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Temporal and Geographic Stress Testing of Entrepreneurial Proportionalities in United States Counties

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Abstract: Urbanization is one of man's greatest challenges. Its handling requires a better understanding of orderliness in the demographic–socioeconomic–entrepreneurial domain of human settlements. Operating business enterprises are manifestations of successful entrepreneurship, which is the characteristic of interest here. Non-linear entrepreneurial proportionalities can be detected through the use of log–log regressions (power law analyses). Such analyses revealed many entrepreneurial proportionalities in datasets of a large number of U.S. counties. This enabled the examination of the temporal and geographic sensitivities of three entrepreneurial types: total entrepreneurship (expressed in total enterprise numbers), new entrepreneurship (the ability to successfully start enterprises of types not yet present), and existing entrepreneurship (the ability to start more enterprises of types already present). Stress testing of the entrepreneurial proportionalities during a period of economic growth (2000 to 2007) followed by a period of economic decline (the so-called Great Recession from 2007 to 2010) enabled the examination of a hypothesis that suggested that the entrepreneurial proportionalities are not temporally or geographically sensitive. The hypothesis is accepted for new and existing entrepreneurship. Total entrepreneurship is geographically sensitive, but not temporally. There is apparently no lack of entrepreneurship in human settlements. Their total entrepreneurship (expressed as total enterprise numbers) appears to be a function of their population sizes and prosperity/poverty levels.

Keywords: entrepreneurship; new entrepreneurship; existing entrepreneurship; entrepreneurial space; entrepreneurial proportionalities; human settlements; U.S. counties; power laws; stress testing

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1. Introduction

Global urbanization is one of the greatest challenges humanity faces after becoming social [1]. Although cities have proven to be humanity's engines of creativity, wealth creation, and economic growth, their rapid and ongoing growth has also been a source of pollution and disease [2]. This has contributed to global problems such as climate change and incipient crises in food, energy, and water availability. The future of humanity and the long-term sustainability of the planet are inextricably linked to the fate of human settlements [2].

Scaling studies reveal the underlying principles that determine the dominant behavior of highly complex systems [3]. In urban studies, scaling research [4] has demonstrated that the spatial and temporal levels of the social, economic, and political interactions of urban settlements are subject to constraints imposed by environmental conditions, technology, and institutions [3,5]. Settlement Scaling Theory (SST) provides the means to generate predictions for how measurable quantitative attributes of human settlements are related to their population sizes [3].

Some surprisingly simple, but statistically significant, proportionalities have been recorded in the enterprise structures of many human settlements. One indicates that the total number of enterprises—a measure of total entrepreneurship (a fuller discussion of entrepreneurship follows below)—in human settlements such as South African towns [6], U.S. counties [7], U.S. micropolitan statistical areas [8], and U.S. metropolitan statistical areas (MSAs) [9] are linearly proportional to their population sizes [6–9]. The second proportionality indicates that new entrepreneurship (the ability to successfully start new business types not yet present in a human settlement) in South African towns [10] and smaller U.S. counties [11] is sub-linearly proportional to their total enterprise numbers. A third proportionality follows from the foregoing. Existing entrepreneurship (the ability to start more businesses of types already present) represents the difference between total and new entrepreneurship. Given that new entrepreneurship is related to total entrepreneurship, existing entrepreneurship is, therefore, also related [11].

The first proportionality extends over many orders of magnitude of population size and enterprise numbers of MSAs. Youn et al. [9] remarked that there is approximately one business establishment for every 22 people in U.S. cities, regardless of their size, and, on average, a new workplace is created each time a city size increases by 22 people. Due to the limitations of enterprise-type classification systems [9], the second proportionality was found to apply to smaller human settlements (maximum enterprise richness values of approximately 300 to 350) [6,7]. This proportionality is a regular, but non-linear, increase of about 60 percent in the number of different enterprise types in human settlements when their enterprise numbers double [10–12]. The third proportionality is a regular and super-linear increase of about 135 percent in the existing entrepreneurship of human settlements when their enterprise numbers double [11].

Entrepreneurship clearly plays a role in these proportionalities. The first involves entrepreneurship that manifests in the total number of enterprises and employees in human settlements. The second involves abilities to identify and successfully pursue business opportunities of business types that have not previously been present in specific human settlements. The third involves abilities to identify and successfully pursue more business opportunities of business types that are already present in specific human settlements. These proportionalities have elicited some comments but are still not well understood. For instance, Youn et al. [9] remarked that the remarkable constancy of the average number of employees and the average number of establishments across U.S. cities is contrary to previous wisdom and somewhat puzzling. Understanding the dynamics and vulnerabilities of these proportionalities should enhance knowledge about the entrepreneurial sustainability of human settlements. This is what is being pursued here.

1.1. Literature Survey

1.1.1. Human Settlements and Enterprise Dynamics

Cities are man's greatest invention and are gateways for ideas [13]. Cities are also a standard unit of observation in urban economics [14]. A project of the Santa Fe Institute was started early in the new millennium to investigate the demographic and socioeconomic dynamics of cities [2]. Scaling analyses were used to reveal the underlying dynamics and structure of cities [2–5,15,16]. The development of the SST [4] provided a set of hypotheses and relationships that together estimate how measurable quantitative attributes of settlements are related per capita. The functional properties of cities, such as levels of economic productivity, material infrastructure, and even conflict, vary in a scale invariant way from the largest cities to the smallest towns within urban systems [17]. Even the smallest settlements have elements that functionally find correspondence in larger modern cities. The power law is the preferred scale invariant function to describe the characteristics of cities across scales [17]. Power laws quantify how measurable aggregate properties respond to changes in the size of a system [18]. Their analytical power stems from the fact that responses are often simple, regular, and systematic over a wide range of sizes, indicating that there are underlying generic constraints at work on these systems as they develop. Power law analyses are used in this contribution.

However, the views and research practices of the Santa Fe group have been criticized [19]. Martin & Sunley [19] stated that a formal (mathematical) modelling methodology is neither necessary nor sufficient for understanding the complex behavior of the economic landscape. They added that evolutionary processes in the socioeconomic sphere are not easily reduced to, nor rarely can be adequately represented by, formal models. However, over the last few decades and in diverse disciplines such as economics, geography, and complex systems, perspectives have arisen that many properties of cities are quantitatively predictable due to agglomeration or scaling effects [17,20]. A theoretical framework that combines two main processes, namely, the dynamics of agglomeration/polarization and the unfolding of an associated nexus of locations, land uses, and human interactions, is now available and provides the means to understand all cities [21]. Understanding the dynamics of the constraints mentioned in Ref. [18] is obviously important and is a major reason for this contribution. In such a pursuit, it is necessary to consider innovation and entrepreneurship as potential constraints in the linkages of the demographic–socioeconomic domains of human settlements.

1.1.2. Innovation and Entrepreneurship as Elements in City Dynamics

The clustering of talent and economic assets, face-to-face interaction, buzz, diversity, and the critical mass that only cities can provide are essential elements in innovation, creativity, and economic growth [22,23]. The expansion of city populations requires the expansion of innovation cycles at a continually accelerating rate in order to sustain growth and avoid stagnation or collapse [15]. For instance, patent production as an indicator of innovation scales super-linearly with increases in city populations [2].

Entrepreneurship is a crucial mechanism in economic development [24]. The function of entrepreneurs is to reform or revolutionize the patterns of production by exploiting inventions or untried technological possibilities for producing new commodities or producing old ones in new ways [25,26]. Such 'industrial mutation' revolutionizes the economic structure from within by incessantly destroying the old one and creating a new one [25].

Entrepreneurship, in common with other unit ideas such as leadership, is an elusive concept [27]. It is broad and wide-ranging, and its boundaries are fuzzy and may incorporate a number of disciplinary approaches. For instance, entrepreneurship has been defined over time in terms of: Environmental, structural, strategic, and leader personality qualities [28]; attempts at new ventures or new business creations [29]; the extraction of value from environments [30]; and the pursuit of opportunity beyond resources controlled [31]. Davidsson [32] cautioned that there is a paradox if entrepreneurship research is limited to something that can be defined by an outcome criterion, e.g., a successful new business, then some important parts of the entrepreneurial process, e.g., failure, may be missed.

Given that the focus of this contribution is on the entrepreneurial dynamics of selected human settlements, it is necessary to focus on outcomes. Therefore, entrepreneurship is here defined in terms of three outcomes: (i) how many enterprises are in operation in a specific human settlement (i.e., total entrepreneurship, which is the manifestation of successful entrepreneurship), (ii) how many different enterprise types are present in the settlement (the ability to conceive business opportunities linked to enterprise types not yet present, i.e., new entrepreneurship), and (iii) existing entrepreneurship (the difference between total and new entrepreneurship, a measure of the repetition of business ideas that are already in operation).

How does entrepreneurship relate to SST? The enterprise numbers (measures of total entrepreneurship) of MSAs and U.S. counties have a linear or almost linear per capita relationship [9,33] and in this way appear to follow the basic SST tenet of being per capita based [34]. However, the number of enterprises in U.S. counties is not only a function of their population numbers, but also of the prosperity/poverty levels of their communities, i.e., their buying power [33] (which is more fully explained later). Total entrepreneurship in these counties is, therefore, only partially dependent on population numbers. In addition, new entrepreneurship and existing entrepreneurship are strongly and non-linearly related to total entrepreneurship [35]. Their per capita links are, therefore, indirect. This contribution takes this difference into account by focusing on two entrepreneurially-based relationships: that between total entrepreneurship and new entrepreneurship, and that between total entrepreneurship and existing entrepreneurship. These links have not been explored before. It is now necessary to review knowledge about each of the entrepreneurship types mentioned before.

Total Entrepreneurship (Which Is Estimated from the Total Number of Enterprises in a Human Settlement)

Linear per capita indicators are often used to characterize and rank cities [34]. This approach was initially used in this analysis but discarded when non-linear proportionalities were revealed (see later). Proportionalities between the population numbers and total entrepreneurship of human settlements are a seemingly common characteristic of human settlements [6,9,12]. For instance, analyses by Youn et al. of a large number of U.S. MSAs [9] revealed a linear relationship. Statistically significant linear relationships between the population sizes and total enterprises have also been reported for South African towns [6] and Alabama counties [12]. In these cases, the proportionalities were detected over ranges of small to large towns or counties.

These observations generated a number of questions: Why are there proportionalities between population and enterprise numbers when large numbers of human settlements (e.g., thousands of U.S. counties) that range widely in size and geographic location are investigated? What are the implications of these proportionalities? Three issues seem to be important. Firstly, there cannot be a lack of entrepreneurs in any settlement because its population size is involved in the determination of its enterprise numbers and not some entrepreneurial measure. In other words, population size contributes to the determination of the 'entrepreneurial space' of settlements. Entrepreneurial space determines how many enterprises can survive and exist in a settlement [10,11,33]. Secondly, the population numbers and total enterprise numbers of human settlements have been linked in a measure of community prosperity/poverty, termed the enterprise dependency index (EDI) [33]. This index expresses the financial ability of a settlement to sustain enterprises. It is expressed in terms of persons per enterprise. Higher indices indicate poorer communities, and vice versa. The number of enterprises in any human settlement, therefore, depends on both its population size as well as the buying power (financial ability) of its population to sustain enterprises. Stated differently, the population number and the prosperity/poverty status of a human community determine the extent of its entrepreneurial space. Thirdly, a full understanding of the resistance to change of total enterprises versus population proportionality should benefit from an examination of their behavior under stress conditions. Such conditions occurred in the U.S. economy in the 2000 to 2010 period. The U.S. economy grew from 1990 to 2007, a phenomenon that would stress the proportionality in one direction. Thereafter, the financial crisis and ensuing recession (starting in 2007 and lasting to 2010) injured the US economy [36], a situation that would stress the proportionalities in a different direction. A comparison of the proportionalities of the same human settlements at three different time intervals, i.e., 2000 (during growth phase), 2007 (end of growth phase), and 2010 (end of the recession), would test the resistance to change of the proportionality between population size and total entrepreneurship.

New Entrepreneurship

New entrepreneurship is a measure of business diversity. However, is business diversity important? Diversity is a defining property of complex adaptive systems, whether it be ecosystems, social systems, or economies [37]. The success and resilience of cities, together with their role in innovation and wealth creation, are driven by their ever-expanding diversity [9]. The internal heterogeneity and diversity of cities contribute to their success [38]. If business diversity is important in cities, is this also the case in regions (such as counties) or countries?

The relationship between regional economic diversity and growth and stability has been debated for many decades [39,40]. Some regional scientists have historically promoted policies of economic diversification to achieve economic goals [41]. Regions are also subject to a never-ending process of creative destruction—the process that Schumpeter identified in 1939 as the driving force behind economic development [26]. In the long run, regions depend on their ability to create and attract new industries to offset the decline in and destruction of other parts of their economies.

Making new products or offering new services involves significant challenges [42]. The mix of products that countries are able to make is reflected in their business diversities [43]. The diversity of products and services, therefore, stems from enterprise diversity, which is dependent on new entrepreneurship. The latter is, therefore, an important element in the success of regions and countries.

The number of enterprise types in an economy represents the number of times entrepreneurs in a specific location have successfully started enterprises of types that were not present before. This number, therefore, represents a measure of business diversity and, thus, of new entrepreneurship. A surprisingly simple non-linear proportionality between total entrepreneurship and new entrepreneurship has been detected in South African towns [10,35] and some U.S. counties [11].

In natural ecology, there was confusion in the use of diversity terminologies to describe ecosystems [44]. It was suggested that the term, species richness, should be used as a reference to the number of species in a given area or in a given sample and the term, species diversity, should be used as an expression or index of some relationship between the number of species and number of individuals in a natural ecosystem. Based on a similar logic, the term, enterprise richness, was adopted to reflect the number of enterprise types in human settlements [10,11,35]. In this contribution, the term, new entrepreneurship, is based on the enterprise richness (i.e., number of different enterprise types) of human settlements. It reflects the number of instances where an entrepreneur or group of entrepreneurs successfully founded new business types that have not been present before in a settlement. It must be contrasted with existing entrepreneurship, which is necessary to start more enterprises of types that are already present in a human settlement, e.g., the second or third restaurant, and so on.

The exponent of the power law relationship between the total entrepreneurship and new entrepreneurship of human settlements is typically in the order of 0.65. This indicates that for every doubling (100% increase) of total entrepreneurship, new entrepreneurship increases by only approximately 60%. Figure 1 illustrates the use of a hypothetical power law equation to show the importance of new and existing entrepreneurship as functions of the total entrepreneurship of a human settlement. At a total entrepreneurship of 180, the needs for new entrepreneurs and existing entrepreneurs are identical. Below this number new entrepreneurs are increasingly more important. Above this number existing entrepreneurs increasingly dominate. Therefore, the entrepreneurial challenges of small and large human settlements differ significantly. It is important to note that the growth of total entrepreneurship in human settlements always involves both new and existing entrepreneurship, albeit in different proportions. This situation is generally true for towns in South Africa, U.S. counties, and U.S. micropolitan statistical areas—and might apply elsewhere too.

Total entrepreneurship can be divided in more than one way. It can be divided into new and existing entrepreneurship and it can also be divided into entrepreneurship in tradable sectors and entrepreneurship in non-tradable sectors [41]. There is some commonality between new entrepreneurship and entrepreneurship in the tradable sector of human settlements. Both sectors are related in a non-linear way with total entrepreneurship. However, the former scales strongly sub-linearly with total entrepreneurship [11] and the latter slightly sub-linearly [45]. New entrepreneurship and entrepreneurship in the tradable sector are, therefore, not identical. In this contribution, the focus is on new entrepreneurship rather than on entrepreneurship in the tradable sector.

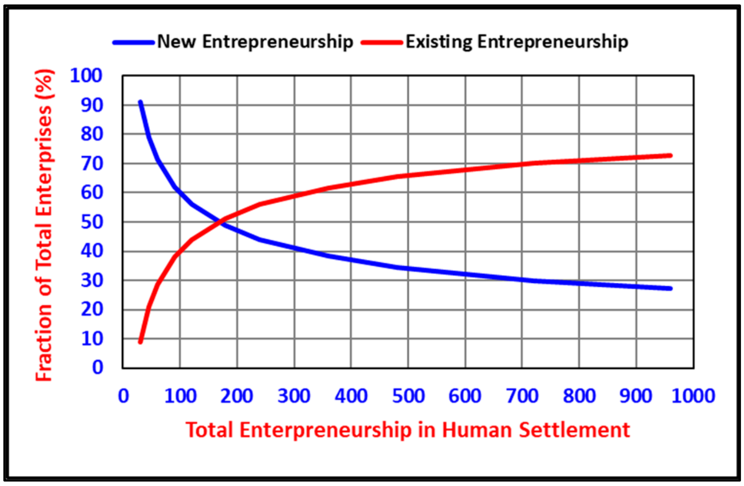

Figure 1. Levels of new and existing entrepreneurship as functions of the magnitude of the total entrepreneurship of a hypothetical human settlement. The hypothetical power law used is: New entrepreneurship = 0.3 (Total entrepreneurship)$^{0.65}$. Percentage share of existing entrepreneurship = 100 minus percentage share of new entrepreneurship.

How resistant to change is the total entrepreneurship and new entrepreneurship relationship? For instance, it might be geographically or temporally insensitive [35]. Data about the growth phase before and during the subsequent decline of the U.S. economy (before and during the recession of 2007) [36] provides an opportunity to stress test the resistance to change of the relationship. A comparison of the proportionality of the same human settlements at three different time intervals, i.e., 2000 (during an economic growth phase), 2007 (end of growth phase), and 2010 (after the recession), would test demographic and economic changes as constraints on the proportionality between total and new entrepreneurship.

Existing Entrepreneurship

There is a third entrepreneurial proportionality in human settlements, i.e., existing entrepreneurship [11]. It is simply the difference between the total entrepreneurship and new entrepreneurship of a human settlement, i.e., entrepreneurship focused on business types already present in a human settlement. Therefore, it represents 'more of the same' entrepreneurship. A statistically significant power law relationship between total entrepreneurship and existing entrepreneurship was registered in Texas counties [12] and South African towns [45]. The exponents of the power laws are super-linear, and existing entrepreneurship increases by approximately 150% upon every doubling of total entrepreneurship (100% increase). In addition, there is a logarithmic relationship between new entrepreneurship and existing entrepreneurship [11]. Existing entrepreneurship expands rapidly as the size of human settlements and their corresponding new entrepreneurship levels increase (Figure 1).

There is some commonality between existing entrepreneurship and entrepreneurship in the non-tradable sector of human settlements. However, these entrepreneurial types are not identical. In South African towns, existing entrepreneurship scales strongly super-linearly and entrepreneurship in the non-tradable sector scales slightly super-linearly with total entrepreneurship [45]. Existing entrepreneurship as well as entrepreneurship in the non-tradable sector are focused on local markets [45,46]. The vast majority of jobs in modern societies are in local services, which are served by people such as waiters, plumbers, nurses, teachers, real estate agents, hairdressers, etc. These people offer services that are produced and consumed locally [46]. Local economies are differentiated by the geographical ranges of the markets of their traded and non-traded industries [47]. In this contribution, the focus is on existing entrepreneurship rather than on entrepreneurship in the non-tradable sector.

1.2. Purpose of This Investigation

Entrepreneurship is a crucial mechanism in economic development [24]. The characteristics of cities enhance innovation and creativity [22,23]. Constraints imposed by environmental conditions, technology, and institutions impact the spatial and temporal levels of the social, economic, and political interactions of urban settlements [3,5]. Therefore, constraints that might impact entrepreneurship in human settlements should be investigated. The prime purpose of this contribution is to investigate the resistance to change of the three entrepreneurial proportionalities present in human settlements, namely those between: total entrepreneurship and population size; total entrepreneurship and new entrepreneurship; and total entrepreneurship and existing entrepreneurship. Such analyses have not been carried out before. The basic hypothesis is that these proportionalities are temporally and geographically robust. To test the hypothesis, the influence of economic changes on the properties of the proportionalities during periods of economic growth and decline is examined. In other words, it is examined if time, geographic location, or community prosperity/poverty levels influence the properties of the proportionalities. U.S. counties were selected as the human settlements in the study.

2. Materials and Methods

2.1. Analytic Strategy

This analysis involves the responses of the three proportionalities to economic changes. One proportionality has a per capita base (total entrepreneurship per population). The other two have an entrepreneurial base (new entrepreneurship per total entrepreneurship, and existing entrepreneurship per total entrepreneurship). The basic premise here is that changes in potential external controlling factors may influence the properties of the proportionalities. The use of appropriate information from U.S. counties from a period when the U.S economy was growing strongly, only to be followed by a significant recession, provides an opportunity to investigate the temporal robustness of the proportionalities. In addition, the use of the data of a large number of U.S. counties from different U.S. states also provides an opportunity to investigate the influence of geographic location on the properties of the proportionalities.

Three different years have been selected to quantify the status quo of the three proportionalities as well as the prosperity/poverty levels of all the counties, and, where possible, groups of counties from 29 different U.S. states. The chosen years are: 2000, during an economic growth phase of the U.S. economy; 2007, at the end of the end of the growth phase and at the onset of the recession; and 2010, after the recession.

An important part of this analysis is a focus on new entrepreneurship. The North American Industrial Classification System (NAICS) [48] is used for the classification of the enterprises of the counties. Given the limitations of this system when the enterprises of large human settlements are classified [9], 1785 small counties (Appendix A) with between 30 and 250 enterprise types were selected for this study (see more later). Precisely the same group of counties was used in the analyses of each of the three selected years.

2.2. Datasets Used

The County Business Patterns datasets of the U.S. Census Bureau [49] were used to obtain information on the numbers of enterprises (called establishments in the datasets) and enterprise types of the selected U.S. counties for 2000, 2007, and 2010. Population estimates were obtained from the Small Area Income and Poverty Estimates (SAIPE) program of the U.S. Census Bureau [50].

2.3. Selection of Counties

The number of enterprise types and total enterprises in the county dataset for 2000 were plotted (not presented here). With the larger number of enterprises, there was a distinct skewness of enterprise types against total enterprises in the counties. This indicated limitations in the NAICS classification system to classify all enterprise types of large human settlements [9]. Given that there is no apparent skewness in the range of 30 to 250 enterprise types, 1785 counties (Appendix A) within this range were selected for study.

2.4. Quantifying Enterprise Numbers, Enterprise Types and Population Numbers

Excel spreadsheets were used to list the numbers of enterprises, enterprise types, and populations of each of the 1785 selected counties. The totals of each of these characteristics for 2000, 2007, and 2010 were calculated.

2.5. Quantifying Entrepreneurship

2.5.1. Total Entrepreneurship

The total number of enterprises (establishments) of a county in the datasheet was taken as a measure of its total entrepreneurship.

2.5.2. New Entrepreneurship

The number of enterprise types in a county was represented by its number of different 6-digit classifications [49] in annual datasheets for 2000, 2007, and 2010. This served as a measure of its new entrepreneurship.

2.5.3. Existing Entrepreneurship

The existing entrepreneurship of a county was obtained by subtracting its new entrepreneurship from its total entrepreneurship.

2.6. Entrepreneurial Proportionalities

2.6.1. Population and Enterprise Relationships

The population to total entrepreneurship relationship for each of the three years (2000, 2007, and 2010) for the 1785 counties as well as for groups of counties within different U.S. states were calculated. Based on Ref. [7], log–log regression analyses (power laws) were used. Microsoft Excel software was used for these analyses.

The nature of the exponents—i.e., super-linear, linear, or sub-linear [2]—of the power laws enabled the determination of the type of relationship between population numbers and total entrepreneurship of all (1785) or groups of counties. The calculation of population per enterprise ratios for different population levels and different groups of counties followed. These ratios are used as measures of the prosperity/poverty states (called enterprise dependency indices, EDIs) [51] of all (1785) or groups of counties from 29 different states.

2.6.2. Total Entrepreneurship and New Entrepreneurship Ratios

Log–log regression (power law) analyses were used to determine the relationships between total entrepreneurship and new entrepreneurship of the groups of counties of 29 different states for 2000, 2007, and 2010.

2.6.3. Testing the Temporal and Geographic Robustness of the Proportionalities

Tests of the resistance to change of the different proportionalities involved either all 1785 counties or county groups from 29 states that have 20 or more representatives among the 1785 counties. The number 20 was chosen as the minimum number of counties to use in determinations of the relationships for geographic comparisons. Testing resistance to temporal change involved comparisons of proportionalities of all or groups of counties for the periods from 2000 to 2007 and 2007 to 2010. Testing resistance to geographic change involved comparisons of the proportionalities of the groups of counties from different U.S. states.

2.6.4. Total Entrepreneurship-Existing Entrepreneurship Relationships

Given a strong relationship between new entrepreneurship and total entrepreneurship, a strong relationship is expected between total entrepreneurship and existing entrepreneurship. Testing resistance to temporal or geographic change involved comparisons of proportionalities for all 1785 counties or groups of them for the periods from 2000 to 2007 and 2007 to 2010.

3. Results

Two unique features are used in this contribution. Firstly, precisely the same 1785 counties are followed through the period from 2000 to 2010. The trends are, therefore, not interpreted in terms of a mixed bag of counties but are based on the same entities throughout. Secondly, the 1785 counties included in the study do not represent all U.S. counties, but only those counties with new entrepreneurship values between 30 and 250 (see Section 2.3). These are, therefore, smaller counties. In addition, the counties reported under the title of a specific U.S. state do not represent all the counties of that state, but only those with new entrepreneurship values between 30 and 250 (i.e., smaller counties).

3.1. The Overall Relationship between Population and Enterprise Numbers of the 1785 Counties

Two techniques were used to examine the relationship between the population and total enterprise numbers of the selected group of counties. Firstly, the total populations and total entrepreneurship were quantified and compared for 2000, 2007, and 2010. Secondly, log–log (power law) regressions were used to quantify the relationships for the same years.

3.1.1. Total Population and Total Entrepreneurship

The total population and total entrepreneurship numbers of the 1785 counties are presented in Table 1 for the years 2000, 2007, and 2010. The relationships between population numbers and enterprise numbers, a measure of the prosperity/poverty of communities, are also reflected. The total populations of the counties increased throughout the 2000 to 2010 period. In the 2000 to 2007 period, total entrepreneurship increased relatively faster than the populations and overall community prosperity increased (EDI decreased). During the recession from 2007 to 2010, the populations still increased, but the total entrepreneurship decreased and the poverty of the counties increased (higher EDI values). The recession had a definite negative impact. These results justified a basic premise of the study, i.e., that periods of strong economic growth or decline would enable an assessment of the robustness (resistance to change) of the enterprise proportionalities of U.S. counties.

Table 1. Population numbers and total entrepreneurship levels of the 1785 counties for 2000, 2007, and 2010. The year 2000 represents a year during a growth phase of the economy in the United States. The year 2007 represents the end of the growth phase and the onset of a recession. The year 2010 represents the impact of the recession after three years.

	2000	**2007**	**2010**
Total population	27,897,900	28,136,519	28,741,293
Total entrepreneurship	587,832	623,719	580,301
Persons/enterprise *	47.5	45.1	49.5

* Persons/enterprise = Enterprise Dependency Index (EDI), a measure of community prosperity/poverty.

3.1.2. Power Law Analyses of Total Population Numbers and Total Entrepreneurship of the 1785 Counties

There was a statistically significant non-linear power law relationship with a sub-linear exponent between population numbers and total entrepreneurship of the 1785 counties in 2000 (Figure 2). Virtually identical relationships were also recorded for 2007 and 2010 (Table 2), indicating that the non-linear relationship between total entrepreneurship and population is very robust. Neither the economic growth period (2000 to 2007) nor the recession (2007 to 2010) had much of an impact on the properties of the power laws. The exponents and constants of the power laws remained virtually identical. Use of these power laws to predict total entrepreneurship values from different county population sizes for the three years showed that overall population numbers and entrepreneurship values increased during economic growth (2000 to 2007) and declined during the recession (2007 to 2010) (Table 3). The latter decline was more prominent in larger rather than smaller counties.

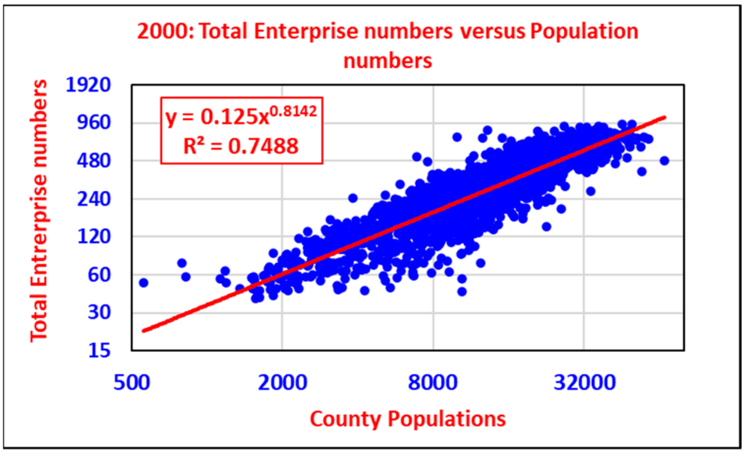

Figure 2. The power law relationship between county population numbers and total enterprise numbers in 2000.

Table 2. Power law relationships between the population numbers and total entrepreneurship of 1785 U.S. counties in 2000, 2007, and 2010.

	2000	**2007**	**2010**
Constant	0.125	0.1385	0.1417
Exponent	0.8142	0.8088	0.7973
Correlation coefficient	0.87	0.86	0.86
Variation explained (%)	74.9	74.2	74.0

Table 3. Use of the equations in Table 2 to predict total entrepreneurship as a function of county populations in 2000, 2007, and 2010. Ratio = increase in total entrepreneurship upon a doubling of population numbers. Enterprises = total entrepreneurship. EDI = persons/entrepreneurship value.

Population	**2000**			**2007**			**2010**		
	Enterprises	**Ratio**	**EDI**	**Enterprises**	**Ratio**	**EDI**	**Enterprises**	**Ratio**	**EDI**
2000	61		32.8	65		30.9	61		32.9
4000	107	1.76	37.4	113	1.75	35.3	106	1.74	37.9
8000	188	1.76	42.5	199	1.75	40.3	183	1.74	43.6
16,000	331	1.76	48.3	348	1.75	46.0	319	1.74	50.2
32,000	582	1.76	55.0	610	1.75	52.5	554	1.74	57.8
64,000	1024	1.76	62.5	1068	1.75	59.9	962	1.74	66.5
128,000	1800	1.76	71.1	1871	1.75	68.4	1672	1.74	76.5

The power laws (Table 2) also suggest that community prosperity (lower EDIs) is higher in smaller rather than larger members of the 1785 counties. Community poverty is higher (higher EDIs) in the larger members (Table 3). The range of EDIs as functions of county population size (Table 3) is much higher than the changes in EDIs induced by the growth or decline events. Although enterprise numbers are clearly associated with county population sizes (see Figure 2), the community prosperity/poverty values of counties are also significant determinants of the economic wellbeing of counties (see EDIs in Table 3). The following section considers the impacts of geographic location.

3.2. Trends in Population and Enterprise Numbers of County Groups from Different U.S. States

States with more than 20 counties in the group of 1785 counties were selected for further analyses. Twenty-nine U.S. states containing 1639 counties are represented (Table 4).

Table 4. The population and total entrepreneurship values in 2000, 2007, and 2010 of U.S. states with 20 or more counties among the selected group of 1785 counties. Growth phase = 2000 to 2007; The recession = 2007 to 2010; n = number of counties with new entrepreneurship values between 30 and 250. Data of the same counties was analyzed for 2000, 2007, and 2010.

	n	Populations			Total Entrepreneurship		
		2000	2007	2010	2000	2007	2010
Alabama	37	794,975	770,143	773,701	14,543	14,453	12,983
Arkansas	55	915,508	893,197	892,648	18,391	17,977	16,592
Colorado	38	331,370	333,567	337,612	10,863	12,480	11,337
Florida	27	575,064	627,825	665,241	9208	11,611	10,525
Georgia	105	1,704,942	1,805,938	1,864,160	30,083	34,941	30,963
Iowa	77	1,100,473	1,062,078	1,068,712	30,844	31,010	29,600
Idaho	31	351,130	369,886	389,418	8371	10,643	9370
Illinois	62	1,038,848	1,022,108	1,026,887	24,490	24,234	22,822
Indiana	45	933,019	920,261	932,631	19,144	19,715	18,148
Kansas	85	687,683	655,262	675,030	19,755	19,525	18,421
Kentucky	91	1,518,495	1,549,386	1,551,241	26,327	27,042	25,313
Louisiana	40	887,415	874,383	884,916	15,049	15,871	15,522
Michigan	31	517,007	507,531	499,295	13,489	13,029	11,716
Minnesota	53	778,896	768,750	778,939	21,334	22,450	21,265
Missouri	86	1,331,933	1,353,680	1,385,631	29,175	31,035	28,458
Mississippi	63	1,290,578	1,287,342	1,289,464	22,689	23,564	21,972
Montana	40	295,675	292,120	304,166	8744	9908	9450
North Carolina	42	932,588	973,460	1,024,279	17,867	20,050	17,997
North Dakota	42	243,909	224,765	233,281	7710	7741	7824
Nebraska	69	545,894	520,775	525,135	15,839	16,211	15,666
Ohio	26	733,596	735,348	746,391	13,199	13,170	11,914
Oklahoma	56	946,649	954,044	995,881	18,521	20,089	19,588
South Carolina	22	562,578	547,465	557,068	9496	9888	8914
South Dakota	53	336,748	337,248	351,960	9784	10,751	10,504
Tennessee	63	1,398,059	1,443,023	1,470,634	22,074	23,015	20,941
Texas	167	2,379,298	2,415,197	2,523,775	46,365	48,451	47,091
Virginia	58	997,832	1,045,569	1,055,067	20,757	23,560	21,106
Wisconsin	32	619,061	621,465	627,822	15,807	16,718	15,359
West Virginia	43	846,380	833,639	846,116	15,972	15,731	14,400

3.2.1. Total Population and Total Entrepreneurship Values of Counties within States

During the economic growth phase (2000 to 2007), the combined population and total entrepreneurship dynamics of the groups were complex (Table 4). The population and total entrepreneurship of groups in six states (Alabama, Arkansas, Illinois, Kansas, Michigan, and West Virginia) decreased. In nine states (Kentucky, Missouri, North Carolina, Oklahoma, South Dakota, Tennessee, Texas, Virginia, and Wisconsin), these parameters increased. In the rest of the groups (Iowa, Indiana, Louisiana, Minnesota, Montana, North Dakota, Nebraska, Ohio, and South Carolina), there was a mixture: either their population numbers increased whilst their total entrepreneurship decreased or vice versa. During the recession (2007 to 2010), the dynamics changed totally. In 26 of the 29 groups, populations increased whilst total entrepreneurship decreased. In Arkansas and Michigan, both parameters decreased, whilst in North Dakota they increased. These dynamics during the economic growth phase and the recession support the contention that their demographic and entrepreneurial dynamics offer opportunities to investigate the robustness of the demographic and entrepreneurial proportionalities of the selected counties.

3.2.2. Population and Total Entrepreneurship Relationships of the Groups from Different U.S. States

Power law analyses were used to determine the population versus total entrepreneurship relationships of the county groups in 2000, 2007, and 2010 (Table 5). The correlations are all statistically significant ($p < 0.001$, as deduced from the variances explained by the power laws and presented in Table 5). The exponents of the power laws (Table 6) reveal several important points. Firstly, there are large differences between the exponents of the power laws for the different county groups. Some groups have super-linear (larger than unity) exponents (Alabama, Arkansas, Georgia, Illinois, Indiana, Kentucky, Mississippi, South Carolina, and Tennessee), while others have linear or near linear exponents (Florida, Iowa, Louisiana, Ohio, and West Virginia), and the rest have sub-linear (less than unity) exponents (Colorado, Florida, Idaho, Kansas, Michigan, Minnesota, Missouri, Montana, Nebraska, North Carolina, North Dakota, Oklahoma, South Dakota, Texas, Virginia, and Wisconsin). The population–total entrepreneurship relationship of the groups, therefore, seems to be geographically sensitive. Secondly, the power law exponents of a county group from a specific state were not temporally sensitive. Neither a period of economic growth (2000 to 2007) nor a period of economic decline (2007 to 2010) affected them much (Table 6). Consequently, there seems to be a strong and enduring temporal robustness (resistance to change) in the population number–total entrepreneurship relationships. Thirdly, power laws deal with relationships between county populations and county enterprises. These are the two constituents of the EDI, a measure of the prosperity/poverty of communities. The impacts of the 2000 to 2010 period on community prosperity/poverty levels are considered in the next section.

Table 5. Percentage variance explained by log–log regressions (power laws) between population numbers and total entrepreneurship of the county groups of 29 U.S. states.

State	2000	2007	2010	State	2000	2007	2010
Alabama	82.1	84.1	84.1	Missouri	87.7	89.5	88.5
Arkansas	81.6	79.9	79.5	Montana	85.2	83.8	82.2
Colorado	72.1	65.5	66.3	Nebraska	88.9	88.5	88.1
Florida	81.6	92.0	89.9	North Carolina	71.0	71.5	74.7
Georgia	71.9	72.9	75.1	North Dakota	86.7	87.0	86.3
Iowa	79.3	74.6	73.4	Ohio	76.0	75.8	72.0
Idaho	66.9	66.8	74.5	Oklahoma	78.2	77.5	75.3
Illinois	91.6	91.4	91.8	South Carolina	87.1	84.3	87.2
Indiana	82.8	84.5	84.7	South Dakota	83.9	89.9	91.7
Kansas	88.9	88.2	88.2	Tennessee	87.2	88.3	88.6
Kentucky	81.3	82.9	84.3	Texas	80.8	82.7	83.2
Louisiana	80.8	86.1	85.3	Virginia	82.3	78.5	78.6
Michigan	74.2	74.2	73.9	Wisconsin	72.9	66.1	67.4
Minnesota	89.7	91.5	90.2	West Virginia	84.1	85.5	84.3
Mississippi	87.1	86.9	88.5				

Table 6. Power law exponents of the regressions between the population numbers and total entrepreneurship of groups of counties in 29 U.S. states.

State	2000	2007	2010	State	2000	2007	2010
Alabama	1.2857	1.2892	1.2624	Missouri	0.9573	0.9563	0.9309
Arkansas	1.1971	1.1823	1.1628	Montana	0.9060	0.8980	0.8917
Colorado	0.8542	0.8815	0.8490	Nebraska	0.9320	0.9294	0.9467
Florida	0.9102	1.0039	1.0091	North Carolina	0.8610	0.8790	0.8733
Georgia	1.0621	1.1026	1.1123	North Dakota	0.8781	0.8980	0.8565
Iowa	0.9995	0.9885	0.9760	Ohio	1.0587	1.0373	1.0475

Table 6. *Cont.*

State	2000	2007	2010	State	2000	2007	2010
Idaho	0.8625	0.8595	0.8668	Oklahoma	0.8294	0.8630	0.8797
Illinois	1.1337	1.1420	1.1451	South Carolina	1.1123	1.1511	1.1644
Indiana	1.1633	1.1508	1.1511	South Dakota	0.9193	0.9005	0.8787
Kansas	0.8453	0.8134	0.7858	Tennessee	1.1090	1.0822	1.0897
Kentucky	1.1644	1.1657	1.1712	Texas	0.8285	0.8364	0.8558
Louisiana	0.9730	0.9548	0.9424	Virginia	0.9190	0.9197	0.9461
Michigan	0.8659	0.8749	0.8677	Wisconsin	0.8959	0.8428	0.7959
Minnesota	0.8546	0.8640	0.8265	West Virginia	1.0264	0.9966	1.0237
Mississippi	1.1804	1.2082	1.1677				

3.2.3. Community Prosperity/Poverty of All or Groups of Counties

The enterprise dependency index (EDI), which is a measure of community prosperity/poverty, is the relationship between the number of people and total entrepreneurship in a human settlement. Power laws (Tables 5 and 6) relate population size and total entrepreneurship to one another and can be used to determine how prosperity/poverty levels change in response to changes in the population sizes of the counties. Three examples are used to illustrate these analyses (Table 7). The exponents of the power laws of Alabama were greater than 1.25 in all three years (Table 6). Alabama serves as an example of the EDI dynamics of counties with super-linear exponents during the economic growth and recession phases. The exponents of the power laws of Iowa were close in unity in all three years (Table 6). Iowa serves as an example of the EDI dynamics of groupings with linear exponents. The exponents of the power laws of Oklahoma were sub-linear and approximately 0.85 in all three years. Oklahoma serves as an example of the EDI dynamics of groupings with sub-linear exponents.

Table 7. Examples of the 2000, 2007, and 2010 dynamics of the enterprise dependency indices of county groupings with power laws with super-linear, linear, or sub-linear exponents.

Example	Population	2000		2007		2010	
		Enterprises	EDI	Enterprises	EDI	Enterprises	EDI
Alabama (super-linear)	8000	104	76.7	108	74.3	101	78.8
	16,000	254	62.9	263	60.8	243	65.7
	32,000	620	51.6	643	49.8	584	54.8
	64,000	1511	42.4	1571	40.7	1401	45.7
Iowa (linear)	8000	222	36.0	232	34.4	222	36.0
	16,000	444	36.0	461	34.7	438	36.6
	32,000	888	36.0	915	35.0	861	37.2
	64,000	1776	36.0	1815	35.3	1693	37.8
Oklahoma (sub-linear)	8000	178	44.9	186	43.0	171	46.7
	16,000	317	50.5	338	47.3	315	50.8
	32,000	563	56.8	615	52.0	580	55.2
	64,000	1001	63.9	1119	57.2	1067	60.0

Three broad issues emerge from Table 7. Firstly, the variation in EDIs of the county groups from Alabama (super-linear power law exponent) and Oklahoma (sub-linear power law exponent) is larger across population levels than across years. Population levels appear to have a greater association with community prosperity/poverty dynamics than phases of economic growth or decline. Secondly, in all of the examples, and at every population level, EDIs decreased somewhat during the growth phase (2000 to 2007), i.e., all communities became more prosperous. During the recession, however, all communities became poorer (their EDIs increased). Thirdly, in human settlements with power laws with super-linear exponents, poverty levels are predicted to decrease from small to large settlements. Communities in smaller settlements are predicted to be poorer (have higher EDIs) than communities in larger settlements. In human settlements with power laws with sub-linear exponents, poverty (EDI) should increase from large to small settlements. In this group, communities in smaller settlements are more prosperous (have lower EDIs) than larger communities. In human settlements with power laws with linear exponents, EDIs are similar across all population levels. In this group, communities in smaller settlements are equally prosperous or poor compared to communities in larger communities.

3.3. Relationships between New Entrepreneurship and Total Entrepreneurship of All or Selected Groups of Counties

3.3.1. Relationships between Total Entrepreneurship and New Entrepreneurship of the 1785 Counties

In 2000, there was a statistically significant ($p < 0.001$) non-linear power law relationship with a sub-linear exponent between total entrepreneurship and new entrepreneurship of the 1785 counties (Figure 3). Virtually identical relationships were also recorded for 2007 and 2010 (Table 8). The relationships were temporally robust.

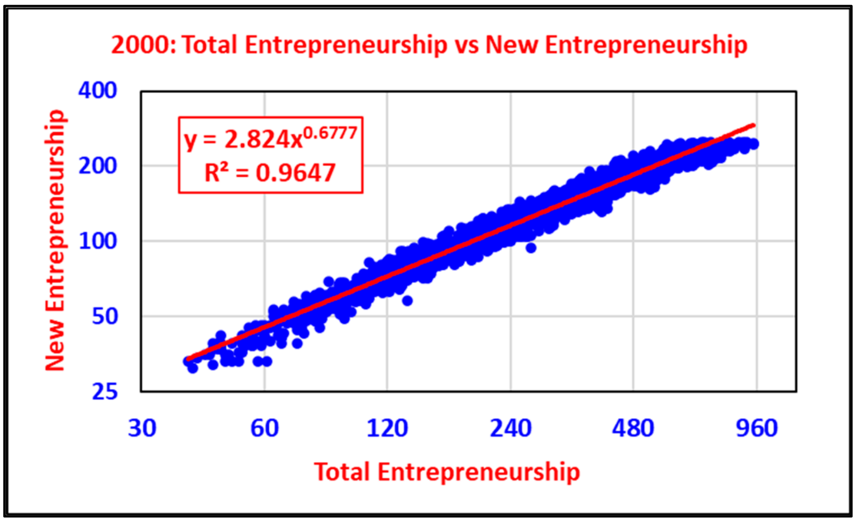

Figure 3. The power law relationship between total entrepreneurship and new entrepreneurship in 1785 U.S. counties in 2000.

Table 8. Power law relationships between the total entrepreneurship and new entrepreneurship of 1785 U.S. counties in 2000, 2007, and 2010.

	2000	**2007**	**2010**
Constant	2.824	2.791	2.687
Exponent	0.6777	0.6799	0.687
Correlation coefficient	0.98	0.98	0.98
Variation explained (%)	96.5	96.7	96.7

Graphs similar to Figure 1 enabled the calculation of total enterprise numbers, where new entrepreneurship equals total entrepreneurship in the counties in the different years. These results were virtually the same: 215 total enterprises in 2000, 215 in 2007, and 211 in 2010. All of these results indicate that the non-linear relationship between total entrepreneurship and new entrepreneurship of the 1785 counties is temporally robust. Neither the economic growth period (2000 to 2007) nor the recession (2007 to 2010) had any significant impact. If this is true for all of the selected counties, is it also true for counties in different geographic locations?

3.3.2. Total and New Entrepreneurship of County Groups of Different U.S. States

Power law analyses were used to determine the relationships between new entrepreneurship and total entrepreneurship of the different county groups (described in Table 5) in 2000, 2007, and 2010. To test the temporal and geographic impacts on the power law parameters, some characteristics of these power laws are compared in Table 9. The temporal impacts of the economic growth period (2000 to 2007) and the recession (2007 to 2010) were very limited in all cases. For instance, the maximum difference between two years of the exponents of a county group of a specific state was 0.053 (Idaho group in 2000 versus 2007). The differences of the power law exponents between county groups of different states were more pronounced. For instance, in 2000 the difference between the power law exponents of Ohio and Montana was 0.127, which was more than double that of the temporal difference. Nevertheless, even the impact of different geographic locations on the new entrepreneurship–total entrepreneurship relationship appears to be limited. These relationships were robust overall.

Table 9. Power law characteristics in 2000, 2007, and 2010 of the new entrepreneurship–total entrepreneurship relationships of county groups of different U.S. states.

States	Power Law Exponents			Where New = Total Entrepreneurship *			Doubling Percentage **		
	2000	2007	2010	2000	2007	2010	2000	2007	2010
Alabama	0.6287	0.6320	0.6541	209	210	196	55	55	57
Arkansas	0.6718	0.7124	0.7290	226	222	214	59	64	64
Colorado	0.7034	0.6628	0.6672	203	202	202	63	58	59
Florida	0.6851	0.6475	0.6630	239	244	241	61	57	58
Georgia	0.6888	0.6725	0.7022	238	229	225	61	60	63
Iowa	0.6406	0.6375	0.6362	221	233	228	56	56	55
Idaho	0.6943	0.6409	0.6678	235	238	243	62	56	59
Illinois	0.6403	0.6687	0.6729	218	210	202	56	59	59
Indiana	0.6620	0.6512	0.6610	240	258	254	58	57	58
Kansas	0.6928	0.7089	0.7085	233	232	230	62	63	63
Kentucky	0.6818	0.6935	0.6996	218	223	213	60	62	62
Louisiana	0.6345	0.6427	0.6522	218	221	204	55	56	57
Michigan	0.7029	0.6938	0.7080	183	210	203	63	62	63
Minnesota	0.6420	0.6495	0.6503	226	232	227	56	57	57
Mississippi	0.6859	0.6933	0.6967	200	193	184	61	62	62
Missouri	0.6852	0.6773	0.6749	229	230	230	61	60	60
Montana	0.7312	0.7015	0.7101	250	250	236	66	63	64
Nebraska	0.7091	0.7196	0.7078	202	212	201	63	65	63
North Carolina	0.6644	0.6402	0.6544	208	222	220	58	56	57
North Dakota	0.7009	0.6970	0.6764	206	210	204	63	62	60
Ohio	0.6044	0.6083	0.6222	252	262	209	52	52	54
Oklahoma	0.6511	0.6634	0.6565	218	208	199	57	58	58
South Carolina	0.6049	0.6448	0.6239	240	222	234	52	56	54
South Dakota	0.7122	0.7205	0.7043	232	219	226	64	65	63
Tennessee	0.6715	0.6760	0.6920	232	224	218	59	60	62
Texas	0.6883	0.7000	0.7084	217	213	201	61	62	63
Virginia	0.6599	0.6474	0.6570	204	212	217	58	57	58
Wisconsin	0.6158	0.6232	0.6439	232	228	222	53	54	56
West Virginia	0.6368	0.6576	0.6675	202	189	187	55	58	59

* Enterprise number where total entrepreneurship equals new entrepreneurship. ** Percentage increase of new entrepreneurship when total entrepreneurship doubles.

3.4. The Relationship between Existing Entrepreneurship and Total Entrepreneurship of U.S. Counties

3.4.1. Relationships between Total Entrepreneurship and Existing Entrepreneurship in 1785 U.S. Counties

In 2000, there was a statistically significant ($p < 0.001$) power law relationship with a super-linear exponent between the total entrepreneurship and existing entrepreneurship of the 1785 counties (Figure 4). Virtually identical relationships were also recorded for 2007 and 2010 (Table 10). Neither economic growth during 2000 to 2007 nor economic decline during the recession (2007 to 2010) had any significant impact on this relationship; it is temporally robust.

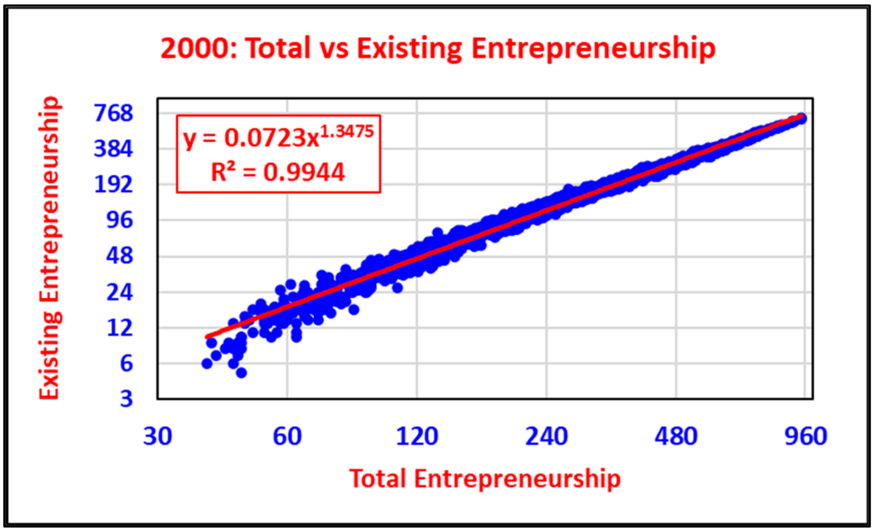

Figure 4. The power law relationship between total entrepreneurship and existing entrepreneurship of 1785 U.S. counties in 2000.

Table 10. Power law relationships between total entrepreneurship and existing entrepreneurship of 1785 U.S. counties in 2000, 2007, and 2010.

	2000	2007	2010
Constant	0.0723	0.0769	0.0762
Exponent	1.3475	1.3358	1.339
Correlation coefficient	0.99	0.99	0.99
Variation explained (%)	99.4	99.5	99.4

3.4.2. Total and Existing Entrepreneurship of County Groups from Different U.S. States

Power law analyses were used to determine the relationships between the existing entrepreneurship and total entrepreneurship of the different county groups (described in Table 5) in 2000, 2007, and 2010. To test the temporal and geographic impacts on the power laws, some characteristics of these power laws are compared in Table 11. Although the relationships for the group of counties of a specific state are very similar in 2000, 2007, and 2010, there are some small differences between states, suggesting a slight influence of geographic location. However, these differences are small, and the relationships appear to be quite robust (resistant to change).

Table 11. Power law characteristics in 2000, 2007, and 2010 for the existing entrepreneurship–total entrepreneurship relationships of county groups in different U.S. states.

Groups	Power Law Constants			Power Law Exponents		
	2000	2007	2010	2000	2007	2010
Alabama	0.0980	0.0911	0.0969	1.3001	1.3119	1.3040
Arkansas	0.0925	0.1021	0.1186	1.3055	1.2875	1.2631
Colorado	0.0732	0.0560	0.0543	1.3444	1.3858	1.3936
Florida	0.0928	0.0845	0.0798	1.3012	1.3147	1.3251
Georgia	0.0565	0.0645	0.0720	1.3877	1.3641	1.3471
Iowa	0.1023	0.0940	0.0914	1.2910	1.3029	1.3088
Idaho	0.0569	0.0531	0.0519	1.3890	1.3967	1.4015
Illinois	0.0737	0.1008	0.0970	1.3442	1.2917	1.2998
Indiana	0.0704	0.0753	0.0789	1.3472	1.3331	1.3264
Kansas	0.0545	0.0641	0.0650	1.3980	1.3688	1.3677
Kentucky	0.0817	0.0850	0.0866	1.3280	1.3192	1.3182
Louisiana	0.0853	0.0952	0.1049	1.3216	1.3017	1.2881
Michigan	0.1579	0.1231	0.1218	1.2210	1.2581	1.2610
Minnesota	0.1002	0.0914	0.0936	1.2928	1.3059	1.3035
Mississippi	0.1054	0.1205	0.1262	1.2868	1.2643	1.2583
Missouri	0.0900	0.0932	0.0781	1.3085	1.3014	1.3326
Montana	0.0652	0.0528	0.0592	1.3626	1.3976	1.3821
Nebraska	0.0816	0.0763	0.0731	1.3329	1.3417	1.3524
North Carolina	0.1059	0.1024	0.0927	1.2844	1.2881	1.3047
North Dakota	0.0692	0.0615	0.0473	1.3620	1.3832	1.4331
Ohio	0.0935	0.0866	0.0792	1.3016	1.3119	1.3277
Oklahoma	0.0747	0.0924	0.0820	1.3420	1.3060	1.3285
South Carolina	0.0828	0.1030	0.0671	1.3241	1.2886	1.3592
South Dakota	0.0433	0.0691	0.0564	1.4414	1.3556	1.3900
Tennessee	0.0643	0.0699	0.0770	1.3635	1.3505	1.3357
Texas	0.0567	0.0629	0.0702	1.3903	1.3716	1.3552
Virginia	0.0836	0.0825	0.0747	1.3269	1.3264	1.3426
Wisconsin	0.0930	0.1211	0.1190	1.3050	1.2622	1.2651
West Virginia	0.0848	0.1061	0.1027	1.3250	1.2891	1.2948

4. Discussion

Global urbanization is a significant challenge to mankind [1]. Its successful handling over the long-term requires knowledge of the behavior of highly complex systems [3] such as the demographic–socioeconomic–entrepreneurial domain of human settlements [2]. Scaling studies have contributed a lot of information in studies of human settlements [3] and were also useful in this study.

Entrepreneurship remains a topic that attracts research attention. Recent studies focused on the business models of a subset of "blue" entrepreneurs focused on marine plastic pollution mitigation [52] and on investigating how innovation promotes digital start-up performance in China [53]. The business model innovation architecture was disassembled into three elements, value proposition, value creation, and value capture, to assess their roles [53]. A psychoanalytic approach was used to investigate the entrepreneurial process of how individuals form ideas for new venture creation [54]. A study of the role of the entrepreneurial orientation of Kenyan famers as reflected in their innovativeness, proactiveness, and risk-taking was also undertaken [55]. These studies focused on the attitudes of individuals (i.e., entrepreneurs) [54,55] or aspects of the business models they use [52,53]. In contrast, this contribution has focused on the physical manifestation of entrepreneurship, i.e., enterprises linked to different entrepreneurial types.

It was kept in mind that entrepreneurship is an elusive concept, but that it can be measured in terms of outputs [27]. Therefore, the number and types of enterprises present in U.S. counties were quantified. The related entrepreneurship entities are total entrepreneurship (the maximum number of enterprises that can be carried in a county), new entrepreneurship (the number of different enterprise types in a county economy), and existing entrepreneurship (the difference between total and new entrepreneurship). This was a useful strategy.

Many questions have been raised about the reasons for and implications of entrepreneurially-linked proportionalities in human settlements [10,11,33,35]. For instance, what is the reason that such proportionalities are present in human settlements when their populations extend over many orders of magnitude and when they are geographically widely spread? Why is there such a strong relationship between total enterprise numbers (total entrepreneurship) and the number of enterprise types? The latter relationship might be linked to the idea that entrepreneurial spaces control the total number of enterprises that can be 'carried' in specific human settlements [11].

Increased financial instability in many countries led to the stress testing of financial systems to quantify their vulnerabilities [56]. This contribution tested a hypothesis that the entrepreneurially-linked proportionalities of U.S. counties are temporally and geographically robust. The techniques used here to quantify the entrepreneurially-linked proportionalities during periods of economic growth and decline and for different geographic locations basically constituted stress testing of the proportionalities under vastly different economic and geographic conditions. This was a useful strategy, and the following was recorded.

The presence of orderliness in the demographic–socioeconomic–entrepreneurial domain of human settlements [1–10] was reconfirmed. This study focused on smaller U.S. counties in order to include sensible measurements of new entrepreneurship in the analysis. The 1785 selected counties (Appendix A) housed about 28 million people (Table 1), a sizeable portion of the U.S. population. County population numbers increased throughout the study period (2000 to 2010), but total enterprise numbers (total entrepreneurship) did not. Total enterprise numbers increased during the economic growth period but declined during the recession (Table 1). Overall, the period of economic growth (2000 to 2007) led to an increase in community prosperity and the recession (2007 to 2010) led to a decrease (Table 1).

Close to linear relationships between population and enterprise numbers were reported for U.S. metropolitan statistical areas [9] and Texas counties [12]. In this study, however, total enterprise numbers (total entrepreneurship) in the selected 1785 U.S. counties, representing smaller counties, were sub-linearly related (power law exponents about 0.8) to their population numbers in the 2000 to 2010 period (Table 2). These sub-linear relationships might reflect an inherent characteristic of smaller counties, i.e., smaller counties have proportionately more enterprises in relation to their population sizes than larger counties. In other words, counties with smaller populations tend to have more prosperous communities than counties with larger populations (Table 3). The relationships between county population and enterprise numbers are temporally robust.

An examination of the dynamics of population and total enterprise numbers of groups of counties from different states reflected a much more complex situation (Table 4). During the economic growth period (2000 to 2007), the populations and total enterprises of some states increased in step. In others, they decreased in step, and in some there were mixed dynamics. In contrast, during the recession (2007 to 2010), populations kept on increasing in virtually all of the county groups while enterprise numbers decreased. In general, communities could not carry as many enterprises during the recession (communities became poorer) and their entrepreneurial spaces decreased.

The power law relationships between the population numbers and total entrepreneurship of counties from different states revealed several important issues. Firstly, all of the power law relationships are statistically significant ($p = 0.01$) (Table 5). In general, counties with larger populations have proportionally more total entrepreneurship. This is in step with previous research results [7,11,12,33,51]. Secondly, the power law exponents of the counties from a specific state tended to be temporally stable (Table 6). Conditions of economic growth or decline did not influence the exponents of the total entrepreneurship–total population relationships of individual county groups much, which is a finding reported here for the first time. Thirdly, there are distinct differences between the power law exponents of different county groups. Some are super-linear, some are linear, and some are sub-linear (Table 6). These differences are probably linked to the prosperity/poverty statuses of the county groups (Table 7), but this is an issue that deserves further investigation [31].

Innovation and entrepreneurship are undeniably interrelated [24,57]. To assess the potential for innovation and entrepreneurship of European Union countries and regions, Ref. [24] used extensive databases and a complex multivariate analysis entailing clustering, and Ref. [57] used a complex matrix system. In contrast, this study quantified different entrepreneurial types with simple power law regression analyses. The power law relationships between total entrepreneurship and new entrepreneurship of the 1785 counties during the 2000 to 2010 period have sub-linear exponents (Table 8). These relationships were temporally stable during the economic growth and decline periods. For the county groups of the different states, the relationships were also temporally and geographically stable (Table 9). Economic or geographic stress factors, therefore, did not alter the proportional relationships between total entrepreneurship and new or existing entrepreneurship. Total entrepreneurship is only partially per capita dependent and new and existing entrepreneurship even less so. The per capita links of the different forms of entrepreneurship deserve to be studied further.

The similarity of the power law exponents of the total entrepreneurship–new entrepreneurship relationships in human settlements is remarkable. In South African towns, the exponents range from 0.67 to 0.71 [35,45]. In a group of small U.S. counties, the range is from 0.68 to 0.70 [11]). In Texas counties, it is 0.68 [12]), and in Alabama counties it is 0.61 [58]. In this study, the range is 0.60 to 0.73 (Tables 8 and 9). Despite the fact that two different enterprise classification systems were used in South Africa and the U.S., the magnitude of the exponents are very similar, and they appear to be temporally and geographically robust. This suggests that the total entrepreneurship–new entrepreneurship relationship might be universally applicable.

The relationship between total entrepreneurship and existing entrepreneurship is finally considered. The exponents of the power laws describing this relationship for the 1785 counties are super-linear and range from 1.34 to 1.35 (Table 10), which is almost identical to an exponent of 1.35 that had been recorded for Texas counties [12]. The relationship is undoubtedly temporally stable during economic growth and decline phases (Table 10). Power laws also describe the same relationships of county groups of the different U.S. states (Table 11). Their exponents vary between 1.26 and 1.39, which are very similar to that recorded for the 1785 counties (Table 10). The relationship between total entrepreneurship and existing entrepreneurship is also geographically stable (Table 11).

What does the non-linear and strong association of new entrepreneurship and existing entrepreneurship with total entrepreneurship signify? New entrepreneurship is a measure of the capacity of some members of a community to identify and successfully start enterprises of types not yet present. Given that the function of entrepreneurs is to exploit inventions or untried technological possibilities to produce new commodities or produce old ones in new ways [21,22], new entrepreneurship is a crucial measure of the innovative capacity of communities. Two aspects of this contribution are especially important: (1) The creative use of the power laws recorded in Table 9 provide the means to estimate the total enterprise numbers at which new and existing county entrepreneurship equaled one another in the 2000 to 2010 period. Furthermore, there was surprising robustness with 215 total enterprises in 2000, 215 in 2007, and 211 in 2010. Counties with fewer than approximately 215 enterprises are more dependent on new entrepreneurship than counties with more than 215 enterprises. This illustrates that smaller human settlements have a significant challenge, i.e., to raise, find, or attract creative persons (new entrepreneurs) who can identify and successfully start businesses of types that are not present in the settlement (see more on this topic later). (2) New entrepreneurship remains important in all counties, even in very large ones where new entrepreneurship usually constitutes some

10 to 20 percent of total entrepreneurship (Figure 1). Economic development strategies do not generally focus on this aspect.

Total entrepreneurship and new entrepreneurship are also closely related (Figure 3) There is also some spread of data points around the line-of-best-fit in Figure 3. For instance, at a new entrepreneurship level of 100, county total entrepreneurship varied from 167 to 240. New entrepreneurship is, therefore, not solely impacted by total entrepreneurship. One or more other factors also play a role. These factors must still be identified. The relationship between total entrepreneurship and existing entrepreneurship similarly exhibits some variation around the line-of-best-fit (Figure 4). This is especially true for smaller counties. For instance, at an existing entrepreneurship level of 21 to 23, total entrepreneurship varied from 59 to 81, which is a large spread. Existing entrepreneurship is, therefore, also not solely impacted by total entrepreneurship. One or more additional factors play a role, and these must still be identified.

In this regard, the traded and non-traded economic sectors are of interest. The vast majority of jobs in local economies are in the non-tradable sector [46,47]. The enterprises of this sector offer services that are produced and consumed locally. The same market is served by existing entrepreneurship. However, entrepreneurship in the tradable economic sector, which is the main driver of prosperity in U.S. communities [46,47], is not identical to new entrepreneurship [51]. It follows that existing entrepreneurship, which also serves local economies, cannot be identical to entrepreneurship in the non-tradable sector. There is a logarithmic relationship between new and existing entrepreneurship and in U.S. counties [11]. When local economies expand, existing entrepreneurship increases much more rapidly than new entrepreneurship (Figure 1). New entrepreneurship is, consequently, proportionally more important in smaller counties and existing entrepreneurship is more important in larger counties. This resonates with the view that the non-tradable sector is responsible for the vast majority of jobs in local economies [46,47]. Deeper insight gained here demonstrates the dynamics of existing entrepreneurship and add to the quantitative understanding of how different elements of entrepreneurship act as drivers of events in human settlements. This process should be continued.

The hypothesis tested in this study is that the entrepreneurially-linked proportionalities of human settlements are not temporally or geographically sensitive. The results indicate that this is true for the relationships of new and existing entrepreneurship, but not for those of total entrepreneurship. The latter relationships might be influenced by different levels of prosperity/poverty in human communities, and this has raised the need to think about the concept of entrepreneurial space [11], which is defined as a combination of the population size of a human settlement and the population's ability to buy goods.

The temporal robustness of all three proportionalities as well as the geographic robustness of new and existing entrepreneurship (determined by analyzing data of a large number of U.S. counties) inevitably led to a conclusion that there could not have been shortages of entrepreneurs in the large number of counties studied here. If there were shortages, there should have been much more patchiness in the enterprise numbers of the counties and such strong and statistically significant power law regressions would not have been observed.

Empirical data are often important in urbanization studies because it is impossible to perform experiments with human settlements. This was also the case in this contribution. Krugman [59] remarked about an agglomeration phenomenon of people in cities (Zipf's law) that a striking empirical regularity was detected with no good theory to account for it. The entrepreneurial regularities observed here also suffer from the same malady. There is still a lack of a theory to account for them. However, a fuller understanding of the concept of entrepreneurial spaces could be helpful.

Finally, there is an enigma to consider. The existence of the extensive entrepreneurial proportionalities observed here indicates temporal and geographic entrepreneurial constancy (stasis) in the economic systems of the counties studied here. How does one reconcile such stasis with Schumpeter's process of creative destruction [25,26]? Schumpeter referred to ongoing change in the form of 'industrial mutation' that incessantly destroys the old economic system and creates a new one [25]. Yet, proportionalities that equate with stasis have been observed. An examination of the enigma of stasis and change in the entrepreneurial domain of human settlements should receive research attention.

5. Conclusions

This study was dependent on the use of empirical data. Large publicly available datasets about U.S. counties enabled a strategy to use information from different years in order to obtain comparable data.

The division of total entrepreneurship into new entrepreneurship and existing entrepreneurship yielded useful information. This is an unusual practice in entrepreneurship research.

The presence of orderliness in the demographic–socioeconomic–entrepreneurial domain of U.S. counties was reconfirmed in a number of different ways and indicated that: (1) In the 2000 to 2010 period, the total entrepreneurship of a large number of U.S. counties or groups of counties from different U.S. states was sub-linearly related to their population numbers, (2) the new entrepreneurship of these counties or groups of counties from different U.S. states was sub-linearly related to their total entrepreneurship, and (3) the existing entrepreneurship of the counties or groups of counties from different U.S. states was super-linearly related to their total entrepreneurship.

Stress testing of the entrepreneurially-linked proportionalities of U.S. counties during a period of economic growth (2000 to 2007) followed by a recession (2007 to 2010) proved to be a useful technique. Principally, it indicated that: (1) The relationships of new entrepreneurship and existing entrepreneurship with the total entrepreneurship of all counties or groups of counties are temporally and geographically robust. Neither economic growth nor economic decline influenced the properties of the relationships. (2) The properties of the relationship between population numbers and total enterprise numbers are temporally robust but not geographically robust. The detected robustness should be taken into account in economic development planning.

Differences in community prosperity/poverty levels apparently caused the lack of geographic robustness. Entrepreneurial space (the total number of enterprises that can be 'carried' in a specific human settlement) is apparently determined by how many people are present in a community and their financial ability to procure goods or services from enterprises. This issue deserves further elucidation.

The temporal robustness of all three proportionalities as well as the geographic robustness of new and existing entrepreneurship provide little evidence of patchiness in the entrepreneurial orderliness of the counties. This indicates there was no lack of entrepreneurs in the counties because all entrepreneurial spaces were occupied.

The presence of extensive entrepreneurial proportionalities in the counties indicates temporal and geographic entrepreneurial stasis in their economic systems. Reconciliation of the idea of stasis with the Schumpeterian idea of creative destruction in economies [26] is a significant challenge that should be resolved.

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Appendix A

Table A1. The counties used in this study.

County	State	County	State	County	State	County	State
Abbeville	SC	Audrain	MO	Blaine	OK	Burke	ND
Accomack	VA	Audubon	IA	Blanco	TX	Burleson	TX
Adair	MO	Aurora	SD	Bland	VA	Burnett	WI
Adair	OK	Austin	TX	Bleckley	GA	Burt	NE
Adair	IA	Avery	NC	Bledsoe	TN	Butler	AL
Adair	KY	Avoyelles	LA	Boise	ID	Butler	NE
Adams	ID	Bacon	GA	Bolivar	MS	Butler	IA
Adams	ND	Bailey	TX	Bollinger	MO	Butler	KY
Adams	OH	Baker	FL	Bon Homme	SD	Butte	ID
Adams	WA	Baker	OR	Bond	IL	Butte	SD
Adams	WI	Ballard	KY	Boone	NE	Butts	GA
Adams	IA	Bamberg	SC	Boone	WV	Caddo	OK
Aitkin	MN	Bandera	TX	Boone	IA	Caldwell	LA
Alcona	MI	Banks	GA	Bosque	TX	Caldwell	MO
Aleutians West	AK	Baraga	MI	Botetourt	VA	Caldwell	TX
Alexander	IL	Barber	KS	Bottineau	ND	Caldwell	KY
Alexander	NC	Barbour	AL	Boundary	ID	Calhoun	AR
Alfalfa	OK	Barbour	WV	Bourbon	KS	Calhoun	FL
Alger	MI	Barnes	ND	Bourbon	KY	Calhoun	GA
Allamakee	IA	Barnwell	SC	Bowman	ND	Calhoun	IL
Alleghany	NC	Barton	MO	Box Butte	NE	Calhoun	MS
Allen	LA	Bates	MO	Box Elder	UT	Calhoun	SC
Allen	KS	Bath	VA	Boyd	NE	Calhoun	TX
Allen	KY	Bath	KY	Bracken	KY	Calhoun	WV
Allendale	SC	Bayfield	WI	Bradford	FL	Calhoun	IA
Alpine	CA	Baylor	TX	Bradley	AR	Callahan	TX
Amelia	VA	Beadle	SD	Brantley	GA	Callaway	MO
Amherst	VA	Bear Lake	ID	Braxton	WV	Calloway	KY
Amite	MS	Beauregard	LA	Breathitt	KY	Calumet	WI
Anderson	KS	Beaver	OK	Breckinridge	KY	Camden	GA
Anderson	KY	Beaver	UT	Bremer	IA	Camden	NC
Andrew	MO	Beaverhead	MT	Brewster	TX	Cameron	LA
Andrews	TX	Beckham	OK	Briscoe	TX	Cameron	PA
Anson	NC	Bee	TX	Bristol Bay	AK	Camp	TX
Antelope	NE	Bell	KY	Broadwater	MT	Campbell	SD
Antrim	MI	Ben Hill	GA	Brooke	WV	Campbell	TN
Apache	AZ	Benewah	ID	Brooks	GA	Candler	GA
Appanoose	IA	Bennett	SD	Brooks	TX	Cannon	TN
Appling	GA	Benson	ND	Brown	IL	Carbon	MT
Appomattox	VA	Benton	MS	Brown	MN	Carbon	UT
Aransas	TX	Benton	MO	Brown	NE	Carbon	WY
Archer	TX	Benton	TN	Brown	OH	Caribou	ID
Arenac	MI	Benton	IN	Brown	IN	Carlisle	KY
Arkansas	AR	Benton	IA	Brown	KS	Carlton	MN
Ashe	NC	Benzie	MI	Brule	SD	Caroline	MD
Ashland	WI	Berrien	GA	Brunswick	VA	Caroline	VA
Ashley	AR	Bertie	NC	Bryan	GA	Carroll	AR
Asotin	WA	Bethel	AK	Bryan	OK	Carroll	MS
Assumption	LA	Bibb	AL	Buchanan	VA	Carroll	MO
Atascosa	TX	Bienville	LA	Buchanan	IA	Carroll	OH
Atchison	MO	Big Horn	MT	Buckingham	VA	Carroll	TN
Atchison	KS	Big Stone	MN	Buena Vista	IA	Carroll	IL
Atkinson	GA	Blackford	IN	Buffalo	WI	Carroll	IN
Atoka	OK	Bladen	NC	Bullock	AL	Carroll	IA

Table A1. *Cont.*

County	State	County	State	County	State	County	State
Attala	MS	Blaine	MT	Burke	GA	Carroll	KY
Carson	TX	Chouteau	MT	Colfax	NE	Curry	OR
Carter	MO	Chowan	NC	Colfax	NM	Custer	CO
Carter	TN	Christian	IL	Colleton	SC	Custer	ID
Carter	KY	Churchill	NV	Collingsworth	TX	Custer	MT
Casey	KY	Cibola	NM	Colorado	TX	Custer	NE
Cass	MN	Cimarron	OK	Columbia	AR	Custer	OK
Cass	NE	Claiborne	LA	Columbia	WA	Custer	SD
Cass	TX	Claiborne	MS	Colusa	CA	Dade	GA
Cass	IL	Claiborne	TN	Comanche	TX	Dade	MO
Cass	IA	Clare	MI	Comanche	KS	Dakota	NE
Cassia	ID	Clarendon	SC	Concho	TX	Dallam	TX
Castro	TX	Clark	AR	Concordia	LA	Dallas	AR
Caswell	NC	Clark	MO	Conecuh	AL	Dallas	MO
Catahoula	LA	Clark	SD	Conejos	CO	Daniels	MT
Catron	NM	Clark	WI	Converse	WY	Davie	NC
Cavalier	ND	Clark	IL	Conway	AR	Daviess	MO
Cedar	MO	Clark	KS	Cook	GA	Daviess	IN
Cedar	NE	Clarke	AL	Cook	MN	Davis	IA
Cedar	IA	Clarke	MS	Cooper	MO	Dawes	NE
Chaffee	CO	Clarke	VA	Coosa	AL	Dawson	GA
Chambers	AL	Clarke	IA	Copiah	MS	Dawson	MT
Chambers	TX	Clay	AL	Corson	SD	Dawson	NE
Chariton	MO	Clay	AR	Coryell	TX	Dawson	TX
Charles City	VA	Clay	GA	Costilla	CO	Day	SD
Charles Mix	SD	Clay	MS	Cottle	TX	De Soto	LA
Charlotte	VA	Clay	NE	Cotton	OK	De Witt	IL
Charlton	GA	Clay	NC	Cottonwood	MN	Deaf Smith	TX
Chase	NE	Clay	SD	Covington	AL	DeBaca	NM
Chase	KS	Clay	TN	Covington	MS	Decatur	GA
Chattahoochee	GA	Clay	TX	Craig	OK	Decatur	TN
Chattooga	GA	Clay	WV	Craig	VA	Decatur	IN
Chautauqua	KS	Clay	IL	Crane	TX	Decatur	IA
Cheatham	TN	Clay	IN	Crawford	GA	Decatur	KS
Cheboygan	MI	Clay	KS	Crawford	MI	Deer Lodge	MT
Cherokee	AL	Clay	KY	Crawford	MO	DeKalb	MO
Cherokee	NC	Clayton	IA	Crawford	WI	DeKalb	TN
Cherokee	OK	Clear Creek	CO	Crawford	IL	Del Norte	CA
Cherokee	IA	Clearwater	ID	Crawford	IN	Delaware	OK
Cherokee	KS	Clearwater	MN	Crawford	IA	Delaware	IA
Cherry	NE	Cleburne	AL	Crenshaw	AL	Delta	TX
Chester	SC	Cleburne	AR	Crisp	GA	Denali	AK
Chester	TN	Cleveland	AR	Crittenden	KY	Dent	MO
Chesterfield	SC	Clinch	GA	Crockett	TN	Desha	AR
Cheyenne	CO	Clinton	MO	Crockett	TX	DeSoto	FL
Cheyenne	NE	Clinton	IL	Crook	OR	Deuel	NE
Cheyenne	KS	Clinton	IN	Crook	WY	Deuel	SD
Chickasaw	MS	Clinton	KY	Crosby	TX	Dewey	OK
Chickasaw	IA	Cloud	KS	Cross	AR	Dewey	SD
Chicot	AR	Coahoma	MS	Crowley	CO	DeWitt	TX
Childress	TX	Coal	OK	Culberson	TX	Dickens	TX
Chilton	AL	Cochran	TX	Cumberland	VA	Dickenson	VA
Chippewa	MN	Cocke	TN	Cumberland	IL	Dickey	ND
Choctaw	AL	Coffey	KS	Cumberland	KY	Dickinson	IA
Choctaw	MS	Coke	TX	Cuming	NE	Dickinson	KS
Choctaw	OK	Coleman	TX	Currituck	NC	Dillingham	AK
Dillon	SC	Fallon	MT	Fulton	IL	Grant	AR
Dimmit	TX	Falls	TX	Fulton	IN	Grant	LA

Table A1. *Cont.*

County	State	County	State	County	State	County	State
Divide	ND	Fannin	GA	Fulton	KY	Grant	MN
Dixie	FL	Fannin	TX	Furnas	NE	Grant	NM
Dixon	NE	Faribault	MN	Gadsden	FL	Grant	ND
Doddridge	WV	Faulk	SD	Gage	NE	Grant	OK
Dodge	GA	Fayette	AL	Gaines	TX	Grant	OR
Dodge	MN	Fayette	OH	Gallatin	IL	Grant	SD
Dolores	CO	Fayette	TN	Gallatin	KY	Grant	WV
Doniphan	KS	Fayette	TX	Gallia	OH	Grant	KS
Donley	TX	Fayette	WV	Garden	NE	Grant	KY
Dooly	GA	Fayette	IL	Garfield	NE	Graves	KY
Dorchester	MD	Fayette	IN	Garfield	UT	Gray	TX
Douglas	MO	Fayette	IA	Garfield	WA	Gray	KS
Douglas	SD	Fentress	TN	Garrard	KY	Grayson	VA
Douglas	WA	Fergus	MT	Garvin	OK	Grayson	KY
Douglas	IL	Ferry	WA	Garza	TX	Greeley	NE
Drew	AR	Fillmore	MN	Gasconade	MO	Greeley	KS
Duchesne	UT	Fillmore	NE	Gates	NC	Green	KY
Dundy	NE	Fisher	TX	Geary	KS	Green Lake	WI
Dunklin	MO	Fleming	KY	Gem	ID	Greene	AL
Dunn	ND	Florence	WI	Geneva	AL	Greene	GA
Duplin	NC	Floyd	TX	Gentry	MO	Greene	MS
Duval	TX	Floyd	VA	George	MS	Greene	NC
Early	GA	Floyd	IA	Gibson	IN	Greene	PA
East Carroll	LA	Fluvanna	VA	Gilchrist	FL	Greene	VA
East Feliciana	LA	Foard	TX	Giles	TN	Greene	IL
Eastland	TX	Ford	IL	Giles	VA	Greene	IN
Eddy	ND	Forest	PA	Gilliam	OR	Greene	IA
Edgar	IL	Forest	WI	Gilmer	GA	Greenlee	AZ
Edgefield	SC	Foster	ND	Gilmer	WV	Greenup	KY
Edmonson	KY	Fountain	IN	Gilpin	CO	Greenwood	KS
Edmunds	SD	Franklin	AL	Glacier	MT	Greer	OK
Edwards	IL	Franklin	AR	Glades	FL	Gregory	SD
Edwards	KS	Franklin	FL	Gladwin	MI	Grenada	MS
Effingham	GA	Franklin	GA	Glenn	CA	Griggs	ND
Elbert	CO	Franklin	ID	Gloucester	VA	Grimes	TX
Elbert	GA	Franklin	LA	Gogebic	MI	Grundy	MO
Elk	KS	Franklin	ME	Golden Valley	ND	Grundy	TN
Elliott	KY	Franklin	MS	Goliad	TX	Grundy	IA
Ellis	OK	Franklin	NE	Gonzales	TX	Guadalupe	NM
Ellsworth	KS	Franklin	NC	Goochland	VA	Gulf	FL
Elmore	ID	Franklin	TN	Gooding	ID	Gunnison	CO
Emanuel	GA	Franklin	TX	Goshen	WY	Guthrie	IA
Emery	UT	Franklin	IL	Gosper	NE	Haakon	SD
Emmet	IA	Franklin	IN	Gove	KS	Haines	AK
Emmons	ND	Franklin	IA	Grady	GA	Hale	AL
Essex	VT	Franklin	KS	Graham	AZ	Halifax	VA
Essex	VA	Freestone	TX	Graham	NC	Hall	TX
Estill	KY	Fremont	ID	Graham	KS	Hamilton	FL
Eureka	NV	Fremont	IA	Grainger	TN	Hamilton	NE
Evangeline	LA	Frio	TX	Grand	CO	Hamilton	NY
Evans	GA	Frontier	NE	Grand	UT	Hamilton	TX
Fairfield	SC	Fulton	AR	Grand Isle	VT	Hamilton	IL
Fall River	SD	Fulton	PA	Granite	MT	Hamilton	IA
Hamilton	KS	Hertford	NC	Isle of Wight	VA	Johnson	TN
Hamlin	SD	Hettinger	ND	Itawamba	MS	Johnson	WY
Hampshire	WV	Hickman	TN	Izard	AR	Johnson	IL
Hampton	SC	Hickman	KY	Jack	TX	Johnson	KY

Table A1. *Cont.*

County	State	County	State	County	State	County	State
Hancock	GA	Hickory	MO	Jackson	AR	Johnston	OK
Hancock	MS	Hidalgo	NM	Jackson	CO	Jones	GA
Hancock	TN	Highland	OH	Jackson	FL	Jones	NC
Hancock	WV	Highland	VA	Jackson	LA	Jones	SD
Hancock	IL	Hill	MT	Jackson	MN	Jones	TX
Hancock	IA	Hill	TX	Jackson	NC	Jones	IA
Hancock	KY	Hinsdale	CO	Jackson	OH	Juab	UT
Hand	SD	Hitchcock	NE	Jackson	OK	Judith Basin	MT
Hansford	TX	Hocking	OH	Jackson	SD	Juneau	WI
Hanson	SD	Hockley	TX	Jackson	TN	Juniata	PA
Haralson	GA	Hodgeman	KS	Jackson	TX	Kalkaska	MI
Hardee	FL	Hoke	NC	Jackson	WV	Kanabec	MN
Hardeman	TN	Holmes	FL	Jackson	WI	Kane	UT
Hardeman	TX	Holmes	MS	Jackson	IA	Karnes	TX
Hardin	OH	Holt	MO	Jackson	KS	Kearney	NE
Hardin	TN	Holt	NE	Jackson	KY	Kearny	KS
Hardin	TX	Hopkins	TX	Jasper	GA	Keith	NE
Hardin	IL	Hot Spring	AR	Jasper	MS	Kemper	MS
Hardin	IA	Hot Springs	WY	Jasper	SC	Kent	MD
Hardy	WV	Houston	MN	Jasper	TX	Keokuk	IA
Harlan	NE	Houston	TN	Jasper	IL	Ketchikan Gateway	AK
Harlan	KY	Houston	TX	Jasper	IN	Kewaunee	WI
Harmon	OK	Howard	AR	Jasper	IA	Keweenaw	MI
Harney	OR	Howard	MO	Jay	IN	Kidder	ND
Harper	OK	Howard	NE	Jeff Davis	GA	Kimball	NE
Harper	KS	Howard	TX	Jeff Davis	TX	Kimble	TX
Harris	GA	Howard	IA	Jefferson	FL	King and Queen	VA
Harrison	MO	Hubbard	MN	Jefferson	GA	King George	VA
Harrison	OH	Huerfano	CO	Jefferson	ID	King William	VA
Harrison	IN	Hughes	OK	Jefferson	MS	Kingfisher	OK
Harrison	IA	Hughes	SD	Jefferson	MT	Kingman	KS
Harrison	KY	Humboldt	NV	Jefferson	NE	Kingsbury	SD
Hart	GA	Humboldt	IA	Jefferson	OK	Kiowa	CO
Hart	KY	Humphreys	MS	Jefferson	OR	Kiowa	OK
Hartley	TX	Humphreys	TN	Jefferson	TN	Kiowa	KS
Haskell	OK	Hutchinson	SD	Jefferson	WV	Kit Carson	CO
Haskell	TX	Hutchinson	TX	Jefferson	KS	Kittson	MN
Haskell	KS	Hyde	NC	Jefferson Davis	LA	Kleberg	TX
Hawkins	TN	Hyde	SD	Jefferson Davis	MS	Klickitat	WA
Haywood	TN	Iberville	LA	Jenkins	GA	Knott	KY
Heard	GA	Ida	IA	Jennings	IN	Knox	MO
Hemphill	TX	Idaho	ID	Jerauld	SD	Knox	NE
Hempstead	AR	Inyo	CA	Jerome	ID	Knox	TX
Henderson	TN	Iosco	MI	Jersey	IL	Knox	KY
Henderson	IL	Iowa	WI	Jewell	KS	Kodiak Island	AK
Hendry	FL	Iowa	IA	Jim Hogg	TX	Koochiching	MN
Henry	AL	Iron	MI	Jim Wells	TX	Kossuth	IA
Henry	MO	Iron	MO	Jo Daviess	IL	La Paz	AZ
Henry	OH	Iron	WI	Johnson	AR	La Salle	LA
Henry	IA	Iroquois	IL	Johnson	GA	La Salle	TX
Henry	KY	Irwin	GA	Johnson	NE	Labette	KS
Lac qui Parle	MN	Lewis	WV	Lyon	IA	Massac	IL
Lafayette	AR	Lewis	KY	Lyon	KY	Mathews	VA
Lafayette	FL	Liberty	FL	Mackinac	MI	Maverick	TX
Lafayette	MO	Liberty	GA	Macon	AL	McClain	OK
Lafayette	WI	Liberty	MT	Macon	GA	McCone	MT

Table A1. *Cont.*

County	State	County	State	County	State	County	State
Lake	CO	Limestone	TX	Macon	MO	McCook	SD
Lake	MI	Lincoln	AR	Macon	TN	McCormick	SC
Lake	MN	Lincoln	CO	Madison	AR	McCreary	KY
Lake	MT	Lincoln	GA	Madison	FL	McCulloch	TX
Lake	OR	Lincoln	ID	Madison	GA	McCurtain	OK
Lake	SD	Lincoln	MN	Madison	ID	McDonald	MO
Lake	TN	Lincoln	MS	Madison	LA	McDonough	IL
Lake of the Woods	MN	Lincoln	MO	Madison	MO	McDowell	WV
Lamar	AL	Lincoln	MT	Madison	MT	McDuffie	GA
Lamar	GA	Lincoln	NV	Madison	NC	McHenry	ND
Lamar	MS	Lincoln	NM	Madison	OH	McIntosh	GA
Lamb	TX	Lincoln	OK	Madison	TX	McIntosh	ND
La Moure	ND	Lincoln	SD	Madison	VA	McIntosh	OK
Lampasas	TX	Lincoln	TN	Madison	IA	McKenzie	ND
Lancaster	VA	Lincoln	WA	Magoffin	KY	McLean	ND
Lander	NV	Lincoln	WV	Mahaska	IA	McLean	KY
Lane	KS	Lincoln	WI	Mahnomen	MN	McNairy	TN
Langlade	WI	Lincoln	WY	Major	OK	McPherson	SD
Lanier	GA	Lincoln	KS	Manistee	MI	Meade	SD
Larue	KY	Lincoln	KY	Marengo	AL	Meade	KS
Las Animas	CO	Linn	MO	Maries	MO	Meade	KY
Lassen	CA	Linn	KS	Marion	AL	Meagher	MT
Latimer	OK	Lipscomb	TX	Marion	AR	Mecklenburg	VA
Lauderdale	TN	Little River	AR	Marion	GA	Medina	TX
Lavaca	TX	Live Oak	TX	Marion	MS	Meeker	MN
Lawrence	AL	Livingston	MO	Marion	SC	Meigs	OH
Lawrence	AR	Livingston	KY	Marion	TN	Meigs	TN
Lawrence	MS	Llano	TX	Marion	TX	Menard	TX
Lawrence	MO	Logan	AR	Marion	KS	Menard	IL
Lawrence	TN	Logan	CO	Marion	KY	Menifee	KY
Lawrence	IL	Logan	ND	Mariposa	CA	Menominee	MI
Lawrence	KY	Logan	OK	Marlboro	SC	Mercer	MO
Le Flore	OK	Logan	WV	Marquette	WI	Mercer	ND
Leake	MS	Logan	IL	Marshall	MN	Mercer	IL
Lee	AR	Logan	KS	Marshall	MS	Mercer	KY
Lee	GA	Logan	KY	Marshall	OK	Meriwether	GA
Lee	SC	Long	GA	Marshall	SD	Merrick	NE
Lee	TX	Los Alamos	NM	Marshall	TN	Metcalfe	KY
Lee	VA	Louisa	VA	Marshall	WV	Miami	KS
Lee	KY	Louisa	IA	Marshall	IL	Middlesex	VA
Leelanau	MI	Love	OK	Marshall	KS	Milam	TX
Lemhi	ID	Lowndes	AL	Marshall	KY	Millard	UT
Leon	TX	Lucas	IA	Martin	NC	Mille Lacs	MN
Leslie	KY	Luce	MI	Martin	TX	Miller	AR
Letcher	KY	Lumpkin	GA	Martin	IN	Miller	GA
Levy	FL	Luna	NM	Martin	KY	Miller	MO
Lewis	ID	Lunenburg	VA	Mason	TX	Mills	TX
Lewis	MO	Lyman	SD	Mason	WV	Mills	IA
Lewis	NY	Lynn	TX	Mason	IL	Miner	SD
Lewis	TN	Lyon	NV	Mason	KY	Mineral	CO
Mineral	MT	Morrison	MN	Oceana	MI	Pearl River	MS
Mineral	NV	Morrow	OH	Ochiltree	TX	Pecos	TX
Mineral	WV	Morrow	OR	Oconee	GA	Pembina	ND
Mingo	WV	Morton	ND	Oconto	WI	Pemiscot	MO
Minidoka	ID	Morton	KS	Ogemaw	MI	Pend Oreille	WA
Missaukee	MI	Motley	TX	Oglethorpe	GA	Pender	NC
Mississippi	MO	Moultrie	IL	Ohio	IN	Pendleton	WV

Table A1. *Cont.*

County	State	County	State	County	State	County	State
Mitchell	GA	Mountrail	ND	Ohio	KY	Pendleton	KY
Mitchell	NC	Mower	MN	Okeechobee	FL	Pennington	MN
Mitchell	TX	Muhlenberg	KY	Okfuskee	OK	Pepin	WI
Mitchell	IA	Murray	GA	Okmulgee	OK	Perkins	NE
Mitchell	KS	Murray	MN	Oktibbeha	MS	Perkins	SD
Modoc	CA	Murray	OK	Oldham	TX	Perquimans	NC
Moffat	CO	Musselshell	MT	Oneida	ID	Perry	AL
Moniteau	MO	Nance	NE	Ontonagon	MI	Perry	AR
Mono	CA	Nantucket	MA	Orange	VT	Perry	MS
Monona	IA	Natchitoches	LA	Orange	VA	Perry	MO
Monroe	AL	Nelson	ND	Orange	IN	Perry	OH
Monroe	AR	Nelson	VA	Oregon	MO	Perry	PA
Monroe	GA	Nemaha	NE	Orleans	NY	Perry	TN
Monroe	MS	Nemaha	KS	Osage	MO	Perry	IL
Monroe	MO	Neosho	KS	Osage	OK	Perry	IN
Monroe	OH	Neshoba	MS	Osage	KS	Perry	KY
Monroe	TN	Ness	KS	Osborne	KS	Pershing	NV
Monroe	WV	Nevada	AR	Osceola	MI	Person	NC
Monroe	IL	New Kent	VA	Osceola	IA	Phelps	NE
Monroe	IA	New Madrid	MO	Oscoda	MI	Phillips	AR
Monroe	KY	Newberry	SC	Otero	CO	Phillips	CO
Montague	TX	Newton	AR	Otoe	NE	Phillips	MT
Montgomery	AR	Newton	MS	Ottawa	KS	Phillips	KS
Montgomery	GA	Newton	TX	Ouachita	AR	Piatt	IL
Montgomery	MS	Newton	IN	Ouray	CO	Pickaway	OH
Montgomery	MO	Nicholas	WV	Overton	TN	Pickens	AL
Montgomery	NC	Nicholas	KY	Owen	IN	Pickens	GA
Montgomery	IL	Nicollet	MN	Owen	KY	Pickett	TN
Montgomery	IA	Niobrara	WY	Owyhee	ID	Pierce	GA
Montgomery	KY	Noble	OH	Ozark	MO	Pierce	NE
Montmorency	MI	Noble	OK	Pacific	WA	Pierce	ND
Montour	PA	Nobles	MN	Page	VA	Pike	AL
Moody	SD	Nodaway	MO	Page	IA	Pike	AR
Moore	TN	Nolan	TX	Palo Alto	IA	Pike	GA
Moore	TX	Nome	AK	Palo Pinto	TX	Pike	MO
Mora	NM	Norman	MN	Pamlico	NC	Pike	OH
Morehouse	LA	North Slope	AK	Panola	MS	Pike	PA
Morgan	CO	Northampton	NC	Panola	TX	Pike	IL
Morgan	GA	Northampton	VA	Park	CO	Pike	IN
Morgan	MO	Northumberland	VA	Parke	IN	Pine	MN
Morgan	OH	Northwest Arctic	AK	Parmer	TX	Pipestone	MN
Morgan	TN	Norton	KS	Patrick	VA	Piscataquis	ME
Morgan	UT	Nottoway	VA	Paulding	OH	Plaquemines	LA
Morgan	WV	Nowata	OK	Pawnee	NE	Platte	WY
Morgan	KY	Noxubee	MS	Pawnee	OK	Pleasants	WV
Morrill	NE	Nuckolls	NE	Pawnee	KS	Plumas	CA
Morris	TX	Nye	NV	Payette	ID	Plymouth	IA
Morris	KS	O'Brien	IA	Peach	GA	Pocahontas	WV
Pocahontas	IA	Randolph	WV	Rush	KS	Seward	KS
Poinsett	AR	Randolph	IL	Rusk	TX	Shackelford	TX
Pointe Coupee	LA	Randolph	IN	Rusk	WI	Shannon	MO
Polk	AR	Ransom	ND	Russell	VA	Sharkey	MS
Polk	GA	Rappahannock	VA	Russell	KS	Sharp	AR
Polk	MO	Rawlins	KS	Russell	KY	Shelby	MO
Polk	NE	Ray	MO	Sabine	LA	Shelby	TX
Polk	NC	Reagan	TX	Sabine	TX	Shelby	IL
Polk	TN	Real	TX	Sac	IA	Shelby	IA
Polk	TX	Red Lake	MN	Saguache	CO	Sheridan	MT

Table A1. *Cont.*

County	State	County	State	County	State	County	State
Pondera	MT	Red River	LA	Saline	MO	Sheridan	NE
Pontotoc	MS	Red River	TX	Saline	NE	Sheridan	ND
Pope	MN	Red Willow	NE	Saline	IL	Sheridan	KS
Pope	IL	Redwood	MN	Saluda	SC	Sherman	NE
Posey	IN	Reeves	TX	San Augustine	TX	Sherman	TX
Pottawatomie	KS	Refugio	TX	San Jacinto	TX	Sherman	KS
Potter	PA	Renville	MN	San Juan	CO	Shoshone	ID
Potter	SD	Renville	ND	San Juan	UT	Sibley	MN
Powder River	MT	Republic	KS	San Miguel	CO	Sierra	CA
Powell	MT	Reynolds	MO	San Miguel	NM	Sierra	NM
Powell	KY	Rhea	TN	San Saba	TX	Simpson	MS
Power	ID	Rice	KS	Sanborn	SD	Simpson	KY
Poweshiek	IA	Rich	UT	Sanders	MT	Sitka	AK
Powhatan	VA	Richardson	NE	Sanpete	UT	Skamania	WA
Prairie	AR	Richland	LA	Sargent	ND	Smith	MS
Pratt	KS	Richland	MT	Saunders	NE	Smith	TN
Preble	OH	Richland	ND	Sawyer	WI	Smith	KS
Prentiss	MS	Richland	WI	Schleicher	TX	Smyth	VA
Presidio	TX	Richland	IL	Schley	GA	Socorro	NM
Presque Isle	MI	Richmond	VA	Schoharie	NY	Somerset	MD
Preston	WV	Ringgold	IA	Schoolcraft	MI	Somervell	TX
Price	WI	Rio Arriba	NM	Schuyler	MO	Spencer	IN
Prince Edward	VA	Rio Blanco	CO	Schuyler	NY	Spencer	KY
Prowers	CO	Rio Grande	CO	Schuyler	IL	Spink	SD
Pulaski	GA	Ripley	MO	Scotland	MO	St. Clair	MO
Pulaski	MO	Ripley	IN	Scott	AR	St. Francis	AR
Pulaski	VA	Ritchie	WV	Scott	MS	St. Helena	LA
Pulaski	IL	Roane	TN	Scott	TN	St. James	LA
Pulaski	IN	Roane	WV	Scott	VA	St. John the Baptist	LA
Pushmataha	OK	Roberts	SD	Scott	IL	St. Martin	LA
Putnam	GA	Robertson	TX	Scott	IN	Stafford	KS
Putnam	MO	Rock	MN	Scott	KS	Stanley	SD
Putnam	OH	Rock	NE	Scott	KY	Stanton	NE
Putnam	IL	Rockcastle	KY	Screven	GA	Stanton	KS
Putnam	IN	Roger Mills	OK	Scurry	TX	Stark	IL
Quay	NM	Rolette	ND	Searcy	AR	Starke	IN
Quitman	MS	Rooks	KS	Sedgwick	CO	Starr	TX
Rabun	GA	Roosevelt	MT	Seminole	GA	Ste. Genevieve	MO
Rains	TX	Roosevelt	NM	Seminole	OK	Steele	ND
Ralls	MO	Roscommon	MI	Seneca	NY	Stephens	GA
Ramsey	ND	Roseau	MN	Sequatchie	TN	Stephens	TX
Randolph	AL	Rosebud	MT	Sequoyah	OK	Stevens	MN
Randolph	AR	Rowan	KY	Sevier	AR	Stevens	KS
Randolph	GA	Runnels	TX	Sevier	UT	Stewart	GA
Randolph	MO	Rush	IN	Seward	NE	Stewart	TN
Stillwater	MT	Tippah	MS	Valley	NE	Wayne	MO
Stoddard	MO	Tipton	TN	Van Buren	AR	Wayne	NE
Stokes	NC	Tipton	IN	Van Buren	TN	Wayne	TN
Stone	AR	Tishomingo	MS	Van Buren	IA	Wayne	UT
Stone	MS	Todd	MN	Van Wert	OH	Wayne	WV
Stone	MO	Todd	SD	Van Zandt	TX	Wayne	IL
Stonewall	TX	Todd	KY	Vermillion	IN	Wayne	IA
Storey	NV	Tooele	UT	Vernon	LA	Wayne	KY
Sublette	WY	Toole	MT	Vernon	MO	Weakley	TN
Sullivan	MO	Torrance	NM	Vernon	WI	Webster	MS
Sullivan	PA	Towner	ND	Vilas	WI	Webster	MO

Table A1. *Cont.*

County	State	County	State	County	State	County	State
Sullivan	IN	Towns	GA	Vinton	OH	Webster	NE
Sully	SD	Traill	ND	Wabash	IL	Webster	WV
Summers	WV	Transylvania	NC	Wabasha	MN	Webster	KY
Sumner	KS	Traverse	MN	Wabaunsee	KS	Wells	ND
Sumter	AL	Trego	KS	Wadena	MN	Wells	IN
Sumter	FL	Trempealeau	WI	Wahkiakum	WA	West Baton Rouge	LA
Sunflower	MS	Treutlen	GA	Wakulla	FL	West Carroll	LA
Surry	VA	Trigg	KY	Wallace	KS	West Feliciana	LA
Susquehanna	PA	Trimble	KY	Waller	TX	Westmoreland	VA
Sussex	VA	Trinity	CA	Wallowa	OR	Weston	WY
Sutton	TX	Trinity	TX	Walsh	ND	Wetzel	WV
Suwannee	FL	Tripp	SD	Walthall	MS	Wheatland	MT
Swain	NC	Trousdale	TN	Walworth	SD	Wheeler	GA
Sweet Grass	MT	Tucker	WV	Ward	TX	Wheeler	TX
Swift	MN	Tunica	MS	Warren	GA	White	GA
Swisher	TX	Turner	GA	Warren	MO	White	TN
Switzerland	IN	Turner	SD	Warren	NC	White	IL
Talbot	GA	Twiggs	GA	Warren	IL	White	IN
Tallahatchie	MS	Tyler	TX	Warren	IN	White Pine	NV
Tallapoosa	AL	Tyler	WV	Warren	IA	Whitley	KY
Tama	IA	Tyrrell	NC	Wasatch	UT	Whitman	WA
Tate	MS	Uinta	WY	Waseca	MN	Wichita	KS
Tattnall	GA	Uintah	UT	Washakie	WY	Wilbarger	TX
Taylor	FL	Unicoi	TN	Washburn	WI	Wilcox	AL
Taylor	GA	Union	FL	Washington	AL	Wilcox	GA
Taylor	WV	Union	GA	Washington	CO	Wilkes	GA
Taylor	WI	Union	LA	Washington	FL	Wilkin	MN
Taylor	IA	Union	MS	Washington	GA	Wilkinson	GA
Taylor	KY	Union	NM	Washington	ID	Wilkinson	MS
Telfair	GA	Union	OR	Washington	LA	Willacy	TX
Teller	CO	Union	SC	Washington	ME	Williamsburg	SC
Tensas	LA	Union	SD	Washington	MO	Wilson	TX
Terrell	GA	Union	TN	Washington	NE	Wilson	KS
Terry	TX	Union	IL	Washington	NC	Winkler	TX
Teton	ID	Union	IN	Washington	IL	Winn	LA
Teton	MT	Union	IA	Washington	IN	Winnebago	IA
Texas	MO	Union	KY	Washington	IA	Winneshiek	IA
Texas	OK	Upshur	TX	Washington	KS	Winston	AL
Thayer	NE	Upshur	WV	Washington	KY	Winston	MS
Thomas	KS	Upson	GA	Washita	OK	Wirt	WV
Throckmorton	TX	Upton	TX	Watonwan	MN	Wolfe	KY
Thurston	NE	Uvalde	TX	Waushara	WI	Woodford	KY
Tillamook	OR	Valley	ID	Wayne	GA	Woodford	IL
Tillman	OK	Valley	MT	Wayne	MS	Woodruff	AR
Woods	OK	Wright	IA	Yates	NY	Yukon-Koyukuk	AK
Woodson	KS	Wyandot	OH	Yazoo	MS	Yuma	CO
Woodward	OK	Wyoming	PA	Yell	AR	Zapata	TX
Worth	GA	Wyoming	WV	Yellow Medicine	MN	Zavala	TX
Worth	MO	Yadkin	NC	Yoakum	TX		
Worth	IA	Yalobusha	MS	York	NE		
Wright	MO	Yancey	NC	Young	TX		

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