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Haifeng Qian

Kingsley E. Haynes

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Haifeng Qian

and

Kingsley E. Haynes

Haifeng Qian is a Ph.D. Candidate; Kingsley E. Haynes (corresponding author, khaynes@gmu.edu) is the Ruth D. and John T. Hazel, MD Endowed Chair and University Professor of Public Policy, both at the School of Public Policy, George Mason University, 4400 University Drive, MS 3C6, Fairfax, VA 22030, USA. The authors wish to thank the USDA for their support of this research (Contract # 2008-55401-04487). All analysis and interpretations are the responsibility of the authors. The authors would also like to thank Huaqun Li, Mark Middleton, and Carl Turner for their help in collecting and cleaning data.

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ABSTRACT: The primary purposes of this paper are to present the geographic distribution of US business incubators and to explore geographically bounded factors that influence the location of business incubators. Our data show that US business incubators are unevenly distributed across the urban/rural division, states, as well as counties. Factor analysis identifies three common factors from 27 demographic, social, and economic variables drawn from publicly available data at the county level. These factors include agglomeration, welfare, and business/entrepreneurship. The results of binominal logistic regressions suggest that incubators are more likely to be found in counties with high levels of agglomeration but low levels of existing business development. Our findings support the "incubation push" model over the "business pull" model on the location of business incubators, which reflects the policy strategy of incubator creation.

1. Introduction

Business incubation according to the US National Business Incubation Association (NBIA)[1] is "a business support process that accelerates the successful development of start-up and fledgling companies by providing entrepreneurs with an array of targeted resources and services." The organizations pursuing business incubation are called "business incubators." They are generally not-for-profits but can also include government agencies and for-profits entities. Typical services provided by technology-based business incubators include primary services such as shared facilities administrative services, and professional services such as business knowledge training, marketing assistance, accounting/financial management, investor and strategic partner linkages, and networking (Wiggins and Gibson 2003). Business incubators may also offer contract and procurement training and legal assistance. Incubators are named as "virtual incubators" when they provide no primary

[1] From http://www.nbia.org/resource_center/what_is/index.php, retrieved February 7, 2009.

services, in particular, physical office space.

Business incubators play an increasingly important role in nurturing start-up businesses, fostering entrepreneurship, and facilitating economic development. The number of business incubators in the US increased from 12 in 1980 to more than 1,100 by 2006. [2] According to Knopp (2007), North American incubators in 2005 assisted 27,000 start-up companies, created more than 100,000 jobs, and generated revenue of $17 billion. While 39% of those incubators accept only technology firms, 54% are for mixed use and provide resources and services to different types of early-stage companies. The fundamental importance of business incubators lies in the fact that while start-up firms are vulnerable in the market due to lack of all types of resources, assistance from incubation programs makes them more likely to survive. Tenant firms of the NBIA member incubators exhibit a five-year success rate (still in business when five years old) of 87% (University of Michigan et al. 1997), compared with a four-year success rate of 50% for US firms on average (Headd 2000). Business incubators may have direct impacts on regional economic performance since 84% of firm graduates stay in their communities (University of Michigan et al. 1997).

However, regions have not benefited equally from the rapid expansion of business incubators during the past two decades. Among all the US business incubators, 28% are built in rural areas (Knopp 2007). A recent effort (2009) to identify the population of US incubators made by a joint research team from West Virginia University (WVU), George Mason University (GMU), and Florida International University (FIU) has shown that incubators are unevenly distributed across states, metropolitan areas, as well as counties.

[2] From http://www.nbia.org/resource_center/bus_inc_facts/index.php, retrieved February 7, 2009.

Among the total 719 incubators this research has identified, the state of New York hosts 64 of them whereas Wyoming has only 1. At the county level, only 467 out of more than 3000 US counties are home to one or more incubators.

The primary purposes of this paper are (1) to present the geographic distribution of American business incubators and (2) to explore geographical bounded factors that are associated with the location of incubators. For the first purpose, regional variations in business incubation across the urban/rural division, states, and counties are highlighted in mapping incubators at different levels. For the second purpose, this research introduces a set of variables that represent the demographic, social, and economic characteristics of US counties and that might be associated with the presence of business incubators. Factor analysis is subsequently conducted on these variables, identifying three key factors: agglomeration, welfare, and business or entrepreneurship. The paper further employs binomial logistic models to investigate the relationship between these factors and the presence of business incubators in US counties. At the center of our research questions is: is a business incubator more likely to appear in regions advanced in business development (defined as “business pull”) or lagged in business development (defined as “incubation push”)? This research, as far as we know, initiates the efforts to empirically investigate the geographically bounded factors that may influence the presence of business incubators at the local level.

2. Literature

Business incubators play an increasingly important role in assisting start-up firms (Mian

1996), nurturing entrepreneurship (Aernoudt 2004), and driving economic growth (Markley and McNamara 1996). The study of business incubators in many cases is associated with the literature on innovation and technology- or university- based incubators have drawn much scholarly attention (Mian 1996; Rothaermel and Thursby 2005). It also fits the research field of entrepreneurship where the investigation of startup firms has been one of its major missions. It is not uncommon to see that scholars interested in incubators publish their research work in top innovation journals such as *Research Policy,* and in leading entrepreneurship journals such as *Journal of Business Venturing* and *Small Business Economics*.

Despite the growing concern over business incubators, a geographic perspective has been rare. The existing literature sheds little light on why business incubators appear in some regions but not others. Nevertheless, some evidence may be found through the work on the geography of innovation and entrepreneurship. The interest of this research is in all types of business incubators, not limited to technology based ones, and therefore this section focuses on the literature of regional variation in entrepreneurship or new firm formation.

Regional variation in new firm formation has been traditionally explained by population growth or in-migration, and the proportion of employment in small firms (Reynolds et al. 1994). Population growth signals growing market demand which may spur entrepreneurial activity. Concentration of small firms indicates structural flexibility that characterizes many high-growth regions. Small business startups are also affected by the tax rate and competiveness of the local financial market (Bartik 1989). These two factors may have

impacts on financial/accounting performance of firms. In a case study investigating the entrepreneurial culture in the US Capital region, Feldman (2001) identifies venture capital, social capital, entrepreneurial support services, and research universities as environmental characteristics that associated with high technology entrepreneurial initiative. The knowledge spillover theory of entrepreneurship suggests knowledge as an important source of entrepreneurial opportunities (Audretsch 1995; Acs et al. 2009) and supports human capital as another geographically bounded factor that may have an impact on local entrepreneurial activity (Lee et al. 2004; Acs and Armington 2006).

Although the literature has identified several factors associated with new firm formation, we may not assume they exert similar effects on the presence of business incubators. Business incubators, dominantly not-for-profits, may appear in regions with high levels of business dynamics to support the large body of small businesses, and can also be created in regions that lack of business presence to encourage the creation and growth of small businesses. We define the former phenomenon as “business pull,” in comparison with the “incubation push” of the latter. While one of the primary purposes of this research is to investigate geographically mediated factors that influence the presence of business incubators, special attention is paid on whether one or more incubators exist in a region as a result of business pull or incubation push.

3. Geographical Distributions of US Incubators

Despite the growing concern over the role of business incubators in economic development, an entire list of US business incubators to our best knowledge cannot be

found from any public sources. As for the population size, Wiggons and Gibson (2003) reported over 800 US business incubators. According to the National Business Incubation Association (NBIA)[3], there were 1,115 incubators in the US as of October 2006. This represents one of the latest estimations on the number of US business incubators. It is worth noting that the total number depends on the definition of business incubators. Incubators in the 1980s primarily offered shared space and facilities and those in the 1990s featured professional services such as business counseling and training, investor and strategic partner linkages, IT services, networking, and so on. The 1990s also witnessed the emergence of "virtual incubators" which provided only professional business services but not office space. Bearse (1998) has suggested that virtual incubators should not be counted as incubators, since they can not distinct themselves from business consulting firms. Our study accepts this idea and considers an entity as a business incubator only when it provides both office space and professional services, thus excluding virtual incubators as well as entities for business office rental only which may also be identified as incubators.

A recent effort to identify the population of US incubators made by a joint research team from WVU, GMU, and FIU (2009) has provided a list of 719 incubators in the US. In early 2009, the research team collected information on business incubators from various sources, including the NBIA, state business incubation associations, state government agencies, and the Internet. The operation of incubators on the preliminary list was verified through either phone calls or those incubators' official websites. The dataset may not cover all US business incubators but is likely to include most of them particularly for major

[3] From http://www.nbia.org/resource_center/bus_inc_facts/index.php, retrieved February 7, 2009.

incubators. The geographical investigation of US business incubators in this research is based on this dataset and limited to the lower 48 states. Alaska and Hawaii are excluded due to geographic discontinuity.

3.1 By Urban/Rural Division

Most of the identified 713 incubators in the lower 48 states concentrate in urban areas. Under the Office of Management and Budget (OMB) definition of statistical areas, 78% incubators are located in metropolitan areas, compared with 15% in micropolitan areas and 7% outside core based statistical areas (see Figure 1).

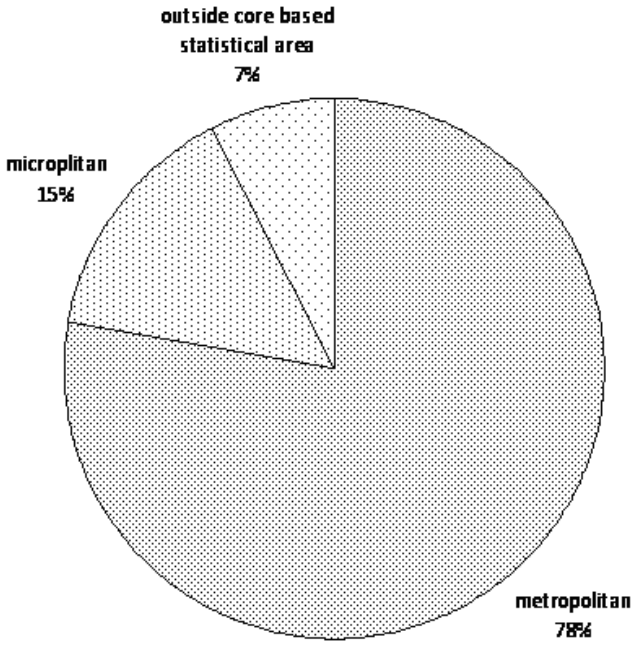

Figure 1: Distribution of incubators across US metropolitan/micropolitan/out of core statistical areas
Data source: incubator information was collected by a joint research team from WVU, GMU, and FIU.

3.2 By State

The number of incubators varies significantly across states (see Figure 2). New York,

Oklahoma, Wisconsin, North Carolina, and Pennsylvania take the lead in hosting incubators, each with over 30 on their jurisdictional areas. While the average number among the 48 states is close to 15, New York has 64 incubators on the list. In contrast, Nevada, Wyoming, Arkansas, New Hampshire, Rhode Island, and Vermont are inactive in business incubation, each with less than 3 incubators. Relatively speaking, states in the West exhibit lower levels of presence of business incubators than other US regions. Incubators standardized by state population are shown in Appendix.

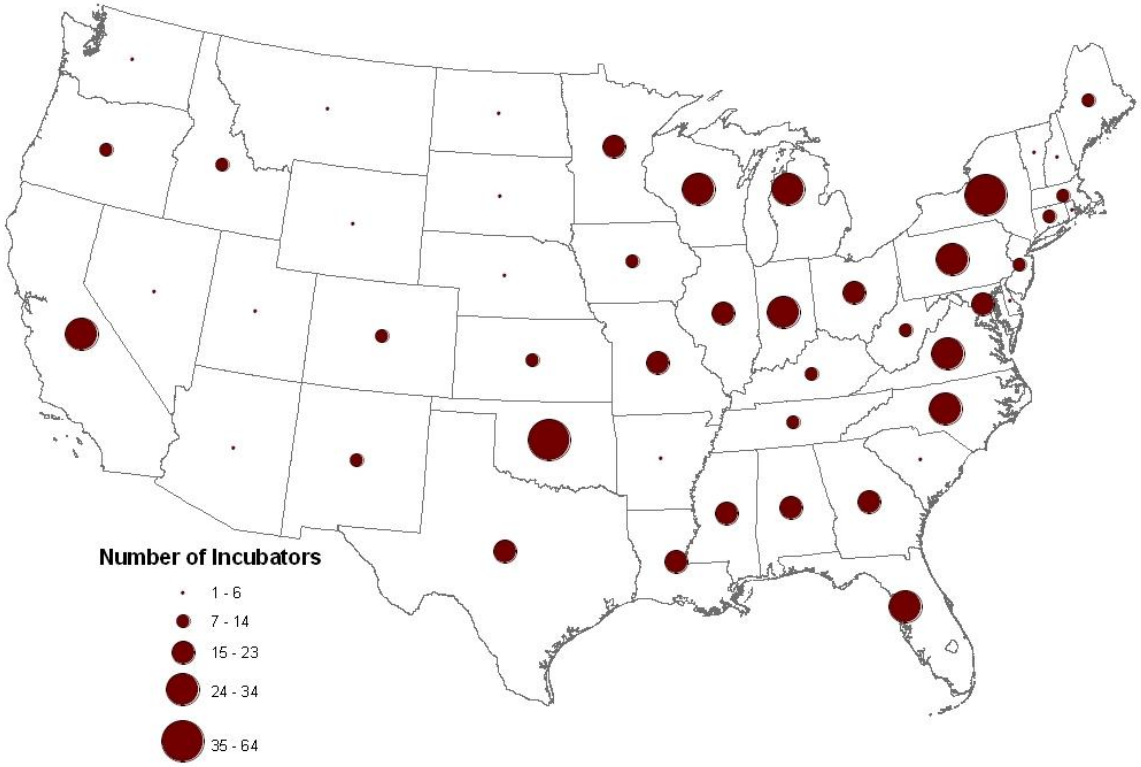

Figure 2: Distribution of incubators across US states
Data source: incubator information was collected by a joint research team from WVU, GMU, and FIU.

3.3 By County

Similarly, business incubators are unevenly distributed across counties (see Figure 3).

Among the 3108 continental counties[4], only 462, or 15% counties are home of one or more incubators. While 326 of these counties have only one incubator, 18 of them hosts 5 or more. On top of the list are Cook (IL), New York (NY), and, Los Angeles (CA), with 11, 8, and 7 incubators respectively. Overall, counties with incubators are dispersed rather than clustered in certain regions.[5] In addition, 316 of the 462 counties with one or more incubators are affiliated with a metropolitan area. Incubators standardized by county population are shown in Appendix.

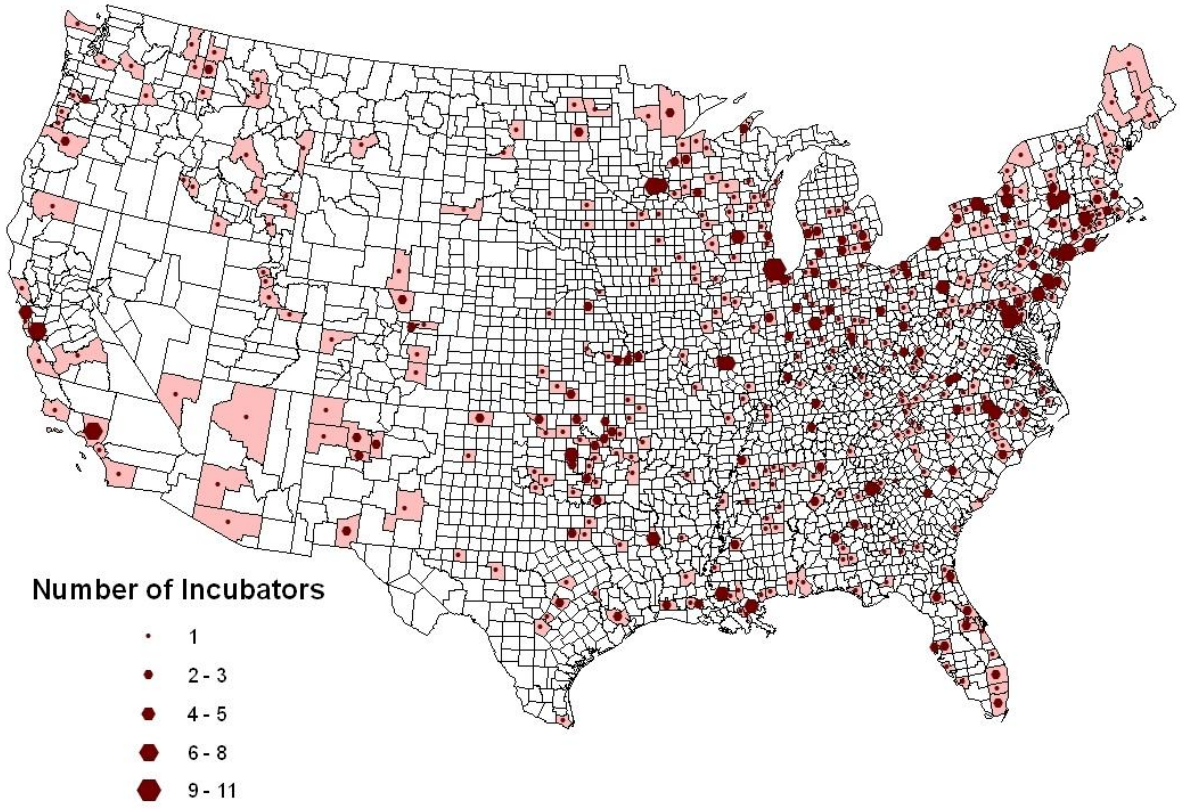

Figure 3: Distribution of incubators across US counties
Data source: incubator information was collected by a joint research team from WVU, GMU, and FIU.

4. County-Specific Factors Associated with Presence of Incubators

[4] According to the definition of County and City Data Book (2007), there are 3109 counties in the continental states. However, Broomfield County, Colorado, did not exist until 2001 and it is excluded in this study.
[5] The Moran's I test does not support the existence of spatial dependence.

This study also explores geographically bounded factors that are associated with the presence of business incubators. It is exploratory rather than confirmatory since little work has been done on this topic. Counties are used as the geographic unit for empirical analysis. 27 explanatory variables with publicly available county-level data are introduced. Factor analysis and binominal logistic regression analysis are employed to seek factors that explain why some counties have one or more business incubators whereas others do not. In particular, our empirical analysis seeks to test whether business pull or incubation push matters in the geographical pattern of US business incubators.

4.1 Variables, Measures, and Data

While business incubators are generally associated with innovation and entrepreneurship in the literature, innovation-specific data at the county level (in particular, R&D) are rarely available from public sources. Based on data availability, we introduce 27 variables (as shown in Table 1) which reflect the demographic, social, and economic characteristics of counties and are likely to influence the presence of business incubators.

For demographic variables, population can best measure the demand in the market where entrepreneurs discover and exploit profit opportunities. Population growth has been suggested as one of the major factors that affect new firm formation (Reynolds et al. 1994), and may further have an impact on business development and hence on the demand for business incubators. Population density signals the extent to which tacit knowledge may be exchanged within a region or spill over from existing organizations. According to the knowledge spillover theory of entrepreneurship (Audretsch 1995; Acs et al. 2009), this can

influence entrepreneurial activity as well. The relative size of population between 18 and 64 years old and labor force participation rate may reflect the labor base for business development.

Social variables include other factors, for instance, education-based formal human capital which is important to knowledge based entrepreneurship. Urbanization may also matter for the same reason as population density. Household mobility signals societal dynamics and risk preferences, both of which may influence entrepreneurial activity. Social diversity has also been suggested as a driving force for entrepreneurship (Audretsch et al. 2009). Health insurance, poverty reduction, and social security are all associated with economic welfare.

Some of the economic variables are proprietor-, firm-, or establishment- specific and to a large extent associated with entrepreneurship and business vibrancy. Others may reflect the economic base for business development, such as the sectoral structure that is embedded in the relative scales of different industries. Income, wage, and house value are included to represent the wealth of a region. Last, while business incubators in many cases are supported by local government, the size of local government may also affect business incubation activity.

The second column in Table 1 presents how our variables are measured for this empirical assessment. Data are collected from various public sources for the year 2000, when the latest US census was conducted, or the year closest to 2000 when available. Using county level data enables us to construct a large scale dataset in which each variable has 3108 observations.

Table 1: List of variables

Variables	Measures	Year	Sources
Demographic:			
* population	* log(population)	2000	Census
* population growth	* 10-year population growth rate	90-00	Census
* population density	* population by area	2000	Census
* working age population	* percentage of population of 18 - 64 years old	2000	Census
* labor force participation	* labor force participation rate	2000	BLS
Social:			
* urbanization	* percentage of urban population	2000	Census
* household mobility	* percentage of households having moved to a different house during the past five years	2000	Census
* social diversity	* population distribution across racial groups [6]	2000	Census
* high school attainment	* percentage of adults with educational attainment of high school	2000	Census
* human capital	* percentage of adults with bachelor's degree/above	2000	Census
* health insurance	* overall health insurance participation rate	2000	Census
* poverty reduction	* percentage of population out of poverty	2000	Census
* social security	* log(household social security income)	2000	Census
Economic:			
* establishments	* number of establishments per capita	2000	CBP
* non-employer establishments	* number of non-employer establishments per capita	2002	Census
* firms	* number of firms per capita	2002	Census
* non-farm proprietors	* non-farm proprietors as a percentage of labor force	2000	BEA
* business in manufacturing	* percentage of establishments in NAICS 31-33	2000	CBP
* business in trade, transport & warehousing	* percentage of establishments in NAICS 42-49	2000	CBP
* business in professional services	* percentage of establishments in NAICS 50-59	2000	CBP
* business in social services	* percentage of establishments in NAICS 61-62	2000	CBP
* business in amenities	* percentage of establishments in NAICS 71-72	2000	CBP
* unemployment	* unemployment rate	2000	BLS
* income	* log(income per capita)	1999	Census
* wage	* log(wage per capita)	2000	Census
* house value	* log(median house value)	2000	Census
* local government	* percentage of employment in state and local government	2000	BEA

[6] Following Ottaviano and Peri (2006), social or cultural diversity is measured through $\text{Diversity}_j = 1 - \sum_{i=1}^{M} p_{ij}^2$, where p_{ij} is the proportion of racial group i in county *j*, and *M* is the number of racial groups being considered. Local population is grouped into five groups: non-Hispanic white, black, Latino, Asian, and others, corresponding to i=1, 2, 3, 4, 5.

4.2 Factor Analysis

The 27 variables we have introduced in the previous section are associated with regional business environment and may potentially influence the creation and survival of business incubators. Whiles in many cases one variable is significantly correlated with another, we adopt the factor analysis method to isolate shared variance and obtain several uncorrelated factor constructs. The retained common factors, which explain the most variance in our data using much fewer dimensions, should make conceptual sense. Factor scores are then calculated for each county, replacing our initial variables to explain the geography of US business incubators. This step paves the way for sequential multivariate analysis particularly while reducing the effect of multicollinearity.

Factors are extracted based on the principal components method. We have determined the number of factors retained for further analysis in terms of eigenvalues, variance explained, the scree plot, as well as content validity. Table 2 shows the results of variance explained by each factor. It can be seen that seven factors have an eigenvalue higher than 1. However, the eigenvalues of Factors 4, 5, 6, and 7 are all less than 1.5 and close to 1. By contrast, the first three factors alone, each with an eigenvalue above 2, account for 55% of the total variance. Such a comparison suggests Factors 4, 5, 6, and 7 are less useful. The Scree test further supports a three factor solution, presenting a single and very clear break at Factor 4 (see Figure 4). We therefore adopt the three-factor solution.

Table 2: Variance explained

	Initial			Rotating three factors		
Factor	**Eigenvalue**	**Proportion**	**Cumulative**	**Eigenvalue**	**Proportion**	**Cumulative**
Factor1	**7.654**	**0.284**	**0.284**	**6.330**	**0.235**	**0.235**
Factor2	**4.586**	**0.170**	**0.453**	**4.543**	**0.168**	**0.403**
Factor3	**2.617**	**0.097**	**0.550**	**3.985**	**0.148**	**0.550**
Factor4	**1.493**	**0.055**	**0.606**			
Factor5	**1.277**	**0.047**	**0.653**			
Factor6	**1.131**	**0.042**	**0.695**			
Factor7	**1.032**	**0.038**	**0.733**			
Factor8	0.881	0.033	0.766			
Factor9	0.776	0.029	0.794			
Factor10	0.702	0.026	0.820			
Factor11	0.662	0.025	0.845			
Factor12	0.603	0.022	0.867			
Factor13	0.567	0.021	0.888			
Factor14	0.463	0.017	0.905			
Factor15	0.404	0.015	0.920			
Factor16	0.366	0.014	0.934			
Factor17	0.296	0.011	0.945			
Factor18	0.277	0.010	0.955			
Factor19	0.229	0.009	0.964			
Factor20	0.213	0.008	0.972			
Factor21	0.183	0.007	0.978			
Factor22	0.159	0.006	0.984			
Factor23	0.144	0.005	0.990			
Factor24	0.118	0.004	0.994			
Factor25	0.096	0.004	0.997			
Factor26	0.067	0.003	1.000			
Factor27	0.003	0.000	1.000			

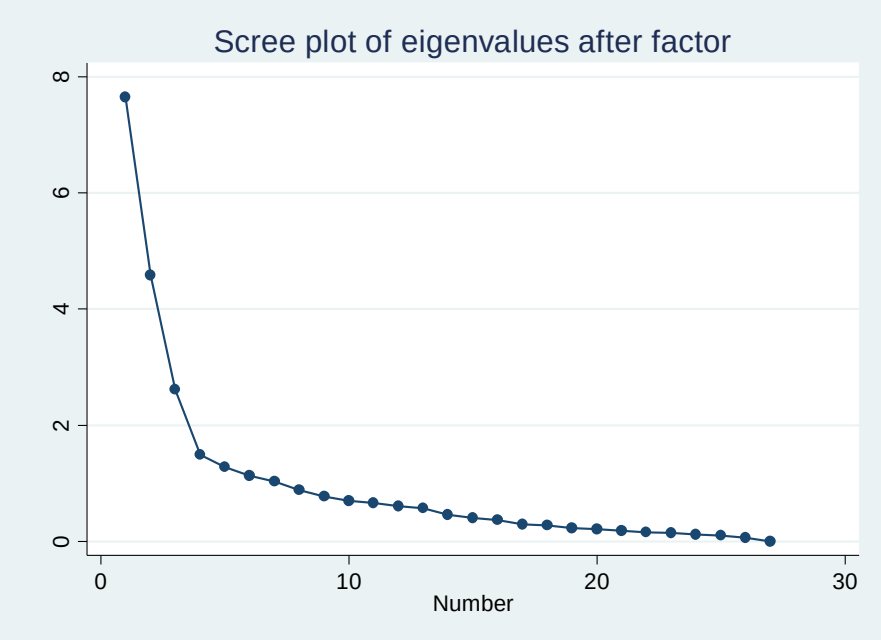

Figure 4: Scree plot of factor analysis

The three factors retained should make conceptual sense or meet criterion of content validity. Table 3 presents the rotated factor matrix with variable loadings on each factor, which can be used to clarify factors. For the purpose of readability, values of secondary and tertiary loadings are not displayed. Factor 1 is mostly associated with population, professional services business, urbanization, house value, human capital, wage, household mobility, working age population, and income, all having a loading higher than 0.6. This leads us to name Factor 1 as *agglomeration*. Factor 2 is constructed primarily by poverty reduction, health insurance, labor force participation, and social security, signaling the *welfare* of a county. Factor 3 is most relevant to firms, establishments, and proprietors and thus can be labeled as *business, business development,* or *entrepreneurship*. To sum up, we identify Factor 1, 2, and 3 as agglomeration, welfare, and business/entrepreneurship. It is worth noting that among all the 27 variables we have introduced, local government is the only one that has not been successfully loaded onto any of these three factors using a 0.3 criterion,

and may need to be separately considered when investigating its effect on the presence of business incubators.

Table 3: Rotated factor matrix (three factor solution)

Variable	Factor1: Agglomeration	Factor2: Welfare	Factor3: Business/ Entrepreneurship
* population	0.799		
* business in professional services	0.784		
* urbanization	0.780		
* house value	0.763		
* human capital	0.738		
* wage	0.727		
* household mobility	0.719		
* working age population	0.657		
* income	0.631		
* business in trade, transport, and warehousing	-0.533		
* population growth	0.444		
* population density	0.338		
* poverty reduction		0.898	
* health insurance		0.871	
* labor force participation		0.680	
* social security		0.660	
* high school attainment		0.594	
* social diversity		-0.580	
* unemployment		-0.572	
* business in manufacturing		0.381	
* firms			0.926
* non-employer establishments			0.884
* establishments			0.770
* non-farm proprietors			0.687
* business in amenities			0.471
* business in social services			-0.326

4.3 Binominal Logistic Regressions

We run binominal logistic regressions (or logit regressions) to explore geographically mediated factors that are associated with the presence of business incubator in a county. The dependent variable is a binominal variable with its value “1” indicating the presence of

one or more incubators vis-à-vis "0" indicating no business incubator(s) in a county. Primary explanatory variables are the three factors we identified in the previous section: agglomeration, welfare, and business/entrepreneurship. The local government variable, which has not been successfully loaded onto these three factors, is further added. In addition, we control the effects of urban/rural status by adding two binominal variables: metropolitan and micropolitan. The model can be written as:

$$\ln(\frac{p}{1-p}) = \alpha + \beta_1 AGGL + \beta_2 WELF + \beta_3 BUSI + \beta_4 LOCGOV + \beta_5 METRO + \beta_6 MICRO + \varepsilon \qquad (1)$$

where *p* is the probability that a county has one or more incubators; *AGGL*, *WELF*, *BUSI*, and *LOCGOV* represent agglomeration, welfare, business development, and local government respectively; and ε is the stochastic error.

Among the three factors, business/entrepreneurship is particularly of our interest in investigating the geography of business incubators, since it addresses our primary research question. A significantly positive coefficient of business/entrepreneurship indicates that incubators tend to exist in regions with a solid business base and strong entrepreneurial culture. This would support the "business pull" explanation on the existence of business incubators. By contrast, if that coefficient is significantly negative, incubators are more likely to exist in regions with poor business operations and lack of entrepreneurship. In this case, incubators are created to nurture business development, echoing the "incubation push" explanation that we have defined.

It should be pointed out that there is a time gap between the dependent variable and explanatory factors or variables. While the list of US business incubators has been built based on the early 2009 information, data for independent variables are for 2000 or the year

closest to that with available data. While a reasonable time length by which data for the dependent variable are ahead of data for independent variables makes more convincible causality, the large time gap in our case may jeopardize causality, providing the fact that some incubators have been recently created and not existing for the year of 2000. However, it generally takes years to plan and build a business incubator, and the potential problem resulting from such a large time gap may be dismissed.

Table 4 presents the binominal logistic regression results for all counties. The coefficient of Factor 3, business/entrepreneurship, is negative and significant, suggesting that business incubators are less likely to exist in regions with strong business and vibrant entrepreneurial activity. This opposes the "business pull" hypothesis and supports the "incubation push" explanation on the presence of business incubators in a region.

Table 4: Logit regression with factors (all counties)

Dependent Variable : Presence of Incubator(s)		
Independent Variables	**Coefficient**	**z-value**
Factor 1 – agglomeration	1.2089 ***	14.37
Factor 2 – welfare	0.0147	0.24
Factor 3 - business/entrepreneurship	-0.4930 ***	-6.19
Local government	-0.0002	-1.04
Metropolitan	0.5296 **	2.43
Micropolitan	0.5938 ***	3.00
Obs.	3107	
Pseudo R2	0.2384	

*** significant at 0.01 level; ** significant at 0.05 level.

Among other factors or variables, agglomeration is positively and significantly associated with the presence of business incubators. This relationship indicates that incubators are more likely to be built in regions with higher levels of agglomeration. The positive and significant coefficients of the two binominal explanatory variables shows that counties in

metropolitan regions or micropolitan regions are more likely to host incubators than counties outside core based statistical areas. Neither welfare nor local government exhibits a significant relationship with our dependent variable.

4.4 County Scale Effects

We have further examined whether our empirical results are affected by the scale of counties in two ways. First, we run separate regressions towards metropolitan counties and non-metropolitan counties (see the results in Tables 5), and find similar patterns to those taking into account all counties. One slight difference is the effect of welfare, which is positive and significant at the 0.1 level for non-metropolitan counties, negative and insignificant for metropolitan counties, and positive and insignificant for all counties.

Table 5: Logit regressions with factors (metropolitan counties and non-metro counties separately)

Dependent Variable : Presence of Incubator(s)		
Independent Variables	**Metro**	**Non-Metro**
Factor 1 – agglomeration	1.4077 ***	1.1457 ***
Factor 2 – welfare	-0.0655	0.1503 *
Factor 3 - business/entrepreneurship	-0.7411 ***	-0.4109 ***
Local government	-0.0001	-0.0003
Obs.	1085	2022
Pseudo R2	0.2129	0.0850

*** significant at 0.01 level; * significant at 0.1 level.

Second, we divide the counties into two groups in terms of population size and then run separate regressions (see the results in Table 6). The first group includes large-size counties with population over 50,000, and the second group covers all other counties with population below 50,000. The results are again similar with our previous results. The difference still lies in the effect of welfare, which is negative and significant in large-sized counties.

Table 6: Logit regressions with factors (small-sized counties and large-sized counties separately)

Dependent Variable : Presence of Incubator(s)		
Independent Variables	**Large-Sized (Pop. > 50,000)**	**Small-Sized (Pop. <= 50,000)**
Factor 1 – agglomeration	0.9141 ***	0.6863 ***
Factor 2 – welfare	-0.2004 **	-0.0089
Factor 3 - business/entrepreneurship	-0.3277 ***	-0.3005 ***
Local government	-0.0002	-0.0001
Obs.	907	2200
Pseudo R2	0.0943	0.0352

*** significant at 0.01 level; ** significant at 0.05 level.

5. Concluding Remarks

With their rising role in business nurturing, job creation, and business development, business incubators have drawn broad attention from scholars, regional development practitioners, and policymakers. To the best of our knowledge, however, the existing literature has failed to provide insights on why business incubators appear in some regions but not others. This question may at least be raised by regional economic planners and entrepreneurs for whom small business development is on top of their interests. From the policy perspective the answer to this question sheds light on whether a region has the conditions for the development of business incubation.

In this paper we have presented the geographical distributions of American business incubators. Geography does matter in business incubation, providing the facts that most incubators are located in metropolitan counties, some states host more (if not much more) incubators than others, and a majority of counties have no incubators at all. We have further attempted to explore geographically mediated factors that are associated with the presence

of business incubators. 27 variables that characterize the demographic, social, and economic conditions of counties, with data available in public sources, are tentatively introduced and grouped into three major factors via factor analysis. These three factors, which account for more than half of the total variance in our dataset, are identified as agglomeration, welfare, and business/entrepreneurship. In subsequent multivariate analysis using binominal logistic regressions, we find that incubators are more likely to appear in counties with high levels of agglomeration and lower levels of business development, both under the *ceteris paribus* condition. Our findings support the "incubator push" model over the "business pull" model for the location of business incubators.

Issues associated with the relative success of incubators or their stimulation of new firm formation or even new firm survival are questions for the immediate future. For those questions we need to track these incubators and their new firm offspring through time in the context of their changing milieu and ancillary support structure.

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Appendix

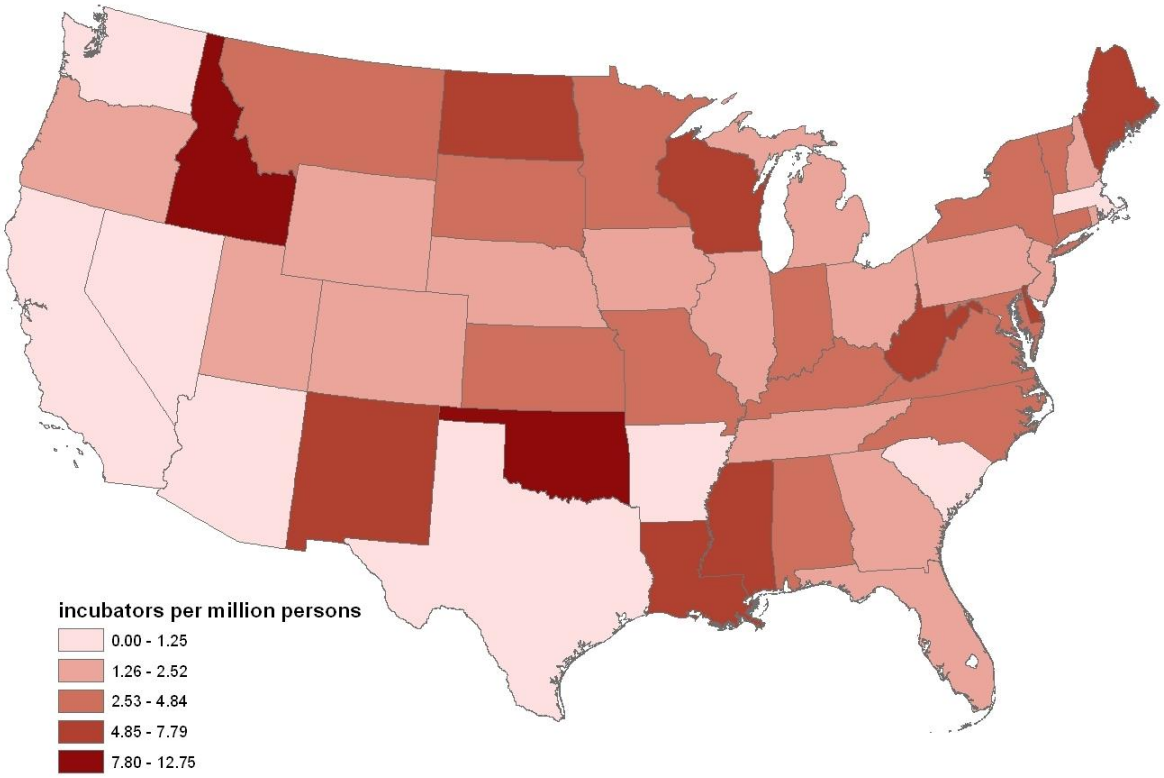

Figure A1: Incubators per million persons by state

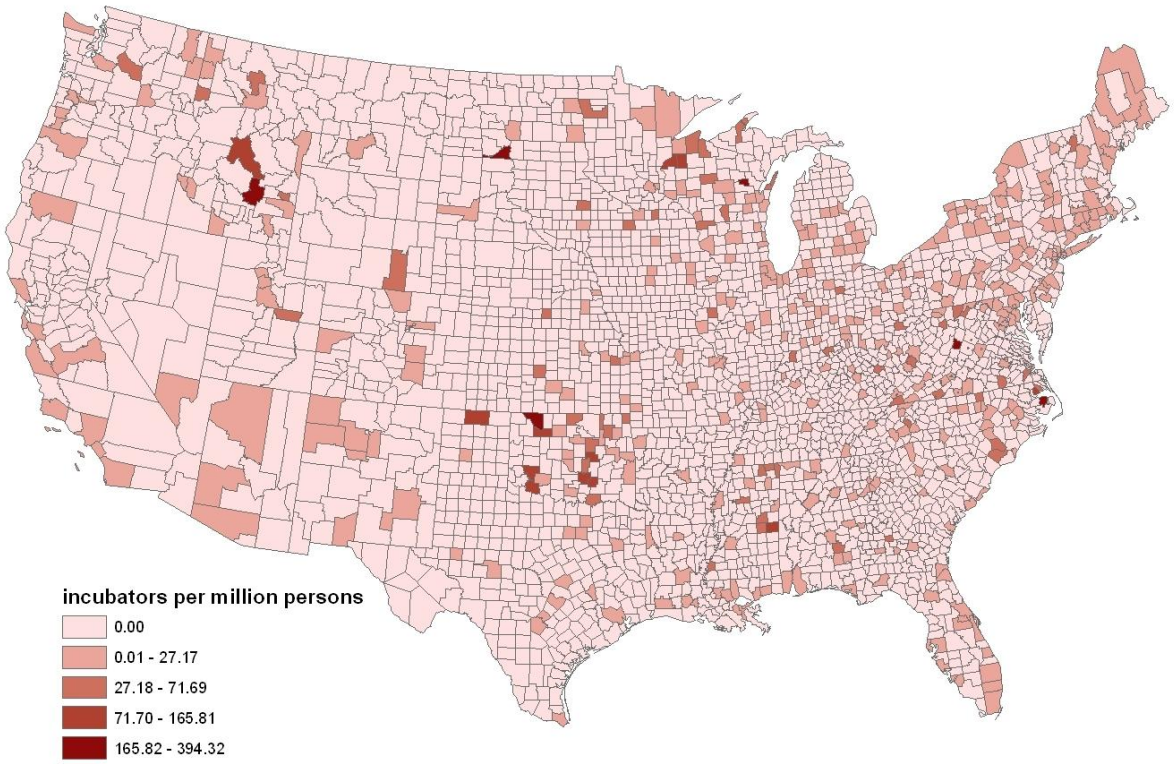

Figure A2: Incubators per million persons by county