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Cover Page Footnote

We are grateful to the local city accountants/ clerks for the cities of Muskogee, Tahlequah and Wagoner and to David Francis of the Oklahoma Tax Commission for invaluable assistance with the data

PANDEMIC EFFECTS ON RETAIL SALES AND LOCAL ECONOMIES: EVIDENCE FROM NORTHEASTERN OKLAHOMA[1]

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ABSTRACT

Early post-COVID pandemic studies focused on the macroeconomic impacts of that event on employment, income, healthcare costs, food security, etc. Yet there has been little emphasis on how changes in consumption spending patterns resulting from the pandemic affected retail sales and revenues, each of which are major contributors of growth for local economies. This study investigates these relationships by implementing retail pull and sales gap analyses to determine how non-metropolitan rural regions responded to consumption expenditures and retail sales before and after the pandemic. Using three cities of northeastern Oklahoma as a case study, retail pull factors at the city level and sales gap coefficients at the industry level are determined for food stores, apparel, and restaurant industries. While all three cities share some socioeconomic and demographic characteristics, this study observes differences in gap coefficients among them, thus indicating variation in their ability to attract retail shoppers.

Keywords: pandemic, retail sales, revenue, gap coefficients

INTRODUCTION

The COVID pandemic exacted a huge toll on the global economy with almost every nation around the world reporting loss of employment, production, and per capita income. The US economy reported a drop of 32.9% in real GDP during the second quarter of 2020 owing to the closure of many nonessential businesses, and amid massive unemployment rates (the rate in April 2020 was worse than the Great Depression of 1929-20), loss of income and a general sense of socioeconomic deprivation and food insecurity (Bureau of Economic Analysis). The impact of the pandemic was profound across all socioeconomic and demographic sections as measured by major economic indicators like employment, personal income, healthcare costs, consumption and spending, agriculture, and trade just to name a few (BEA; BLS; CRS, 2020; Anh and Steinbach, 2022). Research has shown that along with some of the broader or macroeconomic impacts that followed the pandemic, microeconomic effects such as increases in both local and online shopping, shifting patterns in favor of home dining, and issues with food security were very pronounced during this event. These microeconomic impacts resulted from some of the many interconnected relationships between product and resource markets that influence consumer and producer behavior. The rise in per capita personal income across most counties driven by increased government assistance during the pandemic has led to increases in spending or consumption

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expenditures. These higher expenditures potentially generate further rounds of spending in the economy leading to higher overall revenue, income, and sales tax dollars.

The basic microeconomic behaviors as described above (under certain flexible assumptions) relate spending to economic growth, especially for local economies. This relationship is called the multiplier effect. Though strict assumptions often limit the ability of such economic hypotheses to explain national or state-level impacts, they can be applied to local economies where local consumption spending and sales revenues are major drivers of economic growth. Rural nonmetropolitan economies provide good examples and are therefore the focus of the current study. Most nonmetropolitan counties in the United States are near urban enclaves, but some are quite remote. However, the economic growth or development of each is generally dependent upon spending and revenue dollars generated in local stores and big box chain retailers and less subject to the type of investments that increase incomes in cities and suburbs.

Nonmetropolitan counties also experienced major shifts in shopping behavior and the breakdown of supply chains driven by closures and loss of workforce during the pandemic. These observations call for more research on the socioeconomic impacts of the pandemic on rural economies which have been somewhat ignored relative to the attention given to corresponding impacts on urban economies (Mueller et al. 2020). This study focuses on three contiguous counties in northeastern Oklahoma along with the principal city of each and compares changes in employment, wages and sales tax revenues beginning in the year preceding the pandemic up to the year in which the pandemic commenced. Retail pull coefficients for the cities and sales gap coefficients for selected industries are calculated for each period, and observed changes are explained in the context of the study region. In addition, demographic and spatial relationships are incorporated to explain differences in pull coefficients between the cities examined**.**

Numerous studies to date have focused on the impact of the pandemic in terms of food insecurity, disruption in supply chains, rising unemployment, falling housing prices, increasing health insurance and healthcare costs, and the widening digital divide. Most of these studies were conducted at a macroeconomic level, using available national survey datasets, or at the state or regional levels using primary data or advanced digital microdata. A few regional microeconomic studies focused on problems at the state or county level including some that highlight counties within Oklahoma, as described below. A report by Arati (2020) concluded that the pandemic forced small businesses to change their marketing due to drastically changing customer behavior and caused severe cash flow problems for several small businesses that were already operating with limited financial resources thus resulting in many employee layoffs and some permanent closures. Sanders and Bir (2020) argue that economic policies of the Federal Reserve System and Congress aimed at increasing the money supply in the economy would likely lead to inflation. They caution that low interest rates would adversely affect farmers and others in agriculture-related businesses through high demand and rising commodity and input prices. In an online questionnaire addressed to economic actors from many industries across the 77 counties of Oklahoma assessing the strengths and weaknesses of the state's economy, Bir et al. (2020) find that there are regional and occupational variations in impacts and recovery times on respondents. Whitacre and Rippetoe (2021) relate mask mandates in Oklahoma cities to higher retail expenditures per capita during the pandemic. In their study of the Oklahoma economy for early 2020, Rickman and Wang conclude

that energy prices and employment in the energy or mining industry played a major role in forecasting quarterly growth for the state economy.

At the microeconomic level, small businesses, especially in rural America, were hit hard by the pandemic. At least 60% of Oklahoma businesses requested federal PPP loans during July 2020 (Wilkerson 2020). Most of these belonged to the retail sector which were forced to shift operations to the online environment and compete with large retail chains such as Walmart and Costco. Accordingly, a focus on impacts by retail sales and how they affected local nonmetropolitan communities in Oklahoma during the pandemic is policy relevant since retail sales tax collections comprise a major source of revenue for these communities (Whitacre and Rippetoe 2021).[2] In this study we complement analyses performed by researchers at Oklahoma State University to determine the retail pull factor at the city level for communities in Oklahoma (Barta and Woods 2012; Shideler and Malone 2017; Loy et al. 2018). Specifically, we focus on three economically integrated cities of northeastern Oklahoma where the impact of the pandemic was high during the latter half of 2020 and early 2021, but where few COVID restrictions were in place. Although the Oklahoma-specific studies cited above emphasize some of the ongoing statewide challenges, they look no deeper than county-level data. Alternatively, this paper is the result of a county-and-city level investigation that attempted to determine the degree to which the pandemic-driven loss of employment and wages at the county level also affected sales revenue collections for the related cities. Secondly, this study focuses on retail in general and specific industries like apparel, food stores and restaurants to determine the retail pull factors as well as sales gap coefficients at the industry level. The purpose here is to determine the retail pull factor for each city, and if there are differences in sales gaps across industries at the local level. Finally, we attempt to explain the spatial differences in shopping patterns, apart from the pull factor, that produce lower sales gap coefficients in retail sales for some cities as compared to others with similar demographic and socioeconomic characteristics. Although a full-scale economic impact study would have analyzed many impacts on the local economies, this study focuses primarily on retail pull factors as it was the retail industries in Oklahoma that were primarily affected by pandemic driven closures.

METHODOLOGY

The regional impact upon retail sales and local economies has been studied in less detail than the more significant impacts of the pandemic on other sectors or on supply chains affecting several parts of the economy. Part of the reason may be variations in retail trade expenditures and impacts on local economies resulting from the remoteness of the location where the impacts are most concentrated. As stated in the background section, nonmetropolitan locations may or may not have spatial interdependencies with metropolitan areas in terms of retail sales or overlaps in shopping populations across locations. Hence, we conduct a city-level analysis which seems to be more appropriate in estimating the number of people purchasing products within the city limits (local impacts) rather than a county-level analysis with overlapping city limits. First, the study determines the retail trade gap coefficients or pull factors at the city level using the methodology outlined in Shaffer et al. (2004), Barta and Woods (2012) and Shideler and Malone (2017) and utilized by the Oklahoma state extension offices. The method applied by Shideler and Malone (2017) is slightly different than that of Barta and Woods (2012), with the latter utilizing a

[2] In 2012, retail sectors accounted for 62.5% of total sales tax collections in Oklahoma

population growth factor for estimating growth in retail demand at the city level. The current study uses the approach in Shideler and Malone (2017) where retail demand for each city is estimated by using current levels of state and county per capita income. Results are then compared with actual retail sales of the city. Sales gap coefficients are then obtained for three industries by city. The selected industries are food stores, restaurants and food services, and apparel. These industries contribute substantially to the sales tax revenues in the respective cities (Oklahoma Tax Commission) and are part of the industry group that was nationally affected by COVID-19 restrictions. Including this group of industries in our analysis may help determine some of the economic impacts of the pandemic on those local communities which rely largely on retail sales. Retail pull factors and sales gap coefficients are calculated for both 2019 and 2020. The methodology employed for determining these is outlined in Table 1 below.

Table 1: Retail pull factor calculations

County income per capita/state income per capita	Adjustment factor
State per capita retail sales	State retail sales / state population
Estimated sales for community per capita	State per capita sales * Adjustment factor
Trade area capture	Actual retail sales for city or community / Estimated sales for community per capita
Pull factor	Trade area capture/ Population of the city or community

As illustrated above, the pull factors are affected by state and county per capita income and city population which will vary over time. However, the variation over a three year or five-year period for any state or city is not large enough to significantly influence results here (US Census, BEA). The final part of the analysis considers the spatial proximity of each city to metropolitan areas and to smaller cities and towns using population growth maps and daytime population growth trends. The latter is an indication of the strength of a county to attract more people relative to its own population. These spatial data are used as supplements to explain the gap coefficients for each city.

DATA

This study focuses on three contiguous counties in northeastern Oklahoma along with the principal city of each, namely, Muskogee, Tahlequah, and Wagoner. Only one of the counties is bounded by the Tulsa and Broken Arrow metropolitan area (one of the two major metropolitan regions of Oklahoma). County level data for the number of business closures, employment and wages are obtained from the Quarterly Census of Employment and Wages (QCEW) published by the Bureau of Labor Statistics (BLS) and Oklahoma Works, a state Government website. City officials in Muskogee, Tahlequah and Wagoner were contacted to provide retail sales tax collections data from 2019 and 2020 for the months of January to December. The data from these officials included both sales and use tax revenues for the cities, but only the former is used for further analysis. For the City of Muskogee, data for September 2021 was supplied by Ms. Benita Hotema, Assistant Financial Analyst at the City Clerk's office. The corresponding data for Tahlequah was acquired from DeAnna Hammons, City Clerk and Michelle Collins, Finance

Support Officer in September 2021, while for Wagoner, relevant information was provided by Laura Duvall, Accountant during October 2021.

For determining the sales gap coefficients at the industry level, the study utilizes data at the 2-digit NAICS level for retail sales in the state of Oklahoma and in the three cities noted above. The retail sales tax data are gathered from the Oklahoma Tax Commission's ledger reports which provide publicly available data for the most recent three years. Although 2021 is outside the period of the study, Sales tax collections, each reported annually on a June-ending fiscal-year basis, are obtained at the city level for the three industries considered in the analysis for 2019-2021. Hence, data for 2019 at the industry level shows the sales tax collections from June 2019-June 2020, while the same for 2020 captures the sales tax collections from June 2020-June 2021. Since the full impact of the pandemic in terms of sales tax collections would not manifest until the middle or end of 2021, this minor adjustment in data is assumed to not affect the main results. Data for the remaining socioeconomic variables like county and state per capita income, and city and state population levels are obtained from the American Community Survey (ACS) data (three-year averages) published by the US Census Bureau. Table 2 illustrates the main data sources used in the study. Table 3 provides summary statistics on sales tax collections for the three cities and the state over the study period.

Table 2: Data sources for calculating retail pull coefficients

City sales tax collections	Available from City Office or Oklahoma Tax Commission (OTC)
City Sales tax rates	Available from OTC
State sales tax collections	Available from City Office or OTC
State sales tax rates	Available from OTC
City retail sales	City sales tax collections/ city sales tax rate
State Retail sales	City sales tax collections / city sales tax rate
City Population	Available from American Community Survey, US Census Bureau
State Population	Available from American Community Survey, US Census Bureau
County Per capita income	Available from American Community Survey, US Census Bureau
State Per capita income	Available from American Community Survey, US Census Bureau

Table 3: Summary statistics for sales tax collections over 2019-21 (millions of dollars)

		Oklahoma		
	n	mean	SD	median
2019	12	405,526,491.51	15,587,134.98	410,350,222.22
2020	12	389,925,874.54	21,653,076.09	394,564,716.73

2021	8	435,986,277.93	43,044,161.88	455,913,922.03
		Muskogee		
	n	mean	SD	median
2019	12	20,751,11.07	1,048,29.75	21,190,54.27
2020	12	21,257,25.81	1,622,78.85	21,553,68.80
2021	8	23,555,72.61	2,747,09.41	23,891.22.66
		Tahlequah		
	n	mean	SD	median
2019	12	8,201,81.92	59,793.30	8,365,11.20
2020	12	8,918,86.97	1,002,90.34	9,121,10.32
2021	8	10,340,87.28	1,132,97.45	10,299,81.48
		Wagoner		
	n	mean	SD	median
2019	12	3,247,26.00	55,650.91	3,122,49.00
2020	12	3,344,27.00	33,153.02	3,340,96.50
2021	8	3,611,24.50	26,394.02	3,633,75.50

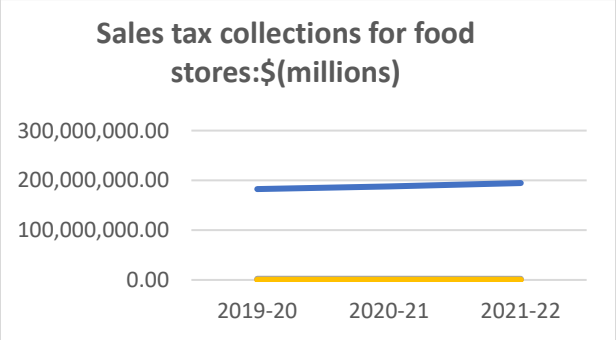

Fig 1: Sales tax collections for 2019-2021 for food stores: OK, Muskogee, Tahlequah and Wagoner

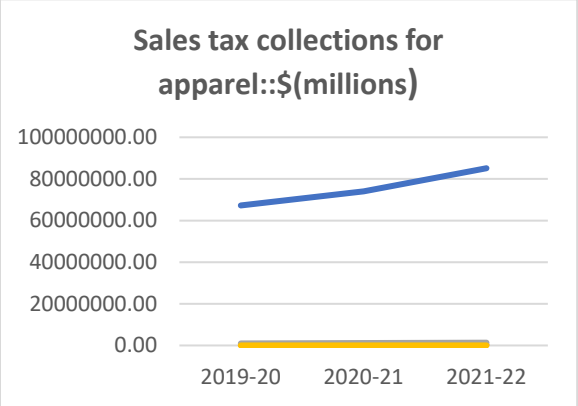

Fig 2: Sales tax collections for 2019-2021 apparel: OK, Muskogee, Tahlequah Wagoner

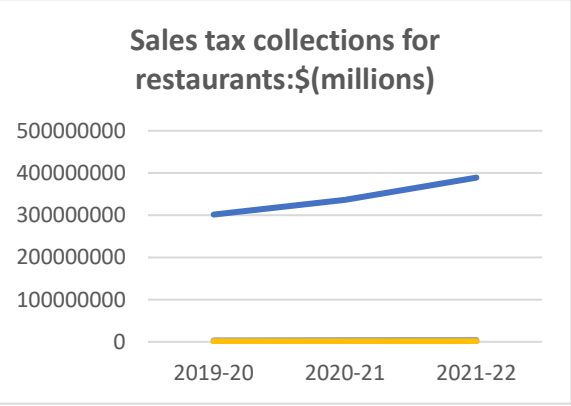

Fig 3: Sales tax collections for 2019-2021 for restaurants: OK, Muskogee, Tahlequah and and Wagoner

Figs. 1-3 above depict the sales tax revenues for the three industries (food stores, apparel, restaurants) at the state and city levels for 2019-2021. Since data was available for 2019 until 2021, the plots show three data points with the state of Oklahoma (top trend line) having the largest percentage share in each industry and an increasing trend in all years. In comparison, the three cities had almost stable sales tax collections during the study period.

RESULTS

As a general overview of how the pandemic affected Oklahoma and its counties, data from Oklahoma Works indicates that there were over 9,700 business locations that shuttered between March 2020 and January 2021, with retail trade having the most closures followed by professional, scientific, and technical service and healthcare and social assistance. Small businesses constituted 87% of these business closures in the state (8,448 out of 9,747). Overall, the average annual employment in all industries for Oklahoma fell by 4.44% between 2019 and 2020 while average weekly wages increased by 3.14% during the same period.

A similar pattern is discernable at the county level during the same period. As shown in Fig.4 below, Cherokee County average employment dropped by 2-5% from the first to the last quarter of 2020 in industries like hospitality, mining, and manufacturing. For Muskogee County (Fig 5) though, there was a 33% decline in average quarterly employment (first to last quarter) in the construction industry, followed by a drop of 17% in mining and 12% in the manufacturing industries. In Cherokee County, average weekly wages across all industries increased by 10.5% from 2019 to 2020, while the increase was 3.4% and 1.7% in Muskogee and Wagoner counties, respectively.

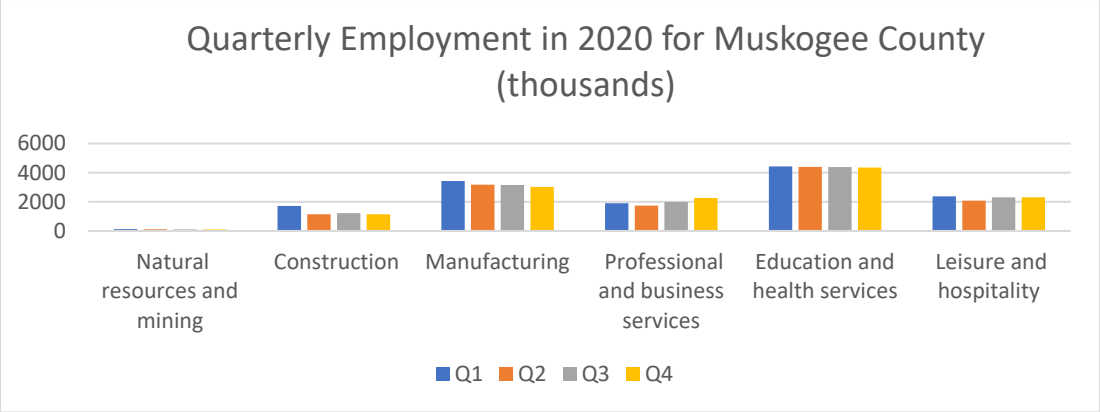

Fig 4: Average quarterly employment in six industries in Muskogee County in 2020

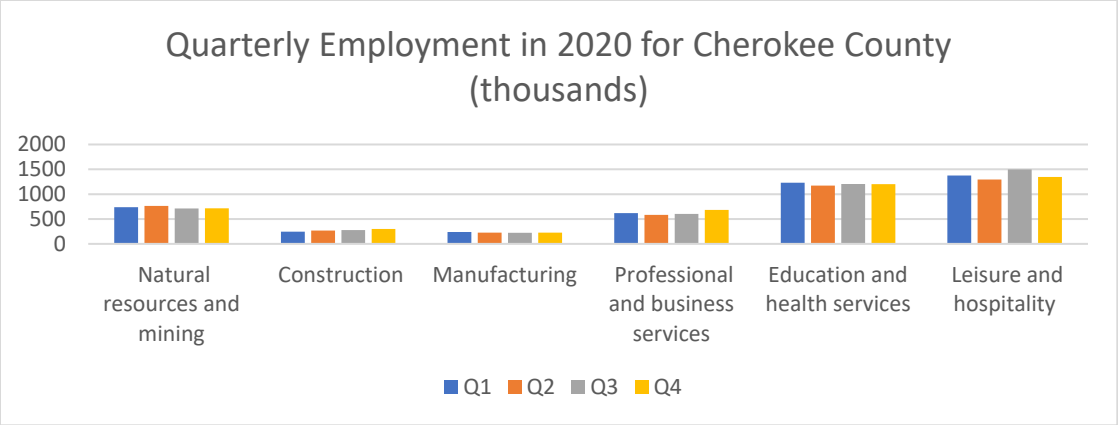

Fig 5: Average quarterly employment in six industries in Cherokee County in 2020

However, the negative impact of the pandemic upon retail trade in Oklahoma illustrates that smaller cities may have had an economic ripple impact that is more likely to go beyond employment and wages. This is captured by the retail pull factors for Muskogee, Tahlequah, and Wagoner as shown in Table 4. The retail pull factors do not differ much for the cities of Muskogee and Tahlequah for 2019 and 2020. The pull factor for Tahlequah is above 1.0 for 2019 and 0.96 for 2020 implying that the city population tended to shop more locally for both time periods. In fact, Tahlequah may have attracted some retail business outside of the city as given by its pull factor of 1.001 in 2019. In contrast the city of Wagoner had a retail pull factor below 0.50 for both 2019 and 2020, indicating that the city may be losing local customers in retail sales, a trend that continued through the pandemic. The numbers for Wagoner also highlight the proximity of that city to the Broken Arrow metropolitan region with a larger market for retail purchases. Although the latter is a valid reason for Wagoner to lose retail customers, it's in sharp contrast to Tahlequah, seat of a rural county located very close to Fort Smith, Arkansas, another metropolitan area. The only notable socioeconomic difference in the two cities of Tahlequah and Wagoner is that the population of Tahlequah is almost double that of Wagoner.

Table 4: Retail pull factor for the cities of Muskogee, Tahlequah, and Wagoner for 2019-20

Muskogee	**2019**	**2020**
County income per capita/state income per capita	0.84	0.84
State per capita retail sales ($)	27,496.56	26,438.77
Estimated sales for community per capita ($)	23,097.11	22,208.56
Trade area capture	26,952.87	28,714.95
Pull factor	0.72	0.76
Tahlequah		
	2019	**2020**
County income per capita/state income per capita	0.78	0.78
State per capita retail sales ($)	27,496.56	26,438.77
Estimated sales for community per capita ($)	21,447.32	20,622.24
Trade area capture	16,687.29	15,968.79
Pull factor	1.00	0.96

Wagoner	2019	2020
County income per capita/state income per capita	1.03	1.03
State per capita retail sales ($)	27,496.56	26,438.77
Estimated sales for community per capita ($)	28,321.46	27,231.93
Trade area capture	3,439.72	3,684.21
Pull factor	0.39	0.41

Note:

To understand if the retail pull factors are reflected in the sales coefficients for specific industries in each city, sales gap coefficients are determined for three industries: food stores and apparel (NAICS code: 44), and restaurants (NAICS code 72). All three saw increases in state sales tax collections between 2019 to 2020 yet were among the hardest hit during the pandemic. For instance, the leisure and hospitality business in Oklahoma, which includes restaurants, experienced an increase in unemployment of almost 20% (after mining at around 30%) during the early months of the pandemic (Wilkerson,2020). The sales gap coefficients for each industry for the cities of Muskogee and Tahlequah are provided in Tables 5 and 6 respectively. All three industries in Tahlequah had a sales gap coefficient above 1.0 before and after the onset of the pandemic including the restaurant industry which had a gap coefficient of 3.01. The sales gap coefficients are also similar for Muskogee for all three industries considered, before and after the pandemic. Like Tahlequah, the coefficient for each industry exceeds 1.0, indicating that people purchasing within the city limits outnumbered residents**.** Also evident is a synergistic effect between restaurants and apparel for the two cities, with both industries drawing residents from outlying areas which, in turn, contributed toward higher sales tax dollars in the regional markets.

Table 5: Sales gap coefficients for the City of Muskogee

Food stores	2019	2020
County income per capita/state income per capita	0.84	0.84
State per capita retail sales in food ($)	1,031.27	1,061.66
Estimated sales in food for community per capita ($)	866.26	891.80
Estimated number of consumers making food purchase	67,797.42	65,223.96
Sales gap coefficient	1.80	1.73

Apparel	2019	2020
County income per capita/state income per capita	0.84	0.84
State per capita retail sales in apparel ($)	380.04	418.43
Estimated sales in apparel for community per capita ($)	319.23	351.48
Estimated number of consumers making apparel purchase	75,631.12	84,364.45
Sales gap coefficient	2.01	2.24

Restaurants	2019	2020

County income per capita/state income per capita	0.84	0.84
State per capita retail sales in apparel ($)	1,703.86	1,900.78
Estimated sales in restaurants for community per capita ($)	1,431.24	1,596.66
Estimated number of consumers making purchase in restaurants	62,596.72	64,708.79
Sales gap coefficient	1.66	1.72

Note:

Table 6: Sales gap coefficients for the City of Tahlequah

Food stores

	2019	**2020**
County income per capita/state income per capita	0.78	0.78
State per capita retail sales in food ($)	1,031.27	1,061.66
Estimated sales in food for community per capita ($)	804.39	828.10
Estimated number of consumers making food purchase	39,296.70	33,792.21
Sales gap coefficient	2.36	2.03

Apparel

	2019	**2020**
County income per capita/state income per capita	0.78	0.78
State per capita retail sales in apparel ($)	380.04	418.43
Estimated sales in apparel for community per capita ($)	296.43	326.38
Estimated number of consumers making apparel purchase	33,571.54	31,124.68
Sales gap coefficient	2.01	1.87

Restaurants

	2019	**2020**
County income per capita/state income per capita	0.78	0.78
State per capita retail sales in restaurants ($)	1,703.86	1,900.78
Estimated sales in restaurants for community per capita ($)	1,329.01	1,482.61
Estimated number of consumers making purchase in restaurants	47,047.32	5,1575.56
Sales gap coefficient	2.82	3.09

Data for Wagoner (Table 7) displays gap coefficients below 0.5 for food stores and apparel but slightly above 1.0 for the restaurant industry. Again, these numbers (which do not vary much for 2019 and 2020) demonstrate that the city of Wagoner succeeded in pulling people into their restaurants but not in the food stores or apparel stores. A possible cause of lower sales gap coefficients and low retail pull factors for Wagoner may be the growing increase in online purchases that dominated shopping during the pandemic. Both sales and use taxes went up in Wagoner between January 2019 to December 2020, with total sales taxes increasing by 3% and use taxes increasing by 35.5%. The increase in sales taxes may indicate more retail sales in absolute

numbers but fails to provide further information about retail pull within the city. It also falls short of determining sales gaps for important industries that dominate shopping in these nonmetropolitan areas.

Table 7: Sales gap coefficients for the City of Wagoner

Food stores		
	2019	**2020**
County income per capita/state income per capita	1.03	1.03
State per capita retail sales in food ($)	1,031.27	1,061.66
Estimated sales in food for community per capita ($)	1,062.20	1,093.51
Estimated number of consumers making food purchase	3,695.44	4,183.51
Sales gap coefficient	0.41	0.47
Apparel		
	2019	**2020**
County income per capita/state income per capita	1.03	1.03
State per capita retail sales in apparel ($)	380.04	418.43
Estimated sales in apparel for community per capita ($)	391.44	430.99
Estimated number of consumers making apparel purchase	641.50	757.32
Sales gap coefficient	0.07	0.08
Restaurants		
	2019	**2020**
County income per capita/state income per capita	1.03	1.03
State per capita retail sales in restaurants ($)	1,703.86	1,900.78
Estimated sales in restaurants for community per capita ($)	1,754.97	1,957.81
Estimated number of consumers making purchase in restaurants	9,048.59	9,283.74
Sales gap coefficient	1.01	1.04

To further explain the gap coefficients above, we utilize county level maps showing daytime population growth. Daytime Population is an aggregate of the following subcategories: retired and disabled people, homemakers and working-aged people not in the labor force, unemployed people, employed people, persons working at home (both self-employed and employed by a company), children at home (typically preschool), and students (Pre-K to 12th and post-secondary, including college and vocational). As shown below, Wagoner County (red) had a daytime population decrease in 2020-21, while both Muskogee and Cherokee counties show a 5,000-33,000 increase in daytime population during the same time period.

At the same time, the daytime population for 2021 (Q3) was determined within 20 mins drive time for the three cities. Within that radius, the population in Tahlequah was estimated at

34,170 while that of Muskogee was estimated at 67,004. (The population calculation or method of estimation is given in the appendix.**)** Inserting these daytime population numbers for Tahlequah, the revised retail pull coefficients are found to be 0.48 and 0.47 for Tahlequah during 2019 and 2020, respectively. For Muskogee, the retail pull coefficients are 0.40 and 0.43 in 2019 and 2020, respectively. Although less than 1.0, they indicate that both cities retained close to half of retail sales even within a driving distance of 20 minutes. For Wagoner, the negative daytime population growth is explained by a trade area encompassing Muskogee as well as most of the population clustered around the Broken Arrow region. So spatial proximity to a metropolitan region seems to be affecting Wagoner more than Muskogee and Tahlequah.

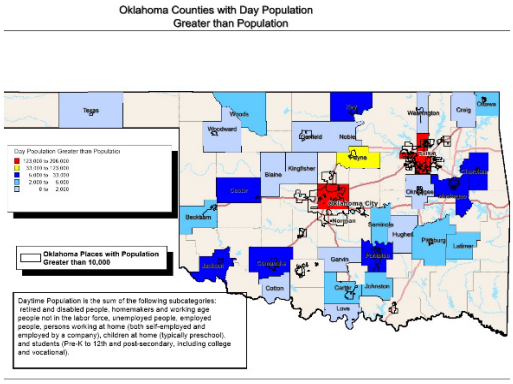

Fig. 6: The dark shaded counties showing positive population growth

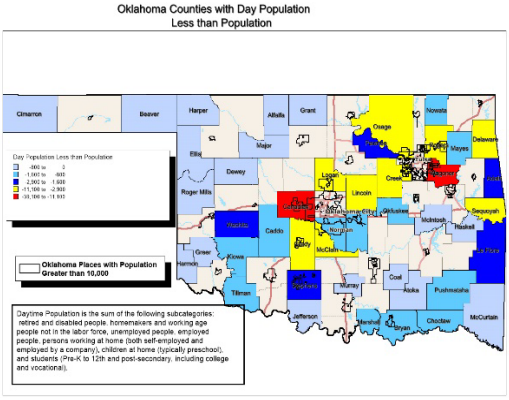

Fig 7: The light shaded counties showing negative population growth

The retail pull and sales gap results given above may be compared with results from retail gap studies that have been conducted in other parts of the country. For instance, a retail analysis of Macon County, Georgia indicates that the largest amount of sales tax revenues exists for food/bar sales followed by general retail. Utilizing zip code level data to determine shopping preferences among different neighborhoods, the study qualitatively evaluated the demand for retail according to demographics, distance and time of shopping. A retail gap analysis study (2013) completed for the city of Deer Park, Texas (population of 33,676) showed leakages or lower retail pulls for almost every industry except for meat and fish markets and retail bakeries. Among other categories, the study considered food stores, restaurants and apparel for the determination of retail gap and found a 100% leakage of sales dollars for apparel and 75-100% leakage for eating places. This conforms to our analysis of the City of Wagoner, although the latter has a lower population than Deer Park. A similar analysis for the City of Ennis, Texas also indicated a 0.26 and 0.76 leakage index for the apparel industry and for the food services industry, respectively, which somewhat resembles the pull factors for Wagoner. The leakage index was determined by dividing the actual sales by the potential sales in each industry. Using a similar methodology for the city of Richmond, Indiana, the leakage index for the food and beverages industry was found to be 0.75, except for specialty food stores with a leakage index of 0.49. In contrast, the clothing and accessories industry showed a leakage index of 0.27.

A 2007 sales gap analysis of the retail sector in Salem, Massachusetts employed a demand-supply framework similar to the trade area and pull factor analysis considered here. The estimated sales (estimated demand) were derived by projecting the number of retail shopping trips to a few

of the well-known shopping malls by individuals from the city and neighboring towns. The estimated retail demand was compared to retail sales to determine resulting gaps and surpluses. The results showed an estimated gap in spending of over $1 million for clothing accessories and over $2 million for specialty food. However, clothing retail sales exhibited a surplus of just over $100,000, and restaurants generated surplus spending of over $39 million during the period possibly indicating a higher trade area and pull coefficient for those industries. Using 2016 data from the Oklahoma Tax Commission and the US Census Bureau, Loy et al. (2018) found varying pull factors for the nonmetropolitan cities. While small cities with less than a population of 500 varied in sales capacity, cities like El Reno, which are close to the OKC Metropolitan Area, showed a pull factor of 0.92 as compared to Claremore, a suburb of the Tulsa Metropolitan Area at 2.00. The difference may be attributed to Claremore attracting more visitors, similar to Tahlequah in our analysis.

It may be noted that the studies above were not related to the pandemic and the methods employed were not documented in enough detail (except for the Loy et al. (2018) study) to compare the numbers at an absolute level. Also, results from these studies fall short of showing an absolute pull factor ratio based on per capita income or population trends. But they do reflect some of the industry level trends reported in this study for nonmetropolitan towns, and, in addition, demonstrate the need for retail analysis at the city level.

ROBUSTNESS TESTS

This study considers two time periods: the year before the pandemic, and the pandemic year itself to determine retail pull factors for the three cities. To validate the findings, we consider two additional years (2018 and 2021) of retail sales taxes and recalculate the pull factors. The selection of the year 2021 is significant because almost all pandemic restrictions were lifted in Oklahoma towards mid-2021.[3] Also, data for population and per capita income at the state and county level as well for the cities are updated for 2021, based on recent US Census publications. Though all three cities saw increases in sales taxes during 2021, the pull factors as shown in Table 8 below do not suggest much inter-year variation except for Wagoner which had a retail pull of 0.25 in 2018 (despite the sales tax rate being raised in the city during that year).

Table 8: Retail pull factor for the cities of Muskogee, Tahlequah and Wagoner for 2018 and 2021

Muskogee	2018	2021
County income per capita/state income per capita	0.84	0.79
State per capita retail sales ($)	27,330.08	29,504.46
Estimated sales for community per capita ($)	22,957.27	23,308.52
Trade area capture	26,135.51	30,183.80
Pull factor	0.69	0.82

[3] We did not include 2022 in our analysis since tax data for all months of the year is currently not available from the OTC website. However, 2022 falls beyond the scope of analysis here.

Tahlequah	**2018**	**2021**
County income per capita/state income per capita	0.78	0.81
State per capita retail sales ($)	27,330.08	29,504.46
Estimated sales for community per capita ($)	21,317.46	23,898.61
Trade area capture	13,973.35	16,059.19
Pull factor	0.84	0.99

Wagoner	**2018**	**2021**
County income per capita/state income per capita	1.03	1.05
State per capita retail sales ($)	27,330.08	29,504.46
Estimated sales for community per capita ($)	28,149.98	30,979.68
Trade area capture	2,265.27	3,448.89
Pull factor	0.25	0.44

Since sales tax data at the sectoral level is not archived by the Oklahoma Tax Commission beyond three years (David Francis, personal communication, 2022), the results for the sales gap coefficients are not displayed here. However, it may be inferred from the results above that they are unlikely to show much variation compared to those for 2019-2021.

DISCUSSIONS AND CONCLUSIONS

There is a dearth of research on the impact of the pandemic on nonmetropolitan communities in the United States. This study focuses on the effect of retail sales taxes, a major source of revenue for rural counties, and determines the retail pull factors for three major cities of northeastern Oklahoma, before and after the pandemic. Retail pull coefficients are often used to determine the ability of a region to retain residential spending and revenue and draw people from outside to shop locally. Lower retail pulls indicate the opposite, i.e., the region may be facing a leakage of retail sales dollars to areas outside the region. In addition to retail pull factors, this study considers the sales gap coefficients for three industries (food services, apparel, and restaurants) during the same period to determine the impact of the pandemic on retail sales at the industry level.

The three cities of Tahlequah, Muskogee and Wagoner in northeastern Oklahoma are very similar in terms of socioeconomic and demographic characteristics and may be economically integrated. Yet, results from retail pull factors and sales gap coefficients illustrate that despite being close to both Muskogee and Tahlequah, Wagoner lost retail sales before and after the pandemic, and except for the restaurant industry has shown a sales gap coefficient below 1.0 at the industry level. Although these numbers may not predict lower retail growth for Wagoner, they do indicate that not all nonmetropolitan rural areas may have similar amenities to attract sales which can boost spending patterns and local revenues. Lower retail pulls for Wagoner could be explained by its proximity to a larger metropolitan area of the state and recent transition to online sales during

and after the pandemic. However, the numbers may also indicate factors like market size, the demand for retail services, types of products sold and the nature of the community and workforce.

Two major policy implications can be drawn from this basic retail pull study. For one, the preliminary gap numbers derived here may be used to determine which industries need increased investment (in terms of infrastructure or otherwise) to promote growth in the sector. Smaller cities, e.g., the City of Wagoner, thrive on revenues from restaurants. Consequently, a higher demand, as indicated by a sales gap greater than 1.0 for restaurants, implies more investment is needed in this sector as compared to apparel or food stores. In other words, the city could attract more retailers for restaurants depending upon location and market demand. Policymakers should be aware that although Wagoner shares similar socioeconomic characteristics with Tahlequah and Muskogee, the lack of sufficient demand and size of the market for food stores or general retail may show lower pull factors. Secondly, the study provides a basis for implementing a sectoral level impact analysis where the gap coefficients continue to be larger than those for cities with comparable demographic and socioeconomic conditions. As recent reports from the USDA suggest that rural areas still need to catch up to urban locations, attempts to grow revenue and increase employment in retail businesses are movements in the right direction.

In conclusion, it may be said that retail pull and sales gap figures provide preliminary measures for determining the success of a community in raising its local sales and revenues with an aim to generating economic growth. Factors such as degree-of-competition from neighboring cities, and demand and availability of skilled workforce may influence retail pull factors. However, as retail sales revenues constitute a substantial part of the local revenues of hundreds of rural communities in the U.S., results from this study may be used for further analysis into why some communities are able to attract consumers while others are not. This study also highlights changes in shopping preferences that will potentially affect smaller communities across the nation as the economy attempts to rebound.

APPENDIX

Methodology for estimating daytime population

Daytime population is the sum of the following subcategories: retired and disabled people, homemakers and working age people not in the labor force, unemployed people, employed people, persons working at home (both self-employed and employed by a company), children at home (typically preschool), and students (PreK to 12th and post-secondary, including college and vocational). Daytime population data provides researchers with a more accurate understanding of the distribution of people during the day within their trade areas. Also, it provides a better understanding of the type of persons within the store's trade area. Daytime population is derived from US Census Bureau, Bureau of Labor Statistics and the National Center for Education Statistics.

Daytime population is determined by adding together all of the subcategories, which are derived from their relevant source agencies. Some people can be classified as falling within more than one subcategory of daytime population. For example, people working at home who are disabled. As a result, some people may be counted twice. This double-counting results in the daytime population being approximately 6% higher than the population counts in PopStats.

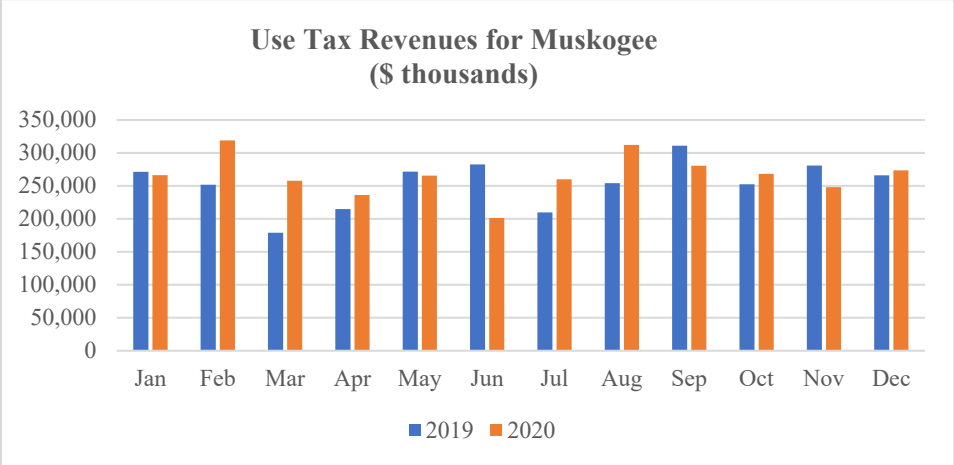

Fig A1: Monthly use taxes for the City of Muskogee for 2019-2020

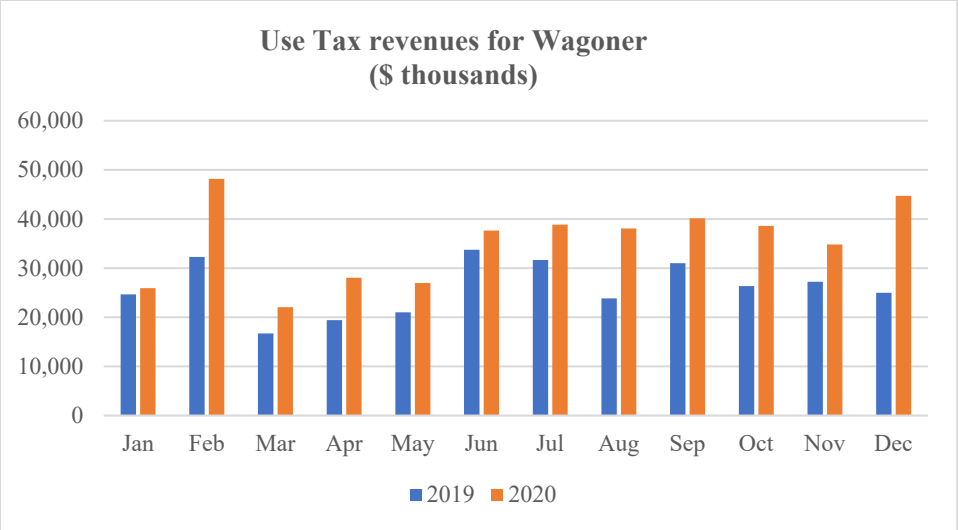

Fig A2: Monthly use taxes for the City of Wagoner for 2019-2020

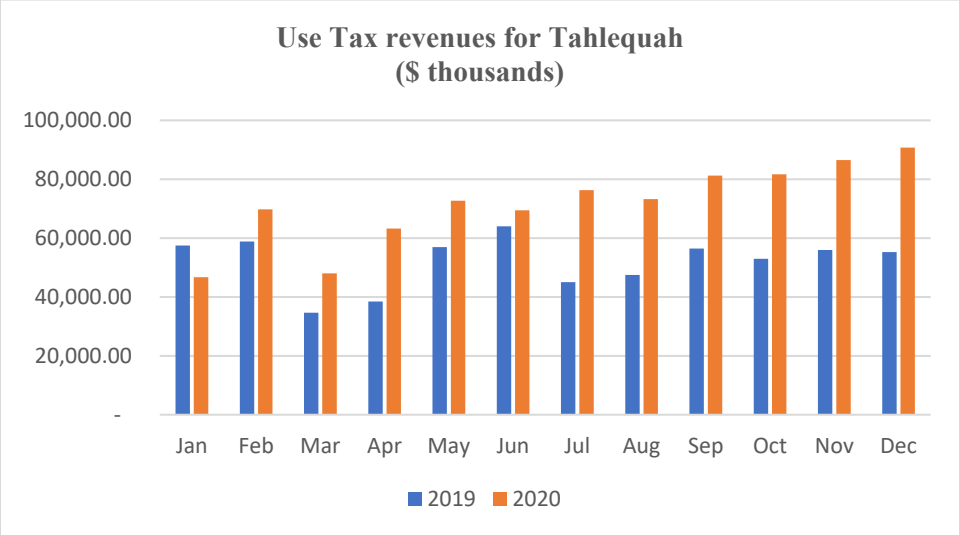

Fig A3: Monthly use taxes for the City of Tahlequah for 2019-2020

Table A1: Calculation of the sales gap coefficient for Apparel industry in Wagoner

	2019
County income per capita/state income per capita	1.03
State per capita retail sales in apparel ($)	380.04
Estimated sales in apparel for community per capita ($)	391.44
Estimated number of consumers making apparel purchase (city retail sales in apparel /estimated sales in apparel for community per capita) (251105.75/391.44)	641.50
	2020
County income per capita/state income per capita	1.03
State per capita retail sales in apparel ($)	418.43
Estimated sales in apparel for community per capita ($)	430.99
Estimated number of consumers making apparel purchase (city retail sales in apparel /estimated sales in apparel for community per capita) (326396/430.99)	757.32

REFERENCES

American Community Survey 5-year Data Profiles. Available at https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/

Ahn, S and F. B. Norwood. 2020. "Measuring Food Insecurity during the COVID-19 Pandemic of 2020." *Applied Economics Perspectives and Policy* 43(1):162-168.

Ahn, S. and S. Steinbach. 2021. "COVID-19 Trade Actions in the Agricultural and Food Sector". *Journal of Food Distribution and Research* 52 (2): 51-75.

Arati, J. 2020. "Impact of COVID-19 on the Small Business Sector." Oklahoma Cooperative Extension Service Publication. Stillwater: Oklahoma State University

Barta, S.D. and M.D. Woods. 2012. "Gap Analysis as a Tool for Community Economic Development." Oklahoma Cooperative Extension Service Publication AGEC 917. Stillwater: Oklahoma State University

Bir, C., A. Hagerman and M. D. Woods. 2020. "Oklahoma Economic Pulse Survey Results". Oklahoma Cooperative Extension Service Publication CR-1990. Stillwater: Oklahoma State University

Congressional Research Service. 2020. "Global economic Effects of COVID-19." Report #R46270. Available online at: https://crsreports.congress.gov/

Edmondson, H., M. Gill, B. B. R. Jablonski, J. Ladd, J. Rossi, S. Schaffstall, D. Thilmany and T. Woods. 2021. "US Consumers Food Insights During the COVID-19 Pandemic." *Choices* Quarter 4.

Karl F. Siedman Consulting Services and Bridgewater State College Institute for Regional Development, 2007. "Downtown Salem Retail Market Study: Interim Report."

Loy, R., B. Whitacre and D. Shideler. 2018." Pull Factors: A Measure of Retail Sales Success Estimates for 77 Oklahoma Cities." Oklahoma Cooperative Extension Service AGEC 1079. Stillwater: Oklahoma State University

Lusk et al. 2020. "Economic Impacts of COVID-19 on Food and Agricultural Markets". CAST Commentary**.** Available online at: https://www.cast-science.org/publication/economic-impacts-of-covid-19-on-food-and-agricultural-markets/

Mueller, J. T., K. McConnell, P.B. Burrow and J. Farrell. 2020. "Impacts of the COVID 19 Pandemic on rural America." *Proceedings of the National Academy of Sciences* 118(1)

Ninigret Partners. 2018. "Macon Downtown Retail Analysis: Findings and Recommendations."

Oklahoma Works. Available online at: https://oklahomaworks.gov/covid-business-impacts/

Report prepared by the Retail Coach for the City of Deer Park. 2013. "Retail Gap Analysis: Retail Trade Area, Deer Park, Texas."

Report prepared by the Retail Coach for the Ennis Economic Development Corporation. 2019. "Retail Trade Area Gap/Opportunity Analysis."

Rickman, D and H. Wang. 2020. "Economic Outlook 2020 Summer Update: The Virus Rules." Center for Applied Economic Research Spears School of Business Publication. Stillwater: Oklahoma State University

Sanders, L and C. Bir. 2020. "How the Coronavirus Has Affected the General Economies of The US and Oklahoma." Oklahoma Cooperative Extension Service Publication. Stillwater: Oklahoma State University

Shaffer, R., S. Deller, and D. Marcouiller. 2004. *Community Economics: Linking Theory and Practice*, 2nd ed. Ames, IA: Blackwell Publishing.

Shideler. D and T. Malone. 2017. "Measuring Community Retail Activity." Oklahoma Cooperative Extension Service Publication AGEC 1049. Stillwater: Oklahoma State University

US Bureau of Economic Analysis. Available online at https://www.bea.gov/data/gdp/gross-domestic-product

US Bureau of Labor Statistics. Quarterly Census of Wages and Employment. Available at https://www.bls.gov/cew/downloadable-data-files.htm

Whitacre, B. and K. Ripptoe. 2021. "Mask Mandates and Retail Consumer Spending: A Comparison of Oklahoma Communities During COVID-19." Oklahoma Cooperative Extension Service Publication AGEC-1998. Stillwater: Oklahoma State University

Wilkerson, C. 2020. "U.S. and Oklahoma Economic Outlook in the Midst of COVID-19 and Low Oil Prices." Paper presented at the Virtual Economic Forum of the Federal Reserve Bank of Kansas City, OK City Branch, Oklahoma City, OK.