PUBLIC MARKET TRADE AREAS: LOCAL GOODS, FARMERS, AND COMMUNITY IN THE U.S. SOUTHWEST REGION, 1996-2016

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The number of public markets in the United States increased from more than 300 in the 1970s to more than 8,600 by 2016. This increase in markets is related to changes in food production, localism and the local food systems movement, socioeconomic changes, cultural changes, and perceptions of embeddedness. Research on the underlying conditions for the success of public markets is scant in the United States, and especially in the USDA Southwest Region. This study provides analysis of public market locations as compared with non-market locations by drive-time trade areas during a 20-year period, 1996 and 2016, to gain further insights into factors leading to their success. The results from logit regression analyses and simulations of socioeconomic, college-town status, and climate-grid classifications find an increased likelihood of public markets with population, education, college town status, and some climate-grid locations. Median income, surprisingly, has an inverse relationship with public market success. Qualitative data and a literature review point to three types of embeddedness that motivate customers to attend public markets. This study concludes that "local nontradable consumer goods" tied to place are offered at these "nontradable consumption amenities." These amenities are "third places" that promote social interaction and become important places of community, farmer support, and commerce across the Southwest Region.

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LIST OF ABBREVIATIONS

CSA	Community-supported agriculture
DCM	Denton Community Market
ESRI	Environmental Systems Research Institute
FMC	Farmers Market Coalition
LFS	Local food systems
NMSU	New Mexico State University
PE	Perceived embeddedness (Chen and Scott 2014)
PPS	Project for Public Spaces
RUC	Rural-urban continuum (USDA)
SNAP	Supplemental Nutrition Assistance Program (USDA)
UNT	University of North Texas
USDA	United States Department of Agriculture
WIC	USDA Special Supplemental Nutrition Program for Women, Infants, and Children

CHAPTER 1

INTRODUCTION: THE RISE OF PUBLIC MARKETS

The number of public markets in the United States increased 394% between 1994 and 2016 to over 8600 markets (USDA 2017). This represents a renaissance of public markets that started in the 1970s as a reaction to industrialized food, loss of small farms, search for food quality, and increased awareness of pesticides and chemicals in food (Sommer 1980).

On Saturday mornings and other days of the week (USDA 2016), people from every walk of life gather in ephemeral and permanent retail spaces to buy farm products and local goods. These spaces are in parking lots, city streets, city parks, open fields, airy structures, and public and private buildings across the United States (Tangires 2008; USDA 2016). The markets are in cities, small and large, and entail the economic transactions that occur in farmers' markets and public markets.

These markets often become a unique component of the rural and urban retail environment, as they offer the opportunity for consumers to purchase local goods and have a "retail experience" that is differentiated from other grocery stores, strip centers, malls, and other retail spaces. These "direct farm-to-consumer markets" (USDA 2017) is where consumers may purchase goods directly from the producers themselves and often can interact with the producer and ask how the good was produced.

In many ways, these public markets are a return to the traditional ways of trading goods. A producer hauls the items that they have labored to produce over many miles to bring the items to their customers. The customers, in turn, decide that they need some fresh eggs or spinach, and decide to get up early on a Saturday to buy these items before they sell out. The public market retail experience goes back thousands of years in open markets that existed in ancient cities

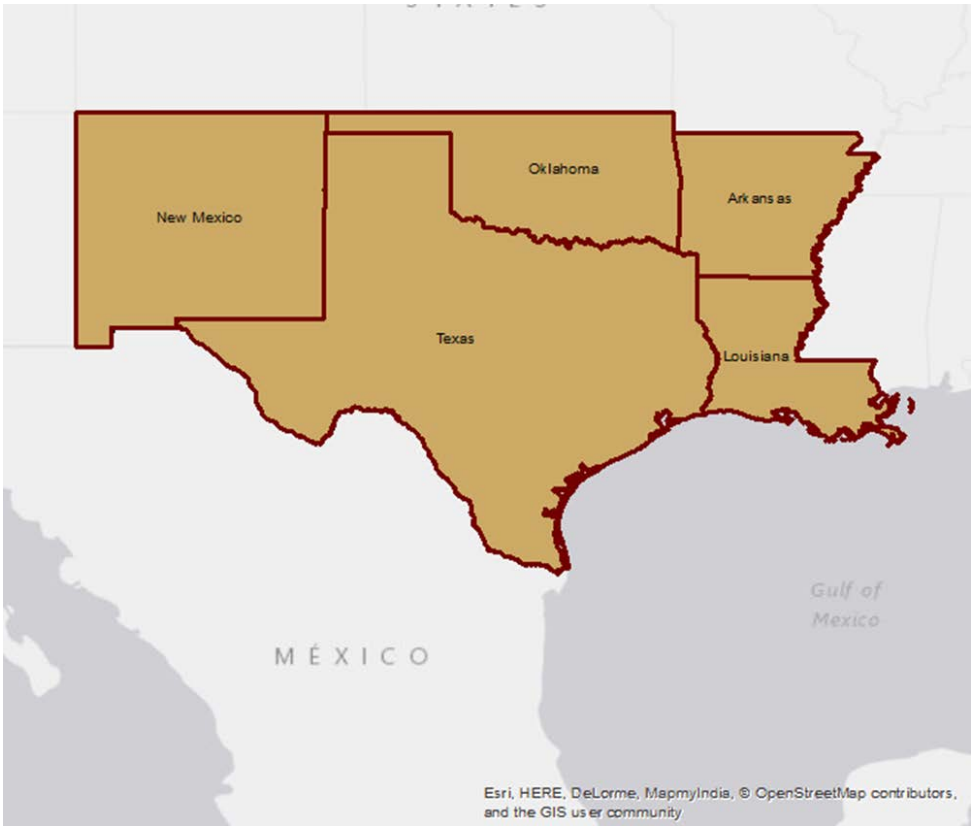
(Tangires 2008). Public markets are defined in the literature in terms of physical space, the types of goods sold, and the size of the markets. At a basic level, a market is a location where economic transactions or exchanges occur (Smith 1776; Berry 1967). For this study, public markets will include farmers' markets and combinations of famers' markets and artisan markets (community markets).

This surge in public markets over the past 20 years led to a growing body of literature on their characteristics, operations, and management. (Corum et al. 2015; PPS 2017; PPS 2016; FMC 2017; USDA FMPP 2017), but relatively little on why markets are successful in certain cities and not in others. This study expands upon the limited literature on public markets and their underlying conditions in the United States (Schupp 2016; Singleton et al. 2015) and local food systems (LFS) in the Southwest Region (Aucoin and Fry 2015). To address knowledge gaps at the trade-area scale, this research evaluates socioeconomic and climatic variables for cities with and without public markets in the Southwest Region (see Map 1.1) between 1996 and 2016. The aim is to analyze what factors make a public market successful or not.

Given the inherent dependence of crop yields and planting decisions by farmers upon growing conditions (Park and Sinclair 1993; Morgan 1961; Sacks et al.2010), this study includes climate zone data that may influence the success or failure of farmers' markets/public markets. The decision-makers that support public markets include farmer vendors that must decide whether to continue farming and whether to continue to participate in farmers' markets/public markets as a retail outlet.

One recent investigation identifies characteristics at the national level of census tracts and neighborhoods with public markets, but there are still significant research gaps on median income and other explanatory variables (Schupp 2016). Another study identified disparities by

county of access to farmers' markets across the United States, but again, there are many unanswered questions on socioeconomic and environmental conditions that promote public markets (Singleton et al. 2015). This current study focusses at the more local scale of trade areas, rather than counties, as defined by drive-times for customers and vendors. Rather than purely Euclidean distance, this method incorporates "time space", which accounts for the time geographic barriers, such as traffic signals and terrain, found in road networks (Cui et al. 2012; Okabe and Satoh 2006).



Map 1.1: Southwest Region Study Area

While there is considerable literature on trade areas for various retail models, there is a scant research on public market trade areas (USDA 2011). Trade areas are defined in the literature as the geographic unit that defines the market where customers are located (Jones and Simmons 1990). Trade areas may also be defined by the vendors who support the retail outlet,

as the situation warrants. In this case, for the public markets, vendors must travel to the retail outlet for trade.

My interest in public markets stems from my position as a market manager (executive director) of the Denton Community Market (DCM) in Denton, Texas, north of Dallas. As a market manager, who also helped found the market, I have witnessed the 900% growth of the market since its first season in 2010. There are the important weekly interactions of customers and producers, the social interactions, that occur in this community gathering space for family and friends. As the Denton Community Market grew by 900% since 2010, I wanted to know why? This story may provide answers to me and other decision-makers that are thinking about continuing or starting new public markets.

One approach to studying public markets is to evaluate the localism movement (Cooke 1990; Oosterveer and Sonnenfeld 2012), embeddedness (Sadler 2013; Bubinas 2009; Henneberry 2009; Govindasamy 2002; Chen et al. 2014), and the motivations to participate in public markets by vendors and consumers. The characterization of the types of customers who are making "decisions" to visit the markets is an important focus at the case study level and regional data level. These interrelated topics will be important for relating public markets to the economic geography concept of nontradable consumption amenities where place-based transactions occur (Schiff 2015). Results from a recent case study on the Denton Community Market (DCM 2017) will further provide insights into the decision-making process in Denton, Texas within the DFW region.

For this study, success of public markets is defined broadly to mean the mere presence of a public market in a trade area. While it is possible to define market success in terms of visitor counts, vendor numbers, and sales revenue, tax revenue, business incubation, this data was

unavailable for the Southwest Region's markets (Stephenson 2008; Corum et al. 2015; USDA 2009; USDA AMS 2017). The USDA (AMS 2017) also notes that access to local food, increased sales to neighboring businesses and suppliers, and additions of food accessibility programs, such as the USDA Supplemental Nutrition Assistance Program (SNAP), are measures of success. This dichotomous definition of success, as the presence of a market or not, led to the use of the logit regression analysis, or qualitative choice analysis (Train 1993), as described in Chapter 4.

The findings will indicate characteristics of trade areas for public markets in the Southwest Region in two time periods, 1996 and 2016, and factors that increase the likelihood of public markets' success. This study concludes with a discussion on whether public markets are place-based experiences that are different from traditional retail, and whether they are defined as nontradable consumption amenities (Schiff 2015). The motivations for customers to frequent markets are placed in the context of perceived embeddedness, localism, the creative class, customer characteristics, and previous economic geography findings on amenities in cities (Glaeser 2001; Glaeser et al. 2004).

CHAPTER 2

LITERATURE REVIEW AND THEORY

There are currently over 8,600 farmers' markets/public markets in the United States (USDA 2017). The USDA graph (USDA ERS 2016) shows the market growth through 2014 over a 20-year period when the USDA started tracking their numbers (Figure 2.1). These markets are in a variety of places, including city parks, city streets, private buildings, parking lots, institutions, tents, open fields and stands in farms, and other undefined locations (Figures 2.2 and 2.3). Of those identified locations in the USDA database (USDA 2016), most are in local government building grounds, both in the United States and in the USDA Southwest Region, the geographical boundary of this study.

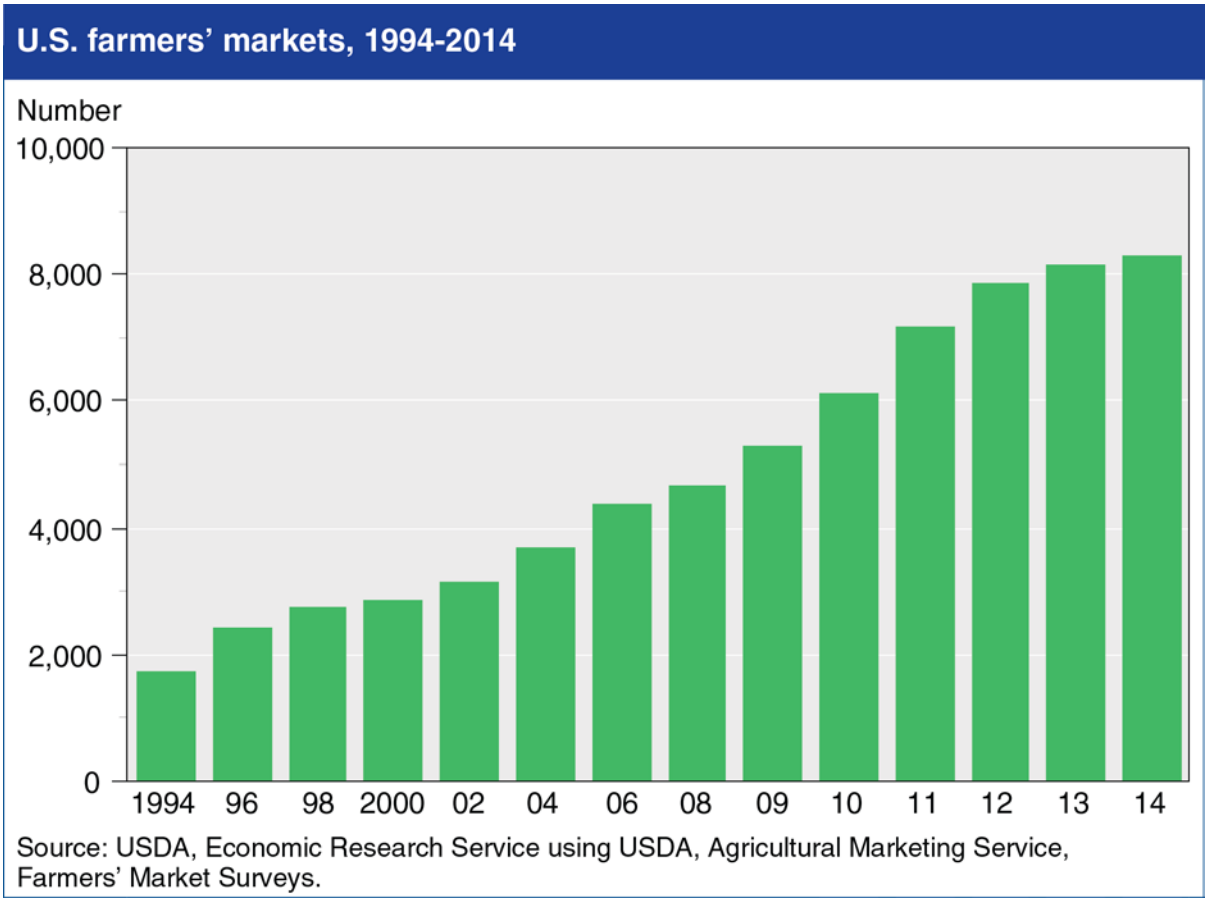


Figure 2.1: 20 Years of the Growth of Farmers' Markets, Source: USDA ERS 2016

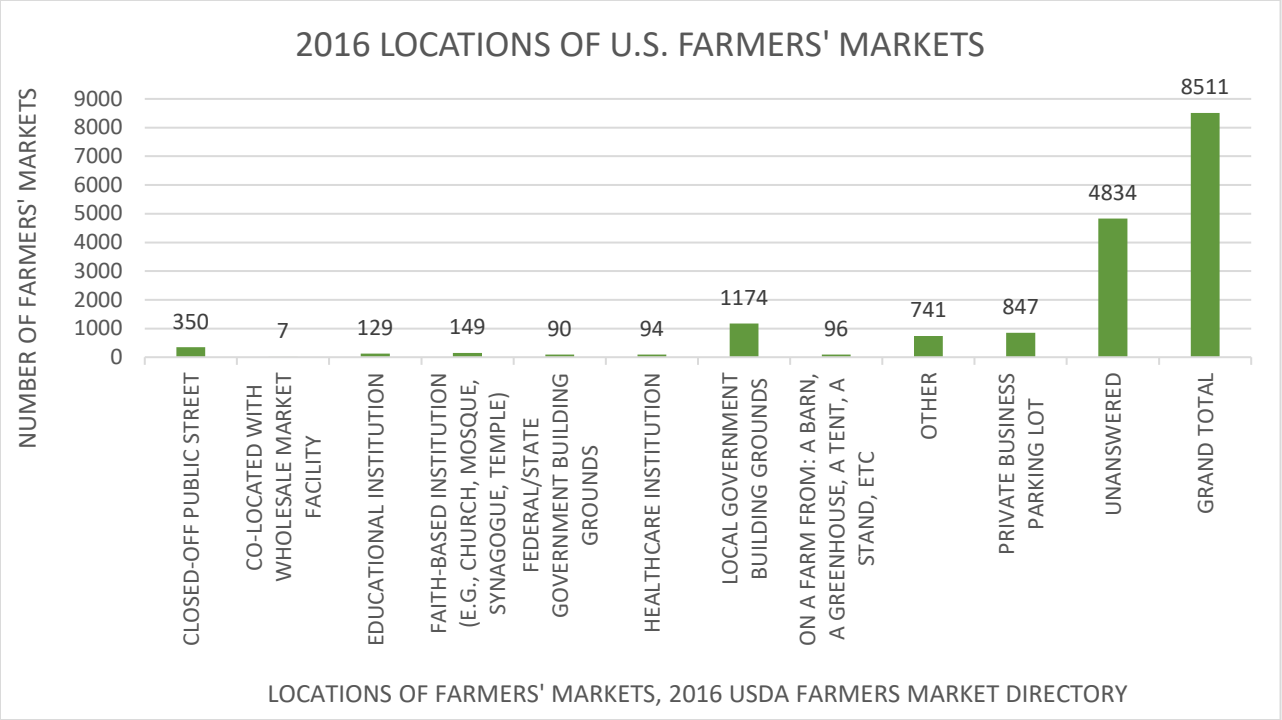


Figure 2.2: Locations of Public Markets in the U.S. extracted from USDA 2016 Farmers Market Directory. USDA 2016

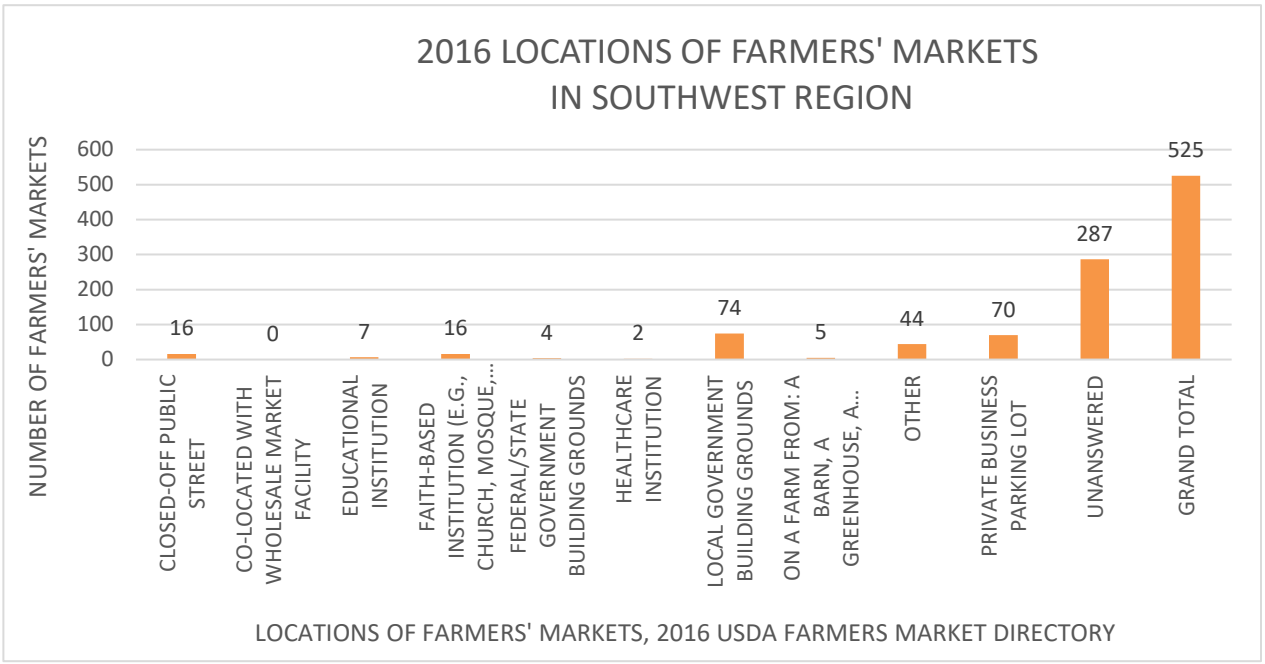


Figure 2.3: Locations of Public Markets in the Southwest Region Extracted from USDA 2016 Farmers Market Directory. USDA 2016

The USDA 2016 Farmers Market Directory is not limited to just farmers' markets, with only food, but also includes markets with other locally-made goods. The Southwest Region community markets (public markets with goods other than local food) presence is proportional to the entire United States. In the 2016 USDA Farmers Market Directory database (USDA 2016), 60% of the public markets in the United States sell crafts as well as local food. In the Southwest Region, out of 525 markets listed, 304 responded and indicated 185 or 61% of the markets that responded sell crafts. Local goods, both food and other commodities, is one subject of this study.

The literature review enumerates definitions of public markets and their positive effects on communities. From comparisons of several studies, consumer preferences studies show what embeddedness factors motivate customers to purchase local goods. Public markets as third places and public spaces in communities attract some of these consumers, including the creative class. To address research gaps, trade area analysis describes the consumers who demand the local goods sold at the markets and sustain market success. Finally, a discussion of local nontradable consumer goods and nontradable consumption amenities will identify literature gaps and topics for this research and the regression analyses.

2.1 Definitions of Public Markets

Markets, as a general term, are the geographic locations where exchange or economic transactions occur (Smith 1776; Berry 1967). The transactions are rooted in classical economic theory of supply and demand. The market price is:

> regulated by the proportion between the quantity which is actually brought to market, and the demand of those who are willing to pay the natural price of the commodity, or the whole value of the rent, labour, and profit, which must be paid in order to bring it tither. (Smith 1776, reprint 2003)

In the retail geography literature, the economic exchange is part of a decision-making process that occurs in markets. The market place is a site "with social, economic, cultural and other referents where there are a number of buyers and sellers, and where price offered and paid by each is affected by the decisions of others." (Berry 1967: 1) These decisions create a retail geographic location that is the "interface" between the geography of production and the geography of consumption (Berry 1967). This definition truly applies to public markets, where customers travel to a location to meet directly with the producers who make the products.

There is no consistent definition of public markets and farmers' markets in the literature, and it has changed over time with changing cultural and economic factors (Pyle 1971; Stephenson 2008; Brown 2001; Spitzer et al. 1995). The term "public markets" is used in the literature to refer to markets that have a public purpose beyond the sale of goods and serve as public spaces (Tangires 2008). The term "public market" formerly meant it was municipally-owned, but the term currently includes many types of markets, such as farmers' markets and craft markets. (Spitzer et al. 1995). Historically these public markets, in other parts of the world and in Colonial America, were important to providing agricultural goods to the urban populations. The public markets do not have to be located in a publicly-owned property, but they allow the direct sale of goods from the producer to the consumer (Tangires 2008).

The physical form of the market is one way of defining them. The Project for Public Spaces (PPS), an organization that conducts research and supports public markets as part of its mission, defines markets by their physical form: open-air markets, shed-roof structures, market halls, and market districts (Spitzer et al. 1995). Tangires (2008) also provides a comprehensive encyclopedic compilation of physical forms of public markets in the United States since the Colonial period, additionally including street markets, street vendors, enclosed market houses,

central markets, and wholesale terminal markets.

The source and type of products sold is another way to define public markets (Brown 2001). Brown, a geographer, states that in “a true farmers’ market some, if not all, of the vendors must be producers who sell their own products” (Brown 2001:658). From a literature review of USDA definitions going back to 1948, Brown suggests using three main categories for farmers’ markets: terminal markets, public markets, and farmers markets (with subcategories of wholesale farmers markets and retail farmers markets) (Brown 2001).

The USDA today also defines farmers’ markets by the goods sold. The USDA currently defines farmers’ markets as including direct sales: "a farmers’ market is defined as a retail outlet in which two or more vendors sell agricultural products directly to customers through a common marketing channel” (USDA Agricultural Marketing Service: Ragland and Tropp 2009). The Texas Department of Agriculture Certified Farmers Market program, located in the Southwest Region, also defines a farmers’ market as one that has two or more farmers selling produce directly to consumers (Texas Department of Agriculture 2014).

Yet another classification method of public markets is by their size. The Project for Public Spaces (PPS) study on economic impacts of markets, divided markets into Large regional public markets (indoor), Mid-size public markets (indoor/outdoor), and Mid-size farmers’ markets (outdoor). PPS stated that each market has a mix of producer agricultural goods, non-producer agricultural goods, prepared foods, and art (Project for Public Spaces 2007).

This study will utilize the term “public markets” as the overarching term to include farmers’ markets, artisan and farmers’ markets, and community markets. This study also assumes that the producers are selling most products themselves, and are not wholesale or resale products. This research hypothesizes that public markets are not only a reflection of

governmental and institutional definitions, but also the socioeconomic factors, climate, and imbued meanings of the transactions and the local goods sold.

2.1.1 Economic Development and Public Markets

From 1992 to 2012, the value of local food purchased from farmers directly by consumers doubled to $1.4 billion in sales (USDA 2017). The increase in sales corresponds with a 394% growth in the number of markets in the United States from 1994 to 2016 (USDA 2017). The market growth occurs during an expansion of government support through USDA funding. The Farmer-to-Consumer Direct Marketing Act of 1976 established the role of the Cooperative Extension Services offices to assist farmers' markets (Brown 2001) and established the Farmers' Market and Local Food Promotion Program through the USDA (U.S. Senate 1974). This federal economic support is one reason that many markets are flourishing. Even with this funding, not all cities have public markets. Many cities and states support public markets because of perceived economic benefits, such as small-scale farmer business incubation (Guthrie 2006), consumer choice (Guthrie 2006), downtown development through attracting business to the area (Bubinas 2009), retention of sales in the community (Sadler 2013), and the multiplier effect of sales (Bubinas 2009; PPS 2007; Hardesty et al. 2016). Public markets are not only important for community revitalization and local commerce, but also are important gathering spaces (Spitzer et al. 1995).

Economic development strategies often include local amenities and quality of life elements that are important for attracting businesses and residents to an area. (Moore et al. 2006). Public markets are amenities in a community. The literature discusses the attractiveness of public markets as retail spaces and downtown and destinations as reasons for their positive economic

impacts (Murphy 2011; Bubinas 2011; Spitzer et al. 1995). Public markets are differentiated from other types of retail spaces by the "experiential" nature of the shopping experience. The differentiating characteristics of public markets from the typical retail environment of grocery stores are: the producers sell the products themselves, and the products offered are fresh and healthy choices. Customers in one study in New Zealand were interested in finding "products of difference", defined as seasonal, local, unusual, or organic (Murphy 2011).

Public markets may benefit communities that are already experiencing economic growth, real estate development, and a strong economy as well as communities that are striving to redefine themselves, such as those that want "community revitalization." Community revitalization has a history going back to the urban renewal era of the 1950s and 60s. More recently, public-private partnerships and government programs focus on economic development and physical redevelopment of declining areas or stagnant areas in a city. Revitalization efforts often include federal empowerment zones and housing and community development; neighborhood-based organizations' and community development corporations' redevelopment efforts; neighborhood plans; and economic development approaches by local and state government. (Keating et al. 1996).

Other recent literature on public markets and economic development does not largely focus on neighborhood revitalization but is focused economic impact studies of estimates of the direct benefits of markets on different sectors of the local economy. In evaluating the economic benefits of markets, the literature points to positive outcomes for communities, however, the net benefit must be considered. If products purchased in the markets would have been purchased elsewhere in the city, the opportunity cost shock may result in a transfer of economic activity rather than growth in economic activity.

Most recent economic studies on public markets include the IMPLAN input-output model (Yosick 2008, Otto 2010, Henneberry 2009, Hughes 2008, Brown 2010, Myles 2010; Hardesty et al. 2016) or a combination of IMPLAN and opportunity cost model (Hughes 2008). IMPLAN calculates the direct (sales to producer), indirect (inputs), and induced (money spent by producer in this case) economic impacts. For example, two IMPLAN studies found significant economic benefit to the local economy. A Kentucky study of an artisan market determined that the artisan market had about $2 million in economic benefits in 2013 (Kentucky Arts Council 2013). A study in Sacramento California region estimated $1.3 million of economic output by direct market producers in 2013 (Hardesty et al. 2016).

The opportunity cost and IMPLAN model found positive economic impacts in West Virginia, despite reductions from opportunity costs (Hughes et al. 2008). The Hughes study evaluates the economic impacts of farmers' markets in West Virginia utilizing vendor survey data and the IMPLAN-based input-output model. This study is particularly interesting because it uses the concept of the opportunity cost framework to look at spending that is lost to West Virginia because of spending at farmers' markets. Vendor surveys from 34 farmers' markets collected data on types of products sold, sales, and distribution percentage by IMPLAN crop categories. The question being answered was what would have occurred, the opportunity cost shock, had farmers' market spending been directed to grocery stores, building materials, and garden supply stores. The net impact on the state economy was measured as the difference between the farmers' market "shock" and the opportunity cost "shock."

Aside from IMPLAN, there is another type of multiplier for public markets. The Project for Public Spaces (PPS) commissioned a study to create economic multipliers for public markets for the calculation of economic impacts (Project for Public Spaces 2007). This study is referred

to in the literature quite extensively because it was the first major study on public markets and economic impacts. This study did not include, however, opportunity costs.

Very few studies have been conducted on the economic or other benefits of public markets in the Southwest Region. A Oklahoma farmers' markets IMPLAN study found nearly a $6 million-dollar positive economic benefit (Henneberry 2009). There are three major studies that were conducted in Texas demonstrate the importance of the local food economy and the variety of vendors that participate in the markets.

A first study evaluated whether farmers' markets alleviate the lack of access to healthy food in low-income communities, or food deserts, in Texas (Brady 2012). The author utilized USDA Farmers Market Survey Data, USDA food desert locater data, and the 2006-2010 American Community Survey data. The author did not find any correlation between the location of farmers' markets and food deserts, but did find that census tracts with farmers' markets are more likely to be economically disadvantaged.

A second project by the Texas AgriLife Extension Service consisted of an IMPLAN input-output evaluation of the Austin Downtown Farmers Market. The market experienced 8% growth in customers from 2009 to 2010 and $1.6 million in direct sales were generated during that time from agricultural, prepared food, and artisan products. They estimated that $2.7 million were generated in induced and indirect output. The study did not provide details on customer demographics. At Austin Downtown Farmers Market, nearly one-half (43%) are artisan vendors and the remaining are agricultural and food vendors (Dudensing et al. 2011).

A third study by the City of Austin focused on local food, and included public markets as an important component of the local food movement. (City of Austin 2013). There is growing interest in local food in Austin, with evidence from traditional media coverage and social media.

The City recommends doing feasibility studies of permanent public market facilities and food hubs; allocating more vacant land for urban agriculture; marketing local food as an amenity; and educating the local population on economic and physical well-being (agriculture) from local food.

The more limited research on public markets in the other Southwest Regions states does still show a significant economic impact and importance in the states. New Mexico has seen considerable growth in its public markets and growth in direct sales from farms to producers. A study concluded that a majority of the $6.5 million in direct sales from producers to consumers, as of 2002, were from farmers' markets (NMSU 2006). The number of markets has only increased since that time. There has been an increase in customers and vendors at farmers' markets in Arkansas, with about $6.3 million in economic impacts as of 2012 in Arkansas (University of Arkansas CES 2017). There are efforts in Louisiana to continue to work with the USDA in supporting both urban and rural farmers' markets (FMC 2016).

2.1.2 The Meaning of Public Markets: Localism and Local Food

The localism movement stems from the economic restructuring of globalization that affects local areas or localities (Cooke 1990; Oosterveer and Sonnenfeld 2012;). Localism has relevance for food. It is a postmodern reaction to globalization, alienation from economic and food systems, and increases in time and space between the consumption and production of food. Ultimately localism assumes that personal freedom is gained by using local goods and services (DuPuis 2005). "Localism generally supports the local production and consumption of goods, local control of government, and the promotion of local history, local culture, and local identity" (Mayhew 2015).

Consumers and farmers have an increased awareness of the environmental and economic impacts of large-scale farms and the air pollution and carbon impacts of non-local supply chains. This 'localism" movement is exhibited in the supply-side and the demand-side of food. (Oosterveer and Sonnenfeld 2012). The local food movement includes the supply-side with small and medium farmers emphasizing freshness and local economic benefits, and other sustainability benefits. Local food retailers such as greengrocers and restaurants, are promoting relationships with local farmers. On the demand-side, consumers are frequenting public markets, subscribing to home delivery systems of food from local farms (CSAs), and planting community gardens (Oosterveer and Sonnenfeld 2012). Rather than mass-produced food, local food symbolizes "sustainable consumption" to express values of "ecological citizenship" (Seyfang: 2006).

Defining "local" is not clear-cut or unanimous across the United States. The 100-mile Diet was popularized by two authors (Smith and McKennon 2007; Oosterveer and Sonnenfeld 2012; Food Network Canada 2009). The 100-mile radius is now part of the common lexicon of "food miles" and what defines "local" food in the United States (Gayeton 2014).

Localism, or its many manifestations, is often an overarching theme when discussing public markets in the literature. The terms "alternative food networks" (Holloway and Knefsey 2000; Seyfang 2006) and "authentic farmer' markets" (Murphy 2011; Hall et al. 2008) are terms related to sale of local food and the motivations of customers and producers to participate in public markets. The "authentic' encompasses markets that allow direct face-to-face sales to customers of local food products from the farmers and producers themselves (Hall et al. 2008; Murphy 2011). Localism has specific meaning for the space at public markets.

2.1.3 Public Markets as Third Places and Public Spaces

Over the past 30 years, the concepts of space and sense of place transformed geography and other social sciences during the Spatial Turn (Ayers 2010; Soja 2009). Globalization changed the role of "Euclidean space" as culture and consumption became "internationalized." (Warf and Arias, p 5 2009). Geography, planning, and urban design literature discusses the importance of the sensory experiences and the reasons people visit and linger in public spaces (Jacobs 1992; Hiss 1991; Gehl and Svarre 2013). These public spaces may have many characteristics, including seating areas, areas to stand, and areas of movement. Most important is the presence of other people (Gehl and Svarre 2013).

Public markets today are often planned spaces, more than in the 1970s during their initial renaissance in the United States (Francis and Griffith 2011; Sommer 1980). Markets are more than "leftover spaces" in parking lots and in space created by underpasses. Many markets are now in parks, pedestrian promenades, pavilions, and plazas with "explicit design." (Francis and Griffith 2011). The main elements of the planned public markets are the promenade (or movement corridors); the working market (vendor stalls and backstage areas), the market landscape (open space adjacent to market); and the market neighborhood (connections to neighborhood) (Francis and Griffith 2011). Some markets that are planned are often becoming integral parts of the community and the urban built environment. Many markets are still temporary, nonetheless, as shown by the USDA data (USDA 2016) on public market locations (see Figures 2.2 and 2.3) in parking lots, open fields, and other temporary locations.

The spatial-temporal qualities of public markets, often in temporary locations or infrequently held, encourage more research on space and place (Holloway and Knefsey 2000; Tiemann 2008; Tong et al. 2011; Murphy 2010; Francis and Griffith 2011). As Holloway and

Knefsey (2000) argue, farmers' markets are "socially constructed" spaces, or "new consumption spaces" where quality is measured by knowing how the local food or good is produced by direct connections with the producers. The local food movement is symbolized in these spaces and many of the products are "embedded" with ethical and environmental qualities. Goods are linked to places and/or are purchased in "alternative spaces" that eliminate the middlemen of supermarkets. (Holloway and Kneafsey 2000). These researchers relate experiences with the UK farmers' markets to the symbolism of the "whole space:"

> It is argued that not only are particular products purchased, but the whole space which the products are bought is, in a symbolic sense, consumed. (Holloway and Kneafsey 2000: 290)

There are multiple meanings and symbolism that motivate consumers and producers to decide to participate in public markets as "places."

The symbolic transactions of consumers purchasing items from the producers themselves within a "whole space" is also related to Edward Relph's (1976) ideas on place. Relph's influential work, *Place and Placelessness*, defined humanistic geography and phenomenology of the 1970s. His definition of place is relevant in thinking about public markets as places, rather than just spaces. As Relph states:

> In short, those aspects of the lived-world that we distinguish as places are differentiated because they involve a concentration of our intentions, our attitudes, purposes and experience. (Relph 1976:43)

The social interactions of the producer and the consumer also reflect the social and cultural positions of people in cities and regions in an era of globalization. The place of public markets are locations for the purchase of a product may become a symbol or "sign" in itself (Baudrillard and Poster 2007). The consumption of objects, in this case local goods, distinguish one consumer from another.

The social interactions that occur at public markets are "informal associations." (Tiemann 2008). Tiemann (2008) describes two type of markets that are producers-only: indigenous markets and experience markets. Indigenous markets are generally in small towns, have a narrower range of goods, and producers may only be part-time or retired. These markets are less likely to promote informal associations for most patrons. Experience markets, on the other hand, are often in larger towns or college towns, offer a combination of food and craft items, and are more prone to promoting informal associations. Informal associations occur within the economic transactions between consumer and producer, and in the public spaces where visitors meander through the booths or sit in park open space or other open space (Tiemann 2008).

These markets become "third places," which promote, according to Tiemann (2008), David M. Hummon's "third places" Third places are defined by Ray Oldenburg (2005, 1989) and summarized by David M Hummon as follows:

> They provide the individual with stimulation and the joy of shared fellowship, while enriching a person's perspective on life through conversation with diverse others. They serve society by offering settings for ritualized revelry, teaching skills necessary for association beyond private life, developing political consciousness, and nourishing a broader appreciation for public life and space. (Hummon 1991:931)

These experience markets, or third places, serve as public spaces and amenities that attract visitors to the downtown with their local food and goods, authenticity, and social activity. They also assist with economic development (Tiemann 2008; Bubinas 2011), and promote tourism (Jolliffe 2008). The "whole space" is valued and "consumed" as a public space or place. The Project for Public Spaces (PPS) promotes public markets, touting the social, economic, public health, and cultural benefits of these public spaces in cities (PPS 2017).

2.2 Consumer Preferences and Embeddedness of Public Markets

As consistently shown in the literature, typical customers of public markets are white women, highly educated, older, and have above average income levels (Sadler 2013; Bubinas 2009; Henneberry 2009; Govindasamy 2002). The women are not only white, educated, and with higher incomes, but are also more likely to be married (Wolf et al. 2005). Research findings on customer preferences evolve concurrently with other research trends and philosophical and cultural changes on food and local goods.

Consumer preferences studies on public markets date to the 1980s. The most comprehensive evaluation of the public market literature from 1940-2000 by Brown (2002) summarizes the results of studies in each decade between 1980 and 2000. Brown (2002) notes significant research gaps with the increase in markets in the United States over that period, from 340 markets in 1970 to 3,000 by 2001 (Brown 2002). From 1980 to 1990, the studies reveal that "quality" and "price" and "variety' were in general most important to customers. By the 1990s "quality", "variety", "atmosphere", "convenience", "help farmers," and superiority to supermarkets were some main reasons for consumers shopping at public markets. College education, being female, and having moderate to high income were cited in both decades as common characteristics of customers (Brown 2002). Brown (2002) states: "Consumers patronize farmers' markets because they enjoy them and feel the markets provide high-quality produce at a reasonable price." (Brown 2002: 168). As noted, there is not information on "political awareness, reading habits, health education, or other personal or cultural factors that might be expected to influence consumer patronage of farmers' markets" (Brown 2002: 169). Since 2000, studies conducted in the United States and in other countries on consumer preferences and motivations for public market patronage often measure different variables than

earlier studies (Dodd et al. 2014; Sadler et al. 2013; Vecchio 2011; Murphy 2011; Henneberry et al. 2009).

Some patterns emerge when comparing recent studies (Table 2.1) and other studies on consumer preferences and motivations. First, supporting "local" products, farms, and community are ranked high on the list of motivations for most studies. Second, price is not a determining factor (except Naples), but instead quality and freshness supersede price for market customers, as supported in other studies (Govindasamy et al. 2002). Finally, social interactions, either with friends or with the farmers or vendors themselves, rank high in these and other studies (Govindasamy et al. 2002; Sadler et al.; Henneberry et al.; Wolf et al. 2005; Hall et al. 2008).

Farmers' market customers have different reasons for shopping at them in comparison with grocery stores. Murphy (2011) compared New Zealand farmers' market customers to supermarket customers and found the following high-ranked reasons: quality produce, location, food on special, healthy food, shorter lines, and customer service. Locally-produced food (17), having a good time (15), and lively atmosphere (19) were much less important, and ranked near the bottom out of 22 characteristics measured (Murphy 2011). Murphy concluded that localism alone was not the only differentiation from supermarkets, as authenticity measures were more important.

These studies include topics of localism, environmentalism, and organic produce that were not noted in studies cited by Brown (2002). These additional topics lead some researchers to evaluate the concept of embeddedness and public markets.

Embeddedness entered the economic geography literature after Granovetter (1985) wrote an influential article about the social embeddedness of economic relations at the individual and collective scale (Granovetter 1985; Kitchin and Thrift. 2009).

Table 2.1: Consumer Preferences and Motivations at Public Markets (2010-2016)

	Dodd et al. 2014 Toronto, Ontario, Canada	Sadler et al. 2013 London, Ontario, Canada and Flint, MI	Vecchio 2011 Washington, DC and Naples, Italy	Henneberry et al. 2009 Oklahoma	Murphy 2011 New Zealand
Number of Respondents	298	895 (both cities)	Not indicated	312	252
Reasons for Visiting Markets (Descending Order)	1.Quality of Product 2.Supporting local community 3.Family outing 4.Healthier diet 5.Environmental concerns 6.Other 7.Convenience of location 8.Interaction with vendors 9.Social opportunity 10.Variety of products	1.Local/Fresh Food 2.General Groceries 3.Specific Vendor 4.Meet with Friends 5.Family Activity 6.Ambiance	<u>Washington, DC</u>: 1.Supporting local farms 2.Food quality <u>Naples, Italy</u>: 1.Savings 2.Producer-consumer relationship 3.Freshness and genuine food 5.Preservation of cultural and gastronomy traditions 6.Reduced pollution, energy saving, and environmental protection	1.Quality 2.In-season 3. Local products (Oklahoma-grown) 4.Social—meet friends and community members 5.Support local farmers and businesses	1 Quality produce 2.Healthy food 3.Seasonal produce 4.Supporting the local community 5.Locally produced food 6.Customer service 7.Having a good time 8.Lively atmosphere
Type of Analysis	Statistical	Statistical and Spatial, Kernel-density by dollars spent	Dot survey Statistical	Statistical, IMPLAN economic impact	Statistical, compare famers' market and supermarket shoppers
Average Amount Spent per Visit (Not Inflation-Adjusted)	Not cited	$31 US in Flint $38 CDN in London	$23.93 in D.C.	Not cited	Not cited

Economic behavior is embedded in relationships and personal relations, or social relations (Granovetter 1985). Geographers and economists, and other scholars apply embeddedness to many social science topics, including public markets (Chen and Scott 2014; Morris and Kirwan 2011; Hinrichs 2000; Oosterveer and Sonnenfeld 2012; Hunt 2007).

Food purchased at the public market represents more than just fresh and of high quality, as noted in earlier studies (Brown 2002), but is linked by researchers to social embeddedness (Oosterveer and Sonnenfeld 2012; Hinrichs 2000), spatial embeddedness (Chen and Scott 2014), and ecological embeddedness (Morris and Kirwan 2011). Social embeddedness is the social tie that forms between the producer and the consumer as they have face-to-face interactions at the market for the purchase of local goods. (Oosterveer and Sonnenfold 2012; Morris and Kirwan 2011; Hinrichs 2000; Bubinas 2011). Ecological embeddedness relates benefits to the environment or nature by participation in alternative food networks (AFN) in an era of globalization (Morris and Kirwan 2011). There are four dimensions in the ways producers and consumers "relate to the ecological: understanding, realizing, utilizing, and negotiating." (Morris and Kirwan 2011: 329). AFN includes recent developments in organic and more environmentally sensitive agriculture, often involved with direct marketing between farmers and consumers. The direct marketing includes farmers' markets and community supported agriculture box schemes of local goods and produce (Morris and Kirwan 2011). Selling and purchasing these goods is the manifestation of ecological embeddedness.

Spatial embeddedness includes an extension of social embeddedness, as locally-produced food is deemed of higher quality than food produced in the globalization scale, or" global food" (Morris and Kirwan 2011). "Perceived spatial embeddedness" is when consumers perceived

connections with the local goods purchased that supports local farmers and also the community (Chen and Scott 2014).

The economic concept of utility is the basis for embeddedness. Embeddedness is "the degree to which economic activity is constrained by non-economic factors." (Chen and Scott 2014:57). Embeddedness, as presented by Chen and Scott (2014) combines localism, alternative food networks, and space into one model that may explain customer behavior to maximize utility at public markets. Chen and Scott create a triad model of "shoppers perceived embeddedness" (perceived embeddedness or PE), to explain customers' purchasing behavior at markets. Markets transactions, products, and spaces imbued with meaning to maximize acquisition utility, exchange utility, and emotional utility gained from purchases. (Chen and Scott 2014).

Using structural equation modeling, Beijing organic farmers' market customer data provided the evidence for the PE model: perceived social embeddedness from social interactions at the market; perceived spatial embeddedness from buying local food and supporting local farms; and perceived natural embeddedness by customers of connecting with nature or bettering the environment. They conclude that "shoppers may derive utility from other sources than the goods they purchased," based upon this first major study of PE and the relationship of purchasing behavior at one farmers' market (Chen and Scott 2014:61). Perceived embeddedness, the authors argue, may contribute to market success. Chen and Scott (2014) found a positive association between PE and the money spent per visit and whether the customers intend to return for another visit.

Other types of studies point to utility gained by visiting public markets. Tourists often seek public markets as tourist destinations. (Travel Industry Association 2006; Jolliffe 2008). Recent research on food tourism in the United States points to a portion of the general traveler

who will travel 50 miles or more or stay overnight at least one night to experience local food (Travel Industry Association 2006). These tourists place great importance on experiencing local cuisine, either as the main (deliberate) reason for the travel or secondary (opportunistic or accidental). This is important when evaluating the socioeconomic background and the motivations of public market visitors. (Travel Industry Association 2006). In a survey of 2,364 leisure travelers in the United States, the culinary traveler (food and/or wine traveler as 17% of that sample) reported that 83% were either very interested or somewhat interested in visiting public markets/farmers' markets. This cohort was ranked just below the group that dine at local restaurants and experiencing local cuisine in general (Travel Industry Association 2006). Detailed demographic information shows post graduate education and annual household income of over $100,000 characterize the majority of food travelers (excluding wine travelers). Another recent study in 2013 in the United States of over 2,000 travelers shows that three-quarters of all leisure travelers are classified as culinary travelers (Getz et. al. 2014). The surveys were quite large and most likely represent a fairly accurate breakdown of the types of tourists, and especially culinary travelers.

This culinary tourist trend is noted in Canada as well, where the demand for local food is increasing, and there is a related demand for public markets/farmers' markets and tourism associated with the farmers' markets (Jolliffe 2008). New Brunswick, Canada case studies show there is a great potential to combine the farmers' markets and food tourism with general tourism. There is also the potential to promote the farmers' markets along with festivals and events and as an "authentic" tourist attraction. (Jolliffe 2008). These characteristics of localism and embeddedness lends the question: who supports and what types of cities support public markets?

2.3 Recent Studies Show Characteristics of the Public Market Locations

A recent study of 2011 USDA Farmers Market Directory data and census data evaluated the characteristics of markets at the census tract and neighborhood levels (Schupp 2016). This study utilized ½ mile, 1 mile, and 2-mile buffers drawn around farmers' market locations as related to population. The white proportion was also conducted at the regional scale. The bivariate analysis for each variable analyzed fourteen socioeconomic characteristics of farmers' markets, including the proportion of white residents, median income, age, education, housing values, public assistance rates, median rent, social security rates, and "struggling" rates, or measures of how well people are doing. Schupp (2016) compared the statistical differences among the variables for farmers' market locations, non-farmers' market locations, and the mean for the entire United States. The study found that New York and California have the most farmers' markets, while the South and the West have much fewer markets. Texas has among the lowest concentrations of farmers' markets relative to 1,000 population. Eighty percent (80%) of markets in the United States are in metropolitan areas, and about 9% are in rural areas, using RUC data (USDA ERS 2016).

The study findings lead to many questions on the conditions needed for farmers' markets (Schupp 2016). The researcher suggests that more study is needed on the relationship between income and farmers' markets. At the neighborhood level, places without farmers' markets had higher income levels than with farmers' markets, but some measures suggest higher income levels in areas with farmers' markets. Neighborhoods and census tracts had higher education levels, rents, and housing values than areas without farmers' markets. There are higher participation rates in SSI and public assistance in areas with farmers' markets. In general, there are older populations in neighborhoods that have farmers' markets than do not (Schupp 2016).

Another recent study in the United States (Singleton et al. 2015) finds disparities in counties that have and do not have farmers' markets. This study utilizes the 2009-2010 USDA Food Environment Atlas data at the county-level. The atlas maps farmers' markets, other food outlets to show the availability of food throughout the United States from 2009-2016 (USDA ERS 2017). This study compares the following variables at the county level for those with farmers' markets and those without farmers' markets: region (northeast, south, Midwest, and west); the sociodemographic characteristics (race, age, median household income, and % of adults living in poverty); health characteristics (obesity and diabetes); and environmental factors (availability of grocery stores, supercenters, conveniences stores, SNAP stores, WIC stores, fast food and full service restaurants, CSA (Community-supported agriculture), and recreation facilities) (Singleton et al. 2015). Further analysis also includes analysis of these variables in metro and non-metro counties.

The study has three levels of analysis. First, logistic regression and Poisson regression models analyzed the association between the explanatory variables and the existence of a farmers' market in each county. Second, the odds ratio [the ln (probability of market/probability of no market)] determined the odds of having at least one farmers' market in the county with the county-level explanatory variables. Last, the Poisson regression model was used to analyze the explanatory variables and the per capita per 100,000 population of farmers' markets in counties with at least one farmers' market.

The major study results are as follows (Singleton et al. 2015):

1. Median income is associated with an increased odd of farmers' markets in non-metro counties but not metro counties. Poverty was lower in counties with farmers' markets. Higher than national average median income increases the odds of having a farmers' market in a county.
2. There are higher levels of obesity in counties without farmers' markets.

3. There are statistically significant differences between counties with farmers' markets. The difference in race and the existence of full-service restaurants is not statistically significant.
4. Other retail outlets and facilities are associated with farmers' markets in different ways. Higher per capita of convenience stores in counties decreases the likelihood of farmers' markets, in metro and non-metro areas. At the same time a variety of other facilities increases the likelihood of farmers' markets: recreation facilities, supercenters, and specialized food stores. Higher per capita of grocery stores is associated with increases per capita of farmers' markets. Fast food restaurants in metro and non-metro counties was positively associated with per capita farmers' markets. There is an increased likelihood of farmers' markets in metro counties, but not non-metro counties, having fast food restaurants.
5. The South Region (Census region which includes the USDA Southwest Region, except New Mexico which is in the West region), unlike other regions, has more counties without farmers' markets (55.8%) than with farmers' markets (35.8%).
6. Percentage of black and Hispanic residents is negatively associated with per capita farmers' markets.

Results show differences at the county geographic scale between those with farmers' markets and those without farmers' markets (Singleton et al. 2015). These differences are related to population density (metro and non-metro), socioeconomic variables, and the retail and community amenity environment. Higher socioeconomic status is generally associated with the greater likelihood of public markets, but with some inconsistencies. Higher median incomes increase the likelihood of farmers' markets, and poverty lowered the likelihood. On the other hand, the per capita number of farmers' markets is not associated with median income (Singleton et al. 2015).

The retail environment differentiates counties with and without farmers' markets. The presence of other types of retail increases the likelihood of famers' markets, such as grocery stores, superstores, and specialty food stores. Grocery stores are very influential. A large concentration of grocery stores (high per capita) is associated with a significant increased the per capita of farmers' markets. Fast food restaurants in metro areas and non-metro areas are positively associated with farmers' markets, but the likelihood only increases in metro counties.

A diversity in consumer food and retail choices appears to be related in some way to the presences of farmers' markets/public markets in many counties. The presence of convenience stores does not bolster the per capita number of public markets (Singleton et al. 2015).

2.4 Establishing the Concept of Nontradable Goods in Economic Geography

Glaeser (2001) defines four critical urban amenities for the success of cities: "rich variety of services and consumer goods"; aesthetics and physical setting; good public services; and finally speed (Glaeser 2001: p 28). He differentiates national goods, such as manufactured goods, from local goods, those goods that are "hard to transport" (Glaeser et al. 2001: 28). These local goods are consumption amenities. In his description, Glaeser includes restaurants, live performance theaters, and movie theaters, among these local goods and consumption amenities. He notes that cities with these consumer goods amenities have grown more quickly than cities without them.

Schiff (2015) expands upon Glaeser's concept and defines these local goods as "local nontradable consumer goods." The term, local nontradable consumer goods is further categorized by Schiff in his study on restaurants, as a "nontradable consumption amenity" described as:

> I will continue with this notion of *local nontradable consumer goods* and suggest that it is especially for products characterized by significant consumer transportation costs, *heterogeneous tastes*, and a fixed cost of production, that the ability of cities to agglomerate people with niche tastes will lead to greater variety. Examples of this type of product would include bars, concert halls, hair salons, movie theaters, museums, restaurants, and any other *location-based service or good that is differentiated and patronized by consumers with a specific set of preferences.* This ideawould also hold for retailers that aggregate specific collections of *tradable goods and where visiting the store itself* provides some substantial benefit to the consumer, such as specialty bookstores, niche toy stores, or clothing boutiques. (Schiff 2015:1086-87; emphasis added)

The key concepts of a "location-based service or good" and "consumers with a specific set of preferences" appear to be relevant for public markets. Public markets are gathering spaces and appeal to consumers with specific preferences. Central place theory establishes product differentiation in cities and is relevant for the variety of goods necessary to include local nontradable consumer goods.

2.5 The Context for Local Nontradable Consumer Goods: Creative Cities and College Towns in a Global Economy

The presence or not of local amenities is influenced by education levels of people who live there (Glaeser 2004). The relationship between education and other talents of the population and characteristics of cities is discussed in the literature on creatives and college towns. As the world becomes more interconnected in the global economy, cities are becoming more important as hubs of innovation and concentrations of human capital. The "creative city" concept goes back at least to the 1980s (Landry 2009) and has since evolved to include approaches to economic development. Some cities attempt to attract "human capital or talent," the educated (Vinodrai 31, 2013), and the "creative class" (Florida 2012) to foster new ideas, technological innovation, and the economic growth. Populations with four-year college degrees are correlated with promoting economic growth in U. S. cities (Glaeser 2004). The creatives, however, are not limited to the college-educated, according to Richard Florida who defined the term in the early 2000s (Florida 2012).

The creative class is a new social class that includes college-educated (60%) and non-college educated people (40%) whose work entails creating "meaningful new forms." (Florida 2012: 38). Florida brought the term "creative class" into the economic and urban geography debate about the conditions necessary in a city for economic growth. His concept includes the

first tier of the super-creative core, including college professors, novelists, nonfiction writers, cultural figures, analysts, architects, designers, and artists, and thought leadership such as analysts and cultural figures. The second tier of the creative class are the creative professionals, such as high-tech, legal, and healthcare professionals, sales, and financial services, who are in "knowledge-intensive industries" (Florida 2012). There are also technicians that are a subset of the creative class. Economic growth, Florida contends, occurs in communities that are welcoming to the creatives, and that have amenities that would attract that class to live there.

The creative class is measured by a "creativity index" in a city, which includes technology (technology and patent concentration); talent (creative class); and tolerance (foreign-born share, gay and lesbian index, and integration index) (Florida 2012). In 2010, Boulder, Colorado was ranked first for the creativity index and Austin, Texas was ranked the highest in the Southwest Region at 17 out of 361 metro areas (Florida 2012), with creative class concentrations in its downtown and western portions (Florida 2017:144) (Table 2.2).

Table 2.2: Creativity Index Ranking for Selected Metro Areas in the Southwest Region, 2010 (Florida 2012)

Metro Area	Ranking (out of 361)	Creativity Index out of 1.000	Creative Class Share of Employment
Austin-Round Rock, TX	17	0.916	34.4%
Dallas-Fort Worth-Arlington, TX	33	0.865	34.3%
Santa Fe, NM	39	0.849	34.3%
Albuquerque, NM	48	0.820	32.9%
Houston-Baytown-Sugar Land, TX	52	0.794	33.0%
Las Cruces, NM	80	0.727	33.8%
San Antonio, TX	100	0.663	31.2%

It should be noted that the "Keep Austin Weird" civic movement reflects the creativity and eccentricity of Austin as its cultural identity for the city (Long 2010). This "Keep…Weird" movement is also occurring in other cities with high creativity indices, such as Boulder,

Colorado (Rank 1) and Portland, Oregon (Rank 13), that pride local business and a "sense of place" in a period of rapid growth and homogenization.

There is no universal agreement on the true importance of the creative class or the definition of the class for economic development more generally. Florida notes economist Edward Glaeser's contention that the college-educated solely define this class, thought Florida disagrees (Florida 2012).

In the Canadian and European context, another analysis of Florida's work leads to more diverse conclusions about the creative class, and that different creatives may be attracted to different types of cities (Asheim 2014). This conclusion stems from a study on relating the percentage of talent pool in creative occupations in Canadian cities to a variety of quality of life indices (Vinodrai 2014). The indices are melting pot, bohemian (artistic occupation), gay, universities (their presence), patents per capita, economic diversity, livability (housing in repair), affordability, and sustainability (bike or public transit commuting). Sustainability and bohemian indices are the most significant, followed by university presence, economic diversity, and the gay index for creative workers overall. (Vinodrai, 2014). These creative workers do not have uniform preferences, as art and cultural professionals are drawn to areas of diversity and openness (bohemian, sustainability, universities, and gay index), while natural and applied science professionals are drawn more to areas of innovation (patents, universities, affordability, sustainability, and livability). (Vinodrai 2014). Whoever is correct, the question remains: does the presence of the creative class promote public markets in a city? Is education related? The level of the creativity index?

The presence of college towns, with colleges per capita prior to 1940, is highly correlated with the presence of the college-educated by the year 2000 (Glaeser 2004). Likewise, the

educated city is correlated with population growth. (Glaeser 2004). Furthermore, "human capital is associated with rising consumer amenity levels at the local level…" (Glaeser 2004:76). This relationship between consumer amenities and education leads to a discussion of college towns.

College towns are unique to the United States (Gumprecht 2003). The college towns are within two major cultural categories, according to geographer Gumprecht (2009): the more left-leaning schools emphasizing the social sciences and humanities, and the more conservative in colleges that emphasize the physical and applied sciences. (Gumprecht 2003; Gumprecht 2009). He describes college towns, such as Davis California and Lawrence, Kansas as having farmers' markets that reflect the preferences for organic food and a more diverse restaurant and food culture (Gumprecht 2009). Many college town retail districts have concentrations of health food stores and vegetarian restaurants. Some college towns, such as Davis, California, have a history of founding food co-ops and other alternative institutions. College towns often attract the creative class, "college towns all over are home to creative individuals who found their place in a college town. and certain college towns develop into bohemian islands." (Gumprecht 2009: 191).

The questions emerge as to whether consumer amenities, such as public markets, may be correlated with education levels and/or college towns. Is the creative class part of this discussion?

There are a considerable number of college towns in the Southwest Region, as shown in Table 2.3. The total of 830 towns includes colleges and universities, as well as junior colleges and other technical schools. In this case, college towns include more than the "college-educated" and includes other types of creatives as defined by Florida (2012 and 2017). The relationship between college towns and public markets is a topic of investigation for this study.

Table 2.3: Colleges, Universities, and Technical Schools in the Southwest Region (USGS ScienceBase Data, 2010)

Type of Educational Institution	Count of NAICS Category
Business and Secretarial Schools	4
Colleges, Universities, and Professional Schools	244
Computer Training	1
Cosmetology and Barber Schools	148
Junior Colleges	230
Other Technical and Trade Schools	203
Grand Total	830

2.6 Central Place Theory and Trade Areas

Central place theory is a pivotal retail model as background for the recent Schiff (2015) research on nontradable consumption amenities. Brian Berry, an influential urban/economic geographer, further examined retail trade areas as related to central place theory in his classic work of the 1960s (Berry 1967; Berry 2005). In the 1950s and 60s, "sophisticated economic location theory" emerged, such as central place theory, based upon neoclassical economics and geography's quantitative revolution. Central place theory asserts that bolstering the central place assists the economic growth of the entire region (Blakely and Bradshaw 2002).

In central place theory, the relationship between scale economies and per-capita demands determines which industry will locate in what size city relative to population. Firms only locate according to access to their consumers and minimizing the firm's travel costs. Firms locate at the center of a region and the city will develop around the firm, with workers locating near the firm to reduce commuting costs. Regions are divided into low, medium, and high order cities according to the size of cities and a variety of goods sold in each city (O'Sullivan 2011). Different types of stores prefer different types of centers. It is the "balance of interdependency"

that creates the central place system (Berry 1967). Central place theory may contribute to the analysis of what types of cities support public markets and support product variety. Product variety is related to city size and urban agglomeration (Schiff 2015; Glaeser 2001).

Urban geography is a "cockpit of competing schools of thought." (Berry and Wheeler 2005). Today economic geographers/retail geographers are also interested in not just in quantitative models alone, but also in cultural geography and questions of consumption and the expression of various identities (Gregory et al. 2009; Crewe 2001; Wrigley et al. 2002). Postmodernism emerges with "multiple-worlds" and "subject-centered" approaches (Berry and Wheeler 2005).

The trade area is one geographic scale that is assumed to be more specific than counties or census places in identifying which cities have the decision-makers (customers, vendors, and institutions) to support the product variety found at public markets. An extensive literature exists in retail geography and economic geography about defining trade areas and analyzing customer data for many types of retail establishments. A trade area is "the geographic area from which the store draws most of its customers and within which market penetration is highest" (Ghosh and McLafferty 1987: 62). The trade area is defined by both socioeconomic characteristics and distance traveled. The trade area is linked to travel distance and transportation costs of the customers, and delineates how far customers are willing to travel to purchase the local goods sold at retail locations. In this case, like found in the USDA competition zone study (2011), vendors must also travel to the location. It is this "spatial market" that is very important to retail establishments and corporations in deciding where to open new locations or close existing ones (Jones and Simmons 1990, Chen 2011).

The literature is limited on trade areas for public markets, but there are some studies on

travel distance. A review of early studies from the 1970s to 1990s found an average travel distance of about 20 miles for farmers and vendors, and noted that vendors will travel longer distances in more rural areas, up to even 240 miles in one case (Brown 2002). More recently, the travel distance for customers ranged from 2 to 19 km (1.25 miles to 12 miles) for Flint, Michigan and 0 to 9 km (5.5 miles) in London, Ontario Canada (Sadler et al. 2013).

The USDA conducted a farmers market manager survey in 2006 that was analyzed by region (USDA AMS 2009). In the Southwest Region, nearly 40 percent (36.4%) of vendors travel less than 10 miles to a market. That is comparable to the United States (37.7%) as a whole. In the Far West, 12.9% of vendors travel more than 100 miles to a market, at only 7.47% in the Southwest. Only a minority, 4.17% of vendors, travel more than 100 miles in the United States (USDA AMS 2009). A 2011 USDA study[1] used mileage as an indicator of travel distance, ranging from 10.2 to 19.2 miles for customers and 23.2 to 46.8 miles for vendors. Customer distances traveled were estimated to be the largest in the most rural communities.

Trade areas are not limited to customers when discussing public markets, since the vendors must also travel to the retail location (USDA 2011). An additional perspective on the trade area literature is foodsheds and marketsheds which delineate the geographic area and distance traveled by customers and vendors (Aucoin and Fry 2015). This literature directly relates the concept of local goods and public markets to trade areas. Foodsheds are another geographical level of analysis for the customer base or customer radius for public markets. Gayeton (2014: 19) refers to the “local foodshed as a geographic area where food is grown and consumed.” (Kloppenburg et al. 1996:12) defines foodshed analysis as the "many quantitative

[1] The USDA *Mapping Competition Zones for Vendors and Customers in U.S. Farmers Market* study (2011) used 2006 Market Manager data on estimated travel distances by customers and vendors.

and qualitative transformations that food undergoes as it moves through time and space toward consumption." The foodsheds include alternative forms of production and distribution in creating a local food system, such as community supported agriculture (CSA), farmers' markets, and sustainable agricultural methods (Kloppenburg et al. 1996; Ackerman-Leist 2013).

A study on the Dallas-Fort Worth's local food system and farmers' markets delineates the foodsheds, or trade area for farmer vendors, and marketsheds, or trade area for customers (Aucoin and Fry 2015). This analysis is another perspective on the USDA (2011) competition zone study (discussed below) from the local food system lens. As reported by market managers, the distance traveled by customers in 2014 were 10 miles for Denton, Texas, 20 miles for White Rock in Dallas, and 30 miles for Coppell (Aucoin and Fry 2015). The researchers noted that Denton's foodshed was much smaller, at about 30 miles[2], than for the other two markets in the study, with farmers mostly in Denton County. Coppell had an approximate 70-mile foodshed[3]. The Aucoin and Fry (2015) study also noted that the Denton Community Market's customers and market managers stated the importance of the market as a community gathering space and not just a location of business activity. The idea of place is important to customers and market managers. On the other hand, the producers/vendors did not have a clear concept of "place."

2.7 Trade Area Study: USDA Competition Zone Study

A comprehensive study on trade areas of farmers' markets is a study conducted by the USDA in 2011 using data on estimates from customer and vendor locations in the 2006 USDA National Farmers Market Managers Survey (USDA 2011). The study included the competition

[2] Estimated from the" Foodsheds for select DFW farmers' markets map" in Aucoin and Fry (2015) study. It is the largest Euclidean distance from the market to the farthest point for each market.

[3] Distance derived like above, Aucoin and Fry 2015.

zones for customers and vendors for all 4,364 farmers' markets in the United States in 2006 (USDA 2011). This study used mileage as an indicator of travel distance, ranging from 10.2 to 19.2 miles for customers and 23.2 to 46.8 miles for vendors (Table 2.4). Customer distances traveled were estimated to be the largest in the most rural communities.

Table 2.4: USDA Average Vendor and Customers Travel Distances by Rural Urban Continuum (RUC) Codes for Farmers' Markets, 2006 (USDA 2011)

Code	Description	Vendor Distance (mi.)	Customer Distance (mi.)	Number of Markets	Percentage of Markets
RUC1	Metro – Population ≥ 1 million	46.8	10.4	1,532	35%
RUC2	Metro – Population 250,000 - 1 million	33.1	12.0	845	19%
RUC3	Metro – Population < 250,000	32.4	12.0	531	12%
RUC4	Urban – Population ≥ 20,000, adjacent to Metro	25.6	11.9	316	7%
RUC5	Urban – Population ≥ 20,000, not adjacent to Metro	35.6	14.6	192	4%
RUC6	Urban – Population 2,500 - 19,999, adjacent to Metro	24.2	12.3	442	10%
RUC7	Urban – Population 2,500 - 19,999, not adjacent to Metro	24.3	10.2	320	7%
RUC8	Rural – Adjacent to Metro	24.7	12.9	84	2%
RUC9	Rural, Not adjacent to Metro	23.2	19.2	101	2%

The USDA defined "competition zones" as a means of looking at what factors may influence market success. The premise of the study is that if there is an overlap of customer or vendor travel zones with other markets' customer or vendor travel zones, this impedes market success. The study finds that most markets have limited competition for customers "which might signal that customers are not willing to travel far to participate in a farmers' market." The study

concludes that “Managers may need to focus on drawing more customers from within their existing trade zones.” (USDA 2011).

The distances traveled to markets by customers and vendors were estimated from the sample of farmers’ market manager respondents in the 2006 USDA National Farmers Market Managers Survey. These weighted averages of distances were classified by USDA rural urban continuum codes (RUCs), a system that classifies counties into nine categories based upon population and location in metropolitan areas. This RUC coding system is a categorization of population density, and defines rural versus urban counties. (USDA ERS 2016)

The competition zone study is very relevant to the current study, since the distances traveled by customers and vendors provides one justification for selecting 15-minute drive times. Although the USDA study did not use drive times, the distances support the assumption that customers travel less than vendors. Table 2.4 shows average distances traveled for customers and vendors in the USDA study.

Although the average distances do not follow a consistent pattern of increasing distance as the county is more rural, in general the most rural counties have the farthest travel distances for customers (19.2 miles) and vendors (23.2 miles). The largest metropolitan areas of more than one million people have the greatest vendor distances traveled of 46.8 miles, yet almost the least customer miles traveled (10.4 miles). More density appears to attract vendors but encourage customers to travel less to get to the farmers’ markets. The findings of the USDA study establish a context for the more detailed trade area analysis of the Southwest Region.

The concept of drive-time, not just distance traveled, is important for this study. The trade area for customers defines the “demand-side” for goods produced in the retail environment. In recent decades, car-based journeys are especially important in determining trade areas (Birkin

et al. 2002), even with the emergence of e-commerce. Drive-time areas are often used in GIS analysis to define the trade area (Segal 2016). Drive-time areas are polygons around a retail location that account for the customers' driving barriers, including driving speed, the road design and, traffic rules. "Time distance" is an important psychological factor in decision-making of customers. (Cui et al. 2012: 1867). While drive-time analysis is often used for "convenience" types of retail (Segal 2016), the concept may be applied to any retail location where customers are deciding between several options. The size of this trade area where customers are willing to travel is the market range related to travel costs (Rodrigue 2016).

It can be assumed that public markets are generative activities, like supermarkets. As found in a review of the economic development literature, shoppers of public markets also shop at other businesses in the downtown during their visit to the market (Hardesty et al. 2016). Tourism to public markets (Jolliffe 2008; Travel Industry Association 2006) also generates retail activity, since tourists will also go to other retail establishments in the downtown.

As a generative activity, the literature states that the size and characteristics of the trade area are important for retail success. Three methods are enumerated to define the business' trade area extent: spatial monopoly and Thiessen polygons; market penetration using customer data; and dispersed markets with lifestyle profiles (Jones and Simmons 1990). The spatial monopoly method is used to select new retail locations. For a spatial monopoly, it is assumed that a trade area only serves one facility and the characteristics of that trade area are linked with that facility. Thiessen polygons are created by connecting the same type of stores and then bisecting the midpoint of the lines. These midpoints are connected to create the trade area (Jones and Simmons 1990). The polygons are used to delineate competing retail establishments of the same type. Public markets competing in a region may have trade areas defined in this manner.

Thiessen polygons do not account for barriers to travel like the drive-time radius trade area, but the model assumes that customers will chose the closest location.

The spatial market and drive-time radius trade area are all aspects of "location intelligence," where Big Data can provide insights into the customers who live within the trade area (Bounds 2016). Geodemographic analysis assumes that people live together in the same areas and will have the same patterns of consumption based upon income, ethnicity, education, and other demographic factors. Marketing can then target the group that is more likely to purchase a product or visit a venue (Inman et al. 2004).

2.8 The Role of Public Markets in Rural Communities

As shown in Singleton et al. (2015), there are differences in some variables associated with public markets between metro and non-metro counties (rural). Rural communities, like low-income socioeconomic urban communities, may be classified as "food deserts," with reduced access to grocery stores, supermarkets, restaurants, and other retail outlets to purchase healthy food. (Smith and Morton 2009). Areas with higher per capita of grocery stores are more likely to have higher per capita of public markets (Singleton et al. 2015), yet some rural communities support public markets. To solve food access problems, communities may turn to food pantries, food coalitions, community-supported agriculture, community gardens, co-operatives, and farmers' markets (Smith and Morton 2009).

Poor access to healthy food is associated with obesity and chronic illness, such as diabetes, while increased access to local food is associated with a reduction in obesity and diabetes (Salois 2011). Local food is available through farmers' markets/public markets or direct farm sales. A Canadian study found that food co-operatives and other types of co-operatives are

"coping mechanisms" for rural areas that have limited retail choice (Rice and Lavoie 2005). Co-operatives lower retail prices and provide "a business presence where outside firms are not willing to locate." (Rice and Lavoie 2005: 371). Public markets may also serve this same role in the rural United States.

2.9 Climatic Factors for Local Food Production

The Farmers' Almanac has been in print since 1818 and helps farmers plan crops according to weather predictions (Farmers' Almanac, 2018). Temperature, precipitation, and soil conditions are related to crop success **(**Park and Sinclair 1993; Morgan 1961; Sacks et al. 2010), and animal husbandry. The almanac (2018), like the USDA zones, designates the Southwest Region as "South Central" and includes the same USDA-designated states. Since farmers are an important component in all markets, if not the sole component in 40% of markets (USDA 2016), the farmers' ability to grow crops and raise animals may very much be associated with public market success. Without the farmers' ability to offer a variety of products, there would be no or little ability to participate in the market.

Annual rainfall and temperature are important for the success of crops and determine the types of crops that can be planted. The USGS publishes maps with annual precipitation zones from the 1990-2010 period (USGS 2015; see Map 4.3). The USDA publishes temperature information in the plant hardiness zone map (USDA ARS 2017). The latest map of 2012 shows the average annual minimum winter temperatures, divided into 10-degree Fahrenheit zones (see Map 4.5). This map helps farmers determine how many growing seasons are possible and the types of plants that may thrive in their zone. Both maps aid farmers in planning their crops according to historic weather conditions.

2.10 The Literature Review Reveals Gaps on Public Markets.

2.10.1 Gaps in Research for Explanatory Variables for Public Markets Success at Different Geographic Scales

Until now, there are few studies at a national scale or the Southwest Region scale about the patterns of public markets and the underlying conditions that make them successful. One major study identifies socioeconomic differences between farmers' market locations and non-farmers market locations in 2011 at the census tract and neighborhood scale (Schupp 2016). There was no clear trend on median income, as lower income neighborhoods are associated with public markets as well as higher income areas. Higher education is associated with farmers' markets, but race was not clear-cut if looking at the regional scales. Ethnic diversity characterized the Mid-Atlantic and New England regions and areas with public markets (Schupp 2016). Schupp (2016) identified the need to investigate the interrelationships of the explanatory variables, which could not be done given the statistical method used.

Another recent study evaluates socioeconomic, health, and, retail environment variables at the county scale, and identifies further research questions (Singleton et al. 2015). They found there might be a relationship between higher median incomes and public markets presence, with a higher likelihood of having a public market in the county (Singleton et al. 2015). They also establish the need for research on the relationship between socioeconomic status and the presences of public markets. Neither of these studies address the trade area scale that may more accurately reflect that actual customers and vendors of a market. The Aucoin and Fry (2015) study addresses the DFW trade areas scale for foodsheds. Their study, however, only includes descriptive data of producers but does not include an analysis of the interrelationships among variables.

2.10.2 Gaps in Economic Model of Local Nontradable Consumer Goods as applied to Public Markets

A major study (Schiff 2015) that discusses nontradable consumption amenities and local nontradable consumer goods does not have any specific discussion on public markets. The nontradable goods are tied to locations, and it is reasonable to assume that the local goods sold at public markets may be deemed local nontradable consumer goods because of where they are purchased. Just as customers experience niche restaurants and purchase food in specific places, so do public market customers. This study will further evaluate this assumption. As discussed above in the consumer demands literature and places literature, public markets may exist because of the desire to experience a sense of place, community, and connection with local culture in an era of globalization. A new model, largely out of humanistic and postmodern thought, includes local nontradable consumer goods, socioeconomic conditions of cities, and other factors that will provide geographic insight into the success of public markets in the Southwest Region.

CHAPTER 3

RESEARCH CONTEXT: CASE STUDY OF THE DENTON COMMUNITY MARKET POSITIONALITY

The City of Denton (population 130,000) is a college town located 35 miles north of Dallas and Fort Worth. The city has two major universities, the University of North Texas and Texas Woman's University. The city is home to the Denton Community Market (DCM), a public market that includes local farm products, local artisan products, and weekly community activities, including live music performances. The market has experienced explosive growth, expanding from 15 vendors in 2010 to nearly 200 vendors in total as of 2017. The DCM averages 70-100 vendors on-site per week and 2,000-5,000 visitors per week at its downtown Denton location.

The concept of positionality is important to the motivation and approach to this study. Positionality is "the fact that a researcher's social, cultural and subject positions (and other psychological processes) affect "the questions asked, the framing of questions, the theoretical bases and reading of those theories (Gregory et al. 2009: 556). Positionality as a factor of influence on geographic research has been discussed in the literature since the 1980s (Gregory et al. 2009) as related to feminism and qualitative research (Bondi 1999).

My position as a market manager of the Denton Community Market was highly influential on selecting the study area, the variables for the study, the subjects of study, and the data collected and analyzed. I was a co-founder of the market in 2009, and have been a market manager from then through the present (2017). I am now its executive director, where I have seen the organization evolve, from a private partnership to a non-profit organization. The term "market manager" is often used in the USDA literature and other studies on farmers' markets and public markets, and this is the primary term I use here. I define the term "market manager"

as someone who is involved in the management of daily operations, management of staff, funding, vendors, activities, policies, and an array of decisions and governmental interactions.

As the DCM grew, my interest in research grew. Denton is a college town, and I wondered if the underlying conditions of the city created success with the market's growth and popularity. The USDA Farmers Market Promotion Program (FMPP) Grant process also helped to formulate my perspective on factors that influence a market's success. Many efforts funded by the grant expanded farmer and vendors success, such as the new Farmer's District added to the market in 2015 (see Figure 3.1).

Figure 3.1: DCM Farmers' District as Outcome of USDA Grant

I worked with the other market manager, the board of directors, the vendors, and volunteers, to improve the DCM in terms of the number of vendors, the number of visitors, the activities offered, and the influence upon the quality of life in the City of Denton. The overall goal was to become a successful market in Denton that is financially stable, promotes economic development, provides local produce and other goods, and is a gathering space for the

community. During the process, I learned that the vendor community is much more diverse than first encountered, for as our size grew so did the diversity of opinions and backgrounds. I also witnessed an increase in ethnic diversity, both in customers and vendors.

Finally, the University of North Texas and Texas Woman's University both assisted the DCM with resources of staff, volunteers, Board members, special collaborative events, information, and vendor training over the years. This collaboration and influence, which continues to grow, is also important in terms of customers and vendors. I wondered how the college town influence was important for our success.

The USDA funding for the market provided the financial support to conduct surveys of market visitors and vendors. The final USDA report is an important key resource for this study in providing qualitative background data.

This market manager experience informed the selection of the regression variables for this study in several ways. First, the DCM market penetration study, completed as manager (see market penetration study summary below), made it apparent there are different income levels by primary, secondary, and tertiary markets or customer base. This raises the question of how important is median income in determining the success of a market? Also, are there certain income levels that promote market success? Since the USDA grant allowed the market to provide SNAP benefits for low-income families, as well as the WIC program, it is apparent that lower income individuals find it difficult to afford the food products at the market without such assistance. Is there an income threshold to predict market success?

Second, my manager experience has shown me that the diversity of vendors and visitors has increased over the years with more ethnically diverse businesses and visitors attending the market. Does ethnicity play a role in market success?

Third, informal observation as manager leads to questions on whether age is a factor for purchasing power and the demand for local products at the market. While many college students attend the market, it is possible that families and older individuals may have higher purchasing power for local goods or that they have more demand for local goods? Or is there an awareness about markets at different customer age levels?

This study is predominantly a quantitative analysis of geodemographic data at the trade area level for the Southwest Region. However, the DCM qualitative data from a previous DCM study for the USDA grant, provide additional insight into the motivations of customers and vendors that participate in the market (DCM 2017). The DCM previous study also analyzed DCM customer zip code data used for a market penetration analysis delimitating the N-minute trade area (Cui et al. 2012).

3.1 DCM Market Penetration and Trade Area Geodemographic Analysis

Market penetration and customer spotting are methods of defining and characterizing trade areas for retail locations. Classic retail geography theory on customer spotting and the division of trade areas in primary, secondary, and tertiary markets (Applebaum 1966) is the basis for the ESRI Business Analyst market penetration analysis of DCM customer zip code data (DCM 2017; see Appendix A). ESRI's Business Analyst software has built-in geodemographic data based upon consumer spending data, 2015 socioeconomic data, and ESRI's proprietary geodemographic segmentation system (Tapestry), all tabulated by zip code. This was the first analysis of DCM customers to determine market penetration and geodemographic characteristics by trade area (drive-time).

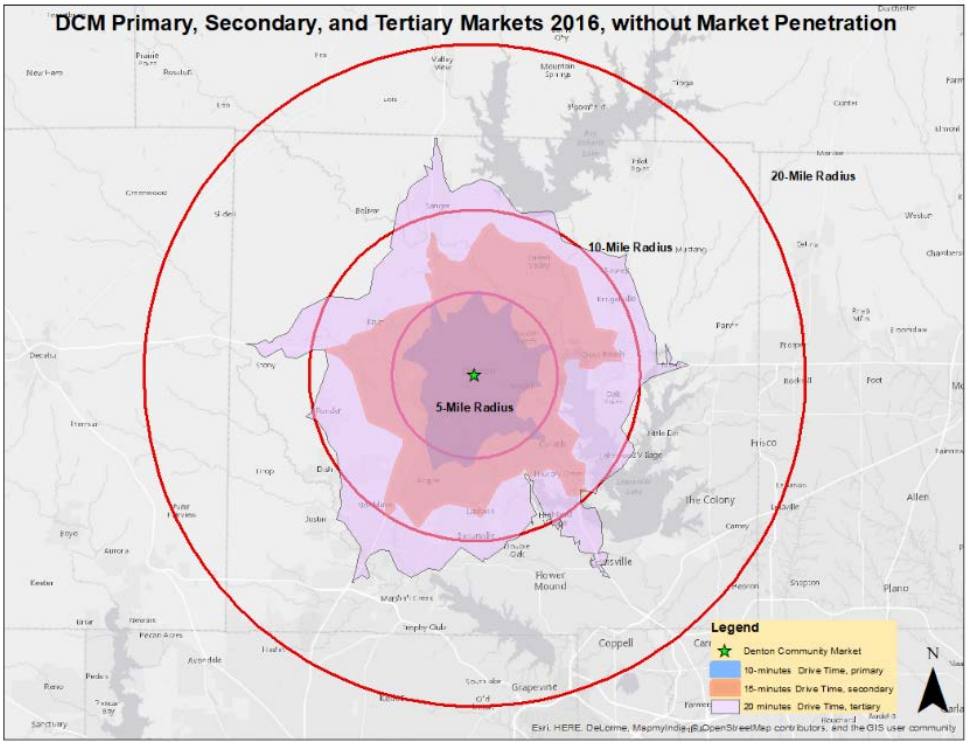
The market penetration is the percentage derived from DCM customers divided by total

population per zip code (ESRI 2017). Customers and sales data is ranked in order by proximity to the store to determine areas with 60% of sales for primary sales trade area. The secondary market would be areas with 15, 20, or 25% of sales (Applebaum 1966). This market penetration analysis combined with a drive-time trade area analysis and geodemographic segmentation analysis is important for the following reasons:

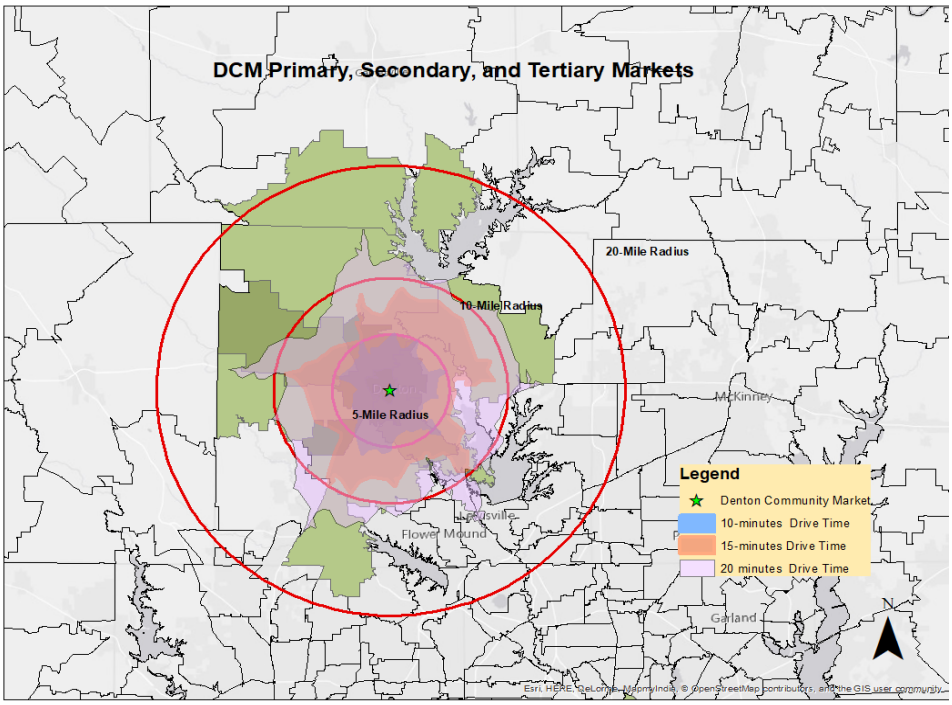
1. It establishes a 15-minute drive time trade area (primary and secondary trade area) of public markets in the Southwest Region.
2. It establishes baseline median income information on current and potential customers of the DCM. This baseline information is important in thinking about median income as an explanatory variable in the public market study.

The GIS overlay of market penetration and drive-time segmentation analysis shows the characteristics of the primary and secondary markets for the DCM. Jones and Simmons (1990) recommend using the market penetration method when a single retail location wants to capture more customers and sales by extending its trade area. The goal is to figure out the proportion of residents in an area or neighborhood that use a retail location. (Jones and Simmons 1990) and then describe those residents by socioeconomic categories and Tapestry geodemographic segments.

Using ESRI's Business Analyst, the distribution of DCM customers is 63% within 10-minute drive time (primary) and 75% within 15-minute drive time, or the primary and secondary markets combined. Map 3.1 shows the primary, secondary, and tertiary markets, using the drive-time radii without the overlay on the market penetration study. Map 3.2 shows the market penetration study overlay. The drive-time trade areas (primary, secondary, and tertiary markets) are characterized by the geodemographic characteristics and the retail potential index for purchasing fruits and vegetables.



Map 3.1: DCM Primary, Secondary, and Tertiary Markets without Market Penetration, 2016. Source: DCM 2017



Map 3.2: DCM Primary, Secondary, and Tertiary Markets based upon Customer Zip Code Locations. Source DCM 2017

Table 3.1 shows the results of the geodemographic analysis by trade areas. The primary trade area, while well saturated at 41%, does not include the higher income customers who may spend more on fruit and vegetables. The secondary market has a higher retail potential for fruits and vegetables and does contain some zip codes (76259 and 76207) with high market penetration. The 2015 median income is $40,567 within 10-minutes (primary) and $56,510 within 15-minutes (primary and secondary). The retail spending potential increases from 81 (10-minutes) to 102 (15-minutes). College students and recent graduates (college town segment) saturate the 10-minute drive time area, while young families (up and coming families segment) and wealthier suburbanites (savvy suburbanites segment) comprise the secondary and tertiary markets in the 15- minute and 20-minute drive time area (see Map 3.1).

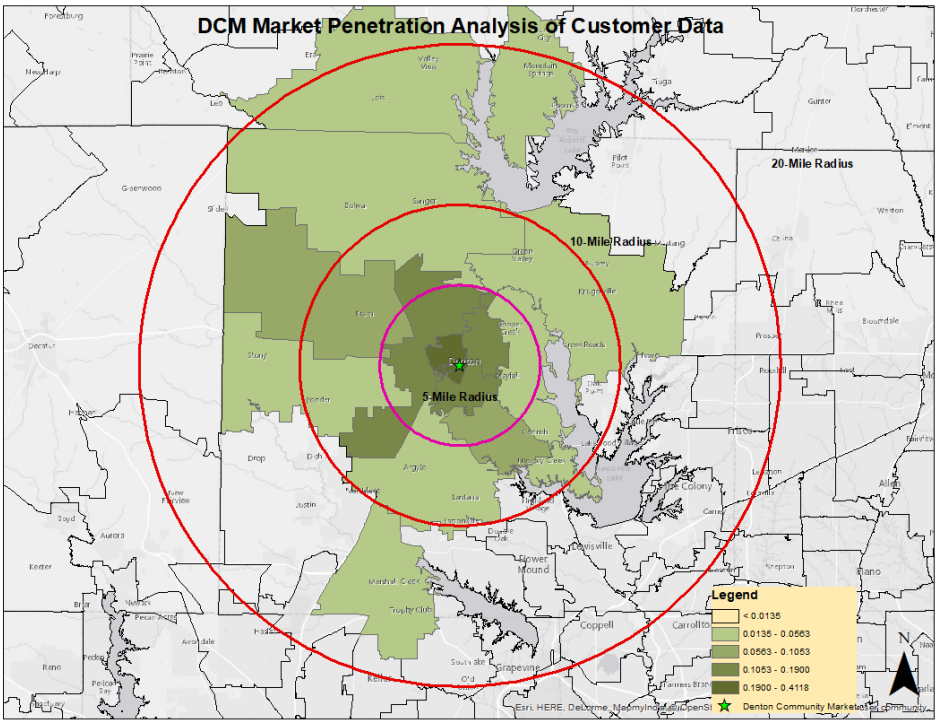
Table 3.1: Results of ESRI Business Analyst Drive-Time Geodemographic Analysis for DCM

	Top 5 Tapestry Segments	Median HH Income	Retail Spending Potential Index for Fruits and Vegetables	Used Organic Food in the Last 6 months
10-Minute	Dorms to Diplomas (14C) College Towns (14B) Bright Young Professionals (8C) Young and Restless (11B) Soccer Moms (4A)	40,567	81	100
15-Minute	Up and Coming Families (7A) Dorms to Diplomas (14C) Soccer Moms (4A) Bright Young Professionals (8C) College Towns (14B)	56,510	102	102
20-Minute	Up and Coming Families (7A) Soccer Moms (4A) Bright Young Professionals (8C) Dorms to Diplomas (14C) Savvy Suburbanites (1D)	67,004	114	101
60-Minute	Young and Restless (11B) Up and Coming Families (7A) Barrios Urbanos (7D) Boomburbs (1C) Home Improvement (4B)	60,805	115	108

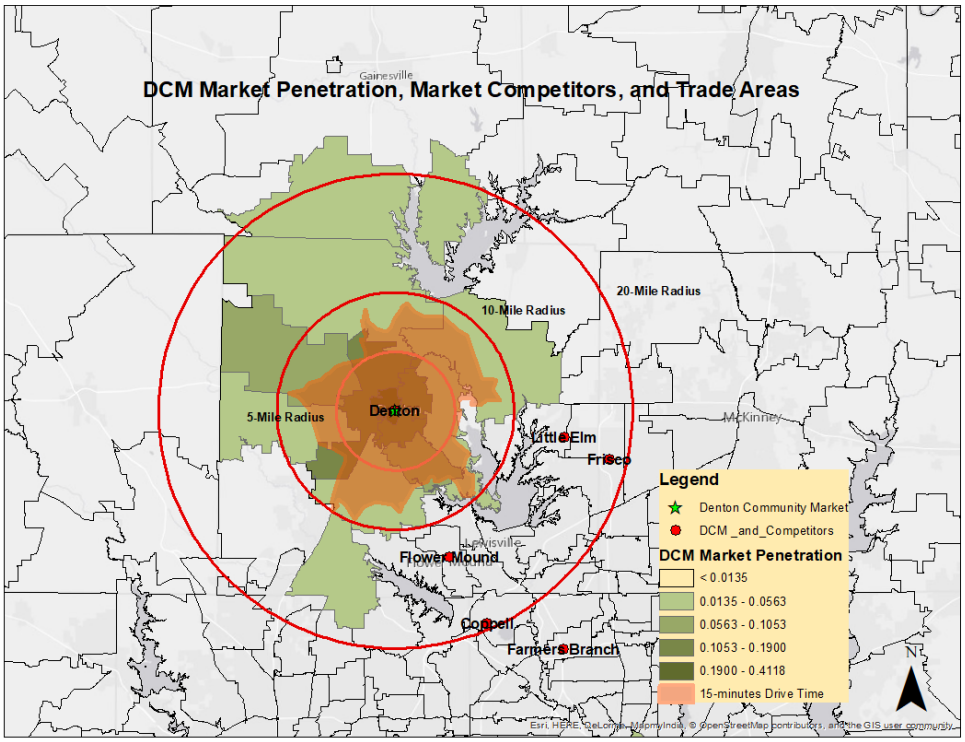
It is important to note that these ESRI Tapestry segments, or geodemographic segments, help predict spending habits based upon socioeconomic status and spending habits. An index of 100 is on par with the rest of the country. A number lower than 100, such as 81 in Table 3.1, means that the 10-minute drive time trade area has a lower spending potential for fruits and vegetables than is norm for the rest of the country. A number higher than 100 indicates a trade area with a spending potential higher than the national average.

Since a majority of DCM customers (75%) are within the 15-minute drive time of Denton, this drive time threshold was used for this study on the Southwest Region. Given that a majority are willing to travel 15-minutes or less to visit a market each Saturday morning, and Denton is located within a large metropolitan area within the Southwest Region, this 15-minute drive time is assumed to be applicable to urbanized areas. As indicated in the USDA (2011) study, rural residents are generally more inclined to travel farther distances, and it is possible that 15 minutes may not capture as many customers in those cases. While it could be argued that more rural areas may have a larger drive-time, for consistency across urban and rural areas in analysis, the 15-minute drive time was used.

Map 3.4 shows the Denton Community Market in relation to its nearest competing public markets.in Little Elm, Flower Mound, Frisco, Coppell, and Farmers Branch. Most of the DCM customers are located within 20 miles of its downtown Denton location, as indicated by the market penetration data, but are concentrated to the north and west of Denton. None of the competitors are within the primary or secondary markets of the DCM or within the 15-minute drive time trade area. The areas of high market penetration do not correspond to areas to the southeast of Denton that have competing farmers' markets.



Map 3.3: Market Penetration of DCM Customers in Denton. Source: DCM 2017



Map 3.4: DCM and Its Competitors. Source DCM 2017

3.2 Evidence of Embeddedness: Local Goods and Community are Important to DCM Customers and Vendors

The Denton Community Market received a $77,000 Farmers Market Promotion Program (FMPP) grant in 2014 to expand operations and promote the agricultural producers at the DCM. As an outcome of this grant, the DCM report included the results of in-person farmer and visitor surveys as well as online vendor surveys. (DCM 2017). Dedoose software identified themes in free-form visitor and vendor responses as summarized in Table 3.2.

Patterns of motivations to attend the market and responses corresponding with perceived embeddedness indicators (PE) (Chen and Scott 2014) emerged from the interview narratives. The DCM study (2017) did not specifically measure PE, but the model is useful in describing the combined three elements of PE. PE is comprised of perceived social embeddedness (PSE), perceived spatial embeddedness (PSPE), and perceived natural embeddedness (PNE) (Chen and Scott 2014). Aucoin and Fry (2015) also included discussion of embeddedness in their discussion of DFW farmer motivations to participate in markets, though not specifically related to the Chen and Scott (2014) model.

Table 3.2: Analysis of Customer and Vendor Preferences at DCM 2015

Customers: Why satisfied with the market? (ranked)	Farmers: Why do you come to the market?	Vendors: Why satisfied with the market? (ranked)
n=24* *Dedoose Analysis	n=9 (Not Ranked-Interviews)	n=54* *Dedoose Analysis
1. Produce (54%)	1.Direct connection with customers to provide local produce	1. Connect with Customers (30%)
2. Local (46%)	2.Environmental benefits	2.Exposure/Advertisement (9%)
3. Organic/Sustainable (17%); Something to Do (17% each)	3.Community	3. Community (7%); Close by (7%); DCM Concept (7%); Vendor Community (7%); DCM Management (7%)
4.Socialize (13%); Community (13%); Crowds (13%); Outdoors (13%)		4. Fun (6%)
5. Dogs (taking them to market and activities) (8%)		5 Good Sales (2%); Local (2%)

Source: DCM 2017

The respondents identified 9 categories of reasons for attending the market or wanting further improvements to the market. Like Brown (2002) and to the customer preferences ranking of recent studies (Table 2.1), Table 3.2 ranks visitor and vendor responses on reasons for participating in the DCM. All of the visitors were satisfied with the market, and a majority identified "produce (54%)" and "local (48%)" as the main reasons for being satisfied. Having "something to do" and "organic/sustainable" produce were the next-ranked reasons for market satisfaction (see Appendix G). The evidence for PE may be summarized as follows:

1. PSE: Many of the responses included elements of social interaction, either with the vendors or the visitors (see Figure 3.2). "Socialize" and "crowds" refer to the social embeddedness of the market, or the meaning that is given to participating in the market as related to social activity. Quotes referring to direct interaction with vendors and customers also are related to social embeddedness. Vendors also indicated that the "vendor community" is important, which implies that social interaction with other vendors is an attractive element of the DCM.

2. PSPE: Spatial embeddedness was very important for visitors (46%) to the DCM. Evidence of spatial embeddedness appears in responses with "local" and "local production." The DCM is located in the 76201 area code. The majority of respondents replied with the "local" or "produce" response as important to them. Local is a spatial term, and shows that geographic location is considered important by participants of the DCM.

3. PSE: Perceived natural embeddedness emerged the most in farmer responses about their farms, and in visitor responses of "organic and sustainable." Environmental sustainability is very important for many of the DCM farmers. The DCM requires that the farms are run sustainably to participate. One farmer describes their motivation for farming and "restoring" the

land”:

> I have felt for years that my calling is to “restore” land by operating in permaculture, and going for creating a forest again. I want biodiversity and have every section with perennials that can grow on their own… The land is being restored, and not taking out more than putting in and I want to leave it better than I found it. (Farmer)

Some other examples of quotes from visitors and farmers are:

> I like to interact with local art and farm producers. I want to support local production. Come to be outdoors and to be in the environment and be with people. (Visitor)

> Yes, very much so [satisfied]. Diversity of local offerings… "fun to come here." Nice to see community that is growing. (Visitor)

> The market is at least 75% of our sales… It is the primary [outlet]. It is a way to interact with people who eat our food, the personal interaction. It is significant and so important for us. (Farmer)

Figure 3.2: Local Produce at the Denton Community Market with Direct Social Interaction between Farmers and Customers

The DCM survey results appear support the premise that the goods and the retail activity have meaning related to perceived embeddedness. This meaning bolsters the argument that the goods purchased at the market and attending the market itself as an activity are related to place,

social interactions, and environmental concerns. The results on spatial embeddedness and social embeddedness correspond to similar observations about the "atmosphere" and community in the DCM case study by Aucoin and Fry (2015) and supports the notion of "sense of place" as important at the DFW famers' markets.

The free-form narrative results are interesting in that these concepts were not presented to the interviewees in multiple choice questions but were a result of the existing visitor and vendor awareness about the DCM market and the local goods available there. The economic interactions that occur at the market are not just related to price, since price was never mentioned as a major motivation for participating in the market. It is the "non-economic "factors that "constrain" the economic activity (Chen and Scott 2014) and differentiates public markets from "from the conventional and global food system" (Chen and Scott 2014:57). Vendors, however, did identify "good sales" as one reason for participating, as well as "connecting with customers" which may be predominantly related to sales.

3.3 Expenditures by DCM Customers

Additional DCM customer data collected in 2017 on expenditures at a single market day for a bundle of local goods shows an average expenditure of $32.35 (Figure 3.3) (DCM 2017). The median household income is $60,000 in this sample, which is consistent with the Tapestry segments data (Table 3.1) within the 15-minute drive time of $56,510 in 2015. It is a small sample of 120 customers, but it does show some interesting facts. This average expenditure of $32.35 is consistent with Sadler et al. (2013) study on average expenditure in Michigan and Ontario. Even though it is a small sample, it is interesting to note the relationship between expenditures and reported household income. In general, as one would expect with normal

goods, as income rises, so does the expenditure. The pattern, however, is not consistent, given that a customer earning $50,000 per year is not spending more than someone earning over $100,000 per year.

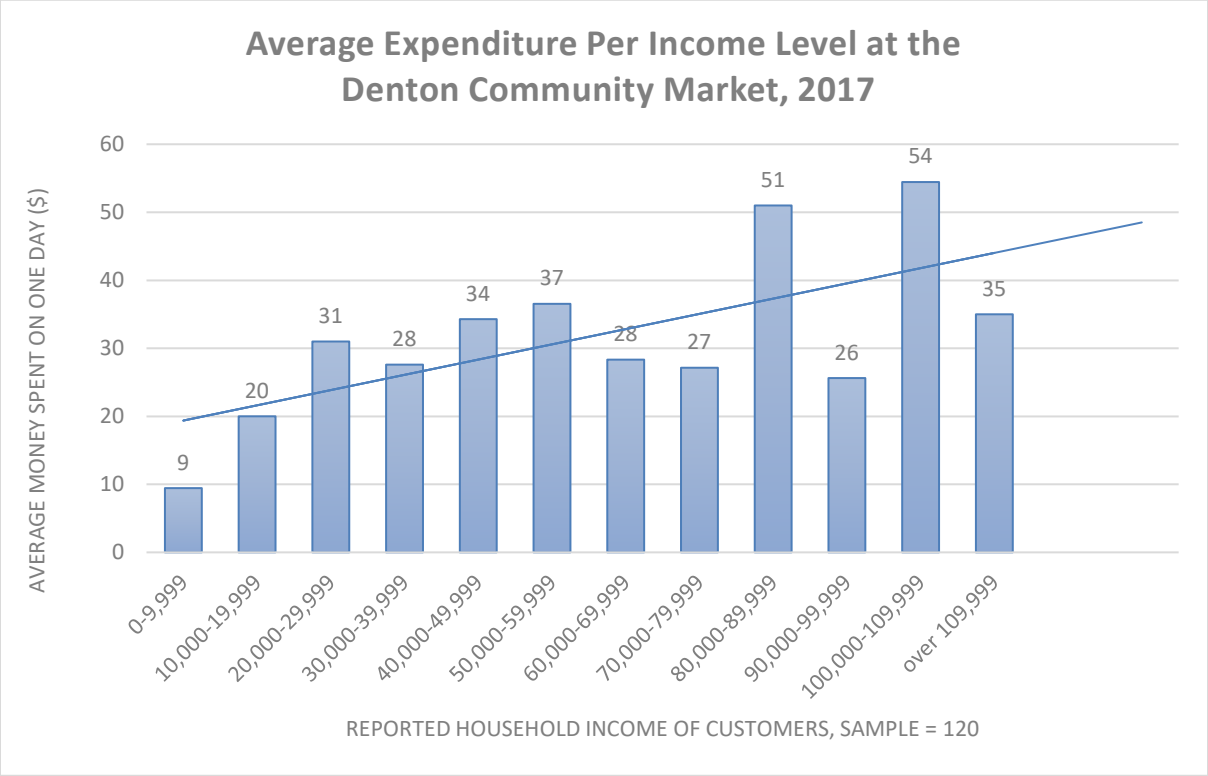


Figure 3.3: Average Expenditure by DCM Sample Customers, 2017

Most of the customers at the lowest income level ($9,999 and under) identified themselves as students, thus these represent a typical customer in the Tapestry segment of dorms to diplomas. Students spent $9.00 on average, well below the $32.35, yet they represent a significant portion the highest market penetration levels in the 76201 and 76203 (University of North Texas) area codes. The other income groups represent the young families and educated professionals who also comprise the Tapestry segments identified, for example, as the bright young professionals, college towns, young and restless, up and coming families, and savvy suburbanites.

This sample did not include WIC (Women, Infants, and Children) voucher customers

who used USDA-funded vouchers to purchase produce at the Denton Community Market. From anecdotal evidence, most farmers report that the WIC customers could not afford to purchase items at the DCM without the vouchers. Likewise, SNAP token customers most likely would not purchase items without their food subsidies. Overall, local goods are appealing and valued by customers at many income levels, since the income levels are diverse and represent several geodemographic segments. The sample represents the diversity of customers that visit the DCM as a community gathering space or place.

CHAPTER 4

METHODOLOGY AND RESEARCH DESIGN

This chapter defines the study area, variables, and data analysis techniques utilized to answer the study's research questions (which are also discussed and defined in this chapter). This study analyzes data about public markets in a new manner compared with previous research. Until now, very few studies exist on the underlying conditions for success of public markets in the United States (Schupp 2016; Singleton et al. 2015) or the Southwest Region. From the literature on public markets and the Denton, Texas background information (DCM 2017), geodemographic variables impact the retail spending potential for fresh vegetables and fruit (ESRI 2017).

Produce is a major retail good sold at public markets that are predominantly farmers' markets, even if they include artisan and other local goods. From the DCM case study (DCM 2017), the geodemographic analysis provided by ESRI of trade areas shows that the higher the median income in Denton, Texas, the higher the retail market potential. The retail Spending Potential Index (SPI) for fruits and vegetables measures the average spent for fruits and vegetables in a zip code as compared to the average spent nationally (ESRI 2017). This retail spending potential measure, a measure for consumer demand, is not available for years prior to 2013. Other variables may be used as proxy for the retail index, in addition to variables not analyzed for public markets in the literature.

For this longitudinal study from 1996 to 2016, the study hypothesizes that there are other variables, in addition to median income, that may be used as proxy for the retail spending potential. These variables may also influence the decision-making of customers, vendors, and institutions for participating in public markets. The nine categories of explanatory variables

utilized for the study are: young age, old age, race, median income, education levels, total population, climate, distance to closest market, and college town status.

A mixed-methods approach for this study incorporates qualitative and quantitative data to evaluate the underlying conditions for public market success. A mixed-methods approach is defined as a method "that reli[es] upon multiple types of data, modes of analysis, or ways of knowing, but may use these elements in a variety of ways in relationship to one another, for multiple intellectual and analytical purposes" (Elwood 2010:95).

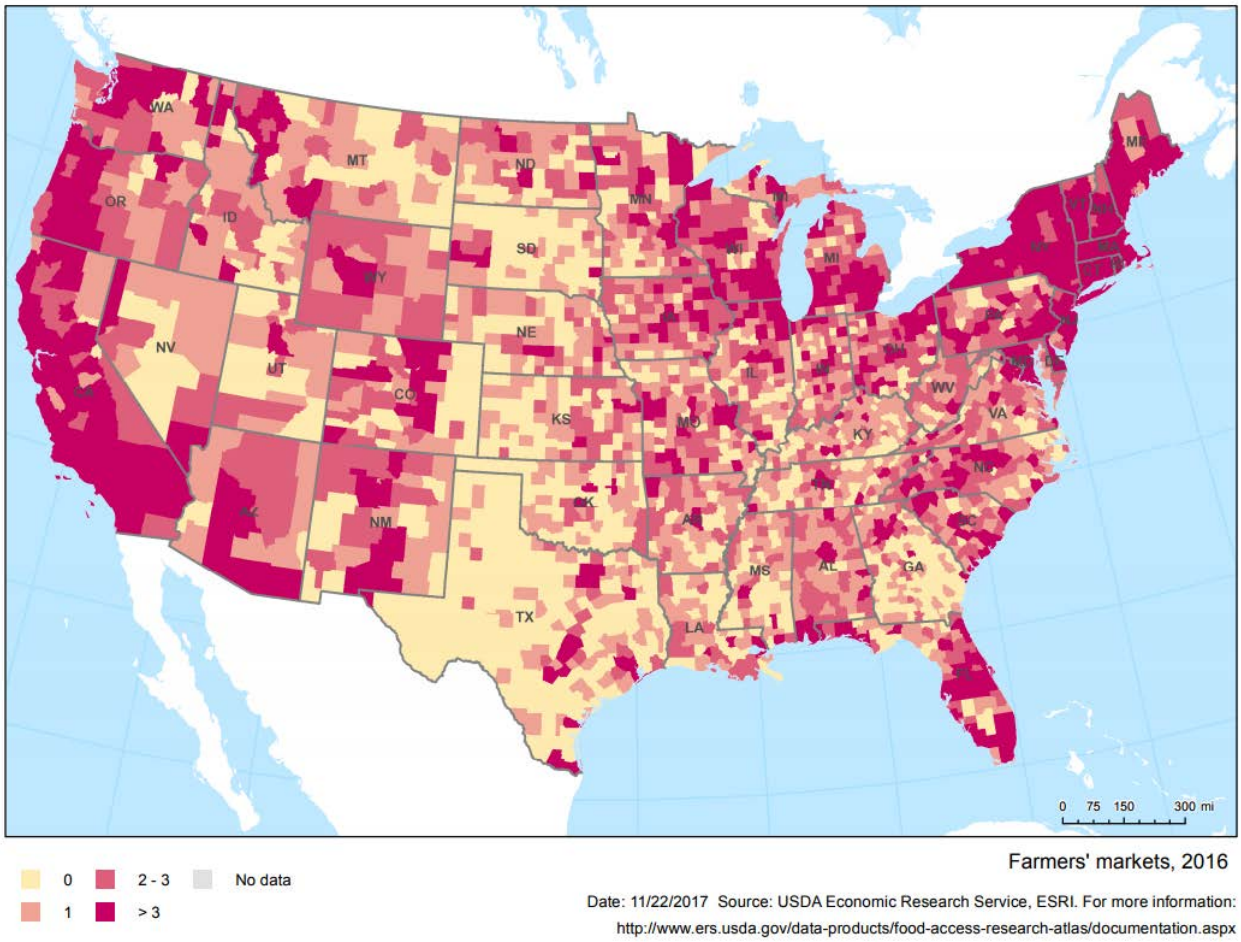
The DCM customer interview results (DCM 2017) on embeddedness and the Aucoin and Fry (2015) interview results on foodsheds/marketsheds add new dimensions to this analysis on public markets and local goods that are not available by quantitative methods alone. Perceptions of local goods and the awareness of the social interactions and environmental benefits of the farming methods are not available in census or other statistical data.

This study will attempt to inform the concept of nontradable goods as a distinctive component of public market success. The background information on the Denton Community Market, will discern possible patterns of "sign values" and symbolism in purchasing local goods. The human experience may differentiate public markets as places with meaning rather than purely spaces or areas of uniformity and "placelessness" (Relph 1976). The uniformity may be commonly found in traditional retail of big box stores, conventional grocery stories, and other brick and mortar retail. Public markets, may have additional meaning for the customers, vendors, and institutions, the decision-makers, who participate.

4.1 Study Area

The scale of this study is at the regional level, the USDA Southwest Region. The region

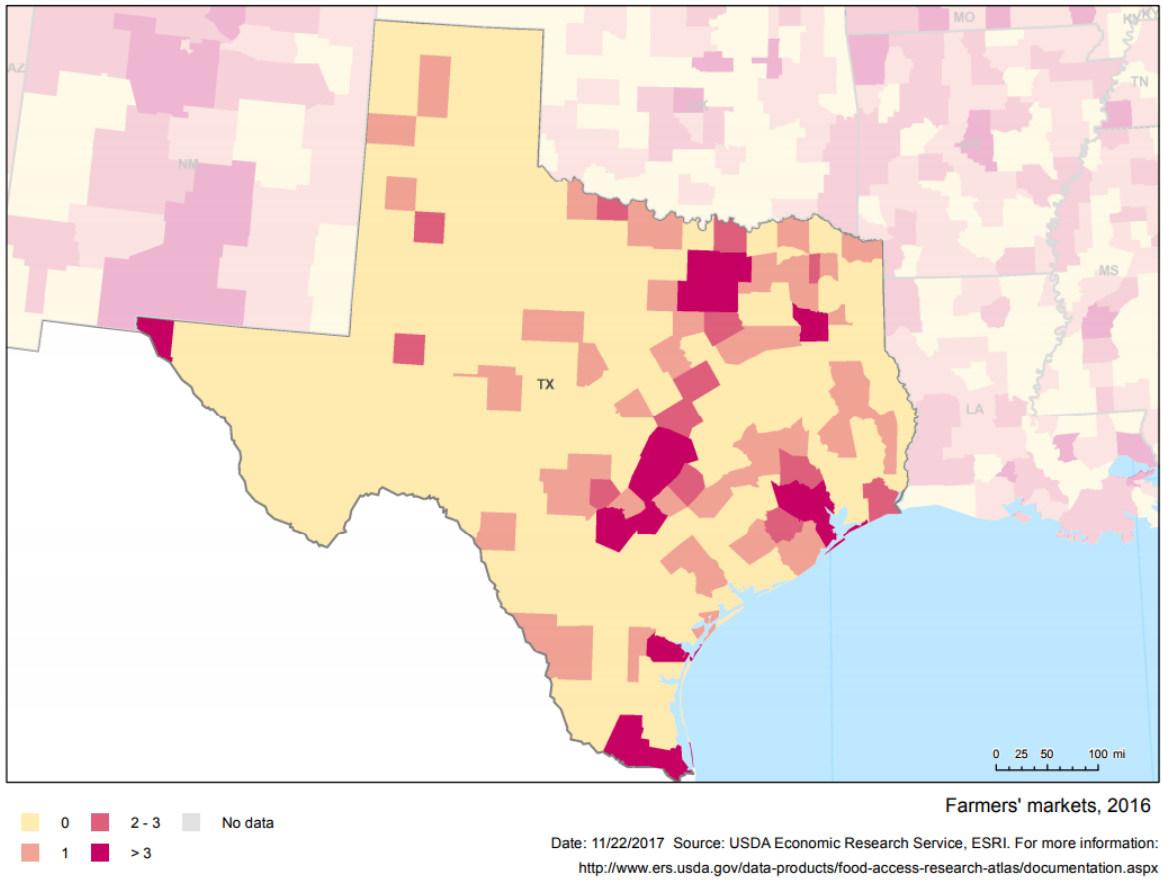
has seen high population growth, especially in Texas, but at the same time there is relatively little research on public markets. The USDA divides the United States into seven regions: Rocky Mountain, Far West, Southwest, North Central, Southeast, Mid-Atlantic, and Northeast. The Southwest Region includes the following five states: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas (see Map 4.1).



Map 4.1: USDA 2016 Farmers Market Density Per County, Source: Food Environment Atlas, USDA ERS 2017

As of 2016, most of the farmers' markets/public markets are located on the East and West coasts, as well as in the Rocky Mountain and in the North Central regions (see Map 4.1). The dark areas have the highest concentrations per county of farmers' markets/public markets. The map shows that in the Southwest Region states, the highest concentration in 2016 was in New

Mexico and scattered areas of the other four states. Among the lowest concentrations of public markets is in West Texas and the Texas Panhandle (see Map 4.2). From observations of this map, it is possible that the lowest concentrations are sometimes related to climatic factors, such as more arid regions.



Map 4.2: USDA 2016 Farmers Markets Density in Texas Per County: Source: Food Environment Atlas, USDA ERS 2017

The growth in public markets is occurring at the same time of rapid population growth in the Southwest Region, particularly in Texas. While the entire Southwest Region grew 33.5% over the 1996 to 2016 study period, Texas' population grew by 45.7% to over 27 million out of over 41 million for the region (U.S. Census 2017; Wyoming 1997; USDA 1996; USDA AMS 2016; Table 4.1). In second ranking, New Mexico experienced 21.5% population growth over

the same period (Table 4.1). The per capita number of public markets increased from 0.05 to 0.12 (per 10,000 population) from 1996 to 2016. While the Southwest Region only has 5% of the markets nationally, Texas is experiencing growth in public markets, and especially in the DFW Metroplex with the establishment and growth of many local markets within the past ten years in Coppell, McKinney, Denton, and many other cities (Coppell 2014, Dallas 2014, Heritage Guild 2015, Denton Community Market 2015).

Because of the availability of detailed customer and vendor data on the Denton Community Market (DCM 2017), the Denton, Texas case study provides more consumer preferences data and results for the DFW area, extending findings by Aucoin and Fry (2015) on the DCM and embeddedness of the market . Denton is in a metropolitan area of rapid growth in the Dallas Fort-Worth Metroplex (DFW). The Dallas-Fort Worth Metroplex (DFW) is the second fastest-growing region in the United States (Beyer 2016). According to the Census, Denton County, where the DCM is located, is among the 20 counties in the United States that added the most population between 2014 and 2015 (U.S. Census 2016). Thus, the DCM case study is an example of a public market in an area of rapid population growth.

The Southwest Region population growth data is the context for analysis at geographic scale of trade areas. As discussed in the trade area literature, the drive-time radius is used to characterize customers in retail geographical analysis. It is an assumption that the trade area defines the more likely characteristics of customers (and vendors), rather than the larger state or even census place scales. The state and census place boundaries are not included in this study, but other climate zones are established for data compilation. There is great variation in climate across the Southwest Region, from desert to the great plains, and it is also assumed that the

climatic zones may define public market success more than state or census place boundaries. As mentioned, more arid regions in Texas has fewer public markets.

The research questions will strive to address major research gaps at the Southwest Region scale about public markets and their continuing growth and success by their mere existence in some areas but not others. While there is population growth across the region, the growth of markets, as shown by Map 4.1 in 2016, is not evenly distributed. Furthermore, there are varying concentrations of markets in different cities. While recent studies provide compelling evidence that there are socioeconomic factors at work in these geographic patterns (Schupp 2016; Singleton et al. 2015), these studies do not address trade areas and still leave room for further analysis and clarification on the possible explanatory variables at work.

While Aucoin and Fry (2015), USDA (2011), Schupp (2016), and (Sadler et al. (2013) conduct their studies of trade areas or counties, only Sadler et al. has the interaction of variables. Other possible factors, such as climate, however, are not included in their analysis. There also is little research, if any, comparing the factors influencing public market locations over time. The "time distance" and "nonhomogeneous" geographic space of road networks (Cui et al. 2012a; 1866-67) is not included in any of these major studies discussed.

Table 4.1: Summary of Per Capita Public Markets in Southwest Region: 1996-2016

State	Number of Markets 2016	2016 Population Census Estimates	Markets Per Capita Per 10,000 2016	Number of Markets 1996	1996 Population Estimates	Markets Per Capita Per 10,000 1996	% Change Population
Texas	212	27,862,596	0.08	75	19,128,261	0.04	45.66
Arkansas	106	2,988,248	0.35	18	2,509,793	0.07	19.06
Louisiana	80	4,533,479	0.18	12	4,350,579	0.03	4.20
Oklahoma	69	3,923,561	0.18	43	3,300,902	0.13	18.86
New Mexico	66	2,081,015	0.32	19	1,713,407	0.11	21.45
Total	533	41,388,899	0.13	167	31,002,942	0.05	33.50

Source: U.S. Census and USDA Farmers Market Directory, 1996 and 2016

4.2 Research Questions

The literature on public markets is limited on the underlying socioeconomic or other factors related to market success in the Southwest Region. The research questions will attempt to explore topics that address the literature gaps on public markets.

The first research question is to address the basic characteristics associated with public markets not found in previous studies on trade areas or counties (Aucoin and Fry 2015; Sadler et al. 2013; Schupp 2016; USDA 2011; Singleton et al. 2015). This will be done at the Southwest Region scale. Furthermore, none of these studies looked at explanatory variables over time. Given the Southwest Regions' population growth, it is likely that the characteristics of the trade areas changed over time. As Applebaum and Cohen (1961) note in their classic work on trade areas, "trade areas of stores do not remain fixed in time because of a multitude of dynamic changes" (Applebaum and Cohen 1961: 73). In this case, the "time distance" variables of the road network and other factors may change the size and shape of these trade areas, particularly in growing cities, and the characteristics will change as well.

1. What are the characteristics of the trade areas of public markets in the Southwest Region from 1996 to 2016?

The second question addresses specific explanatory variables identified in previous studies[4] as well as variables not included in past studies. The goal is to conduct an analysis with the interactions of the variables, similar to Singleton et al. (2015), and to do this at the drive-time trade area geographic scale, not done in Singleton et al. (2015).

2. At the Southwest Region geographic scale, what socioeconomic and climate factors may influence the success or failure of public markets in cities?

The final research question relates the findings of this study with the economic

[4] The previous studies are all of those cited in the literature review related to consumer preferences, trade areas of public markets, economic studies, and studies on college towns and the creative class.

geography theory of nontradable consumption amenities (Schiff 2015, Glaeser 2001). As the Glaeser argues, density and agglomeration benefits are related to a variety of goods and services (Glaeser 2001). Some amenities, such as theaters cannot be transported. Schiff (2015) expands upon this concepts in the study of restaurants, and shows that nontradable consumption amenities, such as these, are tied to location. This study strives to investigate if public markets are nontradable consumption amenities providing nontradable local goods, and if there are certain underlying conditions that make them these types of amenities.

3. Do the regression results and the background Denton Community Market case study data identify evidence that public markets are nontradable consumption amenities?

Qualitative perspectives are also necessary on the consumer experience at public markets, and the background Denton Community Market qualitative data (DCM 2017) will help define this in combination with statistical results from overall trends. The signs and meaning of visiting the market and purchasing goods may be as important as the price paid. It will be hypothesized that a bag of potatoes, for instance, purchased at a public market is different than a bag of potatoes purchased at a typical grocery store. It is the imbued meaning of this supply and demand transaction that calls for a new model of public markets and success. This model must also include the possible role of the "creative class" as producers and consumers who also contribute or purchase the local goods and services provided at many public markets. The experience at public markets as third places (Tiemann 2008) may be part of the meaning of these local goods.

4.3 Empirical Analysis and Data Sources

The methodology for this research was a multi-step process that spans data extraction, Excel data analysis, GIS analysis (TNRIS 2017; ESRI Census 2017; U.S. Census Shapefiles

2017), and STATA statistical analysis. Socioeconomic and climate variables were defined through trade area analysis and statistical analysis (see Figure 4.1). The goal was to create data and conduct analysis that would answer the three research questions posed in this study (see Table 4.2).

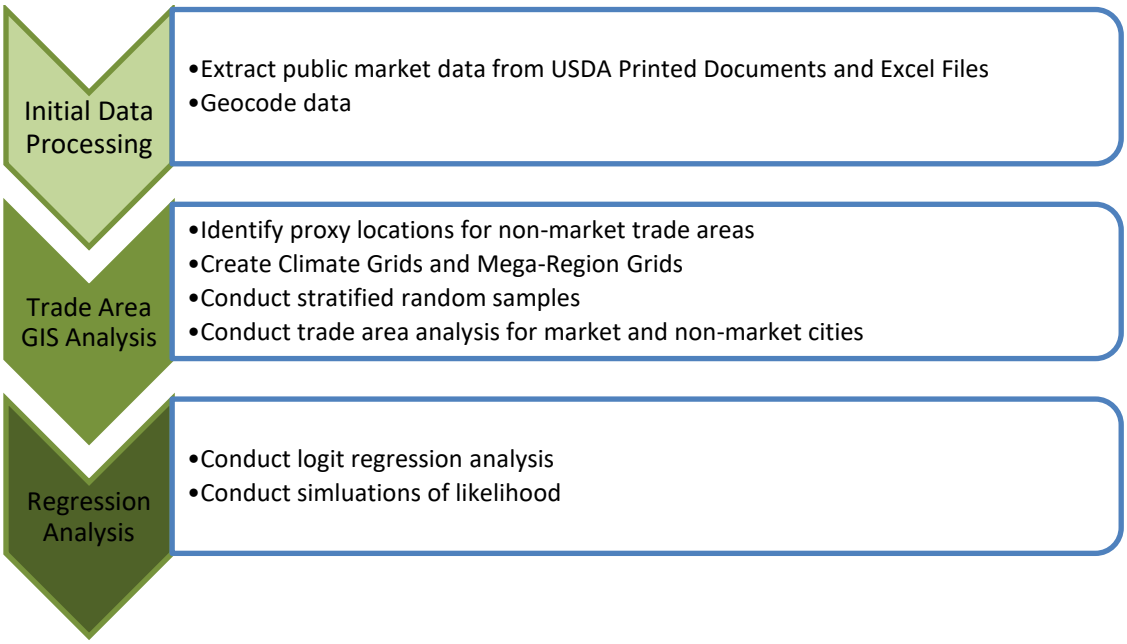


Figure 4.1: Flow-Chart of Data Methodology

For this research, public markets exist, or are defined as successful, if the underlying conditions are present for decision-makers (customers, vendors, and institutions) to participate and support them. The dependent variable in this research design is the dichotomous variable of whether a trade area has or does not have a public market. This variable is a dummy variable, 1 for market and 0 for non-market trade areas.

Nine explanatory variable categories (20 individual variables) to determine what factors influence decision-makers to participate in a public market, including the customers, vendors, and government actors (see Table 4.3). The socioeconomic variables will show whether age, education, race, or income have an impact upon whether the actors attend the markets or support the market to exist, thus be "successful' in a city, or trade area. The most unique explanatory

variables included in this study are the college town status and climate zones. From the "creative class" literature (Florida 2011; Florida 2017; Vinodrai 2014) and the college town literature (Gumprecht 2009), it is assumed that creative and educated people may influence public market success. The Denton Community Market background case study (DCM 2017) also points to this possibility.

Table 4.2: Summary Table of Empirical Analyses and Data Sources to Answer Research Questions

Research Question	Empirical Analysis	Data Sources
1	Determining characteristics of trade areas	• 1990 and 2010 Census place data from Maptitude files • Maptitude 15-minute drive time analysis for markets and non-markets • Summary analysis of variables from trade areas in STATA
2	• Summarizing public market trends and locations • Determining significant factors for public market success	• USDA PDF files of USDA Farmers Market Directory • Abby Fine Reader conversion and manual corrections in Excel • USDA Excel file of USDA Farmers Market Directory • GIS data • Census data • Create climate grid system • Conduct hot spot analysis in ArcMap • Create Centroid files of Census places in Maptitude to be used in stratified sampling • Conduct stratified random sampling • Use NOAA Sampling Extension for ArcMap • Conduct logit analysis in STATA • Conduct likelihood simulation analysis in STATA
3	Reviewing results as evidence for public markets as nontradable consumption amenities.	Summarize maps, empirical analysis, and Denton Community Market Background Case Study

Table 4.3: Variables Used for the Empirical Analysis

Type	Description
Dependent Variable	Dummy variable of market (1) or no market (0)
Independent Variables	• Age of population, 19 and under • Age of population: 65 and over • Ethnicity: percentage non-White • Median income per $1,000 • Education levels (bachelor's degree) • Distance to nearest market • College town (1) or not (0) dummy variable • Climate and growing zones matrix (13 climate zones): Dummy variable for each grid. 1=trade area in grid, 0=no trade area in grid • Urban-rural continuum (Metro=1, Non-metro=0) (omitted from regression after tests) • Total population per 10,000

The 13 climate zones (counted as one in the explanatory category variable list) were generated for this study through GIS and climate data (USDA ARS 2017; USGS 2015). The USDA Southwest Region does not follow any pattern of growing seasons or precipitation. The Southwest Region was divided into 13 subzones that represent more arid regions of New Mexico and Texas, but also more wet climates of the Gulf Coast and Arkansas Mountains.

Another important geographic measure included in the regressions is the distance to the closest market. The USDA Competition Zone study (USDA 2011) suggests that competition from other markets for customers and vendors may be a factor of success.

Finally, another zone-related explanatory variable was the urban-rural continuum utilized the USDA in its competition zone study (USDA 2011). It is reasonable to include this variable, since the USDA study found a distinct difference between rural and urban counties for distance travelled to public markets. (USDA 2011).

4.4 Market Data

The USDA provided PDF scanned files of their Farmers Market Directory for the year 1996 (USDA 1996). There were two data sources of public markets locations used for the empirical analysis: the extracted 1996 market locations in PDF format (USDA 1996) and the downloaded 2016 Excel datafile of the online Farmers Market Directory (USDA 2016). While the 2016 file had latitude and longitude data, along with market address, the 1996 data only had minimal information on market addresses. The PDF documents of the 1996 USDA Farmers Market Directories was converted by ABBY FineReader Software OCR software into Excel files that were further refined and standardized for analysis.

As discussed in Chapter 3, the selection of many variables was influenced by the positionality of this author as market manager. Decision-makers include the customers who decided to attend the market and purchase goods as well as the farmers and producers who decided to participate in the market and bring their locally-produced goods for sale. There are also the other decision-makers, such as governmental agencies and private businesses and institutions, who make markets possible. These other actors may provide resources, such as land, buildings, labor, and capital. This section further elaborates on the selected explanatory variables and their importance relative to the success of markets.

The public market locations were extracted from the USDA database of markets in the United States for years 1996 and 2016. The database is the entire population of public markets. There are possible inaccuracies with the database, since the updates rely upon market managers and other market personnel to enter the data online about their markets, from products sold to location. As mentioned by Ed Ragland at the USDA (Ragland 2014), the data may have some

inaccuracies or lack of complete information because of the user-oriented updates. The USDA does not verify the updates on the market information.

4.5 Determining Characteristics of Trade Areas

To delineate the 15-minute trade area characteristics per public market location (and cities without them, discussed below), Caliper Maptitude software generated the socioeconomic profiles for each trade area. Trade areas were generated for both cities with markets and for cities without markets (those that are randomly selected). Each trade area was generated either from Census Place data in 1990 (for 1996 market and non-market centroids) or in 2010 (for 2016) market and non-market centroids.

The trade area comparisons over time may have some limitations. The trade area data generated from the census place data through Maptitude was not always accurate for place names, and I had to manually correct some information on place names.

Trade areas were defined by 15-minute drive times, but the shapes of the trade areas changed in many locations over time, especially in more urbanized areas. The geographic shape changes to trade areas over time may render the time comparison less meaningful. The shape change is most likely the result of increased road networks, congestion, and population with urbanization in the Southwest Region. The assumption is a 15-minute trade area as a constant that may not be representative of actual drive times in rural versus urban locations.

From the literature review, the typical customer at public markets is white, female, educated, and has above-average income (Sadler 2013; Bubinas 2009; Henneberry 2009; Govindasamy 2002). While recent studies potentially show variability in the degree of the relationship between ethnicity, median income and public markets existence or success (Schupp

2016; Singleton et al. 2015), past evaluations of customer characteristics have pointed to a more white and higher income population. This study revisits some of these variables as well as include new ones for college town, distance to nearest market, and climate (see Table 4.3).

4.5.1 Age of Population

Two cohorts were selected for the study, the young aged 19 and under and the retired or elderly population, aged 65 and over. The young will identify the presence of young families who decided to attend the market or participate as vendors. The retired may be customers or vendors at the market. It is assumed that differing income levels of retirees or young families may influence the success of markets. The ESRI Tapestry segmentation analysis done for the DCM (2017) points to possible age variation of customers in the trade area.

4.5.2 Ethnicity

The percentage of non-white in the population is included to see if minority populations are more likely or less likely to support markets as customers or vendors. The concept of food deserts and accessibility of healthy food to minority populations is discussed in the literature (Singleton et al. 2015), and was a factor in the DCM obtaining the USDA grant. Supplemental food programs were added to the DCM to attract new customers and provide healthier food. Do these populations influence the success or failure of markets in the Southwest Region? (Singleton et al. 2015).

4.5.3 Median Income

It seems obvious, that the purchasing power of customers or vendors would influence

their participation and support of a public market. Studies show that the median income is often higher than average among public market patrons (Sadler 2013; Bubinas 2009; Henneberry 2009; Govindasamy 2002) and may play a role in success or failure of markets (Alkon 2012; Brady 2012; Morales 2009; Morales 2011). If locally-produced goods are more expensive than those provided by traditional retailers, that may also influence the customer's desire to attend the market and support their success. Households with over 100,000 per year in income are more likely to participate in food tourism and visit public markets (Travel Industry Association 2006).

4.5.4 Education Levels

Education levels may or may not influence the demand to purchase local goods or attend public markets. This variable will assess if there is an association between market success and education levels of the population within a trade area/city. High education levels are associated with food tourism (Travel Industry Association 2006). Previous studies on consumer characteristics also point to higher education levels.

4.5.5 Distance to Nearest Market

The distance to nearest market is important because drive-time affects customer and vendor decision-making in attending markets (Cui et al. 2012). This is shown by the USDA study on competition zones that has customers traveling shorter distances in urbanized areas and longer distances in rural areas (USDA 2011). Vendors travel longer distances in urbanized areas. Distance does seemingly matter, as also shown by the DCM market penetration study (DCM 2017). If there are other markets nearby, how does that impact a person's decision to attend a market? (USDA 2011)

4.5.6 College Towns

GIS data of the locations for colleges and universities in the United States in 2010 (USGS 2010) was used to calculate which cities have colleges and which do not in 1996 and 2016. Maptitude was used to merge the college town data with the trade areas with and without public markets. In 2016, 304 out of 798 trade areas had colleges or technical schools (USGS 2010).

College towns have distinct characteristics that often promotes a diversity of restaurant and food offerings, including farmers' markets (Gumprecht 2003; Gumprecht 2009). The question with the college town variable is whether decision-makers are influenced by the presence of colleges. Does education have an influence upon the success of markets, either as customers or vendors? Does the creative class (Florida 2012; Florida 2017; Vinodrai 2014) have anything to do with market success? Is it possible that college towns foster the creation of more local goods? In my experience in Denton, Texas, a college-town with two universities, the DCM has been highly successful in attracting local producers of food and artisan goods. Likewise, the market penetration study conducted on the DCM shows that the primary trade area is within 10 minutes and the secondary is within 15 minutes (DCM 2017). The significance of this is that the primary trade areas is characterized by college students in Denton who can walk, bike, or drive to the market. Is this a factor in its success with 900% growth since the market's inception? What about the presence of university staff as well who live near the market?

4.5.7 Total Population

It seems likely that the greater the population, the more customers and vendors that are available to support the public markets. Singleton et al. (2015) found differences in the

availability of farmers' markets in metro and non-metro counties. These findings point to population as a factor in the location of public markets.

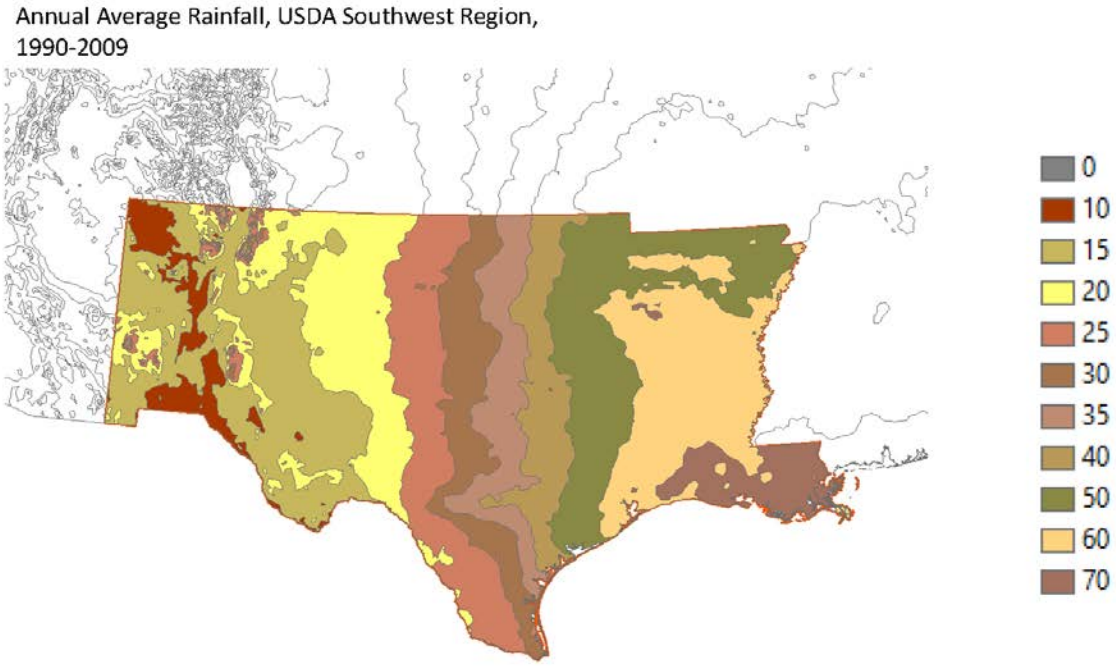
4.5.8 Climate Grids

Climate factors were included in this analysis of trade areas. Given the inherent dependence of farming upon growing conditions (Park and Sinclair 1993; Morgan 1961; Sacks et al. 2010), this study includes climatic zone data that may influence the success or failure of public markets. The decision-makers of this study include farmer vendors that must decide whether to continue farming and whether to continue to participate in farmers' markets as a retail outlet. Out of this farming context, the climate grids were created as the basis for the stratified sampling grids (see Map 4.7). The grids were also included as explanatory variables in the logit regression analyses to test for a relationship between location and public market success.

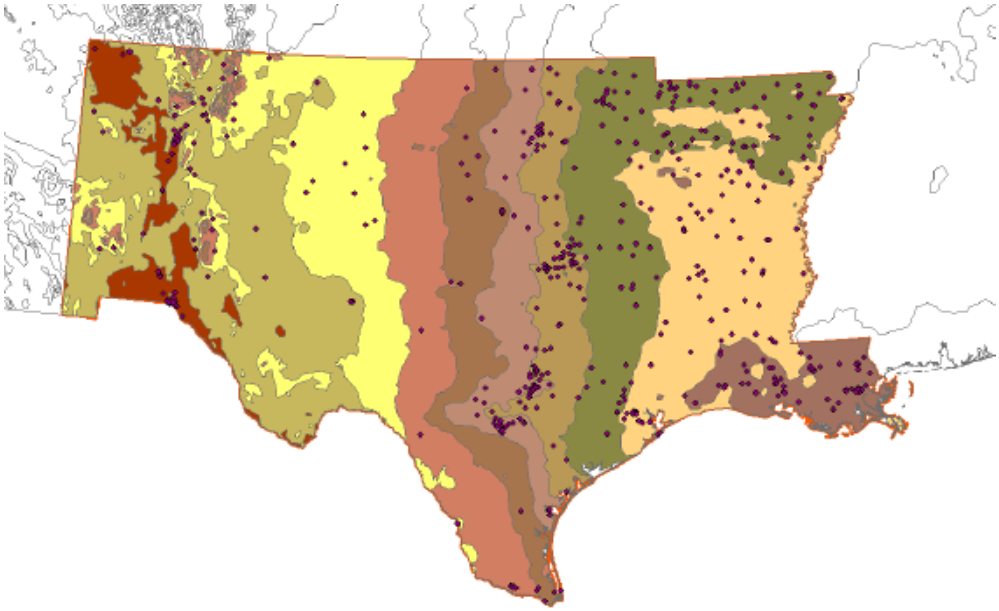
The climate dummy variables were generated using ArcMap and Maptitude to analyze GIS data relative to the generated trade areas. An ArcMap-digitized grid system of precipitation (USGS 2015) and hardiness zones (USDA 2017) created a new climate grid matrix of 13 grids for this investigation (see Maps 4.3-4.7). Dummy variables were created through GIS and statistical work to identify trade areas as located within the grids or not. Some zones were aggregated in ArcMap to reduce the number of zones for sampling, given the sample size. The goal was not to have less than 30 market centroids to sample in each grid or zone. It was necessary to aggregate the 13 grids into the three climate zones (A, B, and C), the mega-climate zones, to maintain the desired minimum 30 sample size per zone (see Map 4.10). Mega-climate zones were used in the stratified random sampling of non-market cities.

The 2016 public markets locations were overlaid on the precipitation map and hardiness

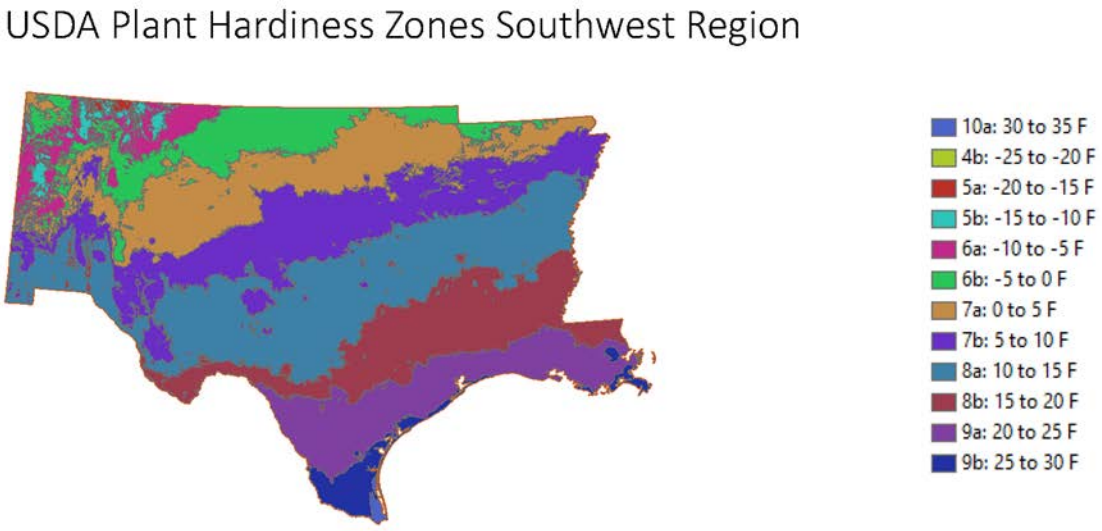
map to create maps that show the increased density of markets in the eastern portion of the Southwest Region, related to urbanized areas of higher population density (see Map 4.8). With examining the maps, one notices clustering of markets that are visually-related to higher average annual precipitation bands. There does not appear to be a pattern with hardiness zones. The clustering can also be seen with the total census places in 2016 (2010) overlaid on the climate grids. There is much more density of census place centroids in the eastern portion than in western portion of the region. These observations provide impetus for including the climate grids in the logit regression analyses.



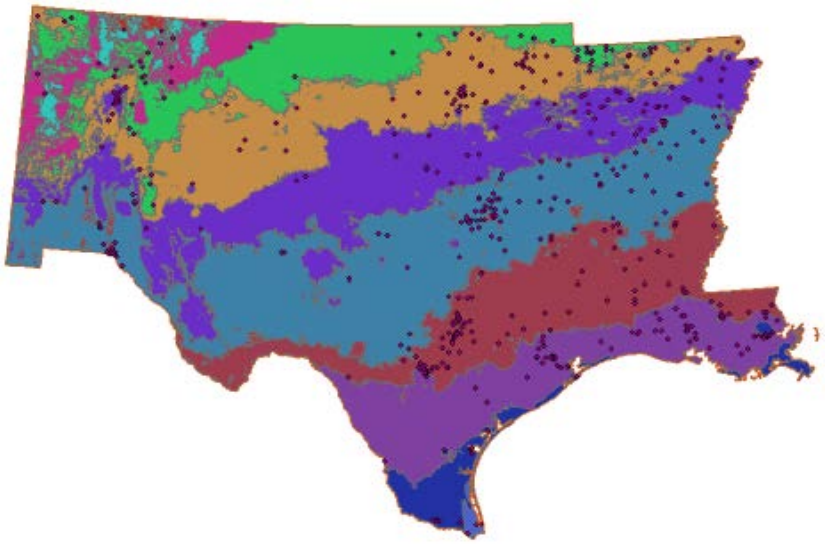
Map 4.3: Annual Average Rainfall in the USDA Southwest Region. Source: Author; USGS 2009



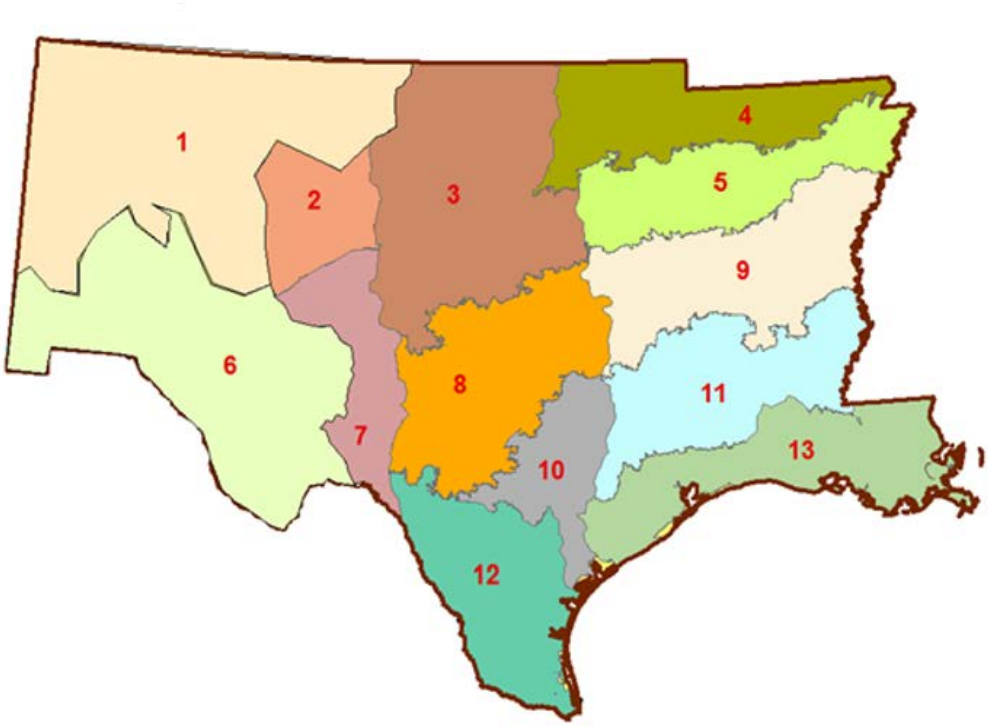
Map 4.4: 2016 Farmers Market Locations on Precipitation Map (USGS 2009; USDA 2016)



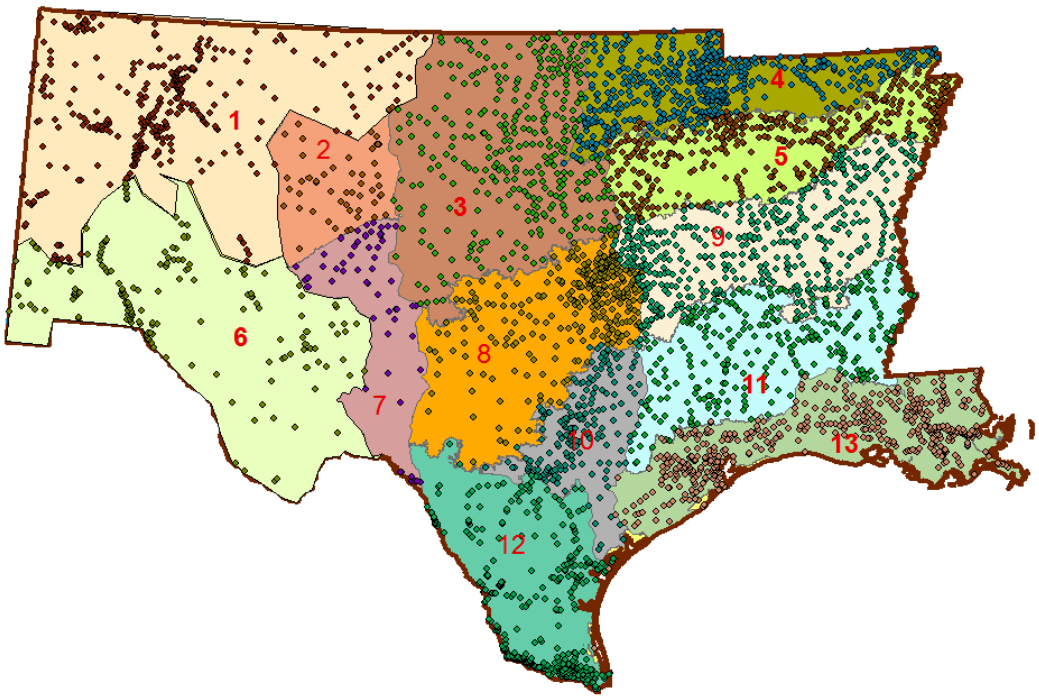
Map 4.5: Plant Hardiness Zones for USDA Southwest Region (USDA 2017)



Map 4.6: 2016 Market Locations on Plant Hardiness Zones Map (USDA 2017; USGS 2015)



Map 4.7: Climate Grid with 13 Sub-regions in the Southwest Region (USDA 2017; USGS 2015)



Map 4.8: Total 2016 (2010) Census Places on Climate Grids (U.S. Census 2010)

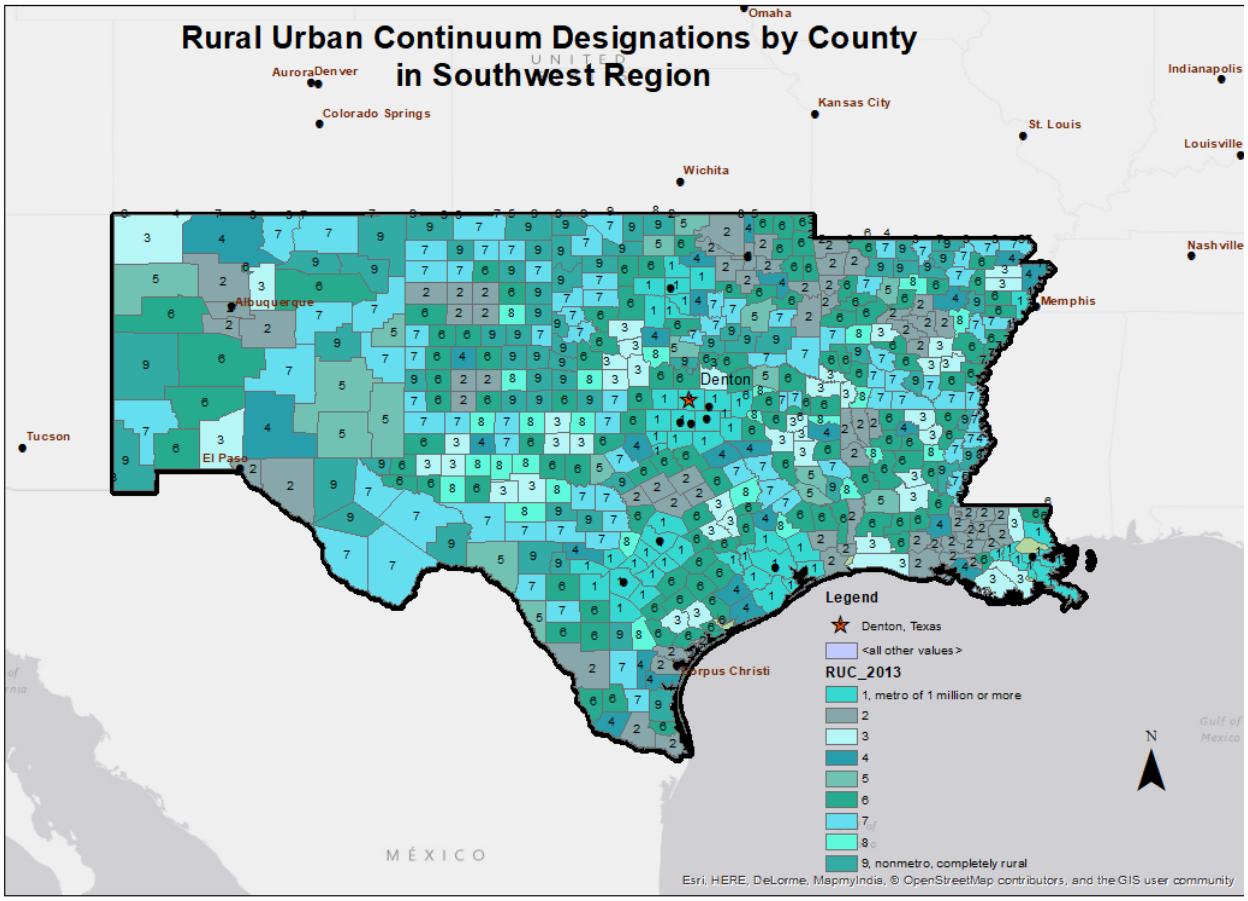
4.5.9 Metro or Rural-Urban Continuum (RUC)

The USDA's study on competition zones (USDA 2011) finds that rural-urban continuum (RUC) (USDA 2013) areas are related to travel distance of customers and vendors (USDA ERS 2016). The USDA RUC codes were joined in ArcMap to the U.S. county data to create an RUC map for the 2013 data. The 2013 RUC map was used to classify the trade areas into Metro and Non-Metro categories for the Southwest Region (see Map 4.9).

This RUC map is particularly relevant to the DCM case study. Denton and the surrounding Dallas-Fort Worth counties are classified as RUC1, metropolitan areas with one million or more people. The more rural counties to the north of Denton County are RUC6. The USDA Competition Zone study indicates that the more urbanized counties generally have a shorter travel distance for customers but a much larger travel distance for vendors. Furthermore, many of the RUC1 have high competition zones for vendors. These general distance trends

appear to correspond with the DCM experience. The average distance traveled by DCM visitors/customers is 10 miles if using the primary and secondary markets as the distances. The DCM foodshed has expanded since the earlier study on DFW (Aucoin and Fry 2015), with the farthest farmer now traveling 90 miles (source: Author) to attend the market each week from RUC6, a rural county to the east of Denton.

The RUC variable was ultimately not used in the regressions, as it did not add value and was not statistically significant in some test runs. This variable is shown for context of distance traveled by visitors and vendors.



Map 4.9: RUC Map of Southwest Region for 2016 (USDA ERS 2016)

4.6 Stratified Random Sampling to Create Non-Market Trade Areas Database

The main research question is what characteristics or underlying conditions of cities are associated with a public market? It is assumed that the existence of a market is a measure of success. This analysis is using trade areas as the "city" geographic area. To answer this question, a logit regression analysis was conducted of trade areas with and without markets. A comparison was done of trade areas with and without markets based upon U.S. Census Place data for 1990 and 2010. The mega-climate zones (Map 4.10) were utilized for selection of the non-market Census places.

This longitudinal study of the public markets includes 1996 and 2016 data for cities with markets, from the USDA Farmers Market Directory, the total population of markets in the United States. Stratified random sampling was utilized to create a comparable non-market city/trade area database. Trade areas were generated for both types of cities. These two categories of markets and non-market trade areas were used in a logistic (logit) regression analysis as a predictive model of what factors may contribute to having public markets in trade areas.

Before conducting the stratified sampling, proxy locations for non-market cities were identified. Google searches (2016) determined these proxy locations based upon a set of rules in selecting locations. First, city halls served as proxies for public markets. If none existed, then a search was conducted for schools, fire stations, libraries, other public buildings, or properties. Centroids in cities without markets in 1996 and 2016 were calculated. An OLS regression in STATA determined that centroids are a good proxy for market locations in cities without markets (Figure 4.2). The regression showed that in 2016, for every 10,000-person increase in population, the distance to the city hall from the market is approximately equivalent to the

distance to the centroid from the market. Thus, the Census Place centroid is a good proxy for public market locations in non-market cities. The census place centroids were used to conduct stratified sampling of non-market cities. Theses centroids of cities then had trade areas calculated for them in Maptitude for 1996 and 2016.

```
. regress DIST_CENTR Pop10000

      Source |       SS           df       MS      Number of obs   =       509
-------------+----------------------------------   F(1, 507)       =     12.50
       Model |  31.384213         1   31.384213   Prob > F        =    0.0004
    Residual |  1272.54234      507  2.50994545   R-squared       =    0.0241
-------------+----------------------------------   Adj R-squared   =    0.0221
       Total |  1303.92656      508  2.56678456   Root MSE        =    1.5843

------------------------------------------------------------------------------
   DIST_CENTR |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
--------------+---------------------------------------------------------------
    Pop10000 |   .0944185   .0267014     3.54   0.000     .0419595    .1468775
       _cons |   1.694992   .0740916    22.88   0.000     1.549428    1.840556
------------------------------------------------------------------------------

. regress DIST_CITYH Pop10000

      Source |       SS           df       MS      Number of obs   =       509
-------------+----------------------------------   F(1, 507)       =      1.87
       Model |    16.6421         1    16.6421   Prob > F        =    0.1718
    Residual |  4506.53746      507  8.88863405   R-squared       =    0.0037
-------------+----------------------------------   Adj R-squared   =    0.0017
       Total |  4523.17956      508  8.90389678   Root MSE        =    2.9814

------------------------------------------------------------------------------
   DIST_CITYH |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
--------------+---------------------------------------------------------------
    Pop10000 |   .0687552    .050248     1.37   0.172    -.0299648    .1674752
       _cons |   1.846917   .1394294    13.25   0.000     1.572986    2.120847
------------------------------------------------------------------------------

.
```

Figure 4.2: Regression for Proxy Locations of Markets

The purpose of the stratified sampling analysis was to select Census Places in the Southwest Region (non-market cities) to compare with cities (the total population) that have markets in the Southwest Region. There are proportional and disproportional methods of conducting stratified random samples for geographic analysis (McGrew and Monroe, 2000). The proportional method in this case is devising a sampling technique that uses the same percentage of non-markets sampled out of the population as markets in defined strata, or groups. The population is divided into subpopulations that are non-overlapping, and a sample is drawn from

each stratum (Cochran 1977). For this study, the population is the total number of census places in 1990 and 2010, respectively, in the Southwest Region. The sample size is the number of markets in each stratum, per years 1996 and 2016, as exist in the USDA Farmers Market Directory. An evaluation of the four different approaches to stratified random sampling, based upon the proportional methods applied in different ways by state and by climate zones is summarized as follows:

- Method 1: The number of unique market cities per state would determine the sample size out of each state to select from the Census Places.
- Method 2: The proportion of the total population per state would be used to calculate the number of cities per state. Texas is by far the largest state, with 67% of the total 41,537,086 population for the SW Region.
- Method 3: The proportion of the number of markets per each climate zone/grid would be used to select the samples per each of the 13 grids.
- Method 4: This method was the best choice for this study. The modified grid of the 13 climate zones were the basis for the Mega-Climate Zones A, B, and C.

The random sampling process was as follows:

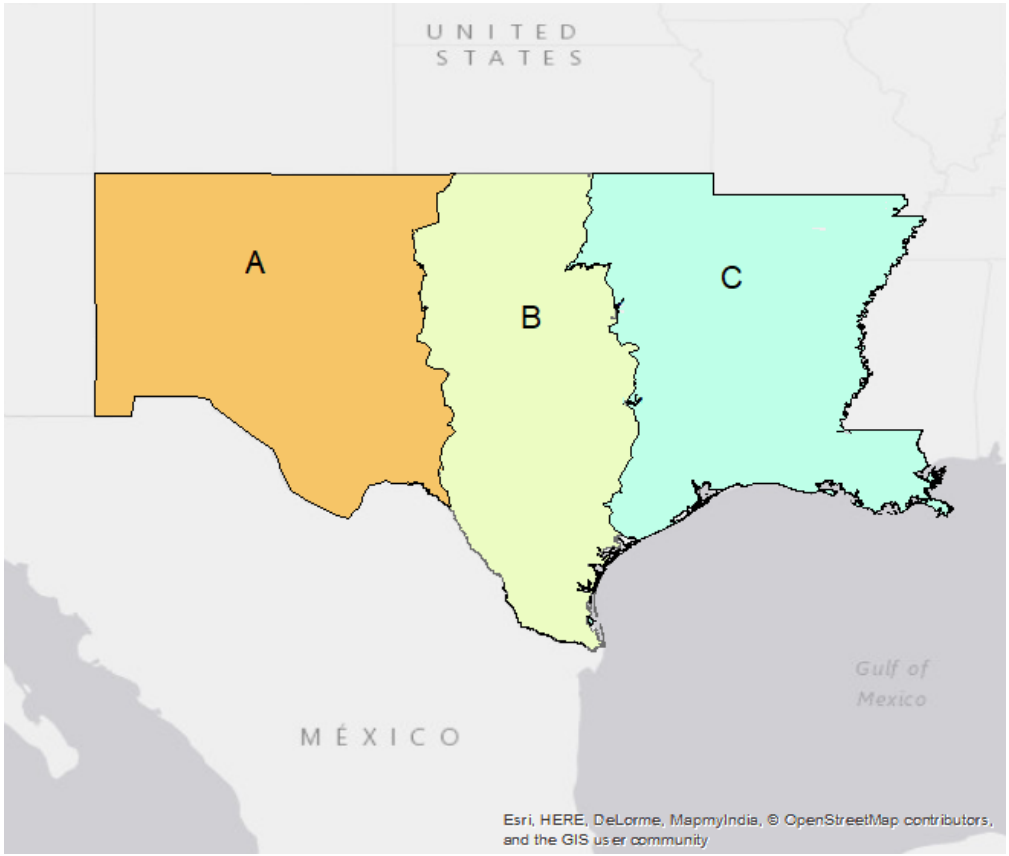
1. The number of markets per zone were selected out of the population of total centroids (see Map 4.10).
2. A discard-and-replace method was utilized to create the final list of non-market census places/centroids.
3. A comparison was made between selected randomly-sampled census places and the master list of market census places. If there were repeats, they were discarded and redrawn from the zone again.

To select the centroids in the sampling process, an extension of ESRI's ArcMap randomly selected the points out of the mega-climate zones. The Sampling Design Tool for ArcGIS, developed by NOAA's Biogeography Branch, was used to select centroid points in the randomly from the population of points on the map. These randomly-selected points were further analyzed for the 15-minute drive time trade area analysis in Maptitude.

The fourth method was the best option because it utilized the climate zones rather than states to select the samples. Texas would have been overrepresented in the sample because of its size relative to the other four states. Using the 13 climate zones was preferable to the mega-zones, but there were not enough markets per zone in 1996 to maintain the minimum sample size of 30 per zone (see Table 4.4 and Map 4.10).

Table 4.4: Summary of Mega-Climate Zones Distribution of Unique Market Cities

Mega-Climate Zones	Number of Markets Per Zone	
	1996	2016
Zone A	30	61
Zone B	59	89
Zone C	77	190
Total	166	340



Map 4.10: Mega-Climate Zones for Stratified Random Sample

4.7 Analyzing Dependent and Independent Variables for Measures of Success

4.7.1 Logit (Logistic) Regression Analysis

The main goal of the regression analysis was to identify what factors influence whether a trade area/city has a public market or not. This dichotomy of outcomes led to the selection of the logit (logistic) regression analysis rather than ordinary least squares (OLS) or other regression methods.

The logit regression is a method of measuring the maximum likelihood of outcomes of categorical data. For this analysis, the categorical data, or response data, is whether a city has a market or not. These categories are assigned dummy variables of 0 (no market exists in city) and 1 (market exists in city). The likelihood, as shown by the beta coefficients, shows the direction and degree that the explanatory variable influences the dependent variable.

The logit regression is a "qualitative choice model" which incorporates its coefficient parameters, the probability that a city has a market (1) or does not have a market (0) (Train, 1993). Furthermore, the choice between having a market and not having a market must be mutually exclusive, exhaustive, and finite to qualify for this method. (Train, 1993). The choice between having a public market or not meets all the required criteria to run a logit regression.

The logit regression model (logit) is used to analyze the explanatory variable data to determine what factors influence "decision-makers" (Train, 1993) to support a public market in their trade areas/cities. In the case of public markets, the decision makers, I would assume, would be the city residents, government officials, and market vendors.

Within the logit framework, the model is showing whether the social welfare or collective utility for the city is high enough to form and sustain a market. The collective utility is a function of observed parameters and unknown factors. Determining what to include as the observed

parameters, or independent variables, is one major focus of this analysis. The closer the probability is to 1 as a regression result for the beta coefficients of the parameters (variables), the greater the utility of having a market is to the decision-makers. The coefficient parameters of the variables determine the probability that every city has a market or not. In this case, the coefficients in the results tables are a major focus of interpreting the regression output tables.

4.7.2 Logit Simulations:

Interpretation of logit (logistic) regression results is not as straightforward as in ordinary least squares (OLS) regression techniques. While the coefficients in OLS represent the marginal effect of each explanatory variable on the dependent variable, this is not the case for logistic regressions. With a logit, the estimated beta coefficients affect the probability of a market according to the following function:

$$Prob\ (M = 1) = \frac{e^{\beta x}}{1+e^{\beta x}}$$

Only the sign and statistical significance can be determined directly from the estimation results. The coefficients shown in the regression results represent the positive or negative effect and the degree to which the explanatory variable impacts the likelihood of public markets. The level of statistical significance was interpreted at the 90%, 95%, and 99% confidence levels based upon the z-scores and the p-levels.

To further illustrate the effect of each statistically significant explanatory variable upon the likelihood (predicted probability) of public markets, simulations conducted in STATA, show the explanatory variable effect (Kim and Rous 2012), within its range, on the public market likelihood. Simulations presented illustrated the effect of the percentage of college educated, the level of median income, the population level, and the climate grids. As the explanatory variable

changes, the simulation shows the resulting mean probability that each market area will have a market.

CHAPTER 5

RESULTS

With the rise in the number of public markets across the United States since 1994, the factors contributing to their existence and success are not fully understood. Income, education, ethnic background, age, presence of college town, urban-rural continuum, and climate may influence the decision-making of customers, vendors, and institutions to support public markets in their cities or trade areas. This analysis attempts to characterize the trade areas for cities with and without public markets in 1996 and 2016 and to answer the main research question: are there socioeconomic and climate factors that determine the success, or mere presence, of public markets in the Southwest Region?

5.1 Research Question 1: Characteristics of Trade Areas

As the results demonstrate, there are distinct differences in trade areas with and without markets in 1996 and 2016. There are also significant changes in characteristics between the years. In 1996, age, minority population, and college-educated proportions are virtually equivalent in trade areas with markets and those without markets. Median income is also almost equivalent (see Table 5.1). The notable differences are that the total population on average is 50.3% bigger in trade areas with markets than without. Another difference is that trade areas with markets are 17.9 miles apart versus 19.7 miles apart on average.

Table 5.1: Comparison of Trade Areas in the Southwest Region 1996

Variable	1996 with Markets					1996 without Markets				
	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std.Dev.	Min	Max
Percent Non-white	167	0.23	0.12	0.00	0.69	164	0.21	0.13	0.01	0.61
Percent College-educated	167	0.07	0.03	0.02	0.17	164	0.06	0.03	0.01	0.17
Percent Age 19 and under	167	0.30	0.03	0.21	0.37	164	0.31	0.04	0.19	0.41
Percent Age 65 and over	167	0.16	0.06	0.02	0.32	164	0.16	0.06	0.05	0.37
Total Population	167	36,644.78	50,382.72	76.00	288,521.80	164	24,374.19	45,641.25	191.00	236,314.20
Population per 10k	167	3.66	5.04	0.01	28.85	164	2.44	4.56	0.02	23.63
Median Income	167	21,060.88	5,220.21	11,164.57	48,302.30	164	21,638.73	7,558.95	9,182.30	63,590.84
Median Income per 1k	167	55.35	46.11	2.87	346.20	164	68.50	58.06	9.18	283.47
Distance to closest Market (mi)	149	17.90	16.89	0.08	85.64	164	19.69	22.66	0.10	112.56

Table 5.2: Comparison of Trade Areas in the Southwest Region 2016

	2016 with Markets					2016 without Markets				
Variable	Obs	Mean	Std.Dev	Min	Max	Obs	Mean	Std.dev.	Min	Max
Percent Non-white	328	0.27	0.17	0.00	0.94	361	0.24	0.20	0.00	0.99
Percent College-educated	328	0.09	0.05	0.00	0.34	361	0.07	0.04	0.00	0.31
Percent Age 19 and under	328	0.28	0.04	0.05	0.39	361	0.29	0.06	0.00	0.54
Percent Age 65 and over	328	0.15	0.06	0.06	0.61	361	0.15	0.06	0.00	0.48
Total Population	328	48,766.28	67,606.63	139.55	437,678.30	361	20,369.72	44,287.71	15.00	417,100.50
Population per 10k	328	0.49	0.68	0.00	4.38	361	0.20	0.44	0.00	4.17
Median Income	328	42,326.00	14,093.30	16,322.13	104,350.50	360	38,175.35	11,632.32	11,527.80	98,597.70
Distance to closest market	327	10.64	13.47	0.00	95.65	221	10.91	10.59	0.02	66.36
Median Income per 1K	328	42.33	14.09	16.32	104.35	360	38.18	11.63	11.53	98.60

By 2016 the differences between the market and non-market trade areas are even more distinct. The market trade areas are slightly more educated, at 9%, than non-market trade areas, at 7% (Table 5.2). The biggest differences in trade areas are in the population size, with market trade areas more than double the population compared with non-market trade areas. Income levels are also 11% higher in market trade areas, at $42,326 versus $38,175. By the descriptive statistics alone, income, education, and more dense population levels attract public markets. This observation is further investigated with the logit regression analyses to determine which factors are statistically significant in predicting the presence of public markets. These analyses test the null hypotheses that the explanatory variables are not predictors of market success.

5.2 Changes in Trade Areas between 1996 and 2016

The change in key descriptive statistics of trade areas shows that the Southwest Region became wealthier (23% in real income), more educated (28% increase), and more ethnically diverse (16% increase) from 1996 to 2016 (see Table 5.3). At the same time, there were slight decreases in the young and retired persons. The distance between the trade area and the closest market also decreased by 0.44%, from 18.7 miles to 10.4 miles in 2016. Population in the market and non-market trade areas rose 10.9% on average, which points to higher population densities (see Table 5.3).

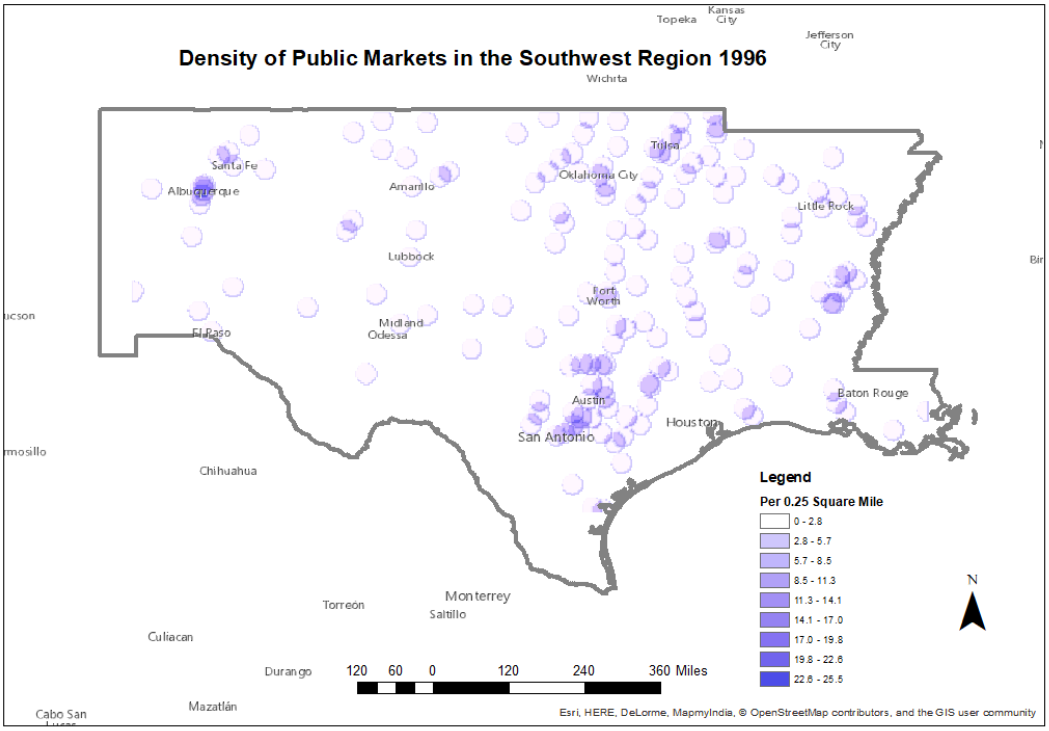
As indicated in Map 5.1, the trade area density is highest in the eastern portion of the Southwest Region and the least dense in western New Mexico and western Texas. By 2016, the number of trade areas with markets has increased in density across the region (Map 5.2). The increased density is noted in the Dallas-Fort Worth Metroplex including Denton, Texas. A further review of the maps indicates significant density increases in Arkansas and Louisiana. The

Austin-San Antonio area has consistent density of public markets over the 20-year period. Public markets are more dispersed in rural areas than urban areas in both 1996 and 2016. As shown in Maps 5.1. and 5.2, the point density of per 0.25 square miles increases from 1996 to 2016 in the Southwest Region. The point density measures the number of markets in each 0.25 mile radius neighborhood divided by the area of the neighborhood.

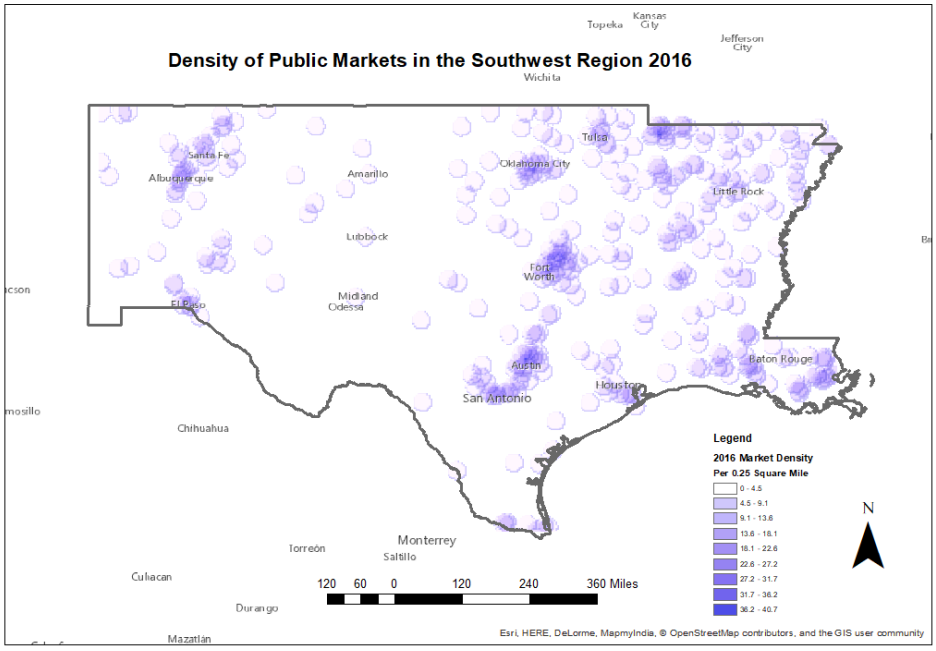
Table 5.3: Change in Selected Trade Area Variables for All Markets in Southwest Region, 1996-2016

Variables	1996	2016	% Change 1996-2016
Percent Non-white	0.219	0.255	16.44
Percent College-educated	0.064	0.082	28.13
Percent Age 19 and under	0.307	0.283	-7.82
Percent Age 65 and over	0.157	0.151	-3.36
Total Population	30,565.090	33,887.970	10.87
Median Income (nominal)	21,347.190	40,154.150	88.10
Distance to closest Market	18.659	10.449	44..00
Median Income (2016 dollars)	13,417.467	16,536.523	23.25

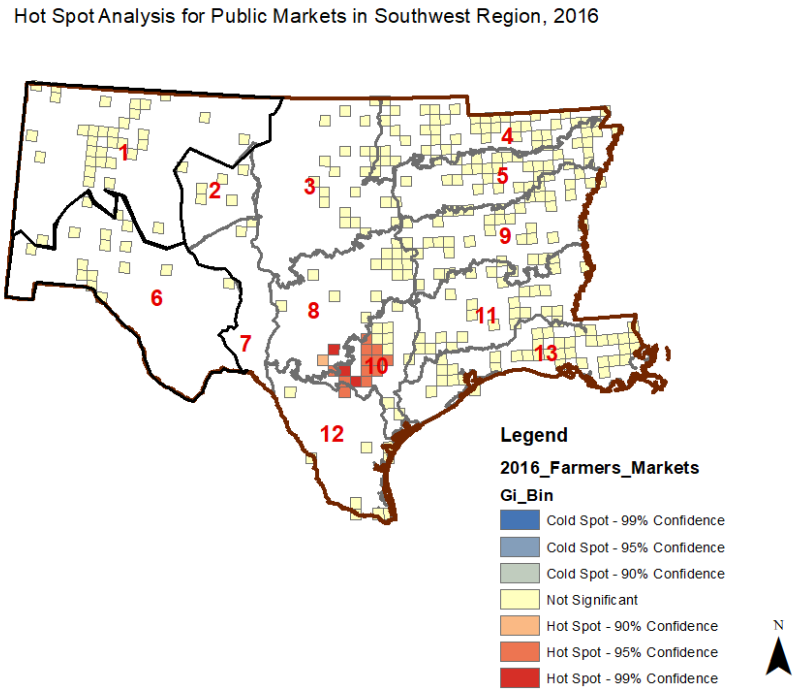
Because of the observed spatial clusters, a hot spot analysis was conducted of public markets in 2016. The hot spot analysis in ArcMap shows statistically significant spatial clusters of hot spots and cold spots according to significance determined by z-scores and p-values (ESRI 2017; see Map 5.3). To be a hot spot, the public market location would have a high z-score and a low p-value. 90%, 95%, and 99% confidence levels show these clusters. On Map 5.3, a statistically significant cluster to 95 and 99% confidence exists in the Austin-San Antonio area of Grid 10. This cluster is not random and there is some factor or factors that are influencing the locations of public markets.



Map 5.1: Point Density of Public Markets in the Southwest Region 1996 (USDA 1996)



Map 5.2: Point Density of Public Markets in the Southwest Region 2016 (USDA 2016).



Map 5.3: Hot Spot Analysis for Southwest Region in 2016 Showing Significant Cluster in Austin-San Antonio Area (USDA 2016)

5.3 Research Question 2: Underlying Conditions for Public Markets

5.4 Correlation between Public Markets and College Towns

The correlation matrix tables show the strength of the relationship between each of the explanatory variables and the dependent variable (market dummy) as well as the relationship between the explanatory variables (see Appendix B). This analysis shows the first indication that college towns are a significant predictor of public markets. The other relationships between median income and education and median income and population are expected. There is moderate relationship between the market dummy and college towns in 1996 and 2016. There is moderately strong positive relationship (over 0.7) between median income in 1996 and trade area population. In 2016, there is a very strong positive relationship between median income and

college education. The more educated the population, the more income is expected. The more urban populations are also expected to have higher incomes than lower population areas.

5.5 The Logit Regression Equation Models

This investigation aims to answer the major research question: what are the underlying factors that contribute to the success of public markets in the Southwest Region? From another perspective: what influences decision-makers to support public markets in the Southwest Region? Furthermore, what retail market conditions support public markets? The logistic regressions are done to test the null hypotheses that each of the explanatory variables have no relationship to the likelihood of public markets in the Southwest Region. If any of the explanatory variables are statistically significant, then the null hypothesis is rejected for that variable, and the alternative hypothesis (that an explanatory variable does have a relationship with market success) is accepted. The 90%, 95%, and 99% confidence levels are used to test each hypothesis, evaluating the z-scores and the p-levels for significance

Whether a market area develops a market is determined by dozens of factors. Let TA indicate each trade area with TA = 1…N and B_{TA} be a variable indicating the net benefit (i.e. net social welfare) of a market to each trade area. Further assume that if $B_{TA} > 0$, a market will exist in that market area, that is, $M_{TA}=1$. This latent B_{TA} variable is unobserved, but we hypothesize that it is determined by local demographic and socioeconomic determinants through the following equation: $B_{TA} = \beta X_{TA} + \varepsilon_{TA}$ where the X_{TA} are observed trade area characteristics and ε_{TA} is the error term which is an amalgamation of all unobserved variables and how they contribute to B_{TA}. In this specification, ε_{TA} is assumed to have a logistic distribution. The model, as specified, can be described as follows:

$$\begin{cases} B_{TA} = \beta X_{TA} + \varepsilon_{TA} \\ M_{TA} = 1 \text{ if } B_{TA} > 0 \\ M_{TA} = 0 \text{ if } B_{TA} \leq 0 \\ \varepsilon_{TA} : \text{ Logistic} \end{cases}$$

Given this specification, the probability that a market will be observed in a trade area or not can be described with the following equations.

$$P(B_{TA} > 0 \mid X_{TA}) = P(M_{TA} = 1 \mid X_{TA}) = \frac{e^{\beta X_{TA}}}{1 + e^{\beta X_{TA}}}$$

$$P(B_{TA} \leq 0 \mid X_{TA}) = P(M_{TA} = 0 \mid X_{TA}) = \frac{1}{1 + e^{\beta X_{TA}}}$$

The likelihood function can then be written as follows:

$$L_{TA} = \prod_{TA=1}^{N} \left(\frac{e^{\beta X_{TA}}}{1 + e^{\beta X_{TA}}} \right)^{M_{TA}} g \left(\frac{1}{1 + e^{\beta X_{TA}}} \right)^{1 - M_{TA}}$$

The β coefficients in the model are determined by calculating the values of β which are maximizing the value of the likelihood function. The STATA simulation tables show the probabilities (likelihood) of public markets at selected levels within the range of each characteristic (variable).

5.5.1 Logit Regressions: Some Explanatory Variables Predict Public Markets

Interpretation of logit (logistic) regression results is not as straightforward as in ordinary least squares (OLS) regression techniques. While the coefficients in OLS represent the marginal effect of each explanatory variable on the dependent variable, this is not the case for logistic regressions. The coefficients shown in the regression results (see Appendix D) represent the positive or negative effect and the degree to which the explanatory variable impacts the likelihood of public markets. The level of statistical significance was interpreted at the 90%,

95%, and 99% confidence levels based upon the z-scores and the p-levels (see Table 5.5). To further demonstrate the effect of each statistically significant explanatory variable upon the likelihood of public markets, simulations in STATA show the explanatory variable effect, within its range, on the public market likelihood. As the explanatory variable changes, the simulation shows the resulting mean prediction of the likelihood of public markets. The mean predictions are shown in Figures 5.1-5.9 and Appendix E.

Not every explanatory variable is significant from the simulations for 1996 without college towns. Both the population levels and median income have very small coefficients, 0.0760 and -0.0686 respectively, and the null hypothesis is still accepted for not having an impact upon public market likelihood. On the other hand, the null hypothesis is rejected that college education levels and grids have no relationship to public market likelihood in trade areas, not including the college town variable. The alternative hypothesis is accepted that college education levels and particular climate grids increase the likelihood of public markets.

5.5.2 Likelihood Simulations Show How Well Explanatory Variables Predict Public Markets

The simulations for the statistically significant variables (Figures 5.1-5.9, Appendix E) show how important that variable is on the likelihood of a public market in the trade areas. Even if the beta coefficient is small, that is not the sole factor on determining the importance of the variable. The statistically significant variables are shown in Table 5.4 are identified to run simulations. The explanatory variables not listed in Table 5.4 were not statistically significant in 1996 or 2016.

Regressions with and without college towns were run to evaluate whether the college towns account for population, income, or education. In 1996, the results show that all three

variables are not significant if college town is included. During that year, college town does appear to account for higher population, income, and education levels. In 2016, while there is an effect upon population when including college town, the other factors shown in Figure 5.1 remain significant. Across both time periods, college towns are highly significant. From the simulations, as population and education increase, so does the likelihood of public markets in the trade areas. The multiple graphs show the upward-sloping curve that illustrates the increased likelihood as the independent variables increase. Age and race were not statistically significant in 1996 or 2016.

Table 5.4: Identification of Statistically Significant Variables for Simulations

Explanatory Variables	1996		2016	
	With College Town	Without College Town	With College Town	Without College Town
Population	No	Yes	No	Yes
Median Income	No	Yes	Yes	Yes
College Education	No	Yes	Yes	Yes
Grids	2,9,10, and 13	9,10,12, and 13	1,3, 6, and 10	1,3, 6, and 10
College Town	Yes	N/A	Yes	N/A

In 1996, trade areas with high populations are much more likely to have public markets than lower populated areas, with under 50% at 5,000 but about 80% at 300,000 people (Figure 5.1). There is also a substantial difference between trade areas with 2% college-educated versus 18% college-educated. There is an 85% likelihood of having a public market with a highly educated population versus a minority of the population being college-educated. This is not to say the lower-educated trade areas will not have public markets, but the probability rises with education.

Table 5.5: Logit Regression Results Summary (β Coefficients, Significance, and Standard Error)

Variable	1996		2016	
	No College Town	College Town	No College Town	College Town
Percent Non-White	1.632	0.742	-0.575	-0.829
	(-1.418)	(1.537)	(0.659)	(0.682)
Percent College-Educated	15.34906**	6.327	25.986***	23.13968***
	(7.807)	(8.399)	(4.945)	(5.075)
Percent Age 19 and Under	-0.441	1.167	3.147	3.429
	(6.511)	(6.864)	(3.543)	(3.633)
Percent Over Age 65	1.468	6.775	0.018	1.761
	(4.083)	(4.447)	(2.801)	(2.921)
Population per 10K	0.076**	0.006	0.855***	0.335
	(0.035)	(0.037)	(0.307)	(0.304)
Median Income per 1K	-0.069*	-0.024	-0.061***	-0.046
	(0.035)	(0.039)	(0.014)	(0.015)
Distance to Closest Market	0.002	-0.007	0.004	-0.001
	(0.008)	(0.039)	(0.010)	(0.010)
College Town	N/A	2.202***	N/A	1.236271***
	N/A	(0.344)	N/A	(0.242)
Grid 1	0.233	0.357	2.523***	2.734***
	(0.467)	(0.518)	(0.606)	(0.629)
Grid 2	-0.932	-1.452**	N/A	N/A
	(0.650)	(0.718)	N/A	N/A
Grid 3	-0.236	-0.708	1.205	1.174***
	(0.399)	(0.447)	(0.449)	(0.450)
Grid 4	-0.205	-0.168	-0.057	-0.007
	(0.401)	(0.443)	(0.285)	(0.294)
Grid 5	-0.108	-0.543	0.278	0.236
	(0.508)	(0.571)	(0.284)	(0.295)

(table continues)

Variable	1996		2016	
	No College Town	College Town	No College Town	College Town
Grid 6	0.071	0.261	1.582**	1.593**
	(0.645)	(0.712)	(0.691)	(0.686)
Grid 7	-0.183	0.451	N/A	N/A
	(0.841)	(0.963)	N/A	N/A
Grid 9	-1.144**	-1.238**	-0.341	-0.197
	(0.451)	(0.495)	(0.270)	(0.277)
Grid 10	1.235**	1.404***	3.097***	3.322***
	(0.504)	(0.540)	(1.054)	(1.060)
Grid 11	0.565	0.501	-0.024	-0.001
	(0.479)	(0.515)	(0.256)	(0.264)
Grid 12	-1.169*	-0.746	-0.359	-0.120
	(0.679)	(0.723)	(0.547)	(0.569)
Grid 13	-0.883*	-1.160**	0.094	0.064
	(0.489)	(0.529)	(0.133)	(0.131)
Grids 2 and 7 (2016 Only)	N/A	N/A	1.333	1.240
	N/A	N/A	1.138	1.169

* 90 Percent Significance, **95 Percent Significance, ***99 Percent Significance

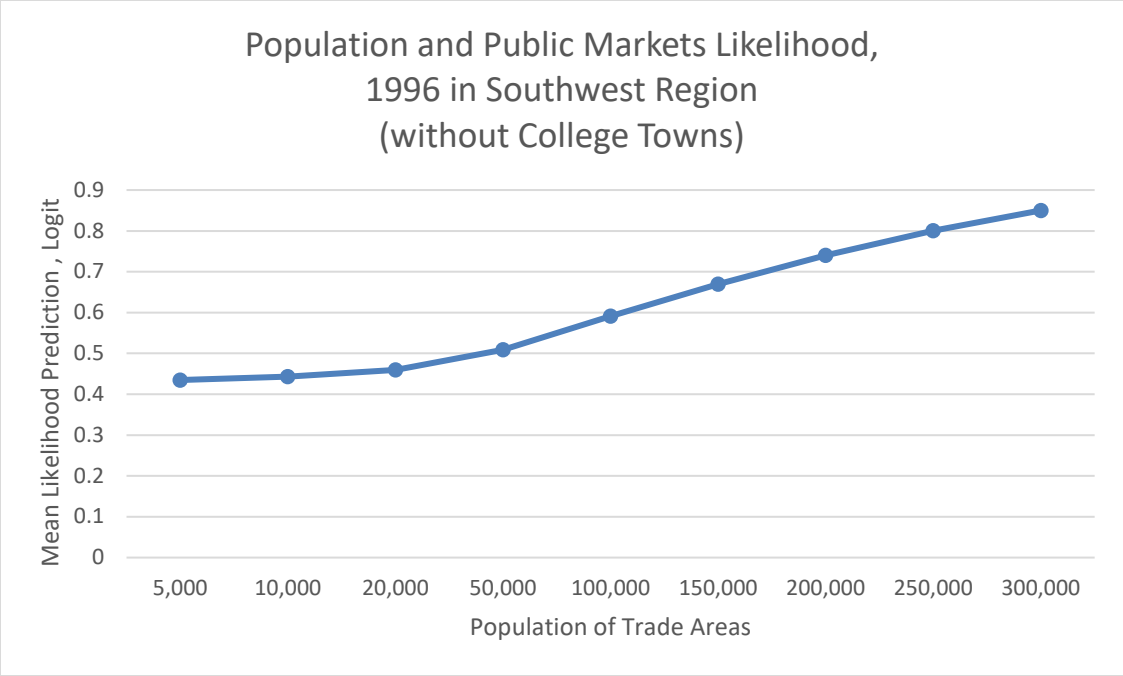


Figure 5.1: Population and Likelihood 1996 without College Towns

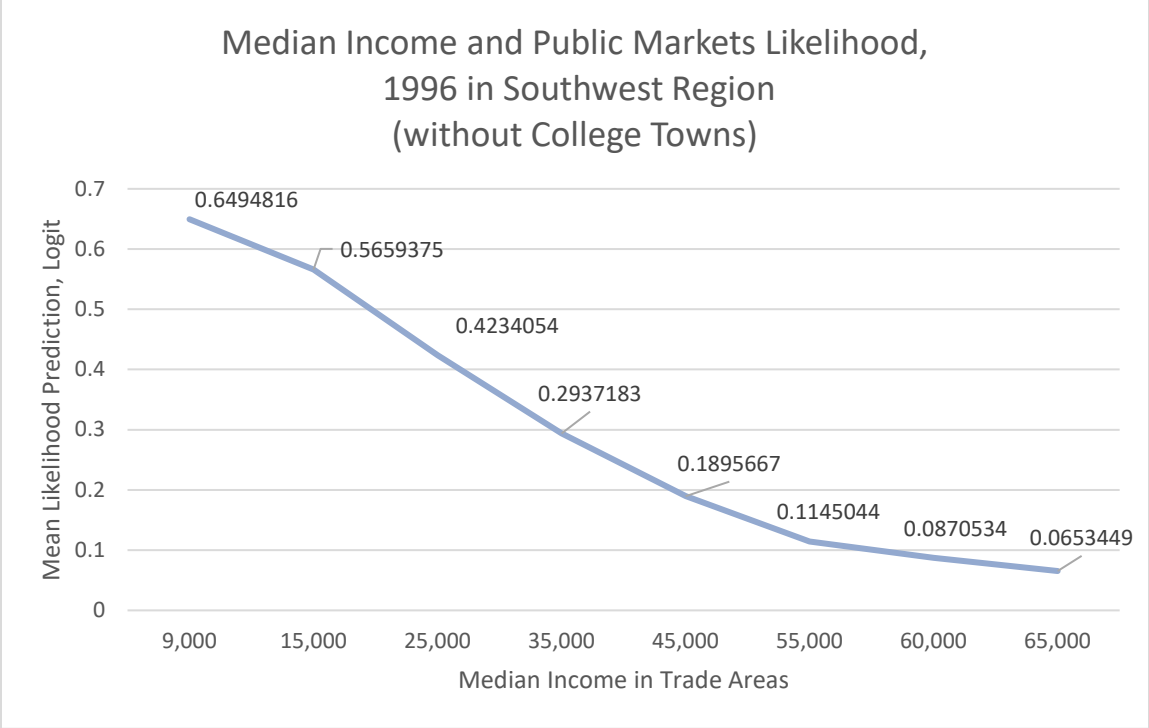


Figure 5.2: Median Income and Likelihood 1996 without College Towns

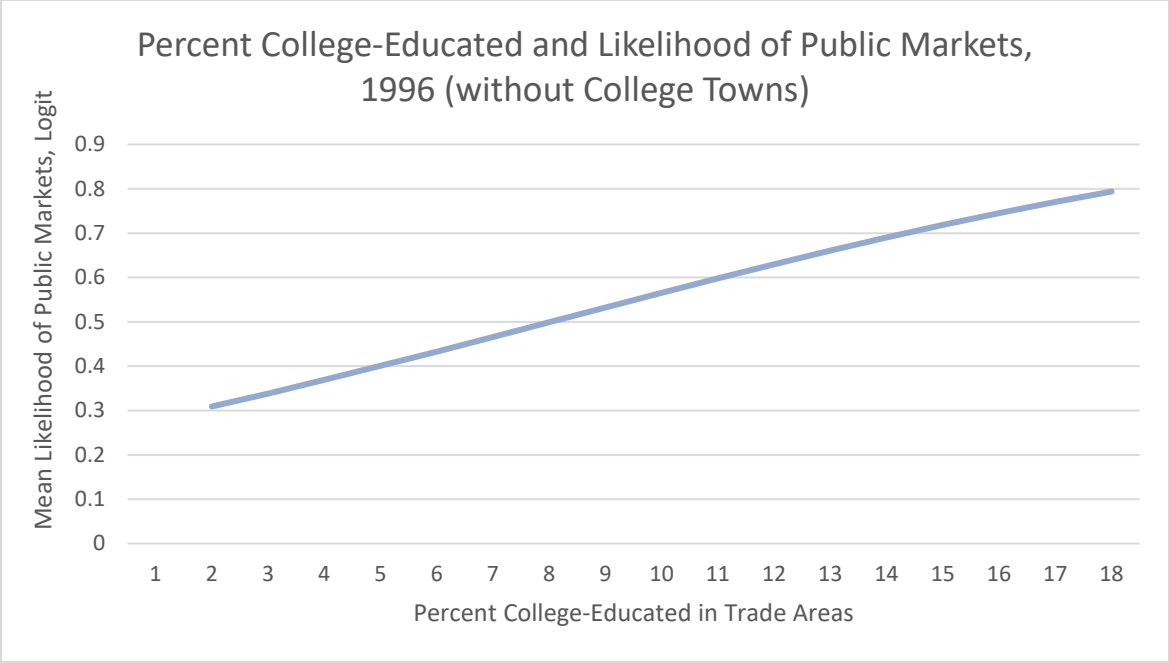


Figure 5.3: Percent College-Educated and Likelihood 1996 without College Towns

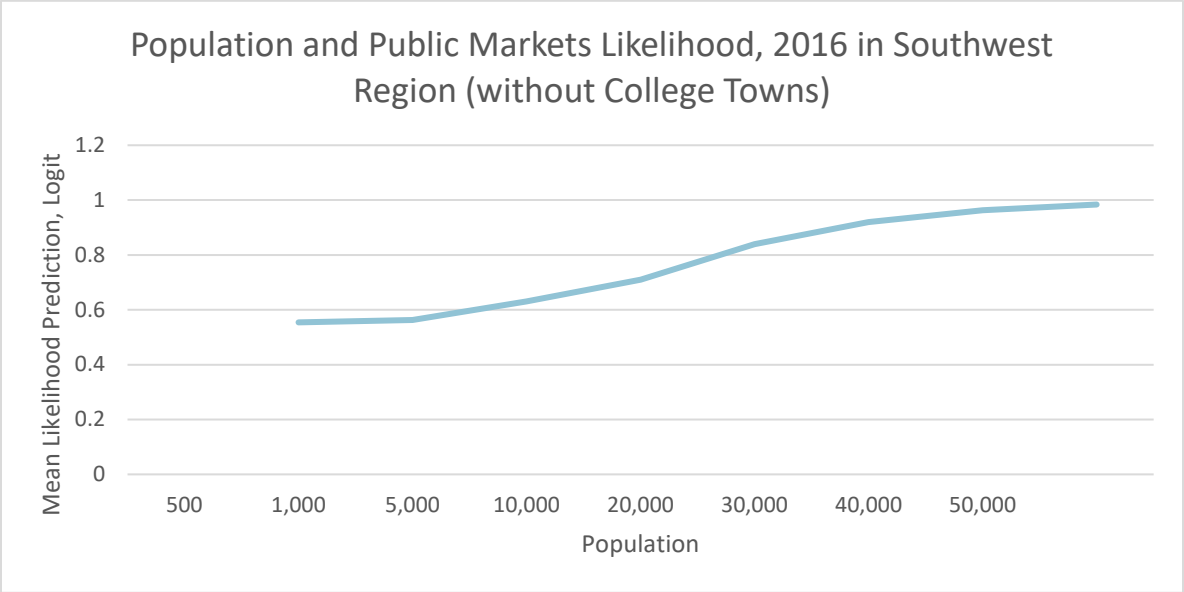


Figure 5.4: Population and Likelihood 2016 without College Towns

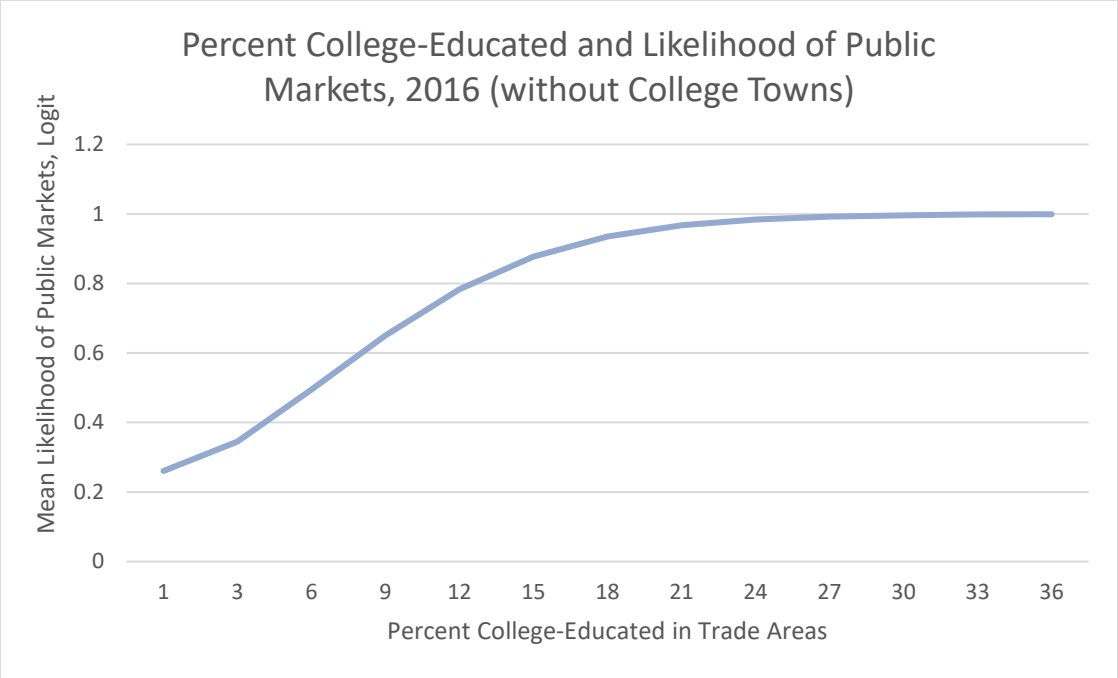


Figure 5.5: Percent College-Educated and Likelihood 2016 without College Towns

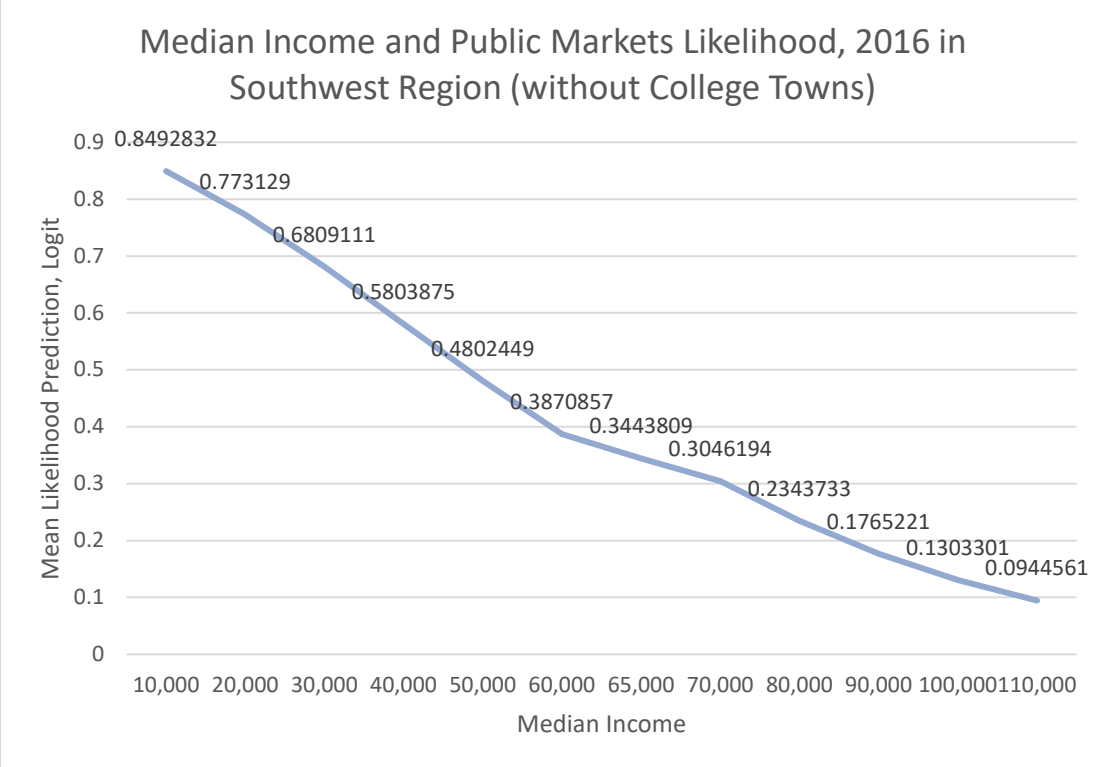


Figure 5.6: Median Income and Likelihood 2016 without College Towns

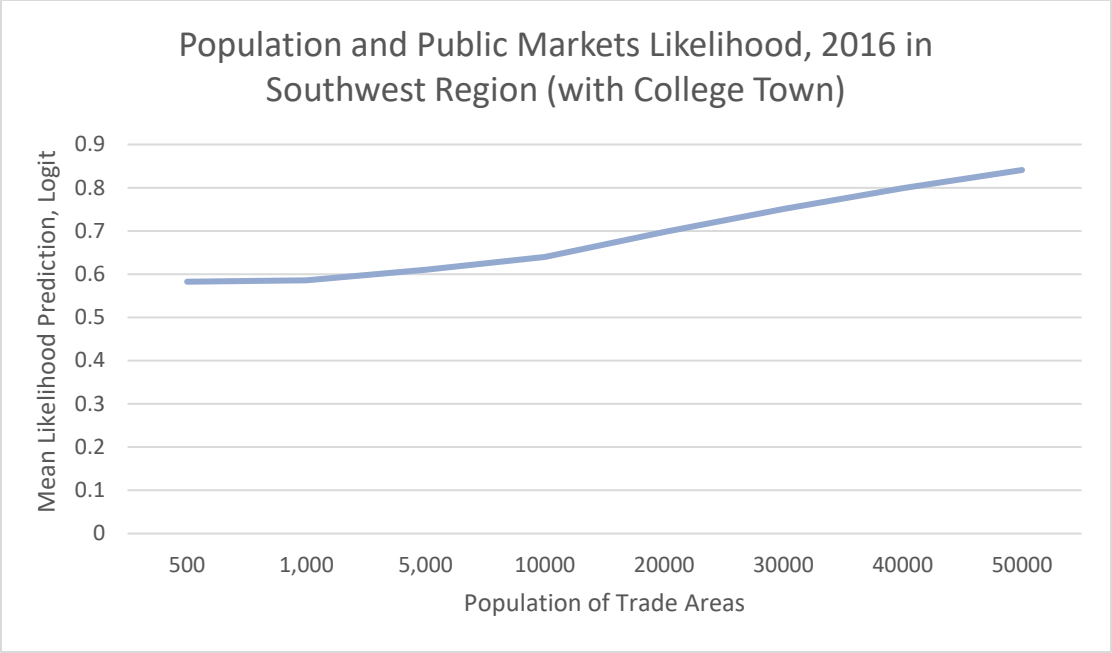


Figure 5.7: Population and Likelihood 2016 with College Towns

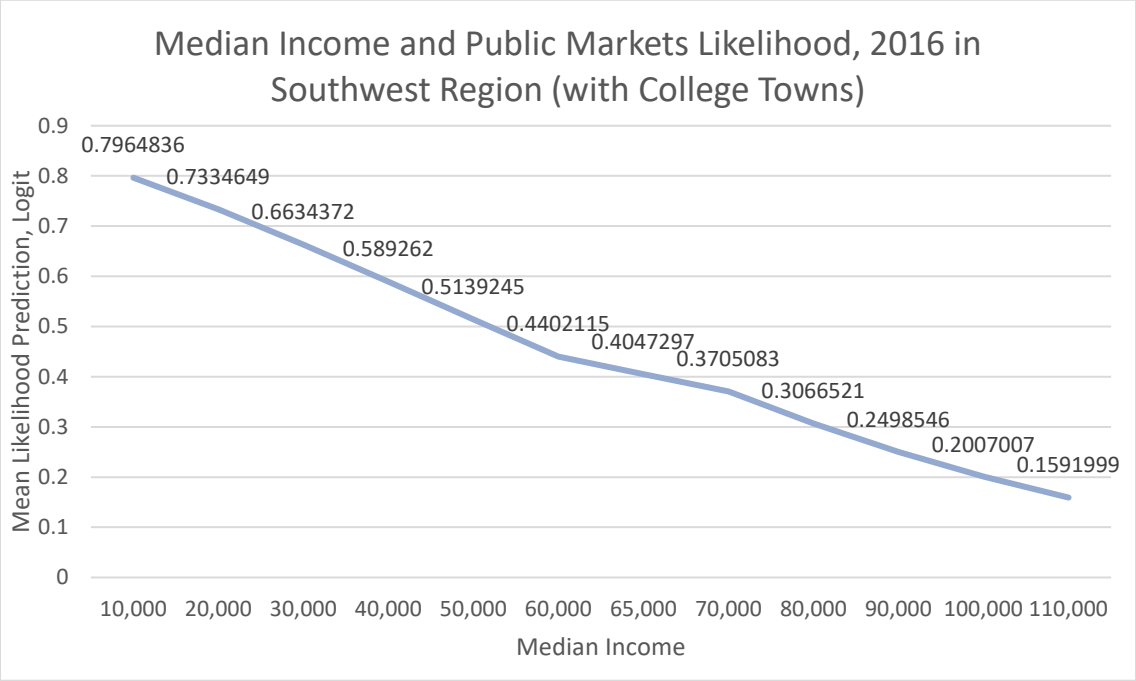


Figure 5.8: Median Income and Likelihood 2016 with College Towns

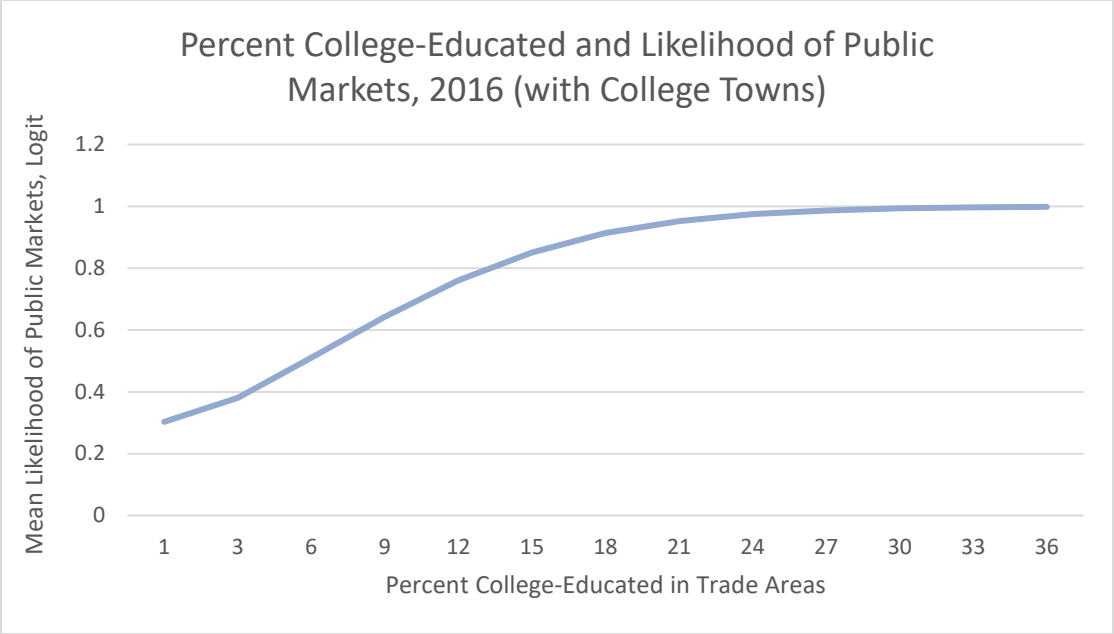


Figure 5.9: Percent College-Educated and Likelihood 2016 with College Towns

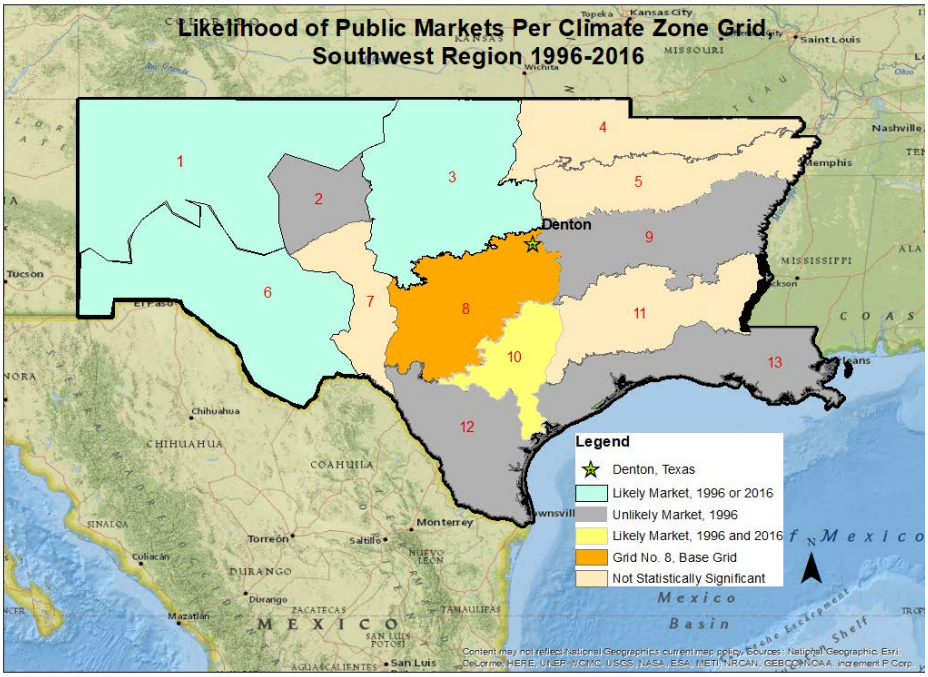
These same trends hold for 2016, but the range of explanatory variables is smaller, with population simulations in 2016 range from 500 people to 50,000, showing an increase of likelihood from 55.4% to 98.4% at 50,000 people (Figure 5.4). In other words, there is almost a 100% chance that a trade area with 50,000 people will have a public market. At 18% college-educated, even without a college town, the likelihood is over 90% for a public market. The likelihood increases and approaches nearly 100% with 27% college-educated. Figure 5.5 shows the flattening of the curve at near 100%. The same trend holds true with college towns (see Figure 5.9).

For median income in 1996 and 2016, with and without college towns, the coefficient is very small and negative at less than 0.10. Median income still has a very large effect upon the likelihood of a public market as shown by the simulation results. The results for median income are unexpected because as the median income increases, the likelihood significantly decreases for both 1996 and 2016 (Figures 5.2, 5.6, and 5.8). The literature attributed higher median incomes to likely customers (Sadler 2013; Bubinas 2009; Henneberry 2009; Govindasamy

2002;) thus this result is contrary to current thought on public markets. Schupp (2016) and Singleton et al. (2015), however, did have some inconsistent or ambiguous results on median income that somewhat corroborates this finding. Median income is significant in all models except 1996 with college towns.

5.5.3 The Likelihood of Public Markets per Climate Grid

The β (beta) coefficients and the simulations demonstrate the likelihood of public markets per climate grid (see Appendix E). The negative beta coefficients mean an unlikelihood of public markets, while positive coefficients mean there is more likelihood of public markets. The simulations show the differing likelihoods relative to Grid 8 (Dallas and Denton). For the statistically significant results, Map 5.4 shows the distribution of likely and unlikely markets locations.



Map 5.4: β Coefficients and Likelihood Simulation Results per Climate Grid for Public Markets in Southwest Region

In 1996, grids in the eastern and southern portions (Texas, Louisiana) of the Southwest Region as well as central New Mexico (Grid 2) were less likely to have a public market. The simulations (with college towns) show that in Grid 2 for instance, there is only a 27.2% chance of having a market versus a 78.1% chance in Grid 10. By 2016, predictions show that the Santa Fe area and much of the rest of New Mexico, Oklahoma were more likely to have a public market relative to Grid 8, the Dallas and Denton area. Grid 10 in the San Antonio and Austin area is consistently more likely to have a public market. These results correspond to the hotspot analysis.

CHAPTER 6

DISCUSSION AND CONCLUSIONS

With the rise of supermarkets, the extensive use of the automobile, and the industrialization of food production, public markets had largely disappeared in the 1950s and the 1960s in the United States until their resurgence in the 1970s. The advent of the USDA direct marketing legislation in Congress and other societal factors contributed to this resurgence (Hall et al. 2008; Sommer 1980; Brown 2002). The resurgence occurred not just in the United States (1970s-80s), but also in Canada (1970s-80s), the United Kingdom (1990s), Australia (1990s), and New Zealand (1990s) (Hall et al. 2008).

Brown (2002) documented the early studies on farmers' markets, or public markets, after they increased in number from just 300 in 1970 to over 3,000 by early 2001. They now number over 8,600 in the United States by 2016 (USDA 2017). The Southwest Region of the United States has seen significant population growth (46%) and a quadrupling (219%) in the number of public markets over the past 20 years, from 1996 to 2016. Their distribution in the Southwest Region and the United States as a whole (see Map 4.1) is not even, but concentrated on the two coasts and largely in metropolitan areas. The Southwest Region has major gaps, especially in West Texas and more rural communities (see Map 4.2).

This study investigates the underlying conditions of success for public markets in the Southwest Region of the United States in 1996 and 2016. A logit regression estimates the probabilities of a public market in a trade area given changes in the levels of explanatory variables: median income, race, age, distance to closest market, education, population, climatic grid location, and college town status. The most comprehensive studies of public markets in the United States using USDA data (USDA 2011, Schupp 2016; Singleton et al. 2015) demonstrated

major gaps in the research. This inquiry begins to close some of those gaps.

The research gaps, public market trends, and the DCM case study (DCM 2017) led to three major research questions. The results of this mixed-method study from logit regressions, background qualitative data, and literature reviews attempt to answer some aspects of these questions not previously addressed in the literature, and especially within the Southwest Region of the United States.

6.1 Results for Research Question 1: What are the Characteristics of the Trade Areas of Public Markets in the Southwest Region from 1996 to 2016?

The characteristics of trade areas for public markets and potential public markets (non-markets) in the Southwest Region changed from 1996 to 2016. The region's trade areas became more diverse, with a 16% increase in the non-white population, more educated by 28%, and wealthier by 23%. This was during a time of 11% population increase in the trade areas.

In comparing public market with non-market trade areas, there are distinct differences. Public market trade areas have higher populations in 1996 and 2016 and are wealthier in 2016 with an average median income of $42,326 in public market trade areas and $38,175 in non-market trade areas. Surprisingly, the distance to the closest market was not substantially different between market and non-market trade areas. There was only a 2-mile difference in 1996 between market and non-market trade areas, but by 2016 the distances were about equal. The distance to the closest market decreased from 17.9 miles in 1996 for public markets to 10.6 miles in 2016.

6.2 Results for Research Question 2: At the Southwest Region Geographic Scale, What Socioeconomic and Climate Factors may Influence the Success or Failure of Public Markets in Cities?

The following factors influence public market success: higher education levels, college-town presence, higher population levels, location grids, and median income in the Southwest Region, both in 1996 and 2016. The higher the college education percentage, the higher the likelihood of public markets. Education influences decision-makers, from customers to vendors, to participate in markets. This is also shown by the high statistical significance of college towns influencing public markets. Public markets are positively correlated with college towns. The educated city, both by education levels and college town status, is more likely to have a public market.

Location in some climate grids influences public market success, but the likelihood of markets may not be related only to climate. Grids in the western portions of the region are more likely to have markets by 2016. The San Antonio and Austin area (Grid 10) is highly likely to have public market success in 1996 and 2016. The regression results correspond with a GIS hot spot analysis of spatial clustering in Grid 10. These location factors may be associated with the precipitation and temperature for growing local crops, but also may be influenced by other unidentified factors, such as institutional support or sub-region culture (Long 2010).

Unexpectedly and not present in the literature, median income is inversely related to the likelihood of public markets in the region. The higher the median income, both in 1996 and 2016, the less likely a market in the trade areas. This is despite the finding that trade areas with public markets are wealthier than trade areas without public markets.

Race, age, and distance to the nearest market are not factors in public market success. The results of distance to nearest market are intriguing because it appears despite competition, as

noted in the USDA study of 2011, it is not a determinant of public market success. This lack of influence by the nearest market is demonstrated in the DCM case study (DCM 2017), where numerous nearby competitors do not have enough of an impact to discourage success and growth of the market.

6.3 Results for Research Question 3: Do the Regression Results and the Background Denton Community Market Case Study Data Identify Evidence that Public Markets are Nontradable Consumption Amenities?

The logit regression results do not directly answer whether public markets are nontradable consumption amenities that have local nontradable consumer goods, those bound to place. The local nontradable consumer goods are "location-based service or good that is differentiated and patronized by consumers with a specific set of preferences" (Schiff 2015: 1086-87). The regression and simulation results lead to indirect measurements of characterizing "consumers with a specific set of preferences," and those preferences are specifically related to localism, the local foods system, community, and other aspects of perceived embeddedness (PE) (Chen and Scott 2014). Thus, there are two major sources of background evidence supporting public markets as nontradable consumption amenities. First, the characterization of consumer characteristics through the comparison of this study to two recent studies on socioeconomic and other explanatory variables (Table 6.1). Second, the relationship between consumer preferences and embeddedness.

Table 6.1: Comparison of Major Studies on Public Markets and Their Underlying Conditions (2015-2017)

	Schupp 2016	Singleton et al. 2015	This Study 2017
Scale	United States Census Tract Neighborhood	United States Counties using USDA Food Atlas	Southwest Region Trade areas using Census place
Variables	Socioeconomic	Socioeconomic, Health Status, and Retail	Socioeconomic, College town, and Climate

(table continues)

	Schupp 2016	Singleton et al. 2015	This Study 2017
Public Market Location Time Period	2011	2013	1996 and 2016
Statistical Method	• Bivariatet-tests to compare means of each variable between farmers' market locations and non-farmers' markets locations • Not likelihood and no interaction of variables	• Logit and Poisson • Likelihood and interaction of variables	• Logit • Likelihood and interaction of variables • Simulations of variables at different values to show likelihood at those values. • Hot spot analysis to show statistically-significant clusters.
Results: Median Income and public market locations	Conflicting results: Median income lower in neighborhoods with markets and some measures show slightly higher incomes	Median income increases likelihood in metro but not non-metro counties	Median income inverse relationship with markets
Results: Education and public market locations	Education higher	Education not measured.	• Education predicts • College Town predicts
Results: Population and public market locations	A majority of markets in metropolitan or micropolitan areas (80%) versus 9% in rural areas. The remaining are in small towns.	Found variation in results between metro and non-metro areas.	Population levels predict the likelihood of public markets. Trade areas gained in population from 1996 to 2016.

First, the results from this research show that the success of public markets is more likely associated with 15-minute drive time trade areas that have higher college education levels, college town presence, and higher population levels. This study also shows that median income is inversely related to the success of public markets in trade areas, given simulations for increasing median income levels. The literature, until recently and with this study, contends that the profiles of farmers' market consumers typically are women, middle-aged, educated, and

white (Sadler 2013; Bubinas 2009; Henneberry 2009; Govindasamy 2002; Wolf et al. 2005) with higher median income levels. Median income as related to the existence of public markets is also questionable in Schupp 2016, using the same USDA database on market locations, but from 2011 rather than 1996 or 2016.

This study's findings respond to many of Schupp's (2016) future research questions in the study of public markets from 2011 across the United States in several ways. Schupp's study compared the difference between the means of fourteen socioeconomic variables in areas with markets and in areas without markets. Median income was generally lower in neighborhoods with public markets, while education, median rent, and housing values were higher. Using a bivariate analysis, each independent variable conducted separately in areas with and without markets. Schupp's study ended with a call for future research showing the interactions of variables "collectively in areas in which farmers' markets are located." (Schupp 2016: 840) This current investigation includes a model of all variables and their interactions using a (logit) regression (see Table 6.1).

This study also responds to questions raised by Singleton et al. (2015). Their research found that median income was not consistent in predicting the likelihood of public markets. Median income increased the likelihood only in metro areas, or areas with higher population density. This present study found that median income is inversely related to public market likelihood, showing that there is more involved than just income in predicting success. While this finding seems counterintuitive given past studies on consumer incomes and public markets, being higher than average, it could be more of an issue of the physical locations of the market. Many markets may be located in older sections of the city that may have lower incomes, despite having a trade area that also includes higher median income households. This is the case in

Denton, Texas, a college town. While median incomes are lower within the 10-minute drive time, representing the college geodemographic Tapestry Segment, these customers are more likely to frequent the market, given the high market penetration levels at the 76201 Zip Code, the location of the market. Yet within 15-minutes, there are higher income households and families, who also frequent the market. It is the embeddedness on all three levels that may prompt economic diversity at some markets. Customers find meaning in purchasing local goods, despite not having higher than average incomes. Further analysis is necessary on the median income data and simulations to determine if the relationship between public markets and median income levels off at a certain income, but is not less predictive.

Other variables besides socioeconomic status are relevant. Singleton et al. (2015) show that the presence of other types of retail, such as supermarkets, is associated with the presence of public markets at the county scale. Although this variable is not part of this study, some climatic zones in the Southwest Region are associated with the presence of markets in trade areas. Zone 10 which is located in the San Antonio and Austin area, with the consistently the highest likelihood in 1996 and 2016, may have other factors, besides climate, that are just as important for the success of public markets.

Austin is in the top tier of cities with the creative class (Florida 2012; Florida 2017) and has the "Keep Austin Weird" civic campaign, an indication of an alternative and bohemian cultural milieu defining a sense of place (Long 2010). Such a milieu is associated with the creative class as well as college towns (Gumprecht 2003; Gumprecht 2009; Vinodrai 2014; Florida 2012). The study results do not, however exclude cities that do not have this milieu. The local food movement and localism pertain to a general reaction to globalism and disconnection from food production and other goods (Oosterveer and Sonnenfeld 2012; DuPuis 2005). An

awareness of this disconnection, however, appears to be more prevalent among the educated, as shown by embeddedness (Chen and Scott) and consumer preference studies (Dodd et al. 2014; Sadler et al. 2013; Vecchio 2011; Murphy 2011; Henneberry et al. 2009).

Second, as shown with a statistical analysis of Perceived Embeddedness (PE), customers appear to gain utility from the social, spatial, and natural (ecological) embeddedness associated with the goods (Chen and Scott 2014). This finding also corresponds to consumer responses about motivations for attending markets (Dodd et al. 2014; Sadler et al. 2013; Vecchio 2011; Murphy 2011; Henneberry et al. 2009). The PE links the three types of embeddedness directly or indirectly to place. Social embeddedness is related to the interactions that occur at the market, spatial embeddedness links goods to local places, and natural(ecological) embeddedness relates goods to the benefit of the natural environment. PE would not exist without the transactions occurring at the market, as all three are necessary and interconnected. The economic transactions are connected to a specific "place" at the market, and geographic perceptions of "local" are key to the utility gained by visiting the market and purchasing local goods. These observations are by far the most convincing evidence that the goods purchased are local nontradable consumer goods purchased at a nontradable consumption amenity. The evidence for PE, using the same indicators as in the Chen and Scott (2014).

This study asserts that public markets are third places (Oldenburg 1989, 2005; Hummon 1991). The markets promote the social interactions with vendors and other visitors and an awareness of the goods being purchased. Such awareness is most likely highest in college towns and educated trade areas. Creatives deem sustainability as highly important for the quality of life and attractiveness of places (Vinodrai 2014). Long (2010) finds this sustainability and environmental awareness in Austin, a highly-ranked creative city in the Southwest Region

(Florida 2012; Florida 2017) as well. This awareness partly stems from the presence of the University of Austin, starting with the activism by its graduates in the 1970s (Long 2010). These embeddedness trends were observed in the analysis of DCM customer preferences, where local, sustainably-produced food, and social interactions were important motivations for attending the market (DCM 2017).

As more awareness of globalization and the disconnection from food production increased over the past couple of decades, so has the interest local food and local goods at the public markets (Hinrichs et al. 2004) Research measures these variables that were not significantly measured prior to 2000 (Brown 2002) and find that customers place importance on local, community, the environment, and social interaction. These are the many signs of the embeddedness of public markets (Chen and Scott 2014)

6.4 Conclusions

- Public markets are more likely in populated areas, and this finding has implications for nontradable consumption amenities.

Glaeser (2001) relates education to population growth in cities. Glaeser also relates faster population growth to the level of amenities in cities (Glaeser 2004). Amenities that are more attractive to educated populations, are also associated with population growth, while amenities that are attractive to less educated workers, show negative associations with population growth. Glaeser further contends that restaurants and live performance venues are amenities attractive to educated consumers. Consumer goods and services are “critical urban amenities” for growth. (Glaeser 2004: 28).

Schiff (2015) expands Glaeser’s (2004) concept of amenities to deem restaurants and other amenities as tied to particular locations, and are not only local goods but are also

nontradable consumption amenities. In other words, nontradable consumption amenities are important to cities. While Schiff's study (2015) was on the variety of restaurants as nontradable consumption amenities, public markets appear to be in a similar category. From the results of this study, public markets are more likely in trade areas with higher percentages of educated populations and with colleges. As Glaeser found, amenities that appeal to the educated are found in cities with more population growth. Public markets are associated with growth and education, as this study finds, so these results correspond with this model on amenities (Glaeser 2004). Following this reasoning, markets may very well generate population growth, while at the same time population growth is associated with public markets. To the extent that public markets attract populations to these trade areas, the population results in this study may be overstated.

It is more likely that areas with population density and an educated population have the retail base to support public markets. Findings of this study show this, both from the descriptive statistics of trade areas in 1996 and 2016, as well as the results of the logit simulations. The bundle of amenities found in college towns may promote a culture of 'bohemian islands" (Gumprecht 2009). The public market may be an important quality of life characteristic, as important as other characteristics that draw the creative class to cities (Vinodrai 2014). The presence of universities, sustainability, and bohemian indices all signify the cultural values of creatives (Vinodrai 2014). Even if the public markets are not promoting growth by themselves, it is more likely that these populations place importance upon what they represent. As found by Chen and Scott (2014), customers who shopped at organic farmers' markets were overwhelmingly college-educated (85.6%), with higher than average income, and were relatively young.

- Public markets are third places in communities.

From the empirical results of this study on public market trade areas, educated people and people in college towns are more likely to support public markets. At the same time, the literature (Dodd et al. 2014; Sadler et al. 2013; Vecchio 2011; Murphy 2011; Henneberry et al. 2009; Aucoin and Fry 2015) and the DCM case study qualitative data (DCM 2017) show that people value the specific experiences that happen at the markets. The social interactions and meaning underlying local goods are very important.

College towns, and those with technical school populations, are particularly important to public market success in the Southwest Region. There are possible explanations for this result related to an awareness and culture that may exist. The residents are educated and creative.in college towns. College towns foster the "creative class" with their students, staff, and professors, alternative culture, and lower rents (Gumprecht 2008). The creative class, though not exclusively college-educated but include technical workers (Florida 2012), are in turn are attracted to college towns (Vindorai 2013). The creative class values sustainability (Vindorai 2013), or the natural embeddedness, that is often symbolized in the local goods that are sold by the producers at these markets. Public markets are distinct "places" rather than just "spaces" and have meaning to the decision-makers, and especially the customers.

Public markets are "third places" (Oldenburg 2005, 1989; Hummon 1991) and for many small towns, college towns, and larger cities, they are "experience markets" (Tiemann 2008). Both third places and experience markets concepts incorporate social embeddedness with "informal associations," (Tiemann 2008), "fellowship" and "conversations" and "nourish a broader appreciation for public life and space." (Hummon 1991: 931). Spatial, social, and natural embeddedness may all contribute to the utility gained from these special places in communities. These markets, with the utility gained from embeddedness, are the antithesis of the placelessness

(Relph 1976) and instead are symbolic in themselves. The public market spaces are "consumed" by the decision-makers as part of the local food system and are "whole spaces" (Holloway and Kneafsey 2000).

- Spatial Patterns of Public Markets in the Southwest Region are Not Conclusive

There are some intriguing patterns of public markets in the Southwest Region that may not be entirely explained by this study. As shown in Map 4.1, the distribution of public markets/farmers' markets in the United States is not uniform. Likewise, from Maps 5.1 and 5.2, spatial clustering can be observed in both 1996 and 2016. The dot density and market density per county maps clearly show clusters of markets.

The hot spot analysis shows that Grid 10 is the area found to have the highest likelihood of public markets in 2016. Both in 1996 and 2016, the logit regressions also found Grid 10 to have a high likelihood of public markets. While climate may be a factor, the results of this study did not find convincing patterns of climate grid analysis to assert that climate is the overwhelming factor of determining public market locations, or success, in the Southwest Region.

Although climate influences growing seasons, it is the awareness of localism and the local food movement that may ultimately influence market success. The more educated the trade area populations, the more likely there will be a successful market. At the same time, income is not a predictor of success. Climate factors appear to have some influence on public market success in the most arid regions, such as West Texas. It appears that other factors or explanatory variables are at work, this study asserts, and culture and population characteristics of the educated and creatives, may be just as important for spatial clusters and patterns of markets.

There are multiple factors, including population levels, that attract public markets to a census place, trade area, or region.

- This Study Further Clarifies the Retail Trade Area Model for Public Markets/Farmers' Markets

Public market retail trade areas do not follow the traditional definition of trade areas as formulated by (Applebaum and Cohen 1961), Ghosh and McLafferty (1987), or Jones and Simmons (1990). These previous definitions focus on customers, not vendors, with the highest market penetration. Instead, as this study contends, trade areas for public markets/farmers' markets must consider other user and spatial elements: both the customers and the vendors who travel to those markets as measured by either Euclidean travel distance or the N-minute trade area of time space (Cui et al. 2012; Okabe and Satoh 2005).

This study is differentiated from recent studies on public market trade areas (USDA 2011; Aucoin and Fry 2015) and public market locations studies (Schupp 2016; Singleton et al. 2015) by defining and utilizing the characteristics of the 15-minute drive-time trade areas. The 15-minute trade areas stem from the DCM (2017) case study on the customer zip code data and market penetration for the market. Denton, Texas, the home base of the DCM, is a college town in the DFW Metroplex within the Southwest Region, an area of significant population growth over the past two decades. The trade areas were not defined by its vendors, since some travel as far as 90 miles, or over one hour, to reach the market each Saturday. As found in the literature (USDA 2011; USDA 2009), vendors are more willing to drive further, or take more time, than customers to participate in public markets. At the same time, the market cannot exist without the vendors. At some level, for practical estimates of market success, nonetheless, the customer trade area is more related to the demand for local nontradable consumer goods available at these

nontradable consumption amenities. In the hierarchy of cities, and central place theory, the variety of goods available are supported by the 15-minute drive-time trade area demand. The "location-based service" is defined by "consumers" that have a "specific set of preferences" (Schiff 2015: 1086-87).

- Further Data Analysis and Limitations of Research Design

Public market trade areas, typically unlike many other retail trade areas models, consist of customers and vendors. Vendors as decision-makers, like customers, must consider time and transportation costs to get to the market location, which may change daily if they participate in other markets as well. Future research analysis could also mores specifically characterize the trade areas of vendors in the Southwest Region. This research could include drive-time "time space" trade areas, like the "foodsheds" defined in Aucoin and Fry (2015). In this case they are "localgoodsheds,' incorporating farmers and artisan vendors of local nontradable consumer goods. This further investigation would expand research done by the USDA (2011; 2009) on vendor trade areas and travel distances.

Over the 1996 to 2016 study period, changes in the trade area characteristics occurred in the Southwest Region. For further investigations, other time frames could be included to show more comparisons in 5-year or 10-year intervals. Likewise, a comparison of various U.S. regions, similar to the ones made by Schupp (2016) for U.S. Census regions, could be done at the trade area level. The regional comparisons could include the interaction of variables, unlike Schupp's (2016) research.

Questions remain about median income and public markets (Schupp 2016; Singleton et al. 2015) from this study and the other major studies. The inverse relationship with median

income in this study does not seem intuitive, though it could be the case that older parts of cities where markets are located have moderate income populations, or that vendors cannot afford to live near higher income areas where markets may occur. Even though vendors are more likely to travel longer distances (USDA 2011; USDA 2009), many often originate within the customer trade area. Both other major studies' findings (Schupp 2016; Singleton et al. 2015) result in the need for more research on the relationship between income and public markets/farmers'/ markets. Likewise, population, while important as a predictor of the likelihood of markets, is still not thoroughly investigated for population density, rather than population numbers, at the 15-minute drive time trade area scale.

For the DCM (2017) case study, relevant observations on embeddedness shows evidence of spatial, social, and natural embeddedness in the qualitative responses from customers. More research is needed with greater numbers of participants in many markets across the region to determine whether the embeddedness outcomes hold in other regions. PE (perceived embeddedness) measured by Chen and Scott (2014) was not measured in the DCM case study as a composite variable. This is motivation for further research on measuring PE as formulated by Chen and Scott (2014) as a combination of spatial, social, and natural embeddedness, and the cultural influences that deem PE potentially important in public market success.

A very significant question remains about the interrelationship of population growth and public markets. Does population growth, as one finds in the DFW Metroplex (Beyer 2016; U.S. Census 2016) promote the growth of public markets or do public markets promote population growth? Upon reviewing the literature on economic development and public markets, at a local scale or regional scale, markets generate economic growth (Guthrie 2006; Bubinas 2009; PPS 2007; Hardesty et al. 2016; Sadler et al. 2013; Murphy 2011l Spitzer et al. 1995; Yosick 2008,

Otto 2010, Henneberry 2009, Hughes 2008, Brown 2010, Myles 2010; Hughes et al. 2008). Further research is indicated to determine how public markets in trade areas are compared with other factors that may be associated with economic growth. Furthermore, are there other factors drawing people and public markets to the same location? How do the other amenities that creatives deem as important factor into the possible other factors? This study's findings assert the importance of "local" and spatial embeddedness. Given that public markets are nontradable consumption amenities as concluded by this study, to Glaeser (2001; 2004), this may be one amenity that attracts human capital to trade areas and promotes population and economic growth. As an important amenity in cities trying to maintain their creative classes and educated populations, the decision-makers at the municipal and institutional levels are wise to support them through the provision of infrastructure, funding, and technical support.

APPENDIX A

TOP MARKET PENETRATION RATES BY ZIP CODE FOR THE DCM

Not all zip codes are listed), n = 374

Zip Code	City	Percent DCM Customer Sample (%)	Population in Zip Code	Penetration Rate (%)
76201	Denton	25.67%	23310	41.00%
76203	Denton	3.48%	3674	35.00%
76205	Denton	9.36%	18430	19.00%
76209	Denton	13.90%	27371	19.00%
76207	Denton	4.81%	11963	15.00%
76210	Denton	12.03%	42741	11.00%
76249	Krum	2.14%	8360	10.00%
76227	Aubrey	4.28%	28441	6.00%
76208	Denton	2.41%	21658	4.00%
76226	Argyle	2.14%	21295	4.00%
76259	Ponder	0.53%	4911	4.00%
76266	Sanger	1.60%	14540	4.00%
75065	Lake Dallas	0.80%	11201	3.00%
76262	Roanoke	2.14%	28146	3.00%
75204	Dallas	1.60%	29085	2.00%
76126	Fort Worth	1.07%	20793	2.00%
76134	Fort Worth	1.07%	24227	2.00%
76272	Valley View	0.27%	5050	2.00%
75068	Little Elm	0.80%	46507	1.00%
75077	Lewisville	0.53%	37143	1.00%
75219	Dallas	0.53%	23626	1.00%
76092	Southlake	0.53%	29462	1.00%
76247	Justin	0.53%	14827	1.00%

APPENDIX B

CORRELATION TABLES FOR EXPLANATORY VARIABLES

1996 Correlations

	mkt~1996	per_n~90	per_c~90	per_u~90	per_o~90	pop_~10k	colle~96	dist_mi	media~1k	grid1	grid2
mktdum_1996	1.0000										
per_nonw_90	0.0742	1.0000									
per_coll90	0.1190	-0.1997	1.0000								
per_und19_90	-0.0584	0.3756	-0.2292	1.0000							
per_ov65_90	-0.0213	-0.2206	-0.4247	-0.5576	1.0000						
pop_90per10k	0.1447	0.1794	0.4434	0.0239	-0.4663	1.0000					
college_t~96	0.4034	0.2353	0.2642	0.0751	-0.3025	0.4354	1.0000				
dist_mi	-0.0446	0.0798	-0.1299	0.3130	-0.0222	-0.0806	0.0851	1.0000			
median96r~1k	-0.0274	-0.2521	0.7313	0.0068	-0.5546	0.3924	0.0905	-0.1721	1.0000		
grid1	0.0373	-0.1180	0.1568	0.0809	-0.1542	-0.0377	-0.0066	0.0814	0.1341	1.0000	
grid2	-0.0941	0.0054	0.0154	0.1053	-0.0788	-0.0442	0.0087	-0.0179	0.0808	0.0724	1.0000
grid3	-0.0489	-0.2827	-0.0526	-0.1419	0.2624	-0.1227	-0.0064	-0.0370	-0.0689	-0.1184	-0.0162
grid4	-0.0246	-0.1880	-0.0182	-0.2353	0.1115	-0.0580	-0.0724	-0.1984	-0.0516	-0.1419	-0.0943
grid5	-0.0118	0.0288	-0.1799	-0.1561	0.2018	-0.1121	0.0292	-0.0202	-0.2578	-0.0928	-0.0617
grid6	0.0257	-0.0152	-0.0331	0.2480	-0.1120	-0.0145	0.0087	0.3034	-0.0107	0.0230	-0.0503
grid7	-0.0328	0.0022	-0.0242	0.1070	-0.0606	0.0108	-0.0643	0.0077	0.0135	-0.0547	0.2480
grid8	0.0091	-0.1141	0.1490	-0.0543	-0.0940	0.1971	-0.0064	-0.1212	0.2218	-0.1310	-0.0871
grid9	-0.1125	0.2353	-0.0925	-0.0508	0.0985	-0.0002	-0.0337	-0.0762	-0.0773	-0.1329	-0.0883
grid10	0.1935	0.0565	0.0212	-0.0343	-0.0407	0.0599	-0.0159	-0.1946	0.0215	-0.1159	-0.0770
grid11	0.0909	0.2837	-0.0238	0.0669	0.0312	-0.0265	0.0459	-0.0487	-0.0936	-0.1119	-0.0744
grid12	-0.0873	0.0932	-0.0940	0.2504	-0.1370	0.1592	0.0112	0.3296	-0.0459	-0.0809	-0.0538
grid13	-0.0773	0.2896	-0.0040	0.1454	-0.1754	0.1360	0.1096	0.1713	0.0683	-0.1159	-0.0770

	grid3	grid4	grid5	grid6	grid7	grid8	grid9	grid10	grid11	grid12	grid13
grid3	1.0000										
grid4	-0.0124	1.0000									
grid5	-0.0858	0.1643	1.0000								
grid6	-0.0978	-0.0943	-0.0617	1.0000							
grid7	0.0399	-0.0681	-0.0445	-0.0363	1.0000						
grid8	-0.0917	-0.1632	-0.1068	-0.0871	-0.0029	1.0000					
grid9	-0.1717	-0.1655	0.0384	-0.0883	-0.0638	0.0138	1.0000				
grid10	-0.1497	-0.1443	-0.0944	-0.0770	-0.0556	0.0209	-0.1352	1.0000			
grid11	-0.1446	-0.1394	-0.0912	-0.0744	-0.0537	-0.1287	0.2146	-0.0442	1.0000		
grid12	-0.1045	-0.1007	-0.0659	-0.0538	-0.0388	-0.0930	-0.0943	0.0554	-0.0795	1.0000	
grid13	-0.1497	-0.1443	-0.0944	-0.0770	-0.0556	-0.1333	-0.1352	0.0176	-0.0442	0.2390	1.0000

.

2016 Correlations

	per_n~10	per_c~10	per_u~10	per_o~10	pop_~10k	mkt~2016	colleg~n	grid1	grid3
per_nonw_10	1.0000								
per_coll_10	-0.1708	1.0000							
per_und19_10	0.1767	-0.2005	1.0000						
per_ov65_10	-0.2232	-0.0870	-0.6556	1.0000					
pop_10_p~10k	0.0548	0.4603	0.1351	-0.3970	1.0000				
mkt_dum_2016	-0.0466	0.2697	-0.0320	-0.0631	0.2325	1.0000			
college_town	0.1371	0.1571	0.1026	-0.2498	0.4045	0.3188	1.0000		
grid1	0.0375	0.0903	-0.1802	0.0845	-0.0738	0.1928	-0.0094	1.0000	
grid3	-0.1292	0.0092	-0.0364	0.0223	-0.0228	0.0894	0.0182	-0.0710	1.0000
grid4	-0.1811	-0.0179	-0.0843	0.1078	-0.0920	-0.0407	-0.0431	-0.1269	0.1132
grid5	-0.1032	-0.1983	-0.1047	0.1264	-0.1719	-0.0775	-0.0619	-0.1160	-0.0475
grid6	-0.1628	0.0140	-0.0676	0.1089	-0.0167	0.1166	0.0054	0.0505	-0.0552
grid8	-0.1397	0.1741	0.1223	-0.1131	0.2377	0.0515	-0.0298	-0.0898	0.0117
grid9	0.2817	-0.0954	0.0708	0.0135	-0.0640	-0.1617	-0.0997	-0.1376	-0.1115
grid10	-0.0812	0.1935	0.0556	-0.1549	0.2550	0.1865	0.0311	-0.0686	-0.0646
grid11	0.1657	-0.0723	0.0597	-0.0372	-0.1062	-0.0894	-0.0269	-0.0913	-0.0860
grid12	-0.1362	0.0125	0.1300	-0.0914	0.2763	0.0305	0.0626	-0.0637	-0.0600
grid13	0.0351	0.0204	-0.0047	-0.0375	0.0943	-0.0097	0.0631	-0.0737	-0.0694
grids2and7	-0.0602	0.0083	0.0524	-0.0314	0.0459	0.0604	0.0685	-0.0318	0.0346
dist_mi	-0.0446	-0.2529	0.0369	0.1027	-0.1722	0.0150	0.0273	0.0246	0.1295
median16p~1K	-0.2603	0.7375	0.0498	-0.2802	0.4250	0.1276	0.0394	0.0359	0.0467
ruralurb_c~e	-0.0475	-0.4426	-0.1775	0.4324	-0.4776	-0.0996	-0.1612	0.0281	0.0853
metro_code	0.0252	0.4146	0.1165	-0.3650	0.4430	0.1021	0.1544	-0.0009	-0.0596

	grid4	grid5	grid6	grid8	grid9	grid10	grid11	grid12	grid13
grid4	1.0000								
grid5	0.0958	1.0000							
grid6	-0.0987	-0.0902	1.0000						
grid8	-0.1513	-0.1038	-0.0698	1.0000					
grid9	-0.2318	-0.0047	-0.1070	0.0781	1.0000				
grid10	-0.1155	-0.1055	-0.0533	0.0496	-0.1252	1.0000			
grid11	-0.1537	-0.1405	-0.0709	-0.1088	0.0610	-0.0622	1.0000		
grid12	-0.1073	-0.0981	-0.0495	-0.0760	-0.1164	0.0883	-0.0772	1.0000	
grid13	-0.1241	-0.1135	-0.0573	-0.0879	-0.1346	-0.0583	0.0067	0.3408	1.0000
grids2and7	-0.0536	-0.0490	-0.0247	-0.0379	-0.0581	-0.0289	-0.0385	-0.0269	-0.0311
dist_mi	-0.1177	-0.0534	0.1394	-0.0332	-0.0443	-0.1200	0.0724	0.0413	0.0261
median16p~1K	-0.0572	-0.2138	0.0153	0.2639	-0.1327	0.1974	-0.0812	0.0178	0.0971
ruralurb_c~e	0.0625	0.2056	0.0434	-0.1844	0.1210	-0.2252	0.0664	-0.1671	-0.1671
metro_code	-0.0687	-0.2242	-0.0529	0.1445	-0.1174	0.1939	-0.0492	0.1392	0.1696

	grids2~7	dist_mi	media~1K	ruralu~e	metro_~e
grids2and7	1.0000				
dist_mi	0.2033	1.0000			
median16p~1K	0.0067	-0.2062	1.0000		
ruralurb_c~e	0.0165	0.2872	-0.5182	1.0000	
metro_code	-0.0201	-0.2392	0.4839	-0.8918	1.0000

APPENDIX C

SUMMARY STATISTICS OF TRADE AREAS

2016 Summary Statistics of Trade Areas

Variable	Obs	Mean	Std. Dev.	Min	Max
Per. Non-white	689	0.255	0.187	0.000	0.991
Per. College-educated	689	0.082	0.045	0.000	0.336
Per. 19 and under	689	0.283	0.052	0.000	0.541
Per. Over 65	689	0.151	0.059	0.000	0.611
Pop. total	689	33887.970	58310.600	15.000	437678.300
Pop. per 10k	689	0.339	0.583	0.000	4.377
Median Income	688	40154.150	13021.220	11527.800	104350.500
Mkt_dum_2016	689	0.476	0.500	0.000	1.000
College town	713	0.353	0.478	0.000	1.000
Grid 1	742	0.061	0.239	0.000	1.000
Grid 2	742	0.008	0.090	0.000	1.000
Grid 3	742	0.050	0.224	0.000	2.000
Grid 4	742	0.152	0.360	0.000	1.000
Grid 5	742	0.127	0.333	0.000	1.000
Grid 6	742	0.032	0.177	0.000	1.000
Grid 7	742	0.001	0.037	0.000	1.000
Grid 8	742	0.071	0.263	0.000	2.000
Grid 9	742	0.158	0.368	0.000	2.000
Grid 10	742	0.047	0.212	0.000	1.000
Grid 11	742	0.100	0.342	0.000	5.000
Grid 12	742	0.046	0.209	0.000	1.000
Grid 13	742	0.198	0.793	0.000	14.000
Grids 2 and 7	742	0.009	0.097	0.000	1.000
Dist. Miles to closest market	601	10.449	12.140	0.000	95.651
Median Inc p1k	688	40.154	13.021	11.528	104.351

1996 Summary Statistics of Trade Areas

Variable	Obs	Mean	Std. Dev.	Min	Max
Per. Non-white	331	0.219	0.125	0.000	0.689
Per. College-educated	331	0.064	0.028	0.010	0.170
Per. 19 and under	331	0.307	0.034	0.193	0.410
Per. Over 65	331	0.157	0.059	0.020	0.374
Pop. total	331	30565.090	48410.650	76.000	288521.800
Pop. per 10k	331	3.057	4.841	0.008	28.852
Mkt_dum_1996	331	0.505	0.501	0.000	1.000
Grid 13	352	0.094	0.292	0.000	1.000
Grid 12	352	0.048	0.215	0.000	1.000
Grid 11	352	0.091	0.288	0.000	1.000
Grid 10	352	0.094	0.292	0.000	1.000
Grid 9	352	0.153	0.361	0.000	1.000
Grid 8	352	0.116	0.321	0.000	1.000
Grid 7	352	0.023	0.149	0.000	1.000
Grid 6	352	0.043	0.202	0.000	1.000
Grid 5	351	0.094	0.292	0.000	1.000
Grid 4	352	0.153	0.361	0.000	1.000
Grid 3	352	0.142	0.350	0.000	1.000
Grid 2	352	0.043	0.202	0.000	1.000
Grid 1	352	0.091	0.288	0.000	1.000
Median Income	331	21347.190	6481.835	6481.835	63590.840
Median Income p1k	331	21.347	6.482	9.182	63.591
Dist. Miles to closest market	334	18.659	19.692	0.079	112.560

APPENDIX D

LOGIT REGRESSION SUMMARY TABLES

1996 Logit Without College Town

```
. logit mktdum_1996 per_nonw_90 per_coll90 per_und19_90 per_ov65_90 pop_90per10k median96revp1k dist_mi grid1 grid2 g
> rid3 grid4 grid5 grid6 grid7 grid9 grid10 grid11 grid12 grid13;

Iteration 0:   log likelihood =  -216.5955
Iteration 1:   log likelihood = -192.48151
Iteration 2:   log likelihood = -192.43824
Iteration 3:   log likelihood = -192.43822

Logistic regression                             Number of obs     =        313
                                                LR chi2(19)       =      48.31
                                                Prob > chi2       =     0.0002
Log likelihood = -192.43822                     Pseudo R2         =     0.1115
```

mktdum_1996	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
per_nonw_90	1.632011	1.417707	1.15	0.250	-1.146644	4.410665
per_coll90	15.34906	7.80694	1.97	0.049	.0477425	30.65039
per_und19_90	-.4412799	6.510614	-0.07	0.946	-13.20185	12.31929
per_ov65_90	1.467609	4.083093	0.36	0.719	-6.535106	9.470323
pop_90per10k	.0760474	.0346018	2.20	0.028	.0082291	.1438657
median96revp1k	-.068612	.0352379	-1.95	0.052	-.1376769	.0004529
dist_mi	.0020511	.0076061	0.27	0.787	-.0128566	.0169589
grid1	.2331688	.4670803	0.50	0.618	-.6822917	1.148629
grid2	-.9320612	.6504162	-1.43	0.152	-2.206854	.3427311
grid3	-.2356161	.3987839	-0.59	0.555	-1.017218	.545986
grid4	-.2054926	.4005872	-0.51	0.608	-.9906291	.5796439
grid5	-.1081503	.5081338	-0.21	0.831	-1.104074	.8877736
grid6	.0707578	.6449918	0.11	0.913	-1.193403	1.334918
grid7	-.1828825	.84146	-0.22	0.828	-1.832114	1.466349
grid9	-1.144263	.4508987	-2.54	0.011	-2.028008	-.2605178
grid10	1.235158	.5043901	2.45	0.014	.2465711	2.223744
grid11	.5653488	.4789058	1.18	0.238	-.3732895	1.503987
grid12	-1.169303	.6786831	-1.72	0.085	-2.499497	.1608913
grid13	-.8833937	.488678	-1.81	0.071	-1.841185	.0743977
_cons	-.106187	2.814526	-0.04	0.970	-5.622556	5.410182

1996 Logit with College Town

```
. logit mktdum_1996 per_coll90 per_und19_90 per_ov65_90 pop_90per10k college_town96 median96revp1k per_nonw_90 grid1
> grid2 grid3 grid4 grid5 grid6 grid7 grid9 grid10 grid11 grid12 grid13 dist_mi

Iteration 0:   log likelihood =  -216.5955
Iteration 1:   log likelihood = -168.55174
Iteration 2:   log likelihood = -168.14158
Iteration 3:   log likelihood = -168.14095
Iteration 4:   log likelihood = -168.14095

Logistic regression                             Number of obs     =        313
                                                LR chi2(20)       =      96.91
                                                Prob > chi2       =     0.0000
Log likelihood = -168.14095                     Pseudo R2         =     0.2237
```

mktdum_1996	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
per_coll90	6.327209	8.39948	0.75	0.451	-10.13547	22.78989
per_und19_90	1.167127	6.86369	0.17	0.865	-12.28546	14.61971
per_ov65_90	6.774722	4.447447	1.52	0.128	-1.942113	15.49156
pop_90per10k	.0055328	.0367501	0.15	0.880	-.0664961	.0775616
college_town96	2.20189	.3443765	6.39	0.000	1.526924	2.876855
median96revp1k	-.0236611	.0386992	-0.61	0.541	-.0995102	.052188
per_nonw_90	.7422211	1.536898	0.48	0.629	-2.270043	3.754485
grid1	.3573279	.5178592	0.69	0.490	-.6576575	1.372313
grid2	-1.451872	.7179498	-2.02	0.043	-2.859028	-.0447165
grid3	-.708369	.4474286	-1.58	0.113	-1.585313	.168575
grid4	-.1677853	.4427377	-0.38	0.705	-1.035535	.6999647
grid5	-.5427423	.5713657	-0.95	0.342	-1.662598	.5771138
grid6	.2607978	.7117467	0.37	0.714	-1.1342	1.655796
grid7	.4508236	.9631553	0.47	0.640	-1.436926	2.338573
grid9	-1.238129	.4949682	-2.50	0.012	-2.208248	-.2680088
grid10	1.404211	.5396105	2.60	0.009	.3465941	2.461829
grid11	.5012692	.514749	0.97	0.330	-.5076202	1.510159
grid12	-.7459338	.7227346	-1.03	0.302	-2.162468	.6706001
grid13	-1.16028	.5293716	-2.19	0.028	-2.19783	-.1227311
dist_mi	-.0069034	.0085281	-0.81	0.418	-.0236182	.0098114
_cons	-2.150001	3.000397	-0.72	0.474	-8.030671	3.73067

2016 Logit without College Town

```
. logit mkt_dum_2016 per_nonw_10 per_coll_10 per_und19_10 per_ov65_10 pop_10_per10k median16per1K dist_mi grids2and7
> grid13 grid12 grid11 grid10 grid9 grid6 grid5 grid4 grid3 grid1;

Iteration 0:   log likelihood = -368.61846
Iteration 1:   log likelihood = -303.79385
Iteration 2:   log likelihood = -299.98037
Iteration 3:   log likelihood = -299.85424
Iteration 4:   log likelihood = -299.85356
Iteration 5:   log likelihood = -299.85356

Logistic regression                             Number of obs     =        547
                                                LR chi2(18)       =     137.53
                                                Prob > chi2       =     0.0000
Log likelihood = -299.85356                     Pseudo R2         =     0.1865
```

mkt_dum_2016	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
per_nonw_10	-.574643	.658621	-0.87	0.383	-1.865517	.7162305
per_coll_10	25.98617	4.944628	5.26	0.000	16.29488	35.67746
per_und19_10	3.146639	3.54275	0.89	0.374	-3.797024	10.0903
per_ov65_10	.0180533	2.800808	0.01	0.995	-5.47143	5.507537
pop_10_per10k	.8554427	.3070308	2.79	0.005	.2536734	1.457212
median16per1K	-.061061	.0139023	-4.39	0.000	-.0883091	-.0338129
dist_mi	.0041474	.0095139	0.44	0.663	-.0144994	.0227942
grids2and7	1.33264	1.13817	1.17	0.242	-.8981314	3.563412
grid13	.094098	.1327069	0.71	0.478	-.1660027	.3541987
grid12	-.3592545	.5465493	-0.66	0.511	-1.430471	.7119625
grid11	-.0242554	.2564924	-0.09	0.925	-.5269712	.4784604
grid10	3.096588	1.053594	2.94	0.003	1.031581	5.161595
grid9	-.3410923	.2696677	-1.26	0.206	-.8696313	.1874467
grid6	1.581804	.6906601	2.29	0.022	.228135	2.935473
grid5	.278121	.2835642	0.98	0.327	-.2776547	.8338967
grid4	-.0570002	.2851174	-0.20	0.842	-.6158201	.5018197
grid3	1.205236	.4486308	2.69	0.007	.3259356	2.084536
grid1	2.5233	.6064424	4.16	0.000	1.334695	3.711906
_cons	-.6080805	1.459318	-0.42	0.677	-3.468292	2.252131

2016 Logit with College Town

```
. logit mkt_dum_2016 per_nonw_10 per_coll_10 per_und19_10 per_ov65_10 pop_10_per
> 10k college_town median16per1K dist_mi grids2and7 grid13 grid12 grid11 grid10
> grid9 grid6 grid5 grid4 grid3 grid1

Iteration 0:   log likelihood = -368.61846
Iteration 1:   log likelihood = -290.81814
Iteration 2:   log likelihood = -286.30135
Iteration 3:   log likelihood = -286.14569
Iteration 4:   log likelihood = -286.14472
Iteration 5:   log likelihood = -286.14472

Logistic regression                             Number of obs     =        547
                                                LR chi2(19)       =     164.95
                                                Prob > chi2       =     0.0000
Log likelihood = -286.14472                     Pseudo R2         =     0.2237
```

mkt_dum_2016	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
per_nonw_10	-.828873	.6820181	-1.22	0.224	-2.165604	.5078579
per_coll_10	23.13968	5.075312	4.56	0.000	13.19225	33.08711
per_und19_10	3.428714	3.632868	0.94	0.345	-3.691575	10.549
per_ov65_10	1.761259	2.921257	0.60	0.547	-3.9643	7.486817
pop_10_per10k	.3348206	.3036942	1.10	0.270	-.2604091	.9300503
college_town	1.236271	.241812	5.11	0.000	.7623278	1.710214
median16per1K	-.0462872	.0146685	-3.16	0.002	-.0750368	-.0175375
dist_mi	-.0012281	.009853	-0.12	0.901	-.0205395	.0180834
grids2and7	1.2399	1.16942	1.06	0.289	-1.052121	3.531921
grid13	.0643274	.1305694	0.49	0.622	-.1915839	.3202387
grid12	-.1197009	.5691847	-0.21	0.833	-1.235282	.9958805
grid11	-.0013655	.2636498	-0.01	0.996	-.5181097	.5153786
grid10	3.321595	1.06029	3.13	0.002	1.243464	5.399726
grid9	-.1968083	.2774255	-0.71	0.478	-.7405522	.3469356
grid6	1.593465	.6863735	2.32	0.020	.2481974	2.938732
grid5	.2362668	.2945947	0.80	0.423	-.3411281	.8136618
grid4	-.0072365	.2941586	-0.02	0.980	-.5837768	.5693037
grid3	1.173937	.4495164	2.61	0.009	.2929008	2.054973
grid1	2.733548	.6289267	4.35	0.000	1.500874	3.966222
_cons	-1.555646	1.517017	-1.03	0.305	-4.528945	1.417653

APPENDIX E

SIMULATIONS

1996 Simulations without College Towns

```
. sum p_mkt_96_pop*;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
p_mkt_96_p~f	313	.4348204	.1761276	.0365126	.8886896
p_mkt_96_p~1	313	.4430055	.1765629	.037874	.8923957
p_mkt_96_p~2	313	.4594622	.1772081	.0407447	.8994833
p_mkt_96_~_5	313	.5092303	.177317	.0506571	.9183127
p_mkt_96_~10	313	.5914919	.1714989	.072396	.9426691
p_mkt_96_~15	313	.6694195	.1589837	.1024571	.960079
p_mkt_96_~20	313	.7396936	.1414849	.1430752	.972357
p_mkt_96_~25	313	.800186	.1212017	.1962746	.9809338
p_mkt_96_~30	313	.8500902	.1003106	.2631799	.9868853

```
. sum p_mkt_96_col*;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
p_mkt_96~l_1	313	.3091744	.1636616	.0147796	.8188969
p_mkt_96~l_2	313	.3385245	.1692327	.0171894	.8405576
p_mkt_96_~_3	313	.3690936	.1738545	.019984	.8600702
p_mkt_96_~_4	313	.4006918	.1774364	.0232223	.8775428
p_mkt_96~l_5	313	.4330999	.1799071	.0269709	.8931048
p_mkt_96_~_6	313	.4660743	.181218	.0313053	.9068989
p_mkt_96_~_7	313	.4993533	.1813455	.0363101	.9190744
p_mkt_96_c~8	313	.5326645	.1802924	.0420804	.9297808
p_mkt_96_c~9	313	.5657333	.178089	.0487213	.9391645
p_mkt_96_c~0	313	.5982906	.1747921	.0563485	.9473652
p_mkt_96_~11	313	.630082	.1704832	.0650881	.954514
p_mkt_96_~12	313	.6608742	.1652651	.0750754	.9607322
p_mkt_96_~13	313	.6904614	.1592577	.0864534	.9661304
p_mkt_96_~14	313	.7186704	.1525922	.0993706	.970809
p_mkt_9~l_15	313	.7453629	.1454061	.1139769	.9748582
p_mkt_96_~16	313	.7704369	.1378372	.1304193	.9783583
p_mkt_96_~17	313	.793827	.1300187	.1488352	.9813803

```
. sum p_mkt_96_median*;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
p_mkt_96_m~9	313	.6494816	.1775708	.1750475	.9832944
p_mkt_9~n_15	313	.8131465	.1123856	.3784288	.9851719
p_mkt_9~n_25	313	.8983337	.07089	.565681	.9930135
p_mkt_96_~35	313	.9481793	.0397363	.7358919	.996722
p_mkt_96_~45	313	.9746442	.0205334	.8563376	.9984651
p_mkt_96_~55	313	.9878737	.0101058	.9272822	.9992819
p_mkt_96_~60	313	.9916549	.0070133	.9491125	.9995089
p_mkt_96_~65	313	.9942686	.004845	.9646391	.9996642

```
. sum p_mkt_96_grid*;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
p_mkt_96_~d1	313	.5817558	.124593	.1708324	.9197552
p_mkt_96_~d2	313	.3191977	.1193784	.0603714	.7813917
p_mkt_96_~d3	313	.4730535	.130009	.1142016	.8776369
p_mkt_96_g~4	313	.4800603	.1299701	.1172845	.8808353
p_mkt_96_g~5	313	.5027498	.1295472	.1277436	.89068
p_mkt_96_g~6	313	.5443974	.1276042	.14904	.9069216
p_mkt_96_g~7	313	.4853255	.1299123	.1196456	.8831882
p_mkt_96_g~8	313	.5279595	.1285502	.1402871	.9007742
p_mkt_96_g~9	313	.2776703	.1124384	.0493987	.742995
p_mkt_96_g~0	313	.7818935	.0879526	.3594504	.968962
p_mkt_96~d11	313	.6551678	.1152087	.223123	.9410998
p_mkt_96~d12	313	.2729874	.1115361	.048236	.7381845
p_mkt_96~d13	313	.32916	.1207686	.063192	.7895912

1996 Simulations with College Towns

```
. sum p_mkt_96_grid*;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
p_mkt_96_~d1	313	.6036644	.2299905	.1931374	.921591
p_mkt_96_~d2	313	.2719313	.1920274	.0377259	.658128
p_mkt_96_~d3	313	.401941	.2350177	.0761779	.8019404
p_mkt_96_g~4	313	.5040968	.243324	.1240239	.8742477
p_mkt_96_g~5	313	.4328792	.2399405	.0886831	.8269399
p_mkt_96_g~6	313	.5855783	.2339163	.1785384	.9143257
p_mkt_96_g~7	313	.6210171	.2256219	.2081265	.9280863
p_mkt_96_g~8	313	.536127	.2412776	.1434312	.8915657
p_mkt_96_g~9	313	.3073671	.2072091	.0463	.7044765
p_mkt_96_g~0	313	.7810752	.1595556	.4054354	.9710004
p_mkt_96~d11	313	.6303006	.223047	.2165629	.9313813
p_mkt_96~d12	313	.3949933	.2336252	.073576	.7959062
p_mkt_96~d13	313	.3207208	.2122737	.0498615	.7204219

2016 Simulations without College Towns

```
. sum p_mkt_2016_grid*;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
p_mkt_201~d1	547	.9165235	.0612164	.5543873	.9991633
p_mkt_201~d2	547	.5321867	.1956037	.090719	.9896659
p_mkt_201~d3	547	.7644149	.1371094	.2498053	.9968811
p_mkt_201~d4	547	.5201685	.1969388	.0861255	.9890664
p_mkt_201~d5	547	.5904078	.1867757	.1164212	.9921553
p_mkt_201~d6	547	.8201898	.1133255	.3267144	.9978577
p_mkt_201~d7	547	.5321867	.1956037	.090719	.9896659
p_mkt_201~d8	547	.5321867	.1956037	.090719	.9896659
p_mkt_201~d9	547	.460526	.2010386	.0662373	.9855261
p_mkt_201~10	547	.9500933	.0389129	.6881965	.9995282
p_mkt_201~11	547	.5270734	.1961923	.088738	.9894149
p_mkt_20~d12	547	.4567497	.2011539	.0651227	.9852647
p_mkt_201~13	547	.5519933	.1930376	.0987858	.9905852

```
. sum p_mkt_2016_col*;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
p_mkt~l_pt01	547	.2606405	.2104835	.0059055	.9816719
p_mkt_201~03	547	.3454019	.2218949	.0098906	.989019
p_mkt_201~06	547	.4951506	.218908	.0213182	.994934
p_mkt_201~09	547	.6506786	.192739	.0453445	.9976704
p_mkt_201~12	547	.7833282	.1519493	.0938527	.9989303
p_mkt_201~15	547	.8775223	.1086347	.1842386	.9995092
p_mkt_201~18	547	.9354278	.0714159	.3299734	.9997748
p_mkt_201~21	547	.9676041	.0432568	.5178123	.9998967
p_mkt_201~24	547	.9843091	.0240433	.7007484	.9999526
p_mkt_201~27	547	.9925807	.0123775	.8362313	.9999783
p_mkt_201~30	547	.9965433	.0060385	.9175894	.99999
p_mkt_201~33	547	.9984025	.0028556	.9604418	.9999954
p_mkt_201~36	547	.9992647	.0013289	.9814617	.9999979

```
. sum p_mkt_2016_median*;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
p_mkt_20~_10	548	.8492832	.1383578	.376573	.9999717
p_mkt_201~20	548	.773129	.1895182	.2469901	.9999479
p_mkt_20~_30	548	.6809111	.2389427	.1511846	.999904
p_mkt_201~40	548	.5803875	.2777886	.088189	.9998233
p_mkt_201~50	548	.4802449	.3001625	.0498993	.9996747
p_mkt_201~60	548	.3870857	.3048745	.0277286	.9994011
p_mkt_201~65	548	.3443809	.3013229	.0205833	.9991875
p_mkt_201~70	548	.3046194	.2945124	.0152504	.9988977
p_mkt_201~80	548	.2343733	.2734563	.0083394	.9979718
p_mkt_201~90	548	.1765221	.2461272	.0045458	.9962714
p_mkt_20~100	548	.1303301	.2159834	.0024736	.9931551
p_mkt_20~110	548	.0944561	.1855576	.0013447	.9874669

2016 Simulations with College Towns

```
. sum p_mkt_2016_pop*;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
p_mkt_201~05	547	.5542296	.2172717	.1147759	.999154
p_mkt_201~t1	547	.562778	.2153705	.1191938	.9991894
p_mkt_201~t5	547	.6303682	.1975829	.1600428	.9994242
p_mkt_20~p_1	547	.7100609	.1702949	.2261485	.9996245
p_mkt_2016~2	547	.8392843	.1103793	.4073948	.9998403
p_mkt_2016~3	547	.9205014	.0608528	.6179125	.9999321
p_mkt_2016~4	547	.9634987	.0298018	.7918544	.9999712
p_mkt_201~_5	547	.9839138	.0135804	.8994911	.9999877

```
. sum p_mkt_2016_median*;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
p_mkt_20~_10	548	.7964836	.1880832	.2600923	.9999108
p_mkt_201~20	548	.7334649	.2256292	.1811819	.9998583
p_mkt_20~_30	548	.6634372	.2579875	.1222566	.999775
p_mkt_201~40	548	.589262	.282162	.0806088	.9996426
p_mkt_201~50	548	.5139245	.2966764	.0523033	.9994323
p_mkt_201~60	548	.4402115	.3015002	.0335742	.9990984
p_mkt_201~65	548	.4047297	.3005554	.0268236	.9988639
p_mkt_201~70	548	.3705083	.2976061	.0214003	.9985684
p_mkt_201~80	548	.3066521	.2865544	.0135786	.9977276
p_mkt_201~90	548	.2498546	.2702011	.0085906	.9963949
p_mkt_20~100	548	.2007007	.2503982	.0054248	.9942849
p_mkt_20~110	548	.1591999	.228678	.0034217	.9909514

```
. sum p_mkt_2016_grid*;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
p_mkt_201~d1	547	.9205234	.0680817	.597523	.9988384
p_mkt_201~d2	547	.5237567	.2259086	.0879928	.9824193
p_mkt_201~d3	547	.7417463	.1711519	.2378585	.9944981
p_mkt_201~d4	547	.5223202	.2260226	.0874138	.9822939
p_mkt_201~d5	547	.5704792	.2204282	.1088903	.9860673
p_mkt_201~d6	547	.8046991	.141336	.3219274	.9963765
p_mkt_201~d7	547	.5237567	.2259086	.0879928	.9824193
p_mkt_201~d8	547	.5237567	.2259086	.0879928	.9824193
p_mkt_201~d9	547	.4847128	.2278393	.073427	.9786769
p_mkt_201~10	547	.9529112	.0425104	.7277431	.9993545
p_mkt_201~11	547	.5234856	.2259304	.0878833	.9823957
p_mkt_20~d12	547	.4999953	.2273727	.0788487	.980228
p_mkt_201~13	547	.5365184	.224753	.0932937	.9834965

```
. sum p_mkt_2016_col*;
```

Variable	Obs	Mean	Std. Dev.	Min	Max
p_mkt~l_pt01	547	.3030968	.2317396	.0086802	.973533
p_mkt_201~03	547	.3808802	.2414906	.0137184	.9831735
p_mkt_201~06	547	.5107206	.2390531	.027093	.9915241
p_mkt_201~09	547	.6428636	.2147027	.0528089	.9957485
p_mkt_201~12	547	.760302	.1745786	.1004141	.9978719
p_mkt_201~15	547	.8512569	.1299315	.1826582	.9989359
p_mkt_201~18	547	.9135151	.0897526	.309117	.9994683
p_mkt_201~21	547	.9521627	.0578196	.4725127	.9997343
p_mkt_201~24	547	.9744981	.0347051	.6420172	.9998673
p_mkt_201~27	547	.9867554	.0195291	.7821639	.9999337
p_mkt_201~30	547	.9932377	.0104636	.8778806	.9999669
p_mkt_201~33	547	.9965824	.0054317	.935033	.9999835
p_mkt_201~36	547	.9982826	.0027685	.9664597	.9999917

APPENDIX F

DCM VISITOR AND VENDOR SURVEYS

Market Survey Questions for DFW Case Studies: Visitor Survey
Date: Location:
Age
Zip Code
Gender
How often do you come to the Market?
Why do you come to the Market?
Are you satisfied with the Market?
What would make you more satisfied with the Market?
Are you satisfied with the variety and types of agricultural products sold at the Market? o Extremely satisfied o Very satisfied o Somewhat satisfied o Hardly satisfied o Not satisfied
What types of agricultural products do you buy at the Market? o Produce o Meat o Eggs o Honey o Jams o Other items (please specify) o Other:
Can you think of specific agricultural products that you would like to be able to buy at the Market?

Market Survey Questions for DFW Case Studies: Vendor Survey
Date: Location:
Vendor Name and Category:
Zip Code
Gender
What markets do you go to and why do you come to this one?
How long have you been a vendor? (Get year)
Why do you come to this market?
How does the market affect your business?
Does the Market offer you the support you need? If not, what do you need?
Farmer specific:
What is your land area?
How much land do you grow on or produce your agricultural product?
What crops do you grow or what do you produce?
Do you want to expand operations or just remain sustainable?
What would make your farm sustainable in the long run?
What do you need to expand?
What sells best?
What are your most productive crops or agricultural products (in terms of yield)?
What are the challenges for these crops or products?
Why do you grow these crops or produce these products?

APPENDIX G

DEDOOSE RESULTS

Dedoose Results: Raw Data Tables: Visitor Surveys n=24

	Be outdoors/enjoy outdoors	Community	Crowds, people, turnout	Dogs	Local	Organic/Sustainable	Produce	Socialize/Meet Friends	Something to do
Zip Code: 76109									
Zip Code: 76201									
Zip Code: 92649									
Zip Code: 76201	2	2	1	1	9	2	7	2	
Zip Code: 92649									
Zip Code: 76109								1	
Zip Code: 76205									
Zip Code: 76210		1			2	1	1		1
Zip Code: 76207					1		3		
Zip Code: Fort Worth									1
Zip Code: 76209	1				1	2	1		2
Zip Code: 33880			1						
Zip Code: 76022				1			1		
Zip Code: 73533			1				1		
What other agricultural products want: no									
What other agricultural products want: fruits, veg, organic									
What other agricultural products want: more variety okra, don't cook so don't buy much									
What other agricultural products want: produce, fruits, veggies									
What other agricultural products want: flowers, like more options									
What other agricultural products want: Meat section, steak, deli									
Types Agricultural products purchased: produce, meat		1			4	1	4		
Types Agricultural products purchased: produce			1		1		1		1
Types Agricultural products purchased: produce, honey, jams									
Types Agricultural products purchased: lotion								1	
Types Agricultural products purchased: honey, jams				1					
Types Agricultural products purchased: produce, honey, baked goods									
Types Agricultural products purchased: Prodeuce, beef, jerkey									
Types Agricultural products purchased: Produce, beef, jerkey					1		1		
Types Agricultural products purchased: Produce, meat									
Types Agricultural products purchased: Honey, jams									
Types Agricultural products purchased: Produce, Eggs					1	1	1		
Types Agricultural products purchased: Produce, eggs, meat, honey, jams					1		3		
Types Agricultural products purchased: Produce, meat, eggs, honey, jams	1				2	2	2		2
Types Agricultural products purchased: none, eat out		1		1	1		1		1
Types Agricultural products purchased: Produce									
Types Agricultural products purchased: n/a			1						
Types Agricultural products purchased: Produce, eggs, honey	2	1	1		2	1		1	
Types Agricultural products purchased: Produce, honey, jerkey, sprouts								1	
Types Agricultural products purchased: Produce, jams							1		
Satisfaction with Market: sure									
Satisfaction with Market: yes	3	3	3	2	11	4	13	3	4
Satisfaction with Market: yes. Like shady atmosphere									
Satisfaction with Market: Yes									
Satisfaction with Market: Yes,					1	1	1		
Satisfaction with agricultural products: Very satisfied	3	2	2	1	8	4	7	1	3
Satisfaction with agricultural products: somewhat satisfied		1		1	4	1	5		1
Satisfaction with agricultural products: Somewhat satisfied									
Satisfaction with agricultural products: Extremely satisfied					1		1	1	
Satisfaction with agricultural products: n/a			1				1		
Gender: F and M									
Gender: M		1			4		2	1	
Gender: F	3	2	2	2	6	4	8	2	3
Gender: M									
Gender: Couple			1		3	1	4		1
Frequency: 2X/mo									
Frequency: first time			2	1			4	1	
Frequency: 1 week, for 6 years since it opened									
Frequency: 3-5 times total									
Frequency: 1 week									
Frequency: Twice per month					4	1	6		
Frequency: Every week	3	1	1		5	4	3	2	2
Frequency: 3 or more times				1					
Frequency: 4-5 times/year									
Frequency: 3-4 times per year		1			1				1
Frequency: 2nd visit									1
Frequency: Once per month		1			3			1	
Age: [20-26.4)				2	1		1	1	1
Age: [26.4-32.9)							1		
Age: [32.9-39.3)		1			2	1	1		1
Age: [39.3-45.7)		1			4		2		
Age: [45.7-52.1)			1		2	1	3		
Age: [52.1-58.6)	1		1		1	2	2		2
Age: [58.57-65]	2	1	1		3	1	3	2	

Dedoose Results: Raw Data Tables: Visitor Surveys n=54

	Close by	Community	Connect with customers, build customer base	Exposure/advertisement	Fun/enjoy	Good sales or good sales outlet	Like market concept, being part of group	Local	Support from other vendors, vendor community	market manage ment, staff, board	to start business, support new business
Vendor Category: Response											
Vendor Category: Art	3	8	9	11	5	3	5	4	5	2	3
Vendor Category: Local Business (brick and mortar or service)	1	1	1	1		1		1	1		
Vendor Category: Produce/Farm		2	6	4	1	1			1		
Vendor Category: Prepared Food		1	8	1	1					2	
Vendor Category: Onsite Food											
On average, what were your gross weekly sales at the Market in 2016? (please select range from answer in Q.8): Response											
On average, what were your gross weekly sales at the Market in 2016? (please select range from answer in Q.8): $100-$300	2	5	11	10	4	4	2	3	3	3	1
On average, what were your gross weekly sales at the Market in 2016? (please select range from answer in Q.8): $1501-$2000											
On average, what were your gross weekly sales at the Market in 2016? (please select range from answer in Q.8): $301-$500	1	2	6	4	1		1	1	1		1
On average, what were your gross weekly sales at the Market in 2016? (please select range from answer in Q.8): $801-$1000			3	1	1						
On average, what were your gross weekly sales at the Market in 2016? (please select range from answer in Q.8): under $100		4	3	2	1		1		3	1	1
On average, what were your gross weekly sales at the Market in 2016? (please select range from answer in Q.8): $1001-$1500											
On average, what were your gross weekly sales at the Market in 2016? (please select range from answer in Q.8): over $2000	1						1				
If Yes in Q. 23, were you satisfied with the Market experience as a Vendor?: Response											
If Yes in Q. 23, were you satisfied with the Market experience as a Vendor?: Yes	4	4	16	5	3	1	4	1	4	4	
If Yes in Q. 23, were you satisfied with the Market experience as a Vendor?: No		1	1			2		2			
If Yes in Q. 17, were you satisfied with the Market experience as a Vendor?: Response											
If Yes in Q. 17, were you satisfied with the Market experience as a Vendor?: No		2	2	1		1	1	3	1		
If Yes in Q. 17, were you satisfied with the Market experience as a Vendor?: Yes	1	4	10	4	4	2	1		2	3	
How were your total sales on December 17th?: Response											
How were your total sales on December 17th?: Very Good	1	2	4	1	1		1	1	1		
How were your total sales on December 17th?: Good	2	2	6	3	1	2	1	1	2	1	
How were your total sales on December 17th?: Excellent	1		6	1	1		2		1	3	
How were your total sales on December 17th?: Poor		1	1			1		1			
How were your total sales on December 10th?: Response											
How were your total sales on December 10th?: Very Good			5	1	1		1		1	1	
How were your total sales on December 10th?: Excellent		1		1	2						
How were your total sales on December 10th?: Poor			2							2	
How were your total sales on December 10th?: Good	1	4	4	3	1	2	1	2	2		
How were your total sales on December 10th?: Very poor		1	1			1		1			
How long have you been a vendor at the Market?: Response											
How long have you been a vendor at the Market?: 5 years	2		3		2		1		2	1	
How long have you been a vendor at the Market?: 4 years		3	5	4	1	2	2	1		1	
How long have you been a vendor at the Market?: 7-11 months		1	4	3			1	2	2	2	1
How long have you been a vendor at the Market?: 2 years		3	6	4	1				1		1
How long have you been a vendor at the Market?: 3-6 months		4	2	4	3	1		1			1
How long have you been a vendor at the Market?: 1 year	1					2	1	1			
How long have you been a vendor at the Market?: Less than 3 months											
How long have you been a vendor at the Market?: 3 years	1	1	4	2					2		
How important has the Market been in the development of your business?: Response											
How important has the Market been in the development of your business?: Extremely important	1	7	19	8	4	1	3	3	6	3	1
How important has the Market been in the development of your business?: Moderately Important	3	2	2	4	1	1	2	1	1	1	
How important has the Market been in the development of your business?: Very important		3	3	5	2	3		1			2
How important has the Market been in the development of your business?: Minimally important											

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