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Economic Contributions of the Local Food Systems in Tennessee

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Abstract

Local food systems (LFS) are often viewed as development pathways for local economies due to their ability to create a multiplier effect in an economy through a significant contribution to output and job creation. There is limited information on these impacts for Tennessee. Therefore, this study measures the gross economic contributions of Tennessee's local food system using IMPLAN's input-output model. Results show that LFS is a crucial component of Tennessee's economy with an estimated total economic contribution of \$37.5 billion. The region's local food system directly employs more than 99,000 people and has an income multiplier of 2.56 and a value-added multiplier of 2.06.

Keywords: economic contributions, local food system, farmers markets, IMPLAN, multipliers, Tennessee

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Introduction

There is a growing interest in the promotion of local foods due to consumers' increasing demand for local produce, powered by the belief that the purchase of local food options are healthier and more supportive of the local economy. An indication of rising consumer demand is the tremendous growth in the sale of local foods through direct marketing channels. According to the U.S. Department of Agriculture (USDA), sales from direct marketing channels for local foods increased from \$511 million in 1997, to \$1.2 billion in 2007, to \$6.1 billion in 2012, and to \$8.7 billion in 2015 (Low and Vogel, 2015), and the demand for locally grown food continues to grow at a rapid rate, representing a crucial market opportunity for local food producers (Pinchot, 2014). Some of the motives for consumers to buy local food items are concerns for food safety, lower prices, and the perception that local foods are of higher quality in terms of freshness and taste (Ekanem et al., 2016). The perception that local foods enhance the local economy, benefit the environment, and help to build social capital are additional reasons consumers shop local (Brown and Miller, 2008).

Local food systems are localized food production on a small scale, with direct-to-consumer sales made through market channels, such as farmers markets, Community Supported Agriculture (CSA), and intermediate sales to local grocery stores, restaurants, and organizations, such as schools, prisons, and hospitals. Promoting local food systems is a popular focus of communities across the United States. For example, the USDA identified local and regional food systems as one of its pillars of agriculture and rural economic development. Between 2009 and 2015, the USDA invested over \$1 billion in more than 40,000 local and regional food system projects. This investment proves that measuring and understanding the contributions of these investments is crucial (U.S. Department of Agriculture, 2015; Vilsack, 2016; Deller et al., 2017). Local food systems are viewed as development pathways for local economies, due to their potential to keep a good percentage of money in the local economy and their ability to create more jobs. Several studies have also examined the economic contributions of local food systems in various states; however, there is limited information on these impacts for Tennessee.

Moreover, most of the evaluation of local food system is limited to one component of this system, such as food hubs or farmers markets. Therefore, there is a need to evaluate the contribution of the local food system on all possible sectors, including producers, processors, and distributors. This article provides a comprehensive approach to evaluating the economic impact of local food systems in Tennessee.

Literature Review

The word "local" implies "from or in a nearby location"; however, there is no general agreement on the definition of "local foods." For some, the term has a geographical connotation; for others it is defined by the market arrangement. In the 2008 Food, Conservation, and Energy Act (2008 Farm Act), the U.S. Congress defined local food as food within 400 miles of its production site or within the state in which it is produced. This definition emphasizes geographical proximity (Hands and Martinez, 2010). Alternatively, local foods are defined based on market channels, which include

direct-to-consumer arrangements, such as farmers markets (Rossi et al., 2017). For this article, local food is defined as food produced, processed, and distributed within the article area, including agricultural produce (fruits and vegetables, dairy, meats and other value added products) sold directly to consumers or through short supply chains. A short supply chain implies more than short distances between production and consumption; it indicates fewer middlemen to no intermediary between the producers and consumers. Venues for direct farmer-to-consumer marketing of local food includes farmers markets, community-supported agriculture (CSAs), and farm stand operations” (Martinez et al., 2010; Ekanem et al., 2016).

Farmers markets are the poster child for local food systems, and they are common areas where several farmers gather regularly to sell an array of fresh fruits, vegetables, and other farm products directly to consumers (Brown and Miller, 2008; Martinez et al., 2010). Since 2007, the number of farmers markets in the United States has grown by more than 180%, and the number of food hubs has increased by 288%. Also, direct sales between farmers and consumers have grown significantly from \$400 million in 1992 to \$2.8 billion in 2017. Similarly, CSAs are programs in which many consumers commit to sharing the risks and benefits of food production with a grower (Holcomb et al., 2013). These two examples of local food systems are commonplace in the marketing of local foods.

Import substitution is a means through which expanding local food systems can impact the economy. When consumers purchase locally produced food items, sales are more likely to accrue to residents and small businesses within the region, which will generate additional economic impacts through income and employment growth within the study area (Swenson, 2009). Existing literature has proven that locally grown foods have positive impacts on local economic activity through localization of processing activities. In response to this trend, local and federal government policy makers have shown interest in understanding how the local food system contributes to the local economy and in developing strategies that bolster local food systems (Low and Vogel, 2015).

Some studies assessed the economic impact of a specific component of the local food system. For example, Henneberry et al. (2009) estimated the impact of farmers markets on Oklahoma’s economy. They showed that farmers markets generate \$31.5 million in gross sales and 140 jobs. An assessment of the impact of the farmers market in West Virginia (Hughes et al., 2008) discovered that farmers markets created a total of 119 jobs, doled out \$2.4 million in output, and contributed \$1.5 million to the Gross State Product. Jablonski et al. (2016) also employed the opportunity cost framework to evaluate the economic impacts of food hubs on regional economies. Food hubs were found to positively impact the state of New York, with a gross output multiplier of 1.75 and an employment multiplier of 2.14.

Several of the research studies reviewed showed that the local food system significantly contributed to local economies. An assessment of Knoxville’s regional foodshed system revealed that the agricultural sector’s total industrial output multiplier is estimated at 1.51. In other words, for every dollar spent on food produced within Knoxville, Tennessee, an additional 51 cents in economic activity is generated throughout the region. The employment multiplier is 1.49, which means that for every job created as a result of transactions with local foods, an additional 0.49 jobs

are created in other industries throughout the region. The study found that primary agriculture in Knoxville employs 6,000 people and adds an additional \$82 million to the economy (Hellwinckel et al., 2014). Also, Otto and Varner (2005) used the IMPLAN input-output model and found that farmers markets in Iowa, directly and indirectly, generated gross sales of \$31.5 million. Hughes et al. (2008) used the IMPLAN model and producer surveys to show that the direct sales at farmers markets in West Virginia generate \$1.7 million and an additional \$2.4 million in output. Connor et al. (2008) estimated that the food system in Michigan contributes more than 18,000 jobs and an output of \$200 million. Similarly, Cummings et al. (1999) estimated that farmers markets in Ontario, Canada, generated 800 additional jobs.

Methodology

To understand the economic contribution of local foods to local economies, the IMPLAN's based input-output model was used to analyze its economic contribution.

An economic contribution analysis quantifies the effects of an existing business, industry, or sector in terms of jobs, labor income, and value-added. Economic contribution analysis is different from *economic impact analysis*. An economic impact analysis measures the changes in spending in a specified region due to a change in economic activity, such as the closing of industries or the establishments of a project or food hubs. The economic contribution of Tennessee's local food system was estimated in three different ways: direct, indirect, and induced effects.

Direct effects are the initial changes in final demand in terms of industry sales/output, employment, and labor income dollars.

Indirect effects stem from input purchases. To increase production, the local food sector must purchase more inputs—these are the first round of indirect effects. Also, the firms that supply these inputs must now purchase more of their own inputs to meet the new demand for their output—these are the additional rounds of indirect effects.

Induced effects are generated from employees of the local food sector spending their wages. When those workers spend their income, it generates the first round of induced effects. These expenditures increase demand for businesses, generating additional rounds of induced effects. Total effects are the sum of direct, indirect, and induced effects. They are the total of transactions attributable to the direct activity that this study measures (Leontief, 1987; McFadden et al., 2016). Hypothetically, in the local food systems, if a sector (Sector P) generates x amount of sales, these sales are the direct effects. Sector P will purchase more inputs from Sector Q to produce more. Sector Q will benefit from the increased business; thus, the value of the increased sales are indirect effects. When workers in Groups P and Q spend the earnings attributable to Group P's x amount of sales to buy goods, the value of these goods is the "induced" effects.

Multipliers indicate the change in economic activity due to a 1-unit direct change. They summarize the total impact, and can be expressed in terms of employment, output, or income. A total output

multiplier is a way to indicate the extent of linked economic activity within a local or regional economy. It is calculated as:

$$\frac{(\text{direct} + \text{indirect} + \text{induced effect})}{\text{direct effect}} = \text{total output multiplier}$$

There are three types of Multipliers: the Output Multiplier, Employment Multiplier, and Income Multiplier.

All of the components mentioned above are estimated using the IMPLAN's input-output model. The input-output model (IO) is an economic model that quantifies and tracks backward linkages related to economic activity between industries and institutions. It is used to track the flow of money from one entity to another. It involves large tables of data that describe the linkages among industries, households, and government entities in a region. The output of one industry will appear as the input of the others (Leontief, 1987). The IO tables for this article are based on secondary data sources, which are national averages from the U.S. Department of Agriculture Census of Agriculture, U.S. Department of Labor Statistics, and other sources contained in the IMPLAN database. These linkages take the form of an expenditure function, which specifies how different inputs are assembled to produce a unit of output.

Results

The estimated total effects of the local food system in Tennessee is \$37.5 billion (Table 1), implying a total output multiplier of 1.47. This means that every \$1 spent on the Tennessee local food system generates an extra 47 cents in the economy. The total impact of \$7.7 billion dollars represents the indirect effects of the local food system, which represent the input or supply transactions that support the local food production. About \$4.29 billion dollars was approximated as the induced effect that stems from the workers' spending on goods and services within the region. Figure 1 also shows the direct, indirect, and induced effect of the local food system in terms of employment, labor income, and value added.

Table 1. Economic Contribution of Tennessee's Local Food System

Impact	Employment	Labor Income	Value Added	Output
Direct	99,689.54	\$2,691,301,805.68	\$6,123,692,219.20	\$25,556,954,934.05
Indirect	41,430.66	\$2,676,626,473.03	\$3,979,285,727.93	\$7,740,982,712.69
Induced	27,306.38	\$1,526,969,241.03	\$2,534,756,185.30	\$4,292,906,910.64
Total	168,426.57	\$6,894,897,519.75	\$12,637,734,132.42	\$37,590,844,557.37

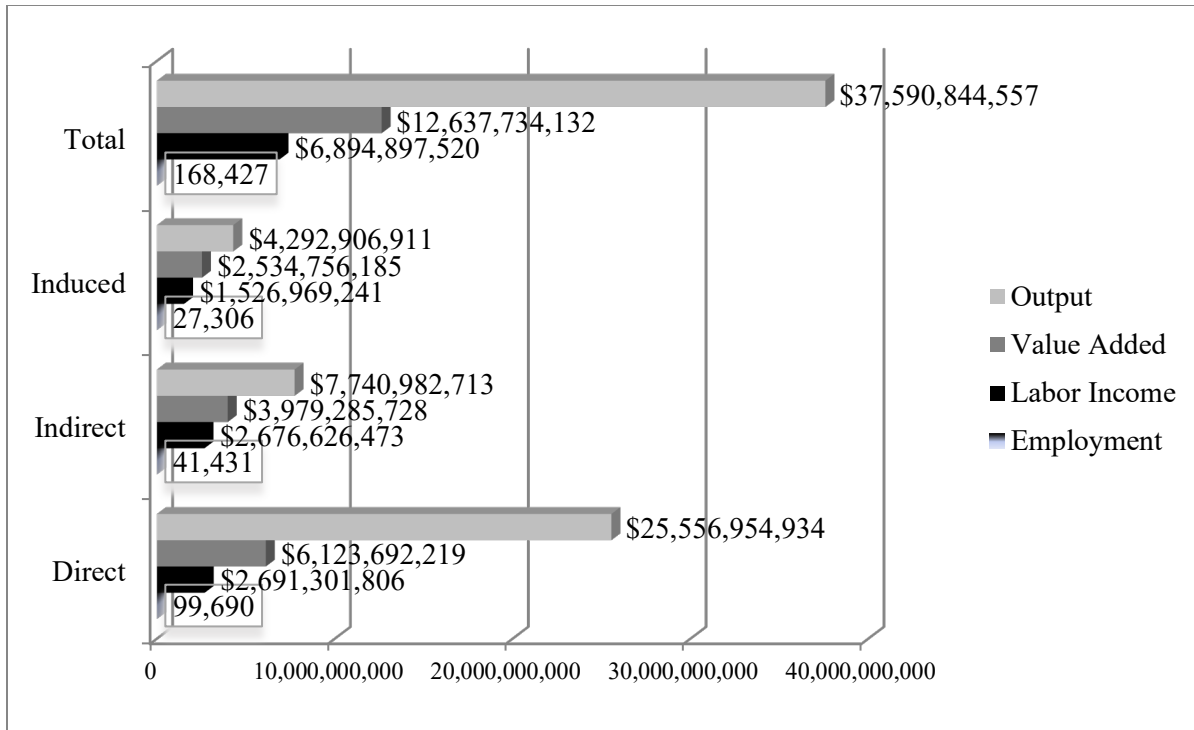


Figure 1. Economic Contribution of Tennessee’s Local Food System

Table 2 shows the multiplier associated with each of these variables. An income multiplier of 2.56 implies that every \$1 spent on local foods within the Tennessee region generates an additional \$1.56 in labor income. The region’s local food system directly employs more than 99,000 people and has an employment multiplier of 1.69. In other words, for every job created by the Tennessee local food system, an additional 0.69 jobs are created in other industries throughout the region. The value-added multiplier of 2.06 shows that every \$1 spent on local food consumption in Tennessee will provide \$1.06 additional value to products in other industries affected by local food sales (Figure 2).

Table 2. Tennessee’s Local Food System’s Income, Employment, Value-Added Multipliers

Multiplier	Value
Output multiplier	1.47
Income multiplier	2.56
Employment multiplier	1.69
Value-added multiplier	2.06

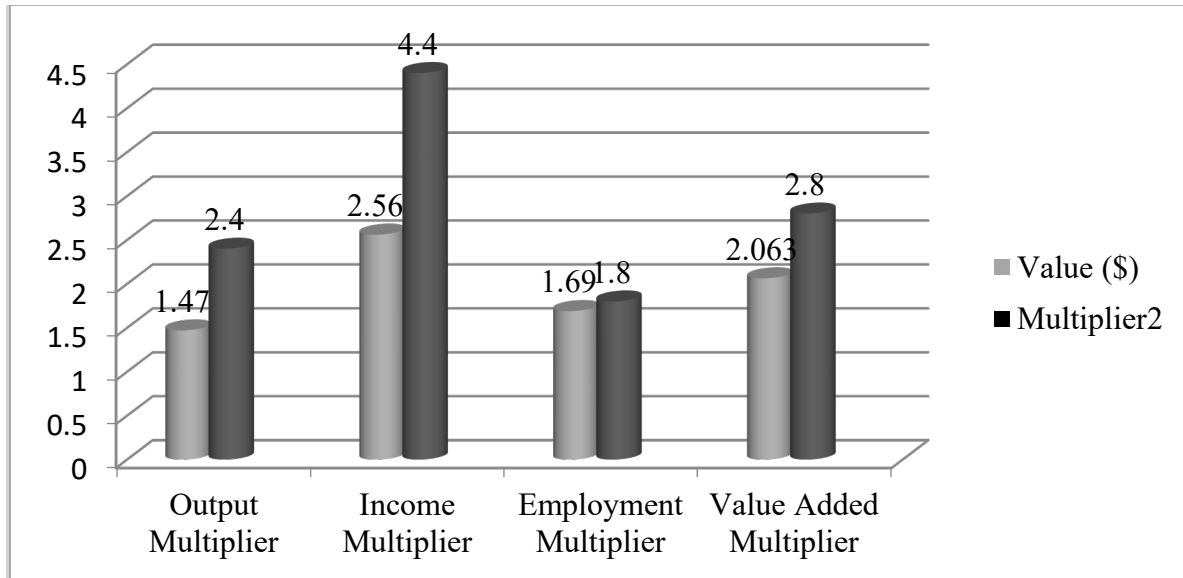


Figure 2. Tennessee’s Local Food System’s Income, Employment, and Value-added Multipliers

Conclusion

This article shows the economic contributions of the local food system in Tennessee. Local Food System is a crucial component of Tennessee's economy, with an estimated total economic contribution of \$37.5 billion. The region's local food system directly employs over 99,000 people, contributes \$2.69 billion to labor income, and over \$6 billion in value-added. This article also shows the extent of linked economic activity within the local economy through an economic multiplier. The total output multiplier of 1.47 indicates that for every \$1 spent in the local food industry, an additional 47 cents is added to the economy. The region's local food system has an employment multiplier of 1.69. In other words, for every job created by the Tennessee local food system, an additional 0.69 jobs are created in other industries throughout the region. The value-added multiplier of 2.06 shows that every \$1 spent on local food consumption in Tennessee provides \$1.06 additional value to products in other industries affected by local food sales.

Since the local food system has significant positive contributions to the total state output, employment, and labor income in Tennessee, it can be a strong avenue for further economic development in the region of Tennessee. Future research should explore a unanimous and strengthened framework in evaluating the local food system to model a method that applies to several definitions and interpretations of the local food system.

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