

The spatial and temporal resilience of the tourism and outdoor recreation industries in the United States throughout the COVID-19 pandemic

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ABSTRACT

Accurately quantifying industry resilience is essential to devising effective recovery strategies. Previous research into industry resilience has either quantified the concept with single metrics aggregated across large geographies (e.g., visitation) or used metrics comparing the relative concentration of an industry within a region to the national average (e.g., location quotients). The former set of metrics prohibits spatially targeted recovery efforts while the latter fails during national crises. We propose the measurement of tourism and outdoor recreation industry resilience to COVID-19 based on growth rates in employment, wages, and establishments using publicly accessible time-series data on all counties in the United States. We use these indicators to characterize the spatio-temporal patterns of industry resilience across the country. The indicators can serve as a useful reference for diagnosing and monitoring industry resilience as well as developing targeted policies, programs, and promotion efforts that facilitate more localized response efforts.

1. Introduction

Within the tourism literature, researchers have increasingly used ‘industry resilience’ as a way to quantify the economic consequences of disasters and crises and effectively address uncertainty (Ritchie & Jiang, 2019). Industry resilience is an industry’s ability to recover from disturbances while mitigating negative future impacts (Ntounis et al., 2022). Quantifying industry resilience has become increasingly salient over the past several years, during which the COVID-19 pandemic dramatically impacted national tourism markets. Within the United States (U.S.), 5,512,000 individuals lost their jobs in the travel and tourism industry, and businesses realized over \$500 billion in lost revenue in 2020 (McCarthy, 2020; Statista, 2022). Research in response to the pandemic has examined how tourism and outdoor recreation industries have been affected (Ntounis et al., 2022), how effectively industries have responded (Abbas et al., 2021), and proposed frameworks for how the industry can move forward in a sustainable manner (Sharma et al., 2021). Throughout this research, industry resilience has been mentioned and at times quantified; however, there is no well-established method for quantifying short- and long-term tourism and outdoor recreation industry resilience to a long-lasting national crisis.

Previous tourism and outdoor recreation studies have typically

measured industry resilience using a single metric aggregated across large geographies. For example, employment rates (Khan et al., 2021), visitor arrivals (Bangwayo-Skeete & Skeete, 2021), revenues (Torres et al., 2019), and surveys of business owners’ and managers’ perceptions of industry resilience to a crisis (Ntounis et al., 2022) are relatively common indicators of industry resilience. Recently, some studies have applied metrics which consider the spatial heterogeneity of industry resilience (Cutter, 2016). Specifically, location quotients have garnered notable attention in recent research, as they hold the potential to show local shifts within the industry relative to a national average (Jang et al., 2022; Smith et al., 2019). Location quotients are an industry’s share of a local total for an economic statistic divided by that same industry’s share of the national total. If a temporary crisis affects industries in a certain region of the U.S., location quotient values enable researchers to compare the average wages or employment of the region’s industries to the average wages or employment of the same industries across the U.S. as a whole; this comparison can reflect how quickly industries in the region are recovering from the crisis (Yang et al., 2021).

Although prior studies have applied a variety of economic metrics that can quantify tourism and outdoor recreation industry resilience, the measures have three major limitations. First, a single metric aggregated across large geographies cannot reflect spatially heterogeneous industry

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resilience across regions. Second, location quotients are not useful within the context of national or global events. If an entire country is affected by a crisis, the tourism industry's share of the national total for any given economic statistic (the denominator in the calculation of location quotients) will likely decline or be highly volatile. Third, many prior studies and industry-specific policies have focused solely on short-term industry resilience, identifying and intervening in areas significantly affected by a geographically acute crisis (Adger et al., 2011; Houston, 2020). This overlooks the long-term dynamics of resilience, prohibiting researchers from identifying areas that may be experiencing economic downturns more slowly (e.g., areas that gradually lose tourism or outdoor recreation industry jobs as the conditions of local natural amenities deteriorate). We are defining short-term industry resilience as an industry's coping capacity to immediately respond toward a crisis, and long-term industry resilience as an industry's capacity to recover from a crisis over time-periods spanning several months to multiple years (Houston, 2020; Rossing et al., 2010).

To address the limitations of previous research, we address two research questions:

- 1) What indicators can be used to reflect spatially and temporally heterogeneous patterns of tourism and outdoor recreation industry resilience?
- 2) How did short- and long-term tourism and outdoor recreation industry resilience change during the COVID-19 pandemic in the United States?

We propose the use of growth rates in employment, wages, and the number of business establishments (hereafter, referred to as establishments), to quantify spatially and temporally heterogeneous industry resilience to COVID-19 across contiguous U.S. counties. The proposed indicators and method allow for spatially explicit short- and long-term inferences about tourism and outdoor recreation industry resilience within the context of national and global crises.

2. Methods

We collected data on quarterly employment, wages, establishments, and location quotients across all counties in the contiguous U.S. between the first quarter of 2019 and the second quarter of 2021 from the U.S. Bureau of Labor Statistics. We selected two industry sectors – arts/entertainment/recreation (NAICS-71) and accommodation/food services (NAICS-72) – to reflect the tourism and outdoor recreation industries. The strength of our dataset is that it reflects the diversity of the tourism and outdoor recreation industries, stratifies the size of these industries, and uses publicly available spatio-temporal data.

Short-term industry resilience was measured by the growth rates of employment, wages, and establishments within the tourism and outdoor recreation industries between the first and second quarter of 2020. These were the first three months of the COVID-19 outbreak in the U.S., reflecting the period between when the outbreak was declared a 'Public Health Emergency of International Concern' by the World Health Organization on January 30 and a 'pandemic' on March 11, 2020. Thus, this short-term period reflects industries' coping capacity to the immediate impacts of COVID-19. Long-term industry resilience was calculated as the mean quarterly growth rates of employment, wages, and establishments within the tourism and outdoor recreation industries between the second quarter of 2020 and the second quarter of 2021. This reflects the period of lagging impacts beyond those experienced in the first few months of the pandemic and the industries' capacity to recover from COVID-19. After calculating short- and long-term industry resilience, we conducted spatial cluster and outlier analyses to identify statistically significant spatial clusters of counties with high or low industry resilience. We subsequently classified distinct high or low industry resilience groups of counties based on their short- and long-term industry resilience to guide regional and national policy recommendations.

3. Results and discussion

Fig. 1 shows the temporal trends in employment, wages, establishments, and location quotients of the tourism and outdoor recreation sectors in the U.S. Short-term growth rates in employment, wages, and establishments all declined notably during the first quarter of 2020 for both industries. The results indicate that most tourism and outdoor recreation sectors across the U.S. experienced a downturn at the outset of the COVID-19 outbreak. The arts/entertainment/recreation sector's short-term growth rates in employment and wages were -41.7% and -32.0% , respectively, which were a sharp decline compared to those at the first quarter of 2019 (15.2% and 10.8% , respectively), a year before the COVID-19 outbreak. Long-term growth rates for employment, wages, and establishments all increased after the first quarter of 2020 (2020 Q2-2021 Q1) for both industries as most U.S. states relaxed regulations to boost their economies (USA Today, 2022). Nevertheless, based on the total growth rates since the COVID-19 outbreak, both sectors tended to decline, supporting previous research observing that many tourism and outdoor recreation businesses experienced long-lasting and negative impacts due to the pandemic (Khan et al., 2021).

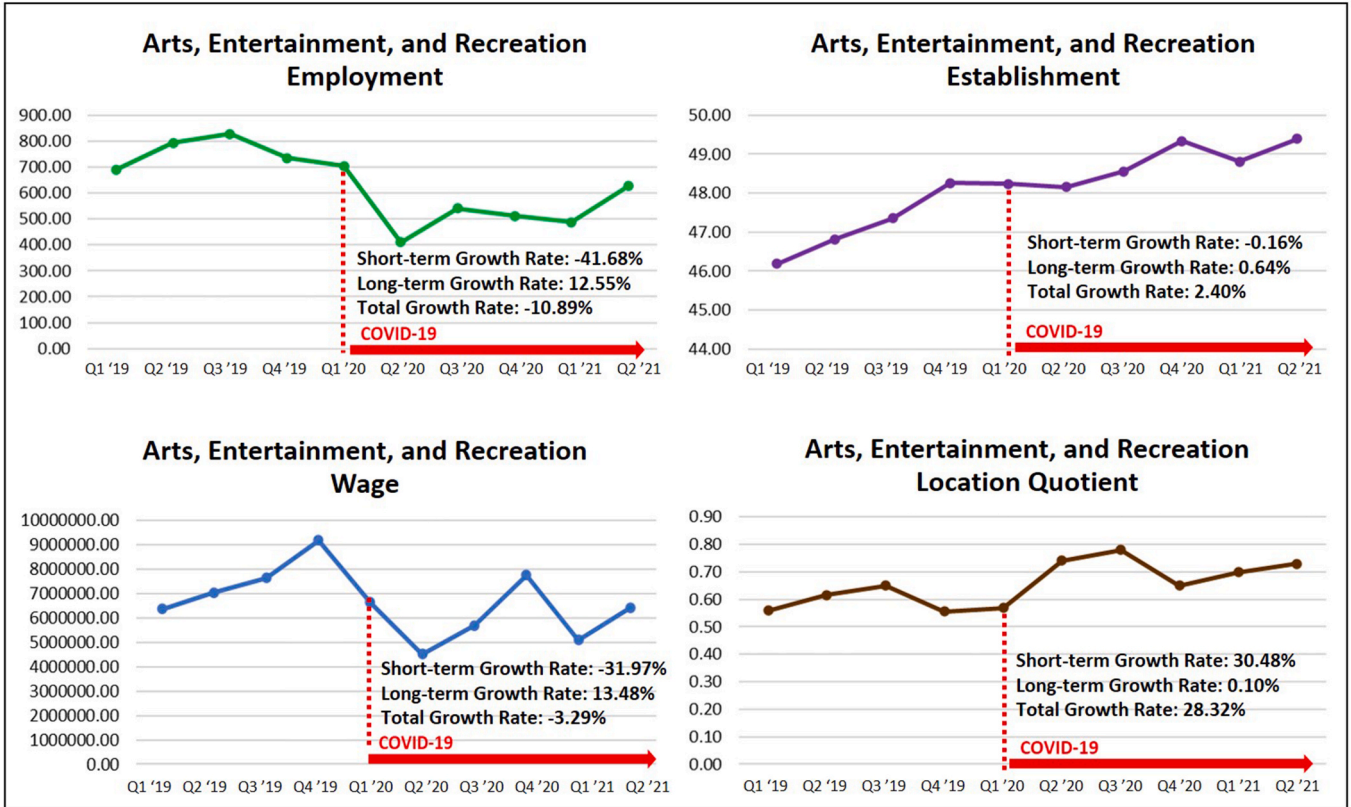
The location quotients for both sectors dramatically increased in the quarter after the COVID-19 outbreak (30.5% and 13.6% , respectively). Both sectors have also experienced continued increases in the total growth rates of location quotients, 28.3% and 13.3% , respectively, since the COVID-19 outbreak. These increases are contrary to not only the temporal trends of employment, wages, and establishments, but also the negative impacts COVID-19 has had on the tourism and outdoor recreation industries, as documented in other studies (e.g., Khan et al., 2021). This finding shows how location quotients are not useful at characterizing tourism and outdoor recreation industry resilience to national crises. The reason for this is that the measure of location quotients assumes national tourism markets are relatively stable, which, as we have observed throughout the pandemic and demonstrated here, is not always the case.

The quadrant scatter plots shown in Fig. 2 illustrate more detailed distributions of industry resilience by county. Unlike Fig. 1 showing overall trends of industry resilience, each dot in the plots in Fig. 2 represents each county's short- and long-term industry resilience status (positive/negative). For the employment, wage, and establishment-based plots, counties are generally distributed in the upper left quadrant, suggesting most counties experienced short-term negative economic impacts in the first quarter of 2020 but have since seen net positive economic growth in their tourism and outdoor recreation industries. To explain this result in more detail, we mapped the spatial distributions of industry resilience across counties in the U.S. and connect the results with each county's local policies and characteristics.

Fig. 3 shows the geographic representation of the industry resilience classifications by county. Most counties can be classified as having low short-term industry resilience but high long-term industry resilience (yellow). In the short term, the accommodation/food services sector was initially impacted relatively more than the arts/entertainment/recreation sector, as indicated by the greater proportion of counties colored in yellow in Fig. 3. This result may be explained by COVID-19 policies: 42 states and territories in the U.S. issued mandatory stay-at-home orders during the first quarter of 2020, which had a greater effect on the accommodation/food services sector that was less adept at transitioning to non-contact operations (Khan et al., 2021). In the long term, industry resilience trended up in most counties (yellow in Fig. 3) as many states in the U.S. gradually opened their doors to visitors and eased regulations (Henderson, 2021).

We further analyzed the spatially varying distributions of regional industry resilience to identify statistically significant spatial clusters of counties with high or low industry resilience (Fig. 4). Concentrated geographic areas with poor short-term resilience were clustered in the western U.S. This finding may be attributable to the large presence of

1-A: Arts, Entertainment, and Recreation (NAICS 71)



1-B: Accommodation and Food Services (NAICS 72)

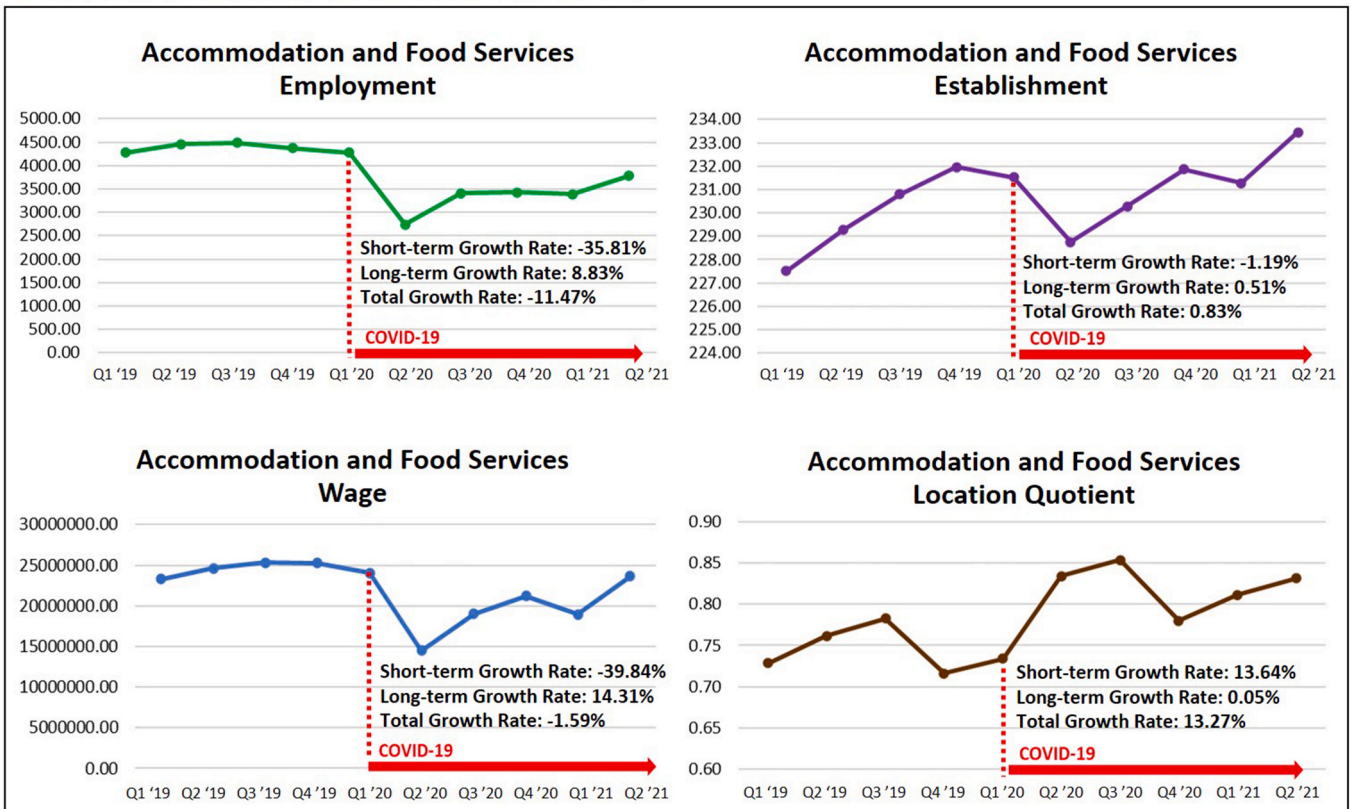
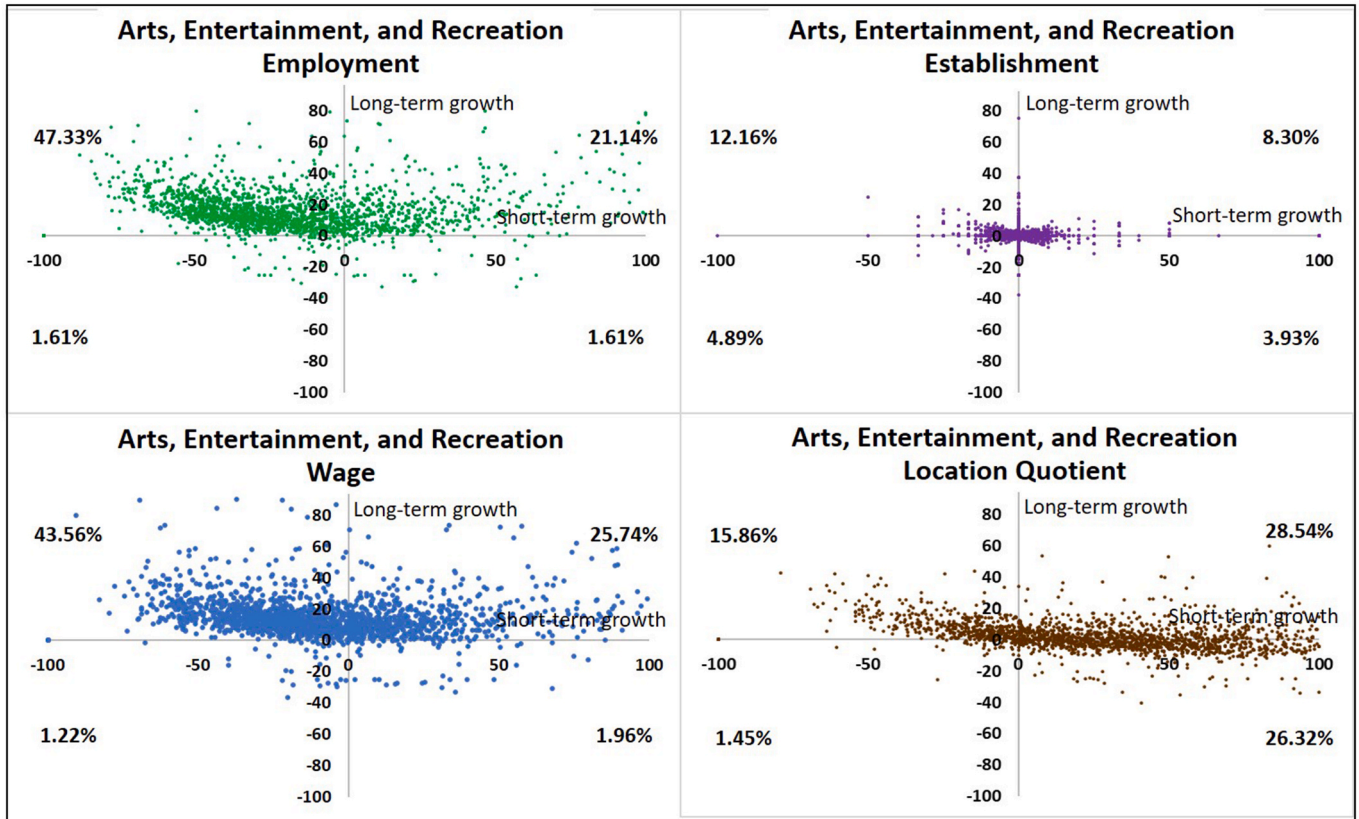


Fig. 1. Temporal trends in mean employment, establishments, wages, and location quotients of the arts/entertainment/recreation (NAICS-71) and accommodation/food services (NAICS-72) sectors in the contiguous U.S.

2-A: Arts, Entertainment, and Recreation (NAICS 71)



2-B: Accommodation and Food Services (NAICS 72)

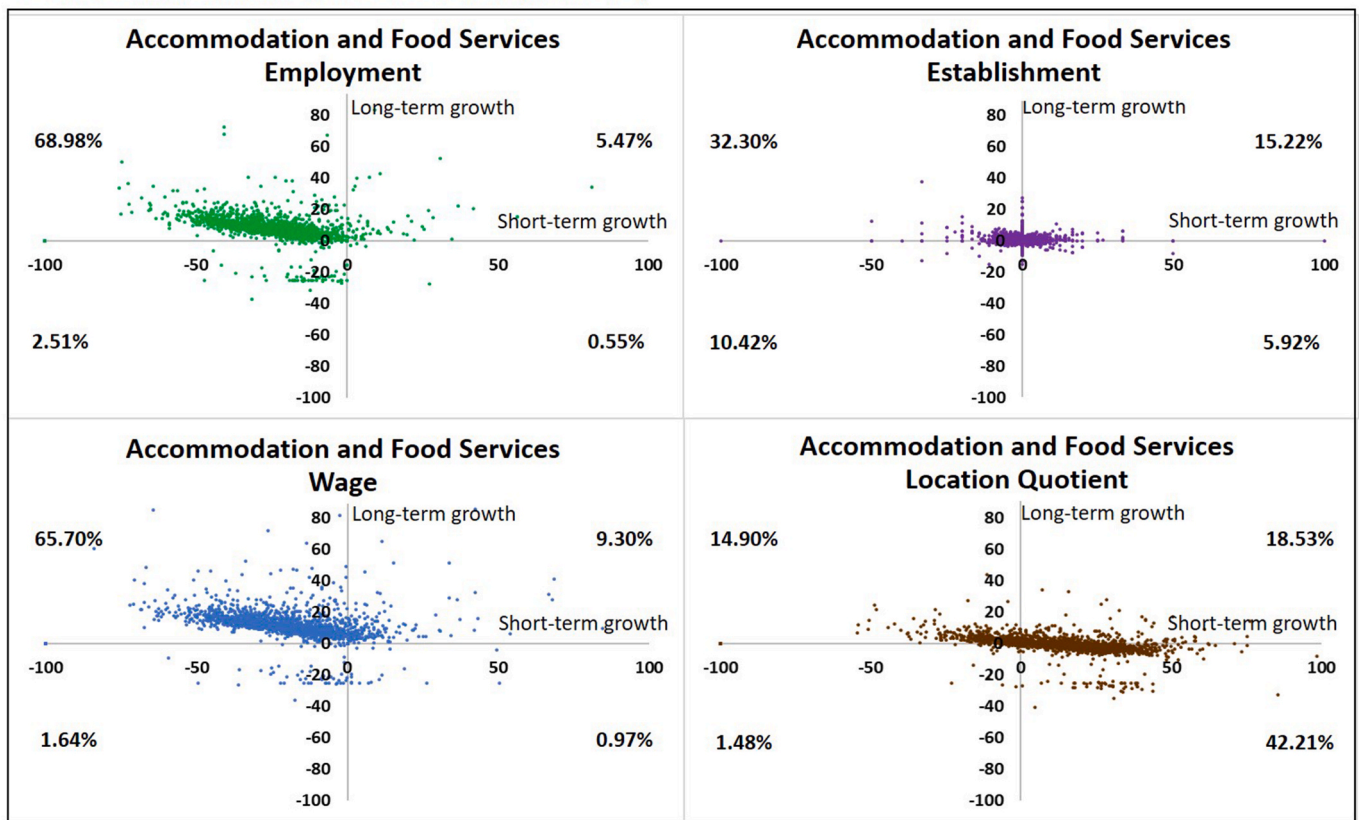


Fig. 2. Short-term and long-term tourism and outdoor recreation industry resilience of the arts/entertainment/recreation (NAICS-71) and accommodation/food services (NAICS-72) sectors of counties within the contiguous U.S.

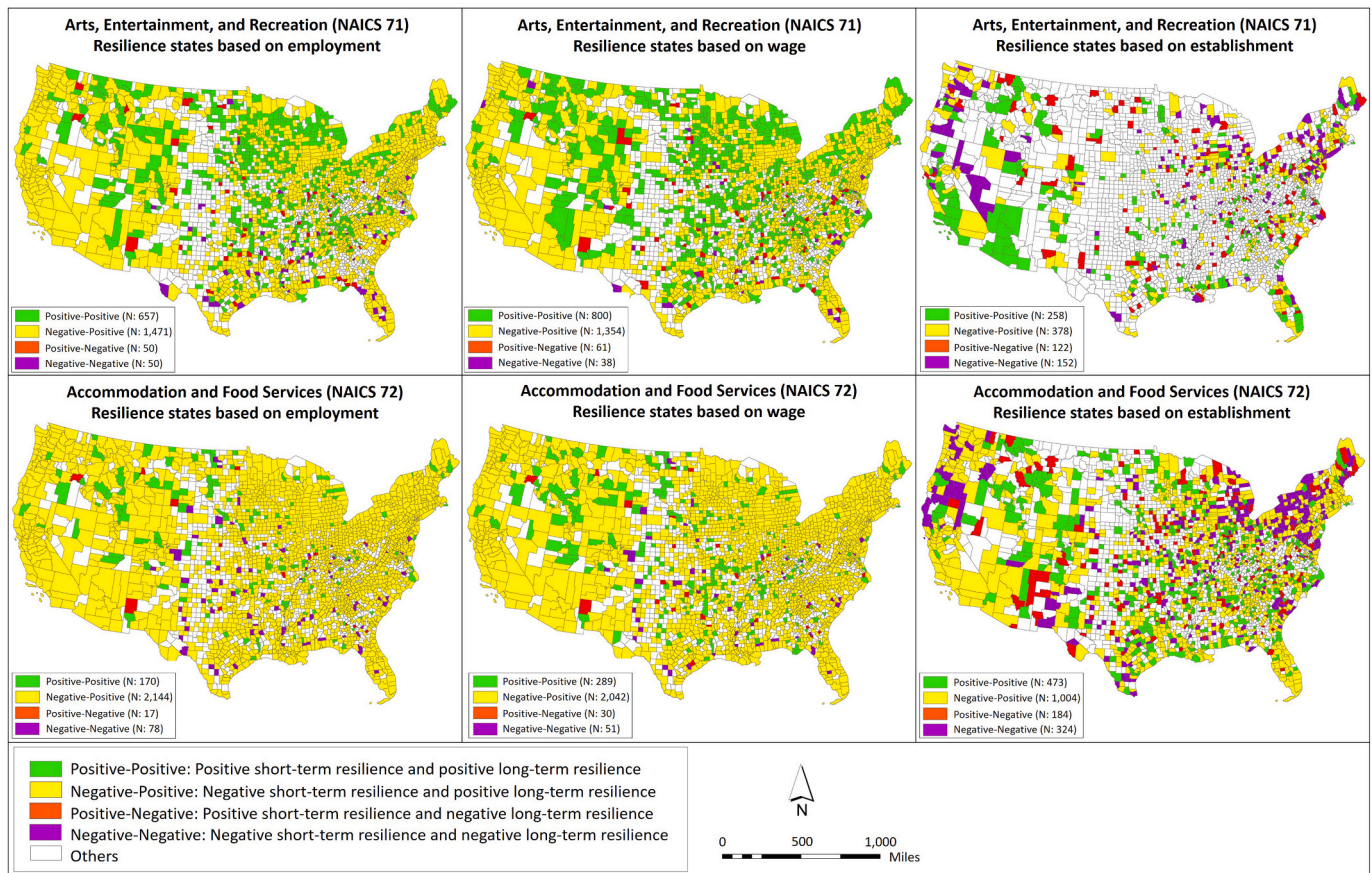


Fig. 3. Tourism and outdoor recreation industry resilience classification of counties within the contiguous U.S.

federal lands in this part of the country and the relatively high dependence on the tourism and outdoor recreation industries in this part of the country (U.S. Bureau of Economic Analysis, 2021). Concentrated geographic areas with poor long-term resilience were clustered in central North and South Carolina as well as the upper Atlantic coast. During the pandemic, South Carolina increased penalties for noncompliance and continued the state of emergency by executive order, which likely negatively affected both the tourism and outdoor recreation industries (McMaster, 2022).

Tourism industry resilience based on establishments showed that most counties were negatively affected in both the short and long terms, but the number of counties with low resilience declined as time went on (i.e., long-term versus short-term resilience). This suggests that while the overall growth of establishments has slightly increased during COVID-19 (Fig. 1), this increase was concentrated only in certain counties, and most counties have not recovered. In the outdoor recreation industry, industry resilience based on establishments suggests most counties were negatively impacted in the short term (i.e., lacking short-term resilience), but that most recovered after the first three months of the pandemic (the number of counties underperforming dropped from 2,110 in the short term to 225 in the long term). This suggests outdoor recreation establishments have recovered relatively well. This finding is corroborated by prior research reporting nearly half of adults in the U.S. participated in outdoor recreation on a monthly basis, with about 20% newly participating in outdoor recreation during the pandemic (Abbas et al., 2021).

4. Conclusion and implications

We proposed new indicators and methods for accurately quantifying spatial and temporal changes in tourism and outdoor recreation industry

resilience to a long-lasting national crisis. Through our analysis, we hope to have highlighted how it is important that short- and long-term industry resilience be examined together, especially in the context of long-lasting crises like COVID-19. The findings presented here offer several implications for both researchers and policymakers who are actively working to mitigate future impacts from national and global crises.

Theoretically, this study widens the scope of industry resilience research by proposing key industry resilience indicators that can reflect spatially and temporally varying abilities to respond to (short-term resilience) and recover from (long-term resilience) a long-lasting national crisis (Folke et al., 2010). This overcomes the challenges of prior industry resilience approaches that focused primarily on industry resilience at a specific point in time, industry resilience aggregated large geographies, and industry resilience in response to a local crisis (Cutter, 2016; Lew, 2014). The findings of this study also demonstrate that location quotients, which are usually applied in industry resilience studies, are not appropriate to quantify industry resilience to a national crisis. Instead, growth rates of employment, wages, and establishments of industries more accurately reflect industry resilience during geographically broad crises events.

Practically, this study proposed an industry resilience monitoring tool, based on publicly accessible time-series data, to effectively diagnose where recovery within the industry is lagging and consequently prepare policy interventions that mitigate future economic losses. This is a key to address crises with high uncertainty, like COVID-19, ultimately leading to sustainable tourism and outdoor recreation development (Espiner et al., 2017). Our measurement method also yielded a practically meaningful classification of counties that can be used to strategically and spatially target tourism and outdoor recreation recovery efforts. For example, regional policy makers should monitor non-urban counties with relatively higher short-term industry resilience and lower

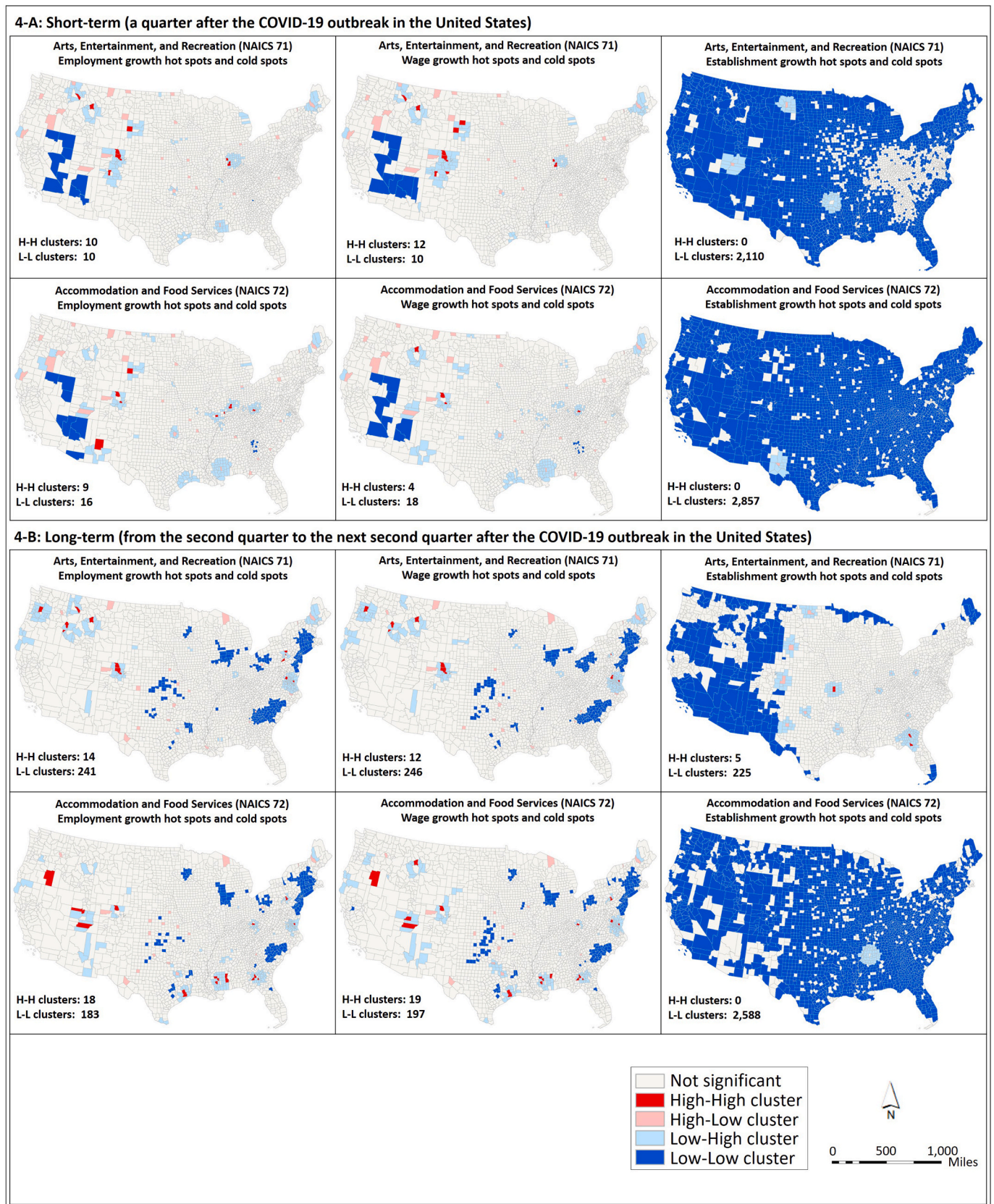


Fig. 4. Significant clusters of short-term and long-term tourism and outdoor recreation industry resilience across the contiguous U.S.

long-term industry resilience to develop political supports for these counties to continue attracting visitors and strengthen their industry resilience during the pandemic. Early in the COVID-19 outbreak, people tended to visit non-urban counties, which are relatively safer and less crowded than urban counties (Han et al., 2022). Thus, these non-urban counties showed relatively higher short-term industry resilience. However, as COVID-19 has continued, more and more people returned to visiting and recreating in urban counties. Public officials and policymakers can monitor changes in industry resilience and, when downturns are noticed, intervene by diagnosing why the downturn is happening and subsequently responding with appropriate policies, programs, and projects.

The industry resilience measurement methods used in this study allow for spatially explicit inferences about industry resilience, enabling differentiation between short- and long-term resilience, even within the context of national and global crises. The findings also call for additional research that considers how various regional policies and development plans interact with short- and long-term resilience (Lew, 2014). Future research needs to examine 'why' growth rates in employment, wages, and establishments decline or increase so that policymakers can strategically plan how to improve industry resilience, ultimately supporting more stable regional economies.

Impact statement

To effectively respond to and recover from a long-lasting crisis, policymakers and researchers must accurately measure and monitor tourism and recreation industry resilience. This study suggested the measurement of spatially and temporally heterogeneous tourism and recreation industry resilience to the COVID-19 pandemic. Specifically, this study used employment, wages, establishments, and location quotients, all of which are time series and easy to collect on a county basis, to measure industry resilience across 3,108 counties in the United States. The study found that industry resilience based on employment, wages, and establishments more accurately reflects industry resilience to the long-lasting COVID-19 pandemic than industry resilience based on the relative location quotients. The findings can help policymakers and practitioners more accurately monitor spatially and temporally varying trends within the tourism and outdoor recreation industries, facilitating more optimal tourism and recreation business operations and resource provisions during a crisis.

CRedit author statement

Eunjung Yang: Methodology, Formal Analysis, Investigation, Data Curation, Writing - Original Draft, Visualization. **Jordan W. Smith:** Conceptualization, Resources, Writing - Review & Editing, Supervision, Project Administration, Funding Acquisition.

Declaration of competing interest

None.

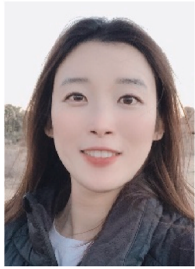
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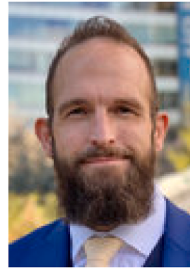
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Jordan W. Smith. Jordan Smith is an Associate Professor at Utah State University. Dr. Smith leads the Institute of Outdoor Recreation and Tourism, which was created to provide data to municipal, county, state, and federal agencies in their decision-making processes on issues relating to tourism and outdoor recreation. Dr. Smith's work combines social psychology, recreation economics, and geospatial analysis to develop an understanding of how outdoor recreation is changing across Utah and the American West.