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Factors Influencing SNAP Benefit Acceptance Program Utilization Rates at Farmers Markets

by Nicole Howley

*Masters of Science
Science, Technology and Public Policy
Thesis Submitted in Partial Fulfillment of the
Graduation Requirements for the*

*College of Liberal Arts/Public Policy Program at
ROCHESTER INSTITUTE OF TECHNOLOGY
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July 2017

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Abstract

The Supplemental Nutrition Assistance Program (SNAP) run under the United States Department of Agriculture (USDA) Food and Nutrition Service is the largest program aimed at addressing food access and hunger in the country. Since the conversion of benefit provision from physical "stamps" to Electronic Benefit Transfer cards (EBT cards), tracking and administering of benefits has become more efficient, but the change has also placed limits on farmers' and farmers markets' ability to accept these benefits as payment in exchange for affordable and nutritious food products. Within the past few decades, the federal government, states, cities, and farmers markets across the country themselves have been implementing and improving programs to facilitate EBT transactions while simultaneously attempting to spread awareness of such initiatives and the benefits of farmers markets to SNAP customers. The Rochester Public Market serves as a national example of SNAP benefit acceptance at farmers markets, accepting over half of a million dollars in SNAP benefits annually and 3.2% of the SNAP benefits spent at farmers market nationwide in 2015. This disproportionately high rate of SNAP benefit acceptance begs the question, what factors influence these rates and what can other markets do to increase utilization rates of SNAP acceptance programs at their market as well?

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I. Introduction

For centuries, farmers markets have served as a direct connection between citizens and local food producers. In the past century, however, as the United States food system has become increasingly complex, the means of food production, supply, and customer access and the surrounding issues have become increasingly complex, too. The entities that own and profit most from food production have changed along with the nutritional levels of the food supply, and the food customers are choosing and have physical and financial access to in the new food environment. All of these areas pose issues to both local food producers and to the health of citizens within the country, particularly those with the least economic access to food who have little option to “vote with their dollar” to support favorable methods of food production, let alone pay for sufficient amounts of food of even the lowest nutritional quality.

The U.S. government has recognized and acted on the issue of financial food access to some extent through the Supplemental Nutrition Assistance Program (SNAP), previously referred to and commonly known as the Food Stamp Program, administered by the United States Department of Agriculture (USDA) Food and Nutrition Service at the federal level and through state offices. Since its founding, SNAP has provided financial resources to households living close to and under the poverty line in order to help them afford the food they need to meet their nutritional requirements. SNAP has helped tens of millions of families each year in its most recent program iteration to purchase food that would otherwise be inaccessible.

Although originally, SNAP benefits were provided in the form of physical “stamps” that could be exchanged with stores and food vendors at locations including farmers markets, the USDA kept pace with modern purchasing trends. By 2002, SNAP benefits were converted from

physical food stamps to credit on an Electronic Benefit Transfer card (EBT card) (United States Department of Agriculture, 2014b). This electronic method of benefit distribution increases ease of payment at many retailers accepting SNAP since EBT cards can be accepted through most card terminals used for credit and debit cards. Additionally, it helped increase ease of distributing and tracking SNAP benefits while reducing fraud. The shift, however, also established barriers to SNAP benefit use at farmers markets and SNAP benefit redemption by local farmers. The price of traditional Point of Sale (POS) hardware and software capable of processing card transactions securely can cost up to \$4,000 and comes with additional processing fees: costs that many supermarkets and grocery stores can afford but that many local farmers cannot (Associated Press, 2013; Vend, n.d.). As the transition from physical to electronic SNAP benefit payment occurred, the amount of SNAP benefits paid to farmers at farmers markets decreased significantly, including a decrease of by almost half between 1994 and 1998, from \$6.4 million to \$3.8 million (as cited in Bertmann, Ohri-Vachaspati, Buman, & Wharton, 2012). The change from physical to electronic benefit payments reduced SNAP participants' access to farm fresh foods and small, local farmers' access to a customer base and SNAP funds.

Over the past decade, the USDA, states, farmers market coalitions, and farmers markets across the country themselves have been working to correct this issue and increase access to market goods for SNAP customers (Bertmann, Ohri-Vachaspati, Buman, & Wharton, 2012; Crompt, Cheadle, Solomon, Maring, Wong, & Reed, 2012; Freedman, Bell & Collins, 2011a; Oberholtzer, Dimitri & Schumacher, 2012; New York State, 2016; Ruelas, Iverson, Kiekel, & Peters, 2011; White House Task Force on Childhood Obesity, 2010; Young et al., 2013). As a result of the implementation of programs, adjustments in policy, and provision of grants, improvements have been seen in farmers market SNAP benefit acceptance and in customer

spending at farmers markets year to year (Oberholtzer et al., 2012; United States Department of Agriculture, 2016a). From fiscal year 2008 to fiscal year 2015, the total number of farmers markets authorized to accept SNAP benefits has increased from 753 markets to 6,483 (an increase of 761%) and the amount of SNAP benefits redeemed at markets increased from \$2,740,236 to \$19,441,570 (an increase of 609.5%) (United States Department of Agriculture, 2016a). In the City of Rochester, New York, almost all farmers markets have an established Token Program for SNAP customers as a means to accept benefits and connect these customers with local food producers. The programs involve wooden tokens available in \$1 or \$5 increments. Customers go to a market office or tent with their EBT cards and market staff or volunteers use a card terminal to process an EBT payment for the \$1 or \$5 market tokens. Customers can then take their tokens and spend them on qualifying items sold by participating market vendors. After purchases are made, market vendors return tokens to market management and market management transfer the matching funds to the vendors, sometimes charging a small processing fee.

In the city, the rate of use of the SNAP benefit acceptance program has increased steadily from year to year with one market outpacing many others both within the city and out of state: the Rochester Public Market. In 2015, the Rochester Public Market brought in over half of a million dollars with the total of \$624,346 spent at the market, 3.2% of the total SNAP benefits spent at Farmers Markets that year (based on numbers from United States Department of Agriculture, 2016a). Additionally, the amount spent at the Rochester Public Market alone exceeded that spent in 44 of the 50 states, the District of Columbia, the Virgin Islands, and Puerto Rico (see Table 1) (based on numbers from United States Department of Agriculture, 2016a).

Table 1: Comparison of SNAP Authorized Farmers and Markets in FY2008 and FY2015

State	FY 2008 Authorized Farmers/ Markets	FY 2015 Authorized Farmers/ Markets	% Increase in Authorized Farmers/Markets FY 2008 to FY 2015	FY 2008 Redemptions	FY 2015 Redemptions	% Increase in Redemptions FY 2008 to FY 2015
AK	0	17			\$10,405	
AL	10	380	3700.0%	\$481	\$85,115	17595.4%
AR	5	70	1300.0%	redacted	\$44,697	
AZ	4	32	700.0%	\$7,291	\$46,817	542.1%
CA	65	541	732.3%	\$547,850	\$3,760,099	586.3%
CO	22	88	300.0%	\$34,166	\$187,033	447.4%
CT	12	81	575.0%	\$3,436	\$117,512	3320.0%
DC	7	50	614.3%	\$805	\$66,129	8114.8%
DE	1	13	1200.0%	redacted	\$23,587	
FL	6	164	2633.3%	\$65,120	\$996,437	1430.2%
GA	9	246	2633.3%	\$49,415	\$434,708	779.7%
GU	0	1			redacted	
HI	40	105	162.5%	\$206,133	\$1,483,688	619.8%
IA	188	213	13.3%	\$39,770	\$71,672	80.2%
ID	2	30	1400.0%	redacted	\$36,762	
IL	9	138	1433.3%	\$18,819	\$406,702	2061.1%
IN	4	81	1925.0%	redacted	\$97,846	
KS	5	50	900.0%	\$4,458	\$70,436	1480.0%
KY	4	232	5700.0%	redacted	\$94,691	
LA	2	26	1200.0%	redacted	\$49,942	
MA	24	231	862.5%	\$7,333	\$387,239	5180.8%
MD	3	120	3900.0%	redacted	\$184,342	
ME	3	131	4266.7%	redacted	\$308,036	
MI	35	372	962.9%	\$137,090	\$1,467,768	970.7%
MN	4	103	2475.0%	redacted	\$229,690	
MO	31	131	322.6%	\$430,279	\$1,038,278	141.3%
MS	3	188	6166.7%	redacted	\$300,292	
MT	5	18	260.0%	\$15,758	\$42,100	167.2%
NC	6	288	4700.0%	redacted	\$239,487	
ND	0	10			\$3,038	
NE	1	57	5600.0%	redacted	\$27,297	
NH	9	42	366.7%	redacted	\$70,087	
NJ	35	75	114.3%	\$429,617	\$220,338	-48.7%
NM	10	55	450.0%	\$189,584	\$206,586	9.0%
NV	0	21			\$15,151	
NY	63	395	527.0%	\$198,414	\$2,864,701	1343.8%
OH	9	170	1788.9%	\$15,290	\$253,151	1555.7%
OK	2	43	2050.0%	redacted	\$53,505	
OR	27	176	551.9%	\$95,529	\$918,906	861.9%
PA	4	194	4750.0%	\$9,358	\$682,749	7195.9%
RI	2	26	1200.0%	redacted	\$105,271	
SC	21	166	690.5%	\$25,683	\$170,512	563.9%
SD	0	25			\$10,634	
TN	5	140	2700.0%	\$8,354	\$143,842	1621.8%
TX	4	121	2925.0%	\$16,495	\$127,737	674.4%
UT	4	31	675.0%	\$5,667	\$65,972	1064.1%
VA	3	161	5266.7%	redacted	\$156,544	
VI	0	3			redacted	
VT	10	80	700.0%	\$4,322	\$94,591	2088.6%
WA	28	152	442.9%	\$47,609	\$655,346	1276.5%
WI	6	130	2066.7%	\$6,399	\$248,834	3788.6%
WV	1	62	6100.0%	redacted	\$51,840	
WY	0	8			\$4,316	
Total	753	6,483	761.0%	\$2,740,236	\$19,441,570	609.5%

This data includes the number of SNAP-authorized Farmers Markets and Direct Marketing Farmers (DMF), by State, at the end of FY 2008 and 2015. Redemption data is redacted in some States for confidentiality, and is not reflected in the percent change. Percent change cannot be identified for States with that did not have any authorized FM or DMF in FY 2008.

(United States Department of Agriculture, 2016a)

The financial success and the rate of use of the Rochester Public Market compared to others farmers markets across the country begs the question, what are the factors or characteristics of a farmers market that influence the rate of use of SNAP benefit acceptance programs? This thesis will examine the rates of use of SNAP benefit acceptance programs at four farmers markets within the City of Rochester, New York, and the characteristics that differ between markets. Numerical data on SNAP transactions from previous years will be analyzed to determine if difference in SNAP benefit redemption and number of customers is truly substantial when compared by hours open and vendors present – factors that differ significantly between markets. Market profiles will also be developed and compared to determine differing characteristics with the potential to influence SNAP customer preference and engagement. Findings from reviewed literature on farmers market SNAP customer engagement will grant further depth to identified characteristics by suggesting an additional point of comparison. Lastly, suggestions will be made as to what policies at the federal, state, local, and organizational level could potentially impact the use of SNAP benefit acceptance programs in the City of Rochester and across the country, and what areas could be further examined to contribute to stronger conclusions about this topic which has previously been underexplored.

II. Literature Review

There are three major components of SNAP benefit acceptance programs at farmers markets: SNAP, Point of Sale (POS) technology, and the farmers markets themselves. These three components address financial, technological, and physical barriers that might otherwise prevent low income customers that utilize SNAP benefits from engaging with farmers and the

nutritious food they sell at the markets. The components of the program and the barriers they help overcome are explored further in this literature review.

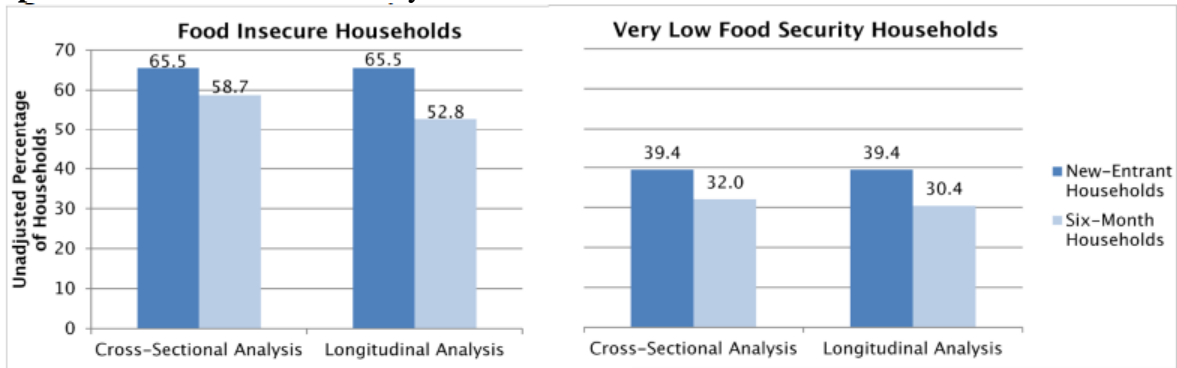
A. SNAP: Financial Access

SNAP is the largest program aimed at addressing issues of food access and hunger across the country. In order to be eligible for SNAP benefits, most households must have a gross monthly income below 130 percent of the poverty threshold and a net monthly income below 100 percent of the poverty threshold with additional restrictions on the number of countable resources that families are allowed to own (United States Department of Agriculture, 2016d). The latter restrictions vary widely from state to state both in terms of how many countable resources families are allowed and what is included as a countable resource; for instance, some states include car values and number of cars owned in this calculation while others ignore this resource (United States Department of Agriculture, 2016d). SNAP eligibility also differs based on the number of elderly and disabled members of the household there are, usually making eligibility requirements slightly more lenient.

As of May, 2016, 43.5 million people in 21.4 million households were receiving SNAP benefits in the United States with an additional 14.5 million people also eligible for these benefits if SNAP participation rates from 2010 hold true (United States Department of Agriculture, 2016c; Cunyngnam, K. E., 2012). Of the individuals receiving benefits, over 60% were children, elderly, or individuals with disabilities and 42% live in households with working adults (United States Department of Agriculture, 2015). A USDA study found that participation in SNAP led to an overall decrease in food insecurity and for most household types assessed when food insecurity is defined as “a measure of whether a household experiences food access

limitations due to lack of money or other resources” (Mabli, Ohls, Dragoset, Castner, & Santos, 2013, p. 1). Nonetheless, a level of food insecurity persisted among participating households in the study (see Graph 1).

Graph 1: Household Food Security Status in SNAP Households



Source: SNAP Food Security Survey 2012.

Note: The cross-sectional estimates compare new SNAP participants to a contemporaneous set of participants who have been receiving SNAP for about six months. The longitudinal estimates compare new SNAP participants to the same participants about six months later.

Cross-sectional estimates are based on a data set with 6,650 households (3,275 new-entrant households and 3,375 six-month households). Longitudinal estimates are based on a data set with 3,275 new-entrant households observed at baseline and again at follow-up six months later.

(Mabli et al., 2013, p. xxiii)

The reason for the continued experience of food insecurity while receiving SNAP benefits may be traced to the origination of the measure for determining SNAP participation awards: the Thrifty Food Plan. The maximum benefit allotment for SNAP benefit recipients is based on the Thrifty Food Plan which is the food plan of the least cost developed by the USDA. Although this food plan is revised every several years to adjust for changing costs in food and changes in dietary knowledge, it was based on the Economy Food Plan developed in 1961, a plan that was originally meant to serve as only a temporary or emergency food plan and did not provide sufficient nutrients for long term use (United States Department of Agriculture, 2007). The Economy Food Plan was also based on the costs of food during a time when most families

made their own food – including their own sandwich bread – from scratch. The Economy Food Plan may set unreasonable expectations for SNAP benefits and SNAP participants due to pervading cultural shifts in food preparation practices and since SNAP benefits can be used over significant time frames, which is part of the reason why the transition to the Thrifty Food Plan was beneficial. In addition to including current food trends, dietary recommendations, and up to date pricing in the new plan, however, they also set the new Thrifty Food Plan with the intent of keeping the cost exactly the same (United States Department of Agriculture, 2007). The similarities in expected food costs in the two plans may help contribute to the level of food insecurity that families receiving SNAP benefits still face.

B. POS Systems: Technological Access to Food

As discussed in the introduction, although the transition of SNAP benefits from physical, paper food stamps to EBT cards provided some advantages in terms of benefit distribution and utilization, it also posed some new barriers to farmers who sold their products directly to SNAP customers. While many food retailers could afford the POS technology that would allow them to accept SNAP benefits from an EBT card, many individual farmers could not. The technological barrier this posed to farmers and to SNAP customers looking to access their products directly from them is largely due to the evolution of POS technology.

POS technological innovation was relatively granular until the 2000s (Ellison, 2013). Point of Sale systems went from the original cash registers developed in 1906 and popularized by the mid-1900s, to computer based in 1973, to personal computer based in 1986, to the majority scanning bar codes and accepting card payments by the 80s and 90s (Associated Press, 2013; Ellison, 2013). Despite the changes over time, the retail model of having a stationary POS

system remained fairly consistent, and to some small retailers including many farmers, inaccessible. The price of POS hardware and the software to process payments securely were often cost prohibitive, sometimes \$4000 before taking into account the processing costs associated with each individual card transaction, which vary based on the software and type of card (Vend, n.d.).

For farmers selling their products directly to customers, POS systems could also be inaccessible due to the mobility of technology and electrical requirements. In New York State, the NYS Department of Agriculture and Markets and NYS Office of Temporary and Disability Assistance charged the Farmers Market Federation of New York to administer a statewide program that would allow farmers markets and other farmers selling directly to customers to access POS technology that would allow them to accept EBT. Although funding was provided for this program, it took years for the technology to catch up to the idea behind the program. On their website, the Farmers Market Federation of New York (n.d.) wrote that in 2001, the wireless POS systems that would accept SNAP ran on an analog system, “limiting the growth of the program to areas with data transmission towers.” Once technology started to evolve, allowing the program to run on a digital system operating off cellular towers, “This technology allowed the program to expand statewide. In 2005, the program began a central terminal model, allowing more markets to join the program, giving greater access to food stamp consumers and more income potential to a greater number of farmers.” As a result of the change in technology, the New York state program continues to grow every year and “In 2010, the program included 202 farmers markets, 8 mobile markets, 24 farmers, 27 farm stands and 17 NYC Green Carts” (Farmers Market Federation of New York, n.d.). The amount spent at farmers markets in 2010 in EBT benefits was \$1.6 million, still less than 1% of the EBT benefits spent in New York State.

The Farmers Market Federation (n.d.) sees the low percentage of benefits spent at farmers markets as an indicator of the potential the program still has to grow.

Several other states offer similar programs offering to connect farmers and farmers markets with POS technology and, by extension, SNAP customers. The Farmers Market Coalition (FMC) also offers a program at the national level called the Free SNAP EBT Equipment Program. In 2014, FMC received funding from the United States Department of Agriculture (USDA) Food and Nutrition Service (FNS) to, “cover the costs of purchasing or renting SNAP EBT equipment and services (set-up costs, monthly service fees, and wireless fees) for up to three years [for individual farmers markets]. Transaction fees (for SNAP EBT, credit, and debit payments) will not be covered” (FMC, n.d.-a). Farmers market administrators who apply to take part in the program can currently chose between four different wireless POS service providers and their technologies as of this writing (see Table 2) (FMC, 2017).

One of the POS service provider options, MarketLink was developed by the National Association of Farmers Market Nutrition Programs (NAFMNP) with funding from USDA FNS (FMC, n.d.). “MarketLink offers smart device technology, used with a mobile application (app) called MobileMarket+. SNAP authorized farmers markets and direct marketing farmers can access MarketLink.org by applying to FMC’s Free SNAP EBT Equipment Program” (FMC, n.d.). The Mobile Application developed by NAFMNP is an example of mobile POS technology. Mobil POS (mPOS) solutions have opened up new doors for small retailers including farmers market vendors and small businesses because of their ability to process card transactions for a relatively low cost. For instance, while a traditional, stationary POS system can cost \$4,000, an iPad mPOS system in 2013 cost about \$1500, and as the cost of tablets goes down, so too might the cost of mPOS hardware (Associated Press, 2013; Vend, n.d.).

Table 2: FMC Participating Service Provider Comparison

Participating Service Provider Comparison



	MarketLink	MerchantSource® ³	TSYS	PaymentSpring
Equipment	Mobile Market+ App, Bluetooth Printer, Card Reader and a Smart Device (iPhone 5c or iPad Mini, or use your own device)	First Data FD410 GPRS Wireless Terminal with internal printer or the ConnectNPay system: a P200 device and a Windows Smartphone	Ingenico iWL255 Wireless Terminal with internal printer	EBT-Only Ingenico iWL255 Wireless Terminal with internal printer
Contract Length	Three years	Month-to-month	Month-to-month	Month-to-month
Cancellation Fee	\$295 in Year 1, \$195 in Year 2, and \$95 in Year 3	none	none	none
Warranty	Manufacturer's warranties on the card reader (6 months), the printer (1 year), and iPhone and iPad (90 days)	FD410 and P200 have a one-year manufacturer's warranty. The FD410 has a 3-year warranty under MerchantSource with 2 free terminal swap-outs	One-year manufacturer's warranty	Three-year manufacturer's warranty
Data Breach Insurance	Not applicable: no card data is stored on the device. Provider's insurance covers users	TransAmor \$100,000 liability insurance included in service costs	Optional \$100,000 liability insurance available for an extra \$5.00 per month	\$100,000 of Merchant Data Breach Coverage with North American Data Security Program
Transactions Fees per swiped transaction¹				
EBT	\$0.15	\$0.15	\$0.10	\$0
Credit	1.79% + \$0.15	1.59% + \$0.20	1.79% + \$0.15	---
Debit	1.79% + \$0.15	1.59% + \$0.20	1.59% + \$0.15	---
Estimated Annual Service Costs to FMC Equipment Program Participants in Years One through Three				
12 or 6 months of service	\$0 + transaction fees	\$0 + transaction fees	\$0 + transaction fees	\$0
Estimated Annual Service Costs to FMC Equipment Program Participants in Year Four (after funding period ends)				
12 months of service	\$220 + data plan ² + transaction fees	\$443.28 + optional data plan ⁴ + transaction fees	\$264.23 + transaction fees	\$250.80 + transaction fees
6 months of service (seasonal estimate)	\$220 + data plan ² + transaction fees	\$221.64 + optional data plan ⁴ + transaction fees	\$147.65 + transaction fees	\$250.80 + transaction fees
To learn more about service provider options, visit bit.ly/ProviderGuide or contact the provider directly.	marketlink.org Ricky Aviles Novo Dia Group (512) 371-4134 ext. 3747 cell (512) 413-4287 ricky.aviles@novodiagroup.com	merchantsource.com Kim Lyons 1 (800) 313-5198 Kim.L@merchantsource.com	tsys.com Chris Shanahan (402) 574-7016 cshanahan@tsys.com	PaymentSpring.com Jason Butts (402) 513-4573 cell (402) 720-7972 jason.butts@PaymentSpring.com

¹ Transaction fees vary depending on the type of card used and how transaction is processed. Estimates in this table are based on swiped transactions with major cards (Visa, Mastercard, etc). Transactions that require entering a PIN, keying in the card number by hand, or using other types of cards (such as corporate cards, reward cards, or small companies) may be more. Refer to individual pricing schedules.

² The MarketLink system includes three years of wireless service. To continue service after Year Three, you'll have to secure and pay for your own wireless plan. Check with your preferred wireless carrier directly for more information on wireless and data service rates. MarketLink also offers a Bring Your Own Device (BYOD) option, which allows participants to use their existing smart device (Apple iOS 6.0 or Android compatible) and wireless plan to run the MarketLink system. In the BYOD option, no added wireless fees would be required in Year Four, because you'd use your existing plan.

³ MerchantSource® is an independent, registered agent office for Ignite Payments, LLC. All bank card merchant service fees are subject to change by Ignite Payments, LLC., a registered ISO of Wells Fargo Bank, N.A., Walnut Creek, CA.

⁴ The ConnectNPay system can run on Wi-Fi or with a data plan. MerchantSource offers an optional AT&T data plan of \$20 per month (\$240 per year) with a max of 150 MB, which can be covered under the FMC Equipment program for three years. After three years, the participant will be responsible for obtaining a data plan.

The low cost of mPOS technology has had large impacts for small retailers. “Mobile point of sale (mPOS) solutions have made such a huge impact in the industry that in 2014 a majority of UK retailers (53%) rated mPOS as the most important in-store technology for consumers. mPOS systems are also gaining market share. In 2015, the IHL Group found that mobile POS software installs are up 41% in North America year to year” (Vend, n.d.). The ability to process card transactions makes a significant difference for many retailers, but initially, EBT transactions were excluded from the technological breakthrough. Before MobileMarket+, there were no mPOS providers that processed SNAP transactions, and the majority of mPOS systems still do not process SNAP transactions. For instance, one popular mPOS company, Square, stated clearly on their website as of this writing, “We don’t currently support EBT or other benefits cards” (Square, n.d.). The lack of mPOS options for processing EBT transactions and the farmers market community’s interest in this technology has been recognized by the USDA. On their website, they write, “The farmers market community has expressed much interest in about applications (apps), add-ons and hardware that support credit and debit transactions on smartphones, tablets, and other hand-held mobile devices” (USDA, 2017). The main barrier to increasing access to mPOS technology for EBT transactions lies in Personal Identification Number (PIN) security. PINs are not always required for the processing of credit and debit card transactions but they are necessary for each and every EBT transaction. As the USDA (2017) writes, “Without a PIN, the transaction cannot be approved by any EBT processor. It is the only means of identification the SNAP customer has to ensure that they are the authorized user of the card.” Many POS devices are capable of accepting PINs, but tablets and smart phones are not:

Typically, [tablets and smart phones] are not designed to accept Personal Identification Numbers (PIN) as part of a transaction. Rather, they only support credit and signature

debit transactions. To achieve Payment Card Industry (PCI)-compliance, PINs may only be entered on tamper-proof, ANSI and ISO-compliant devices ... If any of the [software] companies supporting credit/debit on these devices attempted to incorporate PIN-entry into their products, they would lose their PCI certification and ability to accept signature transactions.

MobileMarket+ exists as an mPOS platform specifically because it was requested and funded by USDA FNS. It is an acceptable option for processing EBT transactions that “has been thoroughly tested by smart phone industry security experts and found to be highly secure, but even that process is not PCI-compliant. FNS is comfortable with its security level and has approved the application for farmers markets.” (USDA, 2017). If other mPOS platforms wanted to be approved to accept EBT transactions, they would have to invest the time and resources to ensure high levels of security for PINs in addition to going through thorough testing processes as well (USDA, 2017).

The options for mPOS platforms that will process EBT transactions are currently limited, but new mPOS technology nevertheless opens up new revenue streams for farmers, both in terms of allowing them to accept SNAP benefits and more widely allowing them to accept credit and debit cards payments from most major banks without major cost. As mPOS develops, companies that have long worked in the POS field are adapting their approaches. For instance, “NCR, formerly known as the National Cash Register, was the first to manufacturer the cash register on a large scale. Last year, the company ... launched a program that merges its software with the iPad” (Associated Press, 2013). New companies are also entering the POS market as a result of mPOS technology, and as they enter the field, they are increasing the level of competition. It is possible that as new and more experienced companies in the field compete to create the most effective and secure technology, new ways of offsetting the cost of card transactions will emerge and costs of transaction and other fees may lower, making the technology even more accessible

to individual farmers and farmers markets and other small businesses. Scott Ellison (2013) from PayPal suggested in a document on the future of POS technology that technological innovations in POS technology and further integration with other existing technologies such as the cloud, tablets, etc. will allow for further innovation in service provision and pricing from POS providers, potentially including data monetization which could hypothetically reduce or eliminate key POS costs. Although the cost and mobility of POS systems primarily impacts small businesses such as farmers and farmers markets, many larger companies have given serious consideration to switching to mPOS systems including Urban Outfitters, JC Penny, Coach, and Nordstrom (Associated Press, 2013). As mobile payment technology progresses further with options such as Apple and Google Pay where customers can pay directly from their mobile devices, it is unclear what further impacts this could have on individual farmers selling at farmers markets, and farmers markets that have implemented SNAP benefit redemption options for their customers. Considering SNAP payments, small retailers, and specifically farmers and farmers markets in the development of these technologies could, if the trends at the Rochester farmers markets hold true, have significant impacts on millions of SNAP beneficiaries' access to healthy, affordable food.

Working to increase farmers and farmers markets' access to POS technology that accepts SNAP benefits could also simultaneously increase their access to other forms of card payment including credit and debit cards. Many POS terminals that currently accept SNAP benefits also accept other types of card payments. Transactions using credit or debit cards do cost more than SNAP transactions. Each card payment comes with multiple associated fees from the POS software processing the transaction and from the bank associated with the card, referred to as interchange fees. SNAP transactions still come with costs from the POS software, though some

of the programs offering free POS technology also offer to cover the cost of these fees for a limited period of time, but they do not come with interchange fees. “The Agricultural Act of 2014, prohibits interchange fees from applying to SNAP EBT transactions, however debit and credit transactions remain subject to interchange fees” (FMC, n.d.-b). In the Act, the Federal Government essentially said that no one had to pay them for their role in processing SNAP benefits. While banks do expect payment for their role in processing debit and credit cards, making these transactions more expensive, credit and debit cards are also more common.

Moody’s Analytics conducted a study to determine “whether the long-term shift to credit and debit cards stimulates economic growth, and found that electronic card payments continue to have a meaningful impact on the world economy” (p. 3). While this study focused on card usage on a global scale and this thesis focuses primarily on EBT card usage specifically at farmers markets, it is possible that some of the findings could translate to the smaller scale. For instance, Moody’s Analytics write that across the board, customers are moving away from cash, checks, and other payment methods in favor of payment cards (p. 4). Since farmers selling at farmers markets have traditionally accepted cash as a main source of payment and since many farmers still do not accept payment cards, this shift alone could affect the amount of customers willing to shop at farmers markets and with particular vendors who do not accept their preferred method of payment, and the amount that they are willing to spend for these vendors’ goods.

In addition to recognizing the pitfalls of not adopting card payment technology, the study by Moody’s Analytics demonstrated the overall benefits that were caused specifically by making the shift:

Moody’s Analytics studied 56 countries that make up 93% of world gross domestic product, over a five-year span—2008 to 2012. Specifically, it found: Greater usage of electronic payment products added \$983 billion in real (U.S.) dollars to GDP in the countries studied. Card usage raised consumption by an average of 0.7% across the 56

countries. That consumption contributed to average additional growth in GDP of 0.17 percentage point per year for this group of countries. For context, real global GDP grew by an average of 1.8% during that time period. The additional GDP growth was realized solely by increased card usage and penetration is equivalent to creating 1.9 million jobs during the period of study (p. 3).

Further, the report showed that adopting card payment technology and its utilization inspired more of the same overtime with exponential growth in the number of card transactions that resulted, even in markets where card usage already made up 50% of transactions taking place (p. 5). It is reasonable to argue that the adoption of more methods for accepting card payments, both SNAP benefits cards and others, could lead to similar (although smaller scale) benefits at farmers markets and for individual farmers as well. This is not to mention the added convenience for customers. Moody's Analytics wrote in their report that their findings, "This should provide valuable input to policymakers around the world as they consider policies that could speed card adoption" (p. 3). Policymakers or individuals otherwise involved with SNAP and with farmers markets may consider the findings of this study as efforts are made to increase the number of EBT card payments made at farmers markets. By offering low-cost technology for farmers markets to accept SNAP benefits, federal and state-level programs are opening up an avenue for farmers to potentially accept other card-based forms of payment as well, simultaneously increasing potential profits for farmers and the ability of SNAP beneficiaries and other payment card holders to access nutritious food.

C. Farmers Markets: Physical Access to Food

As issues of financial and technological access to food are addressed, the issue of physical access to nutritious food sources can remain. Many articles over the past decade have talked about the latter portion of this issue through conversations about "Food Deserts" or

physical areas without ready access to a supermarket or grocery store (assumed to have lower prices and healthier foods than corner stores or other food retailers, including fast food chains) within a specified distance. The distance defined as “accessible” can vary greatly between individual studies and organizations (Beaulac, Kristjansson, & Cummins, 2009; Dubowitz et al., 2015; Karpyn, Young, & Weiss, 2012; Ploeg et al., 2009; Walker, Block, & Kawachi, 2012; Wrigley, Warm, Margetts, & Whelan, 2002). In their literature review, Beaulac et al. (2009) defined food deserts as low-income “areas characterized by relatively poor access to healthy and affordable food, may contribute to social disparities in diet and diet-related health outcomes, such as cardiovascular disease and obesity” (p. 1). Another definition used by Walker et al. in their 2012 study was, “a zip code that does not have a chain supermarket within 0.5 miles of the center of the zip code” (p. 3).

In their comparative study of low-income residents of food deserts and low-income non-residents with more ready access to chain supermarkets, Walker et al. hypothesized that there would be a difference in food preference and purchasing between the two groups but found little evidence in support. Additionally, some studies have assessed whether adding a new food retailers (grocery stores and supermarket primarily) and healthier food products to existing retail locations (corner stores and bodegas) in areas with little physical access to affordable, healthy food makes a difference in the food choices made by shoppers in that area. Some studies have noted some change in food choice (Dannefer, Williams, Baronberg, & Silver, 2012; Gittelsohn, Kim, He, & Pardilla, 2013; Wrigley, Warm, Margetts & Whelan, 2002) and some have observed little to none (Cummins, Flint & Matthews, 2014; Cummins, Petticrew, Higgins, Findlay, & Sparks, 2005; Dubowitz, Ncube, Leuschner & Tharp-Gilliam, 2015; Elbe et al., 2015; Gittelsohn et al., 2010; Lawman et al., 2015; Sadler, Gilliland, & Arku, 2013). Some have hypothesized that

this lack of change in food choice stems from the fact that, while grocery stores and supermarkets may provide less expensive healthy food options, they still provide processed and unhealthy food options, sometimes at lower prices as well (Sadler, Gilliland, & Arku, 2013).

Nonetheless, addressing food access through the methods of attracting new food retailers and improving healthy product variety in existing stores has been the focus of dozens of policies and programs and hundreds of millions of tax dollars at the federal, state, and local levels (Giang, Karpyn, Laurison, Hillier & Perry, 2008; Karpyn, Young & Weiss, 2012; Karpyn et al., 2010; White House Task Force on Childhood Obesity, 2010). Fewer studies have been conducted on residents of areas before and after the establishments of farmers markets in their area; however, preliminary assessments of farmers market customers suggest that this is an area that should be further examined. Quite often, low-income and SNAP customers at farmers markets report eating more fruits and vegetables or eating healthier overall as a result of shopping at markets (Ruelas, Iverson, Kiekel, & Peters, 2011). This finding makes sense since the food most readily available at farmers market is what most expert define as healthy options: local, seasonal fruits and vegetables picked at their peak ripeness. Additionally, buying directly from farmers at these markets can sometimes result in lower prices, which have been noticed by customers (Collaborative Health Research, 2016; Friends of the Rochester Public Market, 2008a; Friends of the Rochester Public Market, 2008b; Friends of the Rochester Public Market, 2009; Friends of the Rochester Public Market, 2010; Friends of the Rochester Public Market, 2012; Friends of the Rochester Public Market, 2013; Friends of the Rochester Public Market, 2014; Karakus, Milfort, MacAllum, & Hao, 2014; Ruelas et al., 2011), while still providing farmers with a larger profit margin than selling to a wholesaler (Griffin & Frongillo, 2003).

Additional benefits of shopping at farmers markets have been identified through surveys of market customers across the country, including the Rochester Public Market which will be reviewed later on. Through a survey of thousands of market customers at two farmers markets located in low-income neighborhoods in in South and East Los Angeles (LA), Ruelas et al. (2011) assessed utilization of these markets and customers' perceptions on the benefits of shopping at these locations. Most shoppers at both markets reported residing within a four-mile radius of the markets (78% South LA, 64% East LA) but there was still a percentage of market attendees from outside that radius. Most shoppers drove to the market (62% South LA, 60% East LA) with a smaller percentage of shoppers walking (29% South LA, 22% East LA) (Ruelas et al., 2011, p. 558). "Well over 80% of respondents rated most market characteristics as good or excellent," including location convenience, availability of parking, hours of operation, cleanliness, safety, social atmosphere, quality, variety, availability and cost of products, and value for the cost of products for sale (Ruelas et al., 2011, p. 558-559). All of these ratings could be unique to the particular markets reviewed by the participants of the individual study, but similarly positive responses have been collected regarding other farmers market as well (Collaborative Health Research, 2016; Friends of the Rochester Public Market, 2008a; Friends of the Rochester Public Market, 2008b; Friends of the Rochester Public Market, 2009; Friends of the Rochester Public Market, 2010; Friends of the Rochester Public Market, 2012; Friends of the Rochester Public Market, 2013; Friends of the Rochester Public Market, 2014; Karakus, Milfort, MacAllum, & Hao, 2014). A large scale study conducted for the USDA by Karakus et al. (2014) involving both focus groups and surveys of SNAP customers regarding 65 farmers markets from across the country similarly found that "[t]he majority of shoppers agreed that they could find more variety and better-quality fruits and vegetables at the [farmers market] than in other stores,"

and that “most shoppers believed that the prices of fresh fruits and vegetables at [farmers markets] were lower or at least the same as in other stores” (p. xvii). Additional reasons participants commonly listed for shopping at farmers markets included “activities for children and social services, community-related events, conducive environment, accessibility, and affordability. In addition, focus group participants reported increased selection, wider variety, and the promotion of local businesses and farmers” (Karakus et al., 2014, p. xvii). The lower prices and higher quality of produce at farmers markets across the country have the potential to attract low-income customers and SNAP recipients and to allow these customers to buy food that is both healthful and enough to feed themselves and their families.

Farmers markets can and have encouraged customers to make more healthful choices in the foods they purchase and prepare. Since farmers markets are often community centered, rather than profit driven as most grocery stores and other food retailers are, they can encourage additional healthy behaviors which Ruelas et al. (2011) confirmed after asking further questions of the participants in their survey to determine what impact shopping at LA farmers markets had on other customer behaviors. As shown in Table 3, taken from the study by Ruelas et al. (2011), an overwhelming majority of survey participants from two LA markets responded that the market had positive impacts on a large number of positive health behaviors (p. 559). Crompton et al. (2012) also surveyed thousands of farmers market customers from 37 additional markets in California, Hawaii, Oregon, and Maryland found similarly positive results “Overall, 74% of respondents said that they were eating more fruits and vegetables as a result of shopping at the markets and 71% said they were eating a greater variety of fruits and vegetables” (Crompton et al., p. 34). The studies previously discussed demonstrate that low-income and SNAP customers that attend farmers markets have greater access to more affordable and nutritious food, and this

access has inspired many customers to report an intent to return to markets as well, creating a more consistent demand for the food produced at small, local farms often using more traditional and environmentally conscious food raising practices. Ruelas et al. (2011) found that 95% of the customers of the farmers market in South LA and 93% of the customers of the farmers market in East LA planned to return (p. 558). Similarly high response rates about returning to farmers markets have been recorded in other studies as well (Karakus et al., 2014; McCormack, Laska, Larson, & Story, 2010).

Table 3: East and South LA: Because of this market I now...

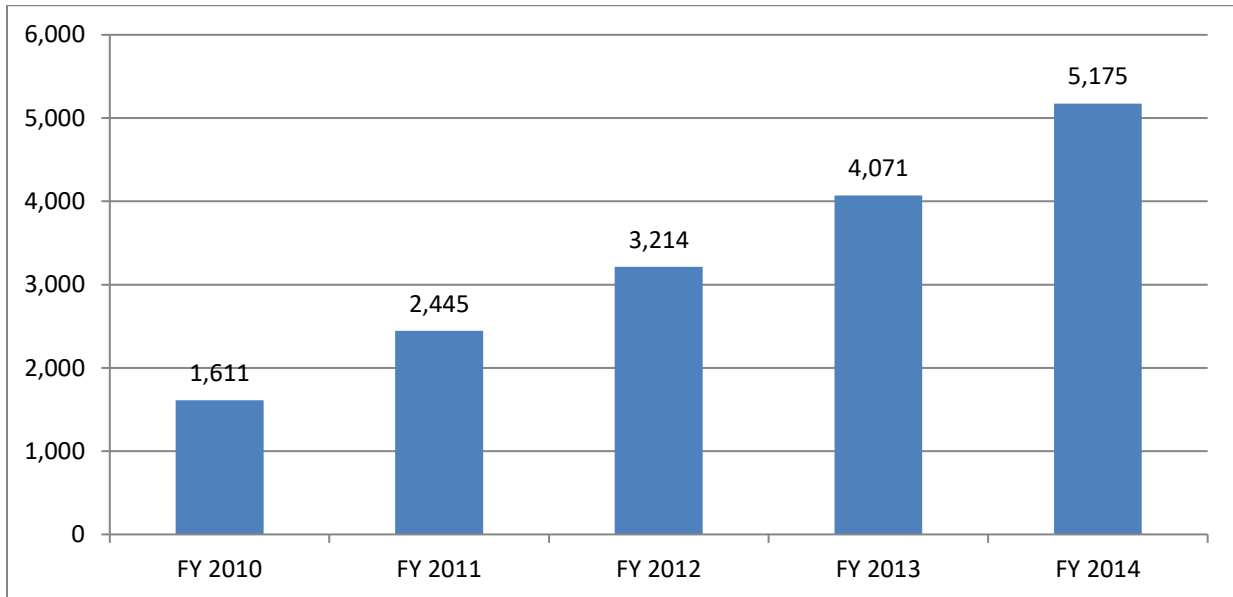
	South LA (%)	East LA (%)
Eat more fruits and vegetables	98	97
Eat more organic food	93	87
Eat food that is fresher (less packaged food)	96	95
Eat less fast food	89	81
Eat more foods that are traditional for my culture/family background	93	90
Eat new kinds of food	90	80
Spend less money on food	79	83
Am better able to provide food for my family and myself	95	91
Feel better about where my food comes from	96	94
Am more physically active	93	90

Only responses that indicate “Agree” or “Strongly Agree” are shown above

(Ruelas et al., 2011, p. 557)

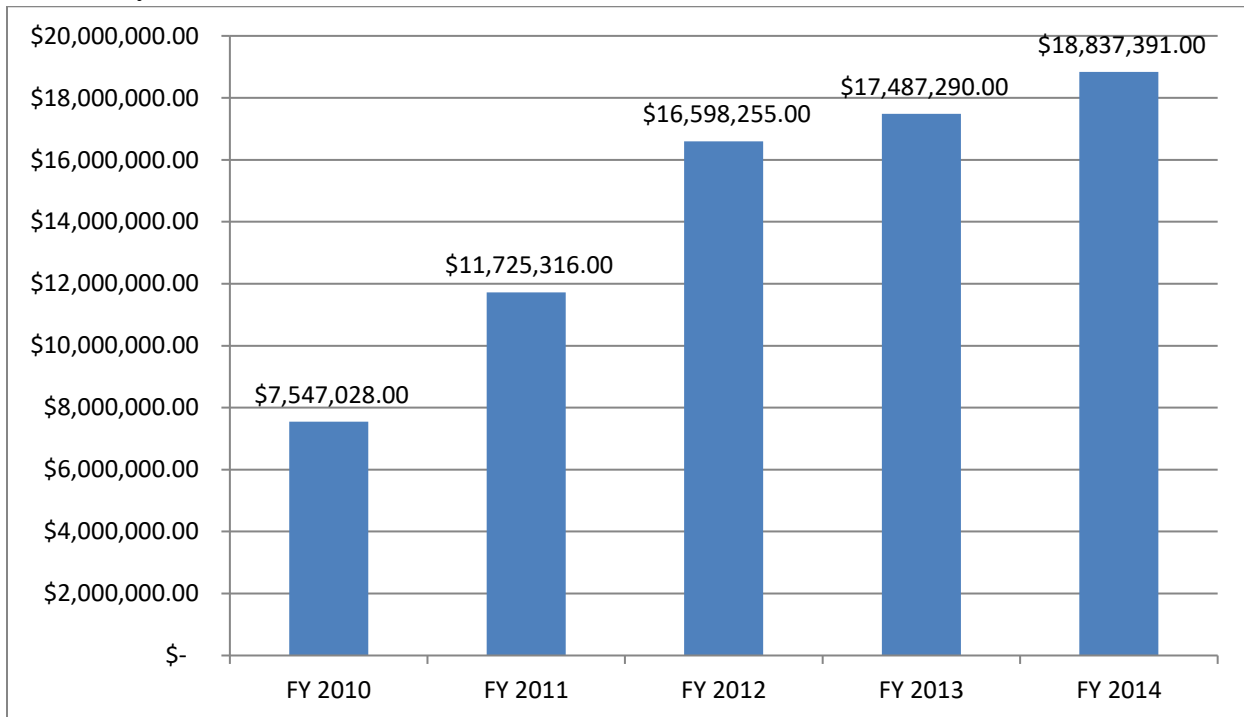
Farmers markets are helping to fill the gap between where SNAP benefits end and where access to and consumption of healthy food begins for the millions of Americans living in poverty, and they are doing so through SNAP benefit acceptance programs, such as those at the markets in Rochester, New York. SNAP benefit acceptance programs allow SNAP customers to access healthy food they otherwise might not be able to obtain while providing additional revenue for local farmers and for markets themselves, allowing them to continue to thrive and to continue to serve their customer base. The number of markets serving SNAP customers and the amount of SNAP benefit dollars being spent at farmers markets is increasing each year (see Graph 2 and 3); however, the percentage of SNAP benefits being spent at markets is still incredibly low in relation to all SNAP benefit spending, less than one percent (0.02%), and there are still SNAP customers who are skeptical about attending markets (Evans et al., 2015; Karakus et al., 2014; United States Department of Agriculture, 2014a, p. 7). There is still progress that needs to be made if farmers markets are going to have a larger impact on food access for those most at risk of food insecurity: people without the financial means to purchase sufficient food for themselves and their households without government assistance. Some markets' SNAP benefit acceptance program, such as the token program at the Rochester Public Market, have shown dramatic rates of use in comparison to other markets with similar programs. If these high rates of use can be replicated, more SNAP customers will have access to affordable, nutritious food while supporting local farmers. In the next section, the methods used in this thesis to compare rates of SNAP benefit acceptance program utilization and market characteristics will be reviewed. Once comparisons are made, more informed hypotheses can be formed as to which factors have the potential to influence rates of farmers market SNAP benefit acceptance programs utilization.

Graph 2: Number of SNAP Authorized Farmers Markets and Direct Marketing Farms in the U.S. by Year



(United States Department of Agriculture, 2014a, p. 11)

Graph 3: SNAP Benefit Redemption at all U.S. Farmers Markets and by Direct Marketing Farmers by Year



(United States Department of Agriculture, 2014a, p. 11)

III. Methods

A. Analytical Framework

The purpose of this thesis project is to determine what characteristics have the potential to influence SNAP benefit acceptance program utilization rates at farmers markets. In order to do so, it is essential to determine how to measure and compare utilization rates of SNAP benefit acceptance programs, what factors are defining of farmers markets versus varied across markets, and what factors should be the focus of further study. Literature has been reviewed to determine the importance of this area of study and what gaps in knowledge still exist. Additional literature was also reviewed in order to answer the questions necessary to conduct a sound analysis.

At this time, various studies have examined what characteristics may influence the rate at which farmers markets are attended and the amount that customers spend at these markets. Fewer studies have examined what characteristics influence the purchasing decisions specifically of SNAP customers at farmers markets. As such, there is very little literature that is directly tied to the comparison being made in this project, meaning that the project has less literature to support and assist in the design, but that this project may help fill a gap in the literature for future researchers. The analysis conducted in this thesis rests on the assumption that some of the same factors that have been identified as potentially influencing the overall engagement with farmers markets may also influence the rate at which SNAP benefits are utilized at farmers markets. The validity of this assumption has not been supported by previous research; however, as farmers markets become an increasingly normalized food source and increasingly accessible for SNAP customers through improved technology, policies and programs, and through their physical presence in more neighborhoods, it makes sense that the characteristics influencing shopping

preferences regarding SNAP benefits would not differ widely from that of the general population.

In order to compare characteristics of farmers markets that might affect SNAP customer shopping preferences, the definition of a farmers market first had to be determined. The definition of farmers markets varies between federal agencies. The definition used for this thesis was that used by the USDA since the department oversees the SNAP program on a national level. The USDA defines farmers markets as follows: “Two or more farmer-producers that sell their own agricultural products directly to the general public at a fixed location, which includes fruits and vegetables, meat, fish, poultry, dairy products, and grains” (United States Department of Agriculture, 2016b). In past studies that have assessed market usage and closure, farmers market characteristics that have varied have been identified and, in some cases, the extent to which they contributed to the increased usage or closure of these markets has been identified.

A study of 50 farmers markets in Oregon compared market size, revenue overall, administrative revenue, management and organization structure, age of the market, experience and turnover of market managers, and pay and the number of hours worked by managers in order to describe “the dynamics of farmers market startups and closures” (Stephenson, Lev, & Brewer, 2008, p. 188). Stephenson et al. (2008) found that 32 of the 50 markets closed between 1998 and 2005 and determined that, out of the 32, 30 closed after less than four years and wrote, “Only two of the 32 markets that failed were older markets (11 and 22 years respectively). While this indicates that market failure is not an issue exclusive to younger markets, the rate of failure for older markets is remarkably lower” (p. 192). Although the reason for each market closure was not specified in the study, a relationship was found between age of farmers markets and market closure. For the purposes of the analysis conducted for this thesis, the assumption was made that

age of farmers markets could also potentially correlate with rates of overall market engagement and SNAP benefit acceptance use at markets. The reasons behind this assumption include the finding by Stephenson et al. (2008) that younger markets were more likely to close, and the potential for longer markets to build stronger customer engagement and community awareness about their presence as a food option. Stephenson et al. (2008) also found that some of the markets that closed had smaller numbers of vendors (4 to 13 selling food products) and “All of the markets that subsequently closed indicated a need for more fruits and vegetables, products considered basic to farmers’ markets” (p. 194). Stephenson et al. (2008) concluded that *market size (measured by number of vendors)* and *product variety* were also important indicators of potential market closure, meaning that these measures might be applicable to this thesis in determining potential for predicting customer engagement and use as well. Other characteristics observed by Stephenson et al. (2008) that were considered for this analysis were, *administrative revenue* (many of the markets that closed had low revenue) and *volunteer or paid management* (volunteer managers and managers with low pay closed more frequently over the study time frame). For the former, Stephenson et al. (2008) cautioned:

It is important to recognize that many farmers’ market organizers do not seek to maximize market administration revenue. Most markets also focus on providing service to their customers, a venue for vendors to earn income and improved nutrition, food security and social enhancement of their communities (p. 191).

The missions of markets can vary and exclude profit generation; however, market revenue is still a relevant consideration because higher revenue can aid in maintaining basic market function, providing programs to increase rates of use, and compensating managers and allow them to dedicate more of their time to the markets without as much personal stress and sacrifice. Stephenson et al. (2008) also provided recommendations as to other areas that might influence

farmers market closures and usage rates over all including *characteristics of the surrounding neighborhood populations*, which may be relevant in this case as well.

Freedman et al. (2011b) examined characteristics that might indicate community readiness for farmers markets at community health centers in South Carolina and found, “Five themes related to readiness for establishing a farmers market at a community health center were identified from the data sources: capacity, social capital, awareness of health problems and solutions, logistical factors, and sustainability” (p. 82). Capacity was defined as including institutional support and previous experience with healthy food programming; social capital was defined as the relationship with the community including community partnerships and public image; awareness of health problems and solutions was defined as including a “vision that the farmers’ market will serve as the solution to community health problems” (p. 85); logistical factors included elements of the physical location including public transportation, surrounding establishments such as schools and colleges that increased customer base, volume of patients, and the availability of local farmers in the area; and sustainability included the elements necessary to ensure the market continued from year to year including an “understanding of the demands of the intervention, broad support for the project, and ownership of the project that would contribute to the continuation of the farmers’ market” (p. 86). Although, the study by Freedman et al. (2011b) provided some insight as to potential areas to examine since the goal of the study was to determine readiness of locations for establishing markets, and hopefully, markets with high rates of engagement by customers and vendors, the locations studied, the framework used, and the conclusions resulting from the study did not match point-for-point with the questions being asked in this thesis project. As a result, this thesis project investigated characteristics based on those found to be most influential by Freedman, but adjusted to increase

their relevancy to the context of this study and the specific markets observed. Specifically, the relevant areas that will be focused on related to those observed in the Freedman et al. (2011b) study are the *institutions supporting the Rochester farmers markets, the structure of the management, and the programs hosted at the markets to support public health.*

One study that ties more closely with the topic of this thesis was conducted on the opinions of market vendors who are engaged with farmers markets in Upstate New York. This is both because of the location of study and because the vendors surveyed in this study provided insight into market dynamics while markets were open and operational versus when they had already closed, like the study by Stephenson et al. (2008). Through semi-structured interviews with 18 vendors who sold at five Upstate farmers markets, Griffin and Frongillo (2003) set out to answer the questions:

(1) What are the reasons farmers sell at [Farmers Markets]? (2) What Benefits do farmers experience from selling at FMs? (3) What challenges and concerns do farmers have related to their work at FMs? (4) What values do farmers possess related to their work at FMs? and (5) What visions do farmers have for future work at FMs?" (p. 190)

Farmers had economic reasons for selling at farmers markets where they could sell their products more easily and for higher prices than they could charge to wholesalers. Additionally, farmers markets provided positive social feedback from customers who purchased their products and recognized value in their work. The difficulties involved with selling at markets that vendors reported include the long days during market season including the work on the farm and at the market. Issues vendors reported at the markets themselves include overlapping products and competing prices, competing with larger farmers, and vendors bringing in produce from out of state and/or season since it can be unripe or worse quality than other products which vendors perceived as bad for the reputation of the market as a whole. Local farmers also worried that out of state products could bring down prices of other products but some vendors said it was

reasonable for distributors to sell at farmers markets during the beginning of the season to provide product variety as long as they didn't have competing products and were honest about their products' origins. When comparing markets reviewed for this thesis project, the *number of vendors at each market* and the *policies regarding distance a product can travel, who can sell at the market (producer-only or wholesale vendors), and food raising practices* will all be observed. As issues, some vendors interviewed by Griffin and Frongillo (2003) also mentioned the time of the market, the weather at the market, insurance, vendor rates, number of customers, and location. The *time and day (and number of hours/days per week), vendor rates, and location* of the farmers markets observed for this thesis project will also be used as points of comparison. Vendors answered the remainder of the questions posed by Griffin and Frongillo (2003) reporting that some of their values associated with their work at farmers markets included working together and cooperating with other farmers (i.e. covering stalls or each other or helping out when one person is busy, defending each other to complaining customers for the betterment of the market's reputation, coordinating prices), honesty regarding products from themselves and other vendors, and courtesy to customers. Vendors also reported a desire for customers to spend money, give feedback, and spread the word to their friends about the market, and a belief that farmers markets "would continue to thrive and expand in the future" (Griffin & Frongillo, 2003, p. 200), a belief fitting with the topic of this thesis project as well.

From the articles reviewed, a set of characteristics with the potential to impact utilization of SNAP benefit acceptance programs at farmers market was developed. This set of characteristics is displayed in the Table 2. An additional characteristic that will be compared in this thesis project that was not considered in the literature reviewed is the length of the market season. The length of the market season may not have been reviewed in previous literature

because many markets have similar season lengths, usually lasting from the end of spring to early fall, matching most natural growing seasons. With alternative forms of agriculture growing in popularity in the Rochester region and elsewhere and storage techniques that increase the longevity of agricultural products, such as hydroponics and cold storage, farmers and vendors based locally can compete with products from out of state and both can continue selling throughout the year. Two of the markets reviewed for this study remain open year-round rather than during select months of the year while two of the markets reviewed remain open during select months out of the year.

Table 4: Farmers Market Characteristics for Comparison

Stephenson et al. (2008)	Freedman et al. (2011)	Griffin & Frongillo (2003)	Other
<ul style="list-style-type: none"> ● Age of the farmers market ● Market size (measured by number of vendors) ● Product variety ● Administrative revenue ● Volunteer or paid management ● Characteristics of surrounding neighborhood populations 	<ul style="list-style-type: none"> ● Supporting institutions ● Management structure ● Programs hosted at the markets to support public health 	<ul style="list-style-type: none"> ● Number of vendors at each market ● Policies regarding distance a product can travel ● Policies on who can sell at the market (producer-only or wholesale vendors) ● Policies regarding food raising practices ● Time and day (and number of hours/days per week) ● Vendor rates ● Market location 	<ul style="list-style-type: none"> ● Length of market season (months per year)

Comparing the rate of utilization of SNAP benefit acceptance programs at farmers markets is also essential to this analysis. No previous studies were found, however, that compared utilization of SNAP benefit acceptance programs or farmers markets themselves.

Thus, a review of available literature did not aid in determining the best measure of program use for comparison across markets. Committee member and Friends of the Rochester Public Market Program Director, Margaret O’Neill provided information and advice on what measures had been used to assess transaction data from the Rochester Public Market previously. The advice from O’Neill served as a springboard whereby many potential measures of use were determined including total dollars spent through the program, the number of unique cards used at each market program throughout the season (providing an estimate of the number of customers spending SNAP benefits at the market per season), the number of new unique cards from season to season (proving an estimate of the number of new customers spending SNAP benefits at the market per season), and the mean and the median amount spent per transaction. Since similar analysis has not been conducted between farmers market SNAP benefit acceptance programs previously, all three measures of program utilization were used for comparison and analysis.

B. Data Collection Techniques

The farmers markets selected for assessment were not selected randomly but rather chosen deliberately to allow for comparison of particular characteristics and rates of use. Selection was advised by thesis advisor Professor Ann Howard and Margaret O’Neill and by past experience with Rochester-Area markets on behalf of the researcher. Additionally, past partnerships on programs between markets, such as the Farm to Fork Project during the 2015 season and the Farmers Markets ROC advertising program which both attempted to get more SNAP customers to attend farmers markets, were taken into consideration so that differences that may have been impacted by grant funding and programming over the years could potentially be shared rather than differentiating factors (Farmers Markets ROC, 2016; O’Neill, 2015).

Out of the dozens of active markets in the Rochester-area, four were selected on the basis of their ability to allow for stronger comparisons. For instance, the Rochester Public Market is open all year and is a well-known market where significant amounts of SNAP dollars are used. The Brighton Market is also open year-round but does not bring in as many SNAP dollars or serve as many customers. The other two markets are not open all year and instead are open seasonally. The balancing of similarities and differences between markets selected for analysis allows for a clearer understanding of what specific factors may have influence on rates of customer engagement with SNAP benefit acceptance programs and to what degree.

Both qualitative and quantitative data was used for market comparison in this thesis project including transaction data and information on the characteristics that differed between markets. Quantitative data on SNAP EBT transactions of the Rochester farmers markets assessed has been kept on file by the Farmers Market Federation of New York, a membership organization for managers of farmers markets in the state. Margaret O'Neill was able to communicate directly with the Federation and share the information on file with the researcher. The transaction records included information from each EBT transaction between January 1 and December 31 of the specified year. The information provided on each transaction included the county the transaction took place in, market type ("farmers' markets"), the Food and Nutrition Service retailer number (FNS#) specific to the farmers market the transaction took place at, the retailer name, retailer street address, retailer city, retailer state, retailer zip code, transaction date and time, a debit designation (vs credit), the dollar amount transacted, and EBT card number of the customer. Only the last eight digits of the customer card number were visible out of the of the 21 on the card which allowed for differentiation of customers without identification of the individuals themselves.

In order to gather information on the previously identified areas of comparison displayed in Table 4, a spreadsheet was developed and filled in with information gathered from various market sources including market guidelines and policy, vendor applications, newspaper articles, past anonymous surveys conducted at the Rochester Public Market by staff and volunteers, reports by supporting organizations, and the market websites. Information collected was then reviewed and refined. Market managers were also asked to collect the lowest prices at which five different common, seasonal food items were being sold at their markets in order to allow for cost comparison across markets. Additionally, demographic information and SNAP numbers for the neighborhoods surrounding the markets was collected from the United States Census Bureau Online Fact Finder tool at factfinder.census.gov.

An attempt was also made to develop and conduct a survey of market customers, and conduct interviews with market management based on a developed interview guide. These plans were not carried out, however. Time constraints arose in the thesis process and it was determined that much of the information necessary for comparison across markets could be found from the other sources described above. Information from these sources could have been beneficial for constructing more complete, multi-level profiles of the farmers markets assessed; however, detail of this level could have also obscured the focus of the analysis and comparisons from the characteristics identified. In future research intended to delve further into this topic, surveys of customers and interviews of market management may be beneficial, but for the purpose of this research, they were deemed unnecessary considering the information already available, constraints on time and resources, and the main focus of the research.

The information collected from the reviewed resources helped construct farmers market profiles based on the characteristics of focus, and allowed for some qualitative and quantitative

analysis and comparison. The sample size of four farmers markets compared to the dozens located in the Rochester region and compared to the over 5,000 SNAP authorized farmers markets and direct marketing farmers nationwide (United States Department of Agriculture, 2014a, p. 11) is very small, but the characteristics of the markets selected do allow for some level of comparison to take place. The samples size does pose some limitations on the ability to determine statistical correlation regarding the various market characteristics and the amount of SNAP benefits spent at each market, and the applicability of the conclusions drawn from this assessment to be applied more widely, however. If more time was available, more markets would be examined and compared to help strengthen the conclusions drawn from this thesis. Nonetheless, the information provided as a result of this assessment provide insight into a new area of farmers market and SNAP research that can be expanded on in the future.

C. Analysis

The raw transaction data provided by the Farmers Market Federation of New York on EBT transactions each year were first cleaned and analyzed to determine the rate of utilization of each market's SNAP benefit redemption program. In order to clean the data, the researcher went through each transaction to determine if it took place during normal market hours. The transaction data for the Westside and South Wedge Farmers Markets were initially combined in the same reports for 2013 and 2014 because the markets were under the same management and using the same equipment to process customer transactions during these years. Since the Westside and South Wedge Farmers Markets take place on different days (Tuesdays and Thursdays respectively), the transactions for each market during these two years were differentiated through observation of the dates on which transactions took place. For each year

data was provided for, the total amount of money transacted through the program was determined along with average transaction, median transaction, and number of unique card numbers used at the market. When data for the previous year was available, the card numbers utilized at the market each year were compared in order to extract the number of new customers at the market from year to year. The average and median transaction are relevant measures of market use because they can indicate customers' confidence in the markets' ability to meet their food needs. Additionally, if a market serves proportionally fewer customers but those customers spend more per transaction, the market may be making a greater difference in food availability for their customers even if the difference is for fewer households. The transaction total is also a relevant measure because it can indicate how much food from farmers markets is being accessed by customers and what economic impact the acceptance of SNAP benefits at the market is having for vendors. The number of unique card numbers is an indication of the number of unique customers served by the market: another measure of how many people are receiving greater access to healthy food from the farmers markets as a result of the SNAP benefit redemption programs. The number of new cards numbers from year to year, when increasing, can indicate greater awareness of the program in the community and potential success of initiatives to encourage a larger market attendance from previous years.

The total number of transactions was not taken into account for multiple reasons including the fact that the transaction recorded on the spread sheet is between the customer and the market, not between the customer and the vendor, meaning that the total number of transactions for each market during the season does not reflect how many times SNAP benefits were exchanged with vendors. Additionally, customers using the SNAP benefit acceptance programs at the farmers markets have different practices for exchanging SNAP benefits; for

instance, some customers will exchange enough SNAP benefits in one transaction to cover their spending at the market for the month while other customers exchange just the amount of benefits they plan to spend at the market that day, and they may come back to exchange more benefits within the same day as they notice more products at the market related to their needs. For these reasons, the number of transactions at each market during the season is less relevant to overall use of the SNAP benefit acceptance programs than the other measures observed.

In addition to determining the values listed above for each market and each year transaction data is available for, the data was processed further to allow for more equitable comparison. The markets analyzed in this assessment were specifically chosen because of their varying market characteristics, which allowed for comparison across these characteristics in the final analysis. Although, the differences in these characteristics can be beneficial in a comparative manner for the final analysis, for comparison of total SNAP spending and total number of customers served by the markets, the variety in the number of vendors at each market and in the months per year, days per week, and hours per day that each market is open can complicate matters. For instance, a market with 15 vendors, open 3.5 hours a day, one day a week, 19 weeks a year will not be able to serve the same number of customers and take in the same amount of money as a market open all year with twice as many vendors or more simply because of restrictions on time and vendor/product availability. The differences between markets in terms of the number of vendors at each market and the months per year, days per week, and hours per day that each market is open were taken into consideration when further data analysis was conducted.

Three of the four markets assessed in this project are open three to four hours a day, one day a week and two of the four markets are open only from June to October each year. The

market with different hours with different hours is open three days a week for seven to ten hours each day, and the two other markets are open year-round. In order to account for these differences and to not let them substantially impact the overall measured rates of SNAP benefit acceptance program utilization in terms of the number of customers using the program and the amount of money the program brought in, the market managers chose the three hours a week when their markets are open that tend to see the highest number of customers. Those three hours were then compared across all four markets for the months of June to October.

After this step was taken, the number of customers attending the markets and the amount of money brought in through the SNAP benefit acceptance programs were compared to the number of vendors at each market. This was done in an effort to represent the average amount of money brought in by the SNAP benefit acceptance program and the average number of customers using the program per vendor. This comparison is valuable for vendors at these markets and at others that have or are considering implementing SNAP benefit acceptance programs because it displays the average benefit of the program to vendors at markets with various characteristics. Next, the potential relationship between these values was compared to the percentage of households receiving SNAP benefits in the area surrounding the market (the zip code the market is located in). The information about the percentage of households in the surrounding area receiving SNAP benefits is important in comparing the measures of SNAP benefit redemption program utilization because, presumably, the number of households receiving SNAP benefits represents the number of customers who would consider spending SNAP benefits at the farmers market. Some markets have more potential SNAP customers in the surrounding neighborhoods. Without taking the percentage of households receiving SNAP benefits into consideration, one market's SNAP benefit redemption program may be seen as having a more

successful program in terms of the number of dollars and customers brought in when the real factor in their success is the location of the market in relation to their customer base. Once the demographics of the surrounding neighborhood were taken into consideration, it was possible to hypothesize about whether there was any difference in the amount of SNAP benefits and unique customers visiting each market that was not explained by the number of months, days, and hours open, number of vendors, and the percentage of households receiving SNAP benefits in the surrounding area.

Following this quantitative assessment and the determination that there was still a level of unexplained variation in the amount of money brought in through the SNAP benefit acceptance program and the number of customers served, qualitative comparison took place. The characteristics in Table 4 were compared across markets. The comparisons based on this information were used to hypothesize what characteristics might have the most significant impact on the differences between market SNAP benefit acceptance program utilization rates. Qualitative assessment was used without further quantitative support because too few markets were assessed in this thesis to perform regression modeling. From the qualitative and quantitative analysis that was conducted, potential relationships were inferred and compared to the findings of past research, and suggestions were made as to what policies could be implemented by farmers markets and by state, local, or federal government in order to further enhance these programs to increase rates of customer engagement, increase the number of SNAP dollars spent at farmers market, increase revenue for local farmers selling at markets, and increase access to healthy foods for SNAP recipients.

IV. Farmers Market Profiles

The four markets profiled for this thesis share some similar characteristics but also differ in many areas. Their similarities stem from matching the USDA definition of farmers markets: “Two or more farmer-producers that sell their own agricultural products directly to the general public at a fixed location, which includes fruits and vegetables, meat, fish, poultry, dairy products, and grains” (United States Department of Agriculture, 2016b). They are also similar in the availability of local fruits and vegetables among other products, and their token programs which are almost identical. Profile of the four different markets are used to further explore market similarities and differences in terms of vendor qualifications, management structures, number of vendors, seasonality, customer feedback, and the amount of SNAP shoppers attending each markets and SNAP benefits being spent.

A. Westside Farmers Market

The Westside Farmers Market, located in the parking lot of Saint Monica’s Church at 831 Genesee Street, is the smallest market assessed in this thesis in terms of vendor size. The Westside website lists 15 regular food vendors but the number of vendors at each market can vary. For instance, some vendors attend the market during specific times of the season when their staple crops are ripe. That being said, every one of the products brought to the Westside Farmers Market are from within 100 miles of the Rochester City limits according to their rules and regulations (Westside Farmers Market, 2016b). The rules and regulations also specify that the Westside Farmers Market is “grower-producer-only”:

All goods to be sold at the [Westside Farmers Market] are to be grown, prepared or crafted by the vendor offering the item for sale, or an employee of that respective

business/operation. The WFM is a producer only market; no re-sellers are to be allowed at the WFM. Without prior permission, vendors also may NOT sell items grown at locations other than their own farm/orchard: you may not sell produce from another grower at your booth (Westside Farmers Market, 2016b, p. 2).

This rule and the rule regarding distance food can travel both prevent wholesalers from selling products grown out of state and establish an opportunity for customers at a city market to interact directly with farmers and food producers in the area. Additionally, these rules prevent farmers who sell at the Westside Farmers Market from experiencing the same frustration recorded among farmers market vendors interviewed for the study by Griffin and Frongillo (2003): specifically the worry that vendors bringing in produce from out of state and out of season would be unripe and taste worse than in-state, seasonal products which could damage the reputation of the market as a whole, while simultaneously bring down prices for those products across the market. Nonetheless, participants in the study by Griffin and Frongillo (2003) recognized that allowing distributors to sell products during the beginning of the season, when less products are ripe, to provide variety could be beneficial to market attendance, as long as the distributors didn't have competing products and were honest about the products' origins.

The Westside Farmers Market management also recognized that the increased product variety could be beneficial to the market and included an exception to the producer-only rule in rules and regulations, although not to any other standards set for products being sold at the market:

Re-selling may be permitted by WFM Management if and only if there is no competition amongst similar goods already being sold at the WFM by a pre-existing vendor. Re-sold goods are to be permitted only if the good's original producer's farm/orchard operation meets all WFM pre-requisites. The purpose of allowing said products is to create product diversity at the WFM, and to support the work of small producers (Westside Farmers Market, 2016b, p. 2).

Additional limits set on products sold at Westside regard the methods by which food is raised or produced. "The WFM seeks to support and encourage the practices of sustainable agriculture at a level deemed appropriate to vendors' individual operations" (Westside Farmers Market, 2016b, p. 2). Certified organic and uncertified products, and products produced with low spray, Integrated Pest Management, and conventional growing practices are welcome for consideration as vendors at the market, but the market management places an emphasis the importance of vendors moving towards sustainability. The market management also expressed their prioritization of sustainable and humane practices used in meat production. "The market will emphasize, but not limit market options to grass based production and pasture raised meats, but we will require a production operation that meets basic guidelines established and interpreted by the Advisory Committee" (Westside Farmers Market, 2016b, p. 2-3).

The Market Advisory Committee maintains the responsibility for establishing, interpreting, and revising these guidelines as they see fit and also directing the market as a whole. According to the Market Rules and Regulations, the Westside Farmers Market is "directed by the WFM Advisory Committee under the guidance of the Southwest Common Council and the fiduciary oversight of the South Wedge Planning Committee" while "Day-to-day responsibilities for WFM operations and functions will be carried out by Market Manager and a volunteer-based Leadership Team" (Westside Farmers Market, 2016b, p. 1). Both the Market Manager and the Leadership Team are volunteer and unpaid. The market itself runs every Tuesday from 4 to 7:30 pm (or until 7 pm during the latter half of the season when the sun starts setting earlier) and from June to October (four months a year).

Vendor fees are the lowest of any market examined at \$150 for the season (19 market days) or \$15 per market for specific, pre-designated days. The Westside Market also has the

highest required rate of insurance at \$2,000,000 (Westside Farmers Market, 2016a, p. 1). In order to maintain affordable prices at the market while still maintaining quality, seasonal, sustainably and ethically raised product availability, the Market Rules and Regulations also includes a "Fair Price Parity Clause" that "encourages all vendors to charge a price for their products that is fair to the producer, their fellow producers, employees and equally importantly to their customers" and a price that includes both the cost of production and a "fair profit for the producer" (Westside Farmers Market, 2016b, p. 3). Even so, the cost of the five items lowest prices were identified for across marketers is still double that of the market with the lowest cost while not being as high as the market with the highest cost.

The Market's location in the parking lot of Saint Monica's Church is appropriate for sunny days, and when it starts to rain, the Market stays open but moves into the shelter of the church walls. The move inside reduces visibility of the market, however, and can lead to customers thinking that the market is closed on days when it is still open. Signage and volunteers dressed in fruit and vegetable costumes occasionally stay outside in the rain and attempt to direct traffic indoors on these occasions. Volunteers also wear the fruit and vegetable costumes on the first day of the market for the annual cupid's shuffle dance and are often joined by customers and neighbors. Musicians from the local area are scheduled to perform at the market each week, and a different craft activity for children attending the market is hosted each week as well. Not-for-profit and community organizations are also encouraged to take part in and table at the market. The Arnett Branch Library, FoodLink, R Community Bikes and Cornell Cooperative Extension are four such groups that have attended the market regularly in recent years. The market was established in 2008 and has run for nine seasons thus far.

B. South Wedge Farmers Market

The South Wedge Farmers market is the second largest market with 19 regular food vendors. Also supported by the South Wedge Planning Committee, the market was founded in 2006 and has a paid manager (Taddeo, 2015). The market runs from June to October on every Thursday from 4 to 7 pm. The market, originally located in the parking lot of Boulder Coffee Co. on the corner of South Clinton Avenue and Alexander Street, changed location to the Genesee Gateway Park at 151 Mount Hope Avenue for the first time during the 2015 season to increase availability of parking and to move a few blocks closer to their office location across the street from the park. The market does not close in the case of weather unless lightning is present. Market vendors are charged \$225 for the season (19 weeks) or \$25 for specific market days and required to have \$1,000,000 in insurance coverage.

Like the Westside Farmers Market, the South Wedge Farmers Market has a set of guidelines regarding what food can be sold at the market and by whom. The products sold at the South Wedge Farmers Market must also come from fewer than 100 miles outside of the city limits and the Market Guidelines specify that the market is producer-only, although the guidelines also explain that there are cases in which exceptions will be made:

Re-selling will only be permitted under the following circumstances: if no grower is selling a particular item, another vendor may purchase the item from a nearby farmer and sell it, provided approval has been obtained from the market manager at least one week prior to each anticipated sale date. The farming operation from which the goods are purchased must meet the standards set forth under these guidelines. The vendor must display the name and address of the farm that grew or produced the item to be re-sold. If that item becomes available from another vendor at the market from that farmer's own production, the vendor re-selling the item must no longer sell it. In addition, market management may at its discretion permit re-selling if the re-selling will allow a market need to be met (South Wedge Farmers Market, 2015, p. 1).

The South Wedge Farmers Market also places value, and priority, on products that are sustainably grown, produced, or raised. The Advisory Board for the South Wedge Farmers

Market has almost the exact same standards of sustainability as the Westside Farmers Market (Westside Farmers Market, 2016b) where different agricultural practices and products both with and without organic certification will be considered, and where guidelines have been established for the ecologically sound and humane raising of animals. The guidelines for the South Wedge Farmers Market (2015) further explain the market and the Advisory Board's commitment to sustainability as follows:

Priority will be given to farms using organic or sustainable methods of agriculture, including the avoidance of genetically modified products. The market is committed to ecologically sound and humane husbandry. The market will emphasize grass-based production and pasture-raised meats, with the expectation that animals must have spent a majority of their life on vendor's farm, must have an appropriate quality of life, and must be raised without growth hormones or antibiotics (p. 2).

The guidelines explain the prioritization of sustainability from vendors at the market and also the market's commitment to maintaining fairness for their customers and vendors alike in the form of a statement on price similar to that presented in the Westside Farmers Market rules and regulations (Westside Farmers Market, 2016b). The South Wedge Farmers Market 2015 guidelines state:

To promote positive relationships among vendors and between vendors and customers, the SWFM encourages all vendors to charge a price for their products that is fair to the producers, their fellow producers, employees and equally importantly to their customers. Such pricing should include both the current costs of production, and a fair profit for the producer (p. 1).

Pricing was not collected from the South Wedge Farmers Market; however, since the South Wedge and Westside Farmers Markets are both attended by some of the same vendors of the products prices were recorded for, it can be reasonably inferred that their level of pricing is similar, meaning that the South Wedge Farmers Market also has prices double that of the market with the least expensive prices but still below the market with the highest. The South Wedge Market also expresses an interest in their community and the local area through their invitation to

community not-for-profits and organizations to attend the market, local bands to play at the market each week, and for rotating chefs from local restaurants and community members with a proficiency for cooking to perform cooking and food demonstrations using ingredients from the market itself, paid for by the market. These efforts offer the opportunity for local organizations, musicians, and restaurants to connect with their community and market attendees while also enhancing the market experience for customers. Cooking demonstrations can be particularly beneficial for restaurants, customers, and vendors alike since they can simultaneously advertise the restaurant and the products sold directly at the market (foods utilized in cooking demonstrations are often highly sought after by customers who participate during that market day) and can teach market customers about new recipes and familiarize them with products they otherwise may not have known.

C. Brighton Farmers Market

The Brighton Farmers Market, founded in 2008, is larger than both the Westside and South Wedge Farmers market with 39 regular vendors of SNAP qualified foods. The market is located in the parking lot of Brighton High School at 1150 South Winton Road every Sunday from 9 am to 1 pm for six months out of the year (May to October). Starting in November, the location shifts to the Brookside Community Center at 220 Idlewood Road for the smaller, winter market and the hours are adjusted to 1 to 4 pm until the summer season starts again. Instead of being supported by a neighborhood organization, the market is funded through the Town of Brighton itself and the market manager is paid (Taddeo, 2015).

With more vendors, the Brighton Farmers Market has more product variety than the Westside and South Wedge Farmers Market. All three markets sell foods from staple categories

including fruits, vegetables, prepared foods, food plants, baked goods meats, and eggs, although the Westside market sometimes lacks dairy products. The Brighton Market has a few more specialty products including honey, maple syrup, pasta, ciders, and juices. The Brighton Market places similar restrictions on their vendors and products as the Westside and South Wedge Market as well (South Wedge Farmers Market, 2015; Westside Farmers Market, 2016b). For instance, the rules of the market state, "Vendors must come from no further than 100 miles from Brighton, NY" (Brighton Farmers Market, 2016c, p. 1). The market website states, however, that most of the farmers and vendors that sell at the market are actually from within 50 miles of the town (Brighton Farmers Market, 2016a). The reasons for the Market's acute focus on local food are explained on their website:

The fruits and vegetables were probably picked within hours of their arrival at the market. That freshness guarantees delicious flavor and nutrition at its peak. Buying local food supports local farmers and their livelihood, preserves farmland, and benefits the local economy. Fewer fossil fuels are burned transporting food such short distances. We reduce our carbon footprint ... (Brighton Farmers Market, 2016a).

The Market's focus on sustainability extends beyond the distance food products and vendors travel. Many of their vendors are certified organic, use organic practices, and/or make an effort to reduce the use of chemicals on their crops (Brighton Farmers Market, 2016a). Market materials also state a priority for organic and sustainably raised and produced products and vendors making an effort to increase the sustainability of their processes (Brighton Farmers Market, 2016c). While many of the vendors at the Westside and South Wedge Farmers Markets use organic and sustainable practices few if any vendors are certified organic by the USDA, primarily due to the cost of the certification. While the certification guarantees certain standards of organic farming practice, it can also raise prices for customers. The Brighton Farmers Market had the highest prices of all four markets for the same products.

On the vendor application, an effort is extended to ensure that future vendors used sustainable practices as well. Vendors offering produce are asked to explain on their application “how [they] apply environmentally sustainable agricultural principles to [their] farming operation” and their “methods in regard to soil building, insect control, weed control, and disease control” (Brighton Farmers Market, 2016b, p. 1). Vendors who raise livestock are asked to describe the “housing, confinement, and pasturing methods, as well as feed provided and use of hormones and antibiotics” in as much detail as needed (Brighton Farmers Market, 2016b, p. 1). Vendors not offering agricultural products are also asked to explain the sustainable methods used in their operation and production processes (Brighton Farmers Market, 2016b). The Brighton Market is also designated as producer-only, although they have similar exemptions to this rule as the South Wedge Farmers Market (Brighton Farmers Market, 2016c; South Wedge Farmers Market, 2015). Vendors fees for the summer season total \$250 (for 24 weeks) and vendors are required to have \$1,000,000 in insurance coverage (Brighton Farmers Market, 2016b). The market rules, similarly to the Westside and South Wedge Markets, include a section on fair pricing. "Vendors are expected to charge prices that are fair to themselves, their customers, and other producers at the market. No price fixing or gouging is allowed" (Brighton Farmers Market, 2016c, p. 1). Care for customers and the surrounding community is also expressed through the inclusion of community organizations in market functions. Like the Westside and South Wedge Markets, the Brighton Market allows community organizations to table on market days and has local musicians perform. Additionally, the market has special events at its summer location including an Eco Fair, Bike Rodeo, Public Safety Day, and Arts Day to help engage the community further.

D. Rochester Public Market

While the Brighton Farmers Market is larger than many other markets in the area, it still has less than 15% of the vendors that the Rochester Public Market has on its busiest days. The Rochester Public Market, run by paid City of Rochester staff, can have over 300 vendors on busy market days, 120 of which accept SNAP benefits through the Market Token Program. At the present time, there are no licenses available for vendors to reserve a recurring space (Rochester Public Market, 2016). Instead, currently, vendors who wish to sell at the market can call a few days in advance to see if a space is available for them to fill on the market day desired (Rochester Public Market, 2016). The daily vendor rates are predominantly higher than the rates at other locations; however, they also vary by market day, market location, and time of year (see Table 5). Vendors at the Market, like at the other markets, are required to have \$1,000,000 in insurance naming the City of Rochester as well.

The Rochester Public Market is located at the same place it was when first established in 1905 (280 Union Street North) and has had a series of renovations over the years, including some renovations in the works currently. There are vendor locations both outdoors under covered, open sheds and in the fully enclosed Wintershed (open year-round). These different locations allow the varied needs of different vendors (such as access to electricity) to be met with ease, and allows for coverage of products in inclement weather, including the winter months. The Rochester Public Market is open every week of the year, three days a week (Tuesday, Thursday, Saturday). Hours, levels of attendance, and the number of vendors at the market is dependent on the day of the week and time of year. On Tuesdays and Thursdays, the market is open from 6 am to 1 pm and on Saturday the market is open from 5 am to 3 pm. The numbers of customers attending the market are lowest on Tuesdays and highest on Saturdays, which may

influence how the daily vendor rates are set as showing in Table 5 with the lowest rates charged on Tuesdays and the highest on Saturdays. The rates for market days between May 1 and October 31 are also the highest likely due to this time frame's relation to the growing season and the nice weather encouraging larger numbers of customers to attend. The rates between January 1 and April 30 are the lowest likely due to the time frame's relation to the growing season as well, and due to the cold weather, which can keep customers home.

Table 5: Rochester Public Market Schedules of Rates (May 2016 – April 2017)

Daily Vendor Rates		
Tuesdays		
Shed A & C	May 1, 2016 – Dec. 31, 2016	\$ 20.00
- Prepared Food		\$ 35.00
Shed A & C	Jan. 1, 2017 – April 30, 2017	\$ 10.00
- Prepared Food		\$ 20.00
Shed B (Enclosed)	May 1, 2016 – April 30, 2017	\$ 30.00
Thursdays		
Shed A & C	May 1, 2016 – Oct. 31, 2016	\$ 40.00
- Prepared Food		\$ 50.00
Shed A & C	Nov. 1, 2016 – Dec. 31, 2016	\$ 30.00
- Prepared Food		\$ 40.00
Shed A & C	Jan. 1, 2017 – April 30, 2017	\$ 20.00
- Prepared Food		\$ 30.00
Shed B (Enclosed)	May 1, 2016 – April 30, 2017	\$ 50.00
Saturdays		
Shed A & C	May 1, 2016 – Oct. 31, 2016	\$ 80.00
- Prepared Food		\$ 120.00
Shed A & C	Nov. 1, 2016 – Dec. 31, 2016	\$ 50.00
- Prepared Food		\$ 80.00
Shed A & C	Jan. 1, 2017 – April 30, 2017	\$ 30.00
- Prepared Food		\$ 55.00
Penn Is./Market Office	May 1, 2016 – Oct. 31, 2016	\$ 60.00
- Prepared Food		\$ 100.00
Penn Is./Market Office	Nov. 1, 2016 – Dec. 31, 2016	\$ 40.00
- Prepared Food		\$ 75.00
Shed B (Enclosed)	May 1, 2016 – April 30, 2017	\$ 85.00

(Rochester Public Market, 2016, p. 7)

In terms of who is allowed to sell at the market, there are no limits on the distance products or vendors are allowed to travel or food raising practices. Instead, vendors are sorted into five Stall Priority Assignment Categories: NYS Farmers, Other Foods, Arts and Crafts, Prepared Foods, and General Merchandise (p. 11). Full descriptions of these categories are provided in Table 6. The Public Market prioritizes farmers from within New York State and then other food vendors, but no strict limits are placed on distance, beyond the specification of the product coming from within state borders. The Market is also not producer-only meaning that it is possible for farmers to sell their food at the market through a friend or a distributor. Additionally, the lack of distance limits allows for a greater variety of food options to be present at the market year-round. A brochure titled “Tips for Shopping for Fruits and Veggies at the Market” described the unique food variety at the market as follows:

At the Rochester Public Market local farmers and small businesses provide a wide variety of foods, plants and merchandise to shoppers. Local farmers sell farm-fresh foods they have produced, side by side with vendors who purchase fruits and vegetables from around the world. As a result, you can find local fresh-picked berries and sweet corn in the summer, plus foods like bananas, avocados and exotic spices year round. While we enjoy a bountiful harvest of fresh produce especially during the summer and fall, wholesale vendors make it possible to enjoy foods like broccoli, green beans and asparagus year-round (Rochester Public Market, n.d., p. 2).

In addition to having a wide variety of food available all year, the presence of Arts and Crafts, Prepared Foods, and General Merchandise vendors add a greater diversity to market offerings too. One issue shoppers at other markets have brought up in past studies is the limited selection of products at the market. As Ruelas et al. (2011) found, “Nearly half of respondents [interviewed at farmers markets] in East LA (44%) and South LA (41%) reported that they would like to see other products sold at the market” (p. 558). In comparison to supermarkets where all items on a person’s shopping list can be found, a prepared food venue might be located within the store, where there might be an ATM and other services all in one location, a farmers

market can seem like a less convenient shopping option to some customers. The inclusion of vendors of other products, programs, and services at the Rochester Public Market may help in attracting greater numbers of customers and greater revenue for local vendors: farmers, artist, or otherwise. Additionally, despite the lack of a fair pricing clause in the Market rules, customers report that the prices at the market are incredibly low to the point where much produce is noticeably less expensive than the supermarket (Friends of the Rochester Public Market, 2008a; Friends of the Rochester Public Market, 2008b; Friends of the Rochester Public Market, 2009; Friends of the Rochester Public Market, 2010; Friends of the Rochester Public Market, 2012; Friends of the Rochester Public Market, 2013; Friends of the Rochester Public Market, 2014; Friends of the Rochester Public Market, 2015; Rochester Public Market, 2016). This is one of the reasons among many others that the Rochester Public Market won the award of America’s Favorite Farmers Market from the American Farmland Trust in 2010 (City of Rochester, NY, n.d.-). Of the four markets, the Rochester Public Market had notably less expensive products that were half the cost of the Westside Farmers Market and less than half that of the Brighton Farmers Market (approximately 42% of the cost).

Table 6: Stall Assignment Priority Categories

1. NYS Farmers	2. Other Foods	3. Arts and Crafts	4. Prepared Foods	5. General Merchandise
“Vendors who grow Agricultural Products in New York State. Agricultural Products include: vegetables, fruits, meats, fish, dairy, and related products, including honey and syrup, livestock, live plants, herbs, spices and live flowers.”	“Vendors of Other Foods such as Agricultural Products (as defined above) not grown in New York State and other edible items including: baked goods, jams, jellies, etc.”	“Vendors of Handmade Arts and Crafts. All products being sold must be handmade by the vendor.”	“Vendors of Prepared Foods. Prepared foods are limited to specialty items, intended to be consumed on-site. *Note: Additional vendors of hot dogs, hamburgers, sausage, or traditional breakfast items will not be considered for placement.”	“Vendors of new General Merchandise. General Merchandise includes but not limited to: clothes, purses, toys and all other non-edible items.”

(Rochester Public Market, 2016, p. 11)

The markets that have been reviewed thus far have hosted programs from the community, adding some variety to their service offerings, and the Rochester Public Market does the same. Because of the Market's high attendance, the Rochester Public Market has been the focus of many programs from various outside organizations and the market staff as well. For instance, food and cooking demonstrations are regular activities at the market. Flavors of Rochester at the Market is a food demonstration series hosted each Saturday from May to September by a partnership between the Rochester Newspaper *Democrat & Chronicle*, Summit Federal Credit Union, and the Market itself with the goal to celebrate cultural and ethnic diversity within Rochester. Margaret O'Neill, who works for the Friends of the Rochester Public Market, also hosts a food demonstration called *Healthy Tastings* once per month at the Market. Foodlink, a nonprofit food bank based in Rochester that distributes food to hungry families in the surrounding area, also hosts a cooking demonstration series called *Just Say Yes to Fruits and Vegetables* (JSY) aimed at serving SNAP recipients (Foodlink, 2016). The program is held on Thursdays from 9 am to 12 pm and Saturdays from 9 am to 1:30 pm by a Foodlink nutritionist and teaches cooking techniques to participants that can be used on a variety of produce found at the Market (Foodlink, 2016).

Educational programs, including *Nature @ the Market*, are also held at the market. *Nature @ the Market* is hosted by Greentopia, a nonprofit dedicated to environmental education, advocacy, and development in the Rochester area (City of Rochester, NY, n.d.-b). On some Saturdays, environmental organizations teach market goers about environmental issues and initiatives. An environmental initiative started at the Rochester Public Market independently of Greentopia is the Flower City Pickers. The Flower City Pickers is an organization made up entirely of volunteers who collect food waste from the vendors at the market and distribute it to

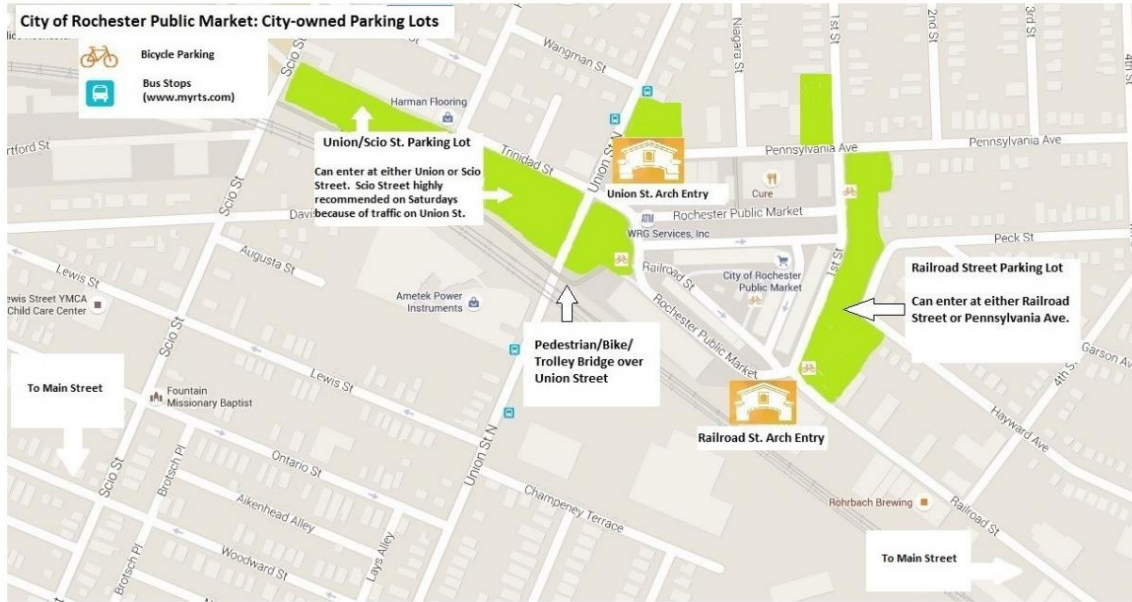
various locations in need including shelters, soup kitchens, people's homes, meat producers, and composting sites, keeping literal tons of food waste from the landfill each Saturday. The Market also hosts many well attended events on Market grounds when the Market is not in session including Food Truck Rodeos, Greatest Community Garage Sales and Super Fleas, Bands on the Bricks, Flower City Days, and Holidays at the Market

The Rochester Public Market has also hosted programs specifically to help address the issue of parking overflow during the summer season and to reduce the environmental impact of travel to the market. The Public Market has five free, city-owned parking lots within walking distance to the Market (see Figure 1) and with a Market-run trolley route that can drive Market customers and their purchases to and from their parking spots in these lots (City of Rochester, NY, n.d.-b). There are also paid parking lots and additional street parking within walking distance. Parking at other markets has not been discussed as an issue because most at present time have sufficient parking available to them. The Rochester Public Market is still expanding their parking options with new Marketmobile Shuttle program just added to the Market's offerings (City of Rochester, NY, n.d.-b). The program provides free shuttle rides to and from the free East End Parking Garage to the Market (see Figure 2): about a five-minute ride with a 20-minute loop (City of Rochester, NY, n.d.-b). There is also a raffle incentive for taking the shuttle.

A raffle incentive is now also available for people who ride their bikes to the market and register for the Bike Benefits Incentive/Reward Program (City of Rochester, NY, n.d.-b). Once registered, customers who ride their bikes to the market can either stop by the Market Office on Market days or send a picture of themselves on the bike at the Market to the Market's email. Participants in the program also receive a discount at local Full Moon Vista Bike Shop. A

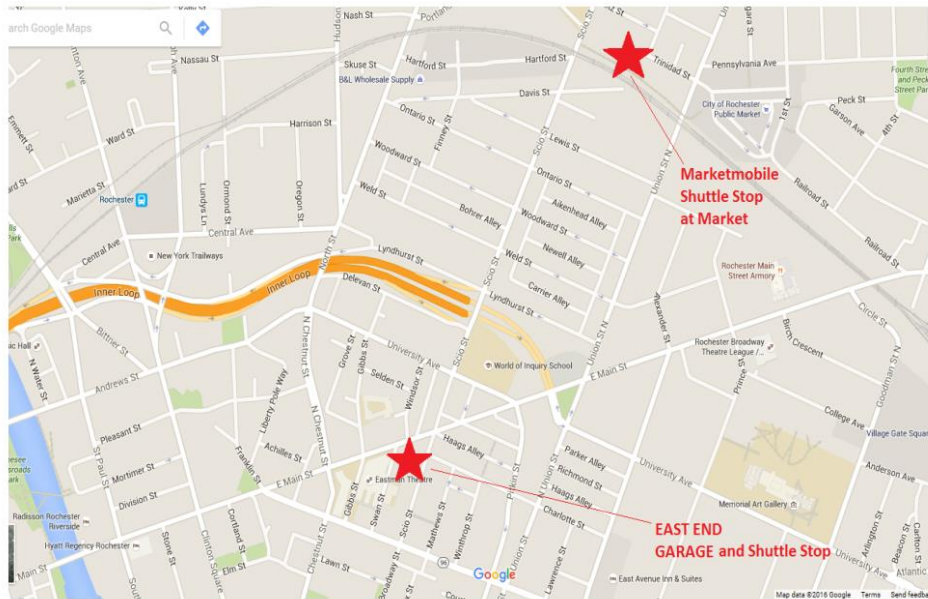
pedestrian bridge was also built over Union Street to increase safety for pedestrians and bikers attending the market and to encourage more people to utilize walking and biking as an alternative to driving.

Figure 1: Parking Near the Rochester Public Market



(City of Rochester, NY, n.d.-b)

Figure 2: Marketmobile Shuttle Map



(City of Rochester, NY, n.d.-b)

While the management of the Market functions discussed so far are primarily managed or overseen by the market management, the SNAP Token Program at the Rochester Public Market is primarily managed by the Friends of the Rochester Public Market. According to their mission: “The Friends of the Rochester Public Market is a not-for-profit volunteer organization whose goal is to provide advocacy, promotional assistance and interpretative and educational programs related to the market's operation and history” (Friends of the Rochester Public Market, 2016). The structure of the SNAP Token Management is different from the other markets in this way, and also in that revenue is generated from the token program: when vendors return tokens, a 2% processing fee is deducted from the total dollars redeemed by vendors. The Friends support the market through developing educational materials, curriculum, and tours about the market, managing the SNAP Token Program, and raising funds to support Market initiatives. The Friends of the Rochester Public Market has also conducted brief, anonymous, structured interviews with customers of their Market Token Program on an almost yearly basis (2008a; 2008b; 2009; 2010; 2012; 2013; 2014). The interviews provide information on use of SNAP Token Program, the impacts of shopping at the market using the token program, and additional feedback and suggestions and will be reviewed in the next section, along with census data, to develop a profile of the customer base at each market.

V. Customer Profiles

Although there are many places across the country that have started SNAP benefit redemption programs at farmers markets, Rochester, New York deserves particular focus. This is in part due to the high poverty rates in the city – translating to high rates of SNAP eligibility –

and in part due to the high utilization rates of the Rochester Public Market SNAP benefit acceptance program. The City of Rochester has notably high rates of poverty. According to a 2013 report, based on census numbers from 2007 through 2011, the city has a poverty rate of about 31 percent: double the national poverty rate in 2010 at 15.3 percent (Doherty, 2013; Bishaw, 2012). This poverty rate makes Rochester the fifth poorest city in the country out of the 75 largest metro areas and the second poorest when compared to cities similar in size within the United States (Doherty, 2013). The report also stated that 83 percent of students within the Rochester City School District are eligible for free lunches through the National School Lunch Program (Doherty, 2013). Eligibility for free lunches through this program is also based on family income being below 130 percent of the poverty line meaning that most if not all of these students live in families that qualify for SNAP benefits.

Not all households that qualify to receive SNAP benefits apply, and the percentage of households utilizing SNAP benefits also varies between zip codes within the city. Table 7 shows the United States Census Bureau's estimates on the number of households receiving SNAP benefits in the zip code each market is located in and the total number of households. Table 7 also displays the poverty rate, race and ethnicity, median income, and some of the household makeup in terms of whether or not there is someone over 60 years old and whether or not there is someone under 18 years within the household for both the total population and for SNAP recipients.

Table 7: 2014 Census Data on Total Households in Market Neighborhoods Compared to Households Receiving SNAP Benefits

Subject	14609 (RPM)		14618 (Brighton)		14619 (Westside)		14620 (South Wedge)	
	Total Estimate	Households Estimate	Total Estimate	Households Estimate	Total Estimate	Households Estimate	Total Estimate	Households Estimate
Households	17,850	4,358	8,008	227	5,784	1,619	11,536	1,935
With one or more people 60 years and	29.2%	22.9%	40.6%	24.7%	28.1%	17.5%	22.3%	17.5%
With children under 18 years	32.1%	53.9%	30.3%	37.9%	39.0%	67.1%	18.0%	27.2%
POVERTY STATUS IN THE PAST 12								
Below poverty level	22.2%	65.0%	5.9%	32.2%	19.0%	48.5%	21.8%	64.2%
RACE AND HISPANIC OR LATINO								
One race	97.4%	94.8%	98.4%	100.0%	96.0%	93.5%	98.0%	97.3%
White	62.0%	36.7%	86.3%	81.5%	24.7%	10.4%	77.3%	55.6%
Black or African American	28.8%	50.3%	4.3%	18.5%	69.0%	82.5%	13.2%	35.4%
American Indian and Alaska Native	0.3%	0.7%	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%
Asian	0.9%	0.4%	6.8%	0.0%	0.9%	0.0%	6.4%	3.6%
Native Hawaiian and Other Pacific	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%
Some other race	5.2%	6.6%	0.7%	0.0%	1.5%	0.6%	0.9%	2.7%
Two or more races	2.6%	5.2%	1.6%	0.0%	4.0%	6.5%	2.0%	2.7%
Hispanic or Latino origin (of any race)	14.4%	21.1%	2.1%	0.0%	4.0%	3.8%	4.8%	6.8%
White alone, not Hispanic or Latino	55.5%	26.8%	85.5%	81.5%	23.0%	8.5%	73.9%	52.1%
HOUSEHOLD INCOME IN THE PAST 12								
Median income (dollars)	40,737	14,664	81,800	32,578	37,448	22,330	40,179	12,012

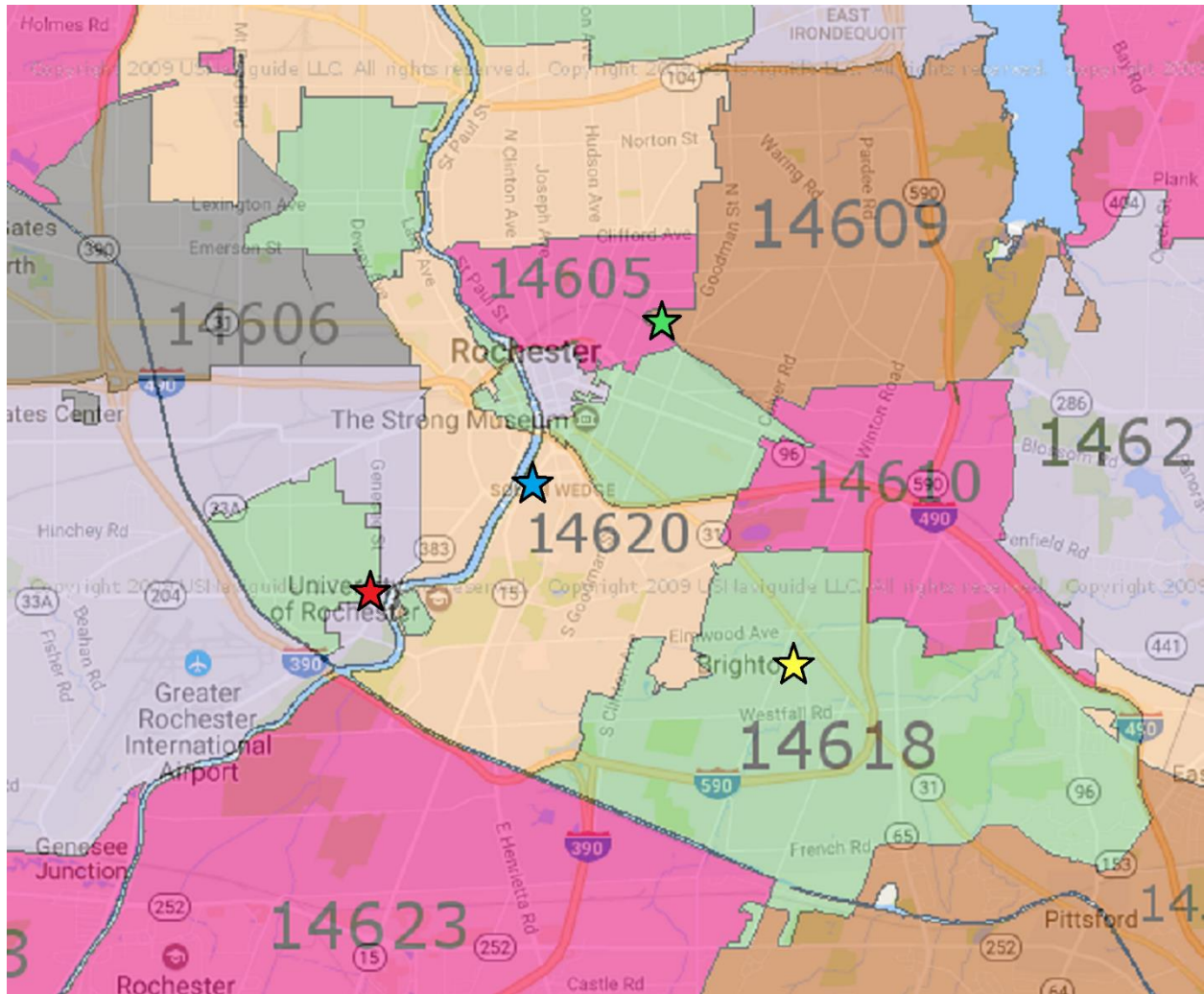
(United States Census Bureau., 2014)

According to the information presented in Table 7, the zip code with the highest number of SNAP households is 14609, the zip code where the Rochester Public Market is located. The zip code with the lowest number of SNAP households is 14618, where the Brighton Farmers' Market is located. This zip code also has the lowest proportion of SNAP households to total households, but the zip code with the highest proportion of SNAP households to total households is 14619 where the Westside Farmers Market is located. Rates of poverty are higher for households receiving SNAP in comparison to the overall population, which makes sense since households need to earn 130% or less of the poverty line in order to be eligible for SNAP. The median income is also lower for households receiving SNAP in comparison to the total population, which can be explained by eligibility requirements for SNAP as well. Higher percentages of SNAP households in all four zip codes also have children in comparison to the overall population.

Some market customers likely come from zip codes outside of the one their market is located in. This is definitively the case with the Rochester Public Market, though, because the number of unique EBT cards used at the Rochester Public Market has exceeded the number of individuals receiving SNAP benefits within the 14609 zip code, even when margin of error is taken into account, in all years transaction data was available for.

The Friends of the Rochester Public Market have collected survey data from SNAP customers that supports the statement that customers come to the market from a variety of neighborhoods outside of the market's immediate surroundings. The Friends of the Rochester Public Market have conducted surveys since months after the start of the Token Program in 2008. The number of participants in the survey have ranged from 48 to 116 with an average of 80 participants each year (2008a; 2008b; 2009; 2012; 2014; 2015). Most surveys asked what zip code the residents resided in, and all surveys that asked found that the majority of SNAP customers came to the market from surrounding neighborhoods but that a portion of SNAP customers did come from farther away (2008a; 2008b; 2009; 2012; 2014; 2015). In 2012, the Friends of the Rochester Public Market found that 93% of SNAP customers interviewed were from the City of Rochester and that 47% of SNAP customers came from neighborhoods closest to the market, defined as the zip codes 14605, 14607, 14609, and 14621. Even though the zip codes in Table 7 do not provide a complete picture of market attendees, they provide a basis of comparison that is useful to some extent in qualitative assessment and that is particularly helpful with the quantitative assessment that is described in the next section.

Figure 3: Market Zip Code Map



Zip Code Map from <http://www.zipmap.net/>. The green star represents the Rochester Public Market. The blue star represents the South Wedge Farmers Market. The red star represents the Westside Farmers Market. The yellow star represents the Brighton Farmers Market.

VI. Findings: Assessment of User Engagement

User engagement was measured in a variety of ways for this assessment including total sales, average and median sale total, number of unique cards, and number of new cards. Table 8 shows some examples of these measures extracted from raw SNAP benefit transaction data from each of the markets assessed in this thesis project. Total sales, the average and median

transaction between the market office or tent and the customer, number of unique cards, and number of new cards were all assessed for each year. The Rochester Public Market had the highest numbers in all categories. The other farmers markets appear to have numbers that are fairly similar other than the higher average sale and fewer unique and new customers at the Brighton Farmers Market. Increases in total sales were seen year-to-year for most markets with the exception of the difference between total sales at the South Wedge Farmers Market in 2014 (\$2,945) and 2015 (\$2,351). 2015 was also the year that the South Wedge Farmers Market moved to a new location which may have impacted the rate at which customers who had been to the market in previous seasons returned to the market.

Table 8: Transaction Data by Market and Year

		RPM	South Wedge	Westside	Brighton
2015	Total Sales	\$624,346.95	\$2,351	\$2,103	\$2,164
	Average Sale	\$27.40	\$11.99	\$13.84	\$18.66
	Median Sale	\$20	\$10	\$10	\$11
	Unique Cards	7,290	87	83	38
	New Cards	4,864	71	66	29
2014	Total Sales	\$544,087.79	\$2,945	\$1,822	\$1,168
	Average Sale	\$27.01	\$13.63	\$10.98	\$18.54
	Median Sale	\$20	\$10	\$10	\$20
	Unique Cards	6,981	97	91	37
	New Cards	4,872	78	79	n/a
2013	Total Sales	\$518,243.85	\$2,059	\$1,618	n/a
	Average Sale	\$27.28	\$14.92	\$11.39	n/a
	Median Sale	\$20	\$10	\$10	n/a
	Unique Cards	6,541	68	76	n/a
	New Cards	n/a	n/a	n/a	n/a

The above measures provide some insight into overall SNAP benefit redemption program utilization at each of the markets, but offer little room for comparison on a broader scale due to some of the major differences between each of the markets. For instance, due to the differences in the length of market seasons and the number of days the markets are open each week, there are simply fewer opportunities to shop at some markets than others. The above information is most relevant for comparison specifically of SNAP benefit acceptance program utilization if the number of days a market is open and the length of the market’s season are seen as factors that could potentially influence the utilization rates and the numbers are adjusted to reflect their influence. Table 9 displays the difference between the markets in terms of weeks open per year, hours open per week, and days open per week.

Table 9: Comparison of Weeks Open Per Year and Hours and Days Open Per Week

	Weeks Open Per Year	Hours Open Per Week	Days Open Per Week
Rochester Public Market	52	23	3
Westside Farmers Market	19	3 – 3.5*	1
South Wedge Farmers Market	19	3	1
Brighton Farmers Market	52	3 – 4**	1

**The South Wedge Farmers Market has longer hours for the first half of the season (4 to 7:30 pm) and closes earlier (at 7 pm) during the second half of the season.*

***The Brighton Farmers Market is open during different hours in the winter: from 1 to 4 pm instead of the 9 am to 1 pm summer hours.*

In order to better compare the number of customers and dollars brought to each market by the SNAP benefit acceptance program, transactions from outside of the season maintained by the Westside and South Wedge Farmers Market were excluded from further analysis of the Rochester Public Market and Brighton Farmers Market transaction data. Additionally, only the transactions from the three busiest hours of market operation at each market were assessed. Three hours were selected because the South Wedge Farmers Market, which is open the fewest

hours each market day out of all four markets, is officially open three hours a week. Nonetheless, the South Wedge Farmers Market and the Westside Farmers Market – which is also open just three hours a week during the latter half of their season – both had transactions take place outside of their advertised hours of operation, for instance, a few minutes before the market officially opened. In order to standardize the data across all four markets, the transactions that occurred outside of standard operating hours for the South Wedge Farmers Market and the three hours that the Westside Farmers Market is open throughout the entire market season were removed when calculating the comparable measures of SNAP benefit acceptance program utilization. The comparable measures for all four markets are displayed in Table 10.

Table 10: Sales and Number of Customers Adjusted for Season Length and Hours Open

		RPM	South Wedge	Westside	Brighton
2015	Total Sales	\$95,924.20	\$2,179	\$1,968	\$1,257
	Average Sale	\$29.07	\$12.17	\$13.86	\$19.05
	Median Sale	\$20	\$10	\$10	\$15
	Unique Cards	2081	83	78	25
	New Cards	1671	68	61	20
2014	Total Sales	\$83,286	\$2,652	\$1,687	\$647
	Average Sale	\$26.62	\$13.26	\$11.03	\$17.97
	Median Sale	\$20	\$10	\$10	\$20
	Unique Cards	2045	93	84	23
	New Cards	1647	74	73	n/a
2013	Total Sales	\$82,543	\$2,019	\$1,534	n/a
	Average Sale	\$26.29	\$14.85	\$11.36	n/a
	Median Sale	\$20	\$10	\$10	n/a
	Unique Cards	1939	67	72	n/a

Once adjusted for time that the markets are open, the difference between the Brighton Farmers Market and both the South Wedge and Westside Farmers Markets are amplified. Without including the Brighton Farmers Market's winter season and an hour of their operation each market week, the total sales and number of unique customers goes down by a noticeable percentage (44.6% and 37.8% respectively for 2014 and 41.9% and 34.2% for 2015). The percentage difference is more dramatic for the Rochester Public Market (84.1% and 70.4% respectively for 2013, 84.7% and 70.7% for 2014, and 84.6% and 71.5% for 2015) likely due to the fact that more hours of their operation are excluded from the measures displayed in Table 10. The percentage difference for both the Brighton Farmers Market and the Rochester Public Market, however, are not proportional to the amount of time excluded; if they were, the difference between the numbers in Table 8 and Table 10 would be 68.7% for the Brighton Farmers Market and 95.2% for the Rochester Public Market. The disproportionate relationship means that the hours for which transaction data was assessed are disproportionately busy when compared to other times when the markets are open. Choosing the busiest hours at these markets was the intent of the researcher, and as a result, the disproportionate relationship is not surprising and instead shows that the intent was carried out. Without including transactions from the majority of hours that the Rochester Public Market is open throughout the year, the difference between their numbers and those of the other markets are significantly less dramatic; however, the difference is still significant. Instead of the dollars taken in per month at the South Wedge Farmers Market during its best year (2014) being less than one percent the amount of SNAP dollars brought in by the Rochester Public Market that same year, once adjusted, the amount taken in by the South Wedge Farmers Market is a little over 3% of the amount taken in by the Rochester Public Market. This is still a dramatic difference, but it does show that a portion of the

Rochester Public Market's financial success can be attributed to the number of hours, days, and months that the market is open in comparison to the others. Once the numbers are adjusted, the Westside Farmers Market is also able to pull ahead of the Brighton Farmers Market in the category of total sales.

One factor that further explains the difference between the utilization of the SNAP benefit acceptance programs at the four markets is the number of vendors per market. The Rochester Public Market has over four times the number of vendors at the Brighton Market (120 vendors vs. 39 vendors at Brighton), over six times the number of vendors as the South Wedge Market (19 vendors), and eight times the number of vendors as the Westside Farmers Market (15 vendors). The Rochester Public Market brings in more SNAP dollars than any other market overall and by equivalent time frames, but the comparison by number of vendors also matters because the two major benefits of the SNAP benefit acceptance programs are that they allow customers access to healthy foods from the market, and that they provide vendors access to another customer base and income that may not have been available otherwise. As such, the number of SNAP dollars brought in per vendor is relevant to the success of the program. Additionally, the comparison allows for markets with vastly different numbers of vendors to be compared more equitably, considering that markets with fewer vendors have less products available for purchase by SNAP customers.

Table 11 shows the number of unique SNAP customers and SNAP dollars collected per vendor by each market adjusted for season length and hours open. When the number of vendors at each market is taken into consideration, the Rochester Public Market still takes in noticeably higher amounts of SNAP dollars and still attracts more customers than the three other markets, but by a significantly smaller margin when compared to the Westside and South Wedge Farmers

Market. For instance, when the number of unique customers at each market was adjusted for season length and hours the markets were open alone, the number of unique SNAP customers at the Westside Farmers Market in 2015 was 3.7% of the number at the Rochester Public Market. After adjusted for the number of vendors at each market, the number of unique SNAP customers at the Westside Farmers Market in 2015 was 74.9% of the number at the Rochester Public Market. When the numbers were adjusted for the number of vendors at each market, the Westside Farmers Market also has more customers and, in 2015, more SNAP revenue than the South Wedge Farmers Market. The margin of difference in number of SNAP customers and SNAP dollars does increase between the Brighton Farmers Market and the three other markets, however, due to the Brighton Market already having the lowest numbers before adjusting for the number of vendors at each market and the Brighton Market having the second highest number of vendors out of the four markets assessed.

Table 11: Sales and Number of Customers Per Vendor, Adjusted for Season Length and Hours Open

		RPM	South Wedge	Westside	Brighton
2015	Total Sales per month	\$319.75	\$114.68	\$131.20	\$32.23
	Unique Cards per month	6.94	4.37	5.20	0.64
2014	Total Sales per month	\$277.62	\$139.58	\$112.47	\$16.59
	Unique Cards per month	6.82	4.89	5.60	0.59
2013	Total Sales per month	\$275.14	\$106.26	\$102.27	n/a
	Unique Cards per month	6.46	3.53	4.80	n/a

The difference between utilization rates at the Brighton Farmers Market in comparison to other markets is significant, but when the neighborhoods surrounding the markets were taken into consideration, the difference seemed more reasonable. Although people from various neighborhoods and zip codes use their SNAP benefits at each market, in order to set a boundary for analysis without concrete knowledge of what proportion of the SNAP customers in each zip code shop at each market, only the SNAP population data from the zip code in which the market is located was used for each market. Table 12 shows the total number of households in the zip code each market is located in and the number of households receiving SNAP benefits as estimated by the Census Bureau American Community Survey for 2014, and the calculated proportion of households receiving SNAP benefits in comparison to the total number of households.

Table 12: Number and Percentage of Households in Surrounding Zip Code Receiving SNAP Benefits

	Total Households in Zip Code	Households Receiving SNAP in Zip Code	Percentage of Households in Zip Code Receiving SNAP
Rochester Public Market	17,850	4,358	24.4%
Westside Farmers Market	5,784	1,619	28.0%
South Wedge Farmers Market	11,536	1,935	16.8%
Brighton Farmers Market	8,008	227	2.8%

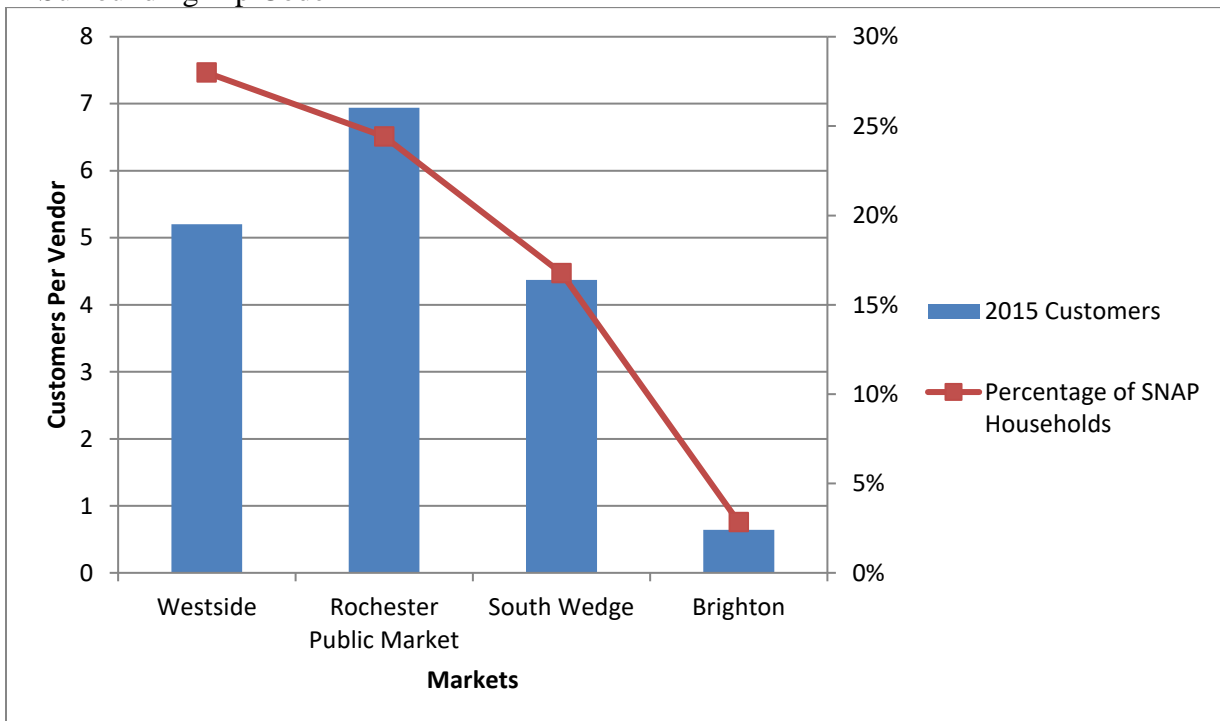
(United States Census Bureau, 2014)

Table 13 displays the percentage of households in the zip code receiving SNAP benefits according to numbers from the 2014 US Census Bureau American Community Survey, the number of unique customers per vendor in 2015 adjusted for season length and hours open, and the number of dollars brought in from SNAP benefit acceptance programs per vendor 2015 adjusted for season length and hours open for each market. Table 14 displays the percentage of households in the zip code receiving SNAP benefits according to numbers from the 2014 US Census Bureau American Community Survey, the average number of unique customers per vendor based on available data between 2013 and 2015 adjusted for season length and hours open, and the average number of dollars brought in from SNAP benefit acceptance programs per vendor based on available data on transactions between 2013 and 2015 adjusted for season length and hours open. If more markets were included in this analysis, the correlation between the number of unique customers and the percentage of households receiving SNAP benefits, and the number of SNAP dollars brought in through the program and the percentage of households receiving SNAP benefits could both be tested reliably. With a sample size of just four markets, however, any correlation coefficient generated would be unreliable. In order to demonstrate the potential for the existence of a relationship between the number of unique customers and the percentage of households receiving SNAP benefits, and the number of SNAP dollars brought in through the program and the percentage of households receiving SNAP benefits, however, Graphs 4 – 7 were generated. If SNAP spending and numbers of SNAP customers are compared at additional markets in the future, a more concrete hypothesis about the relationship between these factors could be established.

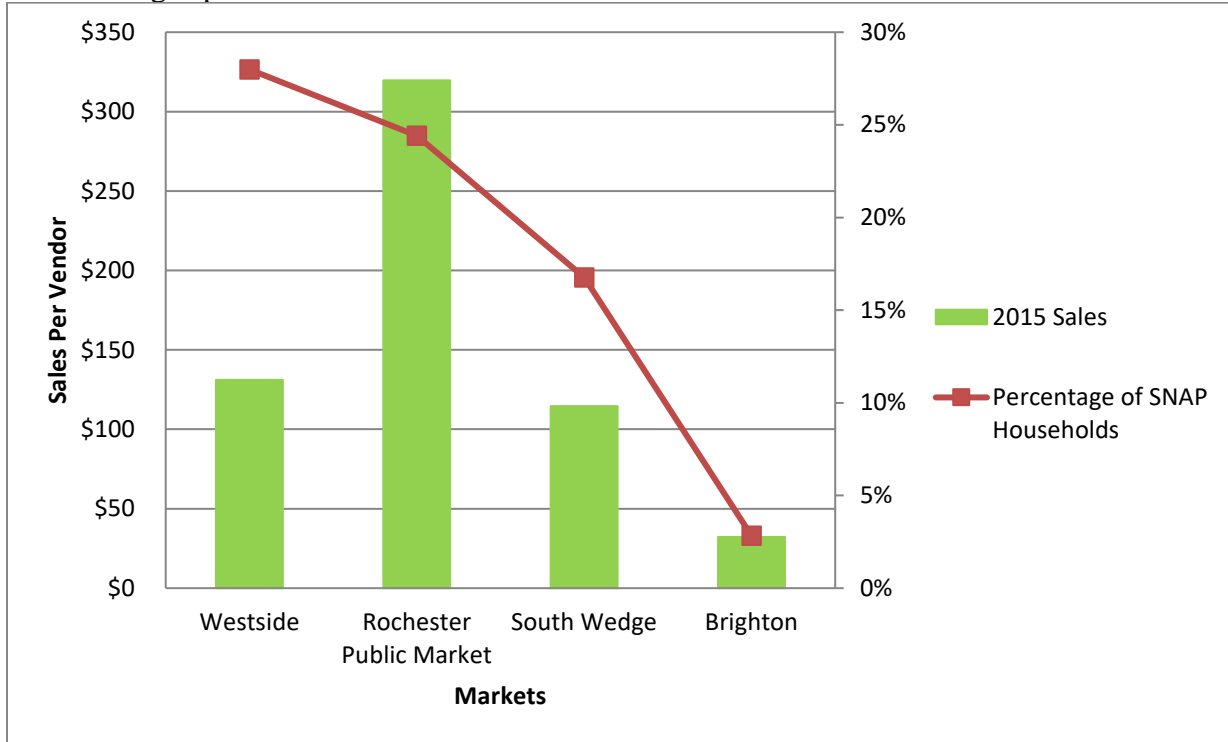
Tables 13 & 14: Number of Customers and Sales Per Vendor Compared to Percentage of Households Receiving SNAP Benefits in Surrounding Zip Code

2015				Average			
	Customers	Dollars	Percentage of SNAP Households		Customers	Dollars	Percentage of SNAP Households
Westside Farmers Market	5.2	\$131.20	27.99%	Westside Farmers Market	5.2	\$115.31	27.99%
Rochester Public Market	6.94	\$319.75	24.41%	Rochester Public Market	6.74	\$290.84	24.41%
South Wedge Farmers Market	4.37	\$114.68	16.77%	South Wedge Farmers Market	4.26	\$120.18	16.77%
Brighton Farmers Market	0.64	\$32.23	2.83%	Brighton Farmers Market	0.62	\$24.41	2.83%

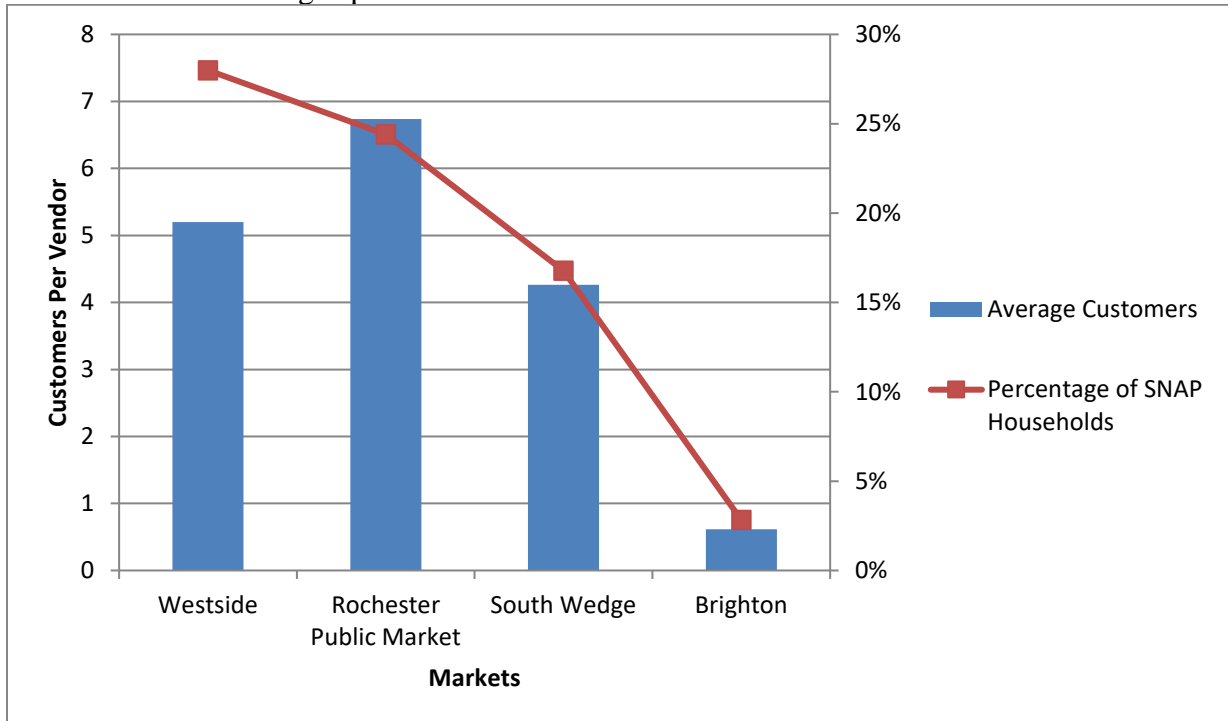
Graph 4: 2015 SNAP Customers Per Vendor and % of Households Receiving SNAP Benefits in Surrounding Zip Code



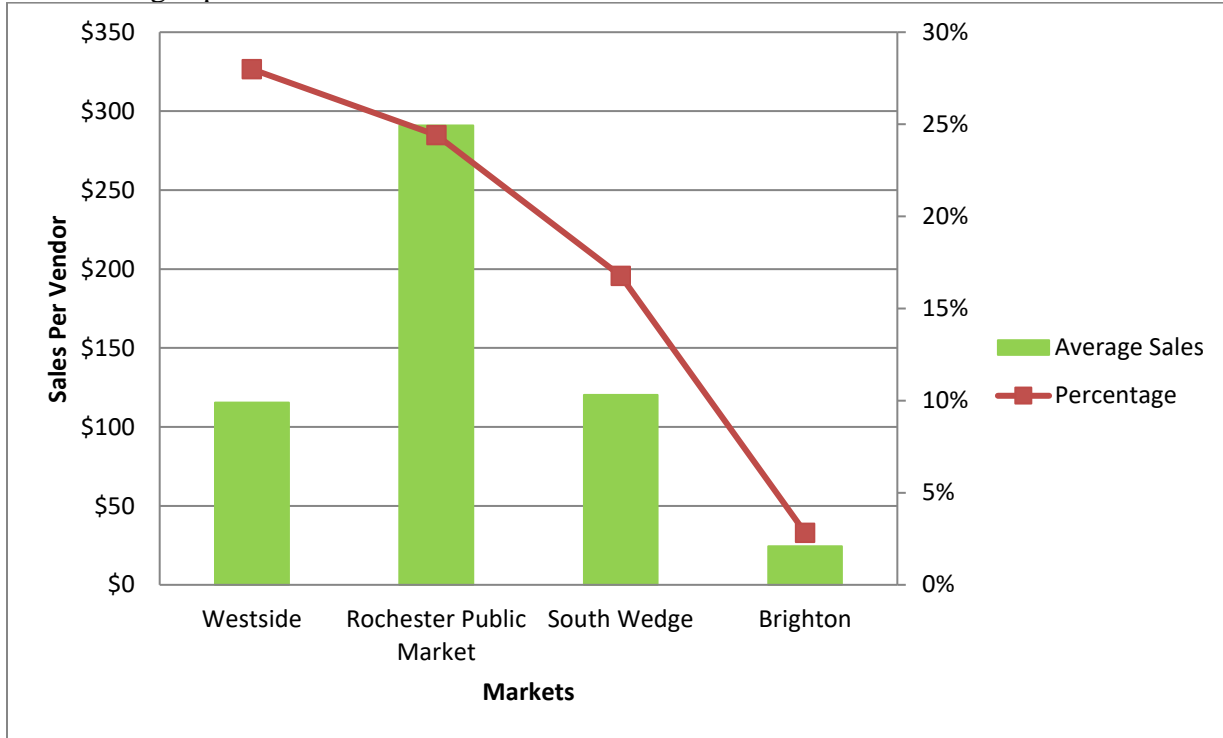
Graph 5: 2015 SNAP Sales Per Vendor and % of Households Receiving SNAP Benefits in Surrounding Zip Code



Graph 6: Average SNAP Customers Per Vendor and % of Households Receiving SNAP Benefits in Surrounding Zip Code



Graph 7: Average SNAP Sales Per Vendor and % of Households Receiving SNAP Benefits in Surrounding Zip Code



Graphs 4 through 7 demonstrate that the factors that are compared might be related in some instances. For example, the Brighton Farmers Market has the lowest number of unique customers per vendor adjusted for season length and hours open and they also have the lowest percentage of households receiving SNAP benefits in the zip code the market is located in. However, the Rochester Public Market still appears to be somewhat of an outlier. In every case the Rochester Public Market has the highest number of customers and SNAP revenue but the Westside Farmers Market has the highest percentage of households receiving SNAP benefits in their zip code. While the percentage of households receiving SNAP benefits in the market zip code could potentially help to explain the significantly lower numbers of customers and SNAP benefits spent at the Brighton Farmers Market, from this level of analysis, it seems that the Rochester Public Market is still consistently an outlier in these areas. The Rochester Public

Market is more of an outlier in terms of SNAP dollars brought into the market than in terms of customers per vendor, however, likely due to the higher amount SNAP customers spend per transaction at this market compared to the others. Looking back at Table 8, the average and median transactions at the Rochester Public Market were about twice as much or more than the average and median transactions at the South Wedge and Westside Farmers Market each year, and the average transaction was also over \$8 more than at the Brighton Farmers' Market as well.

An additional factor that was taken into consideration was the cost of food at each market. During two weeks in late August and early September, 2016, market managers from the Rochester Public Market, Brighton Farmers Market, and Westside Farmers Market collected data about the lowest prices for five common, seasonal items at their markets. Since the Westside Farmers Market and the South Wedge Farmers Market have some vendors in common, and there were barriers to getting accurate prices from the South Wedge Farmers Market, the prices at the South Wedge Farmers Market were assumed to be the same. The prices for each of the five items and the total price are displayed in Table 15. The Rochester Public Market has lower prices for each item and overall. The total cost of the five items at the Rochester Public Market is 50% that of the Westside and presumably the South Wedge Farmers Market, and 41.7% that of the Brighton Farmers Market. The Westside and presumably the South Wedge Farmers Markets had the same or lower prices than the Brighton Farmers Market on all items other than one, and a lower total price; however, the differences between pricing at these three markets are not as significant as those between them and the Rochester Public Market.

Table 15: Pricing for Five Items Available at Each Market

	Rochester Public Market	South Wedge Farmers Market*	Westside Farmers Market	Brighton Farmers Market
1 quart potatoes	\$1	\$2*	\$2	\$2
1 quart tomatoes	\$1	\$2.50*	\$2.50	\$3
1 pint green beans	\$1	\$1.25*	\$1.25	\$3
1 cantaloupe	\$1	\$2.50*	\$2.50	\$2
2 bell peppers	\$1	\$1.25*	\$1.25	\$2
Total	\$5	\$10*	\$10	\$12

* Since the Westside Farmers Market and the South Wedge Farmers Market have a few vendors in common, the prices at the South Wedge Farmers Market were assumed to be the same.

Again, too few markets were reviewed to test for correlation between the number of unique customers and pricing at each market, and the number of SNAP dollars brought in through the program and pricing at each market with a reasonable margin of error. Overall, too few markets were reviewed to conduct regression analysis in order to develop a reliable statistical model of what level of influence different factors had on the number of customers attending and the number of dollars spent at the market. Nonetheless, some potential trends can be observed from the comparisons presented in this section. In the next section, hypotheses regarding what factors potentially have the most influence on number of customers and SNAP revenue will be made based on the findings presented here and Table 16 which compares the various factors discussed in the Methods Section of this thesis project.

Table 16: Market Characteristics

	Rochester Public Market	Westside Farmers Market	South Wedge Farmers Market	Brighton Farmers Market
Size in # of vendors	120	15	19	39
Weeks Open Per Year	52	19	19	52
Hours Open Per Week	23	3.5	3	3.5
Days Open Per Week	3	1	1	1
Management	Paid	Volunteer	Paid	Paid
Market Age (years)	112	9	11	9
Fees for Vendors per season	No licenses currently available, only daily rates	\$150 (19 weeks, about \$7.89 per week)	\$225 (19 weeks, about \$11.84 per week)	\$250 (24 weeks, about \$10.42 per week)
Fees for Vendors per market (pay per market)	For produce retailers (varies per day, time of year, and vendor location): Tues - \$10-30, Thurs - \$20-40, Saturday - \$30-85	\$15	\$25	n/a
Limits set on Distance of Food Origination	None	100 miles	100 miles	100 miles (majority of products come from within 50 miles)
Organic Priority	No	Yes	Yes	Yes
Producer-Only	No	Yes	Yes	Yes
SNAP Benefit Acceptance Program Income Source	2% charge on SNAP benefits redeemed by vendors	No	No	No

VII. Analysis and Recommendations

A. Analysis of Utilization Rates

One objective of assessing the SNAP benefit acceptance programs utilization rates (total sales and number of unique customers) at the four markets was to determine if the difference in

program utilization rates is truly substantial. The significant difference between the number of unique customers and the total sales at the Rochester Public Market and the other three markets was mitigated to an extent when season length, number of hours open, and number of vendors was taken into consideration; however, there is still some difference that is unexplained (see Table 11). Taking the percentage of households receiving SNAP benefits in the surrounding neighborhood and the cost of common products into consideration did offer some additional points of comparison, but quantitative comparison was not as applicable in this case due to the small sample size.

Additionally, even though the percentage of households receiving SNAP benefits could potentially help explain the comparatively low SNAP benefit acceptance program utilization rates at the Brighton Farmers Market, the percentage of households does not explain why the utilization rates at the Rochester Public Market are still higher than the utilization rates at the Westside Farmers Market, which has the highest percentage of households receiving SNAP benefits in the surrounding neighborhood. The differences in pricing of common, seasonal market items might offer more insight into the differences in utilization rates. When compared proportionally to the differences in total sales at the four markets in Table 11, however, there is still some unexplained difference between the Rochester Public Market and the other three. When the number of unique customers in Table 11 are compared proportionally, the differences between the Westside and South Wedge Farmers Markets and the Rochester Public market are essentially reversed; however, the number of unique customers does not account for the fact that customers may visit multiple vendors at any of the markets, and thus might be slightly less representative of overall program utilization when compared at this level. It is also important to consider that the utilization rates for each market per vendor does not necessarily represent the

experience of each vendor on an individual level in part due to the potential for customers to visit multiple vendors at each market, and because the data assessed came from the SNAP benefit acceptance program at each market, not from the vendors that participate in the program.

The pricing of market goods was not compared proportionally to utilization rates at the four markets in developing the findings for this thesis because the relationship between pricing and utilization rates may not be proportional. For instance, if customers consider low prices incredibly important than they may weigh that more heavily in their decision to shop at each market than other market factors. One way to determine the potential relationship between pricing of common, seasonal market goods and utilization rates would be to conduct regression analysis; however, this would have required comparing more markets in order to develop a statistically significant model.

This thesis could have benefited from including more markets for comparison, but including more markets from the Rochester or Upstate New York region would likely not have influenced the finding that the Rochester Public Market has higher utilization rates than other markets. The Rochester Public Market attracts a noticeable percentage of the total SNAP benefits spent at farmers markets across the country, and more than spent at all farmers markets in 44 of the 50 states, the District of Columbia, the Virgin Islands, and Puerto Rico (based on numbers from United States Department of Agriculture, 2016a). It is unlikely that what attracts SNAP customers to spend their benefits at the Rochester Public Market could be explained by the number of vendors, hours and weeks open, and the percentage of households receiving SNAP benefits alone when compared to other farmers markets.

The Rochester Public Market does have higher utilization rates than the other markets even when season length, hours open, and number of vendors are taken into consideration. The

Brighton Farmers Market also has significantly lower utilization rates than the other markets. It is possible that these differences could be explained by the percentage of households in the surrounding area that receive SNAP benefits, product pricing at each market, or a variety of other factors. A variety of factors that could potentially be influential are displayed in Table 16 and were qualitatively compared to the utilization rates, as is discussed in the next section.

B. Analysis of Contributing Factors

The other major objective of this thesis project was to determine what factors or market characteristics might that influence the SNAP benefit acceptance program utilization rates at farmers markets. Since only four markets were compared, regression analysis could not be conducted to develop a potential statistical model for what factors influence the utilization rates of SNAP benefit acceptance programs that could be applied to other markets with any reliability. Therefore, qualitative comparison was done between utilization rates and other market characteristics (those displayed in Table 16) instead.

Most characteristics assessed were chosen as the result of reviewing previously conducted studies by other researchers (discussed in further depth in the Methods section). Few studies had tested what factors influence SNAP customers' engagement with farmers markets or SNAP benefit acceptance programs so the assumption was made that some of the same factors that influence overall customer and vendor engagement and overall farmers market operational success may also influence this area. The first few factors listed in Table 16 were used in the quantitative comparisons between the markets: the market size in terms of the number of vendors, the number of weeks the markets are open during the year, and the number of hours and days each market is open each week. It is possible that the season length and the days and hours

open had impacts on program utilization beyond what was assessed quantitatively, however. For instance, if a market is open all year, it may maintain more relevance in the eyes of its customers. Seasonal markets like the South Wedge and Westside Farmers Markets, have to advertise their market opening each year. Markets that are open year-round, like the Rochester Public Market, their advertising resources on other topics. The impact of different season lengths specifically on SNAP benefit acceptance program utilization is difficult to determine from the markets assessed, however, because both the market with the highest utilization rate and the market with the lowest utilization rate are open all year. The days of the week and hours each market is open may also have an impact on SNAP benefit acceptance program utilization if some of the days and times are more convenient for customers than others. Again, due to small sample size, the impacts of these factors could not be determined from this assessment.

It is also possible that the number of vendors has an impact on program utilization beyond what was assessed in this project as well. For instance, if more vendors bring a greater variety of products to a market, customers may be persuaded by this increase in product variety to utilize their SNAP benefits at the market when they otherwise would have gone to another food retailer. The true impact of the number of vendors is unclear, however, because again, the market with the highest utilization rates and the market with the lowest utilization rates both have the highest number of vendors. The Rochester Public Market has more vendors than the three other markets combined, so the impact of the number of vendors could be greater, but the Brighton Farmers Market which had the lowest utilization rates did also have more vendors than the Westside and South Wedge Farmers Markets combined. There was no clear relationship between vendor rates and program utilization either. The Rochester Public Market had the highest cost per day (\$30 or more) on Saturdays – the busiest day at the market and day market

data was assessed for – than any other market had per day throughout the season, even including more expensive daily rates. Although the relationship between utilization and vendor fees is unclear, the information shows that it is possible to charge higher vendor fees without deterring vendors when a market has demonstrably higher utilization rates, and likely a larger customer base overall.

It is possible that product variety has a more direct impact on program utilization than number of vendors. The Brighton, Westside, and South Wedge Farmers Markets prioritize organic and sustainable practices, place limits on how far the food sold at the markets can travel, and require that all products are sold by the producer or an employee except in circumstances approved by the market board or manager. The Rochester Public Market does not place limits in any of these areas and, although vendors selling local produce are prioritized and are charged lower vendor fees, vendors selling hot food and other more processed food, produce from outside the state and country, and non-food items are all allowed at the market as well. The wide variety of food and products and the sources they come from may be one of the reasons that the SNAP benefit acceptance program there is utilized at the highest rates of the four markets assessed and likely one of the highest rates across the country. With more products sold at the Rochester Public Market, the market may seem similar to a supermarket experience and may allow customers to more conveniently shop for everything on their list than other farmers markets. Customers at the Rochester Public Market also see more of the produce they are used to seeing at grocery stores such as bananas, oranges, and other tropical fruits that they will not find at the other farmers markets. Customers from outside of the country, including the many refugees that move to Rochester and receive SNAP benefits, can also find some of the products they often use in their cultural cuisine that are difficult to find in chain grocery stores as well such as plantains,

lychees, and others. The increased variety of sources of food sold at the Rochester Public Market might drive vendors, including local vendors, to price their products more competitively, leading to lower costs to customers – another factor that could potentially impact program utilization at markets. When considering the number of vendors at each market and the utilization rates of each markets' SNAP benefit acceptance program, it is also important to keep in mind that the causal relationship could go in a few different ways. It is possible that having more vendors at a market increases SNAP benefit acceptance program utilization rates; that utilization rates or larger numbers of customers spending larger amounts of money at the market overall attract more vendors; or that both are true to some extent. The causal relationship between these factors cannot be determined from the level of analysis conducted in this thesis project.

Table 16 also includes market age as a potential influencing factor on utilization rates. The difference in age between the Rochester Public Market and the three others is over almost 100 years. While the Westside and Brighton Farmers Markets were founded in 2008 and the South Wedge Market was started in 2006, the Rochester Pubic Market was first established in 1905. The Rochester Public Market's historical status has allowed it to gain great popularity in the City and even across the county. In 2010, the Rochester Public Market won the America's Favorite Farmers Market contest hosted by the American Farmland Trust by 2,400 more votes than the second-place finisher. On the City of Rochester website (n.d.-a), they have a document with thousands of comments from voters about why they believed the Rochester Public Market should win. The popularity that the Rochester Public Market experienced in 2010 and to this day was not built up over a few years or a decade, but over more than a century, and would be difficult for another market to replicated in a meaningful way within a shorter time span. Determining the impact of the Rochester Public Market's age on the market utilization rate, if

one exists, would involve comparing more markets with a wider variety of age ranges than those that were assessed in this thesis project.

The last factors listed in Table 16 are whether the market management is paid or unpaid and whether there is an income source from the SNAP benefit acceptance program at the markets. Three of the four markets have paid market managers. The Westside Farmers Market is the exception. In the quantitative assessment, the utilization rates of the Westside Farmers Market were very similar to and sometimes outpaced those of the South Wedge Farmers Market, which has a paid manager. Both the Westside and South Wedge Farmers Markets had higher utilization rates than the Brighton Farmers Market. The Westside Farmers Market's higher utilization rates, especially in terms of the number of unique customers, could potentially be attributed to the higher percentage of households receiving SNAP benefits in the surrounding neighborhood. From the four markets assessed alone, it does not appear that having a paid market manager has a noticeable impact on the SNAP benefit acceptance program utilization rates. The absence of a relationship between these two factors could possibly be explained by the fact that market managers oversee all aspects of the market and that their focus is not exclusively placed on the SNAP benefit acceptance program. It is possible that the Westside Farmers Market manager, although unpaid, focuses more of their time on the SNAP benefit acceptance program than others because of the needs of the surrounding area. More time and resources would have to be dedicated to exploring the impact specifically of management on the SNAP benefit acceptance program in order to draw more complete conclusions about this data.

As the Rochester Public Market is the only farmers market that has a source of financial support from the SNAP benefit acceptance program, it is difficult to draw concrete conclusions about the impact of this difference. It is worth note, however. The Rochester Public Market is

unique in that it has a non-profit specifically dedicated to supporting market operations in addition to employees provided by the City. The non-profit runs the Rochester Public Market SNAP benefit acceptance program and, unlike the other markets, charges a percentage fee (2%) to vendors who redeem SNAP benefits spent at their stall. The percentage fee is comparable to what a farmer would have to spend per card transaction if they had their own POS system (although EBT card transactions come with fewer fees and would charge less), but comes without other service fees or the cost of related hardware. The fee goes to the Friends of the Rochester Public Market so that they can continue to support the program and the market. This investment in and focus on the program may have contributed to the Rochester Public Market's higher utilization rates in some way; however, what level of contribution at this point is still unclear.

While many of these areas assessed qualitatively have the potential to make the difference in terms of the SNAP benefit redemption programs' utilization rates, it is still difficult to tell which factors have the most significant influence and to what extent. Additionally, even though a factor such as market age has high potential to be an influencing factor, it is not something that can be changed by strong market management looking to improve the utilization rates of their SNAP benefit acceptance programs. A few of the factors that appear to have some influence and that can also be influenced by market management are vendor diversity, and subsequently product diversity, and the amount of focus and investment in the SNAP benefit acceptance program (i.e. market manager time, financially, etc.). These two factors that will be the focus of the recommendations made in the next section to both farmers market and to policy makers at every level.

C. Recommendations

As SNAP benefit acceptance programs have taken hold at farmers markets over the years, the markets themselves, community organizations, non-profits, and local, state, and federal government have all established programs and policies to aid in their success. This section will recommend additional steps that could be taken at each of these levels. The recommendations will focus on increasing product diversity and investing additional resources in SNAP benefit acceptance programs.

1. Farmers Markets

The high utilization rates of the Rochester Public Market's SNAP benefit acceptance program show that there is potential for other farmers markets to increase the utilization of their programs as well. The Rochester Public Market itself could also potentially attract additional customers and SNAP dollars considering the low percentage of SNAP benefits spent at farmers markets overall (0.02%) (United States Department of Agriculture, 2014a, p. 7). Based on the analysis conducted for this thesis, there are some steps farmers market management can take to potentially increase the utilization rates of their SNAP benefit acceptance programs.

One area that farmers market management should take into consideration is product variety. The Rochester Public Market has the highest number of vendors and the largest product variety without limits on where products come from, who brings them to the market, or how products are produced. The Westside, South Wedge, and Brighton Farmers Markets had less vendors and placed more restrictions in these areas. While consideration should be given to increasing product variety at farmers markets as a means to increase SNAP benefit redemption program utilization, it should be done within the context of the farmers markets' mission. While

many markets aim to increase access to healthy foods for their customers and community, some markets also specifically aim to support local farmers, to advocate for sustainable farming and food consumption, or to meet other ends. Farmers markets are unique from other food retailers in that they often have a greater loyalty to their community than to making a profit. Increasing product variety should be a consideration of markets looking to increase their program utilization, but not at the expense of the mission they set for themselves in the context of serving their community. Nonetheless, the lack of product variety at farmers markets during certain times of year was a concern raised by potential low-income shoppers in a study involving focus groups (Evans et al., 2015). Many customers of farmers markets report eating a greater variety of fruits and vegetables as a result of shopping at farmers markets (Collaborative Health Research, 2016; Crompton et al., 2012; Karakus et al., 2014), but many of the staples fruits and vegetables found throughout the year at grocery stores (i.e. bananas and oranges) cannot be grown in upstate New York with ease or are not always in season (i.e. apples, carrots, berries). As such, the recommendation in this paper is to consider expanding limitations on producers and products at the market if interest in product variety outweighs other community interests.

There are options that would allow markets to expand these policies without completely disregarding their mission and other values, as well. The Westside, South Wedge, and Brighton Farmers Markets currently allow for some exceptions listed to their policies, but these are decided on in a case-by-case manner. Similarly to these markets, management could develop a policy and recruitment strategies that would encourage vendors to sell products that do not meet the markets' top standards (i.e. organic farming, local, producer sold) but only when no other vendors are selling those products. Market management could also develop signage to distinguish between these vendors and their local vendors using sustainable practices. Another

option for a policy that balances product variety and product source is to follow the Rochester Public Market's method of vendor prioritization. The Rochester Public Market prioritizes providing space for local farmers at their markets, but allows other vendors to sell at the market when space is available. Although causation has yet to be substantiated by any researcher, there is also some correlation between having more vendors and markets being able to stay open in the long term. For instance, one study found that most markets that had failed in one state over a period of time had 20 or fewer vendors (Stephenson, Lev, & Brewer, 2008). If farmers markets choose to take steps to increase the variety of products at their market and the number of vendors that sell them, the results could have impacts beyond the utilization of the SNAP benefit acceptance program, potentially impacting overall market attendance and market longevity.

If a market would like to expand their market season, giving additional consideration to product variety becomes increasingly important because, as the growing season comes to an end, the number of vendors who can sell at the market and their product variety may drastically shrink. It is worth noting that adding more days, hours, months, or vendors to a market has the potential to influence program utilization, but it is likely that any growth in program utilization would likely be relatively proportional, not exponential. For instance, for the Rochester Public Market each week, it appeared as though transactions were taking place back to back during the three hours assessed each week and for some time outside of those hours as well. At a certain point, the amount of SNAP benefits that can be redeemed per hour is going to be limited by staff and technological resources available at the market.

For this reason and others, it is important for markets to invest in their SNAP benefit acceptance programs. The Friends of the Rochester Public Market do this through charging vendors 2% of the total SNAP benefits they redeem from the program. This fee is comparable to

the fee applied to most card transactions – although EBT transactions are generally less expensive – and does not require vendors to pay for other maintenance fees or hardware. While this charge makes sense in supporting the Rochester Public Market’s SNAP benefit acceptance program where it brought in over \$12,000 in 2015, it might make less sense for smaller markets where it could take up more time than it is worth to incorporate. If the South Wedge, Westside, or Brighton Farmers Markets implemented similar programs, they would have raised less than \$50 each from their efforts. For midsized and larger farmers markets, a similar program could be more helpful for raising supportive funds. Additionally, it is worth considering paying the market manager, or at a minimum, the administrator of the SNAP token program, especially if the market is interested in expanding its SNAP benefit acceptance program or as a whole.

Stephenson et al. (2008) found that the majority of managers of markets that closed in Oregon between 1998 and 2005 were either volunteer managers or paid little (less than \$2,000) a year. Additionally, Stephenson et al. (2008) found, “There are no extensive data documenting what happens as a market grows beyond what a volunteer can manage relative to the market size and number of hours worked, so it is unclear whether they become overwhelmed or the quality of work declines” (p. 193). The compensation of market managers for the number of hours they invest in the farmers market’s success has also been a topic of discussion between market managers in Rochester (Taddeo, 2015). One article in the local paper discussed potential issues related to lack of market manager compensation including the potential for burnout and frequent changes in market management which could lead to an absence of consistency in market operations (Taddeo, 2015). If small markets located in areas with higher SNAP recipient rates, like the Westside Farmers Market want to ensure that their markets can serve more of these customers by growing their market, they should consider offering some level of compensation to

market managers who contribute their time and effort to this work. By investing in the SNAP benefit acceptance program and increasing product variety for customers, it may be possible to increase the program's rates of utilization.

2. Public Policy

The federal government and various state and local governments have made efforts in an attempt to increase customer engagement with SNAP benefit acceptance programs at farmers markets. As was explored in the Literature Review section of this thesis, the federal government and state governments, including New York State, have invested in programs that provide POS technology to farmers market management and thus allow market management to establish SNAP benefit acceptance programs. Additionally, the only POS software that currently allows SNAP benefits to be transacted using a smart phone or tablet was developed as the result of federal support, financially and otherwise. Without the government investment in these programs so far, many markets would still be without SNAP benefit acceptance programs, many SNAP customers would be left without the option to spend their benefits at their local markets, and local farmers who sell at farmers markets would have significantly less access to SNAP benefits as a source of income. Nonetheless, based on the findings of this thesis project, there is room for government at any level to continue investing and to invest further in SNAP benefit acceptance programs to propel their utilization at farmers markets.

As is made clear by this thesis, there is a need for additional research in this area to determine more concretely what factors may influence the success of these programs at farmers markets. The USDA and state and local government could encourage and financially support this research in an effort to ensure that the SNAP benefit acceptance programs they also support

financially in many cases are as effective as they possibly can be. It is possible to argue that SNAP benefit acceptance programs require relatively little investment from these entities at the moment in terms of their overall budgets, and thus allocating more money to ensure their success does not seem like a necessary or worthwhile investment. It is true that the SNAP benefit acceptance programs take relatively little investment, but it could be counterargued that the current far-reaching benefits of these programs, the potential for these programs to grow, and the potential to continue expanding the far-reaching benefits of these programs still with the minimal initial investment justifies further investment in research in this area.

For instance, as is discussed in the Literature Review section of this thesis, farmers markets have more potential than most other food retailers to positively impact people's diets and overall nutrition. In a time when obesity is often described as an epidemic in this country and when people living in poverty are disproportionately impacted, it is reasonable to invest in programs that could potentially make a greater impact in addressing these issues. Additionally, there is opportunity for government at all levels to invest in improving and expanding SNAP benefit acceptance programs at farmers market beyond investing in research.

The federal government, state governments, local governments, and community organizations have at various times supported matching programs, or programs for low income households that provide financial incentive for purchasing healthy foods (primarily fruits and vegetables), throughout the country. Multiple studies have demonstrated the potential for matching programs to impact the diets of participants. One of the largest studies of an incentive program with 7,500 participating households and conducted by the USDA FNS found that participants consumed close to a quarter cup more fruits and vegetables per day than non-participants, and they spent more on fruits and vegetables (Bartlett et al., 2014). The incentives

in this study were not provided at farmers markets but studies of similar programs matching purchases at farmers markets have had similar results. For instance, the Veggie Project in Nashville, Tennessee (Freedman et al., 2011) and the Philly Food Bucks program in Philadelphia, Pennsylvania (Young et al., 2013) were two incentive programs implemented at a local rather than federal level. Both the Veggie Project and Get Healthy Philly provided incentives for healthy food purchases using SNAP benefits and helped establish farmers markets in low income, racially diverse neighborhoods that had limited access to nutritious, affordable food beforehand. Participants in the Philly Food Bucks program were more likely to report eating and trying more fruits and vegetables than non-participants (Young et al., 2013). Freedman et al. (2011) found that participants in the Veggie project felt that they had a greater exposure to new fruit and vegetables and that the market taught them more about healthy eating but there was no recording of whether or not they felt they ate more fruits and vegetables.

The literature is fairly unanimous in its conclusion that incentive programs encouraging customers to purchase more fruits and vegetables can help to improve customer diets (Bartlett et al., 2014; Freedman et al., 2011; Herman, Harrison, Afifi, and Jenks, 2008; McCormack, Laska, Larson, & Story, 2010; Rochester Farmers Market, 2008a, 2008b, 2009, 2010, 2012, 2013, 2014; Ruelas, Iverson, Kiekel, & Peters, 2011; Young et al., 2013), but many incentive programs can have an end date or will eventually run out of funding. Even so, McCormack et al. (2010) hypothesized that “it is possible that simple exposure to farmers’ markets may increase the long-term use of these markets, independent of any additional coupon provision” (p. 407). This hypothesis was supported by the findings of McCormack et al. (2010) another study by Herman, et al. (2008) which found that another incentive program “increased fruit and vegetable intake in ... and the increase was sustained 6 months after the end of the intervention” (p. 103).

Additionally, Herman et al. (2008) found that the increase in fruit and vegetable consumption of customers using the incentives at farmers markets was greater than the increase for customers using the incentives at supermarkets. “Farmers’ market participants showed an increase of 1.4 servings per 4186 kJ (1000 kcal) of consumed food from baseline to the end of intervention compared with controls, and supermarket participants showed an increase of 0.8 servings per 4186 kJ” (Herman et al., 2008, p. 95).

The studies on incentive programs at farmers markets support the idea that incentives can encourage recipients to consume more healthy foods both while the program is in place and into the future. The study by Herman et al. (2008) also supports the idea that incentives provided at or for purchases at farmers markets have the potential to have a greater impact on customer diet than incentives provided at other food retail locations. Investing in incentive programs at farmers market can have a far-reaching impact on healthy eating and a farther-reaching impact on healthy eating than healthy food programing taking place elsewhere.

In addition to encouraging SNAP customers to eat healthier, studies have also found that incentive programs lead to benefits for farmers markets. Young et al. (2013) found that SNAP transactions and sales increased at all markets in the study area in Philadelphia during the course of the program doubling SNAP sales overall, with tripled sales at markets in low income areas. McCormack et al. (2010) found, “that participants in farmers’ market programs targeting [Special Supplemental Nutrition Program for Women, Infants, and Children (WIC),] participants and/or seniors spent their own money in addition to coupons” (p. 406-7). Another study found that vendors at small and medium sized markets experienced more dramatic increases in sales when an incentive program went into effect at various markets (Oberholtzer, Dimitri, & Schumacher, 2012).

All of the Rochester farmers markets in this thesis have experienced the benefits of matching programs for their SNAP customers through the New York Fresh Connect Checks program where \$2 vouchers are provided for each \$5 of SNAP benefits spent at a farmers market, and other matching programs. Since all four markets have participated in matching programs, this factor was not used as a basis of comparison in the thesis. Matching dollars were not taken into account in the data provided on total sales since the match provided by these programs usually goes directly to the vendor rather than through the market SNAP benefit acceptance program like SNAP dollars taken directly from customers' EBT cards, and because matching programs were not in place throughout the entire study period. Nonetheless, vendors and customers at all four markets did benefit from the matching programs within the time period reviewed in this thesis.

The Rochester Public Market reviewed these impacts more closely than the three other markets in their annual surveys where SNAP customers were asked if the SNAP benefit acceptance program in combination with the incentive program impacted the foods they ate. Each year, 32 to 75% reported eating more fruits and/or vegetables (2008a; 2008b; 2009; 2010). Customers gave additional feedback including commenting that they spend more at the market and eat more fresh foods (fruits and vegetables) at home, that their EBT benefits went further at the market and they were able to buy more healthier and fresher foods, and that they were happy to support local farmers, (2008a; 2008b 2009; 2010; 2012; 2013; 2014). In the surveys conducted, customers also said that matching programs like the Fresh Connect Checks supplemented their SNAP benefits and allowed them to buy food they otherwise would not be able to (2008a; 2008b; 2009; 2010; 2012; 2013; 2014). No study to the knowledge of the

researcher has measured the minimum match required to inspire the results that have been seen across the literature.

By investing in matching programs, all levels of government and community organizations have the opportunity to amplify the impact that SNAP benefit acceptance programs are having at farmers markets. Matching programs can inspire households living near the poverty line to improve their diets and give them otherwise unavailable financial resources to do so. Additionally, dollars invested in the program eventually end up in the hands of farmers market vendors, primarily local farmers. Governments and community organizations can also support growing markets that are conducting EBT transactions at their SNAP benefit acceptance program POS terminals seemingly back to back by providing funding options for additional POS technology. Most programs providing POS technology to markets limit each market to receiving one POS terminal and some only provide a terminal if the market does not already have one on hand. Again, because this is a relatively small investment in relation to the overall budgets of sponsoring organizations, providing additional POS terminals to the markets that can demonstrate steady growth could also allow markets to serve additional customers and increase access to healthy food. By continuing to invest scientific interest, technology, and financially in SNAP benefits acceptance programs, there is the potential to magnify the impact of the programs many times over and to develop stronger programs that can last years into the future.

VIII. Limitations

As discussed throughout this thesis, limitations arose in terms of time and data availability. Some limitations also arose as a result of the methods selected. The research that was conducted within these constraints did result in the ability to draw some conclusions from the data; however, the limitations impacted the conclusions and thus should be discussed.

One of the major limiting factors in the ability to quantitatively assess the utilization rates of the SNAP benefit acceptance programs at the markets was the small number of markets assessed. The markets chosen allowed for more in depth qualitative comparison but it is possible that a greater level of depth of quantitative analysis could have been achieved if more markets were included in the assessment. For instance, it would have been possible to conduct regression analysis and thus to determine whether or not a statistical relationship existed between the utilization rates at each market and their market characteristics. While the correlations recognized by regression analysis would not have determined whether or not a causal relationship existed between the utilization rates and various market characteristics, the statistical relationship could have provided greater direction to future research by providing stronger hypotheses for what characteristics could potentially be influential.

Additionally, it is important to consider the context of the quantitative analysis that was conducted for this thesis. An attempt was made to compare the number of unique customers and dollars spent at each market more equitably by comparing the same number of hours and weeks, and providing the number of unique customers and dollars spent per vendor. While this did achieve the goal of allowing for more equitable comparison, these numbers are not necessarily representative of what each market experiences day to day throughout the season (for instance,

some times of the year may be busier than others) or the experience of each market vendor (some vendors may see more customers than others). Additionally, the researcher specifically chose the hours and weeks that were busiest to include in the assessment, the utilization rates presented in this research are not necessarily representative of utilization rates that would be found during hours and weeks outside of those chosen. Including the dollars that SNAP customers received from matching programs at each market may also have provided a more complete picture of the dollars available to farmers market vendors as a result of the SNAP benefit acceptance programs. For reasons explained in further depth in the public policy recommendations section of this thesis, the decision was made not to include the matching program dollars in the assessment done for this thesis.

Characteristics that were compared across markets could have been assessed at greater depth, but there were limitations on time and ability to access the markets. A more detailed comparison of the prices of common items at the markets could have been conducted to determine if the differences in pricing were consistent across the entire season and for a larger variety of products. Instead of comparing whether or not farmers market managers were paid or unpaid, it may have been more beneficial to compare the number of hours volunteer and paid staff spend running the SNAP benefit acceptance program. It is possible that the number of hours spent running the program at each market would be influenced by the number of hours that are paid for, but comparing the number of hours could have related more directly to the SNAP benefit acceptance program's utilization rate than whether the market manager was paid or unpaid, especially since market managers do not exclusively devote their time to this program.

If time and access to the farmers market allowed, more depth could have been lent to the qualitative comparisons of the markets if surveys of the customers and vendors were conducted.

Surveys of customers and vendors could also have lent further insight into what characteristics to compare across the four markets selected specifically. The literature that informed what characteristics to compare provided a reasonable framework for the analysis conducted in this thesis, but it could have been made more specific to the region with additional insights from the local sources that attend each market.

IX. Conclusion

SNAP benefits give households increased financial access to the food they need to survive, but not automatically the food they need to thrive. When EBT cards initially became the means by which SNAP households received and spent their benefits, they lost direct access to the products sold by local farmers. SNAP benefit acceptance programs at farmers markets and the technology that supports them are starting to make a measurable difference in the lives of low income customers by allowing them additional access to nutritious foods and an environment that studies have shown inspires more healthy lifestyles. Nonetheless, with just 0.02% of SNAP benefits being spent at farmers markets, there is potential for SNAP benefit acceptance programs at farmers markets to have a significantly greater impact (United States Department of Agriculture, 2014a, p. 7).

More time and resources should be invested in determining what actions markets and other supporting organization might be about to take to increase the utilization of these programs. This thesis project provided one of the first steps to making that determination and was able to draw some conclusions that could provide insight to farmers markets and their

supportive organizations now, and researchers as they do more to explore this topic in the future. The quantitative analysis conducted in this thesis project showed that the Rochester Public Market's SNAP benefit acceptance program is being utilized at a higher rate than other area markets. The Rochester Public Market's program should continue to be looked at as an example of how programs at other markets can grow. The qualitative analysis in this thesis project offered comparison of some characteristics that might influence the program's utilization rate including the diversity of products and the level of time and money invested in the SNAP benefit acceptance program specifically. These programs allow farmers markets to connect local farmers to more customers, and to connect low income households to nutritious, high quality food and potentially healthier lifestyles. The Rochester Public Market's program provides an example of how far reaching these impacts could potentially be for other markets in the future.

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