

---

# Gauging a Region's Entrepreneurial Potential

*By Sarah Low, Jason Henderson, and Stephan Weiler*

Regions are facing rapidly evolving pressures from today's global economy. The old rules of the game, where traditional assets such as cheap land and labor determined a region's success or failure, no longer apply. Instead, new categories of assets are shaping economic prospects—assets like workforce skills, lifestyle amenities, access to capital and information, and innovative activity. Finding new pathways to tap these assets makes economic success much easier.

The first step along each new pathway is to measure a region's assets. The Center for the Study of Rural America is working to quantify today's critical regional assets by developing a series of asset indicators. These measures should help regions gauge their own competitive capacities, as well as provide a better understanding of the new drivers of regional economic growth.

Entrepreneurship is emerging as a particularly promising new engine for regional growth. The relation between long-term regional employment growth and entrepreneurship is strong. Not only do entrepreneurs create new local jobs, but they also generate new wealth and new growth.

---

*Sarah Low is a research associate in the Center for the Study of Rural America at the Federal Reserve Bank of Kansas City. Jason Henderson is a senior economist and Stephan Weiler is an assistant vice president and economist in the Center. For details on other regional asset indicators, see *The Main Street Economist*, the Center's monthly newsletter. This article is on the bank's website at [www.kansascityfed.org](http://www.kansascityfed.org).*

In addition, entrepreneurs are innovative users of other regional assets and resources. In fact, entrepreneurs appear to be a critical mechanism for bringing new ideas and innovations to the marketplace.

Despite the growing recognition that entrepreneurship is a vital driver of strong regional growth, acceptable ways of measuring entrepreneurship still are not widely available. Without standard measures of entrepreneurship, private and public decision makers cannot properly evaluate a region's entrepreneurial activity—nor assess ways to spur faster economic activity.

Ideally, two distinct measures of entrepreneurial activity would set critical benchmarks. The first would assess the quantity, or *breadth*, of entrepreneurial activity across a region. Entrepreneurial breadth reflects the size and variety of small businesses in a region that create the foundations for economic growth. Until recently, breadth measures have been absent from economic radar screens. The second measure would assess the quality, or *depth*, of entrepreneurial activity in a region. Depth represents the value these small businesses generate for themselves and their local economy.

Research suggests that rural areas are fostering entrepreneurs but find it more difficult to produce high-value entrepreneurs. Regions that succeed in producing high-value entrepreneurs typically offer a core urban area, a base of human and financial capital, amenities, and infrastructure that support entrepreneurial development. Together, these findings suggest a new set of policies to support entrepreneurs in rural regions.

This article develops measures of entrepreneurial breadth and depth and uses them to gauge entrepreneurial activity across the United States. The analysis focuses on nonmetropolitan, or rural, counties—where small-scale businesses play an especially important role in regional development. But the analysis can apply to any county. The first section defines entrepreneurs and the measures of breadth and depth. The second section shows where entrepreneurial activity is occurring in the United States. The third section discusses key factors that foster regional levels of entrepreneurial breadth and depth. Finally, the fourth section explores some policy implications for regional development.

## I. MEASURING ENTREPRENEURSHIP

Analysts currently lack effective measures of both the breadth and depth of entrepreneurship in a region. Breadth reveals the size of a region's entrepreneurial foundation, giving a sense of how many small businesses employ local resources, generate local income, and enhance local quality of life. Depth reveals the value these foundations add to the local economy and offers insight into whether a region's entrepreneurs are reaching the frontiers of the marketplace. This section first describes entrepreneurs and then discusses why they are important to regional economies. Next, it introduces two new measures of entrepreneurial breadth and depth.

### *What is an entrepreneur?*

The term "entrepreneur" describes a broad range of people who start their own businesses. Several qualities distinguish them from others in the business world. As owners, entrepreneurs are risk bearers. They reap the rewards for innovative, entrepreneurial success and bear the consequences of failure. As managers, they are decision makers. They decide when to innovate, what innovations to adopt, how far to push the innovative changes in their business, and how to acquire and bundle resources to build success in the marketplace.<sup>1</sup>

Entrepreneurs develop from many sources: the ranks of the unemployed, private workers, and corporate managers. Many begin as part-time entrepreneurs. In this article, entrepreneurs are defined as self-employed, which is the "simplest type of entrepreneurship" (Blanchflower and Oswald). These people satisfy the basic characteristics of entrepreneurs: owner-management. They own their own business, exert management control in the business, and have the right to extract business profits.<sup>2</sup> They also assume the risk of losing their business.

Not all entrepreneurs are alike in their impact on local economies (Henderson). Some entrepreneurs start their own business to fulfill a dream or follow a chosen lifestyle. They may open a coffee shop near a lake or teach piano lessons in a small town. Many such lifestyle

entrepreneurs benefit their community by enhancing the local quality of life. These firms indirectly boost regional growth by enhancing the area's mix of stores and other businesses. Lifestyle entrepreneurs mainly contribute to a region's measure of entrepreneurial breadth by adding numbers of entrepreneurs to a region.

Other firms generate more direct economic value for their region. By focusing on creating wealth, income, and jobs, such high-value entrepreneurs enhance economic growth, while identifying and exploiting assets in their region. Some entrepreneurs start new businesses and sell them to finance new ventures. These serial entrepreneurs repeatedly search for new avenues to create wealth, income, and jobs.

The contrast between lifestyle and high-value entrepreneurs demonstrates the tremendous diversity of entrepreneurship. To effectively capture this diversity, analysts need multiple measures of entrepreneurial activity. This article develops a measure of entrepreneurial breadth to identify the *quantity* of entrepreneurs across regions. Next, it develops a measure of entrepreneurial depth to assess the *quality* of these entrepreneurs, in terms of income and the revenue they capture in the regional economy. While this article focuses on rural regions to help clarify the discussion, the analysis is relevant to all types of regions.

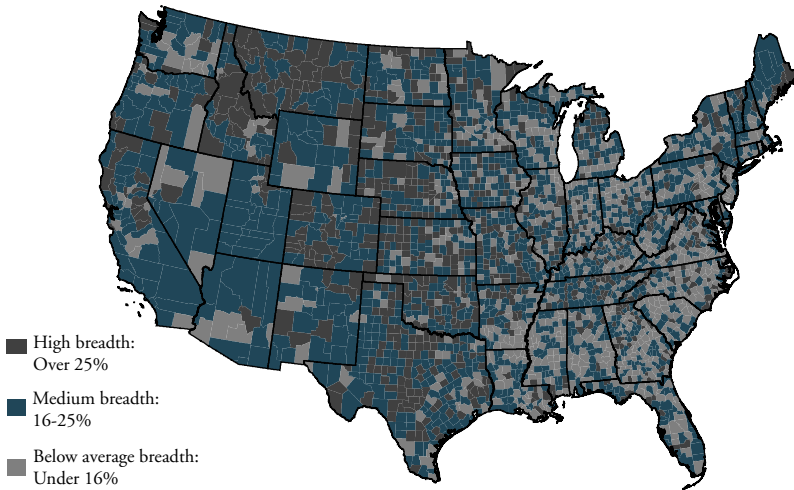
### *Measuring entrepreneurial breadth*

Research indicates that regions rich in entrepreneurial businesses, or entrepreneurial breadth, achieve long-term job growth and regional economic prosperity (Acs and Armington 2003).<sup>3</sup> Breadth is calculated as the number of self-employed persons divided by total employment in a county.<sup>4</sup> This ratio makes it possible to compare the concentration of entrepreneurs across vastly different areas, from sparsely populated rural towns to major metropolitan areas, on an equivalent basis.

The concentration of the self-employed varies widely across U.S. counties (Figure 1). Entrepreneurship breadth is particularly high in the Great Plains, where up to 70 percent of some counties' workers own and manage their own businesses. In other regions, as little as 1.5 percent of workers are self-employed.

Figure 1

### ENTREPRENEURSHIP BREADTH: SELF-EMPLOYMENT OVER TOTAL EMPLOYMENT, NONFARM



#### *Measuring entrepreneurial depth*

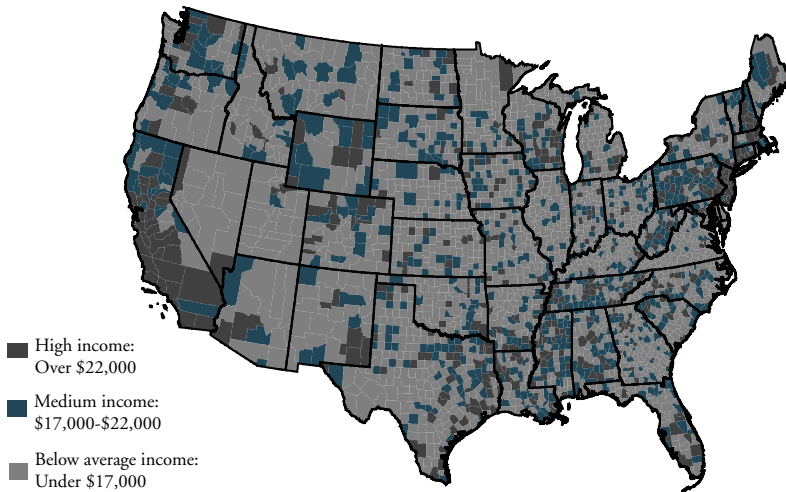
The ability of a region to generate more entrepreneurs is clearly important for economic prosperity, but the ability to generate high-value entrepreneurs may be even more important. Analysts need another measure of entrepreneurship to gauge whether entrepreneurs add value to a region by creating income, wealth, and jobs. Entrepreneurial depth attempts to measure this added value.

Two measures, *average income* and *revenue capture*, can help gauge entrepreneurial depth across U.S. counties. Both measures show that rural counties lag metro counties in entrepreneurial depth. This difference in depth probably stems from differences in market size, industry, or occupational structure between rural and metro areas.

*Average income* is the first measure of depth. It assumes that entrepreneurs with higher incomes operate more profitable firms that add more economic value to the community. As average proprietor income rises, the region as a whole becomes more prosperous. A useful income-based measure of entrepreneurship depth, therefore, is the ratio of proprietor income to proprietor employment in a county.<sup>5</sup>

Figure 2

## ENTREPRENEURSHIP DEPTH-INCOME: AVERAGE PROPRIETOR INCOME, NONFARM



Notes: Medium is calculated as the range between average and one standard deviation above average, and high is calculated as greater than one standard deviation above average proprietor income. Standard deviation essentially is the spread of observations around the average.

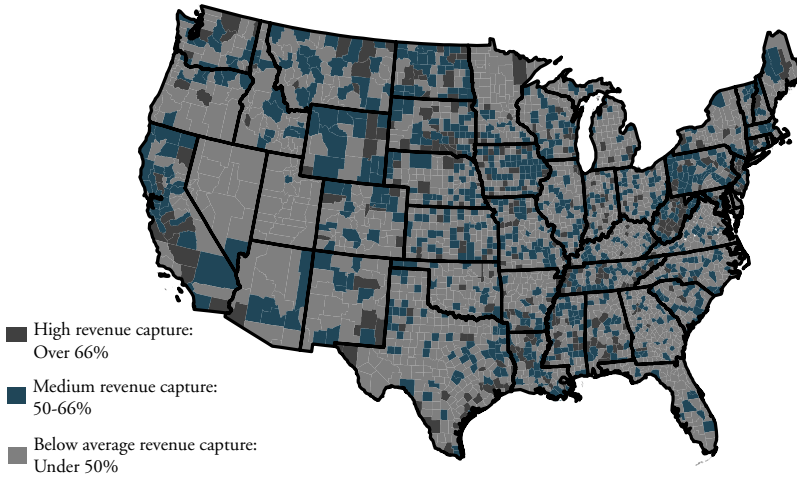
Average proprietor income varies widely throughout the country. Interestingly, those regions with high levels of entrepreneurial activity (breadth) are not usually the same regions that are rich in high-income entrepreneurs (depth).<sup>6</sup>

High-income entrepreneurs are clustered throughout the country. High-income entrepreneurs are plentiful in the southern half of the Mississippi River Valley and in West Virginia, which may be due to small oil and gas businesses. Southern California, the Mid-Atlantic states, Greater Chicagoland, and southeastern Wisconsin also have clusters of high-income entrepreneurship, likely due to the critical mass of dense urban markets in these areas (Figure 2).

*Revenue capture* is the second measure of depth. By generating more income per dollar of revenue, entrepreneurs add more direct value to their local economy. The proportion of the total sales, or revenue, which is captured as income, is directly due to the entrepreneur's own

Figure 3

### ENTREPRENEURSHIP DEPTH-REVENUE CAPTURE: INCOME OVER SALES, NONFARM



Note: Medium is calculated as the range between average and one standard deviation above average, and high is calculated as greater than one standard deviation above average proprietor income.

ideas and skills. This ratio of income to total sales measures the dollar value of ideas and skills contributed by the entrepreneur. This measure adds to the average income measure by gauging the percentage of total sales that ends up as income for the entrepreneurs themselves.

Revenue capture for proprietors is estimated using the ratio of income to total sales of products and services. The measure is constructed as the ratio of nonfarm proprietor income over the nonemployer receipt data.<sup>7</sup> This measure is not skewed by the significant portion of entrepreneurs who work part time, a problem associated with the average proprietor income measure of depth.

While the income and revenue measures of depth are highly correlated, the revenue capture measure provides a slightly different picture of entrepreneurial depth.<sup>8</sup> Counties with a high revenue capture measure are less clustered than counties with a high income measure (Figure 3). Analysis shows that revenue depth depends less on location than either breadth or income depth indicators.

## II. REGIONAL DIFFERENCES IN BREADTH AND DEPTH

Regional levels of entrepreneurial breadth and depth vary from rural to metro counties, perhaps due to differences in local markets, industries, and occupations. This section uses the breadth and depth measures to identify the differences between rural and metro entrepreneurial activity. In comparison to their metro counterparts, rural counties have higher levels of entrepreneurial breadth but lack the depth of entrepreneurship that adds high value to a local economy. The type of markets, industries, and occupations appear to influence the differences between rural and metro entrepreneurship.

### *Breadth: Rural regions spawn more entrepreneurs*

To analyze the relationship of entrepreneurial breadth by county size designation, counties can be divided into three groups, based on the size of their core cities. Metropolitan counties have at least one city with a population of 50,000 or more, or have a significant number of residents commuting into a central city. Micropolitan counties have at least one city with a size of 10,000 to 50,000 people and no larger cities. Town counties have no cities larger than 10,000. Town counties and micropolitan counties are often grouped together and referred to as rural or nonmetro counties, while metropolitan counties are considered urban.

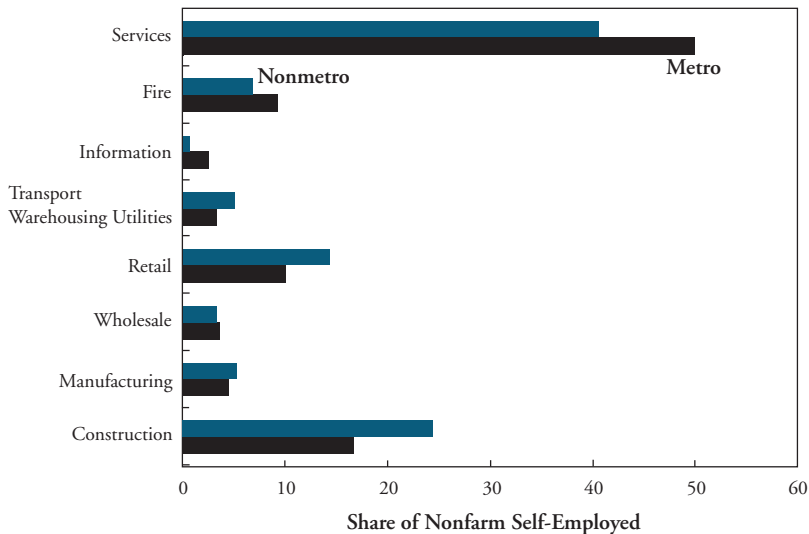
Examining these three types of counties shows that entrepreneurial breadth tends to be greater in counties with smaller cities—in other words, in rural regions. The labor force in town counties is 22.4 percent self-employed, compared to 17.6 percent in micropolitan counties and 15.4 percent in metro counties.

Entrepreneurial breadth may be greater in rural regions for two primary reasons. The first relates to small markets. The smaller populations in rural economies naturally lead to smaller firms serving fewer customers. In 2002, the average employment in rural establishments was 12.0 people, compared to 16.2 people in metro establishments.<sup>9</sup> A smaller firm size implies a higher ratio of owners to workers, and thus greater entrepreneurial breadth.



Chart 1

## SELF-EMPLOYED BY MAJOR INDUSTRY, METRO AND NONMETRO



Source: Current Population Survey, March 2004 Supplement

The second reason relates to the industrial structure of the local economy. Rural self-employment is concentrated in the construction and retail trade industries (Chart 1). Retail firms tend to be smaller than firms in other industries, reinforcing the impacts associated with smaller firm size. In the construction industry, workers may be considered independent contractors instead of employees and thus identified as proprietors instead of wage earners.

### *Depth: More is less in rural areas*

While entrepreneurial breadth is greater in rural regions, depth is greater in densely populated areas. Urban areas have more entrepreneurs with high incomes and higher levels of revenue capture (Figures 2 and 3). The average proprietor income in metro counties (\$19,056) was 34 percent higher than in town counties and 20 percent higher than in micropolitan counties. Average proprietor income was lower on average

than wage and salary income in all county types, however, underscoring the fact that lifestyle entrepreneurs sometimes work part time. Rural areas also trail urban areas in capturing the revenue associated with entrepreneurial activity. Differences in access to large markets, industries, and occupational structure are perhaps some of the causes for less entrepreneurial depth and less revenue capture in rural places.

### *The roles of markets, industries, and occupations in regional breadth and depth*

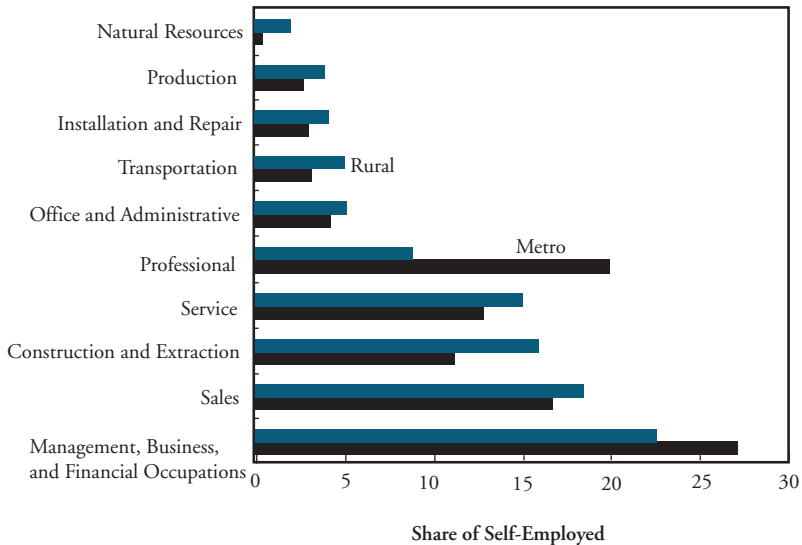
Just as size and geography influence entrepreneurial activity in a region, so do markets, industries, and occupations. Large regional markets benefit entrepreneurs by offering more opportunities for growth and value, thus adding to depth. Certain high-value industries tend to concentrate in metro areas, also increasing depth. Finally, the occupations and skills of workers in a region influence both breadth and depth—for example, white collar workers tend to add to depth.

Poor access to large markets is one likely reason that rural regions lack entrepreneurial depth. Traditionally, new businesses in rural areas are limited by the smallness and remoteness of the local market (Dabson). Entrepreneurs that operate in such markets have fewer opportunities to generate income and capture revenue. More remote firms pay higher transportation and information costs to access distant markets. For example, if two firms sell the same product in the same market, the more remote firm will have to gather more information and face higher transportation costs, thus reducing its ability to capture revenue and limiting its income.

Depth is also affected by the types of industries in which regions specialize (Malecki). Entrepreneurs working in industries that take advantage of greater worker skills are likely to generate more value for themselves and their local economy. Rural entrepreneurs are less likely to operate in higher-skilled industries. In the service sector, only about a quarter of rural service sector entrepreneurs operate businesses in the high-skilled producer service sectors (financial, information and business service industries), compared with 45 percent of metro entrepreneurs.<sup>10</sup> In the manufacturing sector, only 13 percent of rural entrepreneurs operate businesses in the high-tech manufacturing sectors of computers

Chart 2

## SELF-EMPLOYMENT RATE BY OCCUPATION



Source: March 2004 Current Population Survey, Dept. of Commerce

and electrical components, petroleum and chemical manufacturing, and industrial and commercial machinery production, compared to almost 20 percent of metro entrepreneurs.

The skill differences are also reflected in the occupations of the entrepreneurs. Rural entrepreneurs tend to work in more blue-collar occupations than their metro counterparts. Compared to the metro self-employed, higher shares of rural self-employed are working in production, natural resource, and construction occupations (Chart 2). The share of rural self-employed in professional, management, business, and financial occupations is much lower than the share of metro self-employed.

### III. REGIONAL FACTORS OF BREADTH AND DEPTH

Entrepreneurial breadth and depth clearly vary across regions—but what factors lay behind these differences? Because the differences between rural and metro regions are systemic, it appears likely that certain regional factors are shaping the entrepreneurial landscape. The

local economy, human capital, scenic amenities, financial capital, and infrastructure are various regional characteristics that influence breadth and depth.

### *Local economy*

Entrepreneurship is expected to be strong in large vibrant economies and weak in small remote ones. Entrepreneurs are often attracted to metro areas because the local market is large enough to test a wide range of products, and it offers easy access to resources, financing, and labor. Similarly, the density and size of a regional economy tend to create substantial advantages in labor and product markets for both workers and firms.

Regression analysis shows that the size and remoteness of a local economy leads to variations in entrepreneurial breadth and depth (Table 1).<sup>11</sup> Breadth is highest in small, isolated counties. Such counties typically spawn a large number of small firms because their communities need a wide variety of goods and services, but in small volumes. In contrast, depth is higher in more densely populated metro and micropolitan counties. Self-employed workers can earn higher average incomes in larger metro counties, reflecting the advantages of denser urban marketplaces and better job opportunities. Metro entrepreneurs tend to target higher-income activities, since high-income jobs are often alternatives to entrepreneurship in metro areas.

### *Human capital*

Differences between rural and metro counties may simply reflect different regional characteristics, such as skill levels or creativity. In other words, rural and metro counties may have slightly different varieties of human capital. Indeed, traits and behaviors are perhaps the most important differences between entrepreneurs and nonentrepreneurs (Gartner).

One important measure of human capital is educational attainment. College degrees are often related to entrepreneurship because education increases the knowledge and critical thinking skills so vital to the success of an entrepreneur. Research has shown that the skills

Table 1

SIGNIFICANT RELATIONSHIPS BETWEEN  
ENTREPRENEURSHIP MEASURES AND  
VARIABLES EXAMINED

	Breadth	Income-Depth	Revenue Capture-Depth
<b>Local Economy</b>			
METRO	-	+	+
MICRO	-		
WEST	+	-	-
MIDWEST	+	-	+
NORTHEAST		+	+
<b>Human Capital</b>			
COLLEGE		+	
FOREIGN	-	+	+
INFO/ARTS		+	+
<b>Amenities</b>			
TOPOGRAPHY	+		+
<b>Financial capital</b>			
DEPOSITS/POP		+	+
<b>Infrastructure</b>			
BROADBAND	-	+	+
INTERSTATE	-	+	+

Note: For more detailed information on the regressions, see the appendix.

necessary for entrepreneurship are teachable (Lyons). Thus, proprietors who create the most value are more likely to have a college degree (Acs and Armington 2004).

Regression analysis echoes these findings. Entrepreneurial depth-income is higher in counties with higher college educational attainment (*COLLEGE*). In contrast, entrepreneurial breadth and revenue capture are not associated with college educational attainment.

Knowledge in a region can have different sources. Many immigrants become entrepreneurs after coming to the United States, often contributing to the pool of regional human capital differently than

traditional educational. Research has found that the percentage of foreign-born workers is often related to the number of new businesses in a region (Lee and others).

Regression analysis shows that the concentration of foreign-born residents (*FOREIGN*) has a positive relationship with the quality of entrepreneurs in an area. In contrast, it has a negative relationship with the quantity of entrepreneurs. Both measures of entrepreneurial depth, income and revenue, were higher in counties with a greater percentage of foreign-born workers, suggesting that fresh infusions of knowledge and human capital create entrepreneurial value. Entrepreneurial breadth, however, suffers as the percent of foreign born in a region rises. This result may reflect the hurdles many foreign-born entrepreneurs face in starting up businesses in rural areas, which tend to have a smaller proportion of such residents.

Like knowledge, creativity also nourishes entrepreneurship. All regions have a creative endowment to some degree, but many regional entrepreneurs seem especially adept at tapping their own and nearby pools of creativity. The Bohemian Index measures the local concentration of authors, designers, musicians, performers, artists, and other similarly creative occupations (Florida). This index represents the level of creative sector employment focused on the information and arts sectors. The index has shown a positive and significant relationship with both entrepreneurship and the formation of high-tech industry (Lee and others; Florida).

Regression analysis also finds that a strong presence of information and arts workers significantly contributes to higher levels of entrepreneurial depth. The percent of creative sector employment (*INFO/ARTS*) is positively associated with both income and revenue. In contrast, creative sector employment levels are not associated with entrepreneurial breadth.

### *Amenities*

Regions with higher levels of scenic amenities typically have higher levels of economic activity. As economic opportunities move from goods-producing activities, which are often tied to locations with physical resources, to more service-based activity, people have more

flexibility in deciding where to live and work (Rappaport). The self-employed are especially free to locate where they please due to the small scale of their firms. Many will locate in areas with attractive topography, abundant water area, and comfortable weather. In the 1990s, the growth of entrepreneurs was stronger in rural places that enjoyed high levels of natural amenities (Henderson).

Regression analysis supports the idea that high-value entrepreneurs often choose scenic areas to run their businesses. Thus, there appears to be a strong relationship between rugged landscapes, scenic beauty, and revenue capture (*TOPOGRAPHY*). Entrepreneurial breadth also scores high marks in mountainous areas, probably for the same reasons. And as most mountain regions are rural, the natural smaller scale of businesses there further increases breadth.

### *Financial capital*

Access to financial capital is widely seen as critical in developing a region's entrepreneurs (Center for the Study of Rural America). Entrepreneurs, though, often face a particular disadvantage in gaining such access. Small business size and business plans based on new ideas do not mesh well with the traditional information gathering and loan scoring systems favored by banks. Nevertheless, local pools of available capital create a self-reinforcing cycle of entrepreneurial lending: The availability of capital nourishes firms and profits. When these firms deposit their profits, they generate more capital. Extensive asset ownership in the form of bank deposits per capita has a significant and positive effect of firm formation rates (Garofoli; Suteria and Hicks).

Regression analysis reinforces the idea that access to financial capital is essential to regional entrepreneurial success. Average bank deposits per capita (*DEPOSITS/POP*) are positively associated with high levels of depth.<sup>12</sup> In contrast, there appears to be no relationship between entrepreneurial breadth and bank deposits, highlighting the critical distinctions between breadth and the growth-generating potential of depth.

### *Infrastructure*

Elements of regional infrastructure, such as roads and telecommunications networks, give entrepreneurs access to resources and markets that can lead to higher levels of economic activity. Infrastructure is especially important when entrepreneurs find themselves further away from key markets and suppliers.

Interstate highways are perhaps the most accurate measure of region's access to the nation's car- and truck-oriented commerce network. An interstate highway in a county is likely to promote entrepreneurship by making it easier to get supplies and market a product or service.

High-speed Internet connections are the best indicator of a small firm's ability to conduct remote business transactions. Access to the information highway is likely to have a positive effect on high-value entrepreneurship and may be particularly important in allowing entrepreneurial income and value to flourish.

Regression analysis confirms these key relationships. Entrepreneurship is significantly related to regional access to interstate highways (*INTERSTATE*) and to high-speed Internet access (*BROADBAND*). High-value entrepreneurship is positively associated with access to both forms of infrastructure, as both income and revenue capture thrive on ideas, marketplaces, and suppliers.

Perhaps surprisingly, entrepreneurial breadth is negatively associated with interstate and Internet access. This finding suggests that entrepreneurial breadth is greatest where self-employment is due to necessity and economic isolation. Not only are regions with less infrastructure generally smaller and more likely to have small-scale operations—but these places typically offer fewer alternatives to self-employment.

The contrasting depth and breadth findings on infrastructure also reveal a tough challenge for small-scale entrepreneurs. While they contribute most to the breadth measure, they are hindered by the lack of infrastructure access as they try to develop entrepreneurial depth. Businesses linked to the broader economy through infrastructure seem to naturally generate more depth and growth than smaller-scale proprietorships. The high-speed Internet and interstate highways that link successful businesses with value-generating transportation, communication, and information networks are simply less common in remote areas.



#### IV. POLICY IMPLICATIONS

Analysts generally agree that entrepreneurs shape a region's prospects for economic growth. Until now, policymakers have been at a disadvantage in promoting this critical part of regional economic success due to a lack of appropriate measures. This article identified a number of factors that influence both the breadth and depth of entrepreneurial activity in the United States. Four factors are perhaps most relevant for crafting economic development policy—education, quality of life, in-migration, and infrastructure. At times, a factor may influence both breadth and depth, but in opposite ways (Table 1). Thus, policies for promoting entrepreneurial breadth and depth are often likely to differ.

##### *Education*

Counties with more educated residents have greater entrepreneurial depth. While all types of education are beneficial to regional growth, educational programs that enhance entrepreneurial skills are essential. Research has also found that such skills can be taught. Thus, regions can create *entrepreneurial development systems* that seek out potential entrepreneurs and offer the training that develop the technical, managerial, and entrepreneurial skills they need to be successful (Lyons). The best systems are regional in scope and systematic in approach.

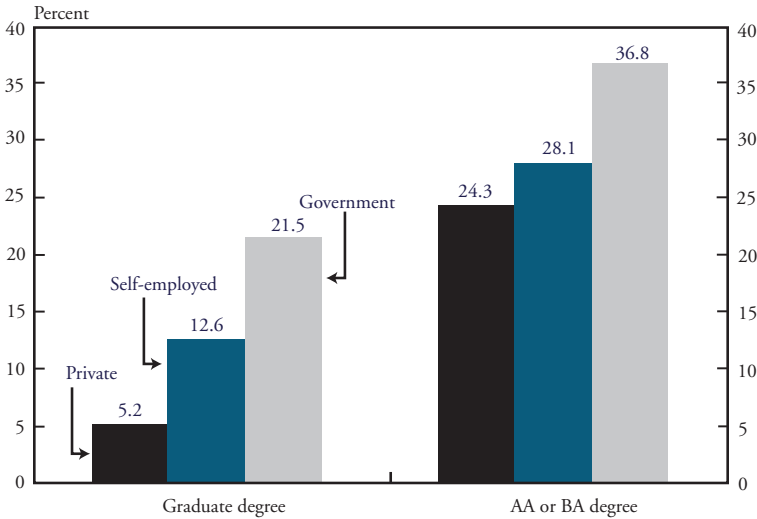
Not all educational programs help develop entrepreneurs equally. The Rural Community College Initiative has identified entrepreneurship and small business development as a key economic development role for community colleges (Rubin). But other learning institutions can take part in the process as well. Self-employed workers have more formal training than workers in the private sector but less than government workers (Chart 3). The self-employed do not necessarily earn graduate or professional degrees. Nevertheless, they are likely to have some college or technical training.

##### *Quality of life*

The quality of life in a region shapes both entrepreneurial breadth and depth. Counties with higher levels of natural or scenic amenities,

Chart 3

## EDUCATIONAL ATTAINMENT OF RURAL ENTREPRENEURS



Source: March 2004 Current Population Survey

creativity, and diversity have more entrepreneurs that add value to the local economy. Communities known as amenity-rich, creative places that are open to a diversity of people and ideas are more likely to develop homegrown entrepreneurs and attract footloose entrepreneurs. Thus, regions seeking new ways to develop local entrepreneurs may want to focus on boosting the quality of life in their communities.

Of course, when assessing quality-of-life potential, not all communities have a clear advantage. But creative policies can often help enhance local amenities to boost quality of life. For example, Hand-Made in America is a regional initiative based in the Blue Ridge Mountains of North Carolina. HandMade in America develops strategies for the region's many craft artisans, enhancing the region's entrepreneurial breadth, attracting tourists, and fostering economic opportunity in the region.

### *Foreign-born entrepreneurs*

Regions with a high ratio of foreign-born residents have more entrepreneurial depth than regions with few such residents. Immigration brings a range of benefits to regions seeking entrepreneurs, especially rural regions. Immigrants help counteract the outflow of native residents that can threaten a community's critical mass. And immigrants frequently become high-value entrepreneurs, often bringing a new business perspective to local assets and markets.

Thus, policy that helps attract immigrants enhances entrepreneurial depth. In addition, immigrants who create diversity simply by being involved in a community may in turn help attract more immigrants with entrepreneurial skills, also increasing breadth.

### *Infrastructure*

Developing infrastructure for transportation and telecommunications may be especially critical for developing entrepreneurial depth. A modern transportation infrastructure allows entrepreneurs to connect to markets and suppliers in other locations by car and truck. A high-quality telecommunications network allows rural entrepreneurs to tap resources, assets, and information from other regions. Policies that focus on infrastructure can encourage steady flows of goods, services, and information—all of which are vital to regions.

## **IV. SUMMARY**

Despite a growing recognition that entrepreneurs are vital to strong regional growth, standard ways to measure entrepreneurial activity remain elusive. This article offers new ways to measure both the quantity and quality of entrepreneurs in a region. These new measures of breadth and depth should give communities a richer understanding of today's entrepreneurs and of the potential to spawn tomorrow's.

The geographic variation of breadth and depth measures across U.S. counties reveals significant differences between urban and rural activity. Regression analysis shows that these variations are shaped by several key regional factors—local economy, human capital, scenic

amenities, financial capital, and infrastructure. Each of the factors has important implications for policymakers who aim to foster more entrepreneurs in a region. Understanding these implications should help regional and community leaders craft better policies to strengthen both entrepreneurial breadth and depth.

## APPENDIX

The empirical model in this appendix helped analyze the effects of the local economy size, human capital, scenic amenities, financial capital, and infrastructure on measures of entrepreneurial breadth and depth. U.S. counties are the unit of observation. Table A1 shows variable definitions and sources. Empirical models are given below:

$$\text{County Entrepreneurship Breadth} = b_0 + b_1 * \text{Metro Dummy} + b_2 * \text{Micropolitan Dummy} + b_3 * \text{West Regional Dummy} + b_4 * \text{Midwest Regional Dummy} + b_5 * \text{Northeast Regional Dummy} + b_6 * \text{College Educated} + b_7 * \text{Foreign Born} + b_8 * \text{Info/Arts/Creativity Employment} + b_9 * \text{Topography} + b_{10} * \text{Broadband Internet} + b_{11} * \text{Bank Deposits per Capita} + b_{12} * \text{Interstate}$$

$$\text{County Entrepreneurship Depth-Income} = b_0 + b_1 * \text{Metro Dummy} + b_2 * \text{Micropolitan Dummy} + b_3 * \text{West Regional Dummy} + b_4 * \text{Midwest Regional Dummy} + b_5 * \text{Northeast Regional Dummy} + b_6 * \text{College Educated} + b_7 * \text{Foreign Born} + b_8 * \text{Info/Arts/Creativity Employment} + b_9 * \text{Topography} + b_{10} * \text{Broadband Internet} + b_{11} * \text{Bank Deposits per Capita} + b_{12} * \text{Interstate}$$

$$\text{County Entrepreneurship Depth-Revenue} = b_0 + b_1 * \text{Metro Dummy} + b_2 * \text{Micropolitan Dummy} + b_3 * \text{West Regional Dummy} + b_4 * \text{Midwest Regional Dummy} + b_5 * \text{Northeast Regional Dummy} + b_6 * \text{College Educated} + b_7 * \text{Foreign Born} + b_8 * \text{Info/Arts/Creativity Employment} + b_9 * \text{Topography} + b_{10} * \text{Broadband Internet} + b_{11} * \text{Bank Deposits per Capita} + b_{12} * \text{Interstate}$$

Empirical results of the three regressions are reported in Tables A2, A3, and A4. Adjusted R-squares range from 0.32 to 0.09 and F-statistics for all equations are significant at the 0.05 percent level. Initial regressions are performed with ordinary least squares (OLS). The Hausman Specification Test detects a simultaneity problem between the dependent variables and the explanatory variables. The two-stage least squares (2SLS) estimation method was implemented to reduce the effects of simultaneity. Results of the 2SLS estimation procedure are

similar in coefficient sign and significance to OLS results. The White Test does not indicate heteroskedasticity in the data and residual plots show few outlying observations. Variance inflation factors were calculated to test for multicollinearity and it was not found to significantly affect results.

Table A1

## VARIABLE SOURCE AND DESCRIPTION

Variable	Source	Variable Description
BREADTH	BEA-REIS	(Proprietor employment/total nonfarm employment) * 10000
DEPTH-INCOME	BEA-REIS	(Proprietor income over proprietor employment) * 100
DEPTH-REVENUE	BEA-REIS & Census	Average proprietor income (BEA) over average non-employer receipts (Census), 2001
METRO*	ERS	Metropolitan counties, 2003
MICRO*	ERS	Metropolitan counties, 2003
WEST**	Census	CA, OR, WA, AK, HI, ID, MT, WY, NV, UT, CO, AZ, NM
MIDWEST**	Census	ND, SD, NE, KS, MN, IA, MO, WI, IL, IN, MI, OH
NORTHEAST**	Census	ME, NH, VT, MA, RI, CT, NY, PA, NJ
COLLEGE	Census	Percent of population age 25+ with BS degree or higher, 2000 Census STF3
FOREIGN	Census	Percent of population foreign born, 2000 Census STF3
INFO/ARTS	BEA-REIS	LQ of NAICS 52 & 71 (Information & Arts, Entertainment Employment) over total nonfarm employment
TOPOGRAPHY	ERS	Scale, 20 being the highest mountain, 0 being flattest plains
BROADBAND	FCC	Counties with >3 high-speed internet providers, 1999
DEPOSITS/POP	FDIC & Census	Total deposits (\$1000) over population
INTERSTATE	Census	Dummy variable: counties containing a portion of interstate highway

\*Nonmetro, nonmicro counties are the omitted condition.

\*\*Southern states are the omitted condition.

Table A2

### REGRESSION RESULTS, BREADTH=DEPENDENT VARIABLE

Adjusted R-Square = .158 F Stat = 48.2 N=3020

	Coefficient	Standard Error	Change in Breadth from a 1 StDev change in Ind. Variable	Significance
Metro	-160.92	38.87	-76.53	***
Micro	-457.64	37.70	-188.46	***
West	329.50	51.19	116.66	***
Midwest	104.54	33.04	49.19	***
Northeast	47.83	60.49	12.04	
College	-33.10	254.12	-2.58	
Foreign	-1,516.41	343.99	-73.79	***
Info/Arts	-18.89	40.21	-9.94	
Topography	72.39	16.17	72.43	***
Broadband	-316.42	57.53	-94.50	***
Deposits/Pop	.52	1.33	961.27	
Interstate	-286.61	31.61	-141.88	***
Constant	2,447.26	39.86		***

\*\*\* = .01 Level of  
Significance\* = .1 Level of  
Significance\*\* = .05 Level of  
Significance

Table A3

### REGRESSION RESULTS, INCOME=DEPENDENT VARIABLE

Adjusted R-Square = .317 F Stat = 117.9 N=3020

	Coefficient	Standard Error	Change in Breadth from a 1 StDev change in Ind. Variable	Significance
Metro	118.80	31.32	56.50	***
Micro	43.68	30.39	17.99	
West	-253.08	41.25	-89.60	***
Midwest	-135.94	26.63	-63.97	***
Northeast	125.18	48.75	31.51	***
College	963.23	204.80	75.06	***
Foreign	3,522.39	277.23	171.41	***
Info/Arts	182.50	32.40	96.06	***
Topography	15.72	13.03	15.73	
Broadband	444.27	46.37	132.69	***
Deposits/Pop	11.62	1.07	2,1337.24	***
Interstate	131.90	25.47	65.29	***
Constant	1,090.12	32.12		***

\*\*\* = .01 Level of  
Significance\* = .1 Level of  
Significance\*\* = .05 Level of  
Significance



Table A4

REGRESSION RESULTS,  
CAPTURE=DEPENDENT VARIABLE

Adjusted R-Square = .089 F Stat = 25.5 N=3020

	Coefficient	Standard Error	Change in Breadth from a 1 StDev change in Ind. Variable	Significance
Metro	.0046	.0079	.002191	***
Micro	.0044	.0077	.001820	
West	-.0225	.0104	-.007977	***
Midwest	.0293	.0067	.013801	***
Northeast	.0280	.0123	.007056	***
College	-.0574	.0518	-.004476	
Foreign	.4493	.0701	.021866	***
Info/Arts	.0221	.0082	.011648	***
Topography	.0065	.0033	.006539	***
Broadband	.0638	.0117	.019048	***
Deposits/Pop	.0020	.0003	3.666448	***
Interstate	.0238	.0064	.011758	***
Constant	.4219	.0081		***

\*\*\* = .01 Level of  
Significance\* = .1 Level of  
Significance\*\* = .05 Level of  
Significance

## ENDNOTES

<sup>1</sup>Entrepreneurs are indeed unique economic players. Entrepreneurs are distinguished from corporate managers and career professionals because, while the latter have decisionmaking roles in the organization, career managers in general are not the risk bearers or owners of the company. While stockholders are corporate owners, they are not entrepreneurs because they in general transfer decision making responsibilities to corporate management. McGrath, McMillan, and Scheinberg (1992) find that entrepreneurs are more risk tolerant than corporate professionals.

<sup>2</sup>However, it is important to remember that the self-employed are not the only entrepreneurs. Aspiring entrepreneurs would not be identified as self-employed because they have not started a business to employ themselves. In some cases, entrepreneurs start by doing part-time business before becoming fully self-employed. Thus, the self-employed are best recognized as a subset of entrepreneurs in the United States.

<sup>3</sup>The correlation coefficient between entrepreneurship breadth and employment growth between 2000 and 2003 was 0.28.

<sup>4</sup>Data for breadth are provided by the Bureau of Economic Analysis' Regional Economic Information System (BEA-REIS). These data provide estimates of nonfarm proprietor employment and total nonfarm employment.

<sup>5</sup>The average income indicator was calculated with Bureau of Economic Analysis, Regional Economic Information System (BEA-REIS) data. Nonfarm proprietor income was divided by the number employed as nonfarm proprietors in 2001. The limitation of the income measure is that these data include both part-time and full-time proprietors, so the metric may be skewed by the ratio of proprietors whose income only partially supports their lifestyle. The average income indicator was not normalized for local prices or wages to highlight the higher income needs for entrepreneurs in urban areas, who tend to face competing higher-income employment alternatives to entrepreneurship.

<sup>6</sup>The correlation coefficient between entrepreneurship breadth and entrepreneurship depth (income) is -0.35.

<sup>7</sup>Nonfarm proprietor income data for 2001 were obtained from BEA-REIS. Data on total firm sales were obtained from U.S. Census Non-Employer Receipts, 2001, which stems from the sales reported by nonemployers to the Internal Revenue Service on Schedule C. Proprietor income and non-employer receipts are not completely analogous. Proprietor income is estimated by the BEA and includes total income, while non-employer receipt data are obtained only for those who file a Schedule C with their IRS tax return, causing proprietors who have receipts under \$1,000 to be omitted. However, if these proprietors were included in the data, the value-added metric would only be smaller. The revenue capture percentage evaluates entrepreneurial value added for both full- and part-time proprietors on a similar basis. In contrast, the average income metric will be skewed by concentrations of part-time entrepreneurs, whose limited hours and associated lower incomes will reduce the overall calculated average.

<sup>8</sup>The correlation coefficient between the income and revenue capture measures is 0.81.

<sup>9</sup>Calculations based on County Business Patterns data.

<sup>10</sup>Producer service and high-tech manufacturing sectors are defined by USDA at [www.ers.usda.gov/briefing/industry/importantindust/](http://www.ers.usda.gov/briefing/industry/importantindust/). Calculations on employment are based on data from the March 2004 Supplement to the Current Populations Survey.

<sup>11</sup>Initial regressions were performed with the ordinary least squares (OLS) estimation method. The Hausman Specification Test detects a simultaneity problem between the dependent variables, entrepreneurship breadth and depth, and the explanatory variables. Two-stage least squares (2SLS) estimation method is used to reduce the effects of simultaneity. Instrumental variables used best estimate the explanatory variable and have estimated regressors uncorrelated with the error term. Results of the 2SLS estimation procedure are similar in coefficient sign and significance to OLS results. Some coefficients change sign, but appear to be robust in the 2SLS equation. The White Test for heteroskedasticity does not indicate heteroskedasticity in the data, and residual plots show few outlying observations. Nevertheless, the 2SLS equations are weighted with population and resulting coefficients are similar in sign and significance to their unweighted equivalents. The unweighted results are presented in the table.

<sup>12</sup>Bank deposits and high-value entrepreneurship undoubtedly reinforce one another. High-value entrepreneurs may be unusually likely to keep their generated income in the local community, thus also generating higher local bank deposits. In turn, these bank deposits create loanable funds that could help regional entrepreneurs invest and grow further.

## REFERENCES

- Acs, Zoltan, and Catherine Armington. 2004. "Employment Growth and Entrepreneurial Activity in Cities." Jena, Germany: Discussion Papers on Entrepreneurship, Growth and Public Policy, Max Planck Institute for Research into Economic Systems, Group Entrepreneurship, Growth and Public Policy.
- \_\_\_\_\_ and \_\_\_\_\_. 2003. "Endogenous Growth and Entrepreneurial Activities in Cities," U.S. Bureau of the Census.
- Blanchflower, David, and Andrew Oswald. 1998. "What Makes an Entrepreneur?" *Journal of Labor Economics*, vol. 1, January 16, pp. 26-60.
- Center for the Study of Rural America. 2003. *Main Streets of Tomorrow: Growing and Financing Rural Entrepreneurs*, proceedings of a conference sponsored by the Federal Reserve Bank of Kansas City.
- Dabson, Brian. 2001. "Supporting Rural Entrepreneurship." *Exploring Policy Options for a New Rural America*, a conference sponsored by the Center for the Study of Rural America, Federal Reserve Bank of Kansas City, pp. 35-48.
- Florida, Richard. 2002. *The Rise of the Creative Class*. New York: Basic Books.
- Garofoli, Gioacchino. 1994. "New Firm Formation and Regional Development: The Italian Case," *Regional Studies*, vol. 28, no. 4, pp. 381-93.
- Gartner, William B. 1988. "Who Is an Entrepreneur? Is the Wrong Question," *American Journal of Small Business*, vol. 12, no. 4, pp. 11-32.
- Graves, Philip. 1976. "A Reexamination of Migration, Economic Opportunity, and the Quality of Life," *Journal of Regional Science*, vol. 16, no. 1, pp. 107-12.
- Henderson, Jason. 2002. "Building the Rural Economy with High Growth Entrepreneurs," Federal Reserve Bank of Kansas City, *Economic Review*, 3rd Quarter.
- Krugman, Paul. 1991. *Geography and Trade*. Cambridge, Mass.: MIT Press.
- Lee, Sam Youl, Richard Florida, and Zoltan Acs. 2004. "Creativity and Entrepreneurship: A Regional Analysis of New Firm Formation." Jena, Germany: Discussion Papers of Entrepreneurship, Growth and Public Policy, Max Planck Institute for Research into Economic Systems, Group Entrepreneurship, Growth and Public Policy.
- Lyons, Thomas S. 2003. "Policies for Creating an Entrepreneurial Region." *Main Streets of Tomorrow: Growing and Financing Rural Entrepreneurs*, a conference sponsored by the Center for the Study of Rural America, Federal Reserve Bank of Kansas City, pp. 97-106.
- Malecki, Edward. 1994. "Entrepreneurship in Regional and Local Development," *International Regional Science Review*, vol. 16, nos. 1&2, pp. 119-53.
- Markley, Deborah, Don Macke, Rae Montgomery. 2004. "BizPathways – Minnesota's Virtual Entrepreneurs Network: Ongoing Evaluation of Effective Practice." Center for Rural Entrepreneurship, August.
- McGrath, Rita Gunther, Ian C. MacMillan, Sara Scheinberg. 1992. "Elitists, Risk-Takers, and Rugged Individualists? An Explanatory Analysis of Cultural Differences between Entrepreneurs and Non-Entrepreneurs," *Journal of Business Venturing*, vol 7, pp. 115-35.
- Rappaport, Jordan. 2003. "Moving to Nice Weather," *Federal Reserve Bank of Kansas City Research Working Paper*, 03-07.

- Rosenfeld, Stuart. 2001. "Networks and Clusters: The Yin and Yang of Rural Development." *Exploring Policy Options for a New Rural America*. Proceeding, a conference sponsored by the Center for the Study of Rural America, Federal Reserve Bank of Kansas City, pp. 103-20.
- Rubin, Sarah. 2001. "Rural Colleges as Catalysts for Community Change, The RCCI Experience," *Rural America*, vol. 16, issue 2, Summer.
- Small Business Administration. 2005. "*The Innovation-Entrepreneurship NEXUS: A National Assessment of Entrepreneurship and Regional Economic Growth and Development*," at [www.sba.gov/advocresearch/rs256tot.pdf](http://www.sba.gov/advocresearch/rs256tot.pdf).
- Sutaria, Vinod, and Donald Hicks. 2004. "New Firm Formation: Dynamics and Determinants." *Annals of Regional Science*, vol. 38, pp. 241-62.