaurants had a higher demand for naturally produced, fresh/whole products. Having more restaurants choosing the attribute level six from the producer attributes, could suggest restaurants prefer purchasing from these numbers of producers at the lowest possible cost, on a weekly basis. All respondents were asked to list local products they would like to purchase. Non-local buyers listed a variety of vegetables (lettuce, tomatoes, cucumbers, peppers, squash, broccoli etc); dairy products; meat (pork, seafood, beef, chicken, etc); herbs; among others. Lettuce, tomatoes, onions, squash, and cucumbers were most frequently listed by non-local buyers. Similar to the non-local respondents, local buyers had a high demand for a variety of vegetables, dairy products and meat products. Local buyers also had a demand for legumes which was not found to be desired by non-local buyers. The most frequently listed products desired by current local buyers were beef, chicken, potatoes, eggs, and onions. Respondents who purchase local food were asked to list local products they currently purchase, and tomatoes, squash, peppers, watermelon and cheese were the top five products purchased locally.

Estimation Results

Responses from the choice-based conjoint questions were used to evaluate restaurant preferences for several products and producers attributes utilizing a multinomial logit model.

Model estimates and marginal effects are presented in Table 5. The results were in general consistent with a prior expectation. Multinomial results showed that from the four producer attributes, product form was the only attribute that had both levels being statistically significant. Products purchased in the form of fresh/whole (0.402) were found to have a positive and significant impact on restaurants' choices, while processed (-0.402) foods were found to have a negative impact. This is an indication that producers who want to sell to restaurant would benefit more from selling products that are not processed (chopped, bagged, etc.) which is consistent with the restaurant product preference shown in Figure 6. Restaurants that were interviewed to pretest the survey indicated they prefer fresh/whole products as they are able to prepare them the way they desire and could minimize waste. This finding suggests the small sample chosen to pretest the survey is representative of the sample used for this study. It was found that restaurants prefer products that are produced naturally (0.204) over conventionally (-0.230) produced crops. This is consistent with consumers' demand for healthier food products and their increased concern about the environment. Organic produced food did not have an impact on restaurants' choice. The organic market has been in existence long before the local market which would cause one to believe that more consumers would gravitate towards it. Also, there are strict guidelines that must be followed in order to label products as organic (proving they are organically produced therefore free of any synthetic pesticides and fertilizers) however there is no clear definition of local. However, local food is promoted as not only being healthy and fresher it is also promoted as being beneficial to the local community and therefore attracts more consumers. Two studies, Clonan et al. (2010) and USDA/ERS (2009) found that consumers chose local products over organic products when they were asked to choose between the two. Based on the results from this study, producers who produce naturally grown products

would have an advantage over the other production methods when approaching restaurants about creating a potential market. Results show that restaurants' want to pay the lowest possible price and would not prefer paying above their current weekly cost, indicated by a negative (-0.632) and significant coefficient. As is expected, paying a price below their current weekly prices has a positive (0.633) and significant impact on choosing a profile. The number of farmers was found to have no significant impact on restaurant profile choices. Which indicate that this attribute is not important to restaurants when making local purchasing decisions.

Marginal effects coefficients were also estimated as they are more informative than multinomial logit parameters (Louviere, Hensher and Swait 2000). These estimates gave a better interpretation of restaurants' preferences for a particular attribute, presented in percentages. The marginal effects estimates are presented in Table 5. Marginal effects results show that foods that were produced naturally were preferred by restaurants. Having the option of choosing natural production positively and significantly influenced a restaurant's choice. The likelihood of a restaurant selecting a profile is significantly increased by approximately 4.4%, when the profile contains the attribute level "natural". As a result local producers who practice natural production would gain an advantage over producers who practice conventional or organic production, and they are more likely to successfully market their products to independently owned restaurants in Alabama. Contrary to the positive influence of natural production, conventional production methods negatively impact a restaurant's choice. The probability of making a profile selection is decreased by 4.9% when conventional production is included in a profile. This negative impact was expected as conventionally produced foods are considered to be less healthy when compared to other production methods (natural and organic) and also conflicts with chefs' interests of promoting a cleaner, more sustainable environment.

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Another attribute that is important to restaurants is product form, specifically the "fresh/whole" attribute level. The "fresh/whole" product form was found to have a positive and statistically significant impact on restaurants' choices. Having this attribute level available in a profile significantly increases the likelihood of a restaurant choosing that particular profile by approximately 8.6%. Restaurant chefs are interested in prepping products based on the particular dish that will be prepared. The product form "processed/bagged" had the opposite impact of "fresh/whole" on restaurants' choices. As expected, paying a price below their current weekly cost significantly increases the probability of a restaurant choosing a profile. The attribute level "10% below weekly average" had the greatest percentage (14.2%) impact on a restaurant's decision to select a profile. As the price increases above the weekly average cost ("10% above weekly"), restaurants are no longer interested in a profile that features this attribute level, which is evident from the negative marginal effect of 13.5%. This is an important finding that producers must keep in mind when approaching restaurants with a business proposal. Organic production did not have an impact on restaurants' choices. Since restaurant chefs perceive naturally produced foods to be healthy, fresh and environmentally friendly (similar to organic production) paying a premium for organic is not viable to these restaurant. The attribute "number of farmers" was found to have no significant impact on a restaurant's choice.

Participants were given three price levels as a means of soliciting their WTP for producer and product attributes. Average price represents the average weekly cost paid for a basket of goods by each restaurant. Along with average price, participants were given the option of paying 10% above or 10% below their average weekly cost for the same basket of goods. In order to determine WTP, the single price parameter estimate must be used. This new price variable was created by using 0 if average price was the price level that was selected, 10 if 10% below and -10

if 10% above was selected, respectively. Following Louviere, Hensher and Swait (2000) a new multinomial model was estimated using this price parameter. According to these authors, the price coefficient in a linear model reflects the change in utility for a change in the price of a good, which captures the marginal utility of money. However, the price coefficient is negative, reflecting the theory that higher prices result in lower utility. In order to change this coefficient into the marginal utility of money (instead of marginal disutility of price), one can multiply the price coefficient by -1. Using the new coefficients from the multinomial model, the following equation, $\frac{-\beta_{attribute}}{\beta_{price}}$ was used to calculate willingness to pay for the attribute levels in this study. Since the attribute levels for price used in the study were percentages, not dollar value, the WTP estimates are interpreted as percentages (See Table 6). Willingness to pay estimates indicates restaurants place the highest value on natural and fresh products. Restaurants were WTP approximately 3.14% and 6.19% more for natural and fresh/whole attribute levels, respectively. Again, this highlights the importance of these two particular attributes to restaurants. Local producers desiring to market their products to restaurants must be able to provide products with these attributes. If producers are unable to do so, this could negatively affect their chances of entering this market. Based on their negative percentage WTP (-6.19%) restaurants are not interested in purchasing processed foods from local producers. It is important to note the "optout" option available to restaurants. Participants were given the option of not choosing either of the two profiles available to them ("optout"). It was found that not choosing a profile is a disincentive (-21.49%) to restaurants. This suggests that restaurants want to choose from the four attributes, but not the combination of these attributes that were available in a single choice set to them.

Conclusions

Consumers' increased demand for locally produced food is having a direct effect on restaurants' demand for local food. This study evaluated restaurants preferences for various local product and producer attributes. Results revealed restaurants prefer purchasing products that are naturally grown. They also placed significant values on products in the form of fresh/whole as opposed to purchasing products that are processed. Prices played a significant role in restaurants' purchasing decision. Restaurants preferred purchasing at the lowest possible price, a price below what they currently pay on a weekly basis. These results suggest that it may be profitable for producers in Alabama to target independently owned restaurants as a means of extending their marketing outlet. There is strong demand for local products by restaurants as indicated by these findings which would not only be beneficial to producers but to restaurants and their customers, and the community at large. Producers can better understand what restaurants are looking for, based on information from this study, not only in terms of attributes but also the type of produce being demanded. Producers should be aware that producing diverse products is key to better implementing a successful local marketing system. Data showed that availability of products and availability of information about products was important to restaurants. Producers must therefore find effective ways of advertising the products available. This is important as lack of information is one of the major reasons preventing restaurants from connecting with local producers and purchasing locally. This suggests that there is potential for direct marketing to restaurants that producers are not currently utilizing.

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Figure 1: Example of a Choice Set

Number of Farmers: 9	**Number of Farmers:** 6	
Producer Type: Conventional	**Producer Type:** Natural	**I Would Select Neither Option**
Product Form: Fresh/Whole	**Product Form:** Fresh/Whole	
Price: 10% Below Average Weekly	**Price:** Average Weekly	

Preferred
Choice   ☐   ☐   ☐

Figure 2: Payment Methods
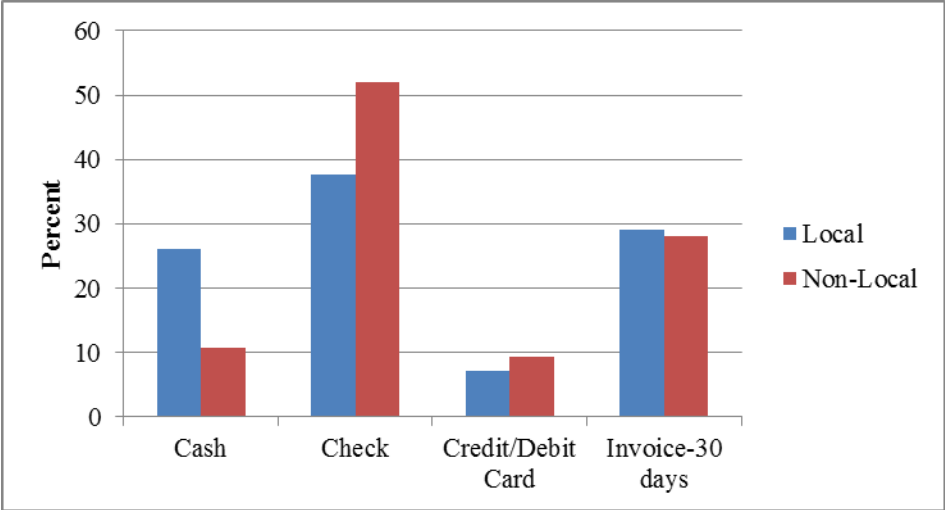
Figure 3: Importance of Factors Influencing Local Purchase Decision
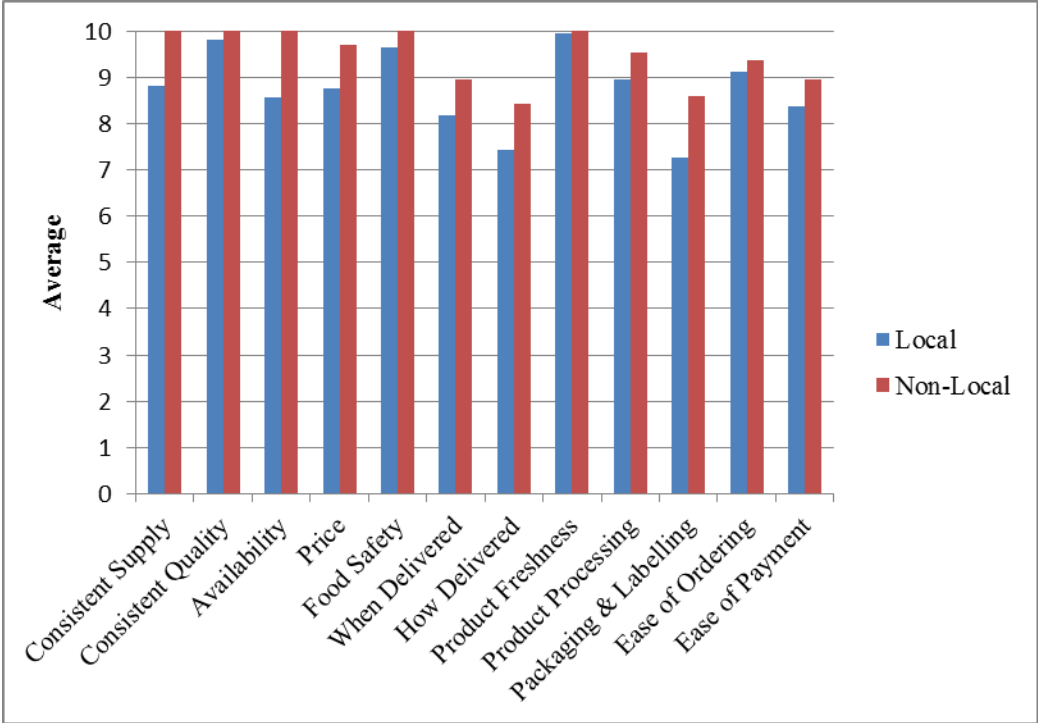
Figure 4: Percentage of Weekly Food Purchases Locally Grown

3%

7%

19%

71%

■ 1% to 25% of purchases locally grown

■ 26% to 50% of purchases locally grown

■ 51% to 75% of purchases locally grown

■ 75% or more of purchases locally grown

Mean = 22% are locally grown
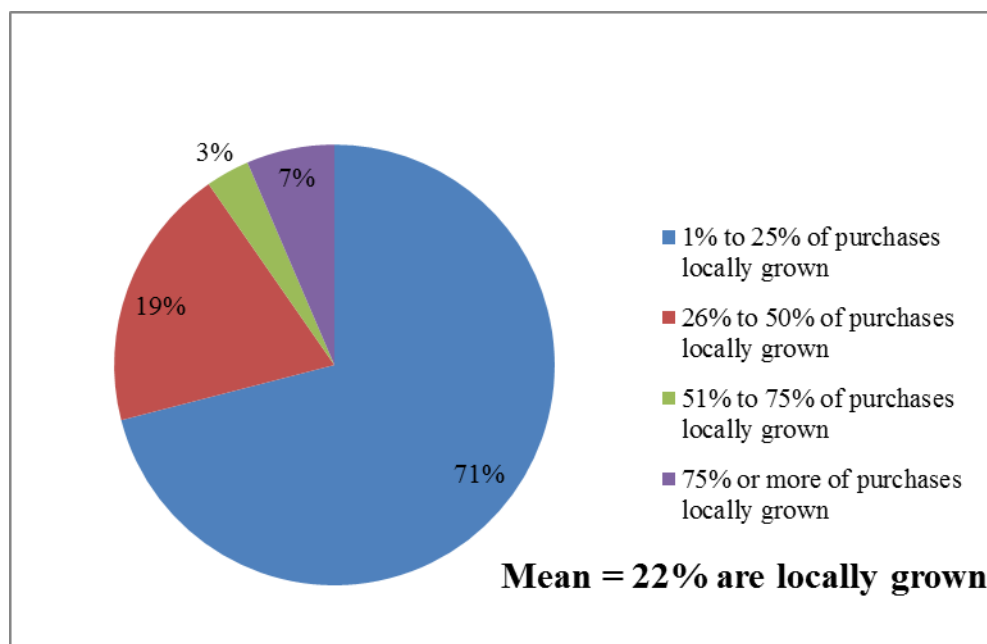
Figure 5: Sources of Locally Grown Food
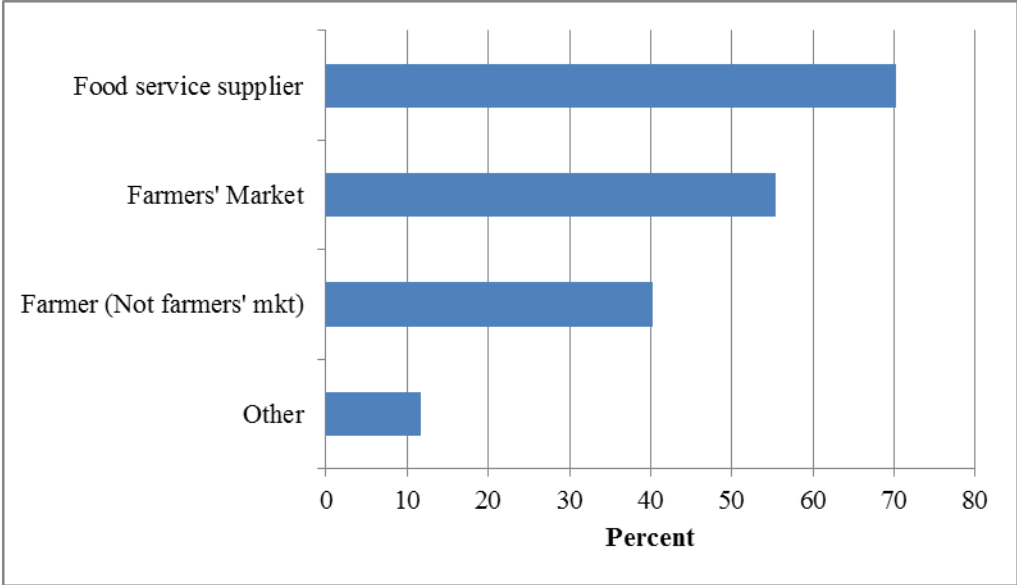
Figure 6: Restaurants' Preferred Product and Producer Attribute Mix
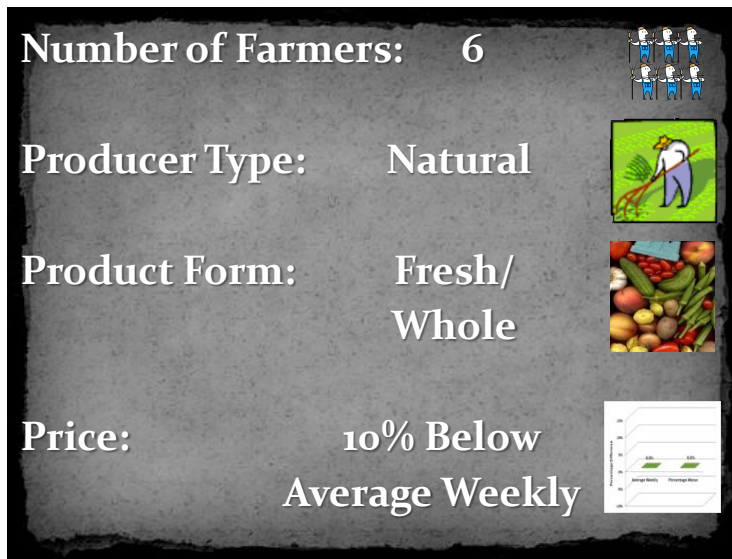
Table 1: Local Producer Attributes and Attribute Levels

Attributes	Attribute Level
Number of farmers	3
	6
	9
Production Method	Conventional
	Organic
	Natural
Product Form	Processed/Bagged
	Fresh/Whole
Price	Average Weekly
	10% above average weekly
	10% below average weekly

Table 2: Background Information on Restaurants that Purchase Local and Non-Local Products

	Mean	Std. dev
Years in business		
Non-Local	12.00	16.10
Local	14.00	16.24
Meal Prices ($):		
Breakfast		
Non-Local	6.65	3.95
Local	7.59	1.80
Lunch		
Non-Local	8.59	2.34
Local	8.87	2.37
Dinner		
Non-Local	13.22	6.48
Local	14.98	7.92
Average Weekly Food Expense ($)		
Non-Local	6550.40	6306.95
Local	5774.11	5499.01

Table 3: Percentage Responses of Restaurants that Purchase Local and Non-local Products

	Frequency (%)	Mean	Std. dev
Buy local		1.49	0.50
Yes	51		
No	49		
Food safety standards (Local Buyers)		1.759	0.819
Familiar	83		
Not Familiar	17		
Buying local would impact your profit (Non-local Buyers)	2.813		1.566
Agree	44		
Indifferent	35		
Disagree	17		
Unsure	4		
Buying local impact your profit (Local Buyers)		2.208	0.948
Agree	62		
Indifferent	28		
Disagree	10		

Table 4: Mean Food Attribute Ratings for Restaurants that Purchase Local and Non-local
Products

Attribute	Mean	Std. dev
Consistent supply	8.65	2.41
Consistent quality	9.27	1.87
Year-round availability	8.30	2.72
Price	8.24	1.96
Food safety	9.10	1.83
When product is delivered	7.56	2.88
How product is delivered	6.94	3.24
Product freshness	9.22	1.88
Product processing	8.29	3.00
Product packaging and labeling	6.97	3.51
Ease and efficiency of ordering	8.24	2.59
Ease and efficiency of payment	7.70	3.02

Table 5: Multinomial Logit Model Estimates from Choice-Based Conjoint Questions

Variables	Coefficient	Std. Error	PValues	Marginal Effects
Three	0.055	0.068	0.417	0.012
Six	-0.036	0.064	0.575	-0.008
Nine	-0.019	0.068	0.776	-0.004
Natural	0.204***	0.065	0.002	0.044***
Organic	0.026	0.068	0.703	0.006
Conventional	-0.230***	0.067	0.001	-0.049***
Fresh	0.402***	0.047	0.000	0.086 ***
Processed	-0.402***	0.047	0.000	-0.086***
Average	-0.031	0.065	0.640	-0.007
Below	0.663***	0.067	0.000	0.142***
Above	-0.632***	0.067	0.000	-0.135***
Optout	-1.395***	0.098	0.000	-0.299***
No, of respondents	131			
Log Likelihood	-1771.906			
Chi-Square Stats	458.59			
McFadden's LRI	0.1665			

 Note: *** indicates statistical significance at 1% level.

Table 6: Percentage Willingness to Pay for Producer and Product Attributes

Variables	Estimates
Three	0.852%
Six	-0.553%
Nine	-0.300%
Natural	3.146%
Organic	0.402%
Conventional	-3.549%
Fresh	6.190%
Processed	-6.190%
Optout	-21.492%

Appendix A

Restaurant Preferences Survey

ALABAMA COOPERATIVE Extension SYSTEM

Alabama A&M and Auburn Universities
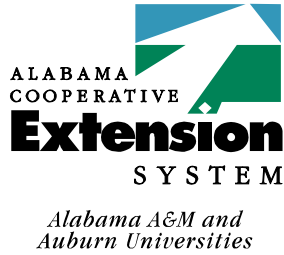
Section 1: Background Information

1. How long has this restaurant been in business (years)? _____

2. What is your primary role at the restaurant? _____

3. In what county is the restaurant located? _____

4. What is the average cost of each of the following meals at your restaurant?

Breakfast $ _____

Lunch $ _____

Dinner $ _____

5. What is your average weekly expense for food (dollars)? _____

6. Does your restaurant currently purchase locally-grown food products?

Yes ☐

If you answered YES to question 6, complete sections 3 and 4 only (Local Buying and Conjoint Product Analysis), DO NOT complete section 2 of the survey.

No ☐

If you answered NO complete Section 2 and 4 only (Not Currently Purchasing Local), DO NOT complete section 3.

Section 2: Not Currently Purchasing Local – Complete this section if you currently purchase local foods

1. What is the primary reason your restaurant does not currently purchase locally grown food?
_____

2. How familiar are you with food safety standards required for producers and other vendors from whom you purchase food?
☐ Extremely Familiar   ☐ Familiar   ☐ Not Very Familiar   ☐ Not at all Familiar

3. Please rank the following payment options in terms of preference for purchasing locally grown products **(Most Preferred, 2, 3 and Least Preferred can only be selected once). Circle response.**

	Most Preferred	2	3	Least Preferred
Pay with Cash	Most Preferred	2	3	Least Preferred
Pay by Check	Most Preferred	2	3	Least Preferred
Pay with a credit or debit Card	Most Preferred	2	3	Least Preferred
Invoice to be paid within 30 days	Most Preferred	2	3	Least Preferred

4. Please rate from 0 (Not Important) to 10 (Very Important) the importance of the following factors in terms of making a decision to purchase locally grown food? (Circle response)

	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Consistent supply	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Consistent quality	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Year-round availability	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Price	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Food safety	Not Important	1	2	3	4	5	6	7	8	9	Very Important
When the product is delivered	Not Important	1	2	3	4	5	6	7	8	9	Very Important
How product is delivered	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Product freshness	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Product processing	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Product packaging and labelling	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Ease and efficiency of ordering	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Ease and efficiency of payment	Not Important	1	2	3	4	5	6	7	8	9	Very Important

5. What is your restaurant's level of interest in promoting locally grown food on your menu or promotional material?

	Not Interested	2	3	4	5	6	7	8	9	Extremely Interested
Promoting Locally Grown	Not Interested	2	3	4	5	6	7	8	9	Extremely Interested

6. Purchasing locally grown food would have a positive impact on this restaurant's profit.

☐ Strongly agree   ☐ Agree   ☐ Indifferent   ☐ Disagree   ☐ Strongly disagree

7. What locally grown food products would you like to purchase in the future (rank by order of importance)?

1. _____   4. _____

2. _____   5. _____

3. _____   6. _____

8. Please give your restaurant's total gross sales for 2009. Enter the value in the box below or choose the appropriate category (Providing an exact value will increase the accuracy of our estimate).

☐ less than $100,000   ☐ $300,000 to $399,999   ☐ $1,500,000 to $1,999,999
☐ $100,000 to $149,999   ☐ $400,000 to $499,999   ☐ $2,000,000 to $2,999,999
☐ $150,000 to $199,999   ☐ $500,000 to $749,999   ☐ $3,000,000 to $3,999,999
☐ $200,000 to $249,999   ☐ $750,000 to $999,999   ☐ $4,000,000 to $4,999,999
☐ $250,000 to $299,999   ☐ $1,000,000 to $1,499,999   ☐ $5,000,000 or more

2009 Gross Sales (These figures are strictly confidential and will be used for survey totals only.)
_____

If you do not currently purchase local food, Skip to Section 4.

Section 3: Local Buying – Complete this section only if you currently purchase local foods

1. What percentage of your weekly food purchases (**from page 1, question 5**) is locally grown? _____%

2. What percentage of the locally grown food purchased by your restaurant is obtained by the following methods (%)? Enter "0" if the method is not used.

    Directly from a farmer (not a farmers market)   _____

    From a farmers market   _____

    Delivered by a food service supplier   _____

    From a food broker   _____

    From a local processor   _____

    Other (please list)

3. What percentage of locally grown food used at your restaurant is:

    Delivered to the restaurant (%)   _____

    Picked up by restaurant staff (%)   _____

4. What is the total number of producers you currently purchase locally grown food from on a weekly basis (producers)? _____

5. How many deliveries per week do local producers make to your restaurant? _____

6. How familiar are you with food safety standards required for producers and other vendors from whom you purchase food?

☐ Extremely Familiar   ☐ Familiar   ☐ Not Very Familiar   ☐ Not at all Familiar

7. I would be interested in receiving additional training or information on food safety requirements for vendors.

☐ Strongly Agree   ☐ Agree   ☐ Indifferent   ☐ Disagree
☐ Strongly Disagree

8. Please rank in order from 1 (most important) to 6 (least important) the following reasons that your restaurant purchases locally grown products? (each number can only be used once). **(Circle response)**

	Most Important	**2**	**3**	**4**	**5**	**Least Important**
There is a higher profit margin for local products	Most Important	2	3	4	5	Least Important
Competitors purchase local products	Most Important	2	3	4	5	Least Important
Customer demand	Most Important	2	3	4	5	Least Important
Support local producers	Most Important	2	3	4	5	Least Important
Product Quality (taste and freshness)	Most Important	2	3	4	5	Least Important
You can purchase at a lower price	Most Important	2	3	4	5	Least Important

9. Purchasing locally grown food has had a positive impact on your restaurant's profit.

☐ Strongly Agree ☐ Agree ☐ Indifferent ☐ Disagree ☐ Strongly Disagree

10. Please rank the following payment options in terms of preference for purchasing locally grown products.

	Most Preferred	**2**	**3**	**Least Preferred**
Pay with Cash	Most Preferred	2	3	Least Preferred
Pay by Check	Most Preferred	2	3	Least Preferred
Pay with a Credit or debit Card	Most Preferred	2	3	Least Preferred
Invoice to be paid within 30 days	Most Preferred	2	3	Least Preferred

11. What is the most effective method you have used to find local producers and products (select one)?

☐ Trade Magazines or Newspapers   ☐ Internet

☐ Producers themselves   ☐ Farmers Markets

☐ Cooperative Extension Service

☐ Other (please specify) _____

12. Please rate from 0 (Not Important) to 10 (Very Important) the importance of the following factors in terms of making a decision to purchase locally grown food?

	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Consistent supply	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Consistent quality	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Year-round availability	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Price	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Food safety	Not Important	1	2	3	4	5	6	7	8	9	Very Important
When the product is delivered	Not Important	1	2	3	4	5	6	7	8	9	Very Important
How product is delivered	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Product freshness	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Product processing	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Product packaging and labelling	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Ease and efficiency of ordering	Not Important	1	2	3	4	5	6	7	8	9	Very Important
Ease and efficiency of payment	Not Important	1	2	3	4	5	6	7	8	9	Very Important

13. What is your restaurant's level of interest in promoting locally grown food on your menu or promotional material?

	Not Interested	2	3	4	5	6	7	8	9	Extremely Interested
Promoting Locally Grown	Not Interested	2	3	4	5	6	7	8	9	Extremely Interested

14. What locally grown food products would you like to purchase that you are not currently able to purchase (rank by order of importance)?

1   _____

2   _____

3   _____

4   _____

5   _____

6   _____

15. What are the primary locally grown food products currently purchased by your restaurant (rank by value of annual purchases)?

1   _____

2   _____

3   _____

4   _____

5   _____

6   _____

16. Please give your restaurant's total gross sales for 2009. Enter the value in the box below or choose the appropriate category (Providing an exact value will increase the accuracy of our estimate).

☐ less than $100,000   ☐ $300,000 to $399,999   ☐ $1,500,000 to $1,999,999

☐ $100,000 to $149,999   ☐ $400,000 to $499,999   ☐ $2,000,000 to $2,999,999

☐ $150,000 to $199,999   ☐ $500,000 to $749,999   ☐ $3,000,000 to $3,999,999

☐ $200,000 to $249,999   ☐ $750,000 to $999,999   ☐ $4,000,000 to $4,999,999

☐ $250,000 to $299,999   ☐ $1,000,000 to $1,499,999   ☐ $5,000,000 or more

2009 Gross Sales (These figures are strictly confidential and will be used for survey totals only.)

_____

The hypothetical profiles below are used to determine your preference for local producer attributes. The profiles represent a specific situation you would face when purchasing local food. Each profile consists of 4 producer attributes: 1) number of farmers, 2) producer type, 3) product form, and 4) price. For the "price" attribute you would consider your current average weekly expense for local purchases (see Page 1 Question 5 on survey). The percentage above (below) average weekly price is how much more (less) you would pay for local food purchases with the given attributes in the profile.

There are 8 choice sets listed below, each consisting of three choices (two profiles and an option not to select either profile). Please compare the features of the profiles and select your most preferred choice from each choice set. Please carefully evaluate and complete all 8 choice sets.

Choice 1

Number of Farmers: 9	Number of Farmers: 6	
Producer Type: Conventional	Producer Type: Natural	I Would Select Neither Option
Product Form: Fresh/ Whole	Product Form: Fresh/ Whole	
Price: 10% Below Average Weekly	Price: Average Weekly	

Preferred Choice   ☐   ☐   ☐

Choice 2

Number of Farmers: 9	Number of Farmers: 9	
Producer Type: Conventional	Producer Type: Conventional	I Would Select Neither Option
Product Form: Processed/ Bagged	Product Form: Fresh/ Whole	
Price: 10% Above Average Weekly	Price: 10% Above Average Weekly	

Preferred Choice   ☐   ☐   ☐

Choice 3

Number of Farmers: 9	Number of Farmers: 6	
Producer Type: Natural	Producer Type: Organic	I Would Select Neither Option
Product Form: Processed/ Bagged	Product Form: Processed/ Bagged	
Price: Average Weekly	Price: 10% Above Average Weekly	

Preferred Choice ☐   ☐   ☐

Choice 4

Number of Farmers: 6	Number of Farmers: 3	
Producer Type: Natural	Producer Type: Natural	I Would Select Neither Option
Product Form: Fresh/ Whole	Product Form: Fresh/ Whole	
Price: 10% Above Average Weekly	Price: 10% Above Average Weekly	

Preferred Choice ☐   ☐   ☐

Choice 5

Number of Farmers: 6	Number of Farmers: 6	
Producer Type: Organic	Producer Type: Organic	I Would Select Neither Option
Product Form: Processed/ Bagged	Product Form: Fresh/ Whole	
Price: 10% Above Weekly Average	Price: Average Weekly	

Preferred Choice ☐   ☐   ☐

Choice 6

Number of Farmers: 6	**Number of Farmers:** 6	
Producer Type: Natural	**Producer Type:** Conventional	I Would Select Neither Option
Product Form: Processed/ Bagged	**Product Form:** Fresh/ Whole	
Price: 10% Below Average Weekly	**Price:** 10% Below Average Weekly	

Preferred Choice   ☐   ☐   ☐

Choice 7

Number of Farmers: 3	**Number of Farmers:** 6	
Producer Type: Organic	**Producer Type:** Conventional	I Would Select Neither Option
Product Form: Fresh/ Whole	**Product Form:** Fresh/ Whole	
Price: Average Weekly	**Price:** 10% Above Average Weekly	

Preferred Choice   ☐   ☐   ☐

Choice 8

Number of Farmers: 3	**Number of Farmers:** 3	
Producer Type: Conventional	**Producer Type:** Organic	I Would Select Neither Option
Product Form: Processed/ Bagged	**Product Form:** Fresh/ Whole	
Price: 10% Below Average Weekly	**Price:** 10% Above Average Weekly	

Preferred Choice   ☐   ☐   ☐

CHAPTER 2: IMPACT OF THE NEW TARIFF-ONLY REGIME ON ACP AND LATIN COUNTRIES

History of the Banana

Bananas originated in the rain forests of Southeast Asia and the western Pacific region (Pillay et al. 2012) and may have been cultivated as early as 1000 B.C. (Jenkins 2000). The plants were then brought to the Middle East and Africa and transplanted on the Canary Islands, by the Portuguese (Mariani 1983). In 1516 bananas were planted in Haiti and Dominican Republic as an inexpensive, sustainable food, for the slave population (Jenkins 2000). Bananas were then taken to Panama and Mexico, which rapidly spread throughout Central America and the rest of the Caribbean (Pillay et al. 2012). Bananas are tropical or subtropical plants that bear bunches of either yellow or reddish fruits. The plant can grow as tall as thirty feet and is probably the largest plant that does not have a woody stem above the ground, making it prone to wind-storm damage (Reynolds 1927). The plant produces a red flower (bract), which points downward as it matures. The bract eventually falls off exposing the young bananas. The fruit grows on a single shoot with seven to ten bunches each holding fourteen to twenty individual fruits (Koeppel 2009).

It takes approximately one year and six months for the plant to grow from a shoot to producing a mature bunch of bananas (Shepherd 1964). The stalk generally weighs from eighty to one hundred and fifty pounds, each containing up to one hundred and fifty individual bananas. The bananas are usually cut green because if they are allowed to ripen on the plant they will lose

their flavor and become sour; they will also split open and attract insects (Reynolds 1927). Each plant produces fruits only once and is then cut down and left to rot, forming humus, which supports another shoot growing from the same stem (von Loesecke 1949). In order to bear fruits, a banana plant needs fourteen to twenty three consecutive months of frost-free, sunny weather. They are mainly produced in tropical countries where high rainfall and soil is most suitable (Barraza et al. 2011). Because of the conditions needed for its growth, banana production is concentrated in only a few countries; generally Latin, African, Caribbean and Pacific countries.

Latin American and ACP countries are the main suppliers of banana to the EU. A significantly larger share of EU's banana imports are supplied by Latin countries (77%) while ACP countries account for approximately 22%. ACP banana farms are mainly family farms producing a much lower production quantity than Latin American banana plantations. Banana production is highly labor intensive and costly to produce and as a result ACP countries must rely greatly on family members to cultivate, harvest, and pack bananas, in order to reduce these costs. Given the high production cost and low production volume of ACP bananas, they are unable to compete with Latin American countries. In order to increase their competiveness, the EU granted ACP countries preferential trade treatment in which they are allowed to export bananas duty free to the EU. The preferential treatment created a long-standing dispute between Latin American countries and the EU. In an attempt to settle the trade dispute after many years and numerous trade regimes, the EU implemented a tariff-only regime in 2006. Under this regime, quotas from ACP and Latin countries were eliminated; however, bananas from ACP countries remained duty free while Latin American countries were charged a tariff of €176/ton. However, the tariff is expected to progressively decrease to €114/ton by 2017. It is speculated that the elimination of the Latin quota and the reduction in tariff will negatively impact the ACP

banana dependent countries. Specifically, critics anticipate a decline in EU import volume from ACP countries due to lower import prices on Latin bananas. This study seeks to determine whether critics' speculations have any underlying truth. Therefore, the primary objective of this study is to determine EU demand for fresh bananas differentiated by country of origin, given the change in the regime. Specific objectives are to: 1) estimate the EU demand for imported banana from source-specific countries, 2) use the empirical estimates to measure the responsiveness of import demand with respect to changes in import prices, domestic prices, and the price of labor used by importers, and 3) use the import demand estimates to project future EU demand given the reduction in tariff on Latin bananas.

Banana Regime

The history of the European Union (EU) and African, Caribbean and Pacific (ACP[1]) countries date back (and beyond) to the 1957 Treaty of Rome, where EU member states (formally European Economic Community) had long-standing economic relationships with ACP countries (Laaksonen et al. 2007). At the time of the Treaty, some ACP countries were still colonies of European countries[2] (Fishman 1996). The EU member states signed the 1957 Treaty primarily to show support and commitment to their colonies and overseas territories (Laaksonen et al. 2007). Before signing the Treaty, member states such as France insisted that special rights be granted to their overseas dependencies, including development aid and free trade (Rommel 2012). As more and more colonies gained their independence, the 1963 Yaoundé Convention was signed by EU member states to respond to challenges faced by a number of these

---

[1] From the list of ACP countries, the following were used in this study: Belize, Burundi, Cameroon, Cote d'Ivoire, Dominica, Dominican Republic, Ghana, Grenada, Jamaica, Kenya, Rwanda, St. Lucia, St. Vincent, Suriname, and Uganda.

[2] See Fishman for a list of other ACP countries that were still colonies beyond 1957.

independent ACP countries[3]. Some of these challenges include implementing measures to (a) increase agricultural productivity, (b) increase the standard of living for farmers, (c) stabilize markets, and (d) ensure reasonable consumer prices (Harris et al. 1978). However, the Yaoundé Convention failed to accomplish the intended goals leaving these challenges unresolved. The Yaoundé Convention was resigned in 1969 but expired in 1975.

In 1975, the Lomé Convention was signed with the hope of accomplishing what the Yaoundé Convention did not. The Lomé Convention was signed on February 28th, 1975, in Lomé, capital of Togo. It was intended as an economic cooperation agreement between the EU and forty six ACP countries (Harris et al. 1978). The Lomé convention primarily offered ACP countries free market access to the European markets, with special arrangements for some agricultural products, including bananas (Rommel 2012). The trade arrangements for bananas were primarily to protect banana exporting ACP countries, preventing them from being placed in a less favorable position than they enjoyed before the convention, regarding access to the European market (Harris et al. 1978). After the Lomé convention, the European market was immensely divided, with multiple EU banana import regimes (Guyomard et al. 2006). Some of these regimes focused on restrictions on all imports[4] while others had open entry import, bound to a 20% duty rate; Germany was allowed duty-free import (European Parliament 2010). France, United Kingdom (UK) and Italy offered preferential treatment to ACP countries while other member states imported cheaper bananas, mainly from Latin American countries (Barclay 1999).

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[3] Yaoundé Convention and any other Conventions discussed later, refers to the meeting of government officials from around the world to conduct trade negotiations supervised by the World Trade Organization.

[4] Former colonies in Africa and the Caribbean had special arrangements and were not subjected to these restrictions

The 1975 Lomé Convention's preferential treatment to ACP countries stimulated a long-standing debate between EU, Latin countries and the United States. The United States got involved on behalf of its multinational trading firms; Chiquita, Del Monte and Dole. In an attempt to address the grievances from Latin countries and the U.S., the World Trade Organization (WTO) ruled the EU implement a regime that was non-discriminatory to all countries and consistent with WTO standards. In response to the WTO ruling, the EU implemented a single market regime in 1993. However, this regime was not readily accepted by all member states, as France and the UK wanted to continue restrictions on banana imports from Latin American countries (Barclay 1999). Under the single market regime, ACP countries had a tariff rate quota of 857,700 tons of duty free bananas; split on a country-specific basis. Latin countries had a higher tariff rate quota, 2 million tons, but faced a duty rate of €100/ton[5]. Latin exports in excess of the 2 million tons quota were subjected to a tariff of €850/ton. The quota for both ACP and Latin countries were aggregates of all countries, respectively.

The divide among the member states, and the complaint from Latin countries and the U.S., with respect to the single market regime, challenged the EU to create a regime that satisfies all parties involved while maintaining preferential treatment to ACP countries. In 1995 the EU modified the regime in an attempt to meet WTO rulings. Under the 1995 modifications, the ACP tariff rate quota remained unchanged at 857,700 tons while the Latin tariff rate quota increased to 2.2 million tons[6] (Commission of the European Communities 2000). An additional 353,000 tons were added in 1995 to account for the expanded EU market (Hanrahan 2001). Latin exports in excess of the 2.2 million tons were subjected to the €850/ton duty rate. Further modifications

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[5] The 2011 average exchange rate for U.S./euro ($/€) was $1.39.
[6] In the 1995 framework the tariff rate quota of 2.2 million tons were split accordingly: 49.4% for Costa Rica, Colombia, Nicaragua and Venezuela; 50.6% for other countries

were made to the regime in 1999. While the ACP quota was no longer split on a country-specific basis, the Latin quota remained split, but the allocation to specific countries changed[7].

Under the 2001 regime (the final regime before the tariff only regime), ACP tariff rate quota was reduced to 750,000 tons but remained duty free, while the tariff charged to Latin countries was reduced to €75/ton. In excess of the quota, ACP countries were subjected to €300/ton and Latin countries €680/ton (European Parliament 2010). Besides the tariff and the quota, the intricacy of licensing requirements was a major complaint, and was termed discriminatory by Latin countries. This portion of the regime was modified by simplifying the licensing (General Agreement on Tariff and Trade (GATT) 1994).

After numerous failed attempts over the years to satisfactorily modify the regime, in 2001 the EU carried out negotiations with all countries involved to eliminate the tariff rate quota for Latin countries and move to a tariff-only regime no later than January 1st, 2006 (European Parliament 2010). After efforts through 2003 and 2004 to reach a suitable tariff rate, the EU proposed a duty rate of €230/ton on Latin banana imports on January 1st 2006, without specifying the regime under which ACP banana would be imported (Giovanni 2006). However, the suggested duty rate was not satisfactory to the Latin exporting countries who filed another complaint to the WTO. The EU then proposed a much lower tariff for Latin countries, €187/ton, and a duty free tariff rate quota of 775,000 tons from ACP countries, a 3% increase in the tariff rate quota from 2001 (WTO 2005a). It was ruled that the proposed import regime would not 'result in at least maintaining total market access to Latin banana suppliers' (WTO 2005b).   On January 1st 2006, the tariff rate quota for Latin countries was eliminated and a duty rate of €176/ton applied; an annual quota of 775,000 tons from ACP countries was also adopted

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[7] Under the 1998 Reform the quota was split accordingly: Ecuador 26.17%, Costa Rica 25.61%, Columbia 23.03%, Panama 15.76%, and other 9.43%.

(Giovanni 2008). The ACP tariff rate quota was eliminated in December 2007. Negotiations between EU and Latin countries continued through 2009, which led to the 'Geneva Agreement', signed in December of that year [8] (WTO 2009). Under the 'Geneva Agreement', the tariff on Latin bananas is to fall by eight progressive steps from €176 to €114 per ton, approximately 35%. The final rate is to be reached on January 1st 2017 (Table 1).   Banana imports from ACP countries are expected to remain quota free and duty free.

Competitiveness of Caribbean Bananas

Banana exports play a fundamental economic role in banana producing Caribbean and Latin countries (ECLAC 2008). Based on 2000-2010 data (Food and Agriculture Organization (FAO) 2013), banana export value represents a significant percentage of the total export value in Caribbean countries such as Belize (11%), Dominica (17.5%), St. Lucia (22.8%) and St. Vincent/Grenadines (27.7%). Although not as significant as Caribbean countries, Latin banana exports also represent a significant percentage of their overall export value; Costa Rica (8%), Ecuador (13.4%), Honduras (7%) and Panama (10.7%). Despite the importance of banana trade to Caribbean countries' economies, banana is primarily produced by small-and medium-scale producers (Addy 1999). Similarly, much of the bananas produced in African countries are also by small-scale, subsistence farmers ranging from 0.25 to 5 hectares (Karamura et al. 1998). Caribbean banana production is highly labor intensive. Banana producers in the Caribbean rely heavily on family members to cultivate, harvest, and pack bananas. Family labor is supplemented by a few hired workers who are usually neighbors and friends (Godfrey 1998).

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[8] The Geneva Agreement was signed between the EU and Brazil, Columbia, Costa Rica, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Peru and Venezuela. These countries are referred to as Latin American Most Favored Nations (MFN).

Contrary to ACP production, Latin bananas are mainly grown on plantations typically greater than twelve thousand acres and are operated by the U.S. major distributors: Chiquita, Dole and Del Monte (Raynolds 2003). Because of the fragility of the fruit, the Latin banana production process remains labor intensive. However, unlike ACP dependence on family labor, Latin banana corporations hire cheap, temporary laborers who are excluded from legal minimum-wage standards, job-security guarantees, and benefits (Foro Emaus 1997; Ransom 1999, 10-13). Further minimizing the cost of labor, most Latin American banana plantations hire minority workers, often migrants working in the country illegally (Moberg 1996). Because of the scale of production in the Latin countries, human labor input can be reduced by the use of mechanical inputs but cannot be replaced (Bourgois 1989).

Added to the challenge of labor cost is the complexity of shipping and marketing the fruit. The process of getting bananas from the fields to distant consumers is a complex set of transnational production, processing, and marketing activities (Raynolds 2003). This process includes cutting, washing, packing, shipping, ripening, and wholesaling. Because of the complexity of the shipping and marketing process, distributors play an important role. The Dollar banana system is vertically integrated with the three major corporations managing both production and distribution themselves, guaranteeing product quality and supplies at the end of the supply chain. The ACP banana system is less integrated with a number of distributors that are not involved in the production process, coordinating export (Welch 1996). Additionally, the cost of shipping and distribution are significantly higher for ACP bananas because of the lower import volumes and multiple stops required by vessels for loading cargos.

Figure 1 presents 1997 banana production costs for Latin American and ACP countries. Because of the small-scale production, lower yields, relatively higher wage rates paid to workers,

and the lack of chemical-intensive methods, ACP production costs are twice that of Latin American bananas (Moberg 2008). Jamaica's (approximately $390/ton) production cost, the lowest ACP cost, was almost twice that of Columbia ($200/ton), which is the highest production cost incurred by a Latin country.   Dominican bananas cost roughly an average of $515/ton to produce, which is the highest cost for an ACP country. The high cost of production makes it difficult for ACP countries to compete making them highly dependent on EU preferential treatment.

Latin American countries not only produce significantly larger volumes of banana, they supply almost 80% of the EU import. Despite their large percentage share, the Latin countries have the capacity to supply an even greater share. However, the EU imposed a tariff rate quota as well as a high duty rate to restrict Latin American supply. The Latin American banana producers' biggest competition is the ACP, although not a huge threat in terms of volume. Given ACP countries are not able to supply nearly as much as Latin countries, they were granted preferential treatment to ensure they maintained fair market access. Bananas imported from ACP countries entered the EU duty free, but they too were restricted by a tariff rate quota. However, after years of negotiations and a number of regimes, the EU eliminated the tariff rate quota for both the ACP and Latin countries. More notable is the tariff changes for the Latin American countries.   The tariff implemented on January 1st, 2006 was €176/ton, but is expected to gradually decrease to €114/ton by 2017. The combination of no tariff rate quota and a reduction in tariff further extend the advantage of Latin banana countries over ACP countries. A reduction in tariff implies a reduction in the import prices of Latin bananas.

Banana Production

Majority of the bananas produced and exported are concentrated in only a few countries (Hallam 1995). Using FAO statistics, banana production, imports and exports for the world, ACP and Latin countries are highlighted below. Total world production increased (65%) from 65 million tons in 2000 to 102 million tons in 2010. Over this period, India (largest producer in the world) supplied on average 20% or more of the world's total production. During this period, India's share of the world's production increased from 22% to 29%. However, India consumes almost all of its banana produced and exports less than 1% each year. The main countries evaluated in this study are Columbia, Costa Rica, Ecuador, Panama, Africa (Cameroon and Cote d'Ivoire), and Dominican Republic. These countries were selected from the list of ACP and Latin countries primarily because they supply the largest portion of the total EU banana import. Banana production for the above mentioned countries are presented in Figure 2. From this point on, all comparisons made are among the countries evaluated in this study and the time period of data used is from 2000 to 2010, unless stated otherwise.

Ecuador had the highest volume of production over the data period. Ecuador's banana production increased approximately 22% from 6.4 million tons in 2000 to 7.9 million tons in 2010. This increase can partially be attributed to the increase (43%) in yield over the same period. Ecuador consistently ranked among the top ten banana producing countries over the data period, except in 2000, and ranked fourth in 2010. In 2010 they accounted for almost 8% of world's production. Costa Rica's banana production declined 17% from 2 million tons in 2000 to 1.8 million in 2010. During this period, average yield declined 7%, which could be the contributing factor to the overall decline in production. The decline in production translated into a decline in total exports, thus a decline in overall share of the world's production (a percentage

point). Costa Rica was ranked among the top ten producing countries until 2007. Despite its decline (23%) in yield (caused by crop disease and weather-related problems) banana production in Columbia increased about 28% from 1.5 million tons in 2000 to 2 million in 2010. Over the data period Columbia ranked among the top ten producing countries, every year except 2000, 2001 and 2007.

Africa's production increased 36% from 931,630 tons in 2000 to 1.2 million tons in 2010, while yield increased 43%. Africa's percentage increase is the second highest among the countries. Even though they experienced a high increase in production, Africa supplied just over 1% of the world's production during the period. Panama and the Dominican Republic reported the lowest production quantity for the period. However, the Dominican Republic had the highest percentage increase in production. Bananas produced in the Dominican Republic increased 74% from 422,322 tons in 2000 to 735,045 tons in 2010, but accounted for less than 1% of the world's production. In contrast to the Dominican Republic, Panama experienced a significant decrease in banana production.   Panama's banana production decreased 49% from 660,398 tons to 338,280 tons, which could be partially attributed to the decline (28%) in yield. Panama accounted for 1% of the world's total production in 2000 but decreased to 0.33% in 2010. The difference in production between Latin and ACP countries is due to the major difference between large plantation production and small to medium size farm production.

Banana Export

Bananas represent one of the most valuable and most widely traded agricultural crops in the world (FAO 1998). World banana exports increased 22% from 14 million tons in 2000 to approximately 17.5 million tons in 2010. During this period the total banana export value almost

doubled, increasing from $4.2 billion to $8 billion. World banana export increased consistently from 2001 to 2009 but declined (5%) from 2009 to 2010. Despite the 5% decline in volume, total export value declined by less than 1%. Export quantities of source-specific countries and their percentage share of the world's export market are presented in Figures 3 and 4, respectively. Ecuador exports more than half their banana production. Ecuador exported 62% of its banana production in 2000 but increased exports to 65% of production by 2010. Their highest percentage export (86%) was recorded in 2007. Total export volume from Ecuador increased 29% from 3.9 million tons in 2000 to 5 million tons in 2010. The increase is consistent with the increase in production except for 2009-2010. Over the data period Ecuador ranked number one among the world's banana exporting countries and accounted for a range of 28% to 31% of the world's exports.

Costa Rica accounted for 10% or more of the world's total export over the period, except 2009 (9%). Costa Rica supplied 13% of the world's export in 2010, their highest. They ranked second, in terms of world's percentage share, among the countries in this study. Costa Rica exported more than 90% of their total production on average over the period. In 2010, their export exceeded production (101%), where the excess was supplied by the country's banana imports. Although they exported their highest share in 2010, total export volume declined 12% from 2 million tons in 2000 to 1.8 million tons in 2010. They ranked among the top five world banana exporters during the data period and ranked second in 2010. Exports from Columbia increased 8% from 1.5 million tons in 2000 to 1.7 million in 2010. Similar to Ecuador and Costa, Columbia exports a significant portion of their banana production. They exported 98% of production in 2000 but exports declined to 83% of production in 2010. There was a significant decrease in the percentage of production exported from 2009 to 2010. On average, Columbia

accounted for approximately10% of the world's total export and ranked among the top four exporters. They were the third largest exporter in 2010.

Africa, Panama and Dominican Republic export the lowest quantities among selected countries. Africa exported less than half their bananas produced, except in 2000 and 2001 where exports were slightly above 50%. Although their percentage share of the world exports decreased (2%) from 2000 to 2010, their export quantity increased 19%. Exports totaled 481,202 tons in 2000 and increased to 573,535 tons in 2010. Africa accounted for less than 4% of the world's total export over the period. Panama exports, although initially very low, declined 56% from 148,328 tons in 2000 to 64,600 tons in 2010. Unlike the other Latin countries, Panama exports approximately 20% of their total production. In 2000 they accounted for 3% of the world's exports but their share declined to approximately 1% in 2010. The Dominican Republic accounted for the smallest percentage share of the world's total export during the period, approximately 1%. Although its share is very small, Dominican Republic had the largest increase in banana export quantity for the period. Their export increased from 19,000 tons in 2000 to 250,000 tons in 2010. Production also increased (74%) over the period, which could be the main cause of the increase in export. The percentage of production exported increased from 5% to 34% over the period.

Banana Import

The EU is the world's leading banana importer. Data for banana imports are obtained from the Statistical Office of the European Commission (Eurostat) and are recorded in millions of kilograms (kg). The data period for import is 2000-2011. Over the period, EU total fresh

banana imports increased 37% from 3.3 billion kg to 4.5 billion kg[9]. During this period, total EU

banana expenditures increased approximately 47% from €1.9 billion to €2.8 billion. In 2006,

after the tariff-only regime was implemented, the EU reported its highest percentage increase in

total import volume. Total imports increased 20% to 4.1 billion kg in 2006, from 3.4 billion kg

the previous year. Total import value also increased (7%) from €2.3 billion to €2.4 billion. The

average banana import price was €61/100kg for the data period. The highest average price was

€66/100kg in 2005, but the average declined significantly to €59/100kg in 2006.

Import quantities, share of total import quantities, import values and import prices for

selected ACP, Latin and the rest of the world (ROW) are presented in Figures 5-8, respectively.

On average, Ecuador supplied the largest (24%) quantity of the EU banana import from 2000 to

2011. Imports from Ecuador increased 78% from 691 million kg in 2000 while total import

value increased 103% from €368 million. In 2011, EU imported 1.2 billion kg of bananas from

Ecuador valued at approximately €467 million. On January 1, 2006, the EU implemented the

tariff-only regime. The tariff-only regime not only removed the quota on total import quantity

from Latin and ACP countries, but also reduced the duty-rate paid by Latin countries. At the end

of 2006 (one year after the regime), imports from Ecuador increased 8.5% from 886 million kg

in 2005 to 962 million kg. Despite the increase in import quantity, total import value decreased

almost 4% from €568 million. Although total import quantity from Ecuador increased from

2005 to 2006, its percentage share of EU import declined from 26% to 23%. The import price of

Ecuador bananas during this period decreased from €64/100kg to €57/100kg.

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[9] EU refers to EU 15. This includes Austria, Belgium, Germany, Denmark, Spain, Finland, France, United
Kingdom, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Sweden.
Fresh banana data does not include plantains and from here on refer to as banana unless stated otherwise.

On December 15, 2009 the tariff decreased 15% from €176/ton to €148/ton. After the reduction in tariff, banana imported from Ecuador decreased 4% from 1.15 billion kg in 2009 to 1.09 billion in 2010. However, during this period, Ecuador's banana production and yield increased and total export decreased implying an increase in domestic consumption or an excess supply situation. Ecuador's total import value also decreased (3.9%) from 2009 to 2010. During this time there was no significant change in import price. On January 1, 2011, the tariff was further reduced approximately 3% to €143/ton. Following this decrease, total import quantity from Ecuador increased 13% and total import value increased16%. In 2010 total import quantity was 1.09 billion kg and increased to 1.23 billion kg in 2011. The increase in total import quantity increased Ecuador's total import share from 24% to 27%. Import price increased slightly from €58.40/100kg to €59.89/100kg. Average import price for Ecuador over the period was €58/100kg and was the lowest import price across all countries.

Import quantity from Columbia increased 83% from 617 million kg, while total import value increased 131% from €324 million. In 2011, EU imported 1.1 billion kg of banana from Columbia valued at approximately €750 million. The increase in import quantity increased Columbia's percentage share of EU bananas from 18% to 25%. On average, Columbia accounted from approximately 23% of total EU import which is the second highest among the countries. Columbia's average import price for the period was €62/100kg which was the second highest import price, slightly lower than that of Africa. Columbia's highest import price was €71/100kg in 2004 and lowest €53/100kg in 2000. After the tariff-only regime was implemented in 2006, total banana imports from Columbia increased 18% from 778 million kg in 2005 to 921 million kg in 2006. Although imports increased 18%, the percentage share of EU import did not change significantly. From 2005 to 2006, Columbia's production increased, export to the EU

increased but overall export decreased indicating a shift in export to other markets to compensate for the EU market. Total import value also increased, approximately 8%, from €530 million to €571 million while import price decreased. Following the 2009 tariff reduction, imports from Columbia decreased 3% from 1.20 billion kg to 1.16 billion kg, however, there was a slight increase (1%) in import value from approximately €767 million kg. Similar to Ecuador's 2009-2010 period, Columbia's production increased and overall exports decreased, inferring an increase in domestic consumption or excess banana supply in the country. Import price increased from €64/100kg in 2009 to €66/100kg in 2010. After the tariff reduction in 2011, Columbia's import quantity and value decreased approximately 2% and 3% from the previous year, respectively. During this period there was no significant change in price however its share of EU import declined.

Costa Rica accounted for approximately 19% of EU total banana imports from 2000 to 2011, making it the third largest supplier of EU banana. Unlike the significantly large increase in import quantity and value for Ecuador and Columbia, Costa Rica's import quantity and value increased by 26% and 27%, respectively. Import quantity from Costa Rica increased from 656 million kg in 2000 to 829 million kg in 2011, while import value increased from €368 million to €468 million. Average price over the period was €61/100kg, where highest price reported was €67/100kg and lowest €55/100kg. Import quantity from Costa Rica increased 47% from 555 million kg in 2005 to 816 million in 2006. Import value during this period increased approximately 22%, from €374 million to €455 million. In 2005, the average import price was €67/100kg but decreased to €55/100kg in 2006. The increase in import quantity from Costa Rica increased its total percentage share from 16% to approximately 20%. Import quantity increased (3%) from 753 million kg from 2009 while total import value decreased (3%) from €456 million.

However, there was no significant change in Costa Rica's share of EU imports for this period. Import price decreased from €60/100kg to €57/100kg. After the third tariff reduction, total import quantity from Costa Rica increased 7% from 772 million kg to 829 million kg. This increase reflected a slight increase in Costa Rica's percentage share from 17% to 18%. Total import value during this period increased 6% from €441 million to €468 million, while import price decreased €57/100kg to €56/100kg. Overall, Costa Rica had the highest increase in import quantity in 2006, after the tariff-only regime was implemented.

Contrary to the increase in other Latin countries, import quantity and value from Panama significantly declined. The quantity of Panama's import decreased 59%, from 389 million kg in 2000 to 160 million kg in 2011. This can partially be attributed to the decrease in its banana production over the same period. Total import value decreased 64%, from €236 to €85 million in 2011. Panama's average import price (€58/100kg) was the second lowest and accounted for approximately 8% of EU total import over the period. After the tariff-only regime, imports from Panama increased 28% from 241 million kg in 2005 to 307 million kg in 2006, slightly increasing its percentage share. Total import value also increased (16%) from €157 million to €182 million while import price decreased from €65/100kg to €59/100kg. During the 2009-2010 and 2010-2011 period, total import quantity and value decreased for Panama. Import quantity decreased (0.69%) slightly from 2009 to 2010, while total import value decreased approximately 4%. Because the change in import quantity was so small, the percentage share was not significantly impacted. Panama's total production and overall export increased from 2009 to 2010 indicating a shift in supply from the EU market to another source. The import price from 2009 to 2010, declined from €49/100kg to €47/100kg. Quantity decreased 12% from 183 million kg in 2010 to 156 million kg in 2011. During this period Panama's total share of EU

imports decreased slightly to 3%. Total import value decreased 3% while import price increased from €48/100kg to €53/100kg.

Although bananas from ACP countries remained duty-free after the tariff-only regime, the tariff rate quota was eliminated allowing ACP countries to export their maximum available quantity without any consequences. Africa accounted for approximately 12% of EU total imports from 2000 to 2011. Over this period, import quantities from Africa increased 13%, from 405 million kg to 458 million kg. Import value also increased (18%) from €233 million to €275 million. Africa had the highest (€65/100kg) average import price among the countries. After the tariff-only regime in 2006, imports from Africa increased 11% from 426 million kg in 2005 to 472 million kg in 2006. Import value also increased (4%) from €306 million to €318 million. Despite the increase in quantity, Africa share of EU imports slightly declined from 12% to 11%. During this period, import price also declined from €71/100kg to €67/100kg. During the 2009-2010 period, imports from Africa increased (2%) from 479 million kg but import value decreased (3%) from €307 million. Average import price decreased from €64/100kg to €61/100kg. There was no significant change in percentage share. Finally, during the 2010-2011 period, total import quantity and value decreased 6% and 8%, respectively. The percentage share declined a percentage point to 10%. Average import price decreased from €61/100kg to €59/100kg.

It is speculated that banana imports from ACP countries will decline due to the reduction in Latin tariff rate, resulting in cheaper Latin import prices. Given the data for Africa the speculation appears factual; however, data for Dominican Republic would reject these claims. Import quantity and value for Dominican Republic increased in all periods where the tariff was reduced. Over the data period (2000-2011), Dominican Republic accounted for only 4% of the

total EU import from 2000 to 2011. The Dominican Republic experienced the highest increase (400%) in quantity for all countries, an increase from 60 million kg to 327 million kg. Import value also significantly increased (over 500%), from €33 million to €214 million. Import price on average for the period was €61/100kg. Following the tariff-only regime, import increased 22% from 145 million kg in 2005 while total import value increased approximately 31% from €84 million. The increase in quantity did not significantly affect total percentage share. Import price increased from €58/100kg in 2005 to €63/100kg in 2006. After the first reduction in the tariff in 2009, imports from Dominican Republic increased 33% from 228 million kg to 304 million kg in 2010; increasing its percentage share of the EU banana market 5% to approximately 7%. Total import value also increased (35%) from €155 million to €209 million. EU imports from Dominican Republic increased approximately 8% from 304 million kg in 2010 to 327 million kg in 2011. During this period, total import value increased by 2% while price decreased from €68/100kg to €65/100kg.

Who Benefits Most (Raw Data)

In order to have a picture of the "winners" and "losers" of the tariff-only regime, country comparisons are provided below. The comparison is based only on data presented above, as obtained from Eurostat, considering quantity, value, and share, holding all else constant. Data showed that banana import from all countries to the EU increased after the implementation of the tariff-only regime. Based strictly on quantity, Costa Rica saw the highest increase (47%) followed by Panama (28%), Dominican Republic (22%), Columbia (18%), Africa (11%), and Ecuador (8.5%), respectively. This would indicate that critics' speculations are false, as ACP countries also saw an increase in import quantity. As expected, holding all else constant, the reduction in tariff caused a reduction in banana import prices from Latin countries. Although the

prices were decreased, the increases in import quantities were high enough to increase import value paid to each country. All countries had an increase in import value, except Ecuador. Dominican Republic, only based on monetary value, received the highest payout from the EU. However, Costa Rica gained the most market share.

Following the first reduction (15%) in Latin tariff from 2009 to 2010, the impact on import quantities varies. Unlike the 2005-2006 period, where import from all countries increased, the 2009-2010 period had only three countries with increases. Two of these countries were ACP countries, again disproving speculations by critics. Dominican Republic had the highest increase (33%) in banana imported by the EU. Costa Rica (3%) and Africa (2%) were the only other two countries that experienced an increase. The decrease in tariff was not reflected in import prices from Columbia. Columbia import price increased while the other Latin countries had a decrease in prices.   Similar to the 2005 to 2006 period, Dominican Republic benefited most in terms of the value received for their bananas in the 2009 to 2010 period; the highest percentage (35%) increase. During the 2010 to 2011 period, Ecuador (13%), Dominican Republic (8%) and Costa Rica (7%) were the only countries that benefited from the 3% reduction in tariff based on the increase in their banana quantity imported by the EU. Based on the fact that import quantity from Africa decreased, it would appear to confirm critics' speculations. However, only partially as Dominican Republic saw an increase. Import prices from Ecuador and Panama are not consistent with expectations; however, the tariff is not the only factor influencing prices. The increase in import prices for these two countries implies other factors are more influential than the 3% tariff reduction. Based on import value, holding all else constant, Ecuador (16%) benefited most from the tariff reduction. Ecuador also had the highest increase in percentage share of EU import.

Banana Import by Regions

As stated previously, total EU import as well as expenditure (import value) has increased significantly from 2000 to 2011. Total EU import is comprised of bananas from Latin America, ACP and ROW. Latin American countries have dominated the percentage share of EU banana imports over the period (Figures 9 and 10). This region accounts for approximately 77% of total EU banana import. Banana imports from Latin American countries increased approximately 39% from 2.5 billion kg in 2000 to 3.5 billion kg in 2011. Total import value also increased (53%) from €1.4 billion to €2.1 billion during the same period. Similarly, import volume from ACP countries increased as well as its total import value. Import volume increased (29%) from 756 million kg to 977 million kg. Import value increased (26%) from €475 million to €599 million. ACP countries accounted for approximately 22% of EU total imports for the period. ROW, although significantly smaller than Latin and ACP countries in terms of import quantity, had the largest increase (63%) in quantity from 2000 to 2011. Import from ROW increased from 20 million kg to 33 million kg while total value increased 90% from €15 million to approximately €28 million. On average, ROW accounted for just about 1% of total EU imports for the period.

Differential Production Model

Utilizing the methodology of Laitinen and Theil (1978), Laitinen (1980) and Theil (1980), the study uses the differential production model to estimate the import demand for fresh bananas in the EU. The differential production model is derived from the differential approach to the theory of the firm, where firms maximize profit in a two-stage procedure. In the first-stage, firms determine the profit maximizing level of output, and minimize the production cost of

producing this output in the second stage. The total import demand is obtained in the first stage and the conditional factor demand system is obtained in the second stage (Washington and Kilmer, 2002). Davis and Jensen (1994), Koo et al. (2001), Washington and Kilmer (2002), Muhammad et al. (2007) and Muhammad (2007) applied the differential production model to source-specific or quality-specific import demand. Washington and Kilmer (2002) provided an extensive model comparison between the differential production model and the Rotterdam model to show the impact of using the incorrect model specification on elasticities. The study showed that utilizing the differential production model for goods traded internationally is appropriate, since these goods are either processed or pass through a number of domestic channels before reaching the consumer. Muhammad et al. (2007) utilized the differential production model to determine the impact of domestic and import prices on U.S. lamb imports. They used this model to generate conditional and unconditional elasticities for chilled and frozen lamb from Australia and New Zealand, to determine how prices from these sources as well as the U.S. total lamb demand would impact import quantities differentiated by source. Koo et al. (2001) applied the production approach on the demand for wheat differentiated by class and country of origin in the Japanese wheat flour milling industry while Muhammad (2007) used this model to determine the impact of the termination of Kenya's economic partnership agreement on other African countries. The later study evaluated the potential tariff that could have been imposed on Kenya's bananas by projecting quantities and market shares for each country used in the study.

Davis and Jensen (1994) criticized the use of the utility maximization approach to import demand systems used in previous studies and considered the results conceptually flawed (Davis and Jensen 1994). The authors gave three advantages of the producer theory approach over the utility maximization approach to the import demand estimation. Firstly, by using producer

theory, the conceptual problem of treating inputs as final goods is immediately overcome. This is important as most agricultural commodities are inputs that require further processing, not final goods. Secondly, defining the first-stage aggregates is more intuitive in the profit maximization model; therefore, the estimation of the unconditional elasticities is less debatable. The unconditional elasticities derived from the producer approach are structural parameter estimates. Finally, because the production theory approach is a two-stage procedure, the empirical advantages of a two-stage optimization procedure are retained.

Since bananas are differentiated based on their country of origin, each import demand equation represents the demand for bananas from each exporting country (Columbia, Costa Rica, Ecuador, Panama, Africa and Dominican Republic). In a two-step procedure, the total import demand equation is obtained and expressed in the differential form:

$$\Delta X_t = \varphi \Delta p_t + \sum_{j=1}^{N} \pi_j \Delta w_{jt} + \varepsilon_t, \quad (1)$$

where ΔX_t is the finite version of the Divisia volume index and $\Delta X_t = \sum_{i=1}^{n} \overline{f}_{it} \Delta x_{it}$. From the Divisia volume index equation, $\overline{f}_{it} = \left(f_{it} + f_{i(t-12)} \right)/2$. The term f_i is the share of the ith country import considering the total cost of all banana imports and is calculated as $f_i = \dfrac{w_i x_i}{\sum_i w_i x_i}$, where, w_i represents the import price of country i and x_i represents the quantity of imported banana from source country i. Δx_{it} represents the change in banana import from source country i in time t; $\Delta x_{it} = \log \left(\dfrac{x_{it}}{x_{i(t-12)}} \right)$. From equation (1),

$\Delta w_{it} = \log \left(\dfrac{w_{it}}{w_{i(t-12)}} \right)$ and $\Delta p_{it} = \log \left(\dfrac{p_{it}}{p_{i(t-12)}} \right)$, where p represents the output price. Both φ and π are parameters to be estimated where φ measures the impact of a percentage change in output price on the import index, and π_j measures the impact of a percentage change

in input prices on the import index; ε_t is the disturbance term. For the purpose of this study, the Divisia import index represents the total banana import index; p is the wholesale price at which firms sell imported bananas domestically; w_i's are the prices paid for banana imports from each exporting country and the price of labor (wage index). The differential derived demand model, used to estimate the system of import demand equations, is specified as follows:

$$\bar{f}_{it}\Delta x_{it} = \theta_i^* \Delta X_t + \sum_{j=1}^{n} \pi_{ij}^* \Delta w_{jt} + \mu_{it} \qquad (2)$$

where x_i and w_i represent the quantity and price of fresh bananas from source country i; ΔX_t is the import index; θ_i^* and π_{ij}^* are parameters to be estimated, where θ_i^* is the marginal import share coefficient and π_{ij}^* measures the source-specific price effects; μ_{it} is the error term. The differential derived demand model requires the following parameter restrictions be met in order for the model to be consistent with theory:

$$\sum_j \pi_{ij}^* = 0 \ (homogeneity) \text{ and } \pi_{ij}^* = \pi_{ji}^* \ (symmetry).$$

Substituting the right-hand side of equation (1) for the import index term in equation (2), yields the demand for a source-specific import in terms of the changes in domestic prices and import prices:

$$\bar{f}_{it}\Delta x_{it} = \theta_i^* \ \varphi\Delta p_t + \sum_{j=1}^{N} \pi_j \Delta w_{jt} + \sum_{j=1}^{n} \pi_{ij}^* \Delta w_{jt} \qquad (3)$$

Equation (3) can be interpreted as the unconditional derived demand equation since changes in import demand are no longer conditional on output but a function of changes in input and output prices (Laitinen 1980). The unconditional elasticity of derived demand with respect to output price and the unconditional own/cross-price elasticities are derived from equation (3).

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Data

Total import demand and source-specific derived demand equations were estimated using monthly data provided by the External Trade Section of the Statistical Office of the European Commission (Eurostat), under the CN8 commodity classification 'banana, fresh (excluding plantains)'. Source-specific imported quantities of fresh bananas for EU15 were measured in units of 100kg, and values measured in euros. Import values are reported on a cost, insurance and freight (CIF) basis. For the purpose of this study, exporting countries were Columbia, Costa Rica, Ecuador, Panama, Africa, Dominican Republic and ROW. For this purpose, Africa quantities and values are the aggregates of Cameroon and Cote d'Ivoire, which accounted for approximately 27%, on average, of total ACP imports for the period. All other ACP exporting countries were added to ROW because imports from these countries were too small to analyze separately. ROW was calculated by subtracting the sum of imports of all countries listed above from total extra-EU imports. Monthly data were used for estimation and covers the time period January 2000 through December 2011. Import prices were calculated by dividing the value of the commodity by the quantity, resulting in a euro per 100-kg unit of measurement. As a proxy for output price, a per unit value measure of intra-EU exports was used. Because of the labor-intensive nature of banana production, a wage index was used to account for the cost of domestic resources. Export quantities, values and the wage index were also provided by Eurostat.

Descriptive statistics are presented in Table 2. On average, for the data period, Columbia accounted for approximately 23.3% of bananas imported in the EU; the highest import from a source-specific country by a small margin. Ecuador accounted for 22.9%, Costa Rica 19.5% and Panama 7.6%. Together, they accounted approximately 73.3% of the EU total imports. All other Latin countries were aggregated in ROW because they were too small, in terms of import

volume, to estimate separately. Africa accounted for 12.5%, Dominican Republic 4.3% and ROW 10%. On average, the price of Africa bananas was €64/100kg and was the highest import price of the period. Ecuador (€59/100kg) and Panama (€58/100kg) were the lowest import prices. Re-export prices averaged €76/100kg and reached a high of €95/100kg during the data period.

Estimation Results and Discussion

The total import equation and import demand system were estimated using the model procedure in SAS. Given the singularity of the import demand system, the ROW equation was dropped for estimation. The homogeneity and symmetry properties were imposed and tested and could not be rejected. Conditional derived demand estimates for EU imported bananas are presented in Table 3. The conditional derived demand estimates are generated from equation (2) above. The conditional marginal factor share estimates indicated a positive and significant relationship between the total import index and source-specific imports. These estimates indicate that as total banana import increases, imports from Columbia, Costa Rica, Ecuador, Panama, Africa and Dominican Republic will also increase. Ecuador (0.284) had the largest increase and was significantly higher than all the other countries. Columbia (0.202), Costa Rica (0.183), and Africa (0.218) were not significantly different in magnitude, although Africa had a slight advantage. Dominican Republic (0.048) and Panama (0.048) had the lowest increase in quantity. Based on the marginal factor share parameter estimates, Latin countries would see a greater increase in banana export quantity to the EU given an increase in EU's total import. All conditional own-price parameters were negative as expected. However, Panama's own-price parameter estimate was statistically insignificant. Cross-price parameter estimates indicated a significant competitive relationship between Columbia and Costa Rica (0.092), Columbia and

Africa (0.038), Costa Rica and Africa (0.038), Ecuador and Panama (0.0.043), Ecuador and

Africa (0.067) and Ecuador and Dominican Republic (0.031). A competitive relationship

implies that as the price of one country increases, the quantity of the other will increase. For

instance, an increase in the import price of bananas from Columbia will lead to an increase in the

import quantity from Costa Rica. There were no significant complementary relationships

between any countries.

From equation (2) we get the conditional own-price/cross-price elasticity,

$$\eta_{xw}^c = \pi_{ij}^* \ f_i \qquad (4)$$

and the total import index elasticity,

$$\eta_{xX} = \theta_{ij}^* \ f_i \qquad (5)$$

The conditional derived demand elasticities for imported bananas (calculated at the mean) are

presented in Table 4. The conditional import elasticity $(\theta_{ij}^* \ f_i)$, which measures the

responsiveness of a source-specific import change to changes in total import, was found to be

positive and statistically significant for all exporting countries. Africa (1.735) had the largest

change and indicated that a 1% change in total EU import would increase banana imports from

Africa by 1.7%. In addition to Africa, Ecuador (1.239) and Dominican Republic (1.126) had

increases of over 1% with a percentage increase in EU's total imports. Based on the Divisia

index, a 1% increase in the import index would increase banana imports by 1.2% and 1.1% from

Ecuador and Dominican Republic, respectively. Results show that a 1% increase in EU's total

import would result in a less than 1% increase in banana imports from Costa Rica (0.93%),

Columbia (0.87%) and Panama (0.63%). Panama would benefit least from a change in overall

imports, which is evident from the low parameter estimate. Based on the total import index, ACP

countries benefited most from the increase in overall import.

The conditional own/cross price elasticities ($\pi_{ij}^* \quad f_i$) show the impact of import price changes on source-specific imports, holding total imports constant. That is, as import prices change (particularly relative prices) how does import quantity allocation across exporting countries change. All own-price elasticities were negative as expected, and with the exception of Panama, all were found to be statistically significant. Columbia, Costa Rica and Africa were significant at the 1% level while Ecuador and Dominican Republic were significant at the 5% level. The own-price elasticities are -0.512, -0.759, -0.567, -0.323, -0.896, and -0.610 for Columbia, Costa Rica, Ecuador, Panama, Africa, and Dominican Republic, respectively. Based on these estimates, the demand for imported banana is inelastic, however, banana demand from Africa and Costa Rica tend to be relatively more elastic than imports from other countries.

Cross-price elasticities of derived demand for imported bananas indicated a significant substitute relationship between Columbia and Costa Rica. Therefore, a percentage increase in the price of bananas from Columbia would increase imports from Costa Rica by 0.394%. The Columbia/Costa Rica cross-price elasticity was 0.394 while the Costa Rica/Columbia cross-price elasticity was 0.472, reflecting a slightly higher value placed on Costa Rican bananas. Cross-price elasticity also indicated a significant substitute relationship between Columbia and Africa. Thus, a percentage increase in the price of Columbian bananas would significantly increase Africa's banana imports by 0.162%. A higher value is placed on bananas imported from Africa than Columbia, evident from their cross-price elasticity. Columbia/Africa cross-price elasticity was 0.162 while Africa/Columbia elasticity was 0.301.

Costa Rica was found to have a significant substitute relationship with Africa. Therefore, a percentage increase in the price of bananas from Costa Rica would increase bananas imported from Africa by less than 1%. Based on cross-price for Costa Rica/Africa (0.194) and

Africa/Costa Rica (0.301), African bananas are more valuable than Costa Rican bananas. Results also show a significant substitute relationship between Ecuador and Panama, Ecuador and Africa and Ecuador and Dominican Republic. A percentage increase in Ecuador banana prices would increase banana imports from Panama, Africa and Dominican Republic by 0.187, 0.292 and 0.136 percent, respectively. Bananas from all three countries were found to be more valuable than bananas from Ecuador. Overall, source-specific bananas are not highly responsive to price changes in competing countries. Panama was found to have a complementary relationship with Dominican Republic. Hence, a percentage increase in the price of bananas imported from Panama would decrease the import quantity from Dominican Republic. All other cross-price elasticities were found to be statistically insignificant.

Estimation results from stage one, total import demand equations are presented in Table 5. The output price parameter estimate (0.388) was found to be positive, as expected, and statistically significant at the 1% level. Indicating an increase in output price (re-export price) would increase EU's total banana imports. The price of labor (wage index) was found to have a negative impact on total import demand (-0.005) as expected, and statistically significant at the 1% level. Columbia (-0.769), was also found to be negative and statistically significant, and therefore' an increase in its import prices would result in a decrease in EU's total import. Africa (0.466) and Dominican Republic (0.240) were positive and statistically significant; indicating an increase in import prices would increase EU's total import. This result appears to be counter-intuitive; however, this could be a result of the preferential treatment to ACP countries based on colonial ties. Member states, such as France and the UK, continue to import most of their bananas from ACP countries to aid in their development and competiveness in banana trade. Costa Rica was not statistically significant.

From equation (3) and using the conditional own/cross-price elasticity (equ. 4) and the import index elasticity (equ. 5) to simplify notation, the unconditional elasticities of derived demand with respect to output price are obtained

$$\eta_{xp} = \eta_{xX}\varphi \qquad (6)$$

Equation (6) measures the responsiveness of source-specific imports to EU's re-export prices. The unconditional own-price/cross-price elasticity of derived demand is

$$\eta_{xw} = \eta_{xX} * \pi_j + \eta_{xw}^c \qquad (7)$$

Unconditional elasticities of derived demand are presented in Table 6. All output prices were found to be positive, as expected, and statistically significant at 1% level. For every percentage increase in output prices, banana imports increased 0.336, 0.364, 0.481, 0.244, 0.673, and 0.437 percent for Columbia, Costa Rica, Ecuador, Panama, Africa and Dominican Republic, respectively. The impact of output price on imports was relatively smaller for Latin countries than ACP countries. Therefore, imports from Latin countries were relatively less responsive to EU prices than ACP countries, although the difference in elasticity between Latin countries and Dominican Republic was very small.

All unconditional own-price elasticities indicate an inverse relationship between the source-specific import prices and import quantities; however, Panama, Africa and Dominican Republic were found to be statistically insignificant. Results indicated that the demand for Columbian banana were elastic (-1.179), while the demand for banana from Costa Rica (-0.678) and Ecuador (-0.784) were inelastic. The difference in the conditional and unconditional own-price elasticity for Costa Rica was very small, due to the insignificant relationship between the price of Costa Rican bananas and the Divisia import index. The conditional and unconditional own-price elasticity for Ecuador was also very small and was also a result of the insignificant

relationship between the price of its banana and the Divisia import index. The demand for Panama (-0.348), Africa (-0.088) and Dominican Republic (-0.340) bananas were also inelastic but insignificant. Based on cross-price elasticities, banana import from Columbia was positively impacted by banana prices in Costa Rica (0.468), Africa (0.565) and Dominican Republic (0.244). This substitutability relationship indicates that as the price of banana from Costa Rica, Africa and Dominican Republic increase by 1%, banana imports from Columbia will also increase by the elasticities above. Because the unconditional elasticities take into account the impact of source-specific price changes on total EU import, imports from two countries being conditional substitutes can become unconditional complements and vice versa. For instance, conditional cross-price elasticity indicated a substitute relationship between Columbia and Panama however, after taking into account the total import volume effect, unconditional elasticity indicated an insignificant complementary relationship between these countries. Therefore the change in Panama's banana price no longer had an impact on imports from Columbia. Banana imports from Costa Rica were positively affected by a change in the price of banana from Africa and Dominican Republic. A percentage increase in the price of bananas from Africa will increase total import from Costa Rica by 0.63%. The impact from a change in the price of Dominican Republic banana was almost three times smaller than the impact from that of Africa. A percentage increase in the price of bananas from Dominican Republic will increase the import from Costa Rica by only 0.26%. This suggests imports from Costa Rica were more dependent on price changes in Africa than Dominican Republic. The conditional cross-price elasticity for Costa Rica and Dominican Republic were not statistically different from zero but was replaced by a positive and significant unconditional elasticity. On the other hand,

the unconditional price effect of Columbia's banana no longer had an impact on Costa Rica's import.

A 1% increase in the prices of banana from Africa and Dominican Republic will increase banana imports from Ecuador by 0.869 and 0.433 percent, respectively. In all cases the price impact from Africa was twice or more that of Dominican Republic. After EU's total import was taken into consideration, Ecuador and Columbia became complementarily related. Unconditional elasticity indicated that a percentage increase in the price of Columbian bananas will decrease the import demand from Ecuador by 1.057%. This is the highest impact of a change in one country's price on import from another. In contrast to the conditional price effect, unconditional elasticity indicated that banana imports from Panama were no longer responsive to changes in prices from Ecuador and Dominican Republic. The conditional substitutability relationship between Panama and Ecuador became insignificant while the conditional complementary relationship between Panama and Dominican Republic was replaced by an insignificant substitutability relationship.

Unlike the conditional cross price elasticity for Columbia/Africa and Africa/Columbia, unconditional elasticities indicated that banana imports from these countries could be either substitutes or complements. Based on unconditional elasticities, there was a substitutability relationship between Columbia and Africa but a complementarity relationship between Africa and Columbia. An increase in the price of Africa's bananas will increase imports from Columbia, as indicated earlier; however, a percentage increase in the price of banana from Columbia would decrease import demand from Africa by 1.033%. Therefore, Columbia would benefit from an increase in Africa's prices; on the other hand, Africa would not benefit from a Columbia price increase. Since Africa's average banana price is already higher than the

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Columbian price, a further increase in Africa's price will drive more EU countries to buy more Columbia bananas. Similar to Columbia and Africa, Columbia and Dominican Republic also have a substitutability and complementarity relationship. As the price of bananas from Columbia increases by 1%, the total import demand from Dominican Republic decreases by 0.670%. A similar explanation holds true for Dominican Republic, as its banana price is also higher than that of Columbia.

Import and Market Share Projections

One of the key objectives of this study is to determine the impact of the tariff reduction on imports from Latin American and ACP countries from 2012 to 2017. Import demand projections are derived using an elasticity-based forecasting equation (Kastens and Brester 1996). The unconditional elasticities are more suitable for policy analysis since they take into account the total effect of price changes, therefore are used to derive projections (Davis and Jensen 1994). The following forecasting equation is used:

$$x_{it} = \eta_{xp} \frac{p_t - p_{t-12}}{p_{t-12}} + {}_{j}^{n1} \eta_{xw_j} \frac{w_{jt} - w_{jt-12}}{w_{jt-12}} + {}_{k}^{n2} \eta_{xw_k} \frac{w_{kt} - w_{kt-12}}{w_{kt-12}} x_{it-12} + x_{it-12} \qquad (8)$$

Equation (8) states that the quantity imported from country *i* in month *t* is a function of the quantity imported that same month the previous year, and the percentage changes in output price, source-specific import prices, and resource price. Given the tariff was imposed on Latin countries only, the majority of the terms in equation (8) will not apply. Imported quantity and market share projections are presented in Table 7. The reduction in tariff for Latin countries, from €148/ton to €143/ ton in 2011, was projected to positively impact all countries in this study. Imports from Columbia were projected to increase approximately 3.38% from 1.1 billion kg in 2011 to 1.2 billion kg in 2012. Imports from Costa Rica were projected to increase approximately 4% from 829 million kg to 859 million kg. Ecuador was projected to benefit most

from the reduction in tariff. Imports from Ecuador were projected to increase 5% from 1.2 billion to 1.3 billion kg and its total market share was projected to increase 1.7%, the highest increase in market share. Imports from Africa were projected to increase approximately 2% from 458 million to 467 million kg. Imports from Panama and the Dominican Republic were projected to experience the lowest increase, 0.87% and 0.31%, respectively. Costa Rica was the only other country projected to gain market share although only 0.15%. The Dominican Republic was projected to experience the highest market share loss followed by Panama, 3% and 2.5%, respectively.

The tariff was further reduced (5%) from €143/ton to €136/ ton in 2012. Following this reduction, imports from Columbia were projected to increase approximately 4.9% from 1.17 billion kg in 2012 to 1.22 billion kg in 2013. Imports from Costa Rica were also projected to increase roughly 5% from 859 million to 904 million kg. Similar to the 2012 projections, Ecuador was projected to benefit most (both in increased quantity and market share) from the reduction in tariff. Imports from Ecuador were projected to increase (8%) from 1.3 billion to 1.4 billion kg while its market share was projected to increase just over 2%. Imports from Africa were projected to increase (3%) from 467 million to 479 million kg, the highest projected increase for Africa over the entire period. Imports from Panama and the Dominican Republic were projected to experience the lowest increase up to 2017. Panama was projected to increase 1% from 161 million to approximately 163 million kg while imports from the Dominican Republic were projected to increase by only 0.46%. This would decrease their market share by approximately 4%.

A 2.94% reduction in tariff in 2013 was projected to increase import quantity from Ecuador approximately 4%, which would increase its market share 1%, from 2013 to 2014.

Imports from Costa Rica and its market were projected to increase 4% and less than 1%, respectively. Although Columbia, Panama, Africa and Dominican Republic imports were projected to increase 3%, 0.76%, 2% and 0.28%, respectively, their market shares would decline. Columbia's (-0.17%) market share would decrease slightly while Dominican Republic, Panama and Africa would decrease by 3%, 2% and 1%, respectively. The reduction in tariff from €132 to €127 (3.79%) was projected to positively impact each country in terms of import quantity. Imports from Columbia were projected to increase 4% from 1.26 billion to 1.31 billion kg from 2014 to 2015. Costa Rica was also projected to have a 4% increase in quantity from 932 million to 970 million kg. Imports from Ecuador were projected to increase 6% and imports from Africa 2%. Imports from both Panama and Dominican Republic were projected to increase by less than 1%. Only Ecuador and Costa Rica were projected to benefit from an increase in market share. The 2015 tariff reduction (3.94%) was also projected to positively impact import quantity from each country. Ecuador's quantity was projected to increase (6%), bringing their total quantity to 1.6 billion kg by 2016. Their market share was also expected to increase from 32% to 33%. Given the substitutability relationship between Ecuador and Africa and Ecuador and Dominican Republic, the increase in market share for Ecuador is expected to be at the expense of these countries. Similarly, although relatively small, Costa Rica is projected to have an increase in market share (0.08%) as a result of a projected increase (4%) in import quantity. Imports from Columbia, Africa and Panama were projected to increase by 4%, 2% and 1%, respectively. However, their market shares were projected to decrease. Imports from Dominican Republic were projected to increase by less than 1% but its market share projected to decrease by 4%.

Similar to the previous changes in tariff, the decrease in 2016 (4.1%) and 2017 (2.56%) was projected to increase import from all countries. From 2016 to 2017 and 2017 to 2018,

imports from Columbia were projected to increase 4% and 3%, respectively. Imports from Costa Rica were also projected to increase 4% and 3% from 1.0 billion kg and 1.1 billion kg from 2016 to 2017 and 2017 to 2018, respectively. Imports from Ecuador were projected to increase 6% and 4% from 1.6 billion kg and 1.7 billion kg, respectively, the largest increase for the periods. Imports from Panama were projected to increase only 1% from 2016 to 2017 and 0.66% from 2017 to 2018. Imports from Africa were projected to increase 2% and 1% from 508 million kg and 520 million kg, from 2016 to 2017 and 2017 to 2018, respectively. Imports from Dominican Republic over both periods were projected to increase less than half a percentage point.

Overall, all countries benefit from the reduction in tariff paid by Latin countries on bananas entering the EU. As it relates to import quantities, all countries were projected to experience an increase. However, only Ecuador and Costa Rica benefits from the increase in share as a result of the increase in quantities. Ecuador's percentage market share was projected to increase, over the period, by at least 1%. Costa Rica's projected increase was significantly lower than that of Ecuador, and in all cases their increase is less than 1%. Columbia, Panama, Africa and Dominican Republic were all projected to lose market share over the period, up to 2017. Dominican Republic had the highest projected market share loss each year, which was as high as 4%.

Conclusion

After years of dispute, the EU reached a compromise with Latin countries and the U.S. regarding its banana regime. In 2006, the EU implemented a tariff-only regime, where tariff rate quotas were eliminated and €176/ton tariff imposed on Latin countries. The tariff is to decrease by eight progressive steps to €114/ton in 2017. Given this decline in tariff, this study was conducted to determine its impact on Latin and ACP countries. The study analyzed the demand

for source-specific bananas and their responsiveness to changes in prices as well as to total EU import demand. Unconditional own-price elasticities from Columbia, Costa Rica and Ecuador indicated a significant inverse relationship between source-specific import prices and quantities. Demand from Columbia was found to be elastic suggesting Columbia has the ability to increase its export quantity to the EU by reducing it price, translating to an increase in revenue. More importantly, a reduction in its import prices would increase its competitiveness with Ecuador who is currently the leading EU supplier.

Unconditional cross-price elasticities indicated the top three EU banana suppliers (Ecuador, Columbia and Costa Rica) would benefit most from a change in ACP import prices, given their substitutability. Overall, given the complementary relationship between ACP countries and Columbia, an increase in the price of banana from Columbia would not make ACP countries better off. The import index suggests ACP and Ecuador would benefit most from an increase in EU's total banana import. Although ACP price was higher than that of the Latin countries, they are expected to benefit more from the increase in total import. This could be a result of the preferential treatment to ACP countries based on colonial ties. Member states, such as France and the UK, continue to import most of their bananas from ACP countries to aid in their development and competiveness in banana trade.

The EU's main source of banana import (77%) is Latin America and almost all other imports (22%) come from ACP countries. Given that bananas from Latin countries are cheaper and production significantly higher, it is speculated that the reduction in tariff will further benefit these countries and negatively impact ACP countries. The study used unconditional elasticities to project banana import quantities from Latin and ACP countries to determine if this argument holds true. Based on projections calculated, ACP countries are not impacted negatively

specifically in terms of quantities. All countries are projected to see an increase in quantities imported by the EU. However, Latin countries are projected to experience a higher percentage increase than ACP countries. This suggests EU member states are seeking cheaper bananas to account for their growing import market. Unlike the increasing impact on all countries' import quantities, projections indicated some countries' market shares were negatively impacted. Specifically, Ecuador and Costa Rica were the only countries projected to experience an increase in market shares. Ecuador was projected to benefit most from the reduction in tariff based on their significantly higher increase in market share during every period (until 2017).

All ACP countries were projected to lose market share in all periods, up to 2017. This finding, together with the increase in quantities, suggests the percentage change in quantities from ACP countries was not sufficient to make them gain competitiveness in the EU banana trade. That is, the overall impact of the reduction in tariff places ACP at further disadvantage against Latin countries. This could serve as potential support for arguments made for Latin countries being the main beneficiaries of the new regime.

The study used 2011 prices and 2012 projections to determine the potential impact on import value to ACP countries. Calculations show all ACP countries are projected to have an increase in import value, where Dominican Republic is projected to see the largest increase. In case of losses in value to ACP countries from the new regime, the EU has set aside €2 million for compensations. Results from the study highlight the dependence of ACP countries on trade preferences and aid from EU member states. Without trade preferences to the EU, specifically zero tariff imports, ACP countries would be unable to compete with Latin countries given their already higher production cost.   It is therefore important for future banana trade negotiations between the EU and ACP continue to echo the current theme of preferential agreements.

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Figure 1: Comparison of Banana Production Costs, 1997
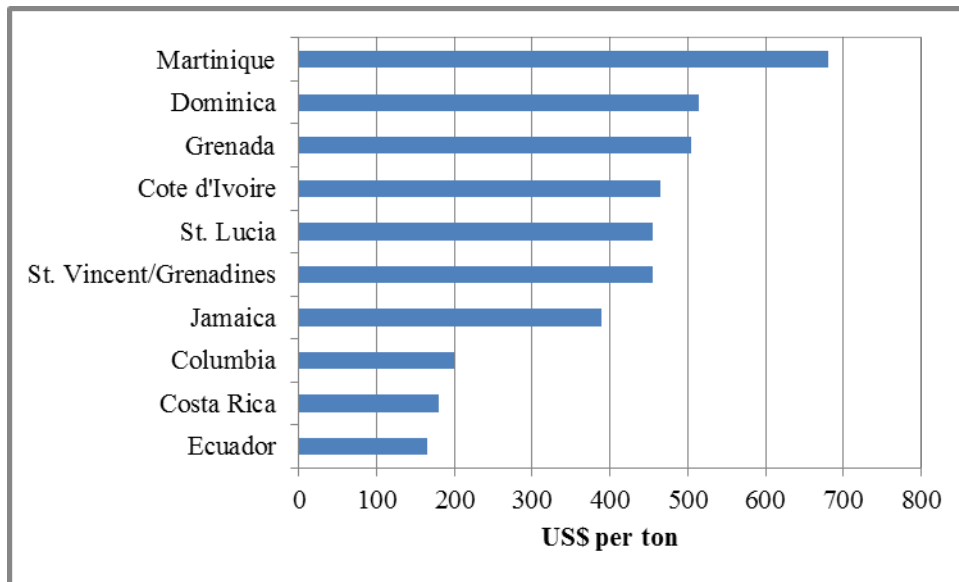
Source: Vanzetti et al. 2005

Figure 2: Banana Production for Source-Specific Countries, 2000-2010
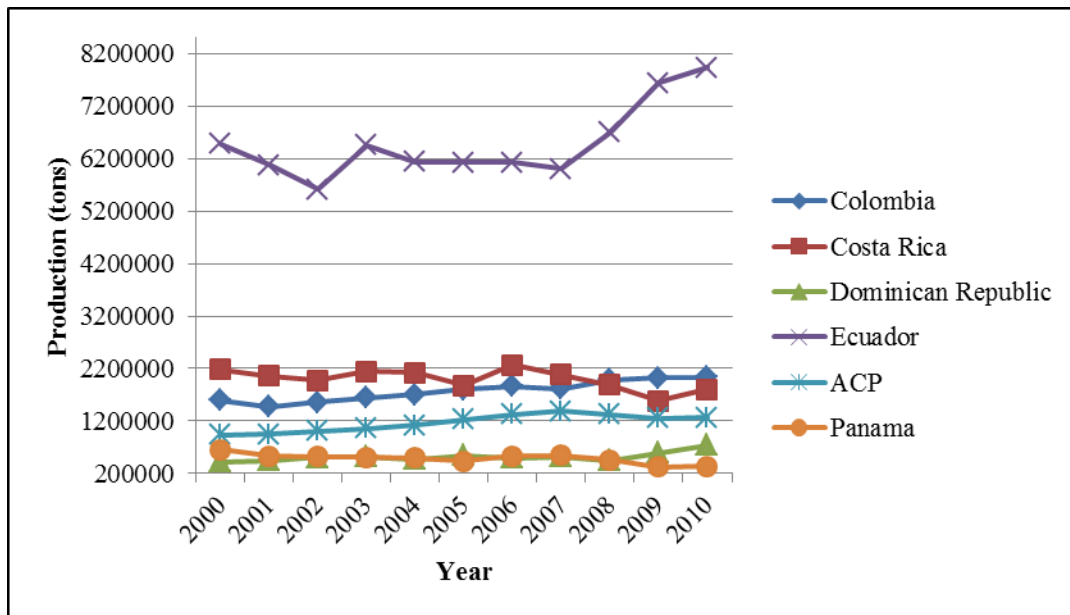
Figure 3: Total Export for Source-specific Countries, 2000-2010
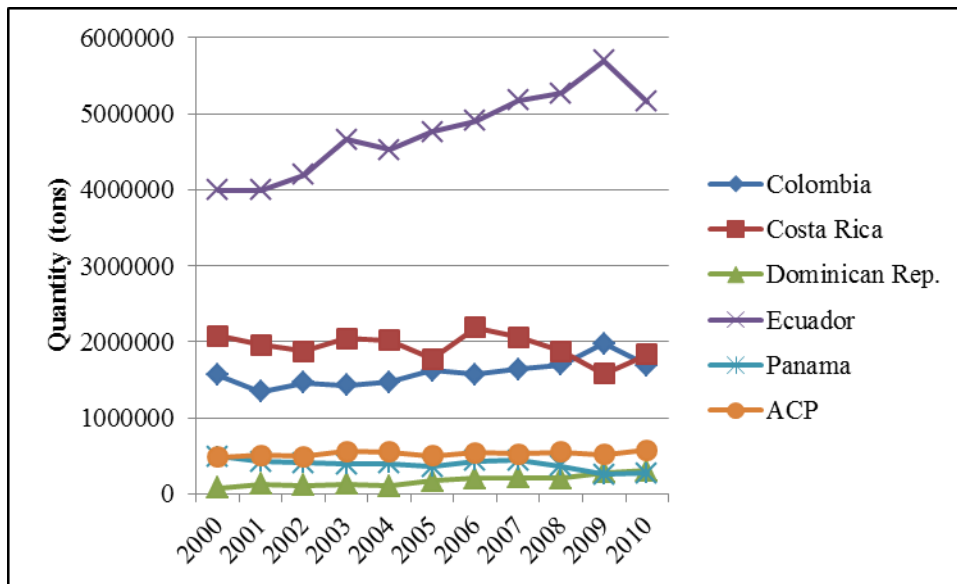
Figure 4: Percentage Share of World's Total Export, 2000-2010
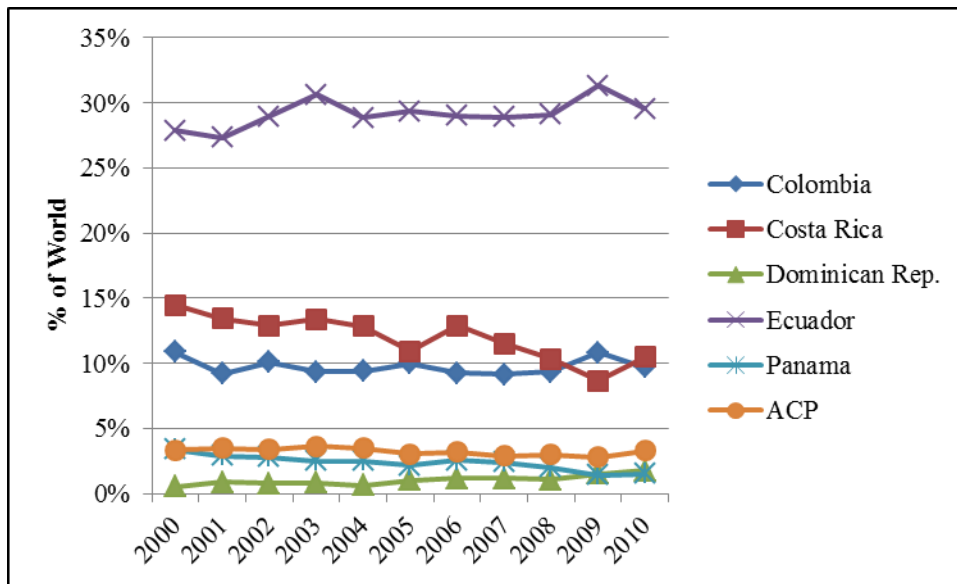
Figure 5: EU Import Quantity from Source-specific Countries, 2000-2011
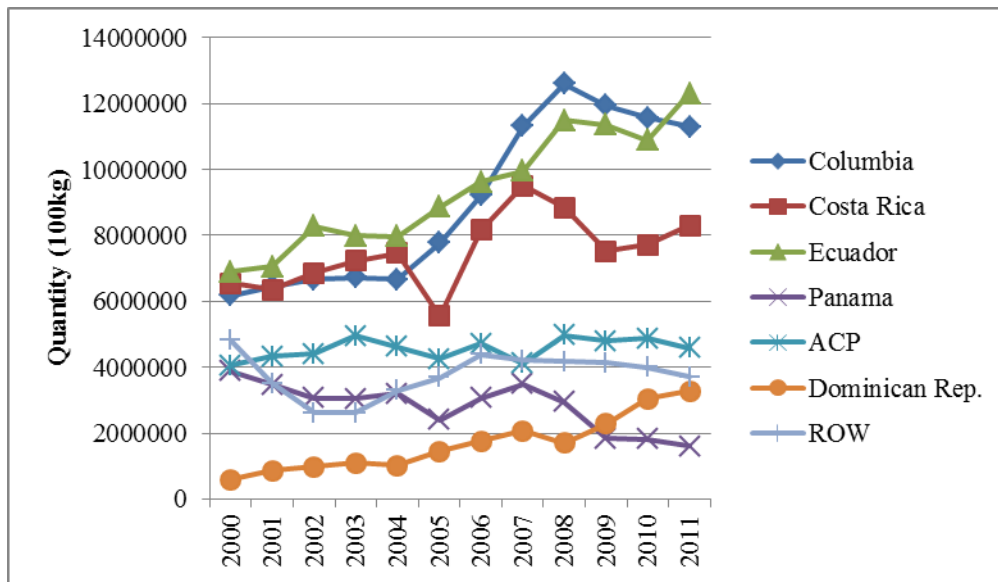
Figure 6: Percentage Share of EU Import from Source-specific Countries, 2000-2011
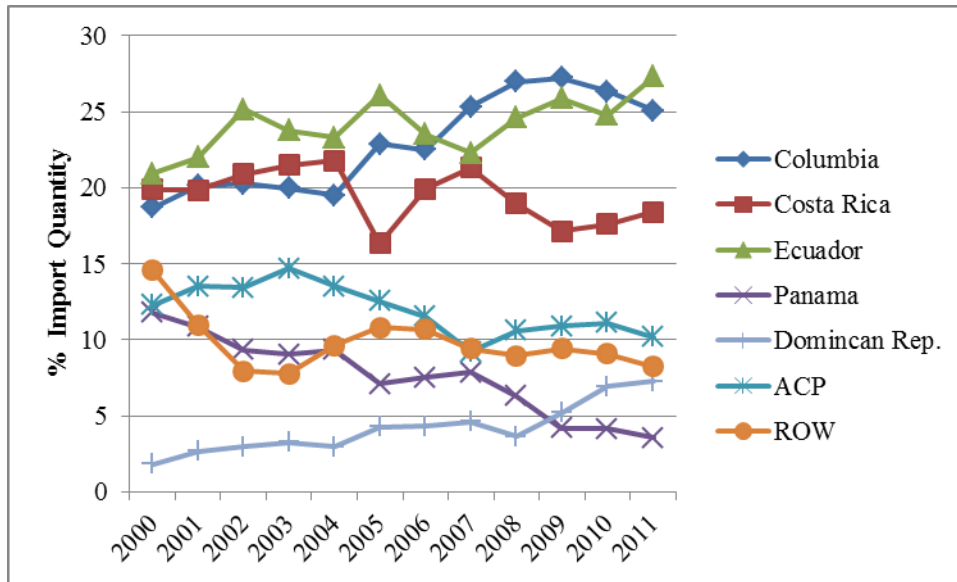
Figure 7: Expenditure of EU Import from Source-specific Countries, 2000-2011
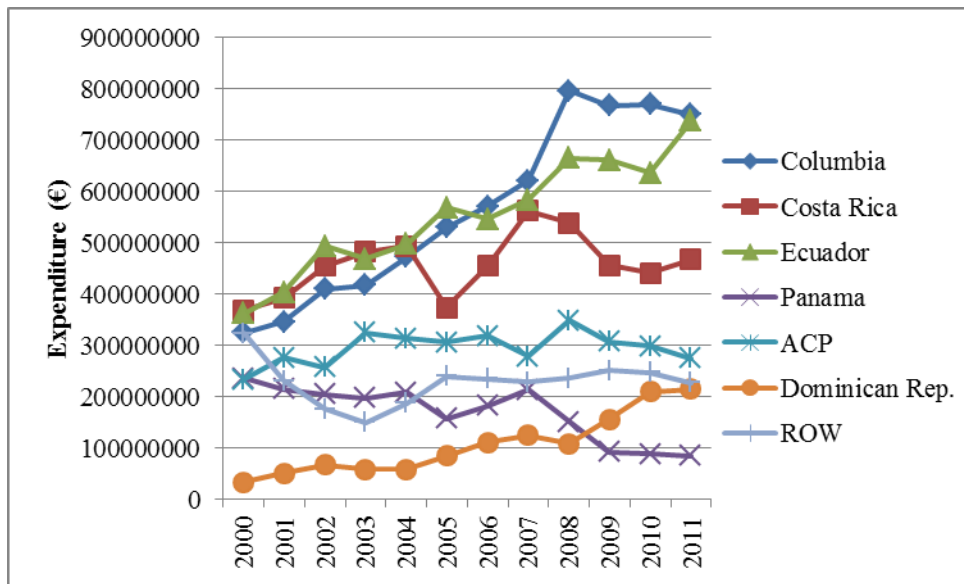
Figure 8: Import Prices of EU Import from Source-specific Countries, 2000-2011
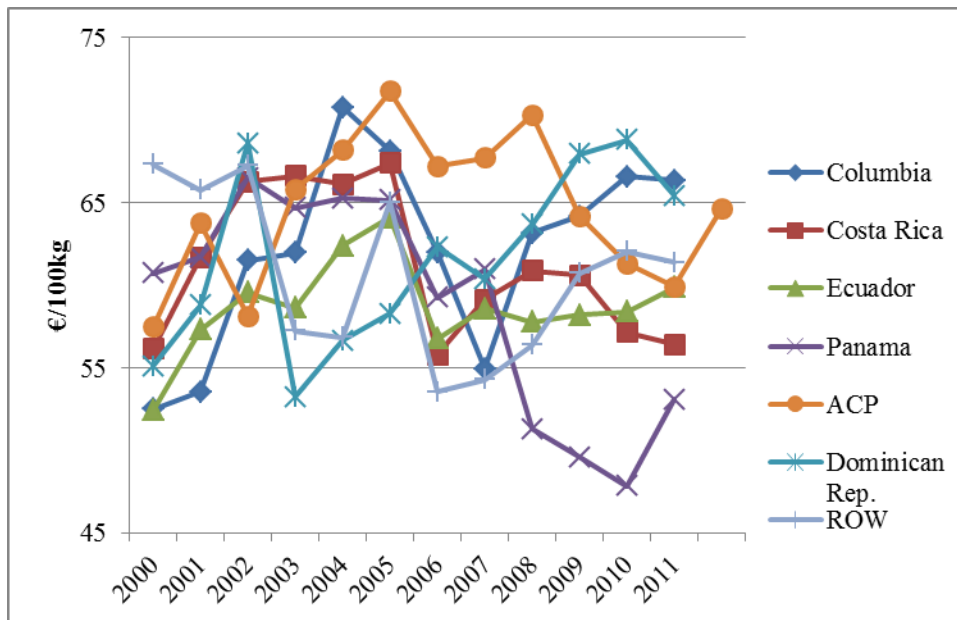
Figure 9: EU Import by Region, 2000-2011
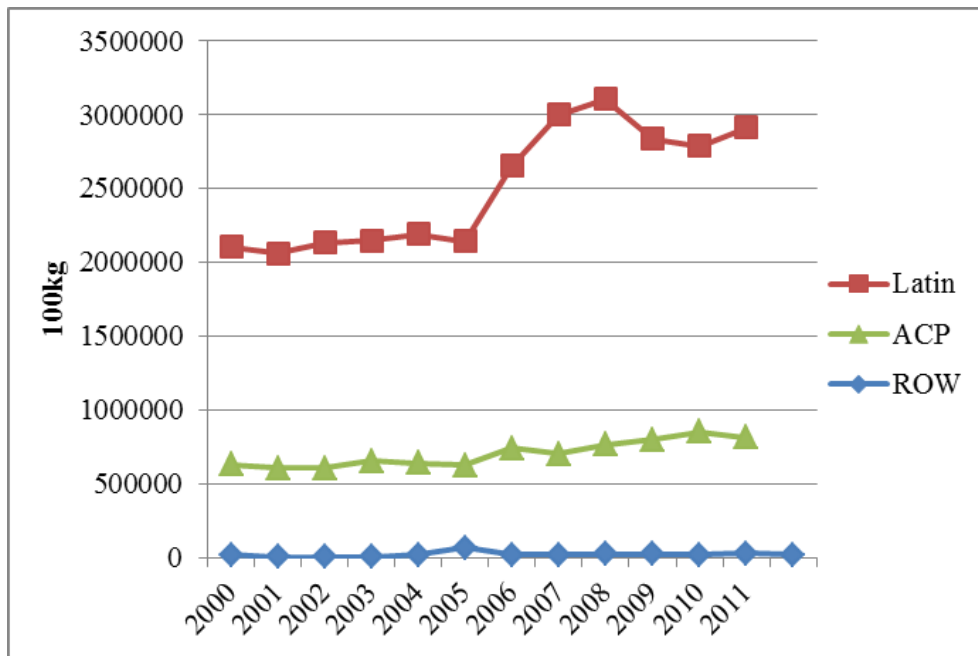
Figure 10: Percentage Share of EU Import by Region, 2000-2011
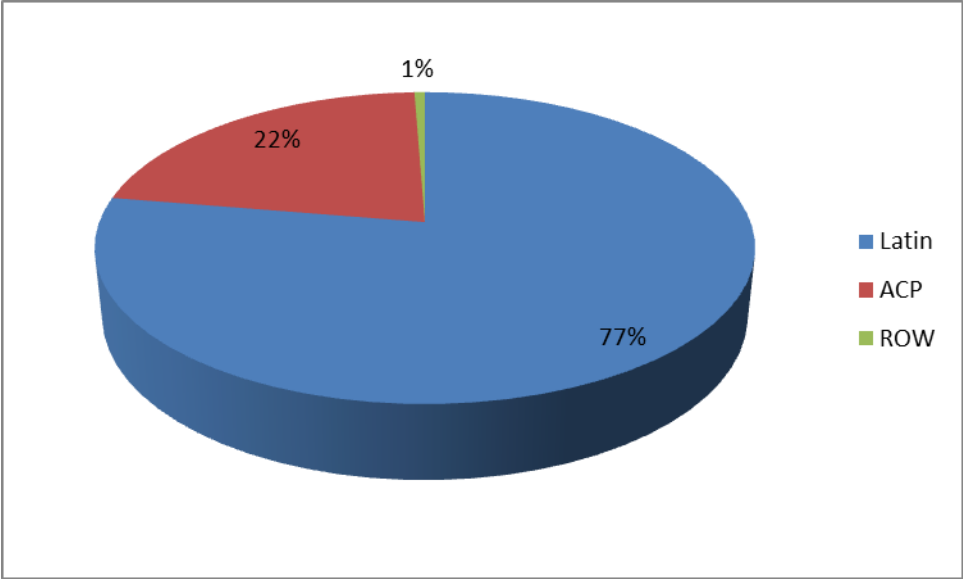
Table 1: EU Tariff on Latin American Bananas

	Tariff (per ton)
January 1, 2006	€176
December 15, 2009	€148
January 1, 2011	€143
January 1, 2012	€136
January 1, 2013	€132
January 1, 2014	€127
January 1, 2015	€122
January 1, 2016	€117
January 1, 2017	€114

Source: WTO, 2009

Table 2: Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum
Import value share				
Columbia	0.233	0.05	0.144	0.36
Costa Rica	0.195	0.031	0.139	0.293
Ecuador	0.229	0.044	0.134	0.316
Panama	0.076	0.035	0.02	0.164
Africa	0.125	0.023	0.079	0.218
Dominican Republic	0.043	0.021	0.012	0.1
ROW	0.098	0.028	0.056	0.197
Import Quantity (100 kg)				
Columbia	752,918	231,107	378,229	1,330,743
Costa Rica	625,589	122,074	350,400	969,715
Ecuador	782,675	213,928	348,024	1,304,452
Panama	235,091	74,559	86,718	396,804
Africa	203,664	38,878	112,725	320,895
Dominican Republic	139,651	74,367	39,885	384,464
ROW	313,349	65,039	166,679	473,840
Import price (€/100 kg)				
Columbia	62.11	6.16	49.97	74.07
Costa Rica	61.17	5	49.38	72.01
Ecuador	58.32	4.43	49.17	68.83
Panama	58.79	8.05	39.58	72.78
Africa	64.46	6.68	46.77	81.14
Dominican Republic	61.62	5.89	46.73	74.36
ROW	60.69	5.49	50.33	71.78
Total Import variables				
Total Imports (100 kg)	1,420,370	215,541	1,013,693	2,234,008
Export price *(€/100 kg)*	101.86	11.9	77.38	128.4
Wage Index	76.46	7.69	61.99	95.67

Table 3: Conditional Derived Demand Parameter Estimates for EU Imported Bananas

Exporting Country	Marginal Factor Share	Price Coefficients, π_{ij}^*					
		Columbia	Costa Rica	Ecuador	Panama	Africa	Dominican Republic
Columbia	0.202***	-0.120***	0.092***	-0.024	0.005	0.038*	0.008
Costa Rica	0.183***	0.092***	-0.148***	0.013	-0.001	0.038*	0.006
Ecuador	0.284***	-0.024	0.013	-0.130**	0.043*	0.067***	0.031**
Panama	0.048***	0.005	-0.001	0.043*	-0.024	-0.017	-0.006
Africa	0.218***	0.038*	0.038*	0.067***	-0.017	-0.112***	-0.013
Dominican Republic	0.048***	0.008	0.006	0.031**	-0.006	-0.013	-0.026**

***, **,* signifies 1%, 5% and 10% levels, respectively.

Table 4: Conditional Divisia and Price Elasticities of the Derived Demand for Imported Bananas

	Divisia Index	Elasticities					
		Conditional Own- and Cross-Price					
		Columbia	Costa Rica	Ecuador	Panama	Africa	Dominican Republic
Columbia	0.866***	-0.512***	0.394***	-0.102	0.023	0.162*	0.036
Costa Rica	0.939***	0.472***	-0.759***	0.066	-0.003	0.194*	0.031
Ecuador	1.239***	-0.104	0.056	-0.567**	0.187*	0.292***	0.136**
Panama	0.629***	0.070	-0.008	0.567*	-0.323	-0.224	-0.082**
Africa	1.735***	0.301*	0.301*	0.533***	-0.135	-0.896***	-0.104
Dominican Republic	1.126***	0.196	0.139	0.726**	-0.145	-0.306	-0.610**

***, **,* signifies 1%, 5% and 10% levels, respectively.

Table 5: Total EU Banana Import Parameter Estimates

Output Price	Input Price Coefficients, π_{ij}						
	Wage	Columbia	Costa Rica	Ecuador	Panama	Africa	Dominican Republic
0.388***	-0.005***	-0.769***	0.086	-0.175	-0.039	0.466***	0.240*

***, ** signifies 1% and 5% levels, respectively.

Table 6: Unconditional Elasticities of the Derived Demand for Imported Bananas

	Output Price	Elasticities					
		Unconditional Own- and Cross-Price					
		Columbia	Costa Rica	Ecuador	Panama	Africa	Dominican Republic
Columbia	0.336***	-1.179***	0.468**	-0.254	-0.011	0.565***	0.244*
Costa Rica	0.364***	-0.250	-0.678**	-0.098	-0.040	0.631***	0.256*
Ecuador	0.481***	-1.057***	0.163	-0.784***	0.138	0.869***	0.433**
Panama	0.244***	-0.413	0.046	0.457	-0.348	0.069	0.069
Africa	0.673***	-1.033***	0.450	0.229	-0.203	-0.088	0.312
Dominican Republic	0.437***	-0.670**	0.236	0.529	-0.189	0.218	-0.340

***, **,* signifies 1%, 5% and 10% levels, respectively.

Table 7: Import Quantity and Market Projections

	Quantity (100kg)	Market share (%)	Projections Quantity (100kg)	Projections % change	Projections Market share (%)
3.38% reduction in tariff (Baseline (2011)					
Columbia	11,305,799	27.3	11,678,275	0.03	27.3
Costa Rica	8,293,472	20.1	8,592,340	0.04	20.1
Ecuador	12,317,069	29.8	12,957,567	0.05	30.3
Panama	1,595,613	3.9	1,609,523	0.01	3.8
Domincan Rep.	3,268,813	7.9	3,279,232	0.00	7.7
Africa	4,580,421	11.1	4,666,564	0.02	10.9
Total	41,361,187	100.0	42,783,502	0.15	100.0
4.90% reduction in tariff (Baseline (2012))					
Columbia	11,678,275	27.3	12,235,756	0.05	27.2
Costa Rica	8,592,340	20.1	9,040,990	0.05	20.1
Ecuador	12,957,567	30.3	13,933,878	0.08	31.0
Panama	1,609,523	3.8	1,629,854	0.01	3.6
Domincan Rep.	3,279,232	7.7	3,294,377	0.00	7.3
Africa	4,666,564	10.9	4,793,729	0.03	10.7
Total	42,783,502	100.0	44,928,584	0.22	100.0
2.94% reduction in tariff (Baseline (2013))					
Columbia	12,235,756	27.2	12,586,703	0.03	27.2
Costa Rica	9,040,990	20.1	9,324,632	0.03	20.1
Ecuador	13,933,878	31.0	14,564,683	0.05	31.5
Panama	1,629,854	3.6	1,642,223	0.01	3.5
Domincan Rep.	3,294,377	7.3	3,303,519	0.00	7.1
Africa	4,793,729	10.7	4,872,217	0.02	10.5
Total	44,928,584	100.0	46,293,978	0.13	100.0
3.79% reduction in tariff (Baseline (2014))					
Columbia	12,586,703	27.2	13,051,643	0.04	27.1
Costa Rica	9,324,632	20.1	9,701,389	0.04	20.2
Ecuador	14,564,683	31.5	15,413,863	0.06	32.0
Panama	1,642,223	3.5	1,658,275	0.01	3.4
Domincan Rep.	3,303,519	7.1	3,315,325	0.00	6.9
Africa	4,872,217	10.5	4,974,955	0.02	10.3
Total	46,293,978	100.0	48,115,451	0.17	100.0
3.94% reduction in tariff (Baseline (2015))					
Columbia	13,051,643	27.1	13,552,739	0.04	27.1
Costa Rica	9,701,389	20.2	10,108,802	0.04	20.2
Ecuador	15,413,863	32.0	16,347,934	0.06	32.6
Panama	1,658,275	3.4	1,675,122	0.01	3.3
Domincan Rep.	3,315,325	6.9	3,327,640	0.00	6.6
Africa	4,974,955	10.3	5,083,989	0.02	10.1
Total	48,115,451	100.0	50,096,227	0.18	100.0
4.10% reduction in tariff (Baseline (2016))					

Table 7: Cont'd. Import Quantity and Market Projections

Columbia	13,552,739	27.1	14,094,399	0.04	27.0
Costa Rica	10,108,802	20.2	10,550,722	0.04	20.2
Ecuador	16,347,934	32.6	17,379,212	0.06	33.3
Panama	1,675,122	3.3	1,692,837	0.01	3.2
Domincan Rep.	3,327,640	6.6	3,340,507	0.00	6.4
Africa	5,083,989	10.1	5,199,980	0.02	10.0
Total	50,096,227	100.0	52,257,657	0.18	100.0
2.56% reduction in tariff (Baseline (2017))					
Columbia	14,094,399	27.0	14,446,827	0.03	26.9
Costa Rica	10,550,722	20.2	10,839,293	0.03	20.2
Ecuador	17,379,212	33.3	18,065,123	0.04	33.7
Panama	1,692,837	3.2	1,704,038	0.01	3.2
Domincan Rep.	3,340,507	6.4	3,348,589	0.00	6.2
Africa	5,199,980	10.0	5,274,204	0.01	9.8
Total	52,257,657	100.0	53,678,073	0.12	100.0

CHAPTER 3: I'D HIT THAT! FACTORS THAT INFLUENCE CONSUMERS TO VIEW A
BUSINESS PROFILE ON MARKETMAKER

Introduction

MarketMaker is an electronic medium created to connect farmers, fishermen, processors, distributors, food retailers and consumers. MarketMaker was developed in 2000 by the University of Illinois, Department of Agricultural & Consumer Economics, with the primary purpose of providing the Illinois farmers greater access to regional markets by linking them with processors, retailers, consumers and other food supply chain participants. This web-based marketing medium, however, has become one of the most extensive collections of searchable food related data in the country. MarketMaker has the potential to provide important infrastructure for households as well as institutional consumers seeking products grown or produced within their city, county or state. With direct access to farmers and producers, consumers can find and purchase numerous products in their desired forms; that is, fresh, processed, etc. Studies have shown that consumers demand local products, which they consider fresher and healthier than products that are transported across the country or hundreds of miles, over days (Wolf et al. 2005; Hardesty 2008). Not only are they demanding these products, but have indicated they are willing to pay more for them (Caprio and Massa 2008). MarketMaker is the direct link between consumers and these local products.

Because the MarketMaker database is populated with homogenous businesses in each business type, there is increased competition among them. Utilizing MarketMaker as a marketing tool is similar to utilizing a social media network. Like social media, the impact of MarketMaker on a business is difficult to quantify. The number of consumer views (profile traffic) on each business profile is the alternative measure of MarketMaker's impact on a business's profitability. It is therefore important for businesses to identify the factors that are important to consumers to ensure increases in profile views.   Therefore, in order to gain competitive advantage and benefit most from MarketMaker, businesses must identify these influential factors.   The primary objective of the study therefore was to identify the factors influencing the number of views a profile receives. Specific objectives were to: 1) evaluate the impact of factors that drives first time views ("first stage" variables), 2) evaluate each business type separately (farmer/rancher, fishery, farmers market, and agritourism) to ensure homogeneous products, 3) separate product categories in the farmer/rancher business type and evaluate each separately (vegetable, fruit and nuts, meat, grains, and dairy) to ensure homogeneous products, and 4) evaluate each MarketMaker state separately. The study utilized count data models, Poisson and Negative Binomial, to accomplish its objectives. Count data models have been used in numerous studies across disciplines (Cameron et al. 1988; Hellerstein 1991; Englin and Shonkwiler 1995; Abdel-Aty and Radwan 2000)

MarketMaker allows consumers the convenience of finding and selecting exactly what they desire by simply clicking on a web base search engine. Consumers are able to conduct a simple search and move to a more complex search if needed. They are able to first select a particular business type, for example, farmer/rancher, farmers market, processor, etc. After selecting the business type, they have the option of choosing businesses located across the state,

by zip code, or further narrowed to a 50 miles radius from that zip code. A user can then type the name of the product or products they are searching for or select from available categories. The categories include dairy, fruits and nuts, grains, herbs, meat and poultry, specialty products, and vegetables. If the user chooses to select from the available categories, they are then able to further refine their search. For example, if a user selects the category vegetables, he/she is then able to select by: vegetable product type (e.g. beans, artichokes, etc.), product attributes (e.g. genetically modified organism (GMO) free, pesticide free, etc.), third party verified (e.g. organic certified, natural, etc.), product form (e.g. bottled, fresh, frozen, etc.) and methods of sale (e.g. farmers market, on farm sales, delivery, etc.). After the user has completed their search, MarketMaker generates all businesses that match the selected criteria. Each business profile provides the consumer the business's address, contact information, and a map that pin points the exact location of the business.

MarketMaker also provides producers several opportunities and benefits. It provides them the opportunity of connecting with economically viable new markets. It also provides producers the information needed to better target consumers and identify potential businesses with which to collaborate (Lamie et al. 2008). Producers are able to select consumer attributes and receive a geo-coded response that shows where these consumers are located. Under the market research section of MarketMaker, producers can choose from six different demographic characteristics to help locate potential markets. These characteristics include age, household type, race, income, education, and foreign born (to determine ethnicity; excluding the U.S.). Each of the characteristics has a list of at least six options to choose from. When a producer chooses the desired demographic category, they are provided full census profiles as well as a map to help locate these consumers. Producers also have the option of viewing consumers' food

preferences, which generates information on average expenditures of several food items. Information on food away-from-home and food at-home expenditures is also available. Food away-from-home is further separated into average breakfast, lunch and dinner expenditures. Producers are also able to view business level data, which allows them to identify other supply chain partners. The geo-coded data feature on MarketMaker also allows producers to map potential business partners that are best suited to serve their intended market.

Although MarketMaker was created and implemented in Illinois, with the intention of benefitting farmers in that state, it has gained considerable interest from other states. MarketMaker is now a national partnership of land grant institutions and State Departments of Agriculture, working with the common interest of creating a comprehensive collaborative database of food industry marketing and business data. The network is now comprised of 19 states plus the District of Columbia and is expected to grow further[10]. MarketMaker, similar to social media marketing, was designed to be an effective way of keeping customers and businesses linked within and across states.

Internet and Social Media Marketing

The internet has become an effective tool in conducting a successful business (Kehal and Singh 2005). It is a low cost method that assists firms in communicating with consumers and other businesses, regardless of the time and distance (Amarasena 2008). It allows small firms to be competitive as it provides them access to vital market information needed to successfully implement marketing strategies (Autio et al. 2000). The internet provides several benefits to businesses. It can be used to reduce transaction costs, capture a larger audience, increase sales,

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[10] Alabama, Arkansas, Colorado, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Michigan, Mississippi, Nebraska, New York, Ohio, Pennsylvania, South Carolina, Texas, Washington D.C., Wyoming

and provide access to market research (Moini and Tesar 2005). Internet sales (e-commerce) are consistently increasing, accounting for a larger percentage of total sales each year. The two main classifications of e-commerce are business-to-business (B2B) and business-to-consumer (B2C), where B2B is transactions between manufacturers and merchant wholesalers and B2C is transactions between businesses and end consumers (Mueller 2001). Based on data from the U.S. Census Bureau (2010), B2B accounted for a significantly higher percentage of total e-commerce, approximately 90%, while B2C accounted for a smaller share (10%). While annual retail sales increased approximately 6% from 2009 to 2010, the increase in e-commerce was almost three times higher (16.3%). E-commerce as a percentage of total retail sales was 4.4% in 2010, an increase from 4% in 2009. Total retail sales in 2010 were $3.8 trillion and total e-commerce was $169 billion. From 2000 to 2010, retail electronic sales increased an average of 20%, while total retail increased an average of 2.7%. The significant increase in e-commerce over the decade indicates the importance of this new marketing tool for businesses.   As a measure for agricultural e-commerce sales, data for food, wine, and beer from the annual retail survey was used. Food, wine, and beer accounted for approximately $4 billion of the total retail sale in 2010. Of the $4 billion, e-commerce accounted for approximately 63% ($2.3 billion). Similar to the U.S. total retail and e-commerce, e-commerce in agriculture is increasing at a much higher percentage than total retail. Agricultural e-commerce sales increased 6.6% from 2009 to 2010, while total agriculture retail increased 3.2%; double total retail sales.

The use of the internet in agriculture, although not as aggressive as other industries, is rapidly increasing but mainly by agribusinesses and larger farms (Just and Just 2006). Based on USDA/NASS (2011) survey, 65% of farms in the U.S. had computer access in 2011, an increase from 64% in 2009. A total of 62% had internet access in 2011, an increase from 59% in 2009.

Of the total U.S. farms, 37% in 2011 were using computer for their farm businesses. In 2011, 84% of farms with sales and government payments of $250,000 and more had computer access, 82% had internet access, and 72% were using computers for their farm businesses. Percentages of each category for smaller businesses, in terms of sales and government payments, were lower. For the same period, 63% of farms with sales and government payments of $10,000 to $99,999 had computer access, 60% had internet access, and only 41% were using computers for their farm businesses. Very small businesses ($1,000 to $9,999) had a slightly lower percentage for each category. Sixty-one percent, 58%, and 27% had computer access, internet access, and used computer for their businesses, respectively.

Having access to the internet not only allows farmers to purchase input supplies more efficiently, but also allows them to reach their customers directly. The USDA/NASS survey shows that a higher percentage (31%) of larger farms used the internet to conduct agricultural marketing activities rather than to purchase agricultural inputs (28%)[11]. The opposite was found to be true for smaller farms. Only 7% and 13% of small farms and very small farms, respectively, conducted agricultural marketing activities over the internet. These percentages have the potential to increase as a much larger percentage of farms both have computers and have access to the internet.

Although sales dollars are not readily identifiable, as with e-commerce, social media is becoming one of the most widely used internet marketing tools and rapidly changing the way businesses communicate with customers (Mangold and Faulds, 2009). Social media is an efficient, cost-effective, "non-traditional" communication method that keeps businesses connected with customers. Consumers are turning away from "traditional" sources of

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[11] Agricultural marketing activities include direct sales of commodities, online crop and livestock auctions, online market advisory services, commodity price tracking, etc.

advertising and are relying more and more on social media to learn more about products and

brands (Naylor et al. 2012) and about 70% are engaging in online shopping. There are different

categories of social media, which include social networks ("Facebook", LinkedIn, etc.),

blogging, microblogging ("twitter"), media sharing (Youtube, Instagram, etc.), forums and

message boards, review and opinion sites, and bookmarking (Sterne 2010). The increase in the

number of consumers using social media to find and purchase products is capturing the attention

of businesses and motivating them to utilize this marketing tool. For businesses who want to

capture a wider, more technologically motivated audience, social media marketing is now a

necessity. Social media not only allows businesses to promote their products and services but

also provide instant feedback to consumers.

Based on a social media marketing survey (Stelzner 2012) conducted in 2012, 94% of

marketers are using social media to market their businesses. About 83% of these marketers said

social media was important to their businesses. Businesses using this marketing tool obtain

benefits such as increased business exposure (85%), increased traffic (69%), gained marketplace

insight (65%), reduced marketing expenses (46%), and improved sales (40%). Despite all its

positives, social media has its drawbacks. One of the major disadvantage of using social media

as a marketing tool is the time that must be invested to not only keep business and product

information updated, but to respond to customers' questions, comments, and reviews. Because

social media marketing is on a global level there is increased competition, which makes it

mandatory for businesses to keep business and product information current. Approximately 59%

of marketers spend six hours or more per week using social media and 15% spend more than

twenty hours per week (Stelzner 2012). Another major concern is the issue of measuring return

on investment on social media marketing. Since sales from social media cannot be directly

measured, marketers must use other alternatives to evaluate whether this marketing strategy is profitable. Some of these alternatives include the volume of consumer-created buzz for a brand based on the number of posts, the number of clicks, purchase considerations, and customer satisfaction (Hoffman and Fodor 2010). Although businesses are required to invest a great deal of time on social media to gain competitive advantage, they are rewarded by consumers who are also spending an increasing amount of time on social media. According to Neilsen and NM Incite's (2012) social media report, consumers spend more time on social networks than any other category of sites. The report showed that consumers spent a total of 2 million hours on social media in July 2012, an increase of 37% from July 2011. About 15% of social media users reported that after seeing social ads they share them with others while 14% purchased products after seeing the ads.

MarketMaker, like social media, is a direct marketing channel that links businesses directly to consumers; eliminating distributors. Direct marketing is an interactive system of marketing that creates an opportunity for building one-to-one relationships with customers. Over the past two decades there has been a significant increase in the demand for local food generating a remarkable increase in direct marketing outlets. Because direct marketing requires finding, capturing, and retaining customers, (which can be challenging) using social media becomes an important tool in bridging this gap. MarketMaker has similar components to social media but requires businesses to invest less of their time on the site. Not having the responsibility of promoting the database to consumers is one of the most desirable advantages to businesses using MarketMaker. MarketMaker is advertised by administrators in each state. However, like social media, the impact of MarketMaker on a business is difficult to quantify. The number of

consumer views (profile traffic) on each business profile is the alternative measure of MarketMaker's impact on a business's profitability.

Estimation Model

Count data models are commonly used in studies that utilize data recorded as non-negative integers. A detailed discussion of these models can be found in Hausman, Hall and Griliches (1984), Cameron and Trivedi (1986) and Gurmu and Trivedi (1994). The main focus in a count data regression is the effect of covariates on the frequency of an event, measured by non-negative integers or counts (Cameron and Trivedi 1996). The most basic and widely used count model is the Poisson regression model (Trivedi 1988). An important property of the Poisson distribution is that it is a natural choice for random non-negative discrete events (Hausman, Hall and Griliches 1984). Another important property of the Poisson process is equi-dispersion property; that is, equal mean and variance. This is, however, a major limitation to using the Poisson regression model. For this study the assumption that the variance of the number of profile views is equal to its mean is inappropriate (Table 1). More often than not, the conditional variance of the data exceeds the conditional mean, usually referred to as over-dispersion. Utilizing the Poisson regression model with the existence of over-dispersion will lead to inefficiency, inconsistency, incorrect standard errors and a poor fit (Cameron and Trivedi 1986). In stochastic modeling, dispersion is usually measured using a dispersion parameter. The dispersion parameter measures the overall ratio of the actual variance found in the data to the variance explained by the model. This parameter should be close to unity if no serious over-dispersion exists. One of the major causes of over-dispersion in the data is omitted variables (Cameron et al. 1988). In this study, the over-dispersion could come from consumer characteristics that are not available for the study.

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In the Poisson model, Y is a discrete random variable and is assumed to be Poisson distributed at any given set of exogenous variables (X's). That is

$$P_r\left(Y = y_i\right) = \frac{\mu_i^{y_i} e^{\mu_i}}{y_i!} \qquad y_i = 0, 1, 2, \dots \text{ and } \mu > 0 \qquad (1)$$

where μ_i is the mean of y at a particular unit i and $\mu_i = \exp(X_i'\beta)$, where $i = 1,\dots,$N. For the purpose of this study, y_i represents the number of consumer views on a business profile and μ_i is expressed as a function of observable profile attributes, first stage characteristics, and product characteristics; included in the p-dimensional vector X_i. Because $V\left(y_i | X_i\right) = \exp(X_i'\beta)$, by the equidispersion property ($E\left(y_i\right) = \mu_i$ and $V\left(y_i\right) = \mu_i$) and the parameterized equation ($\mu_i = \exp(X_i'\beta)$), the Poisson regression is naturally heteroskedastic (Cameron and Trivedi 2005). The most natural estimator for the Poisson model is maximum likelihood. The maximum likelihood estimators of β's can be obtained by maximizing the log likelihood function,

$$lnL(\beta) = \sum_{i=1}^{N} y_i X_i'\beta - \exp(X_i'\beta) - lny_i!) \qquad (2)$$

Because Poisson distribution does not account for over-dispersion the study must apply a distribution that will relax this assumption (Dean and Lawless 1989). The most basic extension of the Poisson model that accounts for over-dispersion is the negative binomial distribution. The negative binomial distribution can be generated by assuming the Poisson parameter μ_i to be gamma distributed. The dependent variable, Y, underlies the negative binomial distribution, which has the probability mass function:

$$f\left(y_i | X_i\right) = \frac{\Gamma\left(y_i + \alpha^{-1}\right)}{\Gamma(y_i + 1)} \left(\frac{\alpha^{-1}}{\alpha^{-1} + \mu_i}\right)^{\alpha^{-1}} \left(\frac{\mu_i}{\alpha^{-1} + \mu_i}\right)^{y_i} \qquad y_i = 0, 1, 2, \dots \qquad (3)$$

The two moments of the negative binomial are $E\ y_i\ =\mu_i$ and $Var\ y_i\ =\mu_i+\alpha\mu_i^2$. Since the variance is now different from the mean, the model can account for over/under-dispersion in the data. The log-likelihood for the mean parameter $\mu_i=\exp\ X_i'\beta\ $ is

$$lnL=\ \sum_{i=1}^{N}\ ln\ \frac{\Gamma\ y_i+\alpha^{-1}}{\Gamma\ y_i+1}\ -\ y_i+\alpha^{-1}\ \ln\ 1+\alpha\exp\ X_i'\beta \\ +y_i ln\alpha+y_i X_i'\beta \tag{4}$$

For the purpose of this study, the negative binomial model was applied to several MarketMaker business types. The elements of the vector X for the estimating equations differ by business types and can be found in the estimated equations in the Appendix.

Data

Data for this study was provided by University of Illinois MarketMaker team, the developers and host of the national MarketMaker database. The national MarketMaker database contains approximately 600,000 profiles listed under ten categories. The categories include agritourism, eating and drinking places, farmer/rancher, farmers market, fishery, food retailer, processor, wholesaler, winery, and buyer. Table 2 shows a breakdown of the number of businesses in each business type. For the purpose of this study only four business types (farmer/rancher, fishery, agritourism, and farmers market) were used. These particular business types were selected because all businesses associated with them are registered in the database. A registered profile is one that was created by the profile owner or created by a MarketMaker administrator on their behalf. Therefore, all profile owners under these four business types are aware of their profiles and are primarily responsible for keeping them updated.

All four business types used in this study have some common variables. One of these variables is the number of views each profile received from consumers searching the database.

The number of views represents the total number of clicks on a particular business profile. For example, the business with the highest number of views in the dataset has been clicked on 4,886 times over the data period, which is equivalent to their number of profile views. However, because a consumer can view a profile as many times as they choose, it cannot be said that this profile has been viewed by 4,886 consumers. Additionally, we cannot differentiate between a consumer view and a profile owner's view. However, profile owners are given an account login to access their profiles, and therefore, very rarely, if at all, will they view their profiles otherwise. The number of views was used as the dependent variable in the study. Another variable "common" to all business types is "time" (converted to months), which indicates how long each business profile has been in the MarketMaker database. "Facebook" and "twitter" are the two types of social media available to all businesses. If a business has a "Facebook" account it was coded 1 and 0, otherwise, the same coding was used for profiles with "twitter" (1 if present, 0 otherwise). "Affiliation" was also common among all business types and represents whether a business was associated with any state or farm programs, including the state's branding program (e.g. Alabama's Buy Fresh Buy Local). A profile that has an "affiliation" was coded as 1; 0 otherwise. The final variable common among all business types was "business spotlight" or ads. Every month a business is featured on the home page of each state's MarketMaker website. Any business that was part of MarketMaker can submit their business profile to be featured by filling out a "business spotlight" form. The "business spotlight" is an easy and free way to increase exposure to a profile. A business that has been featured on the "business spotlight" section was coded 1; 0 otherwise.

Other variables that were used in the study are common to one or more business types but not all. Both farmer/rancher and fishery businesses can list all the products they offer and for the

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purpose of this study, products are classified as "common" or "niche". A "common" product is any product that is offered by more than 5% of the total businesses. For example, under farmer/rancher business type, there were a total of 8,196 businesses of which 12% listed beef as one of their products offered. Beef would therefore be classified as "common". On the other hand, a "niche" product is any product that is offered by 5% or less of total businesses. For example, of the total number of farmer/rancher businesses, only 2% had edamame listed as one of their products offered. Given that a farmer/rancher or fishery operation can have both "common" and "niche" products, each was coded as 1 if present and 0 otherwise. Product form was also used as an exogenous variable in the study and was available for farmer/rancher and fishery businesses. Product form ranges from fresh products to its final processed form, value added, and each product form was coded as 1 if present and 0 otherwise. Businesses from the farmer/rancher, fishery and farmers market business types have the option of reporting their methods of sale used which ranges from a one on one direct marketing to wholesale marketing and also include payment options. All methods of sale are listed and explained in the results section. Each method of sale was coded as 1 if present on a profile and 0 otherwise. Markets served were also used as explanatory variables and included "local", "national" or "international". Each market was evaluated separately and coded as 1 if present and 0 otherwise. All businesses under the farmer/rancher and fishery business types had the option of listing their markets.

Other explanatory variables from the farmers market business type were "sponsors" and "months open". "Sponsors" can be an individuals or businesses who take on the financial responsibilities of a particular market which include covering operational costs, and they were coded 1 if there was a sponsor and 0 otherwise. "Months opened" was recorded as either year

round or individual months; coded 1 if year round and 0 otherwise. All agritourism businesses had the option of listing the amenities they offer, attractions available, and whether they offer fishing. Only businesses that offer at least one of these categories was used in the study. A dummy variable was used to account for each of these categories to determine their impact. Each category was given a 1 if offered and 0 otherwise. Other explanatory variables used from agritourism businesses include "payment options" and "discounts". Payments were either "cash" or other (debit/credit cards and checks). Each was coded as 1 if present and 0 otherwise. Participant experiences were categorized as educational and non-educational and coded as 1 if each were present and 0 otherwise. Finally, we evaluated the impact of offering food services, craft/decorations for sale, and "months opened". Each of these variables was evaluated as a dummy variable and given a 1 if present and 0 otherwise. "Months opened" for the agritourism business type was coded similar to that of the "farmers market"; 1 if year round and 0 otherwise.

After non-participating states were removed from the data set, farmer/rancher had a total of 8,196 farms in the database of which approximately 99% had at least one view on their profile. The majority of these farms without a profile view had been on MarketMaker only a short period of time (5 months or less) when the data was collected. However, about five of these farms had been registered for eleven months or more. There were a total of 299 fishery operations, after non-participating states were removed, available for evaluation. Unlike other business types, all fishery operations in the database received at least one profile view. Agritourism had 1,890 businesses listed in the MarketMaker database. Of this total, approximately 67% received at least one view on their profile. This business type had the highest percentage of businesses without a profile view. With the exception of one agritourism operation, all operations without views had been registered less than one year. The "farmers

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market" business type had a total of 2,940 registered markets, of which approximately 95% had at least one profile view. Similar to agritourism operations without a view, most farmers markets were registered less than a year. The data for this study ranges from 2006 to August 2012. Although MarketMaker has been in operation since 2000, the University of Illinois did not start data collection until 2006.

Descriptive Statistics

Descriptive statistics for the number of profile views and time for the four business types are presented in Table 3. On average, fishery operations received more views than other businesses. "Fishery" operations received an average of 62 views for the data period, with maximum 4,886 views. "Fishery" operations have been on MarketMaker an average of 38 months, and had operations as long as the start of the data collection period. It is important to keep in mind that operations from all business types could be registered with MarketMaker longer than what is suggested by the descriptive statistics. Farmer/rancher operations received approximately 50 views on average. As indicated above, some farmer/rancher businesses did not receive any profile views, hence, a minimum of zero recorded. The maximum views on a farmer/rancher profile were 4,886. Businesses in this category, on average, had been in the database longer than those in the other three operations; 45 months. Agritourism businesses received approximately 42 views, on average, and had been in the database an average of 25 months, the shortest time for all four business types. Farmers markets, on average, received the least (28) views per profile and had been in the database, on average, approximately 39 months.

Percentages of businesses from each business type that had "first stage" variables (common to all business types) are presented in Table 4. These particular variables are called

"first stage" because they influence consumers' first time view on a business profile, except the variable "common". Descriptive statistics show more farmers markets (44%) have a business website than any other business type. Approximately 41%, 34% and 28% of agritourism businesses, farmer/ranchers, and "fishery" operations have a business website. A very small percentage of businesses on MarketMaker use social media to market their products. About 2% or less of businesses across all business types has a "twitter" account while a larger percentage has a business "Facebook" page. Approximately 9%, 7%, 6%, 6% of agritourism businesses, farmers markets, farmer/ranchers, and fishery operations have a "Facebook" account, respectively. More farmer/ranchers are affiliated with state or farm programs than other business types. Approximately 14% of farmer/ranchers were associated with at least one program. About 11% of agritourism businesses, 7% of fishery operations, and 7% of farmers markets, respectively, have at least one "affiliation". Less than 4% of businesses from each business types were featured on the MarketMaker homepage where farmers markets were least featured. The variable "common" for farmer/ranchers and fishery operations, as stated earlier, refers to products that were offered by a larger percentage of businesses. As expected, more businesses offer more "common" products than "niche" products. Approximately 85% and 80% of fishery operations and farmer/ranchers offer these products.

Table 5 presents the top ten states with most views aggregated across all business types. Because each business can claim more than one business type, the total number of views could not be broken down by business type. However, to avoid double counting, business duplicates were removed from the dataset before tallying the number of views per state. Colorado had the most viewed businesses of all states. Colorado had a total of 71,856 views, which was significantly higher than that of Illinois (44,550), the second highest. Although there was a

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significant difference between views for the top two states, Colorado has approximately 50%

fewer businesses in the database than Illinois, and these businesses have been on MarketMaker

for a shorter period of time. Colorado had an average of 125 views per business and

approximately 2,245 views per month. Illinois on the other hand, had approximately 41 views

per business and 781 views per month.   The significantly higher number of views for Colorado

could be explained by several plausible factors. Firstly, it is possible that Colorado consumers

were demanding more local products than those of Illinois. Secondly, the Colorado

MarketMaker team was likely more aggressive in advertising.   Thirdly, it could be a result of the

higher percentage of businesses in Colorado (55%) with business websites than those in Illinois

(34%). Lastly, approximately 10% of Colorado businesses utilize social media, while only 7%

of Illinois businesses. As indicated earlier, "website" and social media networks were among the

variables that influence consumers' first time profile views. New York (32,573), Indiana

(32,538), Michigan (31,323) and Kentucky (31,103) rank third, fourth, fifth and sixth,

respectively. The remaining four states have 20,000 or less views, where Iowa was the only of

the four with 20,000. Mississippi, Louisiana, and Florida all have less than 20,000. These three

states were also the states with the lowest number of businesses in the database and on average

have been online for the shortest period of time.

Descriptive statistics are also presented for the top ten businesses for each business type

with highest all-time views. Given that a business can claim more than one business type, it was

no surprise that there was an overlap of businesses represented in the top ten across business

types. Lauren Farms Inc. received the highest number of views for farmer/rancher, fishery and

agritourism business types. Claiming three business types greatly influences the number of

views on Lauren Farms Inc. All businesses in the top ten farmer/rancher and agritourism

business types had a larger number of "all-time" views than those in fishery and farmers market. Interestingly, all top ten farmer/rancher and agritourism businesses have been featured on the MarketMaker website's "business spotlight" section. Being featured on the MakerMaker website was a major advantage to businesses, which could result in increasing number of profile views. All except one business from the farmers market business type, had been on the "business spotlight". However, this particular business had only been on MarketMaker one year unlike the other businesses. Contrary to the other business types, only four fishery operations were ever highlighted on a MarketMaker website, during the study period. All except two of the top ten fishery operations have been on MarketMaker at least two years. Agritourism was the only business type where all businesses have a website. Under all business types, "Facebook" was the most utilized social network.

Estimation Results

A series of Poisson and negative binomial models were estimated for business types and product categories for the study. The models were estimated using the GENMOD procedure in SAS. In addition to the over-dispersion seen in the raw data, several criteria for assessing goodness of fit showed that the negative binomial model was a better fit for the data than the Poisson model. The dispersion parameter (α) for each model showed the assumption of equi-dispersion was violated. Each diagnostic statistic was presented in respective tables below, for the negative binomial model. Results for the negative binomial models will be discussed and are presented in Tables 5-14.

"First Stage" Views

After a consumer specifies his/her desired product attributes, MarketMaker generates a list of business profiles that match these search criteria. For this study, these variables are called "first stage" variables and include "website", social networks ("Facebook" and "twitter"), "affiliations" and "business spotlight". Business profiles with these variables that match a consumer product search will be among the top profiles generated by MarketMaker and therefore will be the profiles the consumer sees first. The more "first stage" variables a business profile has, the closer it will be to the top of the list. Table 6 presents estimation results for the "first stage" variables. Since the estimators of β's were obtained from the log likelihood function, each factor's coefficient is interpreted as the likelihood of an increasing or decreasing (depending on the sign of the coefficient) impact on the number of views. Based on results, all variables significantly impact the number of views a profile received except the social network, "twitter". All statistically significant variables were at the one percent level except "Facebook". Having a "Facebook" (0.096) account linked to a MarketMaker business profile significantly increased the likelihood of being viewed by a consumer. MarketMaker registration is a straight forward, step-by-step process that requires businesses to complete a profile template by filling in details relevant to their businesses. It is available and easy and convenient for businesses to enter their "Facebook" link to MarketMaker, if they already have one. Businesses without a "Facebook" account are advised to create one, free of cost, in order to maximize their opportunities on MarketMaker. Having a business website (0.425) was also found to positively influence consumer views on a business profile. A profile with a business website was more likely to be viewed first by consumers searching the database. Like "Facebook", businesses can

either copy and paste their website link in the designated position on the template or type it in. It was beneficial to businesses with a website to include it in their profiles.

Two of the most important "first stage" variables impacting the number of views were "affiliation" and "business spotlight". Having an "affiliation" (1.008) with different state and farm programs significantly increased the likelihood of increased consumer first time views. "Affiliation" can impact both first time and repeat views on a profile. Given that some consumers are loyal to labels such as organically produced, or environmentally friendly, etc., consumers are more likely to revisit businesses that offer these attributes. Therefore, having an "affiliation" such as an association for sustainable agriculture attracts consumers who are interested in developing and maintaining a healthy lifestyle. Similarly, being affiliated with a program such as an Agricultural Environmental Assurance Program appealed to consumers who were supportive of a safe, healthy environment. For other consumers who are supportive of their local businesses, having a state branding program affiliation (such as Colorado Proud) will appeal to this group. "Business spotlight" was found to be one of the most important "first stage" variables, as expected. A business featured on the "Business spotlight" is visible to everyone (for one month) who visits a state's MarketMaker website whether they conduct a search or not. "Business spotlight" (2.800) was found to more likely influence the number of first time views on a business profile. Businesses are urged to take advantage of this MarketMaker feature, which is free and therefore can only be beneficial if utilized. "Twitter" was the only variable not found to have a significant impact on consumers' views on a business profile.

Agritourism

There were a total of 2,076 agritourism businesses listed in the MarketMaker database, four of which were removed from the data because they were listed in states that were currently not registered with MarketMaker. The total number of businesses used in the estimation was further reduced after businesses without amenities, attractions, or fishing were removed. The total number of agritourism businesses used in the study was 1,896. Estimation results for agritourism are presented in Table 7. Dummy variables were used to determine the impact of amenities, attractions and fishery on consumer views on agritourism businesses. It was found that only fishing (-1.260) reduces the likelihood of increased consumer traffic to a profile. Fishing is a long-lasting tradition in the U.S. and is one of the most popular recreational activities in the country. In 2011, more than 46 million Americans participated in this activity (Recreational Boating and Fishing Foundation 2012). Because fishing is so commonly done, participants would frequent the traditional, well known fishing website instead of searching agritourism websites. This would, therefore, reduce the need for consumers to utilize MarketMaker to find fishing operations.

Having "amenities" on site (0.232) increases the likelihood of consumer views on an agritourism business profile. This result is consistent with the Wisconsin agritourism survey responses that found that consumers rate "amenities" as very important (Brown and Hershey 2012). Restrooms, adequate parking, and convenient location were among the top "amenities" that were important to consumers from the Wisconsin survey. Some of the "amenities" offered by agritourism businesses on MarketMaker include bathrooms, picnic areas, recycling, Wi-Fi, onsite transportation, level ground/clear pathways, etc. Consumers are seeking convenience and comfort and therefore it is imperative for agritourism businesses on MarketMaker to meet these

demands in order to increase consumer traffic to their profiles. Providing attractions to consumers was also found to increase (0.851) the likelihood of increased profile views. Agritourism's primary consumers were families who were searching for experiences that were both fun and educational (Beus 2008), therefore agritourism businesses seeking to maximize consumer revisits must cater to these needs. Some of the attractions listed by agritourism businesses on MarketMaker are pick-your-own, hayrides, corn maze, petting zoos, live entertainment, and event spaces, among others.

All "first stage" estimates are consistent with model results discussed previously. All variables, except "twitter", were positive and statistically significant. "Facebook" was found to be an important social network to agritourism businesses. "Facebook" (0.250) was found to positively influence consumer views on business profiles. Having a business website linked to MarketMaker also increases the likelihood of consumer traffic to agritourism profiles. Having a business website (0.520) linked to an agritourism profile was found to significantly influence consumers' decision to view that profile. MarketMaker is populated with competitors and therefore businesses must capitalize on any opportunity to set themselves apart from others in order to attract more consumers. Adding a website link to a profile could be one of the simplest ways to accomplish this task. "Affiliation" was also found to be positive (1.429) and statistically significant at the one percent level. Based on this result, agritourism businesses that advertise their connection with state programs are more likely to see an increase in the number of profile views. Some of the programs reported by agritourism businesses include state branding programs, farm bureaus, grower associations, and sustainable agricultural practices. All programs relevant to each state are embedded in the MarketMaker database and only require businesses to select the ones with which they are associated. "Business spotlight" was positive

(2.497) and statistically significant at the one percent level. As mentioned previously, each month a business is featured on the homepage of each state's MarketMaker website making it visible to all consumers before conducting a search. Again, in order to maximize the number of consumer views, agritourism businesses should invest the time to inquire about this feature and take necessary steps to participate.

As expected, the length of time a business has been on MarketMaker (0.020) increases the likelihood of receiving more views on an agritourism profile. The longer agritourism businesses have been in the database, the higher the number of profile views that can be expected. One of the key variables evaluated from this business type was payment type. Payment type was grouped into "cash" and "other payments" where "other payments" include checks and debit/credit cards. Both "cash" (0.049) and "other payment" (0.274) were found to be positive but only "other payments" had a statistically significant impact on the number of views. Because of the convenience of card payments, more consumers are interested in this option. Consumers are not motivated to go to banks primarily because of the amount of time that is required. As a result consumers would be more likely to revisit profiles that provide them multiple payment options. Businesses that accept "cash" only but provide ATM services might be able to attract the "convenience" cluster of customers. Other admission variables estimated were "deposits" and "discounts". Agritourism businesses that require "deposits" (-0.429) should expect lower number of profile views as "deposit" was found to reduce the likelihood of consumer views. Because of uncertainty and unexpected changes in events, consumers desire flexibility in decision making. Contrary to "deposits" required, as expected, offering "discounts" (0.486) positively and significantly influences the number of views on a profile. Several "discounts" were combined to form this variable including "students discount", "military

discount", "senior citizen discount", "midweek rates", "off season rates", and "free". This result confirms consumers are always searching for the lowest cost for products and services.

The impact of accommodations, such as bed and breakfast, on the number of profile views was also estimated.   It was found that accommodation (0.257) significantly increased the likelihood of consumer views on an agritourism profile. Consumers were interested in maximizing family time and agritourism businesses can provide them the opportunity to do so. Providing "handicapped access" also influenced the number of views on a profile. "Handicapped access" (0.198) was found to be positive and statistically significant. This finding was also consistent with Brown and Hershey (2012). Finally, when agritourism businesses were open to customers was also evaluated. If open year round, it was coded as 1, and 0 otherwise. The variable "open" (0.662) was found to be positive and statistically significant at the 1% level. Indicating, consumers were searching more for businesses that were open year round and searching less for seasonal businesses as they know these businesses would be closed a part of the year. Therefore, if possible, agritourism businesses can adjust in order to capitalize on the increase in consumers as a result. Having an event space, food services, and craft/decor was found to be statistically insignificant.

Fishery

Estimation results for the fishery business type are presented in table 8.   The MarketMaker database had a total of 304 registered fishery businesses as of August 2012. However, after removing businesses in states that were not a part of MarketMaker and those registered less than one month at the time of data collection, a total of 297 businesses were evaluated. Results show that unlike the agritourism businesses, social media does not have an

impact on the number of views on a profile. However, all other "first stage" variables had a positive impact, as expected; "website" (0.495), "affiliation" (0.739) and "business spotlight" (1.587). As discussed above, these variables influencing consumer's first time profile views are easy to add. Businesses are only required to invest time in adding their website links, selecting all relevant state associations and filling out an application to be placed in the "business spotlight". Among all the "first stage" variables, being highlighted on the homepage of the MarketMaker "website" was more likely to influence consumer views.

Another interesting variable that was evaluated was the length of time each fishery business had been on MarketMaker. Unlike agritourism, the length of time in the database negatively influenced the number of views on "fishery" profiles. Although intuitively one would expect the opposite, it is possible that the likelihood of business profile views could diminish over time. A business could get an increasing number of profile views when initially entered into the MarketMaker database but could see a decrease in the frequency of views as consumers identify and become familiar with the business, reducing the need to revisit that business profile. Because the majority of fishery businesses offer online purchasing, a higher percentage has websites. After finding businesses in the database, it is likely that consumers will go directly to the business website to make purchases instead of revisiting MarketMaker.

The variable "common" was created by separating products in terms of frequency by fishery businesses. Any seafood product that was offered by 5% and above of fishery businesses were considered a "common" product while less than 5% were considered "niche" products. The majority of the seafood available by businesses on MarketMaker was "common" products. Only a few were offered by less than 5% of operations including cod, triggerfish, squid, tilefish and a few others. Surprisingly, lobster was among the "niche" products. Only 2% of "fishery"

businesses in the database offer lobsters. The variable "common" was found to be positive

(0.658) and statistically significant at the 1% level. Indicating consumers were searching for

businesses which offer the typical seafood products, such as shrimp, crabs, craw/crayfish,

catfish, and bass. One of the most interesting findings from this business type analysis was the

electronic benefit transfer (EBT) variable. EBT (1.233) was found to be positive and statistically

significant. Indicating, a "fishery" business that accepts EBT was more likely to get a higher

number of views on its profile. This result implies that a business that offered consumers the

opportunity of purchasing with EBT was expanding its range of consumers. "Fishery" was the

only business type where EBT or any other food benefit programs were found to be positive.

Offering this option provides low-income customers greater access to fresh seafood.

Several product forms were evaluated, however, only a few were statistically significant

and fewer had a positive impact on the number of views on a profile. Fillet (0.766) was found to

be positive and statistically significant at the five percent level. This indicates consumers were

more likely searching for fish that were processed and ready to be cooked; stated otherwise,

consumers were searching for convenience. Consumers were not anticipating the preparation

process, from scaling to removing intestines, to deboning, but rather a product that is semi

processed that requires very little preparation before cooking. "Fishery" businesses providing

this product form will, undoubtedly, benefit more, based on profile views, than those that do not.

Value Added (2.551) was found to positively and significantly influence consumers' views on a

profile. Value-added can include seafood that is pre-seasoned, packaged and frozen, and a

variety of oven and microwavable seafood meals. Once again consumer demand for

convenience was evident. Other product forms that were found to be significant but negative

were fish skin (-1.969), deveined (-0.731), and "smoked" (-0.9537). These product forms, "fish

skin" and "smoked" could be too specific and may appeal to a smaller percentage of consumers. It could also be the higher cost associated with smoked products.

The study also evaluated the impact of the types of markets served on the number of profile views. "Local" (-0.478) was found to be negative and statistically significant at the one percent level. This could be an indication that local consumers were familiar with fishery businesses in their communities as these operations were typically clustered in specific locations, in close proximity to a body of water (ponds, lakes, rivers and sea). It could also suggest that the attribute "local" was implied when using MarketMaker to source seafood in a consumer's particular state. Consumers searching outside their state would not be considered local, unless they are searching in neighboring states within a certain number of miles. Serving "international" (-1.200) markets was also found to be negative and statistically significant. This could be interpreted as consumers were seeking fresher seafood products. "Internet sales", "mail order", and "shipping (SIM)" were found to be negative (-0.539) and statistically significant, confirming the negative result for "international market". Providing a "delivery" service (0.909) was found to increase the likelihood of consumers' views on a fisher business profile. The positive coefficient implies consumers were more likely to revisit a profile that has this option available. Businesses can determine the cost, both time and dollars, of this service and decide whether it is profitable to make it available to consumers. If it is cost effective, fishery businesses should consider offering delivery services as consumers were searching for this attribute. Providing a debit/credit card payment option was found to negatively influence the number of views on a profile, although one would expect otherwise. Using a debit/credit card requires producers to increase the price of the products to cover the fees charged by banks. None

of the direct marketing methods were found to influence consumers' views on fishery

businesses' profiles.

Farmers Markets

There were a total of 3,041 farmers market registered with MarketMaker at the time of

the data collection, of which 96 were removed because their particular states were not

MarketMaker partners. The remaining 2,945 were used for estimation and results are presented

in Table 9. Results show that the farmers market was the only business type that was influenced

by both social networks. "Facebook" (0.159) and "twitter" (0.489) positively and significantly

influenced the likelihood of consumer views on a farmers market profile. The number of farmers

markets has been rapidly increasing in the U.S. and as of 2012 there were a total of 7,864, an

increase from 1,755 in 1994 (USDA/AMS 2012). One of the major challenges farmers markets

organizers face is developing a marketing plan that communicates meaningful messages to their

core audience (Missouri Extension 2010). Based on results from a survey conducted by the

Missouri Cooperative Extension program, about 50% of farmers markets use social media to

promote their markets since this marketing tool enables them to conveniently share information

with customers and potential customers. In all business types discussed previously, having a

website linked to MarketMaker was very important and farmers market business types were no

exception. "Website" (0.148) was found to be positive and statistically significant at the one

percent level which is consistent with the Missouri survey that found that about 70% of the

farmers markets that participated in the survey use websites to promote their market. Being

affiliated with a state program or organization is significantly important to increasing the

likelihood of views on a profile. "Affiliation" (1.078) was found to be positive and statistically

significant at the one percent level. As is true for other business types, consumers have a higher

demand for stickers and labels and are willing to pay more for these products (Howard and Allen 2006). Nganje et al. (2011) conducted a survey in Arizona that found that consumers were willing to pay more for spinach that was marked with the Arizona Grown Label. Velcovska (2012) also found that consumers in Czech were willing to pay more for products with the label KLASA (which indicates the best quality food and agricultural products by the Czech Republic Ministry of Agriculture) and Czech Bio label (product of organic farming guaranteed by the Ministry of Agriculture in participation with Association of Organic Farming). This indicates the importance of states and farm programs, and businesses in the MarketMaker database are urged to take advantage by promoting these programs on their profiles. As expected, being in the "business spotlight" increased the likelihood of increased consumer views on a particular profile. The estimation coefficient for "business spotlight" (2.878) was found to be the most influential factor driving consumer views on a profile. Farmers markets organizers are encouraged to invest in the "business spotlight" option available on MarketMaker.

Other variables outside of the "first stage" variables analyzed were "time", "sponsor", "methods of sale (MOS)", and times when farmers markets are operational (open). "Time" (0.020) on MarketMaker positively and significantly influenced consumers to view a farmers market profile. The longer these markets have been on MarketMaker, the more views they were likely to receive. Sponsor (0.495) was also found to be positive and statistically significant. Because most farmers markets are non-profit organizations that charge vendors minimal to no fees, it is important to have sponsors who provide financial support to cover operational costs. Sponsors are also instrumental in supporting educational and outreach goals planned by market organizers. With sponsors compensating for operational costs, participating vendors can provide products to customers at a lower cost. Consumers are therefore benefitting from

attending markets with sponsors. Methods of sale include "debit cards", "credit cards", "EBT/SNAP", and "WIC". "MOS" (-0.150) was found to have a negative impact on the likelihood of increased views on a farmers market profile. Although, intuitively, one would expect consumers to desire this option because of its convenience, but the cost associated with it deter consumers. In order to process either of the methods above, markets would need "point of sale" swiping machines. The cost of using these methods depends on the wireless card service provider and the frequency of use. This additional cost to the markets is translated in consumer prices. Additionally, in order to process EBT transactions an account must be established with Food Nutrition Services as well as with the bank. Similar to agritourism businesses, offering a year round market would be ideal to consumers. Being open (0.5394) year round increases the likelihood of an increase in the number of views on a particular profile.

Vegetables

From the farmer/rancher business type, each product category was evaluated separately primarily for product homogeneity. These product categories include vegetables, fruits and nuts, meat, grains, and dairy. Estimation results for vegetable growers are presented in Table 10. There were a total of 4,588 vegetable farmers in the MarketMaker database that were used for the estimation. Results show that all "first stage" variables were found to be statistically significant, except "Facebook". Having a "twitter" (0.231) account linked to a vegetable profile was found to increase likelihood of an increase in the number of views, again highlighting the importance of utilizing social media. Consistent with the "first stage" model results, "website" (0.258), "affiliation" (1.056) and "business spotlight" (2.406) were all positive and significant. Being in the "business spotlight" and having an "affiliation" were most influential on the number of consumer views on a vegetable grower's profile. Finding consistent "first stage" results

across business types not only signify the importance of these factors on consumer search but also the importance of completing profiles with these variables. "Time" (-0.004) was found to be negative and statistically significant.

Results show that vegetable consumers were looking for both "common" and "niche" products. "Common" (0.452) and "niche" (0.093) products were both found to increase the likelihood of consumer views on the number of views on a profile, however, based on the coefficient estimate, "common" products impacts views more than "niche" products. This is an indication that more consumers overall are looking to find their typical vegetables. This is also consistent with fishery consumers. However, farmers should highlight the "niche" products on their profile as consumers are demanding more specialty crops. Several direct marketing channels were analyzed. Contrary to the fishing operations, direct marketing is an important marketing channel to vegetable consumers. All direct marketing channels were positive and statistically significant, except on-farm sale, which was found to be negative. Results show farmers that have a Community Supported Agriculture (CSA) (0.238) program were more likely to have an increase in the number of profile views. A CSA is a direct marketing tool which consists of a community of producers and consumers sharing both the risk and benefits of food production. CSAs are becoming increasingly popular and there were about 1400 in 2010 (Martinez et al. 2010). Participating in a farmers market was also found to be a benefit to vegetable farmers registered on MarketMaker. "Farmers Market" (0.146) positively influences consumers to view a vegetable farmer's profile. "Roadside stand" (0.057) was also important to consumers' decision to view a vegetable profile. "Roadside stands" were a type of market, selling directly to consumers, usually located on or off the farm typically close to a highway (Lloyd et al. 1995). Consumers shop at "roadside stands" for fresher, higher quality products at

a reasonable price as well as for convenience (Rhodus et al 1994). It is therefore essential to complete one's profile by singling out the direct marketing channel available to attract more consumers.

The only direct marketing channel that was found to negatively impact the number of views was on-farm sales (-0.074). Consumers searching for farms to visit to make direct purchases would not need to revisit a MarketMaker profile after they have established a relationship with a farmer. Once the consumer forms this relationship with producers, there is no need to go through MarketMaker to find them, but instead, contact them directly by phone, emails or visits. This therefore reduces the number of revisits to a MarketMaker profile. Equally, the majority of vegetable farmers produce a variety of products and consumers can find most, if not all, products at one location. This also contributes to the decline in the number of consumer revisits to the database. While on-farm sale was found to be negative, this does not suggest that consumers were not looking for this marketing method but only highlights the fact that consumers would not need to revisit a growers' MarketMaker profile after finding farms that offer this marketing channel. Overall the results for direct marketing are consistent with marketing trends.

"Delivery" (0.122) was positive and statistically significant. Consumers were therefore more likely to view a profile and revisit a profile which provides this option. Although convenient, consumers can and usually incur a cost for this service but this positive finding suggests they were willing to pay the cost associated with it. Other methods of sale that are more likely to influence consumers views on a vegetable profile are "mail order" (0.372), "export" (0.284), "retail" (0.132), and "wholesale" (0.270). As expected, based on the information of increased costs, "debit/credit cards" (-0.482) and "WIC" (-0.280) reduces the likelihood of

consumer views on a vegetable profile. This is consistent with explanations for farmers market. Serving the "national" (0.208) market was found to positively influence consumers to view a vegetable profile. This could be a result of consumers searching for "niche" products that were not available in their state.

Several product forms from the vegetable category were evaluated. Profiles with the product form, bottled, positively (0.197) were more likely to increase consumers' profile views. Although consumers were demanding more fresh vegetables, canned and bottled vegetables totaled $2.4 billion in 2009 suggesting there is still demand for these products. Vegetables such as cucumbers, peas, and peppers are used for pickling or spices. The product form "frozen" (0.130) and "vacuum packed" (0.264) were also found to positively and significantly influence the number of consumer views on a profile. Both product forms can increase the shelf life of vegetables. In order to mitigate waste, producers can freeze more vegetables and because of the convenience of preparing, more consumers are demanding more value added frozen vegetables. On the other hand, although statistically significant, consumers were not searching for dried vegetables or those used to make condiments. This is consistent with the healthy lifestyle theory of consumers. Therefore, these product forms reduce the likelihood of consumers' profiles revisits. Surprisingly, the product form, fresh did not have a significant impact on the number of views. It could be that this product form is implied once searching the MarketMaker database. The primary reason consumers utilize the database is to source locally grown products and consumers associate the attribute "fresh" with "local".

Meat & Poultry

Estimation results for the product category, meat and poultry are presented in Table 11. There were a total of 2,198 meat and poultry producers used in this study. Results show that all

"first stage" variables for the meat and poultry category reflect results of the overall "first stage" model, excepting "Facebook" that was found to be negative. All "first stage" variables were found to have a significant impact on the number of views on a meat and poultry producer profile, except "twitter". The negative sign associated with social networks was one of the major differences between the meat and other product categories. Consistent with results from other business types discussed above, being featured on the MarketMaker website had the most influence on consumer views. All meat and poultry products were also categorized into "common" and "niche". Both categories "common" (0.243) and "niche" (0.184), were found to have a positive influence on the number of views on a profile. This suggests consumers are interested in finding all types of meat. Some of the "common" meat and poultry products include beef, pork, goat and chicken while some "niche" products include rabbit, quail, and ostrich. The variable "common" had a slightly higher coefficient estimate suggesting consumers were more likely searching for these products. However, meat and poultry producers were likely to see an increase in profile views regardless of the products listed.

All methods of sale, excepting "wholesale", were found to have a positive and significant influence on consumer views on a profile. These methods include "farmers markets" (0.232), "internet" (0.143), "mail order" (0.185), "export" (0.289), "retail" (0.325), and "delivery" (0.124). The demand for direct marketing is once again highlighted by the positive and significant coefficient for "farmers market". Offering a "delivery" service to consumers is also an important factor for the meat and poultry category, which once again reflect consumers' desire for convenience. The positive and significant coefficients for "internet", "mail order" and "export" suggest that consumers were searching areas that were further from home. The results for the variables "debit/credit card" (-0.839) and "WIC" (-1.108) were consistent with other

business types and product categories. However, given that "internet", "mail order" and "export" are positive, a positive coefficient would have been expected for the debit/credit card payment option. Based on profile data, most producers did not list these options suggesting these methods of payment were implied for producers offering internet sales.

Although meat and poultry producers offer a variety of product form, results show that MarketMaker consumers were more likely interested in the product forms "live" and "vacuum packed". Offering "live" (0.196) animals significantly increase the likelihood of increased consumer views on a meat producer's profile. This could suggest that meat and poultry profiles were being viewed by other businesses who were demanding larger volumes, such as butcher shops. The product form "vacuum packed" (0.218) was found to increase the number of likely views a meat and poultry producer receives on his/her profile. This packaging method greatly extends the storage life of meat, up to 12 weeks depending on the type of meat. Contrary to what was expected, providing "fresh" (-0.129) meat and poultry products decreases the likelihood of receiving increased profile views. As indicated above, the product attribute "fresh" by consumers could be implied since they perceive local to be fresh. From the list of markets served, "local" (0.339) was the only important factor that is likely to influence consumers to view a meat and poultry profile. The positive coefficient of "local" validates the finding and explanation for the attribute "fresh".

Fruit & Nuts

A total of 3,254 fruits and nuts producers were used in this section to determine the impact of different fruit and nut profile attributes on consumer views. Estimation results for fruits and nuts producers are presented in Table 12. Results for the "first stage" variables were

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found to be consistent with other business types and product categories. Excepting "Facebook", all "first stage" variables were positive and statistically significant at the one percent level. Overall, "business spotlight" (2.243) was the most influential factor on consumer views. All explanations for "first time" views for the fruits and nuts category were similar to those of other business types above. Both "common" and "niche" products are important to consumers. The variables, "Common" (0.393) and "niche" (0.229) positively influence the likelihood of consumers' views on a fruit and nut producer profile. This implies consumers were not only looking the typical fruits and nuts but also searching for products that were supplied by very few producers. Some of these "niche" products include papaya, peanuts, tangelo, tangerines, oranges, grapefruits, and walnuts.

"Farmers market" (0.237) was found to be the only direct marketing channel that is likely to positively influence the number of views on a fruit and nuts producer profile. Farmers market is an important marketing channel to producers as it provides them the opportunity to form relationships with consumers, receive feedbacks on products and more importantly receive a premium price for their products. "Farmers market" has been found to be positive across business types indicating consumers' interest in this marketing channel. Similar to previous product categories, on-farm sales (-0.081) is more likely to negatively influence consumers' views on fruits and nuts producer profiles. As stated previously, consumers who are searching for on-farm sales generally revisit farms after forming relationships with farmers instead of revisiting MarketMaker profiles. Customer relationships established with producers greatly understate the impact of MarketMaker. Other methods of sale found to increase the likelihood of consumer's views were "mail order" (0.229), "retail" (0.131), and "wholesale" (0.275). Similar to other product categories, offering customers the option of paying with a "debit/credit card" (-

0.322) negatively influence the likelihood of consumer views. As was found with meat and poultry producers, fruits and nuts producers who offer consumers the option to order by mail did not list "debit/credit card" on their profiles as this method of payment would be implied.

From the list of product form offered by producers, only cider (0.198) was found to positively influences the likelihood of consumers' views. Other product forms that were statistically significant, "wine" (-0.655) and "sauces" (-0.211), were found to have a negative impact. The negative coefficient estimate for wine could be a result of having the business category, winery, in the MarketMaker database. Therefore, consumers would search the winery business category for this product instead of the fruit and nuts product category. All markets served were found to be statistically significant. As expected, "local" (0.251) was found to positively influence the likely of increased consumer views. Selling to regional markets was found to be positive (0.444) indicating consumers were more likely searching for fruits and nuts that were not available in their states. This could also suggest consumers were looking for "niche" products native to other states. The positive and significant estimate for regional markets is consistent with that of the method of sale, "mail order". Serving markets outside of the U.S. however was found to have a negative impact on the number of views.

Grains

Estimation results for the product category, grains, are presented in Table 13. Results of "first stage" variables continue to be consistent among business types. The product category grains, was the only category that had all "first stage" variables statistically significantly, as well as both social networks. All "first stage" variables, excepting "Facebook", were found to likely influence consumers' first visit to a grain producer's profile. Similar to other business types and

product categories, "affiliations" and "business spotlight" were found to be most influential on first time views. From the grains category, "affiliation" (1.014) and "business spotlight" (2.323) were found to be positive and statistically significant at the one percent level. Supplying both "common" (0.355) and "niche" (0.132) products were also found to be important to consumers. Some of the "niche" grain products that are listed by farmers on MarketMaker are flaxseed, millet, mustard, rice, and wheat. Consumer demand for both categories has been consistent across business and product types.

All methods of sale were found to be statistically significant, except "internet". All direct marketing channels were found to be statistically significant at the one percent level. "Farmers market" (0.199) was found to increase the likelihood of consumers' views on grain producers' profiles. Farmers market is one of the most desired direct marketing channels by consumers, evident from results across product categories. Selling at a roadside stand (0.094) was also more likely to influence the number of consumer views on a grain producer profile. Roadside stand was found to only impact the number of views on producer profiles from the vegetable and grains product categories. On-farm-sales (-0.160) is consistently negative across product categories. Other methods of sale likely influencing consumers' views are "delivery" (0.193), "mail order" (0.367), "retail" (0.124), "wholesale" (0.231), and "export" (0.433). Majority of grains on MarketMaker are classified as "niche" indicating only a small percentage of producers offer these products. Therefore, some consumers have to search outside their states in order to find grain products. This is consistent with the positive estimate of ordering by mail. "Debit/credit card" (-0.399) and "WIC" (-0.372), were found to decrease the likelihood of consumer views on a grain profile, similar to results of other product categories. From the product forms evaluated, processed (0.194) and "fresh" (0.057) were the only ones found to

more likely influence the number of consumers' views. Whole grain (-0.3371) was the only

other product form that was statistically significant, however, whole grain was found to be

negative.

Dairy

Estimation results for the dairy product category are presented in Table 14. The dairy

category had the fewest producers (509) in the database at the time of this study. Results show

that among the "first stage" variables, "affiliation" (0.498) and "business spotlight" (1.842) were

the only two variables that were likely to impact on the number of consumer views. Dairy was

the only product category where the number of views on a profile was not impacted by at least

one of the social media network, "Facebook" or "twitter", used in the study. This was also the

only product category where "website" was found to be statistically insignificant. "Time" (-

0.008) was found to be negative. Because there are very few dairy producers in the database,

consumers can quickly become familiar with them and their products eliminating the need to

revisit their MarketMaker profiles after first visit. The dairy products listed in the MarketMaker

database include milk, cheese, yogurt, butter, and ice cream and are mainly classified as "niche".

The variable "Niche" (0.453) was found to be positive and statistically significant indicating

consumer demand for these products. On the other hand, the variable "common" was found to

be statistically insignificant which could be a result of the small percentage of "common"

products in the database.

Farmer's market (0.343) was the only direct marketing channel that was found be more

likely to have a positive impact on the number of views. As is consistent among all business

types and product category, on-farm-sales (-0.532) was found to be negative therefore reducing

the likelihood of consumer profile views. "Delivery" (0.329) was the only other method of sale that was statistically significant and dairy producers can benefit from providing this service to consumers who are seeking its convenience. Also consistent with other product categories is the negative impact of "debit and credit card" (-1.288) payment options. From the list of dairy product forms evaluated, "bottled" (1.082) was the only one found to likely influence consumer views on a dairy profile. This could mean that among the dairy products offered, consumers were demanding milk the most. Serving the "national" (1.014) market was the only market served that was found to be statistically significant. Similar to grains, there was a higher percentage of "niche" products in the dairy category than "common" products which would result in consumers searching across states for these products.

States' Impact

Because of the limited number of observations for these states, Alabama, Arkansas, Texas, Wyoming, and the District of Columbia could not be evaluated separately. The remaining 15 states were analyzed to determine the impact of the "first stage" variables, "time", "common" and "niche" products, "direct marketing", and "WIC" on consumer views in these states. Not all states were found to have affiliations and the "WIC" program. States without affiliations were mainly related to political issues between the states' Department of Agriculture and universities promoting MarketMaker. Many states' Department of Agriculture perceives MarketMaker as their competition as opposed to collaborators with similar objectives intended to assist producers in the state. Estimation results for the states are presented in Table 15. The impact of social networks and the type of network ("Facebook" and "twitter") varies across states. Results show that only three states (Florida, Illinois, and Mississippi) had at least one social network positively influencing consumer views on a business profile in each of those

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states. The number of consumer views on business profiles in Florida (0.493) and Mississippi (1.353) are more likely influenced by the social network, "Facebook" while business profiles in Illinois (0.855) by "twitter". Other significant "Facebook" and "twitter" impacts were found to be negative. Georgia (-0.465), Nebraska (-3.383), New York (-0.698), and Ohio (-0.655) showed that the likelihood of consumer views on a profile was negatively impacted by "Facebook". While, Georgia (-1.297), Indiana (-1.296), Michigan (-0.809), Mississippi (-1.414), and South Carolina (-0.972) showed profile views of businesses utilizing "twitter" were more likely to be negatively impacted. This implies that Florida, Illinois and Mississippi businesses would likely benefit most from social networks. The impact of "website" on a profile views also varies by states. Results show that having a website would more likely have a positive and significant impact on a business's profile in nine states. Producers in Colorado (0.178), Georgia (0.383), Illinois (0.603), Indiana (0.149), Iowa (0.307), Mississippi (0.365), New York (0.237) and South Carolina (0.688) more likely have an increase in the number of consumer views influenced by having a website. Florida (-0.251) was the only state where consumer views were negatively impacted by business websites, despite the fact that approximately half (51%) the producers in the state have a business website. "Website" was not found to have a significant impact on profile views in any other states evaluated.

From the list of states evaluated, eight states had no state or farm affiliations listed, primarily due to political reasons. These states were Georgia, Illinois, Indiana, Kentucky, Louisiana, Mississippi, Nebraska, and New York. "Affiliation" was found to be positive and significant in five of the remaining states. Results show that being associated with state and farm programs more likely positively and significantly impact the number of business profile views in Colorado (1.543), Michigan (0.588), Ohio (1.513), Pennsylvania (1.051), and South Carolina

(0.650). "Affiliations" in Florida and Iowa had no significant influence on consumers view. As expected, business profile views in all states were positively impacted by the "business spotlight" feature on MarketMaker. "Business spotlight" was found to be the most likely factor influencing consumers' view on MarketMaker profiles, in all models estimated in the study. The variable "time" was evaluated to determine its impact on the number of consumer views on a MarketMaker profile across different states. Based on the "first stage" model, including all states, "time" was positive and significant indicating the longer profiles have been on MarketMaker, the more views they likely received. However, when states were evaluated separately, the effect of the "time" variable varies across states. "Time" was found to positively influence the number of consumer views on businesses' profiles in Colorado (0.051), Florida (0.089), Louisiana (0.044), Michigan (0.030), Mississippi (0.041), Pennsylvania (0.136), and South Carolina (0.009), consistent with the overall model. Contrary to findings from the "first stage" model, the number of business profile views were negatively influenced by the length of time on MarketMaker in Georgia (-0.016), Kentucky (-0.008), Nebraska (-0.025), and New York (-0.054). "Time" was found to be insignificant for all other states.

It was also important to determine what products consumers in specific states were searching for. Therefore, the variables "common" and "niche" were evaluated for each state. It was found that both product groups were important to consumers for six of the fifteen states. Consumers in Colorado (0.309 and 0.206), Florida (0.245 and 0.511), Illinois (0.187 and 0.172), Iowa (0.699 and 0.212), Louisiana (0.462 and 0.592), and New York (0.244 and 0.140) were more likely searching for both the typical food products ("common") as well as products that are supplied by only a few producers in a state ("niche"), respectively. Coefficient estimates, based on magnitudes, indicated that consumers in Iowa were likely demanding more "common"

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products. This could be a result of the significantly higher number of producers supplying "common" products as well as majority of producers supplying "common" products were also the ones supplying "niche" products. Indiana (0.607) was the only other state where consumers were only searching for "common" products. Interestingly, consumers in five states were searching for more "niche" than "common" products. The results for "niche" in these states were positive and significant, while that of "common" was either negative or statistically insignificant. Businesses in Georgia (0.247), Kentucky (0.389), Michigan (0.263), Nebraska (0.113), and South Carolina (0.292) supplying "niche" products can more likely expect an increase in the number of consumer views on their MarketMaker profiles. There were no negative impact of "niche" products on producer profiles in any states; however there were some states where this variable did not have an impact.

Several direct marketing channels, farmers market, CSA, roadside stand, and on-farm sales were combined to create the variable, "direct marketing". Contrary to what was expected, "direct marketing" channels had no significant impact on the number of producer profile views for majority of states. Surprisingly, Colorado (0.331) and Indiana (0.359) were the only two states that were found to have a positive and significant "direct marketing" impact. Contrary to what was expected, "direct marketing" in states such as Iowa (-0.331), Mississippi (-0.398), and South Carolina (-0.819) were found to have a negative impact on the number of views on producer profiles. This could suggest that direct marketing is being promoted aggressively outside of MarketMaker, reducing consumers' need to use the database to find these marketing channels. It is important to note that consumers were searching for direct marketing channels based on previous results, however different marketing channels are specific to not only consumers but the states they live in, therefore aggregating all channels could minimize its

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effect. Based on results from previous models in this study, it is expected that accepting the

"WIC" program would negatively impact the likelihood of consumer views on a business profile.

It was found that "WIC" in majority of states was found to be statistically insignificant. This

could be a result of the limited number of producers accepting this food program in these states.

Indiana (-0.869), Kentucky (-0.601), and New York (-3.431) were the only states found to have a

negative "WIC" impact.

Conclusions

The MarketMaker database has become the most extensive collection of food marketing

related data in the U.S. MarketMaker connects producers directly with consumers by

eliminating the middleman, leaving producers with a larger share of the food dollar.

MarketMaker plays a direct role in meeting consumers' demand for fresher, healthier foods. One

of the objectives of creating this database was to provide producers greater access to both local

and regional markets hence increasing revenues. However, it is difficult to identify

MarketMaker's impact on producer profitability in sales dollars. One of the alternatives of

measuring its impact is consumer traffic to a business's MarketMaker profile. Based on results

from the study several factors increase the likelihood of consumers' viewing a profile. Some of

the most important found were factors that influence consumers' first view of a profile. These

include social networks ("Facebook" and "twitter"), business websites, state "affiliations" and

"business spotlight". Of these factors, state "affiliations" and "business spotlight" were

consistently positive and significant across business types. Profiles with state affiliated programs

were more likely to see increase consumer traffic. This was an important finding that

MarketMaker without state support can bring to the attention of their Department of Agriculture.

This finding shows the importance of state programs to consumers. State programs are designed

to not only benefit local producers/business but also the state at large. Collaborating with MarketMaker would increase consumer awareness of these programs as well as the importance of them. In the long run the combined efforts of both the states' Department of Agriculture and MarketMaker will maximize the benefits of everyone involved. The most import factor influencing consumer views on a MarketMaker profile is the "business spotlight" feature of each state's website. Businesses that are seeking to maximize their time on MarketMaker are challenged to utilize this feature.

Results vary by product categories for most factors, however there were some common findings across all types. Producer profiles with "farmers market" listed as a marketing channel were more likely to see increased consumer traffic. This was a consistent finding across product category which was supported by the fact that the number of farmers markets has been consistently increasing in the country. Farmers markets are important to consumers because of the convenience of finding a variety of products in one location. Another important method of sale to consumers is "delivery", and profiles with this factor are more likely to experience increase consumer traffic. Similar to the farmers market finding, consumers' demand for "delivery" indicate consumers demand for convenience.   Although product forms differ across categories, results show consumers were more interested in products that were packaged and require little preparation before cooking or consumption. Across all product category "debit/credit cards" and "WIC" programs reduce the likelihood of consumer visiting a profile. This is a result of the added cost to consumers associated with these factors. Interestingly, the attributes "fresh" and "local" were found to be insignificant for most product categories. This could suggest that consumers expect these attributes to be present given the nature of the database.

Overall results suggest businesses with completed profiles were more likely to attract consumers to their profiles. Businesses that want to take full advantage of the database are encouraged to complete profiles by filling in all applicable information. Businesses should dismiss the notion that consumers will make the extra effort to contact them to find out what they provide, especially with the increase level of competition in the database. MarketMaker administrators can use this information to approach potential businesses about utilizing the database by outlining its benefits to other businesses. This is important as businesses are more motivated by evidence of success or potential success before participating in a program. Findings from the study can also be used to persuade more states to participate in this program. Results from individual states can be used to show what factors are essential to consumers and hence, what factors need to be promoted. Results also prove to non-participating states that MarketMaker is a viable tool that is increasing businesses' revenues across the country.

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Appendix

"First Stage":

$$logNumber\ of\ Views$$

$$= \alpha + \beta_1 facebook + \beta_2 twitter + \beta_3 website + \beta_4 affiliation$$

$$+ \beta_5 Business\ spotlight + \beta_6 Time + \varepsilon$$

Agritourism business type:

$$logNumber\ of\ Views$$

$$= \alpha + \beta_1 facebook + \beta_2 twitter + \beta_3 website + \beta_4 affiliation$$

$$+ \beta_5 Business\ spotlight + \beta_6 Time + \beta_7 Accomodation + \beta_8 EventSpace$$

$$+ \beta_9 Handicap\ Access + \beta_{10} Cash + \beta_{11} OtherPayment + \beta_{12} Discount$$

$$+ \beta_{13} Deposits + \beta_{14} Education + \beta_{15} NonEducation + \beta_{16} FoodService$$

$$+ \beta_{17} Craft + \beta_{18} Months\ Open + \beta_{19} Fishery + \beta_{20} Attractions$$

$$+ \beta_{21} Amenities + \varepsilon$$

Farmers Market business type:

$$logNumber\ of\ Views$$

$$= \alpha + \beta_1 facebook + \beta_2 twitter + \beta_3 website + \beta_4 affiliation$$

$$+ \beta_5 Business\ spotlight + \beta_6 Time + \beta_7 Sponsor + \beta_8 Methods\ of\ sale$$

$$+ \beta_9 Months\ Open + \varepsilon$$

Fishery business type:

$$logNumber\ of\ Views$$

$$= \alpha + \beta_1 facebook + \beta_2 twitter + \beta_3 website + \beta_4 affiliation$$

$$+ \beta_5 Business\ spotlight + \beta_6 Time + \beta_7 Common + \beta_8 Card + \beta_9 Delivery$$

$$+ \beta_{10} Farmers\ Market + \beta_{11} Roadside\ Stand + \beta_{12} SIM + \beta_{13} Dockside$$

$$+ \beta_{14} MOR + \beta_{15} OnFarm\ Sales + \beta_{16} Storefront + \beta_{17} Wholesale$$

$$+ \beta_{18} School + \beta_{19} EBT + \beta_{20} Festivals + \beta_{21} Bushels + \beta_{22} Canned$$

$$+ \beta_{23} Dried + \beta_{24} Fillets + \beta_{25} Fish\ Skin + \beta_{26} Fresh + \beta_{27} Frozen$$

$$+ \beta_{28} Live + \beta_{29} Deveined + \beta_{30} Prepackaged + \beta_{31} Smoked + \beta_{32} Salted$$

$$+ \beta_{33} Vacuum\ Packaged + \beta_{34} Salads + \beta_{35} Value\ Added + \beta_{36} Local$$

$$+ \beta_{37} National + \beta_{38} International + \varepsilon$$

Farmer/Rancher business type (vegetable product category):

$$logNumber\ of\ Views$$

$$= \alpha + \beta_1 facebook + \beta_2 twitter + \beta_3 website + \beta_4 affiliation$$

$$+ \beta_5 Business\ spotlight + \beta_6 Time + \beta_7 Common + \beta_8 Niche + \beta_9 CSA$$

$$+ \beta_{10} Delivery + \beta_{11} Internet + \beta_{12} Mail\ Order + \beta_{13} OnFarm\ Sales$$

$$+ \beta_{14} Export + \beta_{15} Retail + \beta_{16} Roadside\ Stand + \beta_{17} Wholesale$$

$$+ \beta_{18} Card + \beta_{19} WIC + \beta_{20} Bottled + \beta_{21} Milled + \beta_{22} Dried + \beta_{23} Fresh$$

$$+ \beta_{24} Frozen + \beta_{25} Vacuum\ Packaged + \beta_{26} Plants + \beta_{27} Extract$$

$$+ \beta_{28} Condiments + \beta_{29} Salsa + \beta_{30} Sauces + \beta_{31} Pickled + \beta_{32} IQF$$

$$+ \beta_{33} Local + \beta_{34} National + \beta_{35} International + \varepsilon$$

Farmer/Rancher business type (Fruit and Nut product category):

$logNumber\ of\ Views$

$$= \alpha + \beta_1 facebook + \beta_2 twitter + \beta_3 website + \beta_4 affiliation$$

$$+ \beta_5 Business\ spotlight + \beta_6 Time + \beta_7 Common + \beta_8 Niche + \beta_9 Delivery$$

$$+ \beta_{10} Farmers\ Market + \beta_{11} Internet + \beta_{12} Mail\ Order$$

$$+ \beta_{13} OnFarm\ Sales + \beta_{14} Export + \beta_{15} Retail + \beta_{16} Roadside\ Stand$$

$$+ \beta_{17} Wholesale + \beta_{18} Card + \beta_{19} WIC + \beta_{20} Jam + \beta_{21} Fresh + \beta_{22} Wine$$

$$+ \beta_{23} Frozen + \beta_{24} Cider + \beta_{25} Sauces + \beta_{26} Juice + \beta_{27} IQF + \beta_{28} Local$$

$$+ \beta_{29} National + \beta_{30} International + \varepsilon$$

Farmer/Rancher business type (Meat product category):

$logNumber\ of\ Views$

$$= \alpha + \beta_1 facebook + \beta_2 twitter + \beta_3 website + \beta_4 affiliation$$

$$+ \beta_5 Business\ spotlight + \beta_6 Time + \beta_7 Common + \beta_8 Niche + \beta_9 Delivery$$

$$+ \beta_{10} Farmers\ Market + \beta_{11} Internet + \beta_{12} Mail\ Order + \beta_{13} Export$$

$$+ \beta_{14} Retail + \beta_{15} Wholesale + \beta_{16} Card + \beta_{17} WIC + \beta_{18} Cured$$

$$+ \beta_{19} Dried + \beta_{20} Fresh + \beta_{21} Frozen + \beta_{22} Lard + \beta_{23} Live + \beta_{24} Smoked$$

$$+ \beta_{25} Vacuum\ Packaged + \beta_{26} Local + \beta_{27} National + \beta_{28} International$$

$$+ \varepsilon$$

Farmer/Rancher business type (Grains product category):

$logNumber\ of\ Views$

$$= \alpha + \beta_1 facebook + \beta_2 twitter + \beta_3 website + \beta_4 affiliation$$

$$+ \beta_5 Business\ spotlight + \beta_6 Time + \beta_7 Common + \beta_8 Niche + \beta_9 Delivery$$

$$+ \beta_{10} Farmers\ Market + \beta_{11} Internet + \beta_{12} Mail\ Order$$

$$+ \beta_{13} OnFarm\ Sales + \beta_{14} Export + \beta_{15} Retail + \beta_{16} Roadside\ Stand$$

$$+ \beta_{17} Wholesale + \beta_{18} Card + \beta_{19} WIC + \beta_{20} Processed + \beta_{21} Milled$$

$$+ \beta_{22} Fresh + \beta_{23} Whole\ Grain + \beta_{24} Bulked\ Dry + \beta_{25} Flour + \beta_{26} Local$$

$$+ \beta_{27} National + \beta_{28} International + \varepsilon$$

Farmer/Rancher business type (Dairy product category):

$logNumber\ of\ Views$

$$= \alpha + \beta_1 facebook + \beta_2 twitter + \beta_3 website + \beta_4 affiliation$$

$$+ \beta_5 Business\ spotlight + \beta_6 Time + \beta_7 Common + \beta_8 Niche + \beta_9 Delivery$$

$$+ \beta_{10} Farmers\ Market + \beta_{11} Internet + \beta_{12} Mail\ Order$$

$$+ \beta_{13} OnFarm\ Sales + \beta_{14} Export + \beta_{15} Retail + \beta_{16} Roadside\ Stand$$

$$+ \beta_{17} Wholesale + \beta_{18} Card + \beta_{19} WIC + \beta_{20} Bottled + \beta_{21} Fresh$$

$$+ \beta_{22} Pasteurized + \beta_{23} Frozen + \beta_{24} Aseptic\ Packaging$$

$$+ \beta_{25} Fermented + \beta_{26} Raw + \beta_{27} Local + \beta_{28} National + \varepsilon$$

States' Model (same for all states):

$logNumber\ of\ Views$

$$= \alpha + \beta_1 facebook + \beta_2 twitter + \beta_3 website + \beta_4 affiliation$$

$$+ \beta_5 Business\ spotlight + \beta_6 Time + \beta_7 Common + \beta_8 Niche$$

$$+ \beta_9 Direct\ Marketing + \beta_{10} WIC + \varepsilon$$

Table 1: Mean and Variance for Estimation Models

	(1)*	(2)	(3)	(4)	(5)
Mean	50.39	62.44	49.33	46.97	53.35
Variance	231191.00	31961.88	21644.82	19018.08	29140.46
Variance/Mean	4588.00	511.87	438.79	404.86	546.24
	(6)	(7)	(8)	(9)	
Mean	41.65	27.60	62.15	41.00	
Variance	34045.02	6467.94	88416.38	18553.06	
Variance/Mean	817.41	234.38	1422.52	452.51	

*Number in parentheses represents each model estimated in the study.
Product categories (vegetable, meat, grains, fruits and nuts, and dairy),
agritourism, farmers market, fishery, and "first stage" models, respectively.

Table 2: MarketMaker Business Type Breakdown

Business Types[12]	Number of Businesses[a]
Agritourism	2,069
Eating and Drinking Places	359,894
Farmer/Rancher	8,207
Farmers Market	2,942
Fishery	299
Food Retailer	170,971
Processor	28,077
Wholesaler	27,954
Winery	691
Buyer	179

Note: [a] as of July 25, 2012

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[12] It is important to note that since each business can claim more than one business type, this does not necessarily reflect the total number of businesses in the MarketMaker database; it simply shows the breakdown of the business types

Table 3: Descriptive Statistics for Profile Views and Time on MarketMaker

Views

	N	Mean	Std. Dev.	Min	Max
Farmer/Rancher	8196	50.09	154.49	0	4886
Fishery	299	62.15	297.35	1	4886
Agritourism	1896	41.65	184.51	0	4886
Farmers Market	2944	27.60	80.42	0	2209

Time

	N	Mean	Std. Dev.	Min	Max
Farmer/Rancher	8196	44.99	20.49	0.50	68.60
Fishery	299	38.49	22.44	0.63	68.60
Agritourism	1896	25.40	21.84	0.63	68.60
Farmers Market	2944	38.87	19.50	0.63	68.60

Table 4: Percentage of Businesses with "First Stage" Variables

	Farmer/Rancher	Fishery	Agritourism	Farmers Market
Website	34.3%	27.61%	41.48%	44.25%
Affiliation	13.76%	7.41%	10.63%	7.35%
Business Spotlight	3.5%	3.37%	2.8%	1.29%
Twitter	1.29%	1.68%	2.28%	1.94%
Facebook	5.83%	6.06%	8.52%	7.01%
Common	80.91%	85.52%	N/A	N/A

Table 5: Top 10 States with Highest Number of Views

	No. of Views
Colorado	71,856
Illinois	44,550
New York	32,573
Indiana	32,538
Michigan	31,323
Kentucky	31,103
Iowa	20,755
Mississippi	18,828
Louisiana	17,055
Florida	16,899

Table 6: Negative Binomial Estimation Results for "First Stage" Variables

Variables	Estimate
Intercept	2.975***
	(0.014)
Facebook	0.096**
	(0.048)
Twitter	0.084
	(0.093)
Website	0.425***
	(0.023)
Affiliation	1.008***
	(0.033)
Business Spotlight	2.800***
	(0.065)
α	1.363***
No. of Obs	12469

***, **signifies 1% and 5% levels, respectively.

Table 7: Negative Binomial Estimation Results for Agritourism Businesses

	Estimate		**Estimate**
Intercept	0.927***	Checks/cards	0.274*
	(0.175)		(0.165)
Facebook	0.250**	Discount	0.486***
	(0.118)		(0.117)
Twitter	0.108	Deposits	-0.429*
	(0.209)		(0.248)
Website	0.520***	Education	0.071
	(0.074)		(0.119)
Affiliation	1.429***	Non-Education	-0.072
	(0.095)		(0.121)
Spotlight	2.497***	Food Service	-0.055
	(0.166)		(0.093)
Time	0.020***	Craft/Décor	0.051
	(0.002)		(0.092)
Accommodation	0.257***	Open	0.662***
	(0.090)		(0.083)
Event Space	0.127	Fishery	-1.260***
	(0.114)		(0.122)
Handicap Access	0.198**	Attractions	0.851***
	(0.093)		(0.125)
Cash	0.050	Amenities	0.232**
	(0.278)		(0.105)
α	1.285***		
No. of Obs	1896		
Log Likelihood	-5868		
AIC	11750.65		

***, **,* signifies 1%, 5% and 10% levels, respectively.

Table 8: Negative Binomial Estimation Results for Fishery Businesses

	Estimate		Estimate
Intercept	3.154***	Festivals	0.357
	(0.270)		(0.554)
Facebook	-0.264	*Product Form*	
	(0.281)		
Twitter	0.169	Bushels	0.330
	(0.476)		(0.320)
Website	0.495***	Canned	0.333
	(0.128)		(1.218)
Affiliation	0.739***	Dried	-0.549
	(0.220)		(1.094)
Spotlight	1.587***	Fillets	0.766**
	(0.310)		(0.335)
Time	-0.010***	Fish Skin	-1.969**
	(0.004)		(0.917)
Common	0.658***	Fresh	0.219
	(0.154)		(0.164)
Card	-1.016***	Frozen	-0.286
	(0.311)		(0.243)
Methods of Sale		Live	0.098
			(0.223)
Delivery	0.909***	Deveined	-0.731**
	(0.182)		(0.349)
Farmers Market	0.035	Prepack	-0.774
	(0.289)		(0.504)
Roadside	-0.043	Smoked	-0.954**
	(0.375)		(0.448)
Ship/Internet/Mail	-0.539***	Salted	0.583
	(0.188)		(1.139)
Dockside	-0.038	Vacuum	-0.133
	(0.193)		(0.640)
Minimum order	0.389	Salads	0.611
Required	(0.325)		(0.822)
OnFarm	0.263	Value added	2.550***
	(0.181)		(0.998)
Storefront	-0.203	*Markets Serve*	
	(0.209)		
Wholesale	-0.108	Local	-0.478***
	(0.138)		(0.148)
School	-1.263	National	0.348
	(0.958)		(0.241)
EBT	1.233*	International	-1.200**
	(0.695)		(0.622)
α	0.601***		

Table 8 Cont'd: Negative Binomial Estimation Results for Fishery Businesses

No. of Obs	297
Log Likelihood	-1328
AIC	2713.11

***, **,* signifies 1%, 5% and 10% levels, respectively.

Table 9: Negative Binomial Estimation Results for Farmers Markets

	Estimate
Intercept	1.776***
	(0.057)
Facebook	0.157*
	(0.086)
Twitter	0.490***
	(0.144)
Website	0.149***
	(0.038)
Affiliation	1.078***
	(0.071)
Spotlight	2.878***
	(0.155)
Time	0.020***
	(0.001)
Sponsor	0.495***
	(0.038)
Methods of Sale	-0.150*
	(0.085)
Months Open	0.539***
	(0.060)
α	0.887***
No. of Obs	2945
Log Likelihood	-11894
AIC	23776.29

***, * signifies 1% and 10% levels, respectively.

Table 10: Negative Binomial Estimation Results for Vegetable Producers

	Estimate		Estimate
Intercept	2.696***	Debit/credit card	-0.482***
	(0.092)		(0.112)
Facebook	-0.078	WIC	-0.290*
	(0.068)		(0.156)
Twitter	0.231*	*Product Form*	
	(0.130)		
Website	0.258***	Bottled	0.197***
	(0.033)		(0.050)
Affiliation	1.056***	Milled	0.194
	(0.053)		(0.179)
Spotlight	2.406***	Dried	-0.132***
	(0.076)		(0.049)
Time	-0.004***	Fresh	0.021
	(0.001)		(0.031)
Common	0.452***	Frozen	0.130**
	(0.068)		(0.063)
Niche	0.093***	Vacuum Pack	0.264***
	(0.032)		(0.102)
Methods of Sale		Plants	0.196***
			(0.077)
CSA	0.238***	Extract	-0.177
	(0.049)		(0.261)
Delivery	0.122***	Condiments	-0.475**
	(0.041)		(0.213)
Farmers Market	0.146***	Salsa	0.136
	(0.030)		(0.132)
Internet	0.052	Sauces	-0.150
	(0.053)		(0.169)
Mail Order	0.372***	Pickled	0.013
	(0.062)		(0.180)
On Farm	-0.073**	IQF	-0.203
	(0.032)		(0.405)
Export	0.284***	*Markets Serve*	
	(0.085)		
Retail	0.132***	Local	0.049
	(0.047)		(0.045)
Roadside	0.057*	National	0.208**
	(0.033)		(0.103)
Wholesale	0.270***	International	-0.331
	(0.033)		(0.257
α	0.837***		
No. of Obs	4588		
Log Likelihood	-20597		

AIC	41270.69

Table 11: Negative Binomial Estimation Results for Meat Producers

	Estimate		Estimate
Intercept	2.505***	Wholesale	0.033
	(0.125)		(0.051)
Facebook	-0.293***	Debit/credit	-0.839***
	(0.105)	card	(0.175)
Twitter	-0.190	WIC	-1.108***
	(0.182)		(0.338)
Website	0.209***	*Product Form*	
	(0.049)		
Affiliation	0.885***	Cured	-0.145
	(0.072)		(0.147)
Spotlight	2.522***	Dried	0.108
	(0.099)		(0.086)
Time	0.004***	Fresh	-0.130***
	(0.002)		(0.049)
Common	0.243***	Frozen	0.049
	(0.075)		(0.052)
Niche	0.184***	Lard	-0.169
	(0.050)		(0.188)
Methods of Sale		Live	0.196***
			(0.056)
Delivery	0.124**	Smoked	0.034
	(0.054)		(0.114)
Farmers Market	0.232***	Vacuum	0.218***
	(0.049)	Packed	(0.070)
Internet	0.143**	*Markets Serve*	
	(0.064)		
Mail Order	0.185**	Local	0.340***
	(0.079)		(0.067)
Export	0.289**	National	-0.161
	(0.123)		(0.140)
Retail	0.325***	International	0.202
	(0.076)		(0.351)
α	0.978***		
No. of Obs	2198		
Log Likelihood	-10185		
AIC	20430.88		

***, ** signifies 1% and 5% levels, respectively

Table 12: Negative Binomial Estimation Results for Fruits and Nuts Producers

	Estimate		Estimate
Intercept	2.676***	Roadside	0.032
	(0.119)		(0.039)
Facebook	-0.026	Wholesale	0.275***
	(0.081)		(0.040)
Twitter	0.703***	Debit/credit card	-0.322**
	(0.187)		(0.144)
Website	0.178***	WIC	-0.301
	(0.039)		(0.196)
Affiliation	0.641***	*Product Form*	
	(0.060)		
Spotlight	2.243***	Jam/Jelly	0.062
	(0.099)		(0.057)
Time	-0.002	Fresh	-0.004
	(0.001)		(0.042)
Common	0.393***	Wine	-0.655***
	(0.105)		(0.100)
Niche	0.229***	Frozen	0.110
	(0.036)		(0.070)
Methods of Sale		Cider	0.198***
			(0.073)
Delivery	0.081	Sauces	-0.211*
	(0.052)		(0.129)
Farmers Market	0.237***	Juice	0.069
	(0.036)		(0.094)
Internet	0.009	IQF	0.197
	(0.071)		(0.274)
Mail Order	0.230***	*Markets Serve*	
	(0.082)		
On Farm	-0.081**	Local	0.251***
	(0.038)		(0.055)
Export	-0.027	National	0.444***
	(0.108)		(0.135)
Retail	0.131***	International	-0.723**
	(0.054)		(0.313)
α	0.863***		
No. of Obs	3254		
Log Likelihood	-14704		
AIC	29471.81		

***, ** signifies 1% and 5% levels, respectively.

Table 13: Negative Binomial Estimation Results for Grain Producers

	Estimate		Estimate
Intercept	3.086***	Retail	0.124***
	(0.132)		(0.038)
Facebook	-0.138***	Roadside	0.094***
	(0.055)		(0.025)
Twitter	0.611***	Wholesale	0.231***
	(0.118)		(0.027)
Website	0.291***	Debit/credit	-0.400***
	(0.027)	card	(0.093)
Affiliation	1.014***	WIC	-0.372***
	(0.048)		(0.120)
Spotlight	2.323***	*Product Form*	
	(0.066)		
Time	-0.009***	Processed	0.194***
	(0.001)		(0.050)
Common	0.355***	Milled	0.133
	(0.122)		(0.123)
Niche	0.132***	Fresh	0.057**
	(0.025)		(0.025)
Methods of Sale		Whole Grain	-0.337*
			(0.182)
Delivery	0.193***	Bulked dry	-0.176
	(0.034)		(0.147)
Farmers Market	0.199***	Flour	0.030
	(0.024)		(0.221)
Internet	0.057	*Markets Serve*	
	(0.046)		
Mail Order	0.367***	Local	-0.061
	(0.057)		(0.038)
On farm	-0.160***	National	0.073
	(0.026)		(0.119)
Export	0.433***	International	0.160
	(0.074)		(0.259)
α	0.758***		
No. of Obs	6119		
Log Likelihood	-27492		
AIC	55044.86		

***, **,* signifies 1%, 5% and 10% levels, respectively.

Table 14: Negative Binomial Estimation Results for Dairy Farmers

	Estimate		Estimate
Intercept	3.499***	Retail	0.236
	(0.294)		(0.151)
Facebook	0.211	Roadside	0.033
	(0.228)		(0.209)
Twitter	-0.510	Wholesale	0.115
	(0.382)		(0.145)
Website	0.048	Debit/credit	-1.288***
	(0.112)	card	(0.376)
Affiliation	0.498***	WIC	-0.681
	(0.170)		(0.611)
Spotlight	1.842***	*Product Form*	
	(0.256)		
Time	-0.007*	Bottled	1.081***
	(0.004)		(0.159)
Common	-0.110	Fresh	-0.326**
	(0.160)		(0.123)
Niche	0.453***	Past	-0.077
	(0.112)		(0.154)
Methods of Sale		Frozen	0.105
			(0.147)
Delivery	0.329**	Aseptic	0.422
	(0.160)	Packaging	(0.971)
Farmers Market	0.343***	Fermented	-1.370**
	(0.118)		(0.490)
Internet	0.226	Raw	0.031
	(0.189)		(0.147)
Mail Order	0.188	*Markets Serve*	
	(0.167)		
On Farm	-0.532***	Local	0.040
	(0.142)		(0.171)
Export	-0.069	National	1.014**
	(0.307)		(0.365)
α	0.859***		
No. of Obs	509		
Log Likelihood	-2138		
AIC	4335.09		

***, **,* signifies 1%, 5% and 10% levels, respectively.

Table 15: Negative Binomial Estimation Results for States' Impact

	N	Intercept	FB	Twit	Web	Affil	Spotlight	Time	Common	Niche	Direct Mkt	WIC	α
CO	572	1.208***	-0.154	-0.119	0.178***	1.543***	1.508***	0.051***	0.309***	0.206***	0.331***	-0.809	0.476***
		(0.166)	(0.120)	(0.160)	(0.062)	(0.066)	(0.143)	(0.004)	(0.064)	(0.067)	(0.074)	(0.516)	(0.028)
FL	237	1.499***	0.493***	-0.148	-0.251**	0.168	1.744***	0.089***	0.245*	0.511***	-0.036	-0.071	0.769***
		(0.251)	(0.156)	(0.298)	(0.126)	(0.209)	(0.183)	(0.008)	(0.149)	(0.127)	(0.169)	(0.662)	(0.067)
GA	502	3.962***	-0.465*	-1.297***	0.383***	-	1.730***	-0.016***	0.094	0.247***	-0.109	-	0.572***
		(0.193)	(0.249)	(0.443)	(0.079)	-	(0.279)	(0.004)	(0.122)	(0.073)	(0.149)	-	(0.035)
IL	1082	2.830***	-0.054	0.854***	0.603***	-	2.873***	0.000	0.187***	0.172***	0.052	-1.110	0.703***
		(0.162)	(0.118)	(0.269)	(0.058)	-	(0.174)	(0.002)	(0.073)	(0.057)	(0.109)	(0.923)	(0.029)
IN	361	2.619***	0.118	-1.296***	0.150**	-	2.463***	0.004	0.607***	0.114	0.359***	-0.869*	0.453***
		(0.199)	(0.243)	(0.475)	(0.078)	-	(0.135)	(0.003)	(0.122)	(0.075)	(0.129)	(0.526)	(0.033)
IA	409	3.326***	-0.200	-0.586	0.307***	-0.107	2.107***	-0.003	0.700***	0.212**	-0.331***	0.059	0.691***
		(0.126)	(0.224)	(0.395)	(0.097)	(0.317)	(0.243)	(0.002)	(0.129)	(0.092)	(0.123)	(0.301)	(0.046)
KY	452	3.529***	-0.220	-0.492	0.503***	-	3.103***	-0.008***	-0.249**	0.389***	0.131	-1.601***	0.541***
		(0.247)	(0.227)	(0.429)	(0.082)	-	(0.155)	(0.003)	(0.119)	(0.077)	(0.159)	(0.461)	(0.035)
LA	158	2.434***	0.211	0.240	-0.032	-	1.846***	0.044***	0.462***	0.592***	0.138	0.297	0.687***
		(0.382)	(0.259)	(0.472)	(0.207)	-	(0.221)	(0.014)	(0.155)	(0.139)	(0.213)	(0.883)	(0.072)
MI	415	2.571***	0.129	-0.809***	-0.127	0.488***	2.522***	0.030***	0.062	0.263***	-0.195	-0.613	0.543***
		(0.173)	(0.139)	(0.284)	(0.081)	(0.138)	(0.166)	(0.003)	(0.106)	(0.075)	(0.125)	(0.392)	(0.037)
MS	210	2.510***	1.353***	-1.414***	0.365**	-	1.506***	0.040***	0.363	0.189	-0.398*	0.055	0.896***
		(0.321)	(0.221)	(0.428)	(0.174)	-	(0.293)	(0.004)	(0.258)	(0.153)	(0.216)	(0.386)	(0.080)
NE	642	3.997***	-3.383***	0.924	-0.010	-	2.777***	-0.024***	0.046	0.113**	0.068	-	0.206***
		(0.212)	(0.516)	(0.802)	(0.059)	-	(0.336)	(0.003)	(0.053)	(0.049)	(0.068)	-	(0.015)
NY	1564	5.054***	-0.698**	-0.403	0.237***	-	3.640***	-0.054***	0.244***	0.140***	0.073	-3.430***	0.615***
		(0.200)	(0.308)	(0.981)	(0.055)	-	(0.218)	(0.003)	(0.059)	(0.044)	(0.112)	(0.630)	(0.023)
OH	459	3.511***	-0.655***	0.232	-0.058	1.513***	2.941***	-0.001	-0.284**	-0.058	0.197	0.086	0.646***
		(0.237)	(0.196)	(0.470)	(0.084)	(0.136)	(0.199)	(0.003)	(0.136)	(0.082)	(0.123)	(0.538)	(0.041)
PA	239	0.626***	-0.040	0.449	0.081	1.051***	1.814***	0.136***	-0.288*	-0.040	0.124	0.143	0.600***

		(0.237)	(0.188)	(0.328)	(0.119)	(0.128)	(0.259)	(0.008)	(0.161)	(0.112)	(0.116)	(0.349)	(0.056)
SC	387	3.442***	-0.358	-0.972**	0.687***	0.650***	3.035***	0.010*	-0.191	0.292***	-0.819***	0.835	0.575***
		(0.272)	(0.222)	(0.461)	(0.116)	(0.217)	(0.218)	(0.005)	(0.131)	(0.095)	(0.205)	(0.603)	(0.042)

***, **,* signifies 1%, 5% and 10% levels, respectively.

CONCLUSIONS

The food industry is a complex system made up of a variety of companies competing for the highest percentage of the food dollar. Given this level of competitiveness, businesses must select effective marketing channels to increase the number of consumers demanding their products. In order to do so, businesses need to understand consumer preferences and demands and the factors that are driving demand. The three essays in this dissertation sought to provide this pertinent information by analyzing the importance of various factors influencing the demand for food products both locally and internationally. The first essay analyzed restaurants' preferences for various local producers and product attributes in Alabama. Results from this essay revealed restaurants prefer products that are locally grown and are willing to pay a substantial percent for this attribute. Restaurants also prefer products in the form of fresh/whole as opposed to products that are processed. The indicated they were willing to pay a higher percentage for a profile containing this attribute. Price was also a major factor influencing restaurants' purchasing decisions. Results indicated that restaurants prefer paying the lowest possible cost, a cost below their current weekly cost. These findings suggest there is strong demand for local products by restaurants, and producers in the state can profit significantly from utilizing independently owned restaurants as a local marketing channel. Although there is a demand for local products, restaurants have specific demands that must be met by producers who want to capitalize on this market.

This study provides important information to producers that are not currently available to them, since there is no know study that evaluated restaurant preferences for different producer or product attribute in the state. Using findings from this study, producers can determine whether they are able to meet restaurants' preferences before they approach restaurants. Providing they are able to meet these demands and preferences, producers are encouraged to take note of the finding for the "price" attribute. Restaurants are searching for products at the lowest cost and producers must determine ahead of time whether their business would be more profitable using this marketing channel. Extension agents advising current and potential producers should make them aware of the particular food products that restaurants are searching for, and advise to adjust crops where feasible and profitable, if they desire to sell to restaurants. Finally, producers must effectively advertise their products as restaurants highlighted lack of knowledge of what is available as a major challenge for not purchasing locally.

The second essay analyzed the impact of the EU banana tariff-only regime on banana imports from Latin American and ACP countries. Specifically, the study analyzed the demand for source-specific bananas and their responsiveness to changes in prices as well as to total EU import demand. One of the most important own-price elasticity finding relates to Columbia. Demand from Columbian bananas was found to be elastic suggesting Columbia has the ability to increase its export quantity to the EU by reducing it price, translating to an increase in revenue. More importantly, a reduction in its import prices would increase its competitiveness with Ecuador who is currently the leading EU supplier. Unconditional cross-price elasticities indicated the top three EU banana suppliers (Ecuador, Columbia and Costa Rica) would benefit most from a change in ACP import prices, given their substitutability. The import index suggests Africa and Ecuador would benefit most from an increase in EU's total banana imports.

Although ACP prices were higher than that of the Latin countries, they are expected to benefit more from the increase in total import. This could be a result of the preferential treatment to ACP countries based on colonial ties. Where, member states, such as France and the UK, continue to import most of their bananas from ACP countries to aid in their development and competiveness in banana trade.

Based on projections, ACP countries are not impacted negatively specifically in terms of quantities. All countries are projected to see an increase in quantities imported by the EU. However, Latin countries are projected to experience a higher percentage increase than ACP countries. This suggests EU member states are seeking cheaper bananas to account for their growing import market. On the other hand, projections indicated some countries' market shares were negatively impacted. Specifically, Ecuador and Costa Rica were the only countries projected to experience an increase in market shares.

All ACP countries were projected to lose market share in all periods, up to 2017. This finding, together with the increase in quantities, suggests the percentage change in quantities from ACP countries was not sufficient to make them gain competitiveness in the EU banana trade. That is, the overall impact of the reduction in tariff places ACP at further disadvantage against Latin countries. Results from the study highlight the dependence of ACP countries on trade preferences and aid from EU member states. Without trade preferences to the EU, specifically zero tariff imports, ACP countries would be unable to compete with Latin countries given their already higher production cost. It is therefore important for future banana trade negotiations between the EU and ACP continue to echo the current theme of preferential agreements.

The third essay analyzed factors that influence consumers' views on a business

MarketMaker profile. Based on results from the study some of the most important factors that

influence consumers' first view of a profile include social networks (Facebook and twitter),

business websites, state affiliations and business spotlight. Of these factors, state affiliations and

business spotlight are consistently positive and significant across business types. The finding for

state affiliation is particular important for MarketMaker in states that are not supported by their

state's Department of Agriculture. Because of the purpose of state programs, collaborating with

MarketMaker would increase consumer awareness of these programs as well as the importance

of them. In the long run the combined efforts of both the states' Department of Agriculture and

MarketMaker will maximize the benefits of everyone involved. The most import factor

influencing consumer views on a MarketMaker profile is the business spotlight feature of each

state's website. Businesses that are seeking to maximize their time on MarketMaker are

challenged to utilize this feature.

Overall results suggest businesses with completed profiles are more likely to attract

consumers to their profiles. Businesses that want to take full advantage of the database are

encouraged to complete profiles by filling in all applicable information. With the increased

level of competition among businesses using the database, it is in the best interest of businesses

to take the initiative to provide consumers all information needed to increase the number of

consumers to their profile. MarketMaker administrators can use findings from this study to

approach potential businesses about utilizing the database by outlining the potential benefits

associated with the database, and an even greater potential benefit when factors highlighted in

this study are present on a business profile. This is important as businesses are more motivated

by evidence of success or potential success before participating in a program. Findings from the

study can also be used to persuade more states to participate in this program. Results from individual states can be used to show what factors are essential to consumers and hence what factors need to be promoted. Results also prove to non-participating states that MarketMaker is a viable tool that is increasing businesses' revenues across the country.