San Juan Islands

Food Impact Economic Analysis

Prepared by the Center for Economic and Business Research

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WESTERN WASHINGTON UNIVERSITY

CENTER FOR ECONOMIC AND BUSINESS RESEARCH

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About the Authors

The Center for Economic and Business Research is an outreach center at Western Washington University located within the College of Business and Economics. In addition to publishing the Puget Sound Economic Forecaster, the Center connects the resources found throughout the University to assist for-profit, non-profit, government agencies, quasi-government entities, and tribal communities in gathering and analyzing useful data to respond to specific questions. We use a number of collaborative approaches to help inform our clients so that they are better able to hold policy discussions and craft decisions.

The Center employs students, staff and faculty from across the University as well as outside resources to meet the individual needs of those we work with. Our work is based on academic approaches and rigor that not only provides a neutral analytical perspective but also provides applied learning opportunities. We focus on developing collaborative relationships with our clients and not simply delivering an end product.

The approaches we utilize are insightful, useful, and are all a part of the debate surrounding the topics we explore; however, none are absolutely fail-safe. Data, by nature, is challenged by how it is collected and how it is leveraged with other data sources. Following only one approach without deviation is ill-advised. We provide a variety of insights within our work – not only on the topic at hand but also the resources (data) that inform that topic.

We are always seeking opportunities to bring the strengths of Western Washington University to fruition within our region. If you have a need for analysis work or comments on this report, we encourage you to contact us at 360-650-3909 or by email at cebr@wwu.edu.
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The Center for Economic and Business Research is directed by Hart Hodges, Ph.D. and James McCafferty.

Introduction

The Center for Economic and Business Research at Western Washington University was asked to perform an economic impact analysis of the market for local food in San Juan County, Washington. This report examines literature related to the benefits and detriments of buying local, provides forecasts for the County's population and income, an overview of ferry ridership to the San Juan Islands as a proxy for tourism trends, supply and demand of the market for food, analysis of the economic impacts of an increase in agricultural production, economic multipliers of agricultural sectors, and some brief recommendations based on our research. At the end of this report, you will find an annotated bibliography and literature review.

Economic theory strongly suggests that, in most cases, policy interventions to increase local food production are likely to be generally harmful to economic welfare. This is because there are gains from trade when regions specialize according to comparative advantage. In short, the economic benefits from exporting locally produced goods are greater than the economic benefits of buying local. However, there can be other reasons to buy locally produced food such as social benefits and economic diversification.

In this report, we find that the average multiplier for agricultural goods in San Juan County is 1.428. This means that, on average, $1,000 of added food production in San Juan County generates $1,428 of economic activity. We also find that there is a significant gap between the demand for local food and the supply. This gap is likely between $17,852,509.80 to $96,957,105.46. Therefore, we recommend focusing on supporting producers rather than encouraging shoppers to buy local food.

Forecasts

In order to accurately forecast demand for local foods, it is necessary to first understand the number of people in the San Juan Islands at any given time. For this reason, we have assembled forecasts on population in the San Juan Islands and ferry ridership to San Juan County, a proxy for visits. Like any other normal good, we expect demand for local foods to increase as income increases, so we have also forecasted future income growth for San Juan Island residents.

Population

This forecast comes from JobsEQ. The period of historical data is 2010-2019 and the forecast period is 2020-2035—meaning that the population in 2020 is a forecasted value. According to the recent 2020 census, San Juan County's population is 17,788.

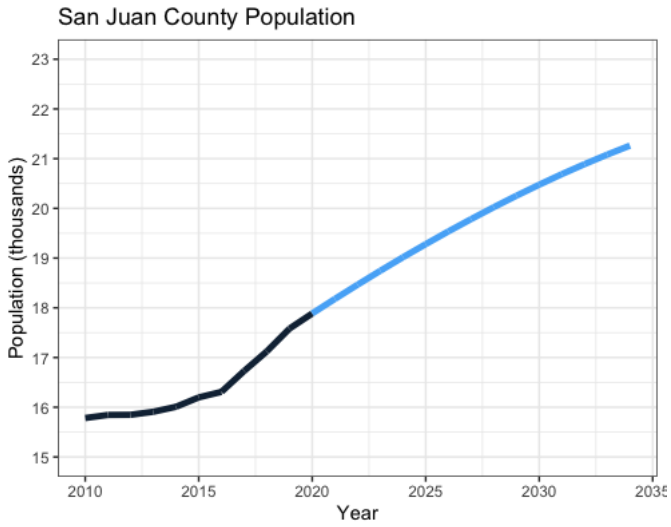

Figure 1

From 2010-2019, the population of the San Juan Islands grew at an average rate of 1.21% per year. From 2020-2034, the population growth rate is expected to average 1.27% per year. For comparison, Washington's growth rate was 1.45% in 2019[1]. By 2025, San Juan County is anticipated to be home to 19,280 residents. By 2030, we expect 20,476 residents, and by 2035 we expect 21,263.

Ferry Ridership Analysis

San Juan County's economy is largely tourism-based. As a result, much of the demand for local food comes from visitors visiting the islands and eating at restaurants that serve locally produced items.

A good measure for the number of visitors in the San Juan Islands is daily ferry ridership from Friday Harbor. The figure below shows the total number of passengers each day from January 1, 2017 to March 31, 2021. The average number of passengers was approximately 5,300 per day. The highest points in each year occur over Memorial Day Weekend.

[1] Washington State's Office of Financial Management, *Total Population and Percent Change*

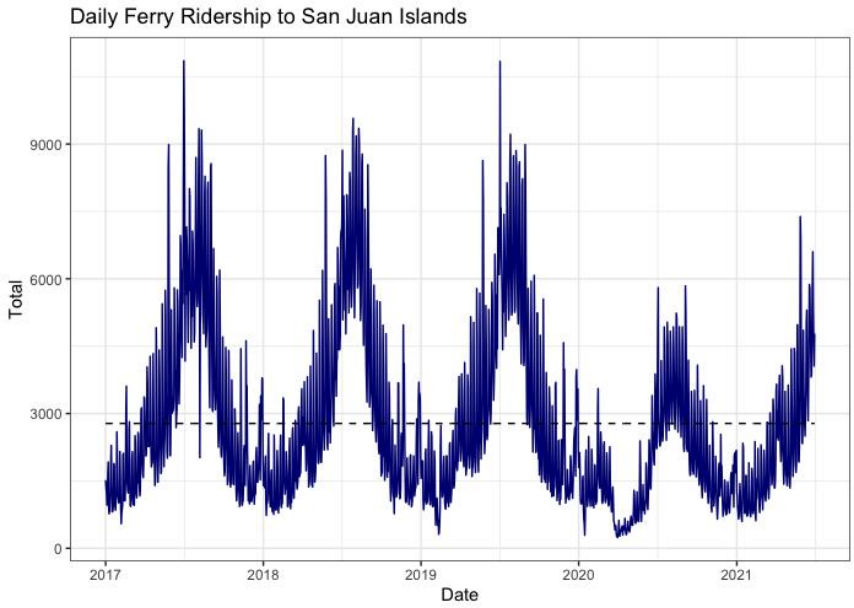

Figure 2

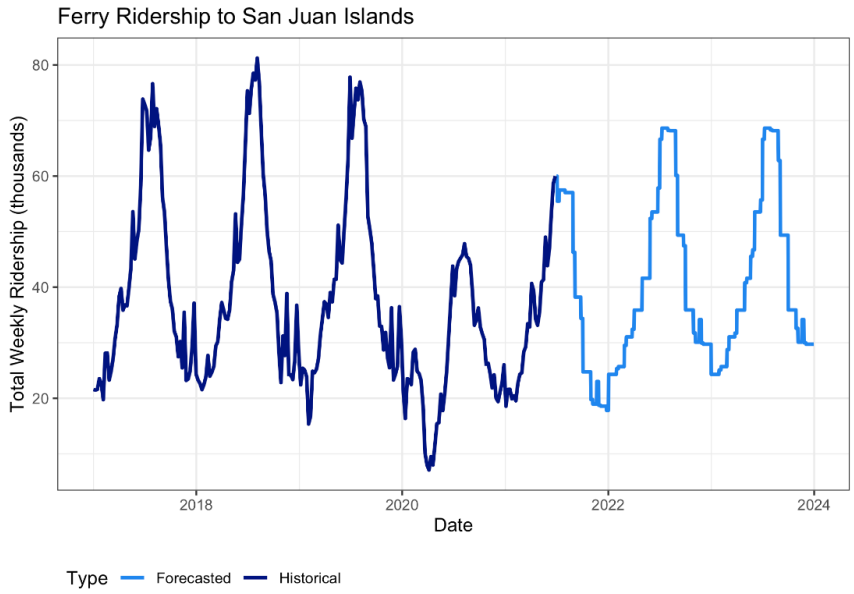

Figure 3

We also present ferry ridership by day of the week in the figure below. Unsurprisingly, Friday and Saturday are the most popular days of the week to visit the islands.

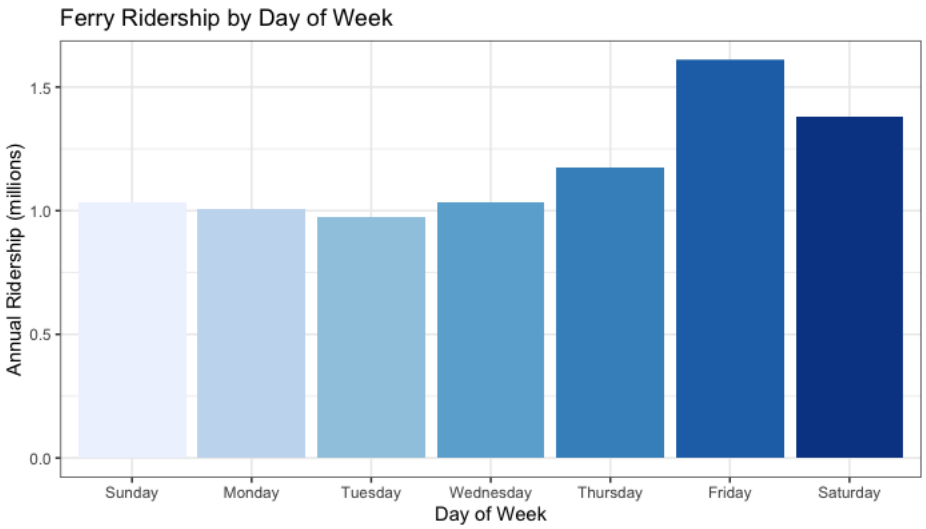

Figure 3

Ferry ridership data shows significant seasonality. The timing of tourist visits is highly predictable in a typical year. However, the COVID-19 pandemic has disrupted tourism activities, making predictions less reliable. The figure below shows the typical number of ferry riders in a month.

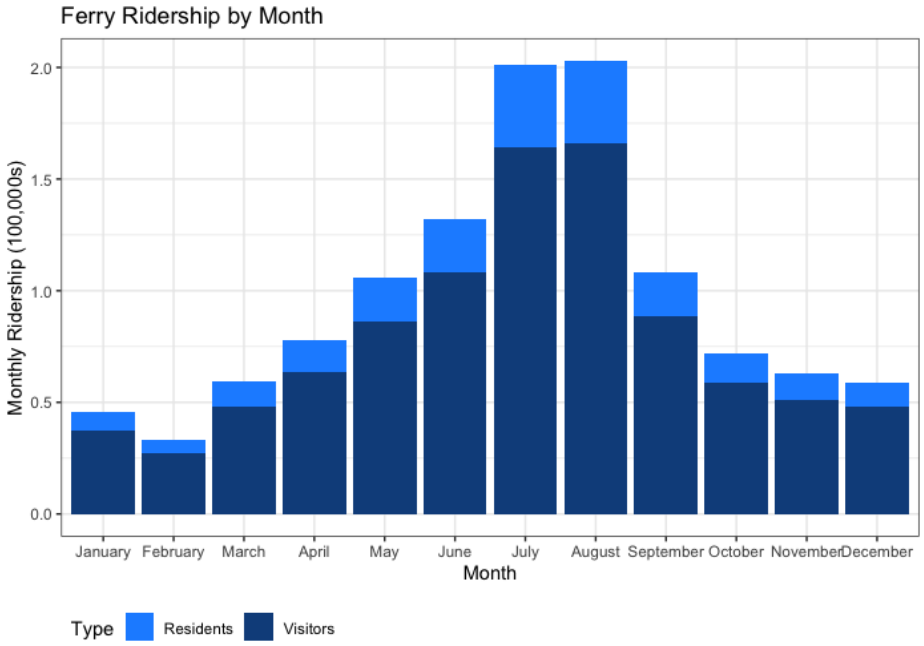

Figure 4

According to data from the 2018 San Juan Islands Visitor Study, 81.74% of ferry riders are visitors and 18.26% are residents. The figure below shows the monthly forecast of ferry riders assuming the ratio holds true. Keep in mind that we do not know whether or not there is seasonality to this ratio because the Visitor Study used cross sectional data. Their sampling was done during May through September, so the ratio is most reliable for those months.

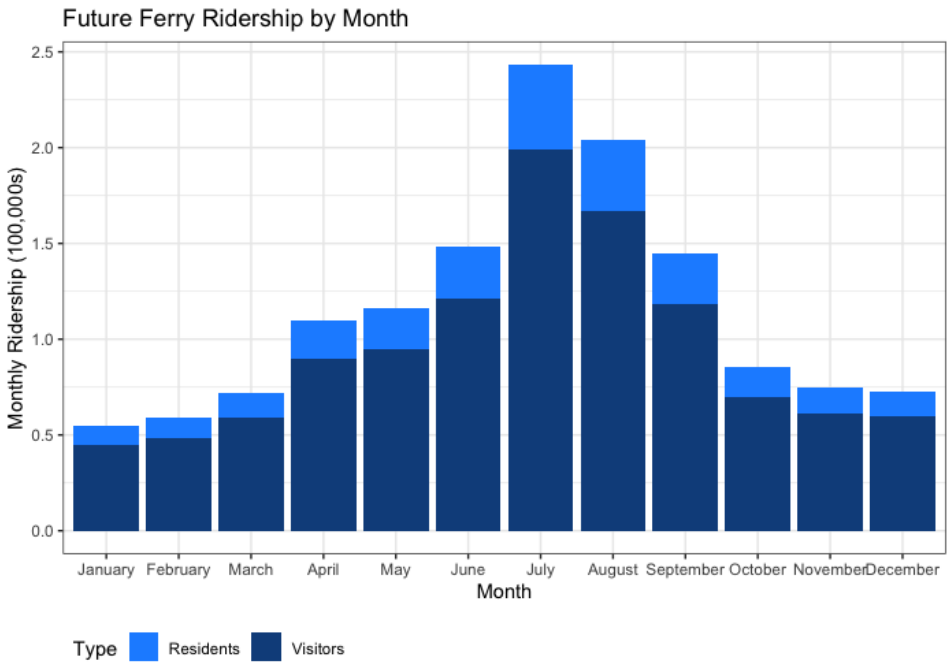

Figure 5

According to the San Juan Island Visitor Study, the average visitor stays for 3 days. Therefore, approximately 3,500 visitors are present per day in the winter and 8,400 visitors are present per day in the summer.

The forecasted data are shown in the table below.

Month	Total Ridership	Residents	Visitors
2022			
January	54,634.63	9,976.28	44,658.35
February	59,616.69	10,886.01	48,730.68
March	73,080.99	13,344.59	59,736.40
April	88,767.24	16,208.90	72,558.34
May	117,833.99	21,516.49	96,317.51
June	154,444.01	28,201.48	126,242.53
July	244,990.85	44,735.33	200,255.52
August	201,969.74	36,879.68	165,090.07
September	141,254.43	25,793.06	115,461.37
October	110,643.10	20,203.43	90,439.67
November	74,371.20	13,580.18	60,791.02
December	71,060.82	12,975.71	58,085.12
2023			
January	54,534.55	9,958.01	44,576.54
February	59,080.67	10,788.13	48,292.54
March	72,115.98	13,168.38	58,947.60
April	109,669.78	20,025.70	89,644.08
May	116,127.62	21,204.90	94,922.72
June	148,173.26	27,056.44	121,116.82

July	243,360.88	44,437.70	198,923.19
August	204,219.63	37,290.51	166,929.13
September	144,698.61	26,421.97	118,276.64
October	85,645.74	15,638.91	70,006.83
November	74,841.68	13,666.09	61,175.59
December	72,986.18	13,327.28	59,658.90

Table 1

While ferry ridership does not tell the whole story of demand for local food, awareness of the trends in tourism presents an opportunity to increase sales of local foods to visitors, bringing in revenue from elsewhere without the added expenses of export.

Based on the San Juan County Local Food Survey, we know that almost three-quarters of respondents care at least 'a moderate amount' about the distance their food travels. The same survey also showed that respondents most commonly reported that 25% of their food comes from the San Juan Islands. This discrepancy paints a picture of an economy that has plenty of demand for locally produced food, but not enough supply.

Income

The forecast for income was performed based on the Puget Sound Economic Forecaster's existing forecast of personal income. Historical data for San Juan County comes from the US Census Bureau's Small Area Income and Poverty Estimates. The historical period is 1997-2020.

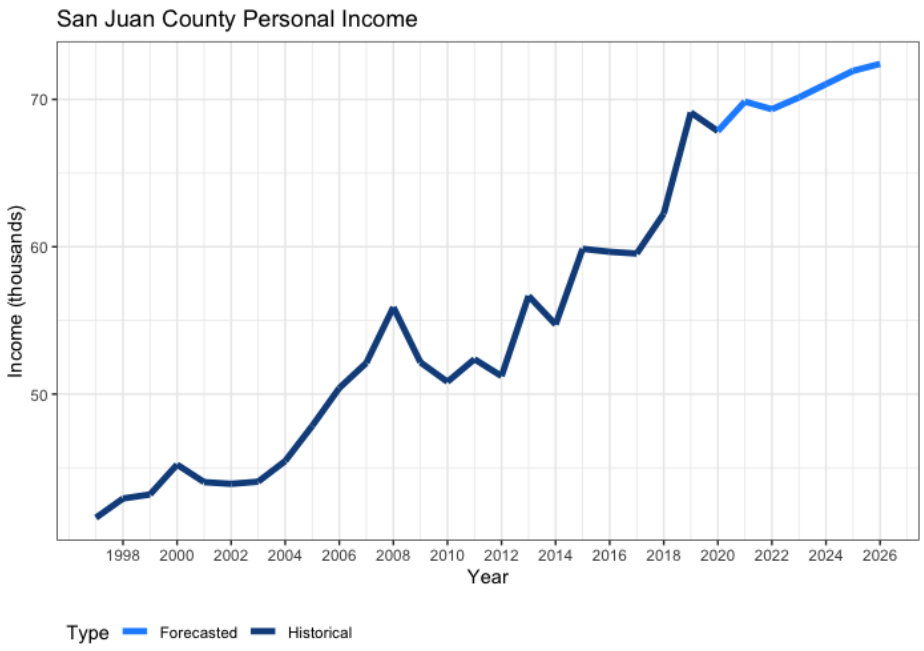

Figure 6

Due to the effects of the COVID-19 pandemic, incomes dropped significantly in 2020. As a result of stimulus payments, we expect incomes to rise significantly in 2021, then drop down before continuing on an upward trend. We expect the median household income in San Juan County to surpass $70,000 by 2025.

Wages

Wages often tell a slightly different story than Income, especially in communities with large numbers of people with significant non-wage income. The San Juan Islands wage and income data diverge for multiple reasons. The San Juan Islands have a nontrivial population of retirees who earn passive income from investments. Wages are also measured on an individual level rather than a household level, as income is. The prevalence of two-income households shifts household income figures above individual wage figures. The figure below shows historic and forecasted future mean wage trends. The forecast was performed using an exponential smoothing with trend model.

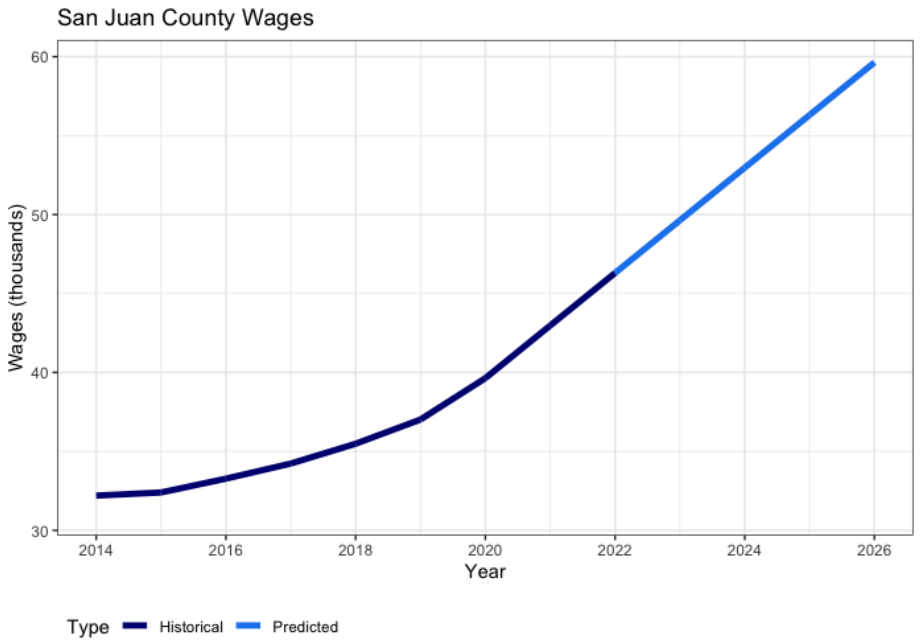

Figure 7

Whereas incomes fell severely in 2020 in the San Juan islands, mean wages increased sharply in 2020. One explanation for this is workers in low paying sectors like leisure and hospitality were the most strongly affected by layoffs during the recession caused by the COVID-19 pandemic. Because these low wage workers were no longer employed, they were not included in 2020 wage data, skewing the average wage up. Our model predicts wages to continue to increase very rapidly, with average wages forecasted to reach $59,636.09 by 2026. Recent increases in inflation may further increase wages, especially for lower wage workers.

Supply and Demand for Local Food

Demand

According to data from the 2018 and 2019 Consumer Expenditure Survey from the US Bureau of Labor Statistics, San Juan County residents spend $90,787,886 on food per year. Of this, $55,550,533 is spent on food at home (groceries) and $35,237,352 is spent on food away from home (restaurants). The table below shows the breakdown of grocery spending by category.

Item	Annual Expenditure
Bakery and Cereal	$7,172,915
Meat, Poultry, Fish, Eggs	$11,747,425
Dairy	$5,848,517
Fruits and Vegetables	$10,657,651
Snacks and Other	$20,124,025

Table 2

Divided among San Juan County's 17,476 residents[2], this comes out to $6,491.82 per resident for groceries and $4,117.96 for dining out. These expenditures count how much a resident spends on food regardless of where they spent it. The table below shows the breakdown by resident for groceries.

Item	Annual Expenditure
Bakery and Cereal	$838.25
Meat, Poultry, Fish, Eggs	$1,372.84
Dairy	$683.48
Fruits and Vegetables	$1,245.49
Snacks and Other	$2,351.76

Table 3

To fully capture how much San Juan County residents are spending within their own county, we compare reported expenditures on groceries to San Juan County grocery stores' reported sales. According to data from the Washington Department of Revenue (DoR), San Juan County grocery stores sold $23,692,197 worth of food in 2019[3]. This means that $31,858,336 in resident spending is unaccounted for by local grocery stores. This figure also does not include non-resident spending at grocery stores, which indicates that the gap may be even greater. This figure includes only grocery stores and bakeries, so there are some gaps for establishments such as convenience stores.

According to data from the San Juan Islands Visitors Bureau, visitors spent $47.6 million on food in 2019. Typically, visitors spend around 80% of their food budget at restaurants, meaning that visitors spent approximately $38.1 million at restaurants and $9.5 million at grocery stores. In 2019, San Juan County restaurants made $26,682,430 while residents spent $35,237,352 at restaurants. Because of the

[2] This figure is slightly outdated, the 2020 census shows a population of 17,788

[3] This data source is a measure of all sales by sector as reported by individual businesses to the Washington State Department of Revenue

discrepancy between SJIVB and DoR data, the true value of restaurant revenue is likely between both estimates. In the table below, we provide a range of possible estimates of visitor food spending and resident food spending broken down by restaurants and grocery stores.

Visitor Spending		Resident Spending		Total	
Groceries	Restaurants	Groceries	Restaurants	Groceries	Restaurants
$3,460,015.79	$ 13,861,975.59	$ 20,232,181.21	$ 12,820,454.41	$ 23,692,197.00	$ 26,682,430.00
$4,322,870.68	$ 17,324,550.50	$ 25,277,660.03	$ 16,022,868.35	$ 29,600,530.71	$ 33,347,418.86
$5,185,725.57	$ 20,787,125.42	$ 30,323,138.86	$ 19,225,282.30	$ 35,508,864.43	$ 40,012,407.71
$6,048,580.45	$ 24,249,700.34	$ 35,368,617.69	$ 22,427,696.24	$ 41,417,198.14	$ 46,677,396.57
$6,911,435.34	$ 27,712,275.25	$ 40,414,096.52	$ 25,630,110.18	$ 47,325,531.86	$ 53,342,385.43
$7,774,290.23	$ 31,174,850.17	$ 45,459,575.34	$ 28,832,524.12	$ 53,233,865.57	$ 60,007,374.29
$8,637,145.11	$ 34,637,425.08	$ 50,505,054.17	$ 32,034,938.06	$ 59,142,199.29	$ 66,672,363.14
$9,500,000.00	$ 38,100,000.00	$ 55,550,533.00	$ 35,237,352.00	$ 65,050,533.00	$ 73,337,352.00
$10,450,000.00	$ 41,910,000.00	$ 61,105,586.30	$ 38,761,087.20	$ 71,555,586.30	$ 80,671,087.20

Table 4

Department of Revenue data is biased by discrepancies between business filing address and physical business location, although this issue is less prevalent in San Juan County than elsewhere in Washington. Visitors Bureau data and Consumer Expenditure Survey data is likely to be biased by small sample size.

Next, to determine the gap between supply and demand, we must convert the demand-side expenditures into their respective wholesale values. Markups can vary significantly between different types of food and between different types of retailers. We provide a wide range of possible markups for groceries and for restaurants separately. For this component, we combine expenditures from visitors and residents.

Groceries	15%	25%	35%	50%
$ 23,692,197.00	$ 20,601,910.43	$ 18,953,757.60	$ 17,549,775.56	$ 15,794,798.00
$ 29,600,530.71	$ 25,739,591.93	$ 23,680,424.57	$ 21,926,319.05	$ 19,733,687.14
$ 35,508,864.43	$ 30,877,273.42	$ 28,407,091.54	$ 26,302,862.54	$ 23,672,576.29
$ 41,417,198.14	$ 36,014,954.91	$ 33,133,758.51	$ 30,679,406.03	$ 27,611,465.43
$ 47,325,531.86	$ 41,152,636.40	$ 37,860,425.49	$ 35,055,949.52	$ 31,550,354.57
$ 53,233,865.57	$ 46,290,317.89	$ 42,587,092.46	$ 39,432,493.02	$ 35,489,243.71
$ 59,142,199.29	$ 51,427,999.38	$ 47,313,759.43	$ 43,809,036.51	$ 39,428,132.86
$ 65,050,533.00	$ 56,565,680.87	$ 52,040,426.40	$ 48,185,580.00	$ 43,367,022.00
$ 71,555,586.30	$ 62,222,248.96	$ 57,244,469.04	$ 53,004,138.00	$ 47,703,724.20

Table 5

Restaurants	200%	300%	400%
$ 26,682,430.00	$13,341,215.00	$8,894,143.33	$6,670,607.50
$ 33,347,418.86	$16,673,709.43	$11,115,806.29	$8,336,854.71
$ 40,012,407.71	$20,006,203.86	$13,337,469.24	$10,003,101.93
$ 46,677,396.57	$23,338,698.29	$15,559,132.19	$11,669,349.14
$ 53,342,385.43	$26,671,192.71	$17,780,795.14	$13,335,596.36
$ 60,007,374.29	$30,003,687.14	$20,002,458.10	$15,001,843.57
$ 66,672,363.14	$33,336,181.57	$22,224,121.05	$16,668,090.79
$ 73,337,352.00	$36,668,676.00	$24,445,784.00	$18,334,338.00
$ 80,671,087.20	$40,335,543.60	$26,890,362.40	$20,167,771.80

Table 6

Altogether, the wholesale value of groceries sold in San Juan County is between $15,794,798.00 and $62,222,248.96 annually. The wholesale value of restaurant food items sold in San Juan County is between $6,670,607.50 and $40,335,543.60. Combined, the total wholesale demand for food is between $22,465,405.50 and $102,557,792.56.

Supply

According to the 2017 Census of Agriculture, San Juan County farmers produced $4,119,000 in agricultural products. This value does not include processed agricultural products, intermediate products, or other value-added production. Understanding the value of all goods of interest would improve understanding of the gap between current supply and demand for local food. According to Department of Revenue data, the total manufacturing sector for San Juan County was $4,938,957 in 2020, this value includes intermediate agriculture products and finished goods, but also includes manufacturing for sectors other than food.

Below is a table of possible production given a range of possible values for the percentage of manufacturing that is food production. For the US overall, 15-23% of manufacturing is food production. This percentage acts as an anchor for possible values of food production in the islands.

10%	15%	20%	25%	30%
$ 4,612,895.70	$ 4,859,843.55	$ 5,106,791.40	$ 5,353,739.25	$ 5,600,687.10

Table 7

The supply of food production in San Juan County is likely between $4,612,895.70 and $5,600,687.10, therefore there is approximately $17,852,509.80 to $96,957,105.46 in unmet demand for food.

Economic Impact Analysis

Methodology

In this section, we provide economic impact analysis of the following scenario:

> *the total food production in San Juan County increases by 10%.*

This analysis was performed using IMPLAN[4]. Production data was first updated according to the 2017 USDA Agriculture Census for San Juan County. This provides a basis for the scenario to determine what level a '10% increase' is. Beyond this, data imbedded in the IMPLAN model was not further altered. The scenario is not dependent on the baseline data, but rather, it shows the impact of a change in the economy. As with all economic impact studies, we must be mindful of our application of the results. This study does not include analysis of net effects to other businesses or to the environment. For example, if farm acreage were increased 10% to generate the 10% increase in production, the analysis does not capture the economic impacts of habitat loss or the loss of revenue that would have occurred had the land been used for something else.

Multipliers

Not all industries have the same economic impact. Increasing the size of two agricultural sectors can have very different impact on the economy. In the table below, we list economic sectors by impact. This tells us which sectors provide the most bang for our buck from investments in them. For brevity, we do not include sectors where there is not enough existing production to know the industry multiplier[5].

Table 8

Description	Direct Effects	Indirect Effects	Induced Effects	Total
Grain farming	1.000	0.316	0.081	1.397
Vegetable and melon farming	1.000	0.192	0.218	1.409
Fruit farming	1.000	0.163	0.204	1.367
Greenhouse, nursery, and floriculture production	1.000	0.113	0.373	1.485
All other crop farming	1.000	0.265	0.126	1.392
Cattle ranching and farming	1.000	1.100	0.113	2.213
Dairy cattle and milk production	1.000	0.257	0.065	1.322
Poultry and egg production	1.000	0.116	0.113	1.229
Animal production, except cattle and poultry and eggs	1.000	0.300	0.161	1.460
Commercial Fishing	1.000	0.030	0.294	1.324
Breweries	1.000	0.136	0.040	1.176
Wineries	1.000	0.281	0.091	1.371
Average	**1.000**	**0.272**	**0.156**	**1.428**

[4] For more information, see IMPLAN.com

[5] For all multipliers, see the accompanying Excel spreadsheet of multipliers

After averaging the total effect multipliers for all food production industries where the multiplier is known, we find an average multiplier of 1.428. This means that, on average, $1,000 of added food production in San Juan County generates $1,428 of economic activity. According to data from IMPLAN, the industries with the highest multipliers are as follows:

- Cattle ranching and farming
- Greenhouse, nursery, and floriculture
- Animal production, except cattle and poultry and eggs
- Vegetable and melon farming

Economic multipliers are just one consideration for which agricultural sectors to invest in, but they provide insight into which sectors provide the most bang per buck.

Rule of Thumb:

$1,000 of agriculture production generates $1,428 worth of economic activity

Model Scenario

In this scenario, we increase the local supply of several commodity items by 10%. In this scenario we make a few key assumptions as follows:

- Supply of local food increases
- All increase in local supply is consumed locally (indirectly increasing demand)
- The increase in price to consumers as a result of the shift is modeled by increasing production

In this model, production numbers were first updated according to the 2017 USDA Agriculture Census data. Then, industry production was increased by 10% for each of the following sectors: grain farming; vegetable and melon farming; greenhouse, nursery, and floriculture farming; poultry and egg production; cattle ranching and farming. These sectors were selected because they have existing production in the IMPLAN model.

To account for the fact that local food prices are more expensive in San Juan County, we increase the increase in local supply by another 27.4%[6]. This brings the total modeled increase in production to 12.74%. Below is a table of the amount of production increased in each sector. We also assume no substitutions effects (i.e., the increase in food expenses does not cut into purchasing other goods.

Table 9

Sector	Added production
Grains	$11,021.00
Vegetables and melons	$60,005.40
Nursery, floriculture, greenhouse	$59,113.60
Poultry and egg	$6,879.60
Cattle ranching and farming	$100,773.40
Total	$237,793.00

[6] This figure was estimated by Learner Limbach and was found by surveying prices at local grocery stores. This figure is an average difference in prices between imported produce and locally produced produce.

The total output that resulted from this change was $382,306 or $161,057 in added value. For reference, the GDP of San Juan County was $863,731,000 in 2019. The multiplier indicated from this change was 1.608, which is particularly high due to the high multiplier on cattle ranching and farming. The direct effect of the increased production creates 6.6 jobs and indirectly creates 2.6 jobs. The income generated by the labor for the 6.6 new jobs is $115,304. The change to the economy had the greatest impact on employment in the following sectors:

- Cattle ranching and farming
- Grain farming
- Vegetable and melon farming
- Greenhouse, nursery, and floriculture
- All other crop farming
- Support activities for agriculture and forestry
- Real estate establishments
- Poultry and egg production
- Wholesale trade businesses
- Monetary authorities

The change to the economy had the greatest impact on output in the following sectors:

- Cattle ranching and farming
- Grain farming
- Vegetable and melon farming
- Real estate establishments
- Grain farming
- Monetary authorities
- All other crop farming
- Poultry and egg production
- Electric power generation
- Wholesale trade businesses

The particular sectors affected by the change are dependent on the type of food production. However, it is clear that increasing food production has spillover effects into other industries. Seemingly the most impacted sectors (other than agriculture) are real estate, monetary authorities, wholesalers, and utilities.

Different industries have different multipliers because of the way that they interact in the economy. An economic multiplier is essentially a measure of how interconnected that sector is. For example, the cattle ranching and farming sector may have a high multiplier because cattle ranching requires many different—and more expensive—inputs (calves, feed, pasture irrigation, inspections, etc.) compared to simpler agriculture sectors.

Economic impact analysis and industry multipliers must be used with discretion. Impact analysis does not consider opportunity costs (i.e., the benefits of using the same money to do something else) or any social costs (i.e., environmental, equity). Industry multipliers are an approximation of ripple effects and the ripple effect of one project may not be typical of the industry. Therefore, economic analysis should be carefully used as one component of the decision making process.

Conclusion and Policy Recommendations

We find that there are clear patterns to ferry ridership to San Juan County. Conveniently, tourism appears to peak during the summer when the most food is available. The most popular weekends for tourism are Memorial Day weekend and Fourth of July weekend. The San Juan Islands can expect to see the usual patterns of tourism return as the effects of the pandemic fade.

The total demand for food was substantially higher than the existing supply of locally produced food. Much of the existing demand is likely met by off-island shopping as on-island grocery stores do not earn near as much as residents spend. This is likely due to higher prices on-island and lack of available products on-island. Improving supply chains may boost on-island spending.

According to the economic impact analysis, the agriculture sectors that would generate the highest amount of economic activity are cattle ranching, greenhouse and floriculture, and all other animal products (excluding cattle, poultry, and eggs). Any increase in agriculture production would have a positive impact on the San Juan Islands economy. On average, for every $1,000 of agricultural production, $1,428 is generated in the local economy. Based on this research, there is sufficient demand to support local production, but there is not enough supply to fill demand. We recommend focusing on supporting supply-side infrastructure to boost the agriculture sector of San Juan County. The San Juan Islands may benefit from focusing on agro-tourism, which brings in more revenue per acre compared to production-focused endeavors.

However, this information must be balanced with other values of San Juan Islands residents. Economic impact analysis does not capture all benefits and detriments of a decision. Although there may be significant economic benefits to supporting agriculture in the San Juan Islands, there are also tradeoffs with environmental health, competing economic endeavors, and other societal interests that must be considered when making a decision.

Literature Review

Economic theory strongly suggests that, in most cases, policy interventions to increase local food production are likely to be generally harmful to economic welfare. This is because there are gains from trade when regions specialize according to comparative advantage. Gains from trade increase as the size and scope of the market increase. This generalized principal has been almost universally accepted by economists since the 1800's. However, this rule of thumb is only true assuming the market is competitive and there are no externalities. Some argue local food production could be welfare increasing relative to conventional agriculture because reduced transportation distance of local foods could lower the environmental impact of agriculture. Others say that transportation causes only a trivial amount of environmental impact which is often offset by higher emissions from less productive smaller scale farms which typically are associated with local farming or by increased energy usage of growing agriculture indoors where local climates require. Economic theory also suggests that local foods could be superior to conventional foods if they are either cheaper or perceived as higher quality/fresher by consumers, in which case consumers would prefer local foods to conventional foods, even without government intervention. Consumers often report perceived quality as a leading reason they choose local over conventional foods. Other reasons include the desire to help small businesses, 'soft glow' effects from knowing their producers, or the belief that buying local is better for the local economy. The belief that money spent locally will stimulate the local economy because there is less 'leakage' and more local spending is viewed by some theorists as a fallacy and while many empirical studies view leakage as a compelling argument to encourage buying local. Theorists point out that this logic can be used as a general argument against gains from trade. When taken to the extreme, the 'leakage' argument implies the false notion that full self-reliance within a household would maximize welfare. After all, a household who mines their own iron to build their own axes to chop down trees for firewood to cook the meat they hunt 'leaks' no money but is effectively made poorer by foregoing opportunities to trade. In short, theorists argue local foods are only beneficial when regions have a comparative advantage in either price or quality relative to imported food or there are significant market failures such as lack of competition or externalities like environmental damage from greater transportation distances. In these exceptional cases, policy interventions may be required to maximize efficiency and achieve ideal economic outcomes.

Contrasting the theoretical viewpoint, most empirical literature finds that buying local benefits the regional economy. Most empirical studies reviewed used IMPLAN analysis, the same IO modeling tool CBER used for our analysis. The most common reason is that local producers spend more on inputs (tools, labor, etc.) within the local economy, decreasing 'leakage', thus stimulating demand and increasing incomes. Due to less leakage from local sales, local marketing channels tend to have higher spending multiplier values. Higher multiplier values imply a greater level of additional induced spending per dollar of local sales. The exact size of the spending multiplier varies from region to region depending on the particulars of crop type, labor costs, marketing channels, study methodology, and various other factors. Due to many differences across studies and regions, it is not recommended to directly compare exact multipliers across studies. However, almost every study reviewed found larger multipliers for local food than conventional food and increases in the number of jobs when spending shifts from conventional to local producers.

In summary, there is a wide gap between the implications of the theoretical and empiric literature on the benefits of local foods to the local economy. Empirical studies tend to find large multipliers to local spending and increased employment from local food systems. However, theory suggests that when regions deviate from production according to comparative advantage, net welfare declines. Perhaps this conflict can be resolved by recognizing that much local production occurs because it is economically efficient, either because it is either lower cost, higher quality, or involves fewer externalities than conventional agriculture. However, we should recognize that attempts to artificially increase local food production without justification from the above bases may be unsuccessful at achieving their goals.

Annotated Bibliography

Local Marketing Channels Background

There is a wealth of articles around the economic impact of local agriculture that look at most local markets for small scale farmers. These include outlets such as:

1. Community Supported Agriculture (CSA). This is a subscriber-based model selling directly to end consumers inability the farmer to engage the end consumer and helping distribute the inherent risk in farming.
2. Local Farmers markets. Typically, within 100-mile radius of the farm location. These events help farmers by performing needed marketing and drawing customers. Direct sales also cut out middlemen, increasing producer profit margins. Many consumers report 'warm glow effects' from knowing their producers, which some are willing to pay a price premium for.
3. U-Pick or on farm stores. A marketing channel where consumers come to the farmer for purchases. U-Pick can lower labor costs of harvesting and is a form of experiental retail for the consumer. Prices tend to be similar or higher than grocery store since consumers are willing to pay for the experience and increased product freshness.
4. Direct to Restaurants.
5. Direct to small regional grocers.
6. 'Direct marketing' encompasses many of these models including CSA, farmers markets, U-pick, and on-farm stores.

Regional Impact in Sacramento Region

Regional-report-final-71316.pdf (localfoodeconomics.com)

ECONOMIC IMPACT OF LOCAL FOOD PRODUCERS IN THE SACRAMENTO REGION

Sacramento Region direct market producers averaged $164,631 in sales per producer, ranging from $2,141 to $4,620,000. Sales for producers in the region who were not engaged in direct marketing averaged $568,105, which is more than triple that of the region's direct marketers, although there are other confounding differences between the types of producers. • Of the direct market producers' total revenues, 44 percent were generated through direct channels, 55 percent through wholesale channels, and one percent in commodity markets.

• Sixty-five percent of the producers' direct-to-consumer sales were generated in the Bay Area, 30 percent in the Sacramento Region and five percent in other parts of the state or outside of California.

• Seventy-three percent of the direct marketers also sold through wholesale channels. Overall, their largest revenue channel was distributors with 30 percent of total sales, followed by farmers markets (16%), Community Supported Agriculture (14%), grocers (13%), and farm stands (9%). Similar to direct-to-consumer, most of the wholesale activity was in the Bay Area.

• The direct market producers' annual production and marketing expenses averaged $155,235 in 2013. Expenses of the producers in the Sacramento Region who are not engaged in direct marketing averaged $214,486, which is 39 percent higher, although there are other confounding differences between the two types of producers.

• Eighty-nine percent of the inputs used by the region's direct marketers were purchased within the region. Meanwhile, 45 percent of the inputs used by producers in the Sacramento Region not engaged in direct marketing were purchased within the region. This means direct marketers tend to spend a greater proportion of costs within the local economy than do businesses operating using conventional marketing channels, as seen in *table 3* below. This is the largest reason why the authors found direct market producers have a greater economic impact in the local community than conventional producers.

Table 3. Average Production Expenses and Local Purchasing Ratio by Category[a]

	Sacramento Region Direct Marketers			Sacramento Region Nondirect Marketers		
EXPENSES	% local	total ($)	% of total expenses	% local	total ($)	% of total expenses
Hired labor	100	69,938	45.1	100	52,739	24.6
Contract labor	99	12,013	7.5	100	11,408	5.3
Fuel, oil, grease	99	6,559	4.2	4	5,586	2.6
Vehicle, equipment and building repairs	97	7,150	4.6	21	2,831	1.3
Machinery hire/commercial trucking	97	1,751	1.1	77	5,193	2.4
Bookkeeping & tax services	98	1,005	0.6	78	237	0.1
Sales, property, excise taxes	97	3,001	1.9	100	9,293	4.3
Real estate rental/lease	78	5,782	3.7	97	1,806	0.8
Insurance	97	3,543	2.3	92	402	0.2
Irrigation and utilities	90	6,515	4.2	57	1,569	1.0
Fertilizer and soil amendments	80	5,530	3.6	5	784	0.4
Pest and weed control materials	42	3,453	2.2	9	2,094	0.8
Crop advising services	64	282	0.2	-	-	-
Seeds and plants	15	4,497	2.9	-	55,242	25.8
Livestock feeding and bedding	65	2,758	1.8	3	48,883	22.8
Veterinary & medicine	10	195	0.1	69	979	0.5
Breeding	56	13	0.0	-	-	-
Processing and other expenses	36	1,349	0.9	-	-	-
Certification, inspections, licenses and permits	67	1,300	0.8	-	-	-
Marketing costs and services	54	8,607	5.5	77.7	5	0.0
Office supplies	100	1,552	1.0	71.0	114	0.1
Other operating expenses	92	8,442	5.4	78.5	15,321	7.1
Total Expenses	**89**	**155,235**		**45**	**214,486**	

[a]A dash indicates that information about the particular expense category could not be broken out from existing IMPLAN data.

Figure 8

Table 4. Total Output Multipliers in the Sacramento Region for Selected Industries, 2013

Industry	Multiplier
Farming-vegetable, fruit, nuts and livestock--direct market	1.86
Restaurants-full service	1.76
Retail-building materials/garden supplies	1.77
Retail-general merchandise	1.75
Construction-single family	1.71
Hotels and motels	1.70
Construction-various nonresidential	1.50-1.66
Restaurants-limited service	1.61
Farming-vegetable, fruit, nuts and livestock-- nondirect market	1.42

Figure 9

The approximate multipliers were calculated by the authors and summarized in table 5 above using an economic analysis software package called IMPLAN. These numbers were arrived at by plugging in local/nonlocal expense ratios into IMPLAN to generate an estimate of the economic multiplier. As is shown, the estimated economic multiplier for the direct market is 1.86 compared to the much lower 1.42 multiplier for non-direct marketing, meaning every dollar spent on directly marketed produce increases spending in the local economy by 1.86 dollars compared to 1.42 dollars for non-direct marketed produce. However, the authors are careful to note these numbers only hold for the specific Bay Area region they studied.

Evaluating the Economic Impact of Farmers' Markets Using an Opportunity Cost Framework

Evaluating the Economic Impact of Farmers' Markets Using an Opportunity Cost Framework (umn.edu)

This study focused only on Farmers' Markets in West Virginia. The authors argue farmers markets tend to boost regional economic output because more money is kept in the local economy. Previous work has agreed with this presumption, however this paper differentiates itself by taking into account the opportunity cost of money spent at farmers markets (if people didn't spend their money at farmers markets they would spend it on something else, perhaps food at traditional grocery stores). It identifies but does not include in the study impacts on secondary businesses close to the location of farmers markets and the draw of tourism generated by such activities due to triviality and absence of data. In more touristic economies, perhaps including the San Juan Islands, impact tourism may be a more important factor to consider. The authors assumed farmers markets have similar costs to grocery stores for their analysis and that all spending at farmers markets proportionally displaces spending at grocery stores (pg. 257). This study includes a survey of 183 farmers on their sales activities and products. This study utilized IMPLAN to perform study to estimate the effect of Farmers Markets on boosting the overall West Virginia economy. Overall, they find that Farmers markets add a net 82 jobs to the West Virginia economy, 1.075 million in output and 0.653 million in GSP (Gross State Product).

Economic Impact of Local Food Systems: Future Research Priorities

Economic Impacts of Local Food Systems: Future Research Priorities | Journal of Agriculture, Food Systems, and Community Development (foodsystemsjournal.org)

This article critiques existing literature on the economic impacts of buy-local. Many studies find buying local provides greater economic benefits to local communities because local vendors are more likely to

buy intermediate factor goods locally which will keep the money circulating in the local community, thus resulting in a higher economic multiplier. Most studies find positive multipliers for spending at farmers markets. However, of the studies examining the economics of local food systems many are not peer reviewed or do not contain public methodology, making their findings unreliable. Input-Output models such as IMPLAN are only partially useful because they assume price changes in one sector are independent of price changes in the rest of the economy. Price flexible models such as REMI can be used in place of IMPLAN to solve these challenges, although only one such price flexible model has been used to analyze markets for local foods. A downside of price flexible models is many equations must be solved at once, restricting the number of sectors which may be analyzed simultaneously. Both REMI and IMPLAN models can lead to inaccurate results if the parameter values fed into the model are wrong, out of date, or otherwise problematic.

Local Food Systems in Florida: Consumer Characteristics and Economic Impact

Local and Regional Food Systems in Florida: Values and Economic Impacts (umn.edu)

Whereas other studies examined in this literature review focus on direct marketing sales of food, which make up just .4% of home food sales, this study looks at all marketing streams of locally produced food, which make up 20.1% of all food sales for home consumption. The study used a mail-in survey design mechanism and received a 21.4% response rate. Care should be taken to note self-selection effects may lead to respondents not being representative of the general population, although survey responses were weighted to attempt to account for demographic disparities of respondents. They estimated all Florida local food sales to be valued at 8.316 billion dollars in the 2011-2012 time frame, with the vast amount of local sales originating at traditional grocery stores. US government data, *reviewed in Trends in U.S and Regional Food Systems: A Report to Congress,* suggests this number is unreasonably high. Similar study designs which include expenditure on local foods marketed through intermediate channels (like grocery stores) find similarly high rates of local purchasing. To estimate economic multipliers, The study used the IMPLAN regional model of Florida's economy. They local food systems create an additional 183,625 jobs, contribute 10.47 billion dollars in value added, and add 19.2 billion dollars of output to the Florida economy, as shown below in figure 5. This implies an economic multiplier of 19.2/8.316=2.31, higher than most other studies have found in other regions. However, it is unclear to what extent they considered the opportunity cost of local food spending, which if omitted, would significantly bias the economic multiplier upward from its true value. The much higher jobs increase of this study compared to other previous studies examined within this review may be partially accounted for by the study's larger population size (entire state of Florida) and broader market scope (including

both direct and indirect marketing channels).

Table 1. Summary of total economic impacts of local food purchases in Florida in 2011–12.

Impact type	Employment	Labor income	Value added	Output	Indirect business taxes
	--- *Jobs* ----	---------- *Million dollars*----------			
Producer margin direct effect	55,656	$1,182	$2,270	$5,511	$14
Indirect effect	23,423	$775	$1,213	$2,662	$75
Induced effect	66,854	$3,213	$5,178	$8,286	$407
Total effect	145,933	$5,170	$8,661	$16,459	$496
Retailer margin direct effect	34,045	$1,189	$1,672	$2,496	$338
Restaurant margin direct effect	3,648	$96	$138	$245	$18
Total all industries	183,625	$6,455	$10,470	$19,200	$851

Figure 10 shows the researchers estimates of the economic impact of local food purchases in Florida.

The Welfare Economics of 'Buy Local'

The Welfare Economics of 'Buy Local'. By Jason Winfree and Philip Watson

This paper draws on economic theory to develop a robust theoretical backbone for understanding economic welfare effects of buying local, especially when applied to the local food movement. They observe many empirical studies in the literature tout large multipliers resulting from buy local programs, although note there is little theoretical work exists to back these claims up. Economic orthodoxy since Ricardo and Smith has suggested there are social welfare benefits to be had by engaging with trade, leading many economists to be skeptical of the wider buy local movement. They also analyze several different motivations driving advocates of 'buy local'. Various motivations examined include a) desire to boost local producer's incomes b) desire to create local jobs c) aesthetic preferences of local production d) attempts to reduce environmental externalities from long transportation distances e) beliefs that local goods are higher quality/ food is healthier f) concern for food security. Each motivation along with appropriate policy responses is modeled to demonstrate theoretical effects on welfare and output. The first theorem of welfare economics states that absent some market failure (externality, market power, etc), the free market will reach a pareto optimal outcome. They find the argument that buy local boosts economies because the money stays within the local community dubious, drawing on the ambiguity of results from analogous international trade topic of import substitution economic development, which has had results ranging from "largely positive" to "utterly disastrous" depending on who you ask (973).They analyze effects of policy subsidizing or taxing local buying, which both unambiguously lead to deadweight loss in the absence of externalities or market power when local producers do not have a comparative advantage. That said, there are real reasons why policies encouraging buy local are desirable, including environmental externalities from long transportation distances not being captured in the free market price of imported goods or preferences for local production. When there are positive or negative externalities or significant market power, there is the opportunity, although not a guarantee, that targeted pro buy local policy can be welfare increasing. However, the authors note that buy local policy is almost certainly an inefficient second-best policy for solving the problem of negative externalities, advocating instead direct taxes/ subsidies on externalities (tax carbon emissions from

transport, not food miles traveled). If the policy goal is to increase the incomes of local farmers, buy local policies are likely to be successful although potentially at the expense of consumers and certainly middlemen. Overall, the framework of the paper in intended to help guide future empirical work by providing a theoretical scaffolding to build upon.

The Economic Impact of Local and Conventional Food Sales

[THE ECONOMIC IMPACTS OF LOCAL AND CONVENTIONAL FOOD SALES | Journal of Agricultural and Applied Economics | Cambridge Core]

This study looks at the economic impacts of local food systems in two rural regions of Missouri and one rural region in Nebraska. The authors not definitional challenges in definitional challenges in what constitutes a local food system and the difficulty in accounting for offsetting reduced spending at grocery stores when spending at farmers markets increases. The study design used a combination of a survey data and IMPLAN to estimate economic impact effects, like many other studies in the literature review. The authors lay out their detailed methodology in the article. Their survey sample size was relatively small, with 95 surveys sent, 33.7% response rate for a total of 32 usable responses across 3 regions. They found mixed results, with increased local spending in both regions in Missouri generating more indirect economic activity than conventional food systems, but conventional sales in Nebraska stimulated more economic activity than local sales in Nebraska. An equal amount of spending on local agriculture stimulates much more job creation than conventional agriculture due to higher costs of labor as a proportion of total costs for smaller scale local farms. Detailed results are shown in the tables below.

Table 4. Total Sales Impacts of Local Food and Conventional Agricultural Sales

Region	Type	Direct Effects	Indirect Effects	Total Effects	Multiplier
Old Trails	Local	$1,000,000	$766,409	$1,766,409	1.77
	Conventional	$1,000,000	$549,324	$1,549,324	1.55
North Ozarks	Local	$1,000,000	$752,723	$1,752,723	1.75
	Conventional	$1,000,000	$518,868	$1,518,868	1.52
Southeast	Local	$1,000,000	$531,559	$1,531,559	1.53
Nebraska	Conventional	$1,000,000	$678,599	$1,678,599	1.68

Table 5. Employment Impacts of Local Food and Conventional Agricultural Sales

Region	Type	Direct Effects	Indirect Effects	Total Effects	Multiplier
Old Trails	Local	82.9	6.0	88.9	1.07
	Conventional	5.8	2.0	7.8	1.35
North Ozarks	Local	82.8	6.6	89.3	1.08
	Conventional	5.8	2.0	7.8	1.35
Southeast	Local	83.0	4.4	87.5	1.05
Nebraska	Conventional	6.5	2.1	8.7	1.33

Figure 11

Trends in U.S and Regional Food Systems: A Report to Congress

Trends in U.S. Local and Regional Food Systems: A Report to Congress (cornell.edu)

This is a congressionally mandated report summarizing various statistics on local food systems. All data is as of 2012 unless otherwise noted. They found an estimate of 6 billion dollars in local food sales nationally. This is interesting because an earlier summarized report in this literature review found a total of 8 billion dollars of expenditure on local food for Florida alone for a similar timeframe, which is seemingly contradictory. Most farms that sell into local streams are very small, with 85% of local food farms earning below $75,000 gross income/year. Economic impact studies regarding local farms are often problematic, especially when studies are compared, because there is no standardized way to account for opportunity costs or standardized modeling assumptions. Nielson finds that contrary to popular belief farmers markets and other direct to consumer models tend to offer similar goods for lower prices than traditional supermarket retailers.

Cost-benefit analysis as a tool for measuring economic impact of local food systems

Cost-benefit analysis as a tool for measuring economic impacts of local food systems | Journal of Agriculture, Food Systems, and Community Development (foodsystemsjournal.org)

Whereas most papers use input-output modeling to estimate the economic effects of increased spending on local food, this paper differentiates itself by using a cost benefit approach. Cost benefit has the advantage that it can incorporate nonmarket benefits of local food systems and provide insight into welfare effects for society as a whole rather than just the local community. The study builds upon theoretical work of others on the welfare effects of local food sourcing. Exploiting a university's dining service's change in institutional sourcing policy favoring local farms for sweet potatoes, the researcher was able to collect data. They calculated total social net costs/benefits by first determining benefits for each relevant group, for example, consumers (in this case university dining services' customers) and farm workers and summing costs/benefits across groups to derive total social costs/benefits. Using a Monte Carlo simulation, the author finds that in more than half of 10000 tested scenarios, increasing local sourcing yields a net loss to society. The authors conclude "The net benefit estimates range from –US$6,888 to US$22,719 in the first year, with a median value of –US$265 and a mean value of US$611. As the median suggests, in the majority of cases (out of 10,000), the net benefit is negative: local sourcing yields a net loss in societal welfare" (18). However, the study did not include external social costs/benefits, which would be necessary to fully capture the net social effects.

One difficulty of studies like this have are many parameters are difficult to know and thus properly specify the model, for example how large is the psychological benefit to consumers of knowing their produce is locally grown, if there is any? Another instructive lesson which this paper discusses is many other studies assume that local produce has fewer environmental externalities than traditional produce due to lower shipping distance, however this conclusion should not be taken for granted. The paper cites an environmental life cycle analysis of tomato crops grown in a regional Michigan supply chain vs distantly grown Californian tomatoes. The cited paper found increased emissions from shipping

Californian tomatoes to Michigan were offset by higher emissions from heating greenhouses in Michigan and smaller economies of scale of Michigan's local food farms. These effects are likely to be different for each crop and differences in growing conditions such as climate between locations or regional differences predominant energy sources, which, when combined with a lack of quality data, greatly complicates detailed analysis which considers externalities, especially when looking at the food system as a whole rather than just a single crop. For this reason, the researchers excluded external social costs/benefits from the study design, which greatly limits the usefulness of the findings.

Figure 4. Annual Net Benefits of Local Sourcing Relative to Status Quo

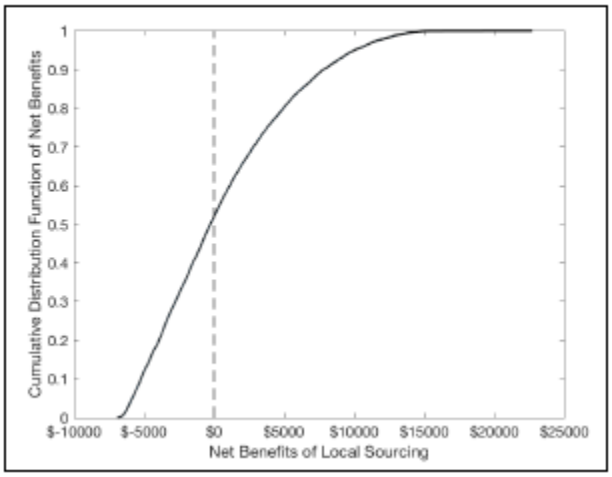

Figure 12

Should You Buy Local?

"Should You Buy Local?" by Carson Young, Journal of Business Ethics

In this article the Author critiques the argument that one should buy local products instead of distant products because it benefits the local economy. The author's first critique is whenever a consumer purchases on factors other than price, quality, or convenience they irrationally decrease the amount of utility they can achieve within their given budget constraint. The author does not object to buying local if a consumer receives benefits from local products in the form of higher quality, lower prices or greater convenience, but does object to buying local for the sake of buying local. Even if it could be proved that shifting purchases to local products would increase producers' wages or output, this is still not sufficient reason to buy local as it only considers one side of the economic ledger. While local producers are likely to be helped when more buy local, consumers will be harmed if the buy local regardless of price, quality, or convenience. Further, benefits to local economies cannot be universalized if all regions buy only local products since possible benefits of buy local are negative sum, so all regions would be worse off. This is because local food is substituted for distant food so regions who exported food must cut jobs and production will largely not take specialize according to comparative advantage.

Where have all the direct-marketing farms gone? Patterns revealed from the 2017 Census of Agriculture

Where have all the direct-marketing farms gone? Patterns revealed from the 2017 Census of Agriculture

Direct to consumer foods have significantly increased in popularity from 1992 to 2007, with sales approximately doubling. USDA data show that Direct to Consumer (DTC) sales of produce have fallen greatly from 2012-2017, as shown in the table below, with average sales falling 10%. The number of farms with DTC operations also fell. This paper documents the recent reversal of historical trends and attempts to provide explanations. One caveat which makes causal investigation difficult is the USDA changed the wording of the survey during the sample timeframe. One possible explanation is the rise of online purchasing could have decreased agricultural DTC sales. Another explanation is increasing land prices made operating DTC farms near cities uneconomical. The authors say trends should be monitored to determine if changes in trends are permanent or transitory and to further investigate the causes of declining DTC food sales.

Table 3. Change in Number of Direct-to-Consumer (DTC) Farms, 2012 to 2017, for the 20 States with the Highest Number of DTC Farms in 2012

State	2012	2017	Change	% Change	2012 Rank
Texas	7,954	7,667	-287	-4%	2
California	8,588	7,623	-965	-11%	1
Pennsylvania	7,577	6,403	-1,174	-15%	3
Ohio	6,612	6,130	-482	-7%	5
Oregon	6,680	5,720	-960	-14%	4
New York	6,342	5,697	-645	-10%	6
Michigan	6,243	5,669	-574	-9%	7
Wisconsin	5,848	5,088	-760	-13%	8
Washington	5,640	4,503	-1,137	-20%	9
North Carolina	4,475	4,058	-417	-9%	10
Kentucky	3,438	3,782	344	10%	17
Tennessee	3,679	3,773	94	3%	13
Missouri	4,096	3,640	-456	-11%	12
Virginia	3,581	3,586	5	0%	15
Minnesota	4,213	3,533	-680	-16%	11
Florida	3,480	3,440	-40	-1%	16
Indiana	3,673	3,235	-438	-12%	14
Colorado	2,896	2,987	91	3%	20
Illinois	2,981	2,628	-353	-12%	18
Iowa	2,964	2,575	-389	-13%	19
Total	144,530	130,056	-14,474	-10%	

Question phrasing varied between 2012 and 2017.

Each state has a statistically significant difference at the 0.01 level except Virginia.

Figure 13

Table 2. Direct-to-Consumer (DTC) Farms and Sales for Commodities and Value-added Products, 1992–2017

		DTC Farms			DTC Sales (billion 2017 USD)		
Year	Survey	Unprocessed Products	Processed Products	Processed and Unprocessed	Unprocessed Products	Processed Products	Processed and Unprocessed
1992	Ag. Census	86,432			$0.7		
1997	Ag. Census	93,140			$0.9		
2002	Ag. Census	116,733			$1.1		
2007	Ag. Census	136,817			$1.4		
2012	Ag. Census	144,530			$1.4		
2015	LFMPS	58,560	74,738	114,801	$1.7	$1.5	$3.1
2017	Ag. Census			130,056			$2.8

Figure 14

Urban Food Supply Chain Resilience for Crises Threatening Food Security: A Qualitative Study

Urban Food Supply Chain Resilience for Crises Threatening Food Security: A Qualitative Study

This study interviewed representatives of businesses and organizations involved in the food system to determine contributants of emergency preparedness in the face of natural and manmade disasters in the Baltimore area. They found smaller and independent organizations tend to be less formally prepared for natural disasters, partly due to their small size and relatively fewer resources. Lack of funds was the most common reason why local food producers did not have emergency preparedness plans. Governments could provide grants or other support to small organizations to aid in the development of preparedness plans. One interview noted the high cost of crop insurance premiums as a barrier to long term business resilience for small scale farms. Other local growers noted lack of expertise or manpower to develop preparedness plans as a barrier to emergency planning. Existing literature supports these findings, with one case study showing large chain retailers and grocers were much more resilient in the aftermath of hurricane Harvey, in part due to more diversified supply chains and greater emergency planning preparedness. Continued efforts will be necessary going forward as climate change continues to increase the damage caused by natural and manmade disasters.

The Economics of Local Food Systems: A Literature Review Of The Production, Distribution, And Consumption Of Local Food

The Economics of Local Food Systems: A LITERATURE REVIEW OF THE PRODUCTION, DISTRIBUTION, AND CONSUMPTION OF LOCAL FOOD

This is a literature review regarding the economics of local food systems. There is no consensus definition of 'local food', but the authors define local food as food distributed to consumers through short supply chains, either direct to consumer or with few or no intermediaries. Local food sales account for just 1.9% of total food sales as of 2008 but have likely increased since then. Direct sales benefit farmers by allowing them to sell directly to consumers and thus capture a higher proportion of the retail price. Consumers report perceived quality and freshness advantages of local produce over traditional produce. Consumers of local produce tend to be higher income than the national average. One survey in South Carolina found consumers were willing to pay a 27.5% price premium for local produce relative to

traditional produce. Consumers also report desire to support local small businesses and farms or social interaction with producers as a rationale for buying local. Institutional consumers cite concerns about seasonal availability, cost, delivery ease, scale, and constancy of quality as barriers for wider adoption of local foods. There are many empirical studies which find local food systems can be an effective part of a wider strategy for regional economic development, however some researchers say more rigorous study is needed. Most economic impact analysis shows there are "strong positive benefits to a regional economy in terms of annual output, gross state output, employment, and labor income" from agricultural production. The largest economic impacts come from direct effects-the sales of the products. Indirect (impact of greater purchases of intermediate inputs from regional suppliers) and induced effects (impact of greater consumption spending by employees) are generally smaller. Other research, such as that by Deller and Brown, finds a weak relationship between local food production and community economic growth and development. There is still uncertainty about the relationship between local food systems and economic development. If developing local food systems helps local economies at the expense of other regions due to reduced demand for imported food, there may be a prisoners dilemma situation where it is individually rational for every region to adopt agricultural self-reliance but when everyone acts this way, societal welfare may fall from reduced specialization and trade. Local food systems are most easily expanded by replacing a proportion of food imports with locally produced food in a model known as Import Substitution. Import Substitution is associated with increased output, higher labor incomes, and more jobs. These benefits are attributed to keeping money local.

Import Substitution at The Regional Level: Application In The United States

"IMPORT SUBSTITUTION AT THE REGIONAL LEVEL: APPLICATION IN THE UNITED STATES" by Jinwoo Kwon

https://www.atlantafed.org/-/media/documents/news/conferences/2010/small-business/kwon.pdf

This paper describes the possibility of applying import substitution policies at the regional level in the United States. Import Substitution is a practice in development economics that aims to grow (typically low-income/developing) economies by encouraging domestic production of certain industries to replace imports through government intervention. The author argues globalization causes "regional economies to leak [money] too much" and that regional economies need to "maintain more money within the local economy to increase regional wealth" (11). By replacing imports with local regional industries, the authors argue, regions can spur economic development by preventing money from leaving local economies. Agriculture is noted as particularly well-suited candidate industry for import substitution. A case study points to a Community Supported Agriculture (CSA) project called Local Harvest in New England which produced benefits for consumers in the form of higher quality produce and benefits for farmers in the form of higher profit margins when selling local products. This project was successful without any specific pro-local government intervention, so it is unclear whether the example can motivate arguments for government induced import substitution. Critics note one major limitation of import substitution is relative efficiency of production within regions who do not have a comparative advantage in productivity. They argue local governments should try to overcome these challenges through robust financial and administrative support for import substituting industries including subsidies. The author does not address potential offsetting economic harms which may occur from taxing existing efficient industries to subsidize inefficient import substituting industries. The authors conclude that Import Substitution can be a healthy part of a regional economic development strategy.

The Economics of Local Food Systems A Toolkit to Guide Community Discussions, Assessments and Choices

The Economics of Local Food Systems A Toolkit to Guide Community Discussions, Assessments and Choices

https://www.ams.usda.gov/sites/default/files/media/EconomicsofLocalFoodSystemsToolkit.pdf

This is a best practices document constructed by the USDA regarding economic impact analyses of local food systems (EIALFS). Selected insights are summarized. Multipliers tend to be larger when economic analyses use broader regional boundaries. For example, multipliers tend to be higher when looking at economic impacts on a state's economy than when looking exclusively at a small town's economy due to the greater proportion of spending which stays within the larger state's economy than the smaller town's economy. A common pitfall of EIALFS Is to treat increased demand for local foods as new spending when it is more likely a shift of spending from other food sources, such as from traditional grocery store expenditures. A full economic impact analysis must look at the net effect on an economy by tracing impacts of increased spending on local foods less impacts of decreased spending on all other food channels. An important limitation of I-O models is they cannot alone project potential returns on investment or cost/benefit analysis despite the periodic misuse of I-O models by "naïve or unscrupulous practitioners of economic impact analysis" (81). Another limitation of I-O analysis is that while they can estimate the number of new jobs generated by a change in consumer spending, they cannot predict who is likely to receive said jobs. I-O modeling usually assumes supply responses are potentially unlimited without price changes. This is a flawed assumption because in the US, most arable land is already being used for existing production so any expansion of local food production would almost necessarily reduce production of other types of farming. Many EIALFS do not consider opportunity cost considerations because it is more logistically complicated to model and there may be political disincentives since higher multipliers can 'sell' projects, even if the model's assumptions are less justifiable. It is important to keep these factors in mind as we construct our EIALFS model.

The Resilience of America's Urban Food Systems: Evidence From Five Cities

THE RESILIENCE OF AMERICA'S URBAN FOOD SYSTEMS: EVIDENCE FROM FIVE CITIES by Kimberly Zeuli and Austin Nijhuis

https://icic.org/wp-content/uploads/2017/01/ROCK_Resilient_Food_f2.pdf

This study summarized effects of increased reliance on locally sourced foods on food system resilience in the face of natural disasters, using evidence from 5 American metropolitan areas. Since most food is processed elsewhere and shipped into cities, impacts of disasters on food processing plants is not likely to cause major impacts on local food supply. One exception is highly perishable products like milk, which tend to be produced more locally than non-perishable products. Urban farming can help reduce the risk of adverse supply shocks caused by disasters affecting imported foods. The authors note, however, that excessive reliance on local foods could make supply chains less resilient in the event of a local disaster due to risk local farms and processing plants could suffer damage. However, given the current low proportion of food grown locally, this is not likely to be a major issue soon. Nearly all food is distributed by truck, so a major vulnerability for all food systems is road and bridge closures caused by natural disasters. In some areas, warehouses are all clustered together in industrial areas, increasing regional risk in the event a natural disaster. Leadership from both the public and private sector is required to

develop more resilient food systems. It is important for governments and organizations to periodically conduct regional food resilience assessments to determine unique or idiosyncratic risks they may face and to develop tailored guidance on how to prepare food systems to adapt to natural disasters.