

Article

# Orderliness in Tourism Enterprise Dynamics in United States Micropolitan Statistical Areas

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**Abstract:** Micropolitan statistical areas (micropolitans) are important elements in understanding the small-town economic forces operating in the United States. This study focuses on the tourism enterprise dynamics of micropolitans. These dynamics are an oft-neglected element in tourism analyses and reports. Power law (log-log) regression analyses are central to the examination of complex socio-economic systems, and have been used here. Micropolitan tourism enterprises are ubiquitous and there is much non-linear orderliness in the interplay between their demographic and entrepreneurial characteristics. The dynamics of the orderliness result in important differences. For instance, total micropolitan employment increases sub-linearly (more slowly) than increases in tourism enterprise numbers, while tourism employment increases super-linearly (more rapidly). This difference could be important in considerations of micropolitan employment. The relationship of tourism and poverty has often been debated. Here, a statistically significant negative correlation was observed between the number of tourism enterprises and a measure of community prosperity/wealth of the micropolitans. Expansion of the tourism sector apparently reduces community poverty in micropolitans. However, community poverty is also lower in larger micropolitans. Therefore, further analyses are needed to examine the potentially spurious correlation. Overall, future decision-making could be supported by the quantified information about the tourism dynamics of micropolitans.



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## 1. Introduction

Small towns in rural settings are a central component of the understanding of the economic forces at work across the United States [1]. A micropolitan statistical area (the term micropolitan is used here to refer to these settlements) is a core-based geographic area of one or more counties with one city containing at least 10,000 but fewer than 50,000 in population [2]. Micropolitans provide a lens on small-town America [3]. In 2017, 27.2 million people, approximately 8.4 percent of the U.S. population, lived in micropolitans. In September 2018 there were 542 micropolitans encompassing 660 counties. A majority of the top 20 most dynamic micropolitans were driven by some combination of tourism, recreation and the attraction of lifestyle amenities [1]. Whether this is generally true for all micropolitans is at the heart of this contribution.

International tourism contributes significantly to the growth of national income, employment, and to the earning of foreign exchange in many developing and industrialized economies [4]. It has been regarded as a major source of economic growth for certain economies. Tourism is one of the largest economic sectors in the world [5]. The 9th consecutive year of sustained growth in world-wide tourism followed in 2018 before the Covid pandemic. Statistics of the United Nations World Tourism Organization (UNWTO) cover a host of different tourism characteristics, e.g., the numbers of visitors and arrivals, information about types of travelers, money spent, destinations travelled to, information about air travel and the impact of digital technologies [5]. Curiously, UNWTO [5] provided

no information on the number of tourism and hospitality enterprises in different parts of the world. However, the U.S. had 396,690 tourism enterprises in 2020 that employed just more than 4.8 million people [6]. Presumably tourism is important in micropolitans but what enterprise dynamics are involved?

The general purpose of this contribution is to examine the importance of tourism enterprises in the socioeconomic domain of micropolitans. The following overview strategy is followed to provide some background to consider this issue. The nature of tourism is initially considered. This is followed by considerations of the socioeconomic relationships in human settlements as revealed by non-linear regression analyses. The links of tourism with these dynamics of human settlements are then considered. This is followed by consideration of the sources of employment in societies and how they relate to tourism. The links between tourism and community poverty are then considered. Finally, it is considered how standard and readily available economic statistics can be used to gain insight into the dynamics of tourism enterprises.

What is the nature of tourism? Typical tourism goods are local amenities, such as hot springs, beaches, mountains, nightlife, restaurant meals, and shopping opportunities [7]. Tourism services are essentially non-tradable because their transport costs are infinite and their consumption must be at the same location as their production. In other words, tourism consists of the consumption of non-traded and traded goods by non-local residents [4]. It is the consumption of a bundle of goods and services with unique destination features [8]. Tourism goods and services are not exportable in the traditional sense because their prices are determined in the local market rather than the international market [7]. However, tourism transforms non-traded goods and services into tradable goods through the process of visits of foreign tourists [9,10]. Tourism is also considered to be a tradable service by the United Nation World Tourism Organization (UNWTO) and is one of the major export sectors of developing countries [5,11]. Clients from elsewhere spend money locally and increase monetary inflows into communities. The net effect is, therefore, similar to the benefits of tradable sector activities, e.g., the creation of jobs, also in other economic sectors [12–14].

Several issues have to be considered when examining the socioeconomic impacts of tourism in micropolitans. Firstly, global urbanization and the rapid growth of cities have emerged as the greatest challenges the planet has faced since humans became social [15]. The future of humanity and the long-term sustainability of the planet are inextricably linked to the fate of cities. Cities, and presumably also micropolitans, are: the crucibles of civilization and the hubs of creativity and innovation [16], the engines of wealth creation and centers of power in countries [15], the magnets that attract creative individuals, and the stimulants for ideas, growth, and innovation [15,17,18]. The whole point of human settlements is to bring people together, to facilitate interaction, and thereby to create ideas and wealth, to enhance innovative thinking and encourage entrepreneurship and cultural activity [15]. The demographic, socioeconomic and entrepreneurial nexus of human settlements has, therefore, received increasing research attention in the new millennium [15]. This approach has later been termed Settlement Scaling Theory [19]. It is a set of hypotheses and mathematical relationships that together generate predictions for how measurable quantitative attributes of settlements are related to their population size. In broad terms, entrepreneurial dynamics form part of the demographic-socioeconomic-entrepreneurial nexus of U.S. counties [20,21]. How do the enterprise dynamics of the tourism sector of micropolitans fit into Settlement Scaling Theory? This question is examined here.

Secondly, researchers have used scaling analyses to reveal the underlying dynamics and structure of cities [15,16,22–24]. The hypothesis of urban scaling states that the functional properties of cities, such as their level of conflict, economic productivity and material infrastructure vary in a scale invariant way from the largest cities to the smallest towns within an urban system [22]. Even the smallest settlements have elements that functionally find correspondences in larger modern cities. The only possible scale invariant function, a power law, is the preferred descriptor of cities across scales [22]. The use of power laws

in scaling analyses quantifies how measurable aggregate properties respond to changes in the size of a system. The analytical punch of power laws stems from the observation that the response of one characteristic in relation to another is often a simple, regular, and systematic function over a wide range of sizes, indicating that there are underlying generic constraints at work on the system as it develops [24]. Is scaling present in the enterprise dynamics of the tourism sectors of micropolitans? And if it is present, what does it signify? The presence of scaling phenomena in the enterprise dynamics of the tourism sector of micropolitans is examined here.

Thirdly, there are two sources of jobs in modern societies [13,25]. Most jobs are in local services, e.g., people that work as waiters, plumbers, nurses, teachers, real estate agents, hairdressers, personal trainers, etc. They offer services that are produced and consumed locally and that are located in the non-tradable economic sector. On the other hand, the tradable economic sector includes the innovative industries, traditional manufacturing, some services, and the agricultural and extractive industries [13,25]. The theoretical definition of tradable and non-tradable industries in local economies is, therefore, based on the geographical ranges of their respective markets. The products and services of the tradable sector sell in external markets and are sources of monetary inflows into countries and communities. The non-tradable sector includes products and services intended mostly for local markets. This sector tends to circulate money in countries and communities. The paradox is that while the vast majority of jobs are in the non-tradable sector, the tradable sector is the main driver of prosperity in U.S. communities [13]. Consequently, weak tradable sectors seem to be linked to increased levels of community poverty.

Poverty has always been a concern in the U.S. [2]. By the end of the previous millennium, the U.S. poverty rate was the lowest it had been since 1974, but was still 11.3% [2]. In 2018, the poverty rate was 11.8% [26]. 38.1 million people in the U.S. lived then in poverty. What are the links between tourism and poverty? Since the 1990s, pro-poor tourism has been promoted as a means of alleviating poverty. Neto [27] and Gascón [28] reasoned that tourism: (i) highlights natural resources and culture, (ii) provides opportunities to diversify local economies possessing few other export and diversification options, (iii) enables opportunities for selling additional goods and services, (iv) offers labor-intensive and small-scale opportunities. In addition, tourism provides a high proportion of low-skill, domestic-type jobs that increases accessibility to the labor market for women [29]. The links between success in the tourism sector and the prosperity/poverty states of micropolitans are examined here.

Fourthly, as mentioned earlier, the net benefits of tourism are similar to the benefits of tradable sector activities. The creation of jobs is an important aspect [13,14]. Tourism is considered to be a tradable service by UNWTO and is one of the major export sectors of developing countries [5,11]. The links between strength in the tourism sector and employment in micropolitans are examined here.

Fifthly, according to the UNWTO [30], tourism is not a traditional industrial sector, and is best understood as a range of responses to a particular consumer demand. The North American Industrial Classification System (NAICS) [31] does not provide precise identification of all tourism sector enterprises. It is, therefore, necessary to consider which enterprise sectors could serve as proxies to reflect the dynamics of this sector. A proxy is, therefore, used to examine the enterprise dynamics of the tourism sector of U.S. micropolitans and the logic of the proxy choice is outlined later.

#### *Purpose and Logic of This Contribution*

The specific purpose of this contribution is to examine the numeric and other relationships between the dynamics of tourism enterprises and other socioeconomic characteristics of micropolitans. Such analysis has not been done before, and if successful, would provide an additional way to enrich tourism research. To clarify the importance of the tourism sector in micropolitans, a number of challenges had to be dealt with. Firstly, it was necessary to show that a NAICS-based data set could be used to describe the general entrepreneurial

dynamics of micropolitans, including those of the tourism sector. Secondly, it was necessary to show that population-based orderliness similar to that of large U.S. cities, is present in the demographic-socioeconomic-entrepreneurial nexus of micropolitans. Once this was confirmed, power law analyses of elements of the demographic-socioeconomic-entrepreneurial domain could be applied to investigate scaling phenomena and other issues. In this process, the relationships between: (i) total enterprise numbers and tourism enterprise numbers, (ii) the tourism sector enterprises and tradable sector enterprises, and (iii) tourism strength and community prosperity/poverty could be assessed.

The rest of the contribution deals next with the materials and methods used before the results are presented. Thereafter follows a discussion before conclusions are drawn.

## 2. Materials and Methods

### 2.1. Datasets Used

The U.S. economy is comprised of millions of enterprises that are constantly churning: some grow, others decline, new ones are founded, some disappear, etc. The publicly-available Business Dynamics Statistics (BDS) data sets of the U.S. Census Bureau [3] track the changes over time. NAICS [31] is used in the BDS data sets to supply information of the composition of the enterprise structures of the micropolitans. The 2016 data set was selected for use because it is long after the Great Recession of 2008–2010 and before the Covid pandemic that started in 2019. It, therefore, reflects fairly normal conditions. An additional data set of the U.S. Census Bureau was used to extract the 2016 population numbers of each of the micropolitans.

### 2.2. The Use of a Proxy to Represent Tourism Sector Enterprises

NAICS [31] does not provide precise identification of the enterprises of the tourism sector. It is, therefore, necessary to consider the use of a proxy. Tourism creates demand for a wide range of products and services purchased by tourists and travel companies [30]. This includes a range of products supplied by other industrial sectors (e.g., food & beverage, building supplies, crafts and soft furnishings) that are not traditionally thought of as part of the tourism sector [32]. In Europe, more than three out of four enterprises in the tourism industries operate in accommodation or food and beverage serving activities [33]. Many tourism employment opportunities are created in the accommodation, transportation and attraction sectors [34]. In South Africa, the travel and tourism 'industry' refers to the economic sectors directly related to the tourism experience: transport, accommodation, catering and recreation [35]. Based on the foregoing considerations, it was decided to combine two NAICS sectors, namely, the arts, entertainment & recreation and the accommodation & food service sectors of a micropolitan data set [36] to serve as the proxy for the tourism sector enterprises of micropolitans.

### 2.3. Power Law Analyses

Should tourism enterprise dynamics be considered part of Settlement Scaling Theory described by Lobo and colleagues [19]? To answer this question, the relationship of population numbers to tourism enterprise dynamics should be examined. Scaling is a general analytical framework used by many disciplines to characterize how population-averaged properties of a collective vary with its size [37]. Power law analyses (log-log regressions) are used here to examine if scaling is part of the relationships between total and tourism enterprise numbers and other micropolitan characteristics. The characteristics examined included: total and tourism enterprise numbers, total and tourism enterprise payrolls, and total and tourism employment numbers. The relationship between tourism enterprise numbers and the enterprise dependency index (EDI), a measure of community prosperity/poverty [20], is also examined. Because of the importance of tradable sector activities [12,14], the links between the tourism sector and characteristics of the tradable sector are also investigated.

#### 2.4. Scaling Terminology

In the application of power law analyses, the scaling terms sub-linear, super-linear and linear are used as defined by [15]. They indicate the following: sub-linear scaling is associated with disproportionate agglomeration of one socioeconomic characteristic at smaller or lower values of another characteristic of counties. It indicates economies of scale. Super-linear scaling is associated with disproportionate agglomeration of one socioeconomic characteristic at larger or higher values of another characteristic of counties. It indicates increasing returns to scale. Linear scaling indicates that one characteristic is linearly associated with another characteristic irrespective of the size of micropolitans.

#### 2.5. Enterprise Structures

A 2-digit BDS data set for 2016 was used to extract for each of the more than 500 micropolitans the following characteristics: (i) the total number of establishments (here called enterprises), (ii) the numbers of 2-digit classifications of enterprise types (Table 1), (iii) the employment associated with the enterprise sectors, and, (iv) the payrolls associated with the enterprise sectors. The number of enterprises (total enterprises as well as that of each of the economic sectors) represents a measure of the number of entrepreneurs involved (total as well as for each economic sector). The enterprise structure of each micropolitan was determined by expressing the enterprise numbers of each of the sectors (Table 1) as a percentage of the total enterprise numbers of the micropolitan.

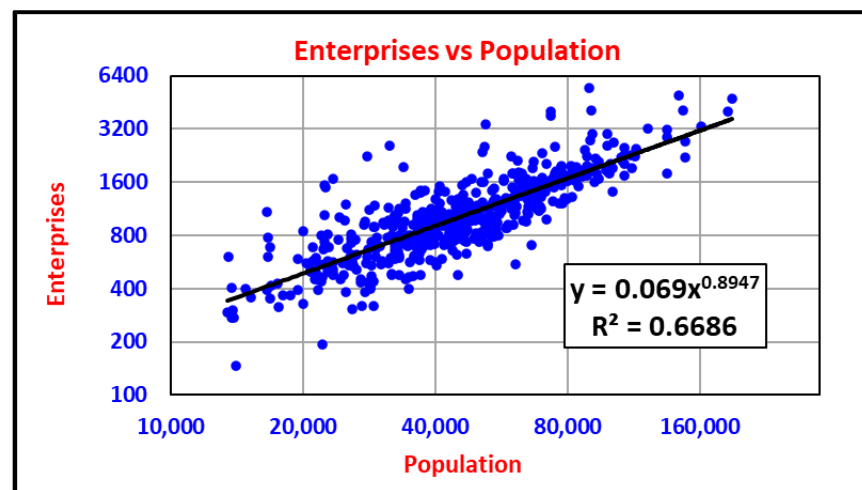
**Table 1.** Enterprise sectors of micropolitans according to NAICS [31]. Note: Proxy for tourism sector enterprises = enterprises in arts, entertainment and recreation sector plus enterprises in accommodation and food services sector.

Enterprise Sector
Agriculture, Forestry, Fishing and Hunting
Mining, Quarrying, and Oil and Gas Extraction
Utilities
Construction Services
Manufacturing
Wholesale Trade
Retail Trade
Transportation and Warehousing
Information Services
Finance and Insurance
Real Estate and Rental and Leasing
Professional, Scientific, and Technical Services
Management of Companies and Enterprises
Administrative and Support and Waste Management and Remediation Services
Educational Services
Health Care and Social Assistance
Arts, Entertainment, and Recreation
Accommodation and Food Services
Other Services (except Public Administration)
Industries not classified

### 3. Results

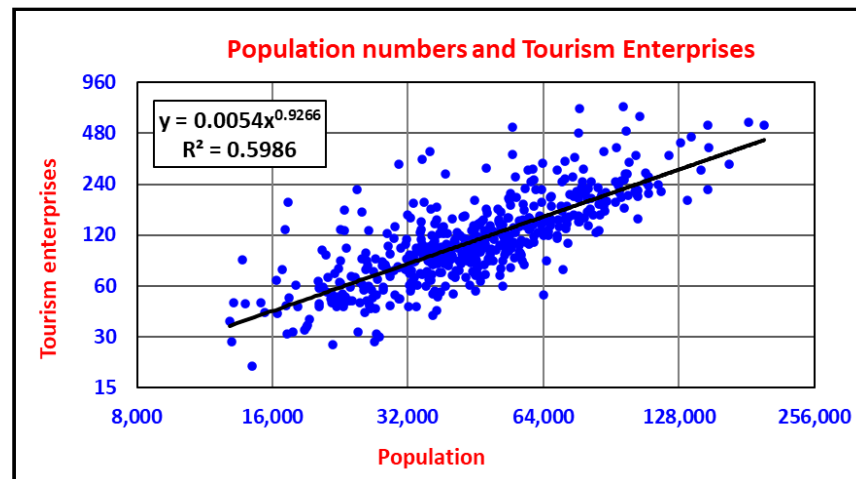
#### 3.1. The Micropolitan Population-Entrepreneurial Nexus

In 2016, population numbers and enterprise numbers were statistically significantly ( $r = 0.82$ ,  $n = 514$ ,  $p \leq 0.0001$ ) correlated in a power law with a sub-linear exponent of 0.895 (Figure 1). On average enterprise numbers increased by only 86% for each doubling of populations (100% increase) in micropolitans. Scaling was present and enterprise numbers were disproportionately denser in smaller micropolitans than larger ones.



**Figure 1.** The power law (log-log) relationship between 2016 population and enterprise numbers in 514 United States micropolitan statistical areas.

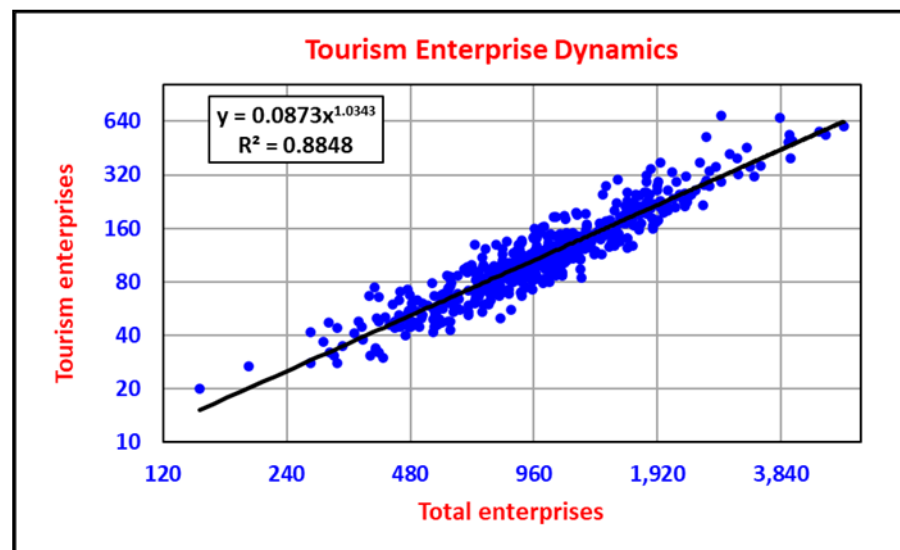
In 2016, population numbers and tourism enterprise numbers were also statistically significantly ( $r = 0.77$ ,  $n = 514$ ,  $p \leq 0.0001$ ) correlated in a power law with a sub-linear exponent of 0.923 (Figure 2). Tourism enterprise numbers increased on average by only 89% for each doubling of populations (100% increase) of the micropolitans. Scaling was present and very similar to that of the population-total enterprises relationship. Tourism enterprise numbers were also disproportionately denser in smaller micropolitans than larger ones.



**Figure 2.** The power law (log-log) relationship between 2016 population and tourism enterprise numbers in 514 United States micropolitan statistical areas.

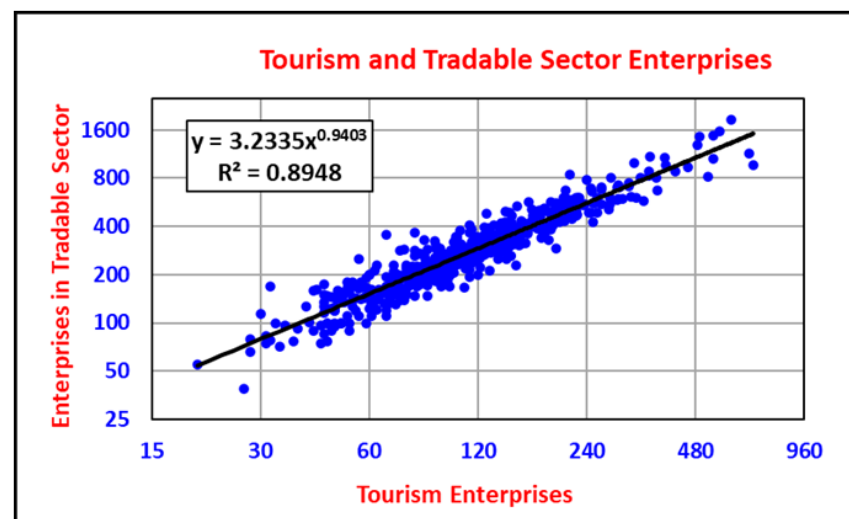
### 3.2. Tourism Entrepreneurship in the Micropolitans

Is there a relationship between total entrepreneurship and tourism entrepreneurship in the micropolitans? The answer is affirmative. In 2016, total enterprise numbers and tourism enterprise numbers were statistically significantly ( $r = 0.94$ ,  $n = 514$ ,  $p \leq 0.0001$ ) correlated in a power law with a slightly super-linear exponent of 1.034 (Figure 3). Tourism enterprise numbers increased on average by only 105% for each doubling of total enterprise numbers (100% increase) in the micropolitans. Scaling was slight and the average proportion of tourism enterprises to total enterprises varied slightly from 10.5% to 11.3% over a range of 250 to 2000 total enterprises.



**Figure 3.** The power law (log-log) relationship between 2016 total enterprise and tourism enterprise numbers in 514 United States micropolitan statistical areas.

Given the importance of the traded sector in local economies [13], is there a relationship between tourism enterprises and enterprises in the traded sector of the micropolitans? The answer is affirmative. In 2016, tourism enterprise numbers and enterprise numbers in the tradable sector were statistically significantly ( $r = 0.95$ ,  $n = 514$ ,  $p \leq 0.0001$ ) correlated in a power law with a sub-linear exponent of 0.940 (Figure 4). Enterprise numbers in the tradable sector increased on average by only 92% for each doubling of tourism enterprise numbers (100% increase) in the micropolitans. Scaling was present and enterprise numbers in the tradable sector were denser in micropolitans with fewer tourism enterprises than vice versa.

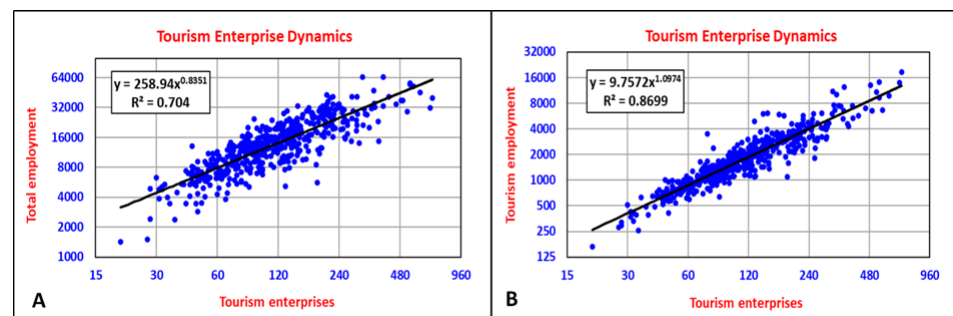


**Figure 4.** The power law (log-log) relationship between tourism enterprise numbers and numbers of enterprises in tradable sectors in 2016 of 514 United States micropolitan statistical areas.

### 3.3. Total and Tourism Enterprises and Employment in the Micropolitans

Given the importance of the traded sector in the stimulation of employment [13] and the fact that tourism turns non-tradable goods and services into exportable goods and services [13], the relationships of tourism sector enterprise numbers with: (i) total employment (Figure 5A), and, (ii) tourism employment (Figure 5B) of the micropolitans were

investigated. In both cases a statistically significant power law describes the relationship. However, there are major differences between the two power laws.



**Figure 5.** The power law (log-log) relationships between tourism enterprise numbers and total employment (A) and tourism employment (B) in 2016 of 514 United States micropolitan statistical areas.

In the case of tourism enterprises and total employment (Figure 5A), the exponential coefficient is sub-linear (0.835). Total employment is disproportionately higher in micropolitans with fewer tourism enterprises than vice versa. Stated differently, the ratio between total employment and tourism enterprises decreases from 148:1 in micropolitans with 30 tourism enterprises to 94:1 in micropolitans with 480 tourism enterprises (Table 2).

**Table 2.** Total employment and tourism employment as functions of tourism enterprise numbers.

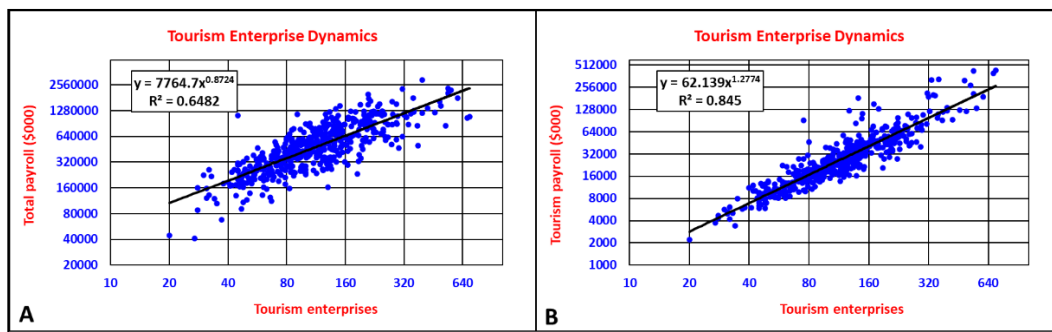
Tourism Enterprises (No.)	Total Employment (No.)	Ratio (as %) *	Total Employment Per Tourism Enterprise	Tourism Employment (No.)	Ratio (as %) *	Tourism Employment Per Tourism Enterprise
30	4433		147.8	408		13.6
60	7909	78	131.8	872	114	14.5
120	14,110	78	117.6	1866	114	15.6
240	25,172	78	104.9	3994	114	16.6
480	44,906	78	93.6	8545	114	17.8

\* = increase (%) relative to a doubling of tourism enterprises (100% increase).

In the case of employment in the tourism sector (Figure 5B), the exponential coefficient is super-linear (1.10) and 87% of the variation is explained. Scaling is present and tourism employment is disproportionately higher in micropolitans with more tourism enterprises than vice versa (Table 2). The ratio between tourism employment and tourism enterprises in micropolitans increases from ~13.6 to ~17.8 when tourism enterprise numbers increase from 30 to 480.

Because the numbers of total enterprises and tourism enterprises are correlated (Figure 3), it is also necessary to determine the nature of the relationships between total enterprise numbers and total and tourism employment (Figure 6). In the case of total enterprises and total employment (Figure 6A), the exponential coefficient is linear. There is no scaling and the relationship between total employment and total enterprises is constant (close to 13:1) over four orders of magnitude of enterprise numbers. In the case of total enterprises and tourism employment (Figure 6B), the exponential coefficient is super-linear (1.16). Scaling is present and tourism employment increases disproportionately (with 124%) for every doubling (100% increase) in total enterprise numbers.





**Figure 6.** The 2016 power law (log-log) relationships between total enterprise numbers and total payroll (A) and tourism payroll (B) of 514 United States micropolitan statistical areas.

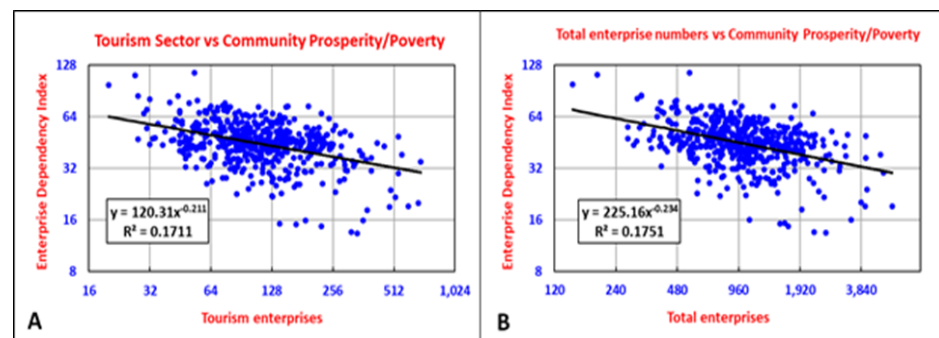
The ratio of total employment to tourism employment decreases from 10.9 to 1 in micropolitans with 30 tourism enterprises to 5.3 to 1 in micropolitans with 480 tourism enterprises. Employment in the tourism sector appears to be increasingly important in micropolitans when the tourism sector strengthens.

### 3.4. The Tourism Sector Enterprises and Micropolitan Payrolls

Given the fact that tourism enterprises are associated with employment numbers in the micropolitans (Figure 5), are these enterprises also associated with their payrolls? This is indeed the case (Figure 6). There is a statistically significant power law ( $r = 0.84$ ,  $n = 514$ ,  $p \leq 0.0001$ ) with a sub-linear exponent (0.872) between tourism enterprise numbers and the total payrolls of the micropolitans (Figure 6A). Close to 65% of the variation is explained by the power law. Scaling is present and total payrolls are disproportionately higher at lower numbers of tourism enterprises. There is also a statistically significant power law ( $r = 0.93$ ,  $n = 514$ ,  $p \leq 0.0001$ ) but with a super-linear exponent (1.277) between tourism enterprise numbers and the tourism payrolls of the micropolitans (Figure 6B). Close to 85% of the variation is explained by the power law. Scaling is present and tourism payrolls are disproportionately higher at higher numbers of tourism enterprises. Based on Figure 6 and on average, the tourism payroll increased from 3.2% of the total payroll of micropolitans with 30 tourism enterprises to 9.75% of the total payroll of micropolitans with 480 tourism enterprises.

### 3.5. The Tourism Sector and Community Prosperity/Poverty

Increased community prosperity in South Africa is associated with strength in the tourism sectors of a group of towns [21]. In the micropolitans, tourism enterprise numbers are statistically significantly and negatively correlated ( $r = -0.41$ ,  $n = 514$ ,  $p < 0.0001$ ) with the enterprise dependency index (EDI, population numbers/enterprise numbers) (Figure 7A). Higher numbers of tourism enterprises are associated with higher levels of community prosperity. However, only about 17% of the variation is explained (Figure 7A). Total enterprise and tourism enterprise numbers are closely correlated (Figure 3). As expected, total enterprise numbers of the micropolitans are also statistically significantly and negatively correlated ( $r = -0.42$ ,  $n = 514$ ,  $p < 0.0001$ ) with the enterprise dependency indices of the micropolitans (Figure 7B). It is at this stage impossible to ascribe the lower enterprise dependency indices (indicating more prosperous communities) solely to the influence of strong tourism sectors. The positive influence may simply reflect a positive influence of town size on community prosperity. This issue still requires further investigation.



**Figure 7.** (A) The power law between tourism enterprise numbers and the enterprise dependency indices of 514 micropolitans. (B) The power law between total enterprise numbers and the enterprise dependency indices of 514 micropolitans.

#### 4. Discussion and Conclusions

Different aspects of micropolitans have been studied before, e.g., their: urbanization processes [38,39]; population changes [40]; creation processes [41]; regional studies [42]; health problems [43]; delineation [44]; growth and volatility [45] and the dynamics of the ‘births and deaths’ of business establishments [46]. A Most Dynamic Micropolitan Index was developed to identify smaller U.S. communities that are thriving and those that are struggling to provide economic opportunities for their residents [47]. Based on the index, the 20 most dynamic micropolitans in the U.S. were identified [47]. Tourism played a role in micropolitan success [1]. Although UNWTO [5] provides a lot of tourism statistics, little information has been provided about tourism enterprises and their dynamics in specific settings such as micropolitans. A comprehensive analysis of the numeric and other relationships between tourism enterprises and other socioeconomic characteristics of micropolitans has not been done before. This contribution fills this void and the impact of the tourism sector (and, thus, of tourism entrepreneurship) in the micropolitans was examined. However, it must be remembered that only two sectors, namely, the arts, entertainment & recreation, and, the accommodation & food services sectors, were used as a proxy for tourism sector enterprises of micropolitans. The actual numbers of all tourism enterprises could not be determined from the dataset used and must be higher than the numbers used here.

Several important findings were nevertheless made: Firstly, each of the more than 500 micropolitans has one or more tourism enterprises. This is not unexpected because tourism is such a large and important economic activity in the world [48]. Tourism enterprises are general and ubiquitous elements of micropolitans. It is important that their dynamics be elucidated.

Secondly, it is impossible not to be impressed by the underlying orderliness present in the demographic-entrepreneurial domains of the micropolitans (Figures 1–7). In the entrepreneurial nexus, it manifests in proportionalities between tourism sector enterprise numbers and: (i) micropolitan population numbers (Figure 2), (ii) total enterprise numbers in micropolitans (Figure 3), and, (iii) enterprise numbers in the traded sector of micropolitans (Figure 4). This orderliness does not usually figure in considerations about tourism development, e.g., [49,50]. Yet, the orderliness might be indicative of constraining factors that might be have to be considered in tourism strategy development. In other words, the power laws reported here could be used in ‘what-if’ analyses (examples are presented later).

Thirdly, many of the observed regularities are non-linear in nature and scaling is present. In other words, the tourism sector fits in with Settlement Scaling Theory [19]. This theory considers that human settlements are complex systems whose infrastructural, economic and social components are strongly, and often non-linearly, interrelated and, therefore, difficult to understand in isolation [15,22–24,51]. The power laws recorded here indicate a range of non-linear associations between various micropolitan characteristics such as

population numbers, total enterprise numbers, tourism enterprise numbers, the number of enterprises in the tradable sector, total employment numbers, tourism sector employment numbers, total micropolitan payrolls and the tourism sector payrolls (Figures 1–7). There is, therefore, a high degree of non-linear orderliness in the demographic-entrepreneurial nexus of micropolitans. These results correspond with previously reported findings on Alabama counties [21]. Beinhocker [52] stated that the economy can be thought of as an order-creating system that converts inputs (matter and energy of low order/high entropy) via a kind of economic metabolism into higher order/lower entropy products and services. This is part of the social and physical order that is present in the economy. The results (Figures 1–7) indicate that the dynamics of tourism sector enterprises also fit in with the ideas of Beinhocker [52].

Fourthly, the importance of the non-linearity of relationships based on tourism enterprise numbers should be recognized. Figure 5 and Table 2 indicate that relative to increased numbers of tourism enterprises, there are distinct differences in the dynamics of total employment and tourism employment. Total employment increases sub-linearly with increases in tourism enterprise numbers, while tourism employment increases super-linearly. Tourism enterprises in larger micropolitans can ‘carry’ more employees than those in smaller micropolitans. The reasons for this are not obvious at this stage and the mechanics of this phenomenon requires further investigation.

Fifthly, there has long been an interest in the relationship between tourism and poverty reduction, e.g., [53–55]. There is a statistically significant ( $p < 0.01$ ) negative correlation between the number of tourism enterprises and a measure of community prosperity/wealth (the enterprise dependency index) (Figure 7A). Expansion of the tourism sector apparently reduces poverty. However, the numbers of total enterprises are also correlated with the enterprise dependency index (Figure 7B) as well as with population numbers (Figure 1). It is possible that the apparent correlation between the number of tourism enterprises and the poverty measure could be spurious as a result of the influence of micropolitan size on their poverty states, i.e., larger micropolitans are more prosperous than smaller micropolitans. The causality implications of the link between tourism and poverty need to be further investigated following the guidelines of Pearl & Mackenzie [56] to resolve causality issues.

Sixthly, are the practical implications of the results reported here and, in particular, the recorded power law interrelationships important in predicting the dynamics of the tourism sector in micropolitans? Simple algorithms have on occasion been used effectively in business and other predictions [57–59]. The relationships presented in Figures 1–7 offer potential to be used in predictions about aspects of the tourism sector.

Two examples are provided to illustrate such applications. In the first, a micropolitan with 150 tourism enterprises could potentially lose in the order of 40 tourism enterprises due to potential fracking operations to produce shale oil. What impacts on employment and payrolls in the micropolitan could be expected? Based on the data of Figures 5B and 6B, the estimated annual losses in employment and payrolls could amount to 688 jobs and \$12.24 million in payrolls. The responsible authorities would be enabled to make more rational decisions. The second example involves an entrepreneur who would like to know to what extent there might be opportunities for more tourism enterprises in a micropolitan of 100,000 people growing at two percent annually. Based on the data in Figure 2, the entrepreneur could determine that there should annually be entrepreneurial space for four additional tourism enterprises. This knowledge could guide the person’s investment decisions.

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