

# **Can farmers' markets improve food accessibility in Wisconsin?**

**Yicong Yang**

## *Abstract*

This study compares the factors that influence food accessibility of the census tracts in Wisconsin, with a special attention to the influence from farmers' markets. A logistic regression model is applied to test the data spatially combined from the USDA Food Access Research Atlas and the USDA farmers market directory. A geographically weighted logistic regression is also applied to examine spatial variations of the factors across the region. It is found that the factors that influence food accessibility are slightly different between urban and rural areas. However, there is no significant relation between farmers' market proximity with food accessibility in Wisconsin according to the regression results.

## 1. Introduction

Farmers' market is a special part of the food system. It is a great source of fresh fruits, vegetables, and other healthy foods in America. It provides food from agricultural producers directly to consumers. It is unlike other food destinations such as large supermarkets, supercenter, or large grocery store, many products in American farmers' market are not affordable. Farmers' markets' contribution to local community's food demand is still a question.

Currently, food access measures are connected to distance to large supermarkets, supercenter, or large grocery stores. Farmers' markets are not included in the food access measure. There is still no clear evidence with regards to what impacts farmers' market have on the food accessibility in the United States.

Therefore, this project aims to examine what influence food accessibility, and whether farmers' markets proximity has a significant influence on food accessibility in neighborhoods in the United States.

Finally, this project also examines whether the factors that influence the accessibility of census tracts differ according to the farmers markets geographic location.

## 2. Data and variables

### *Dataset 1: the USDA Food Access Research Atlas*

The latest version of the USDA food access dataset was collected by USDA in 2015 and released in 2017. It includes 147 variables in 72864 census tracts in the United States. A subset of 1395 census tracts in Wisconsin and 7 variables in the dataset were selected for this research. Variables of interest in this dataset are: low access tracts (LA1and10), population (POP2010), number of household without a vehicle (TractHUNV), and number of households receiving Supplemental Nutrition Assistance Program (SNAP) benefits (TractSNAP), urban tracts (URBAN).

This dataset is also connected to the cartographic boundary shapefiles provided by the US Census Bureau. The 2010 census tract is used jointly with the USDA food access data to produce maps.

### *Dataset 2: the USDA farmers market directory*

In the USDA food access dataset, supermarket, supercenter, or large grocery store (supermarket for short) are where foods are. This “supermarket” does not include farmers market by USDA’s standard. Thus, the USDA farmers market directory is incorporated with the food access dataset. The USDA farmers market directory includes the locations of 8715 farmers markets in the United States collected by USDA through organizing market managers to fill an online form voluntarily. The volunteered geographic information is particularly useful to identify if a census tract has access to farmers market.

To connect his dataset with the USDA food access dataset in a coherent way, the author creates two new dummy variables called “FM1” and “FM10”, representing “having access to farmers market in urban areas” and “having access to farmers market in rural areas”, respectively. More specifically, FM1 codes