

THESIS

TESTING A CONSUMER BARRIER TO FARMERS' MARKET ATTENDANCE:
A RANDOMIZED CONTROLLED TRIAL DESIGN

Submitted by

Nicole M. Didero

Department of Agricultural and Resource Economics

In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Summer 2019

Master's Committee:

Advisor: Becca B.R. Jablonski

Co-Advisor: Marco Costanigro

Martha Sullins

Ryan Rhoades

Copyright by Nicole Marie Didero 2019

All Rights Reserved

ABSTRACT

TESTING A CONSUMER BARRIER TO FARMERS' MARKET ATTENDANCE: A RANDOMIZED CONTROLLED TRIAL DESIGN

This study investigates the efficacy of an informational coupon in attracting new farmers' market customers. Direct-to-consumer (DTC) market sales in the United States (U.S.) have declined since 2007, raising concern about the future viability of DTC markets overall. Farmers' market sales are one of the larger contributors to DTC sales. Previous research suggests that the limited range of products available, and thus the inability to get all of a household's at home food needs through shopping at the farmers' markets may impede sales growth.

This research is timely given limited empirical evidence about successful marketing methods for farmers' market. It contributes new analysis for considering DTC marketing approaches for attracting new consumers. Specifically, this study tests the efficacy of an informational nudge (a kind of information delivery that serves as an alternative to regulations and requirements aimed at changing social behavior) on consumer attendance at a farmers' market in Northern Colorado.

To test the effectiveness of the informational nudge at promoting attendance a winter farmers' market (WFM), we mailed 6,000 physical coupons redeemable for \$10 to households in Fort Collins, Colorado during the 2017-2018 market season. Following a randomized controlled trial (RCT) design, half of the coupons emphasized the wide range of products sold at the WFM, while the control coupons presented a generic picture. One hundred and eleven coupons were redeemed (1.85%), of which 58 were treatment and 53 control.

A two-proportion z-test was utilized to detect a difference in redemption rates between both coupon types. While the coupon was somewhat effective at attracting new customers (36% had never attended the WFM), there were no statistically significant differences in redemption rates between treatment and control.

ACKNOWLEDGMENTS

This research was supported by the U.S. Department of Agriculture (USDA) Agricultural Marketing Service (AMS) through the 2016 Farmers' Market Promotion Program grant 16FMPPCO0026. The content of the research report and presentation is the responsibility of the authors. The authors would like to thank the Northern Colorado Food Cluster (NCFC) and the Farmers' Market Manager for their support of this research and data collection.

I would like to personally thank all the members of my outstanding thesis committee, Dr. Becca B.R. Jablonski, Dr. Marco Costanigro, Martha Sullins, and Dr. Ryan Rhoades. It is through each of your individual patience and guidance that I have learned new skills and gained valuable insights within food systems research. Your collective efforts have given me the motivation to strive for high quality work and to believe that I can complete this rigorous endeavor, thank you all.

Thank you to the 2017-2018 team at the NCFC who supported me while carrying out this project for the Winter Farmers' Market. I thank the professors who mentored me through this thesis adventure as a non-traditional economics student. Finally, I want to extend my forever thanks to my friends and family, and especially my fiancé, for your ever-important enthusiasm, patience, and cooked meals.

TABLE OF CONTENTS

ABSTRACT.....	ii
ACKNOWLEDGMENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
CHAPTER 1 – INTRODUCTION	1
1.1 Introduction	1
CHAPTER 2 – LITERATURE REVIEW	4
2.1 U.S. Local and Regional Food Systems.....	4
2.2 DTC Marketing Channels	8
2.3 Farmers’ Markets	11
2.3.1 Best Marketing Practices for Farmers’ Markets.....	14
2.3.2 Farmers’ Market Consumers and Non-consumers	16
2.3.3 Consumer Barriers to Attending Farmers’ Markets	18
CHAPTER 3 – METHODOLOGY & DATA	21
3.1 Methods.....	21
3.1.2 Experiment Site	24
3.1.4 Survey Description	28
3.1.5 Summary of data.....	29
3.2.1 One-tailed two-sample z-test	34
3.2.2 Power and Sample-Size Analysis	35
CHAPTER 4 – EMPIRICAL RESULTS AND DISCUSSION	37
4.1 Coupon Redemption Rates.....	37
4.2 Sample Population Demographics	37
4.3 Respondent Motivation from the \$10 Coupon for Attending the WFM.....	37
4.4 Treatment coupon effects on consumer attendance at the WFM	40
4.5. Power and Sample Size Tests	41
4.6 Cost Effectiveness Calculations of Couponing Effort	42
CHAPTER 5 – SUMMARY AND CONCLUSIONS	45
REFERENCES	48
APPENDIX A.....	58

LIST OF TABLES

Table 2. 1- Previous research addressing perceived consumer barriers to attending farmers’ markets 18

Table 3. 1- WFM Season Sales 2014-2018 by Sales Category 25

Table 3. 2- Coupon numbers and redemption rates 29

Table 3. 3- Descriptive statistics, demographics 30

Table 3. 4- Descriptive statistics, demographics by coupon type..... 31

Table 3. 5- Descriptive statistics for survey responses 32

Table 4. 1- Stated motivation from coupon and previous WFM attendance by percent..... 38

Table 4. 2- Two-sample test of proportions results for entire sample population 41

LIST OF FIGURES

Figure 2. 1- Typology of Food Marketing Strategies by Sales Volume and Profit Margin (Bauman et al., 2014)	6
Figure 2. 2- Number of DTC farms and sales, 2002-2012 (Low et al., 2015).....	9
Figure 2. 3- Direct sales, by marketing practice & number of farms, 2015 (USDA NASS, 2016b)	13
Figure 3. 1- Conceptual Model for Consumer Behavior Towards Coupons	23
Figure 3. 2- Front images of the treatment coupon and control coupon.....	27
Figure 3. 3- Back image of treatment and control coupons	27
Figure 3. 4- Heat map-Household locations selected by survey respondents.....	33
Figure 3. 5- Heat map (block mode)-Household location selected by survey respondents.....	34
Figure 4. 1- Heat map of selected areas of interest by survey respondents by coupon type	39
Figure 4. 2- Block style heat map of selected areas of interest by survey respondents by coupon type.....	40
Figure 5. 1- Comparison of primary AHFP locations by percent of total sample	59
Figure 5. 2- Comparison of median PAHFD	60
Figure 5. 3- Comparison of selected primary AHFP locations by percent of survey respondents and percent of respondents who seek Colorado food products at those locations.....	61

CHAPTER 1 – INTRODUCTION

1.1 Introduction

The number of outlets where a consumer can purchase locally food has grown in the past decade (Low et al., 2015), and the increased consumer demand for local food has been described as one of the most important food-industry changes in the past twenty years (Richards et al., 2017, p.637). This rise in consumer interest in ‘local’ has been associated with food safety and health concerns, as well as a desire to support food associated with environmental and community benefits (Ekanem et al., 2016; Dimitri & Gardner, 2018). Concurrently, government interest in supporting local and regional food systems¹ has also grown (Low et al., 2015). As just one example, the USDA authorized the Farmers’ Market Promotion Program (FMPP) in the 2002 Farm Bill, and this program has expanded into the Farmers’ Market and Local Food Promotion Program (FMLFPP) under the 2014 Farm Bill. As of the 2018 Farm Bill, these programs are both now housed under the newly created Local Agriculture Market Program (LAMP) with \$50 million dollars in permanent, mandatory funding.

Despite the growing interest in local food systems, 2012 Census of Agriculture data show that between 2002 and 2007 direct-to-consumer (DTC)² sales increased by 17 percent and did not change between 2007 and 2012(Low et al., 2015). Low et al. (2015) suggest two potential

¹ The 2015 report to congress by Low et al. (2015) defines local and regional food systems as, “place-specific clusters of agricultural producers of all kinds—farmers, ranchers, fishers—along with consumer and institutions engaged in producing, processing, distributing, and selling foods” (p.1) and are comprised of direct-to-consumer and intermediated market channels. Within the literature, however, there is yet to be a consensus on the definition of “local” food (Thilmany McFadden, 2015; Bir et al., 2019).

² Direct-to-Consumer marketing channels include sales outlets where producers engage with consumers in “face-to-face market transactions”, and include roadside stands, farmers’ markets, pick-your-own, onfarm stores, and community supported agricultural (CSA) arrangements (Low et al., 2015, p. 5).

reasons why the stagnation may be occurring: 1) growth in intermediated³ sales that are cannibalizing potential direct sales growth, and 2) plateauing consumer interest in DTC markets. While growth in intermediated sales of local food contributed to overall growth in the local food systems sector, the aforementioned findings raise concern about the viability of the 70 percent (nearly 115,000) of local U.S. food producers (Low et al., 2015) who exclusively sell through DTC markets.

One of the most commonly used and the most researched DTC markets are farmers' markets, which have been referred to as the "historical flagship of local food systems" (Brown, 2002, p. 1297). The immense growth in the number of retail farmers' markets in the U.S. (e.g., USDA AMS, 2016) was initiated by the Public Law 94-463 (PL-94-463), called the Farmer-to-Consumer Direct Marketing Act of 1976 (Brown, 2001). Farmers' markets have often been acknowledged for their role in providing market access for beginning, small, and mid-sized farms in the U.S. (Feenstra et al., 2003; Gillespie et al., 2007; Bragg, 2010; Bauman et al., 2018) as well as having small, yet positive, impacts on local economies (e.g. Henneberry et al., 2009; Ekanem et al., 2016). Yet, despite their documented benefits, as well as evidence of declining DTC sales overall, empirical research about attracting new farmers market customers is scant (Ross et al., 1999; Brown, 2002; Staisey & Harris, 2019). Among the research that has explored and identified consumer barriers to attending farmers' markets, one of the most reported barriers is perceived inconvenience resulting from limited product assortment and the inconvenience of

³ Intermediated marketing channels "generally include all marketing opportunities in the local supply chain that are not farmer-to-consumer transactions, including farmers selling to grocers, restaurants, regional aggregators [e.g. food hubs], and buying agreements within the food service operations of institutions [e.g. schools and hospitals]" (Low et al., 2015, p. 5).

multiple shopping trips as an important factor (e.g. Ruelas et al., 2012; Karakus et al., 2014; Gumirakiza et al., 2014).

This study uses a randomized controlled trial (RCT) experiment to assess if marketing, specifically focused on the complete list of food items available at a farmers' market, increases consumer attendance. Specifically, this research asks: "Does advertising the convenience of the farmers' market through coupons significantly impact consumer attendance?" The objective of this study is twofold. First, is to measure the effectiveness of an informational nudge, conveyed by a coupon, communicating that the farmers' market can be a reliable source for one's market basket of at-home food products just as a grocery store can be. Secondly, we aim to record the cost-effectiveness of couponing methods in attracting new consumer patronage to the farmers' market with the goal of increasing farmers' market sales. To carry out these objectives, we conducted the RCT experiment during the 2017-2018 market season at the Winter Farmers' Market (WFM) in Northern Colorado. This is one of two existing studies to apply RCT methodology to marketing methods for farmers' markets. Additionally, this research is the first to provide an estimate of expected redemption rates for farmers' market coupons aimed at attracting consumer attendance.

The organization of this thesis is as follows: first, is a summary of existing literature on local and regional food systems in the U.S. with an emphasis on farmers' markets; next, is a detailed description of the methodology used for this study, the data source used in our analysis, and summary statistics for the variables measured including relevant survey outcomes; finally, empirical findings and discussion are provided before concluding remarks.

CHAPTER 2 – LITERATURE REVIEW

2.1 U.S. Local and Regional Food Systems

The globalization of commodity crop prices has been connected to the historically common cycle of agricultural “booms and busts” and is why some farm and ranch operations have chosen alternative marketing practices through diversification, high-value crops, or alternative business models (Bauman et al., 2018). Participation in local and regional food systems (LRFS)⁴ is an example of a market diversification option appropriate for farmers and ranchers who are unable to compete based on economies of scale, or looking for opportunities to manage risk (Bauman et al., 2018). Total U.S. farm sales of local food were approximately \$11.8 billion dollars in 2017, which was 7.8 percent of the 2017 total market value of U.S. agricultural products sold (USDA NASS, 2019).

Farmers and ranchers who participate in local food systems make up a small, but growing subset of all U.S. agricultural producers (Low et al., 2015). 2017 Census of Agriculture data show that 154,014 producers reported sales from local food systems, which is 8.8 percent of all U.S. producers overall (USDA NASS, 2019). While the majority of U.S. agricultural production sales belong to midsize or large-scale family farms, most U.S. farms are small family farms (measured by Gross Cash Farm Income (GCFI)⁵ (USDA ERS, 2019b). Local food farms also tend to be small family farms (Low et al., 2015). For example, in 2012, 85 percent of local food

⁴ The USDA does not have one officially accepted definition of local and regional food systems.

⁵ Gross Cash Farm Income (GCFI) is defined by the USDA as “annual income before expenses and includes cash receipts, farm-related income, and Government farm program payments” (USDA ERS, 2019a).

farms (139,123 farms) fell under the USDA specified category of “low-sales” “small family farms” (GCFI < \$150,000) with less than \$75,000 in annual GCFI (Low et al., 2015).

Local food systems include DTC (e.g., farmers’ markets, farm stands) and intermediated (e.g., food hubs, restaurants, institutions) market channels. 2017 Census of Agriculture data show that 130,056 producers sold local food through DTC market channels (down from 144,530 producers from the 2012 Census of Agriculture), and 28,958 producers sold through intermediated market channels (USDA NASS, 2019). Farms that participate in local food markets often have a diverse portfolio of products and market outlets compared to conventional producers (King et al., 2010). A producer’s use of a specific local food marketing channel is correlated with two primary characteristics: 1) their farm operation’s size, measured by GCFI, and 2) the commodity they produce (Low et al., 2015). According to 2012 Agricultural Census data, produce farms (those that produce fruit, vegetables, or nuts) represent 29 percent of all local food farms, and accounted for 51 percent of all local food sales (Low et al., 2015). As highlighted by Bauman et al., (2014), there is also a relative tradeoff between sales volume and market channel participation (**Figure 2.1**).

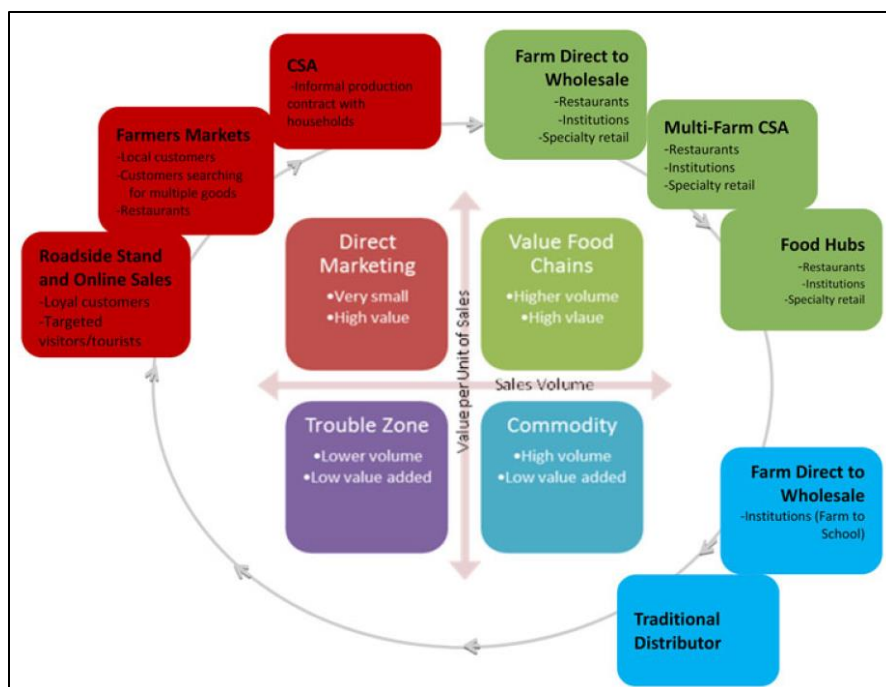


Figure 2. 1- Typology of Food Marketing Strategies by Sales Volume and Profit Margin (Bauman et al., 2014)

For over a decade, there has been research supporting producer and consumer benefits of local food systems (Ekanem et al., 2016; Woods & Thilmany, 2018). Local and regional food systems are purported to provide viable markets for small to mid-size farms and ranches, as they often need to receive a premium over commodity market prices due to their higher costs of production (Tropp et al., 2008; Hardesty et al., 2014; Bauman et al., 2018). Preliminary evidence shows that all farms, regardless of scale, have higher survivability rates if they have local foods as part of their marketing portfolio (Low et al., 2015). Producers who sell through local food markets can benefit from premium prices for their goods and direct connections and relationships with consumers (e.g. Low & Vogel, 2011; Gwin & Thiboumery, 2013; Carson et al., 2016).

Consumers benefit from local food purchases through access to healthy, high quality food (e.g. Karakus et al., 2014; Thilmany McFadden, 2015; Ekanem et al., 2016) and enhanced understanding about where their food comes from and how it is produced (Thilmany McFadden, 2015; Carson et al., 2016). As an example, a 2018 study by the USDA ERS about the

relationship between DTC market channel patronization and a household's demand for produce showed that households that buy directly from farmers buy more fruits and vegetables.

From an economic perspective, the promotion of locally-produced goods consumption has been an economic development strategy wherein consumers substitute local products for non-local products (Jablonski & Thilmany McFadden, 2019). Prior to the 2016 publication of *Economics of Local Food Systems: A Toolkit to Guide Community Discussions, Assessments and Choices* (also referred to as “the Toolkit”), there was not agreement on ‘best practices’ for evaluating the economic impacts of local and regional food systems (Jablonski & Thilmany McFadden, 2019). The Toolkit did, however, build on a number of regional studies that generally have shown that local food production should generate small, but positive, economic impacts (e.g., O’Hara & Pirog, 2013; Schmit et al., 2016; Rossi et al., 2017).

Despite the inconsistencies within previous literature about the welfare contributions of local food systems, Winfree and Watson (2017) argue that there are real economic reasons as to why the full social value of local food systems are not fully reflected in market prices. For example, in their generalized economic welfare analysis of local food systems, they state that local food systems have the potential to aid in mitigating negative externalities like transportation pollution from imported products (e.g. Bougherara et al., 2009; Coley et al., 2011) and can provide positive externalities and non-market amenity values for communities that in turn can perpetuate economic development.

2.2 DTC Marketing Channels

More farms selling through local food markets sell through DTC market channels than intermediated market channels (USDA NASS, 2019)⁶. In 2012, 70 percent of farms (~115,000 farms) using local food channels sold only through DTC market channels, and over half of those farm sales were for produce (fruit, vegetables, or nuts) (Low et al., 2015). 2017 Census of Agriculture data show that 130,056 farms reported local food sales through DTC marketing channels, while 28,958 farms reported sold through intermediated marketing channels (USDA NASS, 2019)⁷. Additionally, DTC sales increased from \$1.3 to \$2.8 billion dollars from 2012-2017 (USDA NASS, 2019).

However, there is evidence of heterogenous performance of local food markets (Low et al., 2015). From 2002 to 2007, DTC sales showed signs of stagnation, and between 2007 and 2012 (when adjusted for 2012 constant dollars) DTC sales appear to have declined by 0.9 percent overall (**Figure 2.2**). Concomitantly, intermediated sales have increased since 2012 and are acknowledged as being the largest area of growth for local food sales (Low et al., 2015; Richards et al., 2017).

⁶ Other sources such as the USDA Agricultural Resource Management Survey (ARMS) and the USDA NASS Local Food Marketing Practices Survey have asked for DTC and intermediated sales numbers, but

⁷ The 2017 Census of Agriculture is the first Census of Agriculture to report both DTC sales and intermediated sales separately.

Number of direct-to-consumer farms and sales, 2002-12			
Item	Census year:		
	2002	2007	2012
All farms reporting direct-to-consumer sales	116,733	136,817	144,530
Percent of all farms	5.5	6.2	6.9
Direct-to-consumer sales (million dollars)	812	1,211	1,310
Percent of all farm sales	0.4	0.4	0.3
Direct-to-consumer sales (millions of constant dollars: 2012 = 100)	1,002	1,322	1,310
Percent change from previous census	36.1	31.9	-0.9

Source: USDA, National Agricultural Statistics Service, Census of Agriculture data, various years; Council of Economic Advisors, *Economic Report of the President* (2014), Table B-3: Quantity and price indexes for gross domestic product, and percent changes, 1965–2013.

Figure 2. 2- Number of DTC farms and sales, 2002-2012 (Low et al., 2015)

Participating in DTC market channel sales presents tradeoffs for producers. Comparing the survival rates of farms that participate in DTC marketing channels to similarly sized farms that do not have DTC sales, Low et al. (2015) found that while DTC farms are more likely to remain in business, the farms without DTC sales are more likely to experience growing sales. Considering farms that sell only in local food systems, Park et al. (2014) determined that farmers that utilize a mix of DTC and intermediated sales or intermediated sales only have higher sales. Likewise, Bauman et al. (2018) found that a combination of DTC and intermediated sales—or only intermediated sales alone—are superior marketing strategies for farm financial viability (Bauman et al., 2018).

Yet, small scale producers often need to scale up to a higher volume of sales to enter intermediated market channels (Bauman et al., 2016) and increasing production volume alone is a considerable barrier (Martinez et al., 2010). Additionally, intermediated markets often include substantial additional regulatory requirements that can be difficult for beginning or small farms to meet (Martinez et al., 2010). These challenges are not insurmountable, for example producers have worked cooperatively through market channels like food hubs to aggregate their product for increased volume to enter in to intermediated sales (Martinez et al., 2010).

The long-term viability of DTC market channels heavily relies on sales growth (Staisey & Harris, 2019), and traditional DTC markets are increasingly faced with competition from conventional retail outlets (Onozaka et al., 2010; Stewart & Dong, 2018a). U.S. supermarkets and superstores, like Walmart, have caught on to consumer interest in supporting local and are selling more locally-sourced products (Richards et al., 2017; Stewart & Dong, 2018a). For example, in 2010 Wal-Mart announced that it would double the percentage of locally grown produce it sold (which they defined as being grown and sold in the same state) to 9 percent by 2015, and by 2013 they has already exceeded that goal with 11 percent of its produce sold from local farms nationwide (Fentress Swanson, 2013). In response to this trend, Richards et al. (2017) carried out a natural experiment seeking to explain why local food is growing in overall retail food demand. Richards et al. (2017) note that because shopping involves substantial fixed search costs, consumers substitute away from making additional stops for local produce at outlets like farmers' markets when local food is available at multi-category grocery outlets. They concluded that when local foods are an important part of a multi-category retailer's assortment of goods, they are able to earn higher margins and sell greater volumes.

Perhaps another reason why local sales at conventional retailers are growing is that many attributes that consumers associate with local foods (such as environmentally friendly production practices) are increasingly met by nonlocal products containing logos or other value-identifying information that can be found through conventional retailers (Bir et al., 2019; Stagner et al., 2019). Consumer perceptions of what defines local also greatly varies (Onozaka et al., 2010; Gumirakiza et al., 2014). For example, a national survey of U.S. consumers by Bir et al. (2019) revealed that 63 percent of primary household food shoppers (88 percent of total respondents) had purchased food from farmers' markets, roadside stands, and U-pick operations in 2017.

However, 68 percent of respondents indicated that they purchase food labeled as “local” or “locally produced” in a grocery store, 10 percent stated they did not, and 22 percent did not know if they had (Bir et al., 2019). Lastly, while DTC outlets like farmers’ markets are a common purchase location for U.S. consumers (e.g. Onozaka et al., 2010; Bir et al., 2019), the percent of their at-home food purchases or calories may be minimal and/or infrequent from these sources (Keeling Bond et al., 2006; Mentzer & Mancino, 2015; Stewart & Dong, 2018a). A 2018 study from the U.S. Economic Research Service (ERS) about the relationship between DTC market channel patronization and a household’s demand for produce simply states, “If retail marketing trends negatively impact DTC outlets, small farmers have the most to lose...Most important to the future of DTC outlets may be whether key customers continue to exhibit a strong demand for food through these outlets” (Stewart & Dong, p. 35a).

2.3 Farmers’ Markets

Farmers’ markets are a well-utilized market channel in local food systems and are most popular for connecting rural farmers to urban consumers (Alonzo, 2013). U.S. farmers’ market data collection and evaluation has been occurring for decades (e.g., Wolnik et al., 2019). Specifically, the USDA Agricultural Marketing Service has recorded and monitored numbers, sales and influence (growth) of farm markets (including farmers’ markets) since the mid-1990s (Woods & Thilmany, 2018). A distinct form of a DTC outlet, farmers’ markets are thought to provide particular benefits to both producers and consumers. Farmers’ markets provide business opportunity with low barriers to entry for beginning, small, and mid-sized farms (Feenstra et al., 2003; Gillespie et al., 2007; Bragg, 2010; Bauman et al., 2018) acting as an incubator for beginning and new farms and opportunities to get direct feedback from customers (Bragg, 2010; Kelly, 2015). The USDA acknowledges farmers’ markets for providing producers the

opportunity to develop a personal relationship with customers and cultivate consumer loyalty (USDA AMS, 2019a).

Standard economic theory (led by the work of George Akerlof (1970) explains that when consumers are equipped with better information, they are better able to make more optimal decisions regarding their purchases; and when information is not perfect or is costly, it is possible for market failures to occur (Lusk et al., 2011). Farmers' markets give consumers the opportunity to obtain more information about their food through face-to-face interactions with producers (e.g. Zepeda & Deal 2009; Carson et al. 2016). As vendors and consumers carry out their conversations at the farmers' market, consumers can seek information directly from the producer before the purchase is made. Moreover, consumers seek direct assurance on specific outcomes when making local food purchases (Onozaka et al., 2010), for example, instead of wanting to support local, they wanted to know that they were supporting the preservation of local farmland with their purchase. Farmers' markets provide the opportunities that consumers are seeking which better assures the consumer that their purchase will provide the desired benefits (Zepeda & Deal, 2009; Onozaka et al., 2010)⁸.

According to the USDA NASS Local Food Marketing Practices Survey, in 2015 farmers' market sales were 23 percent of the three billion dollars in DTC sales, making them the second leading DTC market channel in terms of both sales and number of participating farms (on-farm stores was number one) (**Figure 2.3**) (USDA NASS, 2016a). In 2015, the USDA Local Food Marketing Practices Survey reported that 41,156 farms had \$711 million in sales through farmers' markets (USDA NASS, 2016a). Furthermore, between 1994 and 2016 farmers' markets

⁸ From a welfare economics perspective, Winfree and Watson (2017) argue that though it may be conceivable that the buy local movement increases welfare given the notion that consumers will be happier with a more informed purchase, whether this is a true increase in social welfare is ambiguous.

grew in number by 394 percent, totaling to over 8,600 voluntarily markets listed in the USDA National Farmers’ Market Directory (USDA AMS, 2016).

	Sales		No. of Farms
	\$ million	%	
On-farm store	1,322	44	51,422
Farmers’ market	711	23	41,156
Roadside stand away from farm	236	8	14,959
Community-supported agriculture (CSA)	226	7	7,398
Online	172	6	9,460
Other (pick-your-own, mobile market, etc.)	360	12	39,765
Total	3,027	100	114,801*

**Is less than the sum of individual practices because a farm may use multiple practices.
Source: USDA NASS, 2015 Local Food Marketing Practices Survey.*

Figure 2. 3- Direct sales, by marketing practice & number of farms, 2015 (USDA NASS, 2016b)

However, growth in the number of farmers’ markets is showing signs of slowing, and in many areas across the country (particularly urban), farmers’ markets are reaching a saturation point (Zepeda & Carroll, 2018). In August of 2017, though the number of farmers’ markets had doubled in the number from ten years ago, this number had only grown by 0.2% from 2016 (Zepeda & Carroll, 2018). Gathering 59 interviews at six mobile market sites in the U.S. in 2015, Zepeda and Reznickova (2018) concluded that farmers’ market producers are concerned that the presence of multiple markets has increased costs more than increasing revenue, and question if adding markets increases the number of farmers’ market shoppers, or just makes shopping more convenient for existing patrons.

In conjunction with growing consumer access to locally procured produce at retail outlets, these are concerning indicators for farmers’ markets. It is hard to draw generalizable conclusions about improving market sales given that farmers’ markets and the needs of the communities they serve are not homogeneous (Low et al., 2015). This is also because previous

research has not prioritized this topic. In a review of a variety of farmers' market research from 1940-2000, Brown (2002) classified past farmers' market studies under four main categories: consumers and vendors, economic impact, social impact, and farmers' markets as research sites. In the category most related to this study, "farmers' markets as research sites", all studies related to observing consumer attitudes with the exception of one study about wasted food recovery (Price & Harris, 1998), and none related to testing the efficacy of marketing methods for improved farmers' market sales. Brown (2002) also stated that research before 2000 had significant methodological problems. Following up on the literature review from 2002, Brown and Miller (2008) states the "new" farmers' market research primarily focused on the economic or social impacts of farmers' markets.

There has not yet been a published updated comprehensive literature review of farmers' market studies since 2008. However, in looking at existing literature, much of the research focuses on the attitudes and preferences of farmers' market shoppers (Zepeda & Nie, 2012) (e.g., Ross et al., 1999; Zepeda, 2009; Gao et al., 2012; Gumirakiza et al., 2014), consumer access (e.g. Jilcott et al., 2010; Ruelas et al., 2012; Karakus et al., 2014, Gilliland et al., 2015; Schupp, 2016), and the relationship between farmers' markets and local economic impact (e.g., Henneberry et al., 2009; Sadler et al., 2013; Hughes & Isengildina-Massa, 2015).

2.3.1 Best Marketing Practices for Farmers' Markets

National research on how to increase farmers' market sales has yet to occur, and specific regional studies are scant (Ross et al., 1999; Staisey & Harris, 2019). In an exhaustive literature review, only two studies measure the efficacy of marketing methods on farmers' market

success⁹. Ross et al. (1999) tested the efficacy of offered tastings of locally grown produce at three worksites with 376 employees in a rural community in Maine for six weeks in the summer of 1997. Along with the tastings, they offered information about the produce, and an opportunity to order it at their workplaces. Researchers concluded that the intervention contributed to behavior changes, including that more than a quarter of workers at the intervention sites ordered produce through the project along with increased DTC market purchases at venues like roadside stands and pick-your-own among the intervention group. Staisey and Harris (2019) report results from observations at the Historic Lewes Farmers' Market where they tested approaches to increasing market sales and Supplemental Nutrition Assistance Program (SNAP) redemptions through various marketing tactics (e.g., placing photos of products on coolers, recipe cards at vendor stands, meet the farmer presentations). Sales differences were reported from the market stand level and overall market level, but no empirical tests were carried out to verify the validity of study findings.

Although there is a need for more peer-reviewed research about farmers' market marketing practices, there has been substantial government support including for improved marketing of farmers' markets. This is primarily seen through the USDA FMPP, which has provided funding to grantees that consistently are seeking to prioritize improving marketing. For example, marketing innovations are frequently mentioned in the overviews of many grantees of 2018 FMPP funded projects (USDA FMPP, 2018). This includes "marketing campaigns", "market data collection", digital marketing strategies, and "marketing training". Related to this study's interest in coupon promotion of the farmers' market, FMPP funds have been awarded to

⁹ Two regional studies by Ruelas et al. (2012) and Gumirakiza et al. (2014) do suggest that focusing on consumers who attend farmers' markets more frequently is a viable marketing strategy to increase sales of fresh produce, but marketing mechanisms were not tested in either study.

projects seeking to implement coupon marketing (e.g. 2017 and 2016 fiscal years), and it appears that these coupon efforts are more based around low-income, pregnant females, and senior access to nutritious food (USDA AMS, 2019b).

Research that is most applicable to marketing outcomes for farmers' markets come from broader studies on consumer preferences and willingness to pay for specialized or labeled products like local, organic, and GMO-free (e.g. Costanigro & Thilmany McFadden, 2011; Curtis & Cowee, 2011; Zepeda & Nie, 2012; Costanigro & Lusk, 2014). This is to say that in terms of guidance on what are the best marketing practices for farmers' markets, empirically verified studies can offer generalizations about consumer preferences and behaviors, but lack findings about effects of marketing on consumer behavior. Gumirakiza et al. (2014) states: "A more detailed analysis is necessary for produce growers, market managers, and policy makers interested in...seeking to increase fresh produce sales or consumption among consumers" (p.66).

2.3.2 Farmers' Market Consumers and Non-consumers

Maintaining a base of customers is essential to the survival of farmers' markets (Stewart & Dong, 2018a), and numerous studies examine the motivations of consumers who attend farmers' markets (e.g., Zepeda, 2009; Zepeda & Carroll, 2018). Yet, the information on why some consumers decide not to attend farmers' markets is limited (exceptions include McGarry Wolf et al., 2005; Keeling Bond et al., 2006; Zepeda, 2009; Bir et al., 2019) or specifically focus on fresh produce access for low-income households (Jilcott et al., 2010; Colasanti et al., 2010; Ruelas et al., 2012; Karakus et al., 2014; Gilliland et al., 2015).

Previous research has found that farmers' market consumers tend to demonstrate one or more of the following specific characteristics or attitudes: enjoyment of cooking (Zepeda, 2009) or have time to cook at home (Gumirakiza et al., 2014), value supporting local agriculture

(Keeling Bond et al., 2006; Gumirakiza et al., 2014), have eaten from a garden or have a garden (Ross et al., 1999; Gumirakiza et al., 2014), are health consciousness (Keeling Bond et al., 2006; Gumirakiza et al., 2014), have “higher” incomes (Gumirakiza et al., 2014; Bir et al., 2019), live with others (another adult or child) (Zepeda, 2009; Bir et al., 2019) and have positive attitudes about local food overall (e.g. Keeling Bond et al., 2006; Onozaka et al., 2010; Gumirakiza et al., 2014; Stewart & Dong, 2018a; Bir et al., 2019). Shoppers at farmers’ markets also claim to enjoy the entertainment and social value of the market (e.g. Abello et al., 2012; Gumirakiza et al., 2014; Freedman et al., 2016)¹⁰. Even among non-farmers’ market shoppers, freshness and quality are often ranked higher for farmers’ markets than supermarkets by consumers (e.g. Onozaka et al., 2010; Stewart & Dong, 2018b; Bir et al., 2019). Generally, attitudes alone are not found to be strong predictors of marketplace behavior (Ajzen & Fishbein, 1974; Kraus 1995; Thompson & Kidwell, 1998), but national research has demonstrated that a desire to support local agriculture is a better predictor of farmers’ market patronage than characteristics like demographics (Keeling Bond et al., 2009; Thilmany McFadden, 2015).

Conversely, while less in number, various studies have surveyed nationally representative samples of U.S. consumers about why they do not attend farmers’ markets (McGarry Wolf et al., 2005; Keeling Bond et al., 2006; Zepeda, 2009; Bir et al., 2019). These studies are important to understanding how a farmers’ market might attract a consumer who does not currently shop at farmers’ markets. Both the studies by Keeling Bond et al. (2006) and Zepeda (2009) found that those who are unlikely to shop at farmers’ markets value price attributes and convenience more than direct market shoppers. Ultimately, Keeling Bond et al. (2006) recommend that for attracting non-direct market prone consumers, marketers should emphasize safety, variety,

¹⁰ Note that few studies have been representative of non-white consumers (Ruelas et al., 2012).

country of origin, visual appeal, and convenience of food prep on produce offerings. Likewise, Zepeda (2009) concludes that trying to change consumer attitudes regarding where they purchase produce is a less feasible marketing option and focusing on economic priorities or perceptions (such as cost and time tradeoffs) may have a greater impact.

2.3.3 Consumer Barriers to Attending Farmers’ Markets

The most commonly reported barriers to consumer participation at farmers’ markets include not knowing the market existed, perceptions about affordability, sense of social belonging, and inconvenience (**Table 2.1**). Among the reported inconvenience barriers, consumers often complain about issues of accessibility (including market location, hours of operation, and parking) (e.g. Jilcott et al., 2010; Lohr et al., 2011; Bir et al., 2019), lack of variety of produce (including seasonality of produce) (e.g. Onozaka et al., 2010; Ruelas et al., 2012; Bir et al., 2019), and the farmers’ market not being a one-stop shop (Ross et al., 1999; Connor et al., 2010). Though Richards et al. (2017) did not specifically survey consumers about their perceptions of local food or farmers’ markets, they state that consumers prefer to buy groceries from a multi-product/category venue because of the convenience of being a one-stop shop (Richards et al., 2017).

Table 2. 1- Previous research addressing perceived consumer barriers to attending farmers’ markets

Barrier	Supporting Literature
Affordability and quality	Thilmany et al., 2008; Zepeda & Deal, 2009; Zepeda, 2009; Onozaka et al., 2010; Ruelas et al., 2012
Sense of Social Belonging	Colasanti et al., 2010; Onozaka et al., 2010; Conner et al., 2010; Carson et al., 2016; Freedman et al., 2016; Schupp, 2016
Inconvenience	Ross et al., 1999; McGarry Wolf et al., 2005; Zepeda, 2009; Jilcott et al., 2010; Colasanti et al., 2010; Conner et al., 2010; Jilcott et al., 2010; Lohr et al., 2011; Abello et al., 2012; Ruelas et al., 2012; Karakus et al., 2014; Gumirakiza et al., 2014; Bir et al., 2019

Three national studies stand out in terms of consumer barriers related to convenience. Onozaka, Nurse, and Thilmany McFadden (2010) carried out a national survey of 1,889 primary grocery shopper panelists to explore the underlying factors that motivate consumers to choose local food, and how their buying motivations may differ in different market venues. They found that while consumers perceive local food to have a number of attractive traits like health benefits and supporting local farmers economically, a weakness of local food was the inconsistent availability of produce. To better understand why some SNAP participants do not shop at farmers' markets, Karakus et al. (2014) surveyed a representative sample of SNAP participants who shopped at or lived near the selected sample of 65 U.S. farmers' markets with Electronic Benefit Transfer (EBT) transactions. Farmers' markets were described as not being a one-stop shop and not open on convenient days or times. Parking was also a significant reported issue, but at a lower frequency. The majority of SNAP participants who did not shop at farmers' markets were not aware of the EBT benefits farmers' markets can offer. Lastly, Bir et al. (2019) analyzed responses from a 2017 Qualtrics survey of 1,200 U.S. households. Respondents were asked to indicate to what extent a list of factors were limiting about purchasing local food. With the options of "yes", "sometimes", and "no", over 50 percent of respondents stated that the selection of produce (including seasonality of produce) and the day and time of the farmers' market were moderately to very limiting factors.

Moreover, various regional studies have been carried out that also address consumer perceptions of the inconvenience of farmers' markets or local food. Two studies were carried out in Michigan in 2008 using the same data from a survey of 953 Michigan residents addressing consumer attitudes about attending farmers' markets and buying local food. Colasanti et al. (2010) emphasized results from those who had never attended or only infrequently shop at

farmers' markets and underrepresented populations, where Conner et al. (2010) measured the importance of various factors for deciding whether or not to shop at farmers' markets. The most predominant barriers, or disincentives, reported among both studies included: a need for signage and promotion of the market, inconvenience days and times of the markets, the market not being on the way to other places of interest, inadequate facilities, and the market having an unwelcoming atmosphere (especially reported by women who identify as Latina). On average, respondents chose the selection of produce, day and time of the market, location of the market, and parking as "somewhat important" to "very important" factors (Conner et al., 2010). In a survey of about 1,800 residents from East and South Los Angeles, Ruelas et al. (2012) sought to understand consumer satisfaction with two newly established farmers' markets in both respective locations. Negative themes reported about the farmers' markets were the location of the markets, lack of shaded areas, and a desire for more variety of produce and vendor products overall.

CHAPTER 3 – METHODOLOGY & DATA

3.1 Methods

Randomized Controlled Trial Experiments

A randomized controlled trial (RCT) methodology was used to test our research question. RCT experiments were popularized in clinical research as the “gold standard”¹¹ for testing the efficacy (and safety) of a medical treatment (Kabisch et al., 2011, p. 663), but are commonly used in a variety of scientific fields. RCTs aim to compare a new treatment to an existing standard treatment or placebo (control) among a randomly selected group of participants. Participants are also randomly assigned to either group, and after the period of observation, the effects of the study treatment (the intervention) are compared to the control treatment (Kabisch et al., 2011).

Informational Nudges

The intervention that we use for this RCT experiment comes in the form of an “informational nudge”. Informational nudges are one way of influencing consumption choices and are considered alternatives to regulations and requirements (Thaler & Sunstein, 2008). Specifically, an informational nudge is a kind of information delivery aimed at altering social behavior (Bao & Ho, 2015). An asset of the informational nudge approach for food choices is that it allows for individual flexibility and advocates for personal decision-making (Guthrie et al., 2015).

When addressing consumer food choices, the most common public policy approach is to provide nutrition information (Guthrie et al., 2015). For example, the USDA MyPlate program

¹¹ Kabisch et al., 2011 caution that while this is true, the extent to which results can be prescribed to the wider population is often questioned in the medical field because controlled study conditions likely do not reflect clinical reality.

provides suggested daily servings from each food group with the message, “Before you eat, think about what goes on your plate, in your cup, or in your bowl” (ChooseMyPlate.gov, 2019).

Among the local food systems literature, two studies specifically utilize nudges related to local food purchasing behavior (Ross et al., 1999; Gilliland et al., 2015). The study by Ross et al. (1999) provided local food tasting interventions at work sites to test if the nudge would encourage consumers to purchase local food through the convenience of purchasing at the work location. Alternatively, Gilliland et al. (2015) utilized a smartphone application called “SmartAPPetite” to nudge users into healthier dietary behaviors and local food purchases.

Coupons

The mechanism through which the informational nudge (intervention) will be implemented is through a coupon. Coupon promotions have long been used as a marketing method to increase sales (Nevo & Wolfram, 2002; Barat & Ye, 2012). The goal of a coupon is to inform and motivate consumers to try a product or service with price discounts upon coupon redemption (Ward & Davis, 1977). Coupons can be used to encourage increased sales by already existing customers, to attract new sales from new customers, or both (Barat & Ye, 2012).

In a meta-analysis of over 30 studies post 1980, Barat and Ye (2012) conceptually describe that consumer behavior toward coupons can be operationalized by coupon usage, product perception, and product purchase (by redeeming the coupon), and perception toward coupons can be operationalized by coupon attitude, coupon perception, and coupon knowledge (**Figure 3.1**). According to Inmar (a large commerce data analytics company), the majority of coupons are redeemed at conventional grocery stores (Hale, 2010). A number of factors are essential to the level of coupon redemption, but the factors that are considered causal to coupon redemption variation include: the total coupons distributed, the time period for redemption

opportunity, the coupon value, and the media used to distribute the coupons (Ward & Davis, 1977).

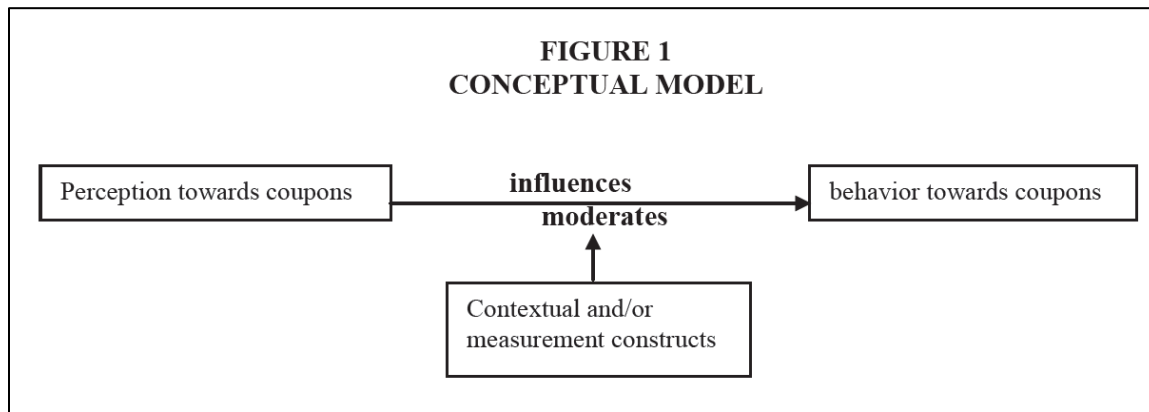


Figure 3. 1- Conceptual Model for Consumer Behavior Towards Coupons (Barat & Ye, 2012)

As highlighted by Barat and Ye (2012), one of the most influential factors for coupon use is the distribution method and has received much attention in prior research (e.g. Lembeck, 1977; Reibstein et al., 1982). 'Unexpected' coupons are generally associated with an increase in purchases and number of unplanned purchases on a shopping trip (Heilman et al., 2002), and unanticipated price decreases enhance consumer tendencies to purchase discretionary goods (Janakiraman et al., 2002). While companies are sending out increasing amounts of digital coupons, and more shoppers are using them, physical paper coupons are still most prevalent (Zumbach, 2016). According to the Kantar Group (a leading insight information and consulting group), over 289 billion print coupons were distributed compared to only 6 billion digital coupons in 2015 (Zumbach, 2016). Mobile coupons have been acknowledged to maintain significant advantages over print coupons (such as higher redemption probability, anytime consumer accessibility, and the possibility of being forwarded); however, print coupons were

used specifically for this experiment to better control distribution and record redemption outcomes (Gonzalez, 2016)¹².

3.1.2 Experiment Site

Colorado provides an interesting and relevant cite for the experiment. The state of Colorado has made key investments to support local food (i.e., the Colorado Proud program and the Colorado Farm Fresh Directory), and perhaps in part due to these efforts, in 2015 Colorado was one of the top six states for DTC sales in the nation (USDA NASS, 2016a). In 2019, there were 160 registered farmers' markets voluntarily listed through the USDA Farmers' Market Directory in over 40 of the state's 64 counties, and within 50 miles of Fort Collins there were 35 (USDA AMS, 2019c). In 2016, a representative survey of Coloradoans found that 51 percent of households shopped at farmers' markets, 20 percent higher than 2011 responses (Christenson et al., 2016).

This study took place at the Winter Farmers' Market (WFM) in Fort Collins, Colorado which is located in the northern part of the state in Colorado's urban corridor referred to as the Front Range. The WFM was managed by the Northern Colorado Food Cluster (NCFC) from 2014 to 2019 with a mission to "support local food producers, provide an outlet for direct sales to consumers, encourage season extension, increase the supply of fresh produce and whole foods in the region, and educate consumers about the variety of local foods produced during the fall, winter, and early spring" (NCFC, 2014, p.1). **Table 3.1** provides a summary of total WFM sales, and sales by sales category from 2014-2018 provided by the Northern Colorado Food Cluster

¹² It is important to note that self-selection bias is difficult to avoid with coupon distribution, meaning those who are interested in the topic conveyed by the coupon are more likely to participate in redeeming the coupon.

(NCFC, 2018). Total WFM sales have steadily increased since 2014, with 2017-2018 WFM sales being 16 percent higher than 2014 market sales. For the 2017-2018 WFM season, value-added sales increased by 27 percent, while fresh food sales declined by 19 percent. There were 50 fresh/value-added vendors and around 76 vendors total (including craft vendors), an increase of six vendors from the previous season. The 2017-2018 profit for the WFM was \$1,075 dollars, which were reinvested for the 2018-2019 market for management fees and other costs to run the market.

Table 3. 1- WFM Season Sales 2014-2018 by Sales Category (NCFC, 2018)

Sales Category	2014–2015	2015–2016	2016–2017	2017-2018
Fresh	\$62,689.00	\$69,302.00	\$73,350.00	\$59,360.18
SNAP & Double Up*	-	\$2,017.00	\$6,888.00	\$5,294.00
Value Added	\$74,214.00	\$70,666.00	\$75,709.36	\$96,506.64
Craft	\$29,983.00	\$31,477.00	\$28,469.94	\$32,321.39
Total	\$166,886.00	\$173,462.00	\$184,417.30	\$193,482.21

*SNAP and Double Up amounts are considered fresh sales

3.1.3 Experimental design

From December 2017 through April 2018 we distributed postcards including a \$10 coupon for the WFM through the U.S. Postal Service to 6,000 random households. A privately contracted mailing service was utilized to distribute the coupons based on one specific attribute, that the houses were located within a 12-mile radius of the WFM. A 12-mile radius was selected based on the findings of a national study by Lohr et al. (2011) that for farmers' markets located in the same Rural Urban Continuum (RUC) code¹³ as the county in which Fort Collins is located (Larimer County), farmers' market attendees will, on average, travel up to 12 miles to attend¹⁴. No other specific characteristics of households were otherwise selected because various studies have found "mixed" results regarding the relationship between consumer demographics and their likelihood of purchasing local food (e.g. Thilmany, Bond & Keeling Bond, 2008; Zepeda, 2009).

Three thousand of the 6,000 total coupons were designed at the treatment to inform consumers about the diversity of products offered at the farmers' market, a one-stop shop. The treatment group coupons were created by a graphic designer and contained an image of a generic grocery list completely checked off, with the statement, "Check off your grocery list at the winter farmers' market" (**Figure 3.2 left**). A full, generic grocery bag with a checked-off grocery list was chosen to demonstrate that the WFM is a one-stop shop for one's at-home food purchasing needs. As recommended by Zepeda (2009), information to attract non-farmers' market shoppers should not aim to change consumer attitudes, and instead focuses on the time

¹³ RUC codes are a USDA classification scheme that distinguish metro counties from nonmetro counties and are considered important measures of rurality for trends in nonmetro areas (Parker, 2016). With just over 350,000 residents (US Census Bureau, 2018), Larimer County falls under the RUC code 2 (Metro Population, 250,000 – 1 million residents). While the Lohr et al. (2011) study was based on 2007 RUC codes, the 2013 RUC code 2 population was the same.

¹⁴ Note that other national research (e.g. Bir et al., 2019) has found that despite not perceiving farmers' markets to be the "closest option" for food shopping, consumers still will shop at farmers' markets.

savings (an economic tradeoff) of attending the WFM, which can be a one-stop shop for a diverse market basket of food goods. The remaining 3,000 coupons did not carry the said informational nudge, and instead maintained a neutral front image advertising the WFM (**Figure 3.2 right**). All 6,000 coupons contained a simple message about the \$10 coupon value on the front and the back side of all 6,000 coupons contained uniform information about the WFM including: directions for coupon redemption, market dates, hours, location, social media, market and study sponsors, and the SNAP benefits accepted logo (**Figure 3.3**).



Figure 3. 2- Front images of the treatment coupon (left) and control coupon (right)



Figure 3. 3- Back image of treatment and control coupons.

Coupons were distributed in two rounds where 1,000 and 5,000 coupons were mailed out in each round respectively. The first round was a “pilot round”, which was carried out to observe

an initial redemption rate as there is no guidance on coupon redemption rates in previous literature. This was important for this project given the budget constraints to carry out the experiment. In Round 1, 500 control coupons and 500 treatment coupons were sent. Round 1 coupons could be redeemed between December 9, 2017 and January 27, 2018 (five opportunities in total). In Round 2, 2,500 control coupons and 2,500 treatment coupons were distributed to be redeemed between February 10, 2018 and April 7, 2018 (five opportunities in total). Coupons were redeemable at a booth located at the entrance of the WFM staffed by the research team.

3.1.4 Survey Description

At the WFM, before being given the \$10, study participants were asked to take a voluntary, self-administered survey via Qualtrics ©. The survey questionnaire was reviewed and approved by the Colorado State University Research Integrity and Compliance Review Office (RICR) Institutional Review Board (IRB Protocol ID: 17-17698H¹⁵). To improve response rates, we made a concerted effort to keep the survey length to a minimum, and we selected the \$10 value of the coupon as a financial incentive (Dillman, 1991). Questions respondents were asked pertained to the respondent's prior attendance at the WFM, the relative appeal of the coupon they received, the importance of the coupon in influence their decision to attend, and basic demographics (age, gender, and annual household income). These questions directly related to our research question.

Respondents were also asked to select among a list of food supply locations where they conduct their primary at-home food purchasing (AHFP) (Mentzer Morrison & Mancino, 2015; Christenson et al., 2016; Stewart & Dong, 2018a), including the percent of their AHFP dollars

¹⁵ Principal Investigator: Jablonski, Becca
Protocol Title: Improving Direct-to-Consumer Markets and Farm Viability Through their Assessment, Coordination, and Development in Northern Colorado
Approval Date: January 19, 2018

spent by location and if they seek out Colorado food products at each selected venue. These questions were taken directly from the 2016 Colorado Department of Agriculture Public Attitudes about Agriculture in Colorado (CDAPAAC) survey (Christenson et al., 2016) so that comparisons could be made between this study and respondents at the state level. The results of these questions and comparisons to the 2016 CDAPAAC survey are provided in **Appendix A**.

3.1.5 Summary of data

Table 3.2 summarizes coupon and survey response numbers. The redemption rate of Round 1 was 15/1,000 or 1.5 percent. The redemption rate for Round 2 was 96/5,000 or 1.92 percent. The average redemption rate between both rounds was 1.71 percent, and the overall redemption rate (111/6,000) was 1.85 percent.

Table 3.2- Coupon numbers and redemption rates

	Control	Treatment	Total
Total Coupons Sent	3,000	3,000	6,000
Total Coupons Redeemed	53	58	111
Redemption Rate	1.77%	1.93%	1.85%
Survey responses	49	53	102

Table 3.3 provides the summary statistics for the demographic questions asked in the survey. These variables are primarily utilized to compare the sample to the state and national populations. **Table 3.4** summarizes demographics by coupon type which may provide interesting comparisons.

Table 3. 3- Descriptive statistics, demographics

Variable	Description	Number of Observations	Mean (Std. Dev.)
Age	Survey respondent age (years): 1=18-24 2=25-34 3=35-44 4=45-54 5=55-64 6=65 or older	90	3.556 (1.500)
Gender	Survey respondent gender: 0=Female 1=Male	90	0.244 (0.432)
AHHI	Survey respondent annual household income (AHHI) (\$): 1= < \$25,000 2= \$25,000-\$34,999 3= \$35,000-\$49,999 4= \$50,000-\$74,999 5= \$75,000-\$99,999 6=\$100,000-\$149,999 7= \$150,000 or more	89	3.775 (1.941)

Table 3. 4- Descriptive statistics, demographics by coupon type (Control, Treatment)

Variable	Description	Number of Obs.		Mean (Std. Dev.)	
		C	T	C	T
Age	Survey respondent age (years): 1=18-24 2=25-34 3=35-44 4=45-54 5=55-64 6=65 or older	45	45	3.578 (1.485)	3.533 (1.531)
Gender	Survey respondent gender: 0=Female 1=Male	45	45	0.244 (0.435)	0.244 (0.435)
AHHI	Survey respondent annual household income (AHHI) (\$): 1= < \$\$25,000 2= \$25,000-\$34,999 3= \$35,000-\$49,999 4= \$50,000-\$74,999 5= \$75,000-\$99,999 6=\$100,000-\$149,999 7= \$150,000 or more	45	44	4.089 (1.905)	3.455 (1.946)

Table 3.5 outlines the descriptive statistics related to variables addressing the research question. All variables were dummy variables, taking on a value of 0 or 1 described below. Primary analysis focuses on the first two variables, which directly relate to the research question. The latter two variables, Attended Before, and Motivated are helpful in achieving the objectives of the research question and serve as secondary observations about the coupon’s impact on consumer decision making.

Table 3. 5- Descriptive statistics for survey responses

Variable	Description	Number of Obs.	Mean (Std. Dev.)
Control Redemption Rate	Was a control coupon redeemed? (0 if no, 1 if yes)	3,000	0.0177 (0.1318)
Treatment Redemption Rate	Was a treatment coupon redeemed? (0 if no, 1 if yes)	3,000	0.0193 (0.1377)
Attended Before	Had the respondent attended the WFM before? (0 if no, 1 if yes)	101	0.6337 (0.4842)
Motivated	Did the respondent state they were motivated by the \$10 coupon to attend the WFM that day? (0 if no, 1 if yes)	102	0.6275 (0.4859)

Figure 3.4 is a visualization provided through Qualtrics about where respondents indicated the general location of their household. The center of the heat map below is where the WFM is located, and the blue circle visually establishes the 12-mile radius from the center. The frequency of the responses is represented by a color scheme: white, blue, light blue, green, yellow, orange, red, where the former are the least clicks and the latter is the most clicks. Almost all respondents came from within the 12-mile radius, and the majority of respondents live close to the WFM. This may be because these distances are reasonable for foot or bike travel. The coupon did attract coupon redeemers from other nearby towns/areas including Loveland, Windsor, Laporte, Timnath, and Wellington. This may be due to the fact that the WFM is the only winter market in the region(USDA AMS, 2019b).

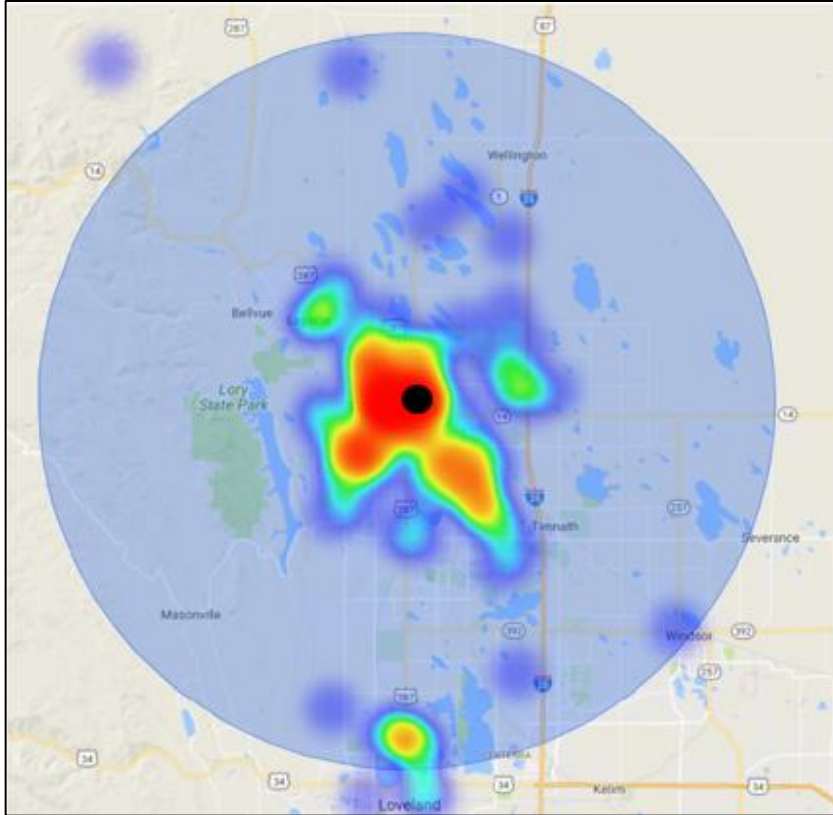


Figure 3. 4- Heat map-Household locations selected by survey respondents

If we split the visualization in **Figure 3.4** up by coupon type, there are some notable differences between where consumer households were generally located. This is depicted in **Figure 3.5** with the control responses are on the left, and treatment responses are on the right. This visualization was transformed through Qualtrics in to “block mode”, which forces the data in to a grid based on pixels. The colors follow the same scheme as described above, therefore, the red boxes are where the most clicks occurred. This is a maximum of four and three clicks for the control and treatment groups respectively. Namely, the visual confirms the randomized distribution of the coupons, and it appears that the control coupon attracted respondents from the furthest distances.

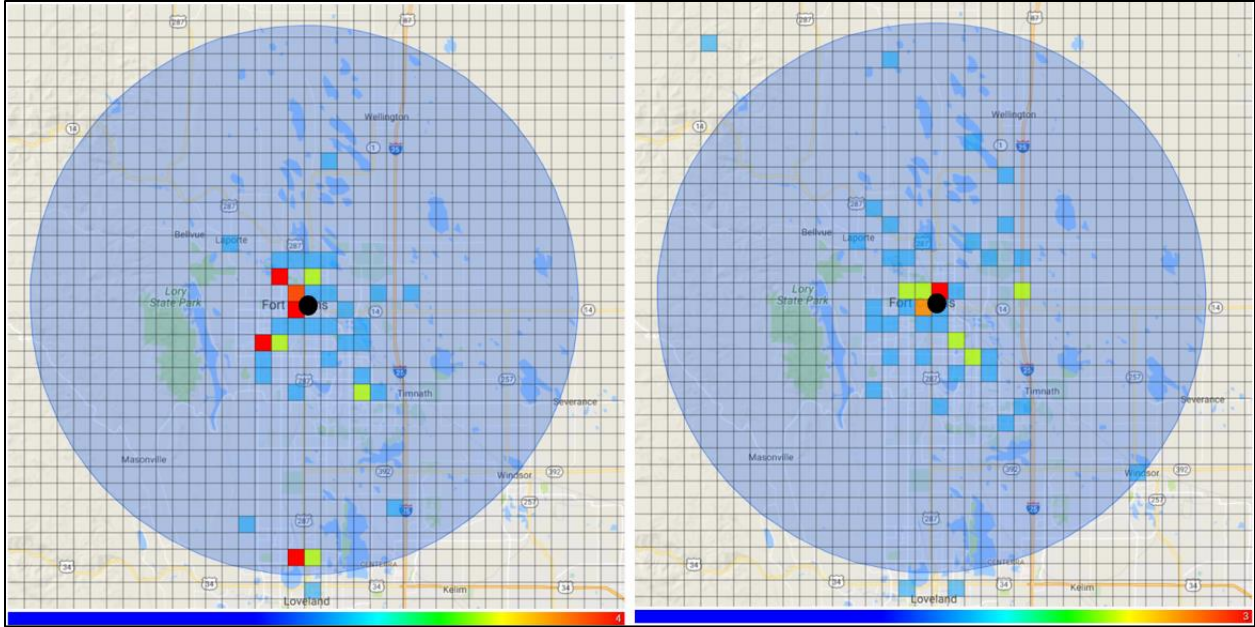


Figure 3.5- Heat map (block mode)-Household location selected by survey respondents

3.2.1 One-tailed two-sample z-test

The hypothesis that the informational nudge conveyed by the treatment coupon had a significant effect on consumer attendance at the WFM was tested with a one-tailed, two-sample z-test. The null hypothesis was that the treatment coupon mean redemption rate (the proportion of redeemed coupons divided by the total sent coupons) is less than or equal to the control coupon mean. The alternative hypothesis was that the treatment coupon mean was greater than the control group mean.

$$H_0: \mu_t \leq \mu_c$$

$$H_a: \mu_t > \mu_c$$

A one-tailed, two-sample z-test (equation 1) tests the difference in means of both groups and is appropriate to test this hypothesis given that random sampling methods were used, the samples are independent, and the variance of both samples can be assumed to be equal.

$$z = \frac{(\bar{x}_t - \bar{x}_c) - (\mu_t - \mu_c)}{\frac{\sigma}{\sqrt{n_t}} + \frac{\sigma}{\sqrt{n_c}}} \quad (1)$$

Where z is calculated as the the ratio between observed and expected means over the standard error for the difference in observed means. Specifically, $\bar{x}_t - \bar{x}_c$ is the observed difference in means and $\mu_t - \mu_c$ is the expected difference in means (our hypothesis dictates that this is 0), σ is the standard deviation (SD) of both coupon types (because in this test the standard deviations are assumed to be equal). Lastly, n_t and n_c are the treatment and control sample populations respectively (Cochran, 2004).

3.2.2 Power and Sample-Size Analysis

Power and sample-size (PSS) analysis are standard practice for designing a statistical study, which is the way by which researchers determine “the optimal allocation of study resources to increase the likelihood of the successful achievement of a study objective” (SataCorp., 2013, p. 1). PSS is helpful in this case to determine the power of the existing sample size, and if the study had an adequate sample size to detect a significant difference in means. Given that this study is the first of its kind in the local food systems literature, there was not a given sample size goal¹⁶. As such, *ex post* measures of power, effect size, and sample size to supplement nonsignificant findings (Brown et al., 2018) and provide suggestions for future research.

Power, effect size, and sample size are some of the main components of PSS analysis. A power function is a function of the population parameter, which is defined by the probability that the observed sample belongs to the rejection region of a test. The power of a test is inversely related to the probability of a type II error (failing to reject the null when the null is false). In

¹⁶ The study by Ross et al. (1999) (which also used an RCT methodology) did not carry out PSS analysis.

PSS analysis, typical power values are 0.8, 0.9, or higher depending on the study objective. Here we will select a power of 0.8 meaning 80 percent of the time, the null will be rejected when the null is false. One-sided (or one-tailed) tests are more powerful than the corresponding two-sided (two-tailed) tests, though the results from a two-sided test have a stronger justification. Effect size (also referred to as a clinically meaningful difference) represents the magnitude of an effect of interest. In this study this is viewed as how far the alternative hypothesis is from the null hypothesis. Sample size is commonly the component of most interest for PSS analysis. The sample size is related to the objective of a study and is determined by the specified significance level, power, effect size, and other study parameters (StataCorp., 2013)

CHAPTER 4 – EMPIRICAL RESULTS AND DISCUSSION

4.1 Coupon Redemption Rates

The overall coupon redemption rate was 1.85 percent. It is difficult to ascertain if our study results point to a low or high redemption rate because there exists no reference for farmers' market coupon redemption rates, and the generalized rate is for the broad class of all retail coupons. The most commonly reported coupon redemption rate (for all coupon types) is about 4 percent (Inmar, Inc., 2014; Pulcinella, 2017; Valpak, 2017). Higher redemption rates are to be expected for more commonly frequented consumer venues such as grocery stores, so the 1.85 percent redemption rate may not be considered as low. The redemption rates provided in this study are an important contribution to local food systems literature, as they provide a benchmark expected coupon redemption rate.

4.2 Sample Population Demographics

The experiment sample was representative of the Fort Collins (2013-2017 in 2017 dollars) and National population (2017) regarding median household income (both between \$60,000 and \$61,000 dollars) and was not representative in terms of gender (U.S. Census Bureau, 2018; Semega et al., 2018). The sample was also not representative of 2016 National median age (U.S. Census Bureau, 2017) or 2015 Larimer County median age (State of Colorado, 2019).

4.3 Respondent Motivation from the \$10 Coupon for Attending the WFM

Table 4.1 presents a tabulation between those who had attended the WFM before they redeemed the coupon, and if they stated they were motivated by the \$10 coupon. Sixty-three percent (64/101) of all survey respondents stated that they were motivated by the \$10 coupon

and 37 (37/101) percent stated that they were not; 63 percent of respondents also had attended the WFM before, and 37 percent had not. Eighty-four percent (31/37) of those who stated they were not motivated by the coupon had attended the WFM before. Among those who stated they were motivated by the coupon, the difference between who had attended and not attended the WFM before was only two respondents.

Table 4. 1- Stated motivation from coupon and previous WFM attendance by percent

	Had Not Attended	Had Attended	Total Sample
Not Motivated	6	31	36.63%
Motivated	31	33	63.37%
Total Sample	36.63%	63.36%	100%

Among those who redeemed a coupon, 102 took the voluntary survey. Looking at **Figure 4.1** coupon redeemers who took the survey were attracted by the WFM logo, the coupon value, the dates and times of the market. The frequency of the responses is represented by a color scheme: white, blue, light blue, green, yellow, orange, red, where the former are the least clicks and the latter is the most clicks. Most notably, respondents who received the treatment coupon (**Figure 4.1** right) were indeed interested in the regions pertaining to the informational nudge (particularly the grocery list). Lastly, consumers in both the control and treatment groups were interested almost identically in the same regions on the back of both coupons.



Figure 4. 1- Heat map of selected areas of interest by survey respondents by coupon type

Figure 4.2 presents the same results as Figure 4.1 when transformed in to “block mode” and emphasizes the popularity of the grocery list. Again, the red blocks are where the most clicks occurred which are nine and 12 clicks for the control and treatment coupons respectively. The blue blocks are where less clicks occurred. The red and orange blocks for control coupon respondents are centered around the common places of interest between both coupons (the WFM logo, coupon value, and dates/times of the market). The treatment coupon had more places of interest to select, and only the coupon value on the back has a red block.

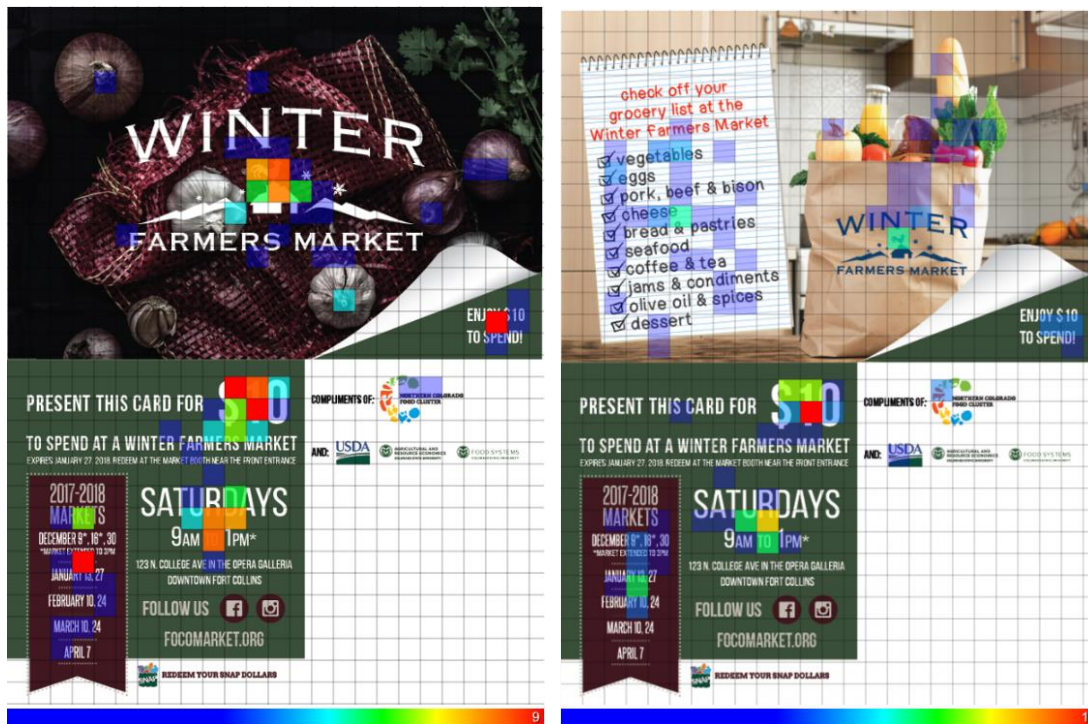


Figure 4. 2- Block style heat map of selected areas of interest by survey respondents by coupon type

4.4 Treatment coupon effects on consumer attendance at the WFM

The one-sided, two-sample z-test results are shown in **Table 4.2** which is the test for difference in means between the treatment and control coupons. The coupon means are presented with standard errors in parenthesis below. The calculated z-score was -0.4790. Thus, we fail to reject the null hypothesis that the redemption rate of the treatment group (58/3,000) was less than or equal to the control group (53/3,000) at the 1%, 5%, and 10% significance levels. This means that there was no detectable significant difference between redemption rates of both coupon types. These results suggest that the treatment had no effect on consumer attendance rates.

Table 4. 2- Two-sample test of proportions results for entire sample population

Observations = 6,000

Variable	Mean (Std. Err.)	95% Confidence Interval	
Treatment Coupon Redemption Rate	0.0193 (0.0025)	0.0144	0.0243
Control Coupon Redemption Rate	0.0177 (0.0024)	0.0130	0.0224
Z= - 0.4790		Pr(Z > z) = 0.3160	

4.5. Power and Sample Size Tests¹⁷

Given that our results are null findings, and allude to the conclusion that the treatment coupon had no effect on consumer attendance, we follow the advice of Sullivan et al. (2004) and elaborated upon by Brown et al. (2018) that no effect is only valid if the econometric test was statistically powerful. Overall, the experiment had a low power (the probability of a Type II error) of 0.06. The simplest element of statistical power is sample size (Brown et al., 2018), and therefore, we calculated the sample size needed to detect a significant difference in means (0.0016), with a power of 0.8. The sample size would have to increase to 177,900 coupons. Unfortunately, distributing this number of coupons would have been cost prohibitive.

In the medical literature, if there is a statistically significant difference between two treatments at a level of $P < 0.05$, it is generally acceptable to conclude that one of the treatments was superior to the other (McGough & Faraone, 2009). However, this measure is less relevant if one does not consider the magnitude of an effect (Sullivan & Feinn, 2012) which is also called the effect size (the difference in means). This is because statistical significance itself does not

¹⁷ All projected calculations are based on 80% power and a 0.05 significance level

inform the meaning of the effect (McGough & Faraone, 2009). We believe that the redemption rate of the treatment group being nine percent (five coupons) greater than the control group is not economically significant. A five coupon effect size is not compelling enough of a difference to conclude that the treatment information had an effect on consumer attendance. Yet, the limitation of effect size measures is that they can only be meaningfully assessed if there are other studies to compare to (McGough & Faraone, 2009; Kraemer & Kupfer, 2012). Given that we do not have other study effect sizes to compare to for a coupon RCT experiment, we believe that a compelling difference in redemption rates would have to be at least thirty percent to achieve a positive return on investment for the couponing effort.

Without increasing the sample size, the effect size would have to be 0.072 to conclude that the treatment had statistically significant effect on consumer attendance with a power of 0.8. Using the existing control group redemption rate of 0.0177 (53/3,000, or 1.8 percent), this would mean that the treatment redemption rate would have to be at least, 0.0897. That is, holding the control redemption rate at 53/3,000, 269/3,000 treatment coupons would need to be redeemed. Achieving the required effect size seems unlikely as even the average redemption rate for grocery store coupons (a largely used and distributed type of coupon) is four percent (Hale, 2010).

4.6 Cost Effectiveness Calculations of Couponing Effort

While the informational nudge had no significant effect on consumer attendance, the coupon was effective in attracting 37 new consumers to the WFM. This leads us to ask: Was this a cost effective marketing method? Using back of the envelope calculations, to offset the cost of the production of the coupons and the \$10 value per customer who redeemed the coupon, the WFM would have to profit \$36 from each of the 111 respondents to essentially break-even for

the cost of marketing¹⁸. However, new customers are more valuable to the WFM in this study, so carrying out the same back of the envelope calculations, but now only considering the 37 new consumers to the market, the WFM would have to profit \$90 from each new consumer to break-even for the cost of marketing¹⁹.

The WFM does not have data on average expenditures per market customer, however total sales for the 2017-2018 season were \$180,324 with an estimated 9,674 customers in attendance. This means that consumers spent around \$18.50 dollars total on average (whether they attended the market once or multiple times) that season. With this average, the break-even expenditure calculations above are not likely to be achieved. However, we do not have data on the differences in expenditures between frequent market customers and non-frequent, however we may assume that customers who shop at the market frequently likely spend more than this average amount. Anecdotally, it is very possible for a one-time visitor to spend \$36 dollars in one farmers' market visit, and \$90 may be less likely. It is also very possible that coupon redeemers will attend the market again, and we would postulate that the \$36-\$90 in expenditures per respondent would not be impossible. As a comparison for thought, the study of 16 farmers' markets in Nevada and Utah by Gumirakiza et al. (2014) found that respondents had spent \$24.78 on average in one summer market visit.

As an interesting comparison, the WFM did host one social media promotion during one market day in March to increase sales. An advertisement was shared through Facebook to those

¹⁸ The total cost of producing and sending out 6,000 coupons was \$2,958 dollars. This number is divided by the 111 respondents who attended the WFM which gives a total individual cost of \$26/respondent incurred to the WFM. Adding the \$10 coupon value for each respondent gives a total cost of \$36 per respondent incurred to the WFM.

¹⁹ This is a similar calculation as above, but instead dividing the total cost by the 37 new customers which equals \$80/new customer. Adding the \$10 coupon value gives a total individual cost of \$90/new customer incurred to the WFM.

who follow²⁰ the WFM offering an additional \$10 for every \$40 purchased in “market bucks” (currency used in exchange for dollars to be spent only at the market). This marketing effort was different than this study in that it marketed primarily to those who already know of and shop at the WFM, not a random sample of Fort Collins households. Reaching at most around 2,500 consumers, the WFM paid \$720 for the promotion and saw a \$4,500 spike in sales from the previous market’s sales. This figure does not include the \$10 for each participant, so we cannot conclude if this promotion was more cost-effective. Nonetheless, the goal of the promotion was to increase sales, and not necessarily to attract new customers, this method may be more cost-effective.

Overall, excluding the importance of gaining a net positive profit from marketing efforts, other fresh food retailers are paying a much higher price for consumer marketing. For example, a 2017 article from *Business Insider* reported on an interview stating that the meal-kit company, Blue Apron, spends around \$460 to gain a new customer, but only makes \$236 a customer per quarter (Taylor, 2017). Blue Apron responded saying that the calculations were “over-simplistic” because the calculation assumes that marketing is only spent on new consumer acquisition, which is not their only target audience. They also market for retaining and engaging already acquired consumers, and report a per customer cumulative net revenue to be around \$390 for 2016. Although the reality of whether Blue Apron remains in the green or the red, this example shows that consumer marketing can come at a much higher cost per consumer than the WFM spent on couponing.

²⁰ As of June 2019, 2,505 people follow the WFM on Facebook.

CHAPTER 5 – SUMMARY AND CONCLUSIONS

This study tests the efficacy of applied marketing methods at a WFM in Northern Colorado. The efficacy of the marketing strategy was empirically tested through a RCT experiment. The treatment was an informational nudge emphasizing the convenience of the WFM in terms of being a one-stop-shop for a diverse selection of food at-home purchases. Using a two-sample z-test of proportions, the results indicated that there was no statistical difference between redemption rates. Though our findings were null, the statistical test had low power and therefore we carried out *ex-post* analysis of power and sample-size (PSS). With this additional analysis we believe that the -test results support the conclusion that informational nudge (the treatment) had no significant effect on consumer attendance.

Compared to previous studies that test the effect of marketing on farmers' market success, this study contributes rigorous methods applied in a farmers' market setting as well as the first known expected redemption rate for farmers' market coupons. The results are useful for market managers who are considering physical coupon advertisements to attract new customers. Limitations of this study are that the survey did not ask respondents if they plan on returning to the WFM, how much they plan on spending at the market, or what products they came to shop for. These would be advantageous questions to supplement research findings, especially in determining if the marketing effort yielded increased sales at the market overall. However, adding additional questions to the survey may have reduced the response rate given the additional time burden placed on the respondent. Overall, the break-even calculations for this study show that, when considering the cost and returns of the couponing effort, couponing to a random sample of consumers likely created financial loss rather than gains for the WFM.

There is still much more research to be carried out regarding the role consumer attendance has in the future viability of farmers' markets. To begin, there still exist two untested barriers— affordability/quality and sense of social belonging. For future iterations of this study, it would be worthwhile to consider more affordable means to couponing. Specifically, it would be interesting to incorporate various coupon redemption values to see if there are optimal redemption values related to redemption rates²¹. Alternative marketing methods should also be considered. This recommendation is supported by Sunstein (2013), who highlights that food choices are both cognitive and emotional factors; public information can be incredibly dry and factual, which may be insufficient to motivate new consumer behavior.

Perhaps most importantly, the issue still remains of how farmers' markets may be able to remain competitive with growing availability of local produce through other market channels. Stewart and Dong (2018a) suggest that DTC producers consider exploring sales through other market channels and take advantage of federal programs like the USDA Local Food Promotion Program (LFPP) that support value chain expansion to intermediated market channels. This may be a viable option for some DTC producers, but many intermediated channels require consistent quantities and qualities of product that may be difficult for small scale producers to achieve. Additionally, many intermediated markets require producers to adhere to more robust food safety regulations – a time consuming and expensive step for beginning producers.

Our findings suggest that marketing the farmers' market as a place to carry out one's grocery shopping does not impact consumer farmers' market attendance. Perhaps the major challenge is trying to sell consumers on the 'convenience' of farmers markets (Rahkovsky et al., 2018). Even though fundamental research has shown that: 1) Consumers care about the intrinsic

²¹ Coupon face value has a positive impact on consumer purchases (Shoemaker & Tibrewala, 1985), and especially new customers (Garretson et al., 1999).

properties of goods (Lancaster, 1966), 2) Underlying factors (like the opinions of their peers, and their evaluation of the effectiveness of “voting with your dollars”) motivate consumers to choose local food (Onozake et al., 2010), and 3) Non-farmers’ market consumer value economic tradeoffs like time and money (Keeling Bond et al., 2006; Zepeda, 2009), these behavioral underpinnings do not make the farmers’ market more convenient overall than the grocery store. Simply put, the convenience of the farmers’ market is a hard trait to push with more consumers seeking to fulfill their grocery needs at “big box stores” like Walmart and Target (O’Connor, 2014; Stewart & Dong, 2018), and companies like Amazon now marketing fresh food delivery to one’s doorstep (Gupta, 2017). Our research suggests that farmers’ markets may be better off focusing on their competitive advantage – for example, facilitating direct interactions between consumers and producers or providing venues that build social capital.

REFERENCES

- Abello, F., Palma, M., Anderson, D., and Waller, M. 2012. Evaluating the Factors Influencing the Number of Visits to Farmers' Markets.
- Ajzen, I. and Fishbein, M. 1974. Factors influencing intentions and intention-behavior relation. *Human Relations*. 27:1-15.
- Alonzo, A. 2013. Farmers Markets as Community Centerpieces. USDA AMS. Retrieved from: <https://www.usda.gov/media/blog/2013/08/05/farmers-markets-community-centerpieces>
- Bao, J. and Ho, B. 2015. Heterogeneous Effects of Informational Nudges on Pro-social Behavior. *Journal of economic Analysis and Policy*. 15(4):1619-1655.
- Barat, S. and Ye, L. 2012. Effects of Coupons on Consumer Purchase Behavior: A Meta-Analysis. *Journal of Marketing Development and Competitiveness*. 6(5):131-144.
- Bauman, A., Shideler, D., Thilmany, D., Taylor, M., and Angelo, B. 2014. An Evolving Classification Scheme of Local Food Business Models. eXtension: Community, Local and Regional Food Systems. Retrieved from: <http://www.extension.org/pages/70544/an-evolving-classificationscheme-of-local-food-business-models#.VLb6JXvxiug>
- Bauman, A., Thilmany McFadden, D. and Jablonski, B.B.R. 2018. The Financial Performance Implications of Differential Marketing Strategies: Exploring Farms that Pursue Local Markets as a Core Competitive Advantage. *Agricultural and Resource Economics Review*. 43(7): 477-504.
- Bir, C., Lai, J., Olynk Widmar, N., Thompson, N., Ellett, J., and Crosslin, C. 2019. "There's No Place Like Home": Inquiry into Preferences for Local Foods. *Journal of Food Distribution Research*. 50(1):29-45.
- Bougherara, D., Grolleau, G., and Mzoughi, N. 2009. Buy Local, Pollute Less: What Drives Households to Join a Community Supported Farm? *Ecological Economics*. 68(5):1488-1495.
- Bragg, E. 2010. Farmers Markets as Small Business Incubators. USDA Agricultural Marketing Service. Retrieved from: <https://www.usda.gov/media/blog/2010/09/01/farmers-markets-small-business-incubators>
- Brown, A. 2001. Counting Farmers' Markets. *The Geographical Review*. 91(4):655-674.
- Brown, A. 2002. Farmers' Market Research 1940-2000: An Inventory and Review. *American Journal of Alternative Agriculture*. 17(4):167-176.

- Brown, C. and Miller, S. 2008. The Impacts of Local Markets: A Review of Research on Farmers Markets and Community Supported Agriculture (CSA). *American Journal of Agricultural Economics*. 90(5):1296-1302.
- Brown, J., Lambert, D., and Wojan, T. 2018. The Effect of the Conservation Reserve Program on Rural Economies: Deriving a Statistical Verdict from a Null Finding. *American Journal of Agricultural Economics*. 101(2):528-540.
- Carson, R., Hamel, Z., Giarrocco, K., Baylor, R., Greden Mathews, L. 2016. Buying in: the influence of interactions at farmers' markets. *Agriculture and Human Values*. 33:861-875.
- ChooseMyPlate.gov. 2019. NA. Retrieved from: <https://www.choosemyplate.gov/>
- Christenson, C., Martin, M., Thilmany McFadden, D., Sullins, M. and Jablonski, B. 2016. 2016 Public Attitudes about Agriculture in Colorado. Retrieved from: <https://www.colorado.gov/pacific/sites/default/files/2016%20Public%20Attitudes%20Report%20Final.pdf>
- Coley, D., Howard, M., and Winter, M. 2011. Food Miles: Times for a Re-Think? *British Food Journal*. 113(7):919-914.
- Cronovich, R., Daneshvary, R., and Schwer, K. 1997. The determinants of coupon usage. *Applied Economics*. 29(12):1631-1641.
- Curtis, K. and Cowee, M. 2011. Buying local: Diverging consumer motivations and concerns. *Journal of Agribusiness* 29(1):1-22.
- Cochran, S.D. 2004. Two Sample Z-Tests. [Lecture slides]. Retrieved from: <http://www.stat.ucla.edu/~cochran/stat10/winter/lectures/lect21.html>
- Colastani, K., Conner, D., and Smalley, S. 2010. Understanding Barriers to Farmers' Market Patronage in Michigan: Perspectives from Marginalized Populations. *Journal of Hunger and Environmental Nutrition*. 5:316-338.
- CDA. 2019. Colorado Proud. Retrieved from: <https://www.colorado.gov/pacific/agmarkets/colorado-proud>
- Colasanti, K., Conner, D., and Smalley, S. 2010. Understanding Barriers to Farmers' Market Patronage in Michigan: Perspectives from Marginalized Populations. *Journal of Hunger and Environmental Nutrition*. 5:316-338.
- Conner, D., Colasanti, K., Ross, R.B., and Smalley, S. 2010. Locally Grown Foods and Farmers Markets: Consumer Attitudes and Behaviors. *Sustainability*. 2:742-756.
- Costanigro, M. and Lusk, J. 2014. The signaling effect of mandatory labels on genetically engineered food. *Food Policy*. 49:259-267.

- Costanigro, M. and Thilmany-McFadden, D. 2011. How do consumers value apples?: a comparison of organic and Colorado Proud labels. Agricultural marketing report. Colorado State University-Department of Agricultural and Resource Economics; Extension.
- Curtis, K. and Cowee, M. 2011. Buying Local: Diverging Consumer Motivations and Concerns. *Journal of Agribusiness*. 29(1):1-22.
- Dillman, D. 1991. The Design and Administration of Mail Surveys. *Annual Review of Sociology*. 17:225-249.
- Dimitri, C. and Gardner, K. 2018. Farmer Use of Intermediated Market Channels: A Review. *Renewable Agriculture and Food Systems*. 1-17.
- Ekanem, E, Mafuyai, M, and Clardy, A. 2016. Economic Importance of Local Food Markets: Evidence from the Literature. *Journal of Food Distribution Research*. 47(1):57-64.
- Feenstra, G.W., C.C. Lewis, C.C. Hinrichs, G.W. Gillespie, and D. Hilchey. 2003. "Entrepreneurial Outcomes and Enterprise Size in US Retail Farmers' Markets," *American Journal of Alternative Agriculture* 18(1):46-55.
- Fentress Swanson, A. 2013. "Small Farmers Aren't Cashing in with Wal-Mart". National Public Radio. Retrieved from: <https://www.npr.org/sections/thesalt/2013/02/04/171051906/can-small-farms-benefit-from-wal-mart-s-push-into-local-foods>
- Freedman, D., Vaudrin, N., Schneider, C., Trapl, E., Ohri-Vachaspati, P., Taggart, M., Cascio, A., Walsch, C. and Flocke, S. 2016. Systematic Review of Factors Influencing Farmers' Market Use Overall and among Low-Income Populations. *Journal of The Academy of Nutrition and Dietetics*. 116(7):1135-1155.
- Gao, Z., Swisher, M., and Zhao, X. 2012. A New Look at Farmers' Markets: Consumer Knowledge and Loyalty. *HortScience*. 47(8):1107-2012.
- Gilliland, J., Sadler, R., Clark, A., O'Connor, C., Milczarek, M., and Doherty, S. 2015. Using a Smartphone Application to Promote Healthy Dietary Behaviors and Local Food Consumption. *BioMed Research International*. 1-11.
- Gillespie, G.W., D. Hilchey, C.C. Hinrichs, and G.W. Feenstra. 2007. "Farmers' Markets as Keystones in Rebuilding Local and Regional Food Systems," in *Remaking the North American Food System: Strategies for Sustainability*, C.C. Hinrichs and T.A. Lyson, eds. Lincoln, NE: University of Nebraska Press.
- Gonzalez, E. 2016. Exploring the Effect of Coupon Proneness and Redemption Efforts on Mobile Coupon Redemption Intentions. *International Journal of Marketing Studies*. 8(6): 1-15.

- Gumirakiza, J.D., Curtis, K., and Bosworth, R. 2014. Who Attends Farmers' Markets and Why? Understanding Consumers and their Motivations. *International Food and Agribusiness Management Review*. 17(2):65-82.
- Gupta, S. 2017. "I Tried Amazon Fresh for a Month and Here's What Happened". Retrieved from: <https://money.cnn.com/2017/10/11/pf/amazon-fresh-value/index.html>
- Guthrie, J., Mancino, L., Lin, C.T.J. 2015. Nudging Consumers toward Better Food Choices: Policy Approaches to Changing Food Consumption Behaviors. *Psychology and Marketing*. 32(5):501-511.
- Gwin, L., Thiboumery, R., and Stillman, R. 2013. Local Meat and Poultry Processing: The Importance of Business Commitments for Long-Term Viability. ERR-150. U.S. Department of Agriculture, Economic Research Service.
- Hale, T. 2010. "The Coupon Comeback". Retrieved from: <https://www.nielsen.com/us/en/insights/news/2010/the-coupon-comeback.html>
- Hardesty, S., Feenstra, G., Visher, D., Lerman, T., Thilmany McFadden, D., Bauman, A., Gillpatrick, T., and Nurse Rainbolt, G. 2014. Value-Based Supply Chains: Supporting Regional Food and Farms. *Economic Development Quarterly*. 28(1):17-27.
- Heilman, C., Nakamoto, K., and Rao, A. (2002). Pleasant Surprises: Consumer Response to Unexpected In-Store Coupons. *Journal of Marketing Research*. 34(3):242-252.
- Henneberry, S.R., Whitacre, B., and Agustini, H.N. 2009. An Evaluation of the Economic Impacts of Oklahoma Farmers Markets. *Journal of Food Distribution Research* 40(3):64-78.
- Hughes, D. and Isengildina-Massa, O. 2015. The economic impact of farmers' markets and a state level locally grown campaign. *Food Policy*. 54:78-84.
- Inmar, Inc. 2014. 2014 Coupon Trends: 2013 Year-End Report. Retrieved from: http://go.inmar.com/rs/inmar/images/Inmar_2014_Coupon_Trends_Report.pdf
- Jablonski, B.B.R. and Thilmany McFadden, D. 2019. What is a 'multiplier' anyway? Assessing the local foods economic impacts toolkit. *Journal of Agriculture, Food Systems, and Community Development*. 8(3):1-8.
- Janakiraman, N., Meyer, R., and Morales, A. 2002. The Mental Accounting of Price Shocks: The Effect of Unexpected Price Changes on Cross-Category Purchase Patterns. *Advances in Consumer Research*. 29(4):342-355.
- Jilcott, S., Hurwitz, J., Moore, J., Blake, C. 2010. Qualitative perspectives on the use of traditional and nontraditional food venues among middle and low-income women in Eastern North Carolina. *Ecology of Food and Nutrition*. 49:373-389.

- Kabisch, M., Ruckes, C., Seibert-Grafe, M., and Blettner, M. 2011. Randomized Control Trials. *Deutsches Arzteblatt International*. 108(39):663-668.
- Karakus, M., MacAllum, K., Milfort, R., and Hao, H. 2014. Nutrition Assistance in Farmers Markets: Understanding the Shopping Patterns of SNAP Participants. Prepared by Westat for the U.S. Department of Agriculture, Food and Nutrition Service, October, 2014.
- Keeling-Bond, J., Thilmany, D., and Bond, C. 2006. Direct Marketing of Fresh Produce: Understanding Consumer Purchasing Decisions. *Choices*. 21(4):229-235.
- Keeling-Bond, J., Thilmany-McFadden, D., and Bond, C. 2009. What influences consumer choice of fresh produce purchase location? *Journal of Agricultural and Applied Economics* 41(1):61-74.
- Kelly, S. 2015. Farmer's Markets Provide Economic and Social Benefits. North Carolina Cooperative Extension. Retrieved from: <https://richmond.ces.ncsu.edu/2015/04/farmers-markets-provide-economic-and-social-benefits/>
- King, R., Hand, M., DiGiacomo, G., Clancy, K., Gomez, M., Hardesty, S., Lev, L., and McLaughlin, E. 2010. Comparing the Structure, Size, and Performance of Local and Mainstream Food Supply Chains, ERR-99, U.S. Dept. of Agr., Econ. Res. Serv. Retrieved from: https://www.ers.usda.gov/webdocs/publications/46405/7029_err99_1_.pdf?v=0
- Kraemer, H. and Kupfer, D. 2006. Size of Treatment Effects and Their Importance to Clinical Research and Practice. *Biological Psychiatry*. 59:990-996.
- Kraus, S. 1995. Attitudes and the prediction of behavior-a meta-analysis of the empirical literature. *Personal and Social Psychology Bulletin*. 21(1):58-75.
- Lembeck, W. 1977. Paper presented at "Couponing and Promotion Testing/Evaluation Workshops," Association of National Advertisers.
- Lusk, J., Roosen, J., Shogren, J. 2011. *The Oxford Handbook of the Economics of Food Consumption and Policy*. Oxford University Press.
- Lohr, L., Diamond, A., Dicken, C., and Marquardt, D. 2011. Mapping Competition Zones for Vendors and Customers in U.S. Farmers Markets. U.S. Department of Agriculture, Agriculture Marketing Services.
- Low, S., and Vogel, S. 2011. Direct and Intermediated Marketing of Local Foods in the United States, ERR-128, U.S. Department of Agriculture, Economic Research Service, November 2011. Available at: http://www.ers.usda.gov/publications/err-economic-research-report/err128.aspx#.U_YljfldXxU (accessed June 2014).
- Low, S., Adalja, A., Beaulieu, E., Key, N. Martinez, S., Melton, A., Perez, A., Ralston, K., Stewart, H., Suttles, S., Vogel, S. and Jablonski, B.B.R. 2015. Trends in U.S. Local and Regional Food Systems, AP-068, U.S. Department of Agriculture, Economic Research

- Service. Retrieved from:
https://www.ers.usda.gov/webdocs/publications/42805/51173_ap068.pdf?v=0
- Martinez, M., Hand, M., Da Pra, M., Pollack, S., Ralston, K., Smith, T., Vogel, S., Clark, S., Lohr, L., Low, S., and Newman, C. 2010. Local Food Systems: Concepts, Impacts, and Issues. U.S. Department of Agriculture, Economic Research Service.
- McGarry Wolf, M., Spittler, A., and Ahern, J. 2005. A Profile of Farmers' Market Consumers and Perceived Advantages of Produce Sold at Farmers' Markets. *Journal of Food Distribution Research*. 36(1):192-201.
- McGough, J. and Faraone, S. 2009. Estimating the Size of Treatment Effects: Moving Beyond P Values. *Psychiatry*. 6(10):21-29.
- Mentzer Morrison, R. and Mancino, L. 2015. Most U.S. Households Do Their Main Grocery Shopping at Supermarkets and Supercenters Regardless of Income. Retrieved from:
<https://www.ers.usda.gov/amber-waves/2015/august/most-us-households-do-their-main-grocery-shopping-at-supermarkets-and-supercenters-regardless-of-income/>
- NCFC. 2018. 2017-2018 Winter Farmers Market Annual Report. Provided by the Northern Colorado Food Cluster, December 2018.
- Nevo, A. and Wolfram, C. 2002. Why do manufacturers issue coupons? An empirical analysis of breakfast cereals. *Journal of Economics*. 33(2):319-339.
- Northern Colorado Food Cluster (NCFC). 2014. Winter Market Report 2014. Provided by the Northern Colorado Food Cluster, December 2018.
- O'Connor, C. 2014. "Are Grocery Stores Doomed? Study Shows More Shoppers Buying Food at Target, Walmart, Pharmacies". Retrieved from:
<https://www.forbes.com/sites/clareoconnor/2014/02/18/are-grocery-stores-doomed-study-shows-more-shoppers-buying-food-at-target-walmart-pharmacies/#21bedfac425a>
- O'Hara, J. and Pirog, R. 2013. Economic Impacts of Local Food Systems: Future Research Priorities. *Journal of Agriculture, Food Systems, and Community Development*. 3(4):35-42.
- Onozaka, Y., Nurse, G., and Thilmany McFadden, D. 2010. Local Food Consumers: How Motivations and Perceptions Translate to Buying Behavior. *Choices*. 25(1):1-6.
- Page, E. and Kantor, L. 2019. FoodAPS National Household Food Acquisition and Purchase Survey: Summary Findings. *Amber Waves Magazine*. USDA ERS. Retrieved from:
<https://www.ers.usda.gov/data-products/foodaps-national-household-food-acquisition-and-purchase-survey/summary-findings/>
- Park, T., Mishra, A., and Wozniak, S. 2014. "Do Farm Operators Benefit from Direct-to-Consumer Marketing Strategies?" *Agricultural Economics*. 45:213-224.

- Parker, T. 2016. Rural-Urban Continuum Codes. USDA ERS. Retrieved from:
<https://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx>
- Price, C. and Harris, J. 1998. Potential Food Loss Recovery from Farmers' Markets: An Application of Geographical Information System Analysis. *American Journal of Agricultural Economics*. 80(5):1207.
- Pulcinella, S. 2017. Why Direct Mail Marketing is Far from Dead. *Forbes Community Voice*. Retrieved from:
<https://www.forbes.com/sites/forbescommunicationscouncil/2017/08/30/why-direct-mail-marketing-is-far-from-dead/#70cb1cef311d>
- Rahkovsky, I., Jo, Y., and Carlson, A. 2018. Consumers Balance Time and Money in Purchasing Convenience Foods. USDA ERS. Retrieved from:
https://www.ers.usda.gov/webdocs/publications/89344/err251_summary.pdf?v=0
- Rastegari Henneberry, S., Whitacre, B., and Agustini, H. 2009. An Evaluation of the Economic Impacts of Oklahoma Farmers Markets. *Journal of Food Distribution Research*. 40(3):64-78.
- Richards, T., Hamilton, S., Gomez, M., and Rabinovich, E. 2017. Retail Intermediation and Local Foods. *American Journal of Agricultural Economics*. 99(3):637-659.
- Reibstein, D. and Traver, P. 1982. Factors Affecting Coupon Redemption Rates. *Journal of Marketing*. 46:102-113.
- Ross, N., Anderson, M., Goldberg, J., Houser, R., and Lorge Rogers, B. 1999. Trying and Buying Locally Grown Produce at the Workplace: Results of a Marketing Intervention. *American Journal of Alternative Agriculture*. 14(4):171-179.
- Rossi, J., Johnson, T., Hendrickson, M. 2017. The Economic Impacts of Local and Conventional Food Sales. *Journal of Agricultural and Applied Economics*. 49(4):555-570.
- Ruelas, V., Iverson, E., Kiekel, P., and Peters, A. 2012. The Role of Farmers' Markets in Two Low Income, Urban Communities. *Journal of Community Health*. 37:554-562.
- Sadler, R.C., Clark, M.A.R., and Gilliland, J.A. 2013. An economic impact comparative analysis of farmers' markets in Michigan and Ontario. *Journal of Agriculture, Food Systems, and Community Development*.
- Schmit, T., Jablonski, B.B.R., and Mansury, Y. 2016. Assessing the Economic Impact of Local Food System Producers by Scale: A Case Study from New York. *Economic Development Quarterly*. 30(4):316-328.
- Schupp, J. 2016. Just where does local food live? Assessing farmers' markets in the United States. *Agriculture and Human Values*. 33:827-841.

- Semega, J., Fontenot, K., and Kollar, M. 2018. Income and Poverty in the United States 2017. U.S. Census Bureau. Retrieved from: <https://www.census.gov/data/tables/2018/demo/income-poverty/p60-263.html>
- State of Colorado. 2019. Age and Gender Population Data. Retrieved from: <https://demography.dola.colorado.gov/population/age-gender-population-data/#age-and-gender-population-data>
- Staisey, N. and Harris, H. 2019. Creating a Farmers' Market Living Lab: Lessons Learned in Growing a Farmers' Market. Food Distribution Research Society. 50(1):145-148.
- Stagner, T. 2019. "Best Grocery Stores and Supermarkets: With the exception of a single national brand, CR's highest rated grocers this year are all regional chains". Retrieved from: <https://www.consumerreports.org/grocery-stores-supermarkets/best-grocery-stores-and-supermarkets/>
- StataCorp. 2013. Stata: Release 13. Statistical Software. College Station, TX: StataCorp LP
- Stewart, H. and Dong, D. 2018a. How strong is demand for food through direct-to-consumer outlets?. Food Policy. 79:35-43.
- Stewart, H. and Dong, D. 2018b. The Relationship Between Patronizing Direct-to-Consumer Outlets and a Households' Demand for Fruits and Vegetables. U.S. Department of Agriculture, Economic Research Service. Retrieved from: https://www.ers.usda.gov/webdocs/publications/86878/err242_summary.pdf?v=0
- Sullivan, G. and Feinn, R. 2012. Using Effect Size—or Why the P Value Is Not Enough. Journal of Graduate Medical Education. 4(3):279-282.
- Sunstein, C. R. 2013. *Simpler: The future of government*. New York: Simon & Schuster
- Taylor, K. 2017. "Blue Apron is spending more than \$400 for every new customer—and that's creating a major problem for the company". Business Insider. Retrieved from: <https://www.businessinsider.com/blue-apron-spends-big-for-new-customers-low-return-2017-8>
- Thaler, R. H., and C. R. Sunstein. 2008. *Nudge: Improving Decisions about Health, Wealth, and Happiness*. New Haven & London: Yale University Press.
- Thilmany McFadden, D. 2015. What Do We Mean by "Local Foods"? Choices Magazine. 30(1):1-6.
- Thilmany, D., Bond, C., and Keeling Bond, J. 2008. Going local: exploring consumer behavior and motivations for direct food purchases. Am. J. Agric. Econ. 90 (5):1303–1309.
- Thompson, G. & Kidwell, J. 1998. Explaining the choice of organic produce purchases and related attitudes of food cooperative shoppers. American Journal of Alternative Agriculture. 6:89-96.

- Tropp, D., Ragland, E., and Barham, J. 2008. Supply Chain Basics: The Dynamics of Change in the U.S. Food Marketing Environment. Washington, DC: Agricultural Marketing Service, U.S. Department of Agriculture.
- U.S. Census Bureau. 2017. The Nation's Median Age Continues to Rise. Retrieved from: <https://www.census.gov/library/visualizations/2017/comm/median-age.html>
- U.S. Census Bureau. 2018. Quick Facts: Fort Collins city, Colorado. Retrieved from: <https://www.census.gov/quickfacts/fortcollinscitycolorado>
- USDA Agricultural Marketing Service (AMS). 2016. Farmers Market Promotion Program 2016 Highlights. Retrieved from: <https://www.ams.usda.gov/sites/default/files/media/FMPP2016Highlights.pdf>
- USDA AMS. 2019a. Farmers Markets and Direct-to-Consumer Marketing. Retrieved from: <https://www.ams.usda.gov/services/local-regional/farmers-markets-and-direct-consumer-marketing>
- USDA AMS. 2019b. FMPP Awarded Grants. Retrieved from: <https://www.ams.usda.gov/services/grants/fmpp/awards>
- USDA AMS. 2019c. Local Food Directories: National Farmers Market Directory. Retrieved from: <https://www.ams.usda.gov/local-food-directories/farmersmarkets>
- USDA Economic Research Service (ERS). 2019a. Farm Structure. Retrieved from: <https://www.ers.usda.gov/topics/farm-economy/farm-structure-and-organization/farm-structure/>
- USDA ERS. 2019b. Farming and Farm Income. Retrieved from: <https://www.ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/farming-and-farm-income/>
- USDA FMPP. Fiscal Year 2018 Description of Funded Projects. Retrieved from: <https://www.ams.usda.gov/sites/default/files/media/2018DescriptionofFundedProjectsFMPP.pdf>
- USDA National Agricultural Statistics Service (NASS). 2016a. Census of Agriculture-Local Food Marketing Practices Survey. Retrieved from: https://www.nass.usda.gov/Publications/AgCensus/2012/Online_Resources/Local_Food/index.php
- USDA NASS. 2016b. Direct Farm Sales of Food. Retrieved from: https://www.nass.usda.gov/Publications/Highlights/2016/LocalFoodsMarketingPractices_Highlights.pdf
- USDA NASS. 2019. Census of Agriculture. Retrieved from: <https://www.nass.usda.gov/Publications/AgCensus/2017/index.php>

- Woods, T. and Thilmany, D. 2018. "Engaging Consumers in the Dynamic Local Foods Marketplace." *Choices*. Quarter 3. Retrieved from: <http://www.choicesmagazine.org/choices-magazine/theme-articles/engaging-consumers-in-the-dynamic-local-foods-marketplace/engaging-consumers-in-the-dynamic-local-foods-marketplace>
- Valpak. 2017. 7 Reasons Why Print and Direct Mail Marketing Rule. Retrieved from: <https://www.valpak.com/advertise/blog/7-reasons-print-and-direct-mail-rule>
- Ward, R. and Davis, J. 1977. Coupon Redemption. Paper presented at the Agricultural and Applied Economics Association (AAEA) Annual Meeting, San Diego, CA.
- Winfree, J. and Watson, P. 2017. The Welfare Economics of "Buy Local". *American Journal of Agricultural Economics*. 99(4):971-987.
- Wolnik, D., Cheek, J., and Weaver, M. 2019. Designing an Effective, Scalable, Data Collection Tool to Measure Farmers Market Impacts. *Journal of Agriculture, Food Systems, and Community Development*. 8(Suppl. 3):9-25.
- Zepeda, L. 2009. Which little piggy goes to market? Characteristics of US farmers' market shoppers. *International Journal of Consumer Studies*. 33:250-257.
- Zepeda, L. and Carroll, K.A. 2018. "Who Shops at a Mature Farmers' Market?" *Choices*. Quarter 3. Available online: <http://www.choicesmagazine.org/choices-magazine/theme-articles/engaging-consumers-in-the-dynamic-local-foods-marketplace/who-shops-at-a-mature-farmers-market>
- Zepeda, L., and Deal, D. 2009. Organic and Local Food Consumer Behavior: Alphabet Theory. *International Journal of Consumer Studies* 33(6): 697–705.
- Zepeda, L. and Nie, C. 2012. What are the odds of being an organic or local food shopper? Multivariate analysis of US food shopper lifestyle segments. *Agriculture and Human Values*. 29:467-480.
- Zepeda, L. and Reznickova, A. 2018. Potential Demand for Local Fresh Produce by Mobile Markets. Washington DC: U.S. Department of Agriculture, Agricultural Marketing Service. Retrieved from: <http://localandorganicfood.org/wp-content/uploads/2018/05/Potential-Demand-for-Local-Fresh-Produce-by-Mobile-Markets-05-18-1.pdf>
- Zumbach, L. 2016. Digital coupon use growing, but old-fashioned paper still king. *Chicago Tribune*. Retrieved from: <https://www.chicagotribune.com/business/ct-digital-coupons-0723-biz-20160722-story.html>

APPENDIX A

To better understand the sample population's shopping behaviors, three graphs are presented to compare to the 2016 Colorado Public Attitudes about Agriculture in Colorado (CDACPAAC) survey results (Christenson et al., 2016). These comparisons are helpful in understanding how this study's sample population relates to a larger sample study of Colorado residents only two years prior which the AHFP questions were based on²².

The *left* bars in **Figure 5.1** are a visual summary of the food outlets respondents selected for their primary AHFP locations. The *right* bars in **Figure 5.1** are the comparison to the CPAAC survey results. Somewhat unsurprisingly, the majority of respondents from both studies (95 percent and 94 percent respectively) primarily shop at supermarket/grocery stores for their at-home food purchases. These results align with where most U.S. households shop for their groceries, regardless of income (Mentzer et al., 2015). The percentage of consumers who shop at farmers' markets being much higher for the WFM study makes sense because data were collected at a farmers' market and specifically because 63 percent of the WFM study sample (refer to **Table 4.1**) claimed that they had attended the WFM before.

²² The CPAAC surveyed 1,000 Colorado residents in 2016 and was "just short" (p. 4) of demographically representative (Christenson et al., 2016)

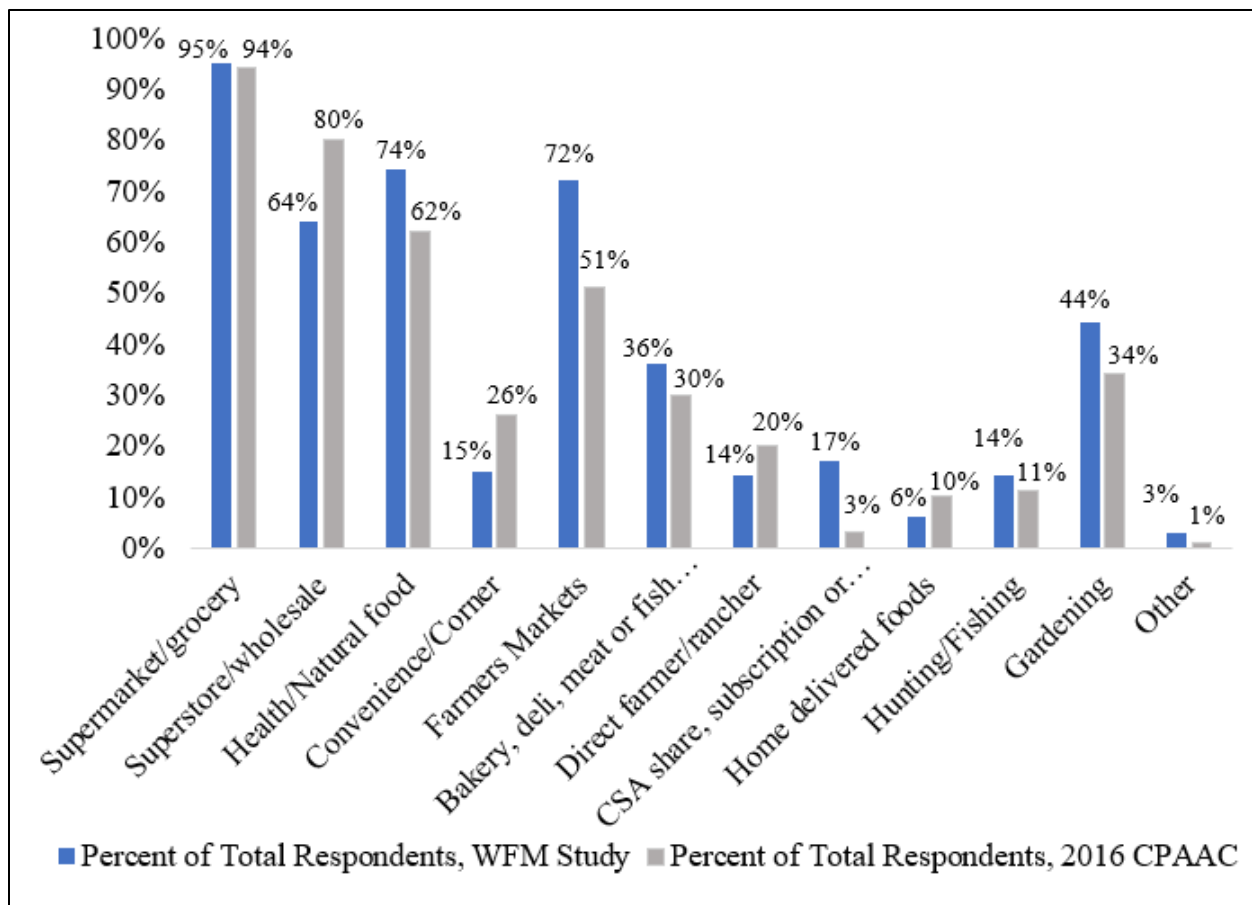


Figure 5. 1- Comparison of primary AHFP locations by percent of total sample

The comparison of results for respondent percent of annual household food dollars (PAHFD) spent at each location (**Figure 5.2**) further supports that this study captured a similar consumer population to the most recent and larger CPAAC State study. Both studies reveal that respondents spend just over 50 percent of their annual household income at supermarket/grocery stores, the largest median PAHFD spent overall with the second largest PAHFD median being through superstores/wholesales venues. Considering the aforementioned findings from the 2012-2013 USDA FoodAPS that 65 percent of consumer household calories came from supermarkets, supercenters, and other large grocers (Page & Kantor, 2019), these findings are less so surprising than supportive of consumer representation in this study. Lastly, while 72 percent of respondents in this study stated that they shop at farmers’ markets for their primary AHFP (refer to **Figure**

5.1), the median PAHFD spent was only 9 percent. This shows that respondents may shop at farmers’ market for their at-home food purchases, but their expenditures are minimal. This is similar to the USDA FoodAPS results which indicate that 3 percent of consumer calories come from specialty food stores like bakeries and farmers’ markets (Page and Kantor, 2019).

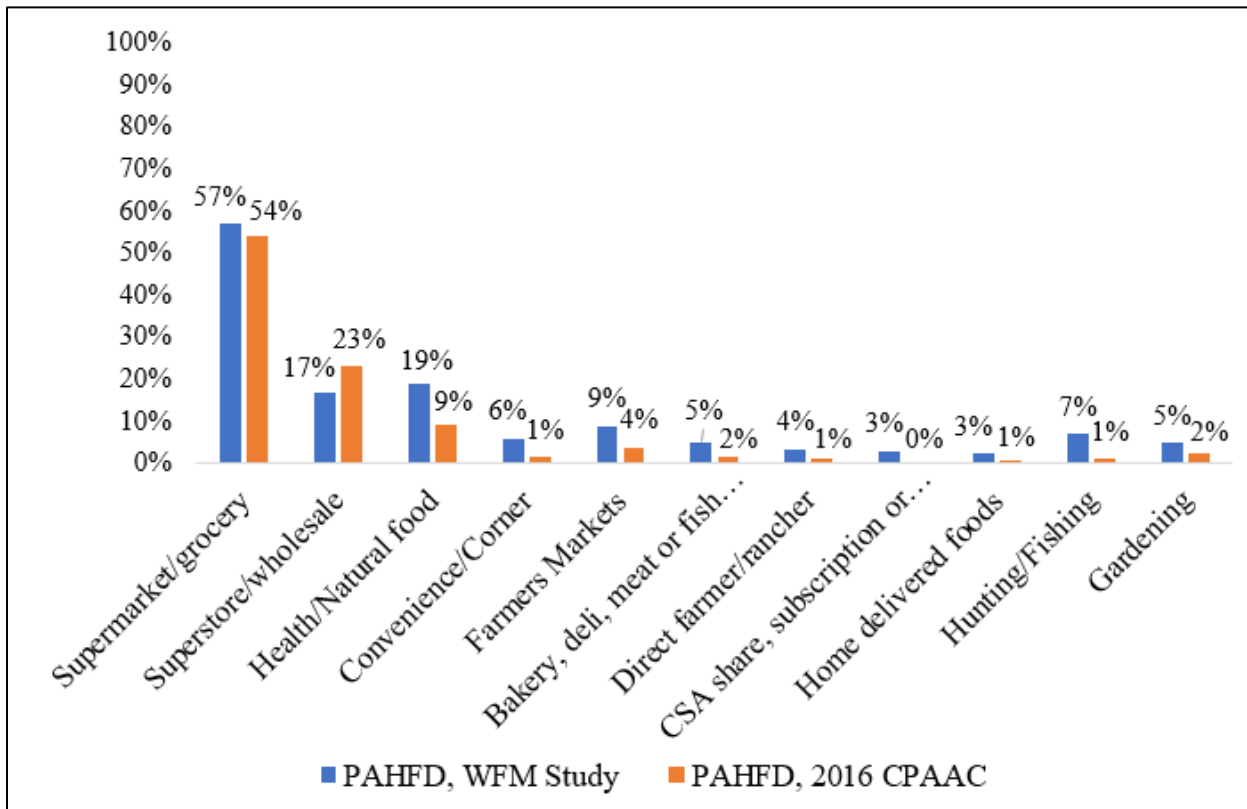


Figure 5. 2- Comparison of median PAHFD

Figure 5.3 provides the locations selected for primary AHFP by over 50 percent of respondents (*left bars*) with a comparison of what percent of those respondents stated they shop for Colorado food products at each respective outlet (*right bars*). When considering the consumer population captured in this study, it is also helpful to understand where most consumers are seeking Colorado food products at their primary AHFP locations. This helps in making inferences about consumer motivations to seek local food and what other venues are providing Colorado food products other than farmers’ markets. For example, of the 95 percent of respondents who said they primarily shop at supermarkets/grocery stores, 67 percent also seek

Colorado food products at those locations. This is to be expected as the Colorado Department of Agriculture program, Colorado Proud, is present in supermarkets and grocery stores state-wide (CDA, 2019). Interestingly, for farmers’ markets and direct purchases from farmers/ranchers, not all respondents stated that they seek Colorado food products through those “local” locations. This may mean that some respondents do not shop at these locations to support local, but instead for other reasons like entertainment or searching for niche products. Overall, the WFM sample population appears moderately to highly aware of supporting Colorado agriculture through buying local. This seems logical with 63 percent of respondents having been to the WFM before.

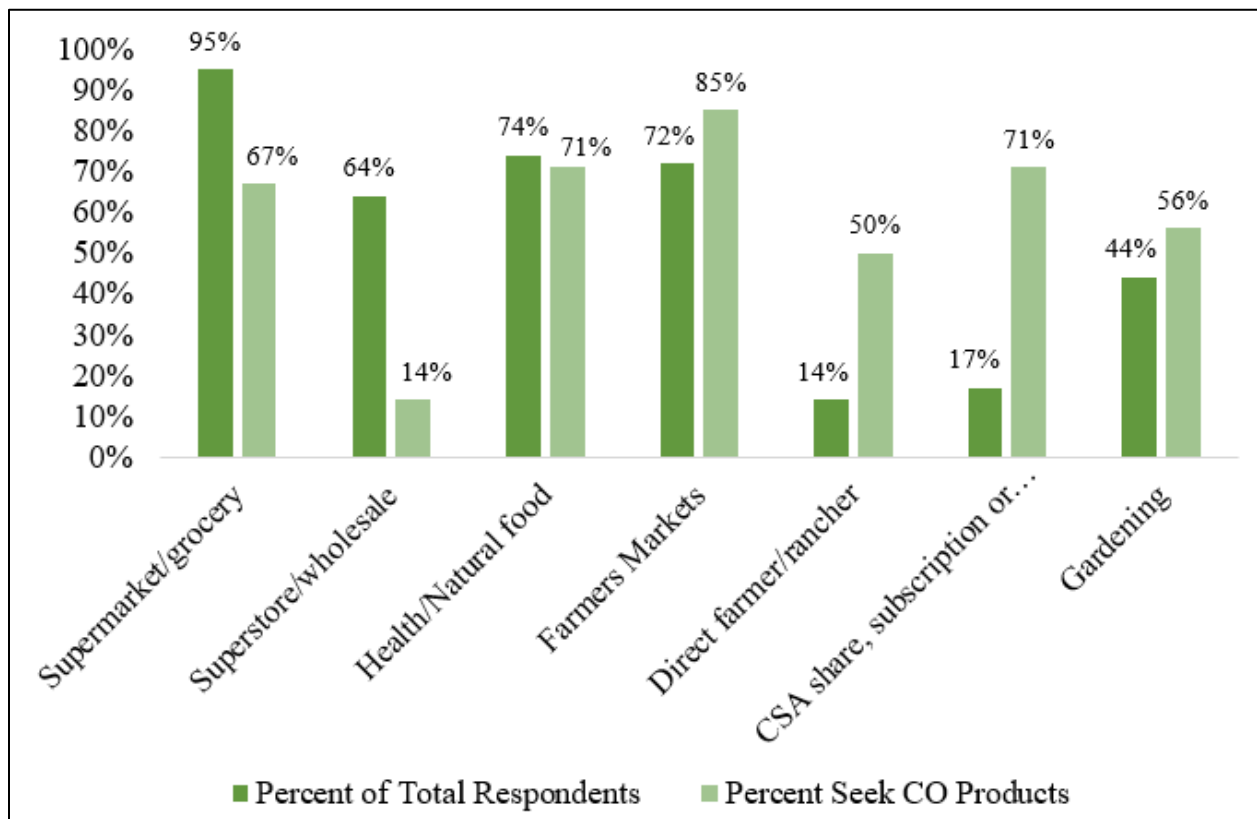


Figure 5. 3- Comparison of selected primary AHFP locations by percent of survey respondents and percent of respondents who seek Colorado food products at those locations