The Journal of
Regional
Analysis
& Policy

JRAP 40(1): 20-33.

Evaluating U.S. Rural Entrepreneurship Policy

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Abstract. We explore the role of entrepreneurship in economic growth and development, paying particular attention to types of entrepreneurship (such as necessity- versus opportunity-based) and the various means by which entrepreneurship can be modeled. This includes a model of knowledge accumulation as a function of investments in stocks of scientists and codified knowledge such as patents. The difficulty of carrying out such work with currently available data is emphasized and we describe how an "ideal" evaluation in terms of data and methodology could be carried out. We also present an overview of some of the evaluations conducted on popular programs aimed at the promotion of entrepreneurship in the U.S.

1. Introduction and motivation

Interest in entrepreneurship and policies to influence entrepreneurial behavior has increased dramatically in recent years among academics and many community economic development practitioners (Acs et al., 2008; Goetz et al., 2009). Foundations such as Kauffman, Kellogg and Lowe have invested heavily in entrepreneurial development, with one foundation president suggesting that entrepreneurship may be the *only* avenue through which the U.S. will retain its global economic lead (Schramm, 2006). In a 2009 special report, the *Economist* magazine refers to entrepreneurs as "global heroes." This raises the question of whether government has a role in stimulating entrepreneurship and, if so, how to evaluate whether policy makes a difference.

Despite the growing interest in and the perceived need for greater reliance on entrepreneurial activity, data on entrepreneurship trends at least in the U.S. are equivocal. The CPS reveals a steady monthly rate (0.32%) of new firm formation since 1996 among households (Fairlie, 2009), while the BEA's REIS[1] reports steady increases in rural self-employment rates between 1969 and 2007, from 14% to 21% percent of all employment, based on updated IRS Schedule C proprietor tax filings (Goetz, 2008*a*,*b*).[2]

Reconciling such data and definitional discrepancies is the first challenge in evaluating entrepreneurship policy. A second is collecting sufficiently detailed data to make meaningful statements about rural versus urban differences in policy. A third challenge is distinguishing among types of entrepreneurship, which range from Schumpeterian innovators to mundane coffee shop owners (Julien, 2007). The former are viewed as key to economic growth via creative destruction while the latter are mere replicators, often born out of necessity rather than opportunity.

One way to think about entrepreneurship during economic growth and development is a Kuznets-type (1955) process as shown in Table 1. The economy evolves from factor- (e.g., agricultural) to efficiency- (e.g., manufacturing) and ultimately innovation-based (e.g., information technologies), as the primary form of organizing work changes along with dominant sectors, sources of growth and firm sizes. While this logic tracks development over time, it also portrays development across the urban-rural continuum and, *ipso*

[1] CPS refers to the Current Population Survey, administered by the Census. The BEA/REIS is the Bureau of Economic Analysis' Regional Economic Information System (Dept. of Commerce).

[2] Note that shares reported here reflect the spring 2009 revisions in the BEA data series.

facto, elements of the product cycle or a Rostow-type (1962) growth process.

These three sources of growth need to be understood and delineated when contemplating rural policy development. In particular, policy interventions that merely shift economic activity to rural areas through traditional subsidies may represent a zero sum game – or worse if agglomeration economies are negated as a result. Indeed, the World Bank (2009) argues that policy should be as spatially neutral as possible – for example, entrepreneurship programs should apply across nations, not just urban or rural territories.

Table 1. Entrepreneurship in the course of economic development.

Feature	Economic development base		
	Factor-based	Efficiency-based	Innovation-based
Main organizational form	Self-employment/ proprietorships	Wage-&-salary employment	Opportunity or necessity entrepreneurship
Income level	Lower	Medium	Higher
Dominant Sector	Natural Resources	Manufacturing	Services
Sources of growth	Abundance of resources	Gap-filling; copy-cat	New products, processes, services
Firm size	Smaller	Larger	Small & large

Adapted from Acs et al., 2008.

The logic outlined in Table 1 also differentiates among true innovation and so-called imitation, input completing or copy-cat behavior (i.e., Julien's (2007) *mundane* entrepreneur), and entrepreneurship of *necessity* (*reactive*) versus opportunity (*radical or Schumpeterian*). For example, Starbucks Corp. is efficiency-based, as Howard Schultz copied the idea of Italian coffee shops. While efficiency-based strategies[3] are limited to factor-based development that relies on non-renewable resources, the potential for innovation-based economic development is fundamentally unbounded (Romer, 1990).

The principles outlined in Table 1 can be illustrated using cross-country data (Figure 1). *Early stage*

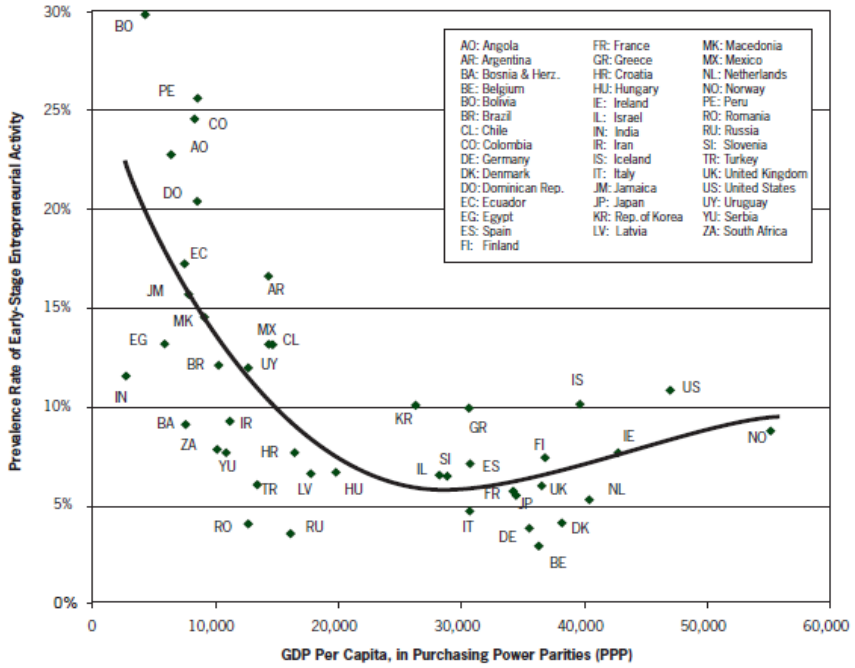

Figure 1. Early-stage Entrepreneurial Activity Survey and GDP/capita (fig. 8 in Bosma et al., GEM 2008, p.22).
Data are from GEM Adult Population Data and IMF. http://entreprenorskapsforum.se/swe/wp-content/uploads/2010/02/GEM-Global-Report_2008.pdf.

[3] Deller (2009) describes specific procedures for implementing such strategies.

entrepreneurial activity is the share of 18-64 year-olds active as beginning entrepreneurs or proprietor-managers of a newly-created business. These early stages are represented by agriculturally-intensive economies.

This *U*-shaped pattern is fairly stable over time, and the importance of institutions and macroeconomic stability in facilitating it is noted in the Bosma et al. GEM report (2008, p. 21). Mature economies have a mix of small and large firms that enjoy economies of scale and scope and benefit from agglomeration economies. They grow through innovation, and economies of scale often reside in manufacturing establishments that transition into knowledge-based firms. Thus, in the most-mature economies such as the U.S., development policy should consider refocusing towards entrepreneurship and knowledge-based establishments. That is, while mundane entrepreneurship can reinforce a growth process, it cannot serve as an engine of economic growth. Sustained growth requires Schumpeter-type entrepreneurs who are innovators.

Our goal here is to provide a framework for thinking about entrepreneurship, policies to influence entrepreneurship patterns, and a means to evaluate those policies. We present five additional sections. In Section 2 we outline a conceptual framework embedded in new growth and agglomeration theories, drawing on the work of Acs and his colleagues (various years). The framework is valuable for sorting out different types of entrepreneurship and identifying policy-relevant variables. In Section 3 we discuss U.S. data sets for potential policy evaluation. We review and evaluate existing entrepreneurial development programs in Section 4. In Section 5 we outline econometric studies that could be helpful in evaluating entrepreneurial policy and suggest further research topics.

2. Conceptual and empirical frameworks

The challenge is to capture serendipity within a formal stylized model. Schumpeter identified creative destruction as the growth-maximizing process in which innovative and more profitable firms replace existing firms. While new growth theory does not address entrepreneurship explicitly, it provides a useful starting point. In this section we follow Acs and Varga (2005, pp. 327-8), Parker (2004) and Goetz and Rupasingha (2009). Knowledge accumulation (dA/dt) is modeled as the product of cumulative codified knowledge (A or total patents) and the number of workers generating new technological knowledge, H_A (Acs and Armington, 2006):

$$dA/dt = \delta H_A^{\lambda} A^{\varphi} \quad (1)$$

Parameter δ measures research productivity and φ reflects how codified knowledge spills over into economic activity (Romer, 1990), specifically new technologies. Parameter λ reflects *tacit* knowledge spillovers; it varies endogenously over space in influencing entrepreneurial efforts. H_A also varies across rural and urban areas, and in this multiplicative model, a given stock of knowledge grows more rapidly in the presence of more knowledge workers.

These spillovers increase with agglomeration or population density (Rosenthal and Strange, 2001, 2003), either within an industry due to localization economies (Marshall-Arrow-Romer economies) or via urbanization effects (Jacobs externalities) across the entire region (World Bank, 2009, p. 128, quoting Kilkenny). We hypothesize that the parameter is larger within industry clusters and among businesses with stronger networks. Acs and Varga (2005) report cross-country estimates of λ=0.36 and φ=0.70, noting that omitted factors could bias the estimates.

Acs and Armington (2006, pp. 37-40) describe four distinct sources of entrepreneurial opportunity: 1) disequilibrium in existing markets; 2) political and socio-demographic change; 3) exploitation of A in equation (1) above; and 4) development of new knowledge embodied in H_A via R&D expenditures. Only the latter two can produce sustained growth, but without ongoing R&D investments even A eventually dries up as a source of opportunities.

From this stylized framework, we motivate a neoclassical entrepreneurial decision equation according to which a new business opportunity is pursued if it pays more than comparable wage and salary employment (Acs and Armington, 2006; Goetz and Rupasingha, 2009):

$$E_i = f([\pi_i(A_\mu, C) - \omega_i]\theta_i) \quad (2)$$

where E_i is entrepreneurial activity in region i, π_i profit expectations associated with the activity, A_μ knowledge that has not yet spilled over into existing firms, C is entrepreneurial climate or culture, ω_i is wage-and-salary earnings and θ_i is individual- and community-level receptiveness to new-firm formation. The latter include spatially-varying education and skills, access to financing, daycare facilities, regulations, and the community's willingness to change.

While profit opportunities are locally-conditioned, A_μ may be constant over space. As such, no separate rural policy would be needed. Transaction costs and absorption capacity do vary over space, however, thus creating varying opportunities. More importantly, because of agglomeration economies returns will vary depending on density, as well as remote or

urban-adjacent location. This heterogeneity needs to be acknowledged in rural development policy, especially given that entrepreneurship is a way to 'grow from within' as an alternative to attracting outside investments.

2.1. Dependent variables

A first issue is measuring entrepreneurial activity. Two approaches are the ecological (firm-based) and labor market-based (Audretsch and Fritsch, 1994), which differ in the denominator used for normalizing across geographies. Another issue is whether to use firms or the number of employees as a unit of measure of growth (Table 2). Additional data details and sources are presented in section 3.

Table 2. Entrepreneurship indicators (measures).

Firm-based	Employment-based	Other
Employer firm birth rate	High-growth firm rate by employment	High-growth firm rate by turnover
Employer firm death rate	Gazelle rate by employment	Gazelle rate by turnover
Business churn	Ownership rate start-ups	Value-added by young firms
Net business population growth	Ownership rates business population	Productivity contribution, young firms
Survival rate at 3 and 5 years	Employment in 3 and 5 year old firms	Innovation, performance, young or small firms
Proportion 3 and 5 year survival	Average firm size after 3 and 5 years	Export performance, small firms

Source: OECD, 2008.

One measure rarely considered is the number of businesses that should not have been started. Introducing this concept into policy evaluation frameworks is difficult, but the opportunity costs of these investments should be considered. The Small Business Administration counts the number of potential entrepreneurs they discourage from starting a business. The ratio of firm deaths to births (appropriately lagged) reveals a region's effectiveness in growing firms. This can be calculated as net firm creation divided by the sum of firm deaths and births.

Plummer and Headd (2008) use Business Information Tracking Series (BITS) data on business establishment births and deaths and find that new firm formation rates are essentially the same in rural as in urban areas, using either the ecological or the labor force method. They find average rates of firm births of 0.11 per firm for primary metro counties, 0.12 for suburban counties, and 0.11 for non-metro counties between 1990 and 2003.

As noted earlier, entrepreneurship may reflect necessity or opportunity. Figure 2 suggests that the share of businesses started in response to opportunity increases with a nation's level of development, while the share established out of necessity falls. With appropriate data, this could be tested across rural and urban areas as well. A complementary hypothesis is that opportunity entrepreneurship is associated with higher returns to self-employment compared to entrepreneurship of necessity. With the exception of value-added and productivity contribution measures, however, the variables in Table 2 are counts or ratios of firms and individuals, and not of earnings, profitability or other returns to entrepreneurship. To be sure, grasping both the differing causes of entrepreneurship (necessity versus opportunity), as well as their different effects, are important items for future research.

Variables showing motivation for firm formation are unavailable at the regional levels and have to be collected in specialized surveys (e.g., Thompson and Walstad, 2008). Nevertheless, Goetz (2008*b*) shows some promise in that patenting activity and higher educational or occupational attainment are positively associated with new firm formation, while the same is true of unemployment rates. Thus the former likely represents entrepreneurship of opportunity while the latter represents necessity, and it may be possible to construct synthetic estimates of the two from secondary data.

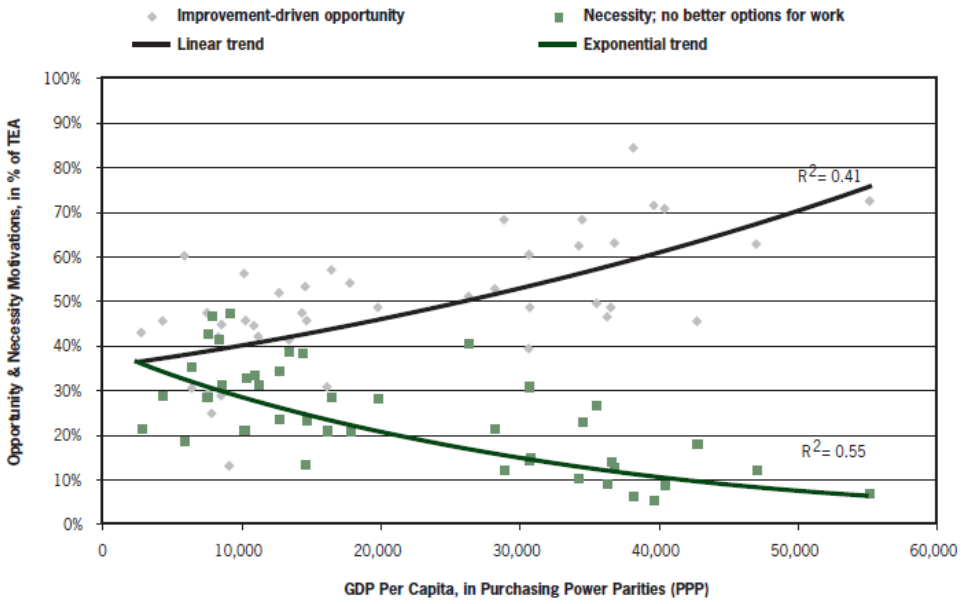

Figure 2. Necessity- and opportunity-based entrepreneurship (share of early-stage activity), GEM 2008 Nations.
Data source: see Fig. 1 above. http://entreprenorskapsforum.se/swe/wp-content/uploads/2010/02/GEM-Global-Report_2008.pdf.

2.2. Independent variables

Explanatory variables in these types of studies can be categorized in a number of ways, building on equation (2). OECD (2008) distinguishes among: 1) regulatory framework; 2) market conditions; 3) access to finance; 4) R&D and technology; 5) entrepreneurial capabilities; and 6) culture (Ahmad and Hoffman, 2008). Goetz and Rupasingha (2009) use demographic characteristics as proxies for the pool from which the self-employed emerge, regional characteristics, and policy as captured in the Economic Freedom of North America index.

More generally, entrepreneurship occurs at three distinct levels. One is the individual, profit-seeking businessman or businesswoman, with a specific set of characteristics that affect entrepreneurial endeavors (Dyer et al., 2008). These could include both mundane and Schumpeter-type entrepreneurs. In econometric studies individual-level attributes such as age, income, education and home ownership (a measure of collateral) are factors that influence entrepreneurship. In contrast, factors such as individual drive, motivation, tolerance for risk-bearing, and ability to generate new insights cannot be captured with secondary data.

The second level is based on the notion that individuals are embedded in networks or community ecosystems that function with underlying support systems and collaborators. These include access to pooled labor markets, transportation, or other specialized service providers, in the sense of Marshall (1966 (1890)). The cluster literature focuses on these linkages (e.g., Goetz and Rupasingha, 2002; Goetz, Deller and Harris, 2009). Although networks are commonly treated as exogenous, individuals clearly act strategically when forming networks and alliances. A new literature is emerging using game theory (Stuart and Sorenson, 2007).

A third literature focuses on how communities support individual entrepreneurs or their clusters – specifically services provided to ensure success. Collaborative Strategies LLC developed the Entrepreneurial League System building on Lichtenstein and Lyons (2006; also Lichtenstein et al., 2004). They conceptualize an entrepreneurial pipeline through which nascent entrepreneurs pass, viewing individual businesses as being at different stages in minor leagues, much like baseball's minor leagues for rookies, A, AA and AAA players. Loveridge and Nizalov (2007) find that the optimal local development policy varies with the existing size distribution of businesses, and they argue that Michigan's economic growth would increase if the state had more small firms.

3. Potential data sources

We briefly describe U.S. data sets available for policy evaluation, distinguishing different levels of geographic detail (Table 3; Fairlie and Robb, 2009). With the exception of YourEconomy.org (Dun and Bradstreet data) and the INC 5000, these data sets are from government sources. While data reporting to the federal government is mandatory, sources such as the

Table 3. Data source, geography, frequency, industry detail, firm size and earnings.

Source	Geography, availability	Industry detail	Firm size	Earnings
GEM	National	Yes	No	No
Kauffman Index	State, 2004 – 2008	Yes	No	No
BDS Census	State, 1977 – 2005	Yes	Yes	Yes
County Business Patterns	County, 1990 – 2007	Yes	Yes	Payroll data
REIS, Self-employment	County, 1969 – 2007	Census years	No	Yes
YourEconomy.org; D&B	County, 1993 – 2007	Yes	4 cats	No
Employment Securities ES 202	Zipcode 1990-present	Yes (NAICS)	Yes	Yes
INC 5000 firms	Zipcode, 2008	Yes	No	No

Source: compiled by authors.

BEA-REIS miss unreported activity. The REIS also overstates the true extent of entrepreneurship because individuals file a different Schedule C for each business they own. One manifestation of this overcounting is the downward-revision by six percent of the 2006 self-employed with the 2007 data release.[4]

Self-employed individuals may also be undercounted on the U.S. Census, because they have only the option of declaring themselves as employed or self-employed. Those who work for others but have a business on the side are excluded. The same question is used in the CPS, which is the basis of the Kauffman Index (Fairlie, 2009). Perhaps the most compelling evidence for undercounting of entrepreneurship is the so-called tax gap (the difference between actual and expected tax revenues), estimated at $365B in 2004. The larger problem here is not only that none of these data sources are set up specifically to collect entrepreneurship data, but also that the definition of entrepreneurship remains elusive (Headd and Saade, 2008).

The self-employed are typically ignored by state policymakers, where development efforts tend to focus on landing "big firms" with tax incentives (Eisinger, 1995). Smaller businesses are an important missed opportunity for policy purposes, and potentially for understanding rural differences. States report only ES202 data on employed workers, and nonemployers, or self-employed workers are not considered explicitly by state agencies. Self-employed workers do not receive unemployment compensation in the U.S.[5]

Thus, as a first policy step we recommend that states take more careful consideration of the growing numbers who work for themselves. Without systematic analysis, we do not know how these individuals are affected by state policies, let alone rural and urban differences. The data exist and the only additional step would be to aggregate income data by individual Social Security Numbers, under protection of privacy. In addition to basic income, details such as NAICS industry codes could be analyzed.

4. Evaluation of existing programs

We present and, to a limited extent, evaluate existing private and public entrepreneurial development programs, including those of Small Business Administration (SBA), Kellogg and the Appalachian Regional Commission. An important context for the focus on local activities is provided by Michelacci and Silva (2007), who report for both the U.S. and for Italy a local bias in entrepreneurship in the sense that businesses owned by local residents are larger and more capital-intensive. These authors suggest that local entrepreneurs are better able to take advantage of local financial resources in their birth region.

[4] McGranahan, pers. comm., Apr. 24, 2009.

[5] As they do in Germany, for example, at least up to six months – see *BusinessWeek*, May 11, 2009, p.44; this article provides anecdotal evidence of the success of the policy.

4.1. Kellogg Foundation's Entrepreneurial Development Systems

In 2004 the Kellogg Foundation announced a national competition for funding Entrepreneurial Development Systems (EDSs), in the amount of $2M each over three years. Over 180 applications were received, far exceeding the resources available. In the end, only six applications were funded.

EDSs are designed to further economic development in lagging communities by: 1) developing and expanding the pipeline of entrepreneurs; 2) building institutional and other support systems for entrepreneurs (including coaching, access to capital and market information, etc.); and 3) influencing state and local policies as well as communities so as to enhance local entrepreneurship. In their evaluation of the program Edgcomb et al. (2008, p. 18) note that:

> [b]ecause of challenges with the data collection at each of the sites, the quantitative record is only partial. Nevertheless, the available data, along with documentation of the qualitative changes, produce a fairly strong picture of what has been achieved.

Edgcomb et al. (2008) note that the EDS projects in each region increased the understanding of and appreciation for entrepreneurship. This is an intangible but nevertheless important impact. It was also recognized that a statewide approach is more effective than only a rural approach. Further, the efforts served as demonstration projects for how firm genesis and growth could be accelerated. Investments made in supporting entrepreneurial infrastructure included promotion of entrepreneurship and facilitating of youth entrepreneurship. They argue that entrepreneurship education was better integrated into college curricula and policymakers were educated on the need for appropriate policy. Finally, the authors contend that solutions were developed that could ensure the sustainability of these systems (Edgcomb et al., 2008).

Overall, the amount of support provided by Kellogg likely was too little and extended over too short a period to effect lasting local changes. It takes time to develop such systems and, more fundamentally, to change the culture of a region in which wage-and-salary employment has long dominated other forms of work. However, results may be costly or difficult to reproduce elsewhere.

Secondary data on firm formation (BEA or Lowe Foundation) could now be used in more systematic impact assessments of the Kellogg funding. To our knowledge this has not been done but it represents an important opportunity because it would allow counterfactuals to be introduced for policy analysis. Figure 3 below, for one of the sites funded by Kellogg, suggests that the effort had no effect.

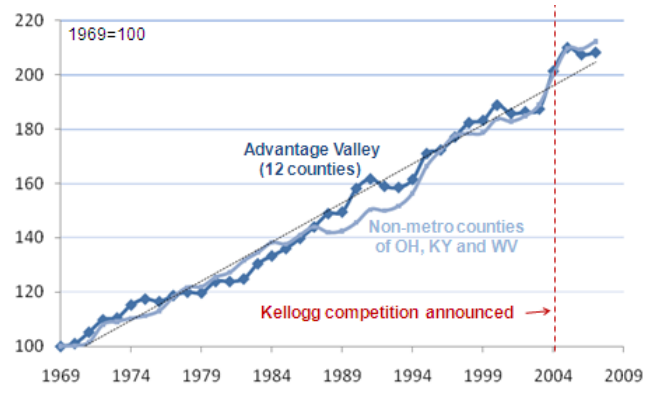

Figure 3. Index of Self-Employed Workers, Advantage Valley, WV-OH-KY Kellogg ELS, 1969-2007.
(BEA/REIS data, 1969=100)

4.2. ARC's entrepreneurial development effort

The Appalachian Regional Commission (ARC) has invested nearly $43M since 1997 to create entrepreneurial economies. Three basic conclusions of an evaluation by Markley et al. (2008, pp. 1-2) are that as a result of the initiative the entrepreneurial pipeline in the region has expanded, entrepreneurs now have more information and greater skills, and the ARC region has more firms (1,787) and jobs (12,178). Also, the authors argue that entirely new sectors have emerged, including the "sustainable wood products industry."

Markley et al. (pp. 9*ff*) draw the following lessons for policymakers. First, it is important to tap into local knowledge bases (consistent with equation 1 above) and to bring together various partners to create leverage or agglomeration economies. The authors discuss other process indicators but also propose that conventional measures of economic development – job creation – be replaced with an "entrepreneurship development metrics portfolio" (p.13). Such a portfolio might consist of (p.14) business profitability measures (see above), counts of youth contemplating entrepreneurship, changes in community support of local entrepreneurs, and measures of incubator use.

Financial and technical support can make a measureable difference in a region's entrepreneurial development. This requires, however, the presence of 'soft factors' such as local champions and leaders who can galvanize a community and a culture conducive to the experimentation embodied in entrepreneurship and small business development. Public policy can support these kinds of individuals, and without them such efforts are likely to fail. Further, the very real impact of climate or culture on new firm formation in

a region is evident. For example, Goetz and Rupasingha (2009) find that the ARC indicator variable is negative and statistically significant, even after controlling for other variables influencing self-employment growth rates during the 1990s. Of course, other persistent differences that precede the creation of the ARC region may underlie this finding.

4.3. Other federal programs

Federal efforts in regional economic development have long been criticized for being disjointed across agency silos. Mills, Reynolds and Reamer (2008) argue that federal policy should aim (p. 9) "to augment regional economic competitiveness by harnessing the power of geographic proximity and inter-organizational collaboration." Of course, this leaves out rural areas with low population densities where it is difficult for clusters to be economically sustainable. USDA/RD (rural development) spending has focused heavily on bricks-and-mortar infrastructure spending, which may be necessary but not sufficient for effecting lasting changes (Kilkenny and Johnson, 2007; Renkow, 2009).

While cluster principles may appeal superficially, they are difficult to implement in practice (Goetz, Deller and Harris, 2009). In fact, there is much that we do not know about how clusters originate, how they subsequently grow, or how policy can foster them. The cluster literature suffers from definitional problems similar to the entrepreneurship literature: no two clusters are exactly alike, and attempts to define clusters become so vague as to be meaningless. Finally, we do not know whether clusters enhance local growth or merely represent undiversified economies vulnerable to economic shocks.

Mills et al. (2008) argue that federal efforts are not only piecemeal but also that they focus on inputs rather than outputs or outcomes, and collaboration across agencies is uncommon. Most federal funds are dedicated to (individual) business, financial and technical assistance, or to research and development (Fig. 4). The over $75B spent in FY 2006 were spread across 14 departments or agencies and 250 individual programs involving regions, firms or workers that failed to establish any kind of synergy or leverage.

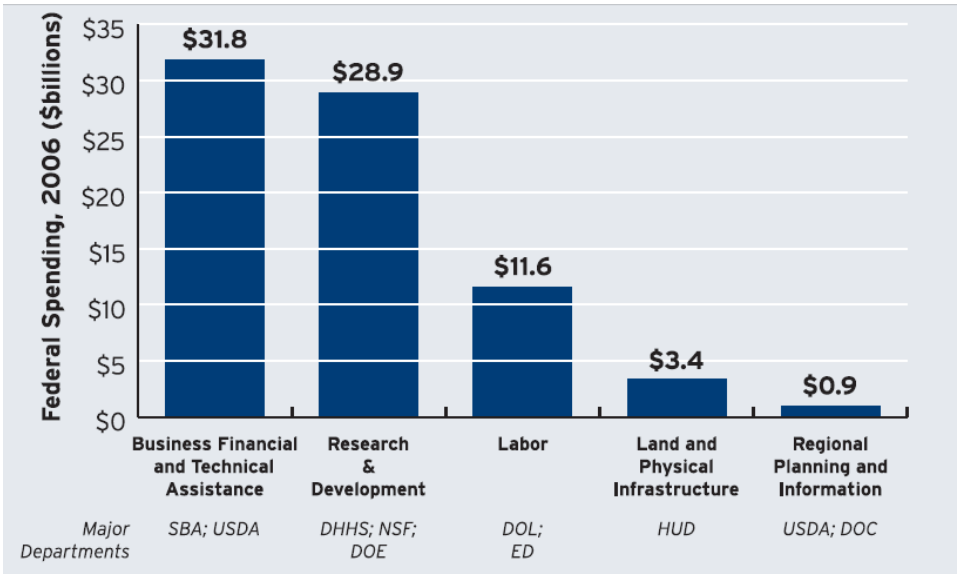

Figure 4. Federal expenditures on regional economic development, by area and department.
Source: Mills et al. (2008), p.6.
Note: includes direct expenditures and loan guarantees

Along these lines, a recent GAO (2008) report found that ample opportunities exist for USDA/RD business development and the SBA loan programs to collaborate more closely. While collaborative efforts currently are in place, such as joint hosting of workshops and cross-referrals between the two agencies, such efforts tend to be sporadic and *ad hoc*, initiated by individual employees rather than being systematically pursued by the agencies. Further (p. *i*), "[t]he two agencies worked together frequently in a few locations, infrequently in others, and not at all in many locations." The GAO recommends that the agencies "define and articulate a common outcome, agree on roles and responsibilities, monitor key progress and results, and reinforce accountability for collaborative efforts. With such an approach, SBA and Rural

Development could more effectively leverage each other's unique strengths and help to improve small business opportunities in rural communities." Shaffer (2001) argues that the National Rural Development Partnership is one federal initiative that seeks to bridge federal, state and local agencies and groups focusing on rural development, which may address these weaknesses. Unfortunately, the success of these efforts can fall prey to political self-interests.

The SBA's Loan and Investment Programs were analyzed in Rossman and Theodos (2008). The SBA operates four programs, with different criteria, exposure levels and goals (2008, p. 2): the Section 7(a) Loan Guaranty; CDC/504 loans; MicroLoans; and Small Business Investment Company Funds (SBIC). In their regressions, Rossman and Theodos include basic characteristics of firms, markets (region, industry, unemployment, etc.) and the type of financing as explanatory variables. The dependent variable is either firm sales or employment growth. The financing is the treatment effect, and includes the dollar amount, interest rate and length of loan.

Rossman and Theodos (2008, p. 58) conclude that SBA financing failed to boost firm performance as measured by sales or employment growth. However, they found that growth increased *prior* to the receipt of financing and suggest that the anticipation of and preparation for the loan application triggered this positive response (or it may indicate that 'healthier' firms were more predisposed to apply for funding). Further, their analysis revealed no statistical differences across the loan terms and conditions, whereas firm age, industry, and region did matter (accounting for only 2 to 10 percent of the variation in the dependent variable). In the case of the 7(a) program, sales (+65) and employment (+44 percentage points) of agricultural and mining firms grew more rapidly than those of other firms (*op. cit.,* p. 20 and 21). Since these firms are often in rural areas, further investigations may prove fruitful.

Furthermore, the opportunity costs of such investments need to be considered systematically in an assessment. For example, would more jobs have been created if the SBA had simply written checks to the general population in the region, or alternatively, would other investments have yielded higher returns?

4.4. NERCRD listening sessions

Prompted by the unmet need demonstrated in the response to the 2004 Kellogg RFP, the four Regional Rural Development Centers hosted listening sessions on rural entrepreneurship in their regions. In the Northeast, 100 rural stakeholders from the public and private sectors noted that the following factors and conditions in their areas were thought to be conducive to entrepreneurship (Goetz and Whitmer, 2007, p.7):

1) networking, mentoring and training opportunities
2) a variety of financial and other incentives to start businesses
3) increasing collaboration among entrepreneurs and agencies that support them
4) expansions of "buy local' campaigns and business-to-business channels

These developments were viewed as possible only due to strong state and local leadership in the area.

Of course, the results of such listening sessions are not free of selection bias among the participants. In particular, the fact that these individuals attended indicates that they were part of a network informed about the event in the first place. We have no data from those not attending. Further, the insights gained are based on what respondents say rather than what they necessarily do. More systematic data and analysis are needed to arrive at robust policy recommendations.

Nevertheless, these listening sessions provided useful information about roles of federal, state and local government policy in supporting – or discouraging – entrepreneurial efforts. These include health care for small business owners, and in fact, Goetz (2008*b*) finds that at the state-level, higher health care premiums are statistically associated with lower rates of new firm formation. Other federal policy options include business insurance, lending programs even for higher-risk start-ups, longer-term funding streams, greater support for the SBA, and the introduction of entrepreneurship curricula in K-12 education. These results provide clues about variables to be included in an overall evaluation framework, outlined in the next section.

5. Developing effective rural policy: what the research shows

If there is a positive message in the existing literature it is that, using the measures of entrepreneurship available, government policy can influence economic startup activities. Other measures, such as regional and individual-level characteristics, are more difficult to influence over the short-term (e.g., average educational attainment, individual drive, and motivation or the community's attitudes toward change), or even impossible to change in the long-run (e.g., natural amenities). On the other hand, policy effects are not always in the anticipated direction. For example, government spending on SBIR Awards is associated with fewer startups, holding other factors constant, possibly

due to a crowding-out effect (Goetz 2008*b*). An applied, policy-relevant literature is also emerging around the returns to self-employment and entrepreneurship, as well as the effects of small business formation on the larger economy (Deller and McConnon, 2009; Shreshta et al., 2007). Entrepreneurial climate and culture in a community also make a difference (Loveridge and Nizalov, 2007; Goetz and Freshwater, 2001, attempt to measure such climate).

More specifically, it is clear that soft factors or latent inputs into the growth process – by definition difficult to measure, model, and put into place – play important potential roles in making communities more entrepreneurial. In this section we focus more systematically on the factors that are measureable and about which we can draw generalizable conclusions. This raises the larger question of whether each community is so unique and the particular constellation of actors so idiosyncratic that principles learned and applied cannot work elsewhere, or whether a set of factors can be identified that consistently influence entrepreneurial activities across rural communities.

A basic evaluation framework is:

$$\Delta Y = f(Y, X, Z, R, T) \quad (3)$$

where

ΔY = a measure of change over time in some measure of entrepreneurship (#, $),
Y = base year value of the measure,
X = regional/local conditions affecting Y (beyond policymakers' control),
Z = individual-level factors affecting Y,
R = rural status indicator (continuum code, density or distance), and
T = policy treatment effect (counseling, funding, training, others).

The dependent variable ΔY consists of basic measures of firm formation (see Table 2), including data stratified by firm size to capture pipeline effects, from YourEconomy.org. One construction of this variable is the number of firms transitioning from small to medium and from medium to large-sized over a predetermined period (e.g., five years). Another measure is ownership of the firm – in-state or out-of-state (these are likely to be FDI or big-boxes). Such measures could also include self-employment counts and average earnings per self-employed worker; the higher the latter, the greater the odds that the entrepreneurship involves opportunity rather than necessity. Conversely, other formulations would consider whether these Y measures affect overall economic performance – specifically, whether self-employment shares are associated with enhanced local growth.

Following Acs and Armington (2006) and others, regional or local conditions affecting Y in vectors X and Z include average firm size (number of workers per firm), business sector specialization (per-capita establishment counts in each sector), establishment density, and industry churn. In addition, educational attainment measures (college and high school graduate shares in adult population) and the share of the workforce consisting of self-employed workers (depending on the dependent variable) are included. Acs and Armington's adjusted R^2 values for these regressors at the level of LMAs and with firm formation rates as dependent variables exceed 60 percent for most sectors and are as high as 86 percent for business services. Additional measures include interstate highway access for transportation as well as broadband availability.

Potential policy treatment effects (T) are SBA training workshops and counseling, USDA/RD programs held and actual expenditures, including but not limited to loan guarantees. Also included are the number of scientists and engineers in the community (occupational data from EMSI) as well as basic patent information to capture existing and new knowledge generation. These are variables H_A and A from equation 1 above, and they are interacted with R. To the extent that they are amenable to policy influence, we also include measures of networks to supplement the agglomeration or clustering effect captured in the number of firms per unit area. For example, Goetz and Shrestha (2009) use coffee shops, cafeterias, and drinking places as venues that encourage networking and find that their presence is independently associated with higher returns to self-employment.

Endogeneity and omitted variable bias that can arise in cross-sectional approaches need to be accounted for carefully. For example, an omitted factor such as business climate may be the underlying cause of both (say) greater venture capital financing and more opportunity entrepreneurship, producing biased results. Creative ways of instrumenting for potential endogeneity has been an important research topic in the growth literature (e.g., Partridge et al., 2008b, 2009). The variables in vector T are entered as alternative (competing and complementary) policies, and in the form of interactions with one another, and with the density term (R) to evaluate the effectiveness of alternative rural policies.

Essentially the data on small-firm formation are starting to become available for more rigorous policy assessment, even at the county-level. At the same time advances in spatial statistical analysis allow

researchers to systematically study the effects of proximity – and of distance and position within the urban spatial hierarchy (Partridge et al., 2007, 2008b, 2009). Likewise, spatial heterogeneity in the effects of the particular variables can be considered using Geographically Weighted Regression (Partridge et al., 2008a).

Many advances have occurred in the general program evaluation literature (Imbens and Wooldridge, 2009). In particular, the issue of "program selection" has greatly advanced. Future studies should take special care because communities that receive assistance could differ systematically from those that do not – for example, they have better leadership that identified and successfully applied for the government program. One correction is to adjust for selectivity effects based on the probability of selection into the "program" and to use weighted regressions based on propensity scores. Imbens and Wooldridge (2009) point out that the standard errors of the estimates must be estimated with significant care.

A good example of this approach is Johnson's (2009) evaluation of the USDA's Business and Industry Guaranteed Loan (BIGL) program. This treatment effect is entered in the form of loan dollars per capita with one- and two-year lags to allow for the program to take effect. The dependent variables are workers' earnings and number of jobs created, rather than explicit measures of entrepreneurship. The study is notable in the present context for the great care taken in calculating a propensity score. This score weights (inversely) observations in proportion to the odds of a county receiving the loan.

Because Johnson has data only on loan recipients, rather than all applicants, the study reveals only that the program had an effect in recipient counties, and not whether the program "caused" more loans to be awarded in those counties. As Johnson points out, a comprehensive evaluation of the BIGL program would require data on the rejected applicants as well. Greenstone et al. (2007) assess the impact of industrial recruitment programs by comparing both successful and unsuccessful counties bidding for a major industrial plant, with the latter serving as key counterfactuals (controls). Of course, care must be taken with using unsuccessful counties as counterfactuals because they are "unsuccessful" for a reason – raising selectivity concerns. Fleming and Goetz (in progress) are evaluating the Kellogg EDS using data on both the successful and rejected applicants.

In summary, with a more refined and thorough understanding of the entrepreneurial process, improvements in spatial econometrics, and the availability of county-level databases, the conditions are ripe for further policy evaluation research on entrepreneurs, and how the process plays out in urban vs. rural areas. Access to geo-coded individual-level tax records with adequate protections of privacy could produce even more robust findings.

The OECD/EUROSTAT conception of entrepreneurship indicators (Determinants → Entrepreneurial Performance → Impacts) outlined in Ahmad and Hoffmann (2008, p. 10) is valuable as an overall analytical framework. We would expect the cumulative benefits of such a policy evaluation to far exceed the costs in the long-run.

6. Conclusion

Entrepreneurship is often viewed as the missing "ingredient X" that can enhance growth and raise living standards. Indeed, support for entrepreneurship and associated programs to increase small business formation has in part grown out of frustrations with past efforts that often focus on the latest fads in economic development including tax incentives, clusters, attracting young creative class workers, and so on. Entrepreneurship has the particular advantage of being locally grown, which is especially important in rural areas. Having a diverse set of entrepreneurs seems especially promising given that traditional rural industries in agriculture, extractive industries, and manufacturing are typically associated with negative growth (Goetz and Debertin, 1996; Deller, Gould and Jones, 2003; Kilkenny and Partridge, 2009). Yet, the absence of agglomeration economies in remote rural areas, including the lack of access to thick input markets and knowledge spillovers, place rural entrepreneurs at a significant disadvantage, suggesting that while the benefits of promoting rural entrepreneurs may be high, so are the costs.

Policymakers have created programs at the federal, state and local levels designed to enhance entrepreneurship. The shift to supporting entrepreneurship should not be taken without rigorous efforts to evaluate these policies. While many efforts have evaluated these programs, practical and conceptual barriers limit the value of their use and their transferability. Foremost, evaluation efforts need to appraise the goals of the 'entrepreneurship' programs (e.g., Partridge et al., 2009). Are these efforts aimed at increasing small business formation, numbers of proprietors, profits, regional output, among others? Or is entrepreneurship a means to an end – specifically, policy enhances entrepreneurship in order to improve *overall* local and regional economic conditions such as through greater population and job growth. In terms of using entrepreneurial policies to enhance rural

development, the latter set of goals seems more appropriate.

One key concern that limits evaluation of entrepreneurship programs is the question of measurement. Clearly, conventional data sets only allow an approximation, forcing analysts to use indirect measures thought to be associated with entrepreneurship – for example, numbers of self employed, earnings per self-employed worker, and numbers of small businesses created. Measuring entrepreneurship is especially critical considering the distinctions between entrepreneurship of necessity versus opportunity. As we have noted, new data sets may allow researchers to draw more rigorous conclusions in the future.

Another complicating factor is the definition of entrepreneurship itself. First are Julien's (2007) mundane entrepreneurs who see market opportunities for new businesses. Market threshold theory tells us that as a community grows, market opportunities are created and new small businesses, such as a hardware store or a coffee shop, will be created from within. Second, reactionary entrepreneurs emerge when an economic downturn forces people into starting their own businesses. Often these new businesses are stop-gap measures, and they close as soon as other employment opportunities become available. The third is what we refer to as Schumpeterian entrepreneurs who innovate and bring these innovations to market, creating new products and sometimes entirely new industries. Within growth theory, these entrepreneurs are key drivers of economic growth. As we have seen, the data currently available make it difficult to decompose new business start-ups data into these respective entrepreneurial categories.

Numerous efforts have evaluated rural entrepreneurship, but most have lacked sufficient rigor, including controls. Many are not based on structural economic models of entrepreneurship, let alone structural models of how entrepreneurship enhances local economies. Likewise, the propensity exists to count direct and indirect jobs using impact models, which may be criticized for over-counting the actual numbers of jobs created (Kilkenny and Partridge, 2009). Finally, in these models, causality needs to be established with great caution. For example, while entrepreneurship may improve local economic activity, strong local economies also attract entrepreneurs. Economists have become much more careful with modeling causality in the last decade. Using the types of models proposed here, we believe careful and relevant evaluation is possible, but this requires adequate funding and flexibility to enable researchers to conduct these studies.

Acknowledgements

An earlier version of this paper was presented at the OECD Conference on Rural Policy Evaluation in Paris, France, June 15-16, 2009. The support of the authors' respective home institutions and of the USDA/NIFA is gratefully acknowledged. Any opinions expressed are strictly those of the authors.

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APPENDIX: Data sources

- BEA Regional Economic Information System (Census Bureau); 1969-2006 – counties
  - https://www.bea.gov/regional/reis/
- YourEconomy.org – 1993-2007, county-level (Dun and Bradstreet/NETS data)
  - http://www.youreconomy.org/
- ES 202, State Employment Securities series (requires confidentiality waiver)
- Business Dynamics Statistics (Kauffman Fdn. and Census Bureau) – 1977-2005; state-level only
  - http://www.ces.census.gov/index.php/bds
- County Business Patterns (Census web-site)
- Kaufman Index of Entrepreneurial Activity (state-level)
  - http://sites.kauffman.org/pdf/KIEA_041408.pdf