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# The Influence of Local Social and Industrial Characteristics on Emergent Entrepreneurship

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**Abstract:** We consider the effect of cities on the individual decision to start a firm. Specifically, we consider how several agglomeration theories may encourage individuals to launch a new firm. We contribute to the expanding literature on entrepreneurship by using the Kauffman Index of Entrepreneurial Activity (KIEA) for 1998-2011 to consider individual startup decisions, while controlling for individual motivations, and to examine the importance of the local industry conditions to new firm launches across several industries. We find that individuals in regions with entrepreneurial social and institutional structures are more likely to launch a new firm, while industry concentration and diversity are only significant in denser locations. The presence of small and new firms in a region creates an environment conducive to entry and is consistent across industries.

*Keywords*: agglomeration, new firm entry, cities, Chinitz

*JEL Codes:* L26, R1, J2

## 1. INTRODUCTION

Some areas seem to have local social and industrial conditions conducive to individuals starting new firms (e.g., Silicon Valley and New York City), while others have conditions that deter entry (e.g., Pittsburgh and Detroit, according to Chinitz, [1961]). We add to the growing literature on entrepreneurship by considering the effect of various sources of agglomeration on an individual's probability of starting a new firm, using the Kauffman Index of Entrepreneurial Activity (KIEA).

The connection between entrepreneurship and urban growth is a stylized fact in economics. Through increased competition and innovation pressures, new entrants encourage existing firm improvements and future regional growth (Fritsch and Mueller, 2004, Wennekers et al., 2010). This research has addressed the challenges of regional and national stagnation and has generated a myriad of studies on entrepreneurship. We focus on entrepreneurship growth within a city rather than economic growth and consider the effects of industry and region characteristics. Previous studies on entrepreneurship growth have focused on either industry or region characteristics and often omit individual motivations. Very few datasets contain such information or contain aggregated data (e.g., startup rates) at the industry or region level. Nonetheless, leaving out these variables that are important determinants of starting a firm (Wennekers, 2006) may significantly bias results. While various sources of agglomeration have been hypothesized to affect startups, it remains unclear whether each source is equally important or if a particular source may capture multiple theories because of limitations in data or modeling

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techniques. By modeling multiple sources of agglomeration together, we attempt to reveal the relative contribution of each agglomeration theory.

Section 2 presents previous literature on the determinants of entrepreneurial entry and the hypotheses tested in this study. We consider the effect on entrepreneurship of agglomerations: Marshall's industry concentration, Jacobs' urbanization, and Chinitz's hypothesis. Individuals may launch firms near customers and suppliers, where they can learn from surrounding firms. Marshall suggested that industry concentration may encourage such knowledge spillovers, while Jacobs (1970) proposed that industry diversity enhanced knowledge spillovers and innovation in startups. Finally, Chinitz (1961) suggests that the presence of small and independent firms leads to social and institutional structures that encourage entrepreneurship.

The third section summarizes the KIEA dataset and explores the entrepreneurship measure used in this paper. The KIEA identifies a wide range of startups as they occur. Alternative datasets contain a coarse measure for entrepreneurship (e.g., number of startups by industry and region) and only include employer, incorporated, or industry-specific startups. The KIEA contains individual-level observations from the Current Population Survey (CPS) from 1998-2011. By capturing new business owners in their first month of significant business activity, this measure provides the earliest documentation of new business development across the country. While the creators of the KIEA use the self-employment question on the CPS to generate their measure, it is not a static self-employment variable. Rather it measures when individuals change their primary employment designation to self-employed. Hence, it may be one of the best dynamic and comprehensive measures of business creation. The KIEA also includes individual data from the CPS, geographic location, and detailed industry classifications that allow industry and region variables from the County Business Patterns (CBP) to be matched to entrepreneurs in the KIEA.

Section 4 presents the empirical framework and estimates for the effect of agglomeration sources on startup decisions for individuals controlling for individual motivations and industry characteristics. We find that Chinitz's hypothesis is the only source of agglomeration that significantly affects the probability that an individual launches a new firm. The presence of small and new firms in a region creates an environment conducive to entry and is consistent across industry sectors. Chinitz-based variables appear to explain startups better than do those pertaining to the hypotheses of Marshall and Jacobs. Section 5 concludes with a summary of results, policy implications, and future research ideas.

## 2. Determinants of Entrepreneurship

We are interested in how local industrial, social, and institutional conditions affect individuals choosing between starting a new firm, being (un)employed, or exiting the labor force. Specifically, we examine alternative agglomeration theories, while controlling for individual motivations. Labor-market theory assumes that individuals choose the mode of employment based on the benefits and costs of each choice (Storey, 1994, Douglas and Shepherd, 2002). We first examine how agglomeration may affect emergent entrepreneurship and then consider individual and industry motivating characteristics.

### 2.1 Agglomeration

One of the basic benefits to agglomerating is that firm productivity can improve through lower transportation costs if customers and suppliers are co-located. Individuals may launch a

new firm near other firms to partake in these external cost savings. The key agglomerating mechanism in new economic geography is the savings from cheaper shipping costs (Fujita et al., 1999). Sugar, for example, was refined in New York City in the 19th century rather than the tropics because of the large costs in transporting refined sugar (Glaeser and Kerr, 2009).

### *2.1.1 Marshallian Agglomeration*

Clusters of firms within an industry may also encourage startups through labor market pooling and knowledge spillovers (i.e., localization economies) (Delgado, Porter, and Stern, 2010). The labor hired in the first few years, vital to any new firm's success, may be constrained by the quality of the labor force in the surrounding region (Dahl and Klepper, 2015). Specialized workers may be required in certain industries and are more likely to pool around agglomerated firms. Labor pooling amongst clustered firms can smooth the effect of firm-specific shocks on individual workers (Marshall, 1890). Workers can easily change jobs when their employer is affected by a negative shock, making workers more productive under such insurance (Krugman, 1991). Large labor pools in a city may also facilitate matching between startups and employees (Helsley and Strange, 1990). Hence, new and existing firms needing similar specialized labor are likely to co-locate and benefit from a greater availability of workers or lower wages in thick labor markets (Glaeser and Kerr, 2009).

Concentrated industries may also promote entrepreneurship through the dissemination of existing and new knowledge. Glaeser et al. (1992) describe the Marshall-Arrow-Romer (MAR) knowledge spillovers that occur when industries are highly concentrated, leading to economic growth. Marshall (1890, p. 225) explained that in concentrated industries, “the mysteries of the trade become no mystery, but are, as it were, in the air.” Customers and suppliers who work closely can share issues with existing products or describe needs and wants for new products (Porter, 1990). Knowledge spillovers are highly localized (Rosenthal and Strange, 2003) and emphasized by studies on patent citations (Jaffe, Trajtenberg, and Fogarty, 2000; Carlino, Chatterjee, and Hunt, 2007).

Contrary to MAR spillovers, Jacobs (1970) proposed that vital knowledge flows into firms from other firms that are outside their own industry. Under this view, variety and diversity will lead to greater knowledge transfer and promote innovation. Several studies have attempted to test whether concentration or diversity is better for regional growth, with mixed findings (Glaeser et al., 1992; Henderson, Kuncoro, and Turner, 1995).

### *2.1.2 Chinitz Agglomeration*

Chinitz (1961) found that characteristics of suppliers, rather than industry concentration, explained entrepreneurial differences between Pittsburgh and New York. Chinitz (1961) described the supplier needs of entrepreneurs as highly localized, compared to those of large incumbent firms that could internalize these needs. The vertically integrated steel firms in Pittsburgh were not concerned with the input needs nor the output capabilities of entrepreneurs. On the other hand, New York City's small supplier network to the fragmented garment industry provided entrepreneurs with specialized inputs. Small firms further exhibit a lack of division of labor, enabling employees to learn a breadth of managerial knowledge that may be useful for running a business (Reynolds, Storey, and Westhead, 1994). These observations were made in an age of manufacturing, but may still apply in the age of information. Chinitz’s hypothesis can be extended to suggest that the presence of small and independent firms leads to social and institutional structures that promote a culture of entrepreneurship (Glaeser and Kerr, 2009).

An entrepreneurial culture may be self-sustained and not limited to specialized input suppliers (Hofstede, 2001). The Silicon Valley encourages entrepreneur trials and emphasizes cooperation between young startups (Saxenian, 1994). Early semiconductors led the way for future entrepreneurs through open inter-firm communication and a vertically disintegrated industry structure.

Glaeser and Kerr (2009) describe agglomerations in entrepreneurship that lead to an entrepreneurial culture. The clustering of entrepreneurs creates social structures that reduce the stigma of failure and increase the likelihood that others take risks (Landier, 2004). Entrepreneurial support institutions may also cluster around concentrations of entrepreneurs (e.g., angel investors, small business incubators, and specialized legal or accounting services). Glaeser and Kerr (2009) find that the "Chinitz effect" explains a significant amount of the variation in entrepreneurship across space while an entrepreneurial culture may be embodied by the Chinitz effect.

### 2.2 Individual Characteristics

Considering local industrial, social, and institutional conditions alone ignores the individual motivations to become an entrepreneur that have been identified by previous studies and results in omitted variable bias. We include demographic information that can play an important role in determining whether or not an individual becomes an entrepreneur. Older individuals are more likely to be self-employed, but younger people prefer to be self-employed (Branchflower, Oswald, and Stutzer, 2001). Storey (1994) finds the highest prevalence of incumbent business owners in the middle-aged cohort while in several countries, nascent entrepreneurs are between the ages of 25 and 34 (Wennekers, 2006). Various ethnic groups have been linked to higher rates of entrepreneurship as immigrants (Delmar and Davidsson, 2000, Jansen et al., 2003). Studies considering gender find that women are much less likely to be self-employed or involved in entrepreneurial activity (Branchflower, Oswald, and Stutzer, 2001; Reynolds et al., 2003; Braunerhjelm et al., 2010).

Education may have opposing effects; Le (1999) discusses the theoretically increased managerial ability and skills that are acquired throughout college, but higher levels of education will increase the quality of outside options. Van der Sluis, Van Praag, and Vijverberg (2008) may be the only study that has identified a positive effect of college dropouts and highly educated individuals.

Income levels can also produce mixed empirical results. Utility-maximizing individuals will select the best mode of employment based on several factors, such as income and risk attitude. In theory, higher-income employed individuals will be less willing to give up their current employment. On the other hand, lower-income employed individuals may choose to become entrepreneurs to increase income and improve working conditions (Douglas and Shepherd, 2002).

Finally, employed individuals are less likely to abandon steady streams of income. Unemployed individuals are more likely to be forced to start a new firm, or may not fit regular employment; Evans and Leighton (1989) find empirical evidence supporting this hypothesis. In addition to changing job status, individuals who change industries may be indicating their risk tolerance and willingness to give up job stability. Entrepreneurs may start businesses out of necessity (e.g., prior industry layoffs, structural changes in employment mix) or not enjoy the typical confines of a nine-to-five job. Less than ten percent of employed individuals changed

industries, whereas 75 percent of entrepreneurs changed industries. Entrepreneurs are not confined to a particular industry and are more likely to branch out from what they know.

### 2.3 Industry Factors

In order for firms to become profitable, new firms must reach minimum efficient scale (MES) (Audretsch, Houweling, and Thurik, 2000). Survival is expected to be improved if this scale is smaller, as firms do not need as many resources to compete (Audretsch, Houweling, and Thurik, 2000). Entrepreneurs that enter an industry with a size closer to the MES are more likely to survive, while smaller entrepreneurs will have difficulty reaching profitability. Larger MES industries also require larger upfront capital and may raise the cost of capital above that of existing firms (Lyons, 1980). Finally, entrants may have difficulty attracting quality workers from larger existing firms.

Small firms may not be deterred from entering industries where scale economies are important (Audretsch, 1991). Industries in which the price level is above the minimum average cost may promote the existence of suboptimal capacity firms, i.e. startups. The further above minimum average cost the price is, the greater the probability of survival is (Weiss, 1976).

## 3. Emergent Entrepreneurs

### 3.1 Measurement of New Firm Launches

No consensus on how to measure entrepreneurship has been reached and each approach yields different interpretations. The number of individuals leading independent enterprises can be measured using self-employment rates (Evans and Jovanovic, 1989; Blanchflower and Oswald, 1998) or average firm size (Glaeser, 2007), but represent static measures. New product introductions (Audretsch and Feldman, 1996) and the founding of new firms (Glaeser and Kerr, 2009) captures the dynamic nature of emergent entrepreneurship. Taking advantage of panel data, we adopt the latter by using an indicator for a change in labor status to self-employed using the Kauffman Index of Entrepreneurial Activity (KIEA) to measure new launches. A wide range of entrepreneurs are included (e.g., incorporated, unincorporated, employer, and non-employer businesses) that are not picked up by datasets based on tax records (e.g., the U.S Bureau of the Census's Longitudinal Business Database).

### 3.2 Data

The KIEA was developed by Fairlie (2012) using the U.S. Bureau of the Census and the Bureau of Labor Statistics' (BLS) Current Population Survey (CPS) covering the years 1998-2011. The KIEA presents a dynamic measure of business formation at the individual level because formation is captured once, when the individual changes primary work status and devotes a significant amount of time to self-employment. Hence, new business launches, rather than business ownership, are captured. Another novelty is that casual entrepreneurs are removed by classifying entrepreneurs as those who devote more than 15 hours per week to self-employment. Finally, individual characteristics can be included from the CPS, such as geographic location, industry, and demographic information.

The CPS surveys more than 130,000 people in a four month period. Eight months later, the same households are re-interviewed over a second four-month period. The CPS uses a sampling method to make the survey nationally representative of the U.S. population, with a sample size of over 700,000 adults between the ages of 20 and 64. CPS respondents are then

matched within a year to create a two-month panel. The primary goal of the CPS is to measure state and national unemployment rates and labor-force characteristics. Precise estimates are made possible by using a national sample, including all 50 states and the District of Columbia. For all empirical exercises in this paper, the CPS sampling weights are employed to correct for nonresponse and post-stratification raking (Fairlie, 2012).

In order to measure entrepreneurship, individuals in the first interview who do not own a business as their main job are identified. Emergent entrepreneurs are identified if the same individuals own their business in the second interview. In order to eliminate casual or part-time business owners, the individual must work more than 15 hours per week and claim owning a business as their primary job, or the work activity to which they devote the most hours. Additionally, individuals in the first survey month who own their own business but devote less than 15 hours are not identified as entrepreneurs.

The U.S. Census Bureau's County Business Patterns (CBP) provides the basis of market and agglomeration measures used, including measures of employment, annual payroll, establishment counts, and the establishment size distribution. Core-based Statistical Areas (CBSA) are defined using the 2000 U.S. census of population to define areas of socioeconomic activity that are linked to an urban center. A CBSA must contain between 10,000 and 50,000 people to be considered a micropolitan region, and over 50,000 to be a metropolitan area. The county of the urban core, and any adjacent counties that share social and economic activity based on commuting to work patterns, comprise the CBSA. These metropolitan area definitions are used to classify regions.

### 3.3 Variables

Table 1 presents the individual control variables provided by the KIEA. Table 2 presents local industry measures calculated for three-digit NAICS and for CBSAs using the CBP dataset. We measure how closely firms are located in each region using employment density. Density is calculated as the number of employees per square mile of land area. Unfortunately, this measure does not separate the importance of customers or suppliers in a particular industry.

**Table 1: Definition of KIEA Individual Variables**

| Variable | Measurement |
|---|---|
| *Education* | Categorical dummies for educational attainment |
| *Income* | Categorical dummies for income level |
| *Married* | Individual is married |
| *Labor Force Code* | Individual was previously unemployed or disabled/retired |
| *Race* | Categorical dummies for race |
| *Female* | Individual is female |
| *U.S. Native* | Individual is native to the U.S. |
| *Same Industry* | Individual did not switch industries in the survey year |
| *Age* | Individual's age and age squared |
| *Home Owner* | Individual owns a home |

**Table 2: Definition of KIEA Region Variables**

| Variable | Measurement |
|---|---|
| *Localization Agglomerations (MAR)* | (Location Quotient) Ratio of a region's share of employment in an industry relative to the nation's share of employment in that same industry |
| *Diversity Agglomerations (Jacobs)* | Ratio of the region's employment in the five largest industries (Smaller values indicate greater urbanization) |
| *Employment Density* | Employment per square mile of land area |
| *Small Business Share (Chinitz)* | Share of a region's employment in firms with fewer than 5 employees |
| *New Firm Concentration (Chinitz)* | Ratio of a region's share of entrepreneurial firms relative to the nation's share of entrepreneurial firms. |
| *Minimum Efficient Scale* | Ratio of the region's average firm size for an industry to the average firm size of the top 50 U.S. firms in that same industry |
| *Average Wage* | Payroll per employee |

(Glaeser et al., 1992) uses a location quotient (LQ) to measure MAR spillovers,which is the ratio of the percentage of employment in an industry within a region to the percentage of employment in the same industry across the entire U.S. Jacobs spillovers are controlled for using the ratio of employment in the largest five industries to employment in the entire region (Glaeser et al., 1992). We include the share of small businesses to estimate the Chinitz effect and the concentration of entrepreneurs to estimate entrepreneur agglomerations.

We use Lackey and Wojan's (2000) measure for MES based on the idea that top firms are more likely to be operating near MES than small entrants. The average size of the top 50 U.S. firms for each industry is gathered using the 2007 Census of Manufacturing data. The MES variable is then the ratio of the region's average firm size for each three-digit NAICS to the average firm size of the top fifty firms in each three-digit NAICS. Values greater than one indicate that the region's industry has a higher average scale than do the largest 50 U.S. firms in the respective industry. Finally, in order to control for outside options of individuals considering employment or starting a new firm, the average industry wage in a region is included.

### 3.4 Summary Statistics

Table 3 shows individual characteristics for emergent entrepreneurs (lower statistic) and non-entrepreneurs (upper statistic). Entrepreneurs are more likely to be low income, and have some high school education, compared to non-entrepreneurs. About 25 percent of entrepreneurs worked in the same industry earlier in the year before starting a business. Ninety-three percent of employed individuals remained in the same industry, or did not change jobs. Home ownership rates and education levels appear to be quite similar amongst the two groups. About 52 percent

of emergent entrepreneurs have medium incomes, while about 26 percent of entrepreneurs have high incomes.

There is little difference between entrepreneurs and non-entrepreneurs in terms of their race and age, while income, gender, and nativity show significant differences. Twenty-two percent of new entrepreneurs have low incomes compared to 16 percent for non-entrepreneurs. Only 41 percent of entrepreneurs are female, while 53 percent of non-entrepreneurs are female. Almost 78 percent of entrepreneurs are native citizens, compared to 84 percent of non-entrepreneurs. Just over 80 percent of both sets of individuals are white and just over 40 years of age.

**Table 3: KIEA Individual Characteristics Comparison**

| Variable | Mean | Variable | Mean |
|---|---|---|---|
| **Same Industry** | | **Bachelors** | |
| *Non Entrepreneur* | 0.933 | *Non Entrepreneur* | 0.191 |
| *Entrepreneur* | 0.245 | *Entrepreneur* | 0.188 |
| **Home Owner** | | **Grad Degree** | |
| *Non Entrepreneur* | 0.695 | *Non Entrepreneur* | 0.091 |
| *Entrepreneur* | 0.685 | *Entrepreneur* | 0.085 |
| **Low Income** | | **White** | |
| *Non Entrepreneur* | 0.157 | *Non Entrepreneur* | 0.817 |
| *Entrepreneur* | 0.219 | *Entrepreneur* | 0.844 |
| **Medium-low Income** | | **Black** | |
| *Non Entrepreneur* | 0.335 | *Non Entrepreneur* | 0.119 |
| *Entrepreneur* | 0.346 | *Entrepreneur* | 0.092 |
| **Medium-high Income** | | **Asian** | |
| *Non Entrepreneur* | 0.213 | *Non Entrepreneur* | 0.020 |
| *Entrepreneur* | 0.171 | *Entrepreneur* | 0.021 |
| **High Income** | | **Other Race** | |
| *Non Entrepreneur* | 0.294 | *Non Entrepreneur* | 0.044 |
| *Entrepreneur* | 0.264 | *Entrepreneur* | 0.042 |
| **Some High School** | | **Age** | |
| *Non Entrepreneur* | 0.120 | *Non Entrepreneur* | 40.661 |
| *Entrepreneur* | 0.164 | *Entrepreneur* | 42.306 |
| **High School Diploma** | | **Female** | |
| *Non Entrepreneur* | 0.303 | *Non Entrepreneur* | 0.525 |
| *Entrepreneur* | 0.298 | *Entrepreneur* | 0.406 |
| **Some College** | | **U.S. Native** | |
| *Non Entrepreneur* | 0.295 | *Non Entrepreneur* | 0.839 |
| *Entrepreneur* | 0.266 | *Entrepreneur* | 0.777 |

Note: Statistics are based on 2,404,524 observations from the Kauffman Index of Entrepreneurial Activity 1998-2011. The upper statistic is for non-entrepreneurs and the lower statistic is for entrepreneurs, adjusted for Current Population Survey weights. Standard errors are estimated using Taylor linearization.

**Table 4: KIEA Index (%) Over Time**

| Year | Total | Male | Female | Manufacturing | Trade | Services |
|---|---|---|---|---|---|---|
| 1998 | 0.29 | 0.33 | 0.25 | 0.07 | 0.35 | 0.33 |
| 1999 | 0.27 | 0.32 | 0.22 | 0.06 | 0.29 | 0.32 |
| 2000 | 0.27 | 0.34 | 0.21 | 0.06 | 0.36 | 0.34 |
| 2001 | 0.26 | 0.31 | 0.23 | 0.08 | 0.27 | 0.31 |
| 2002 | 0.29 | 0.36 | 0.22 | 0.08 | 0.32 | 0.36 |
| 2003 | 0.30 | 0.38 | 0.22 | 0.09 | 0.31 | 0.38 |
| 2004 | 0.30 | 0.37 | 0.24 | 0.10 | 0.27 | 0.37 |
| 2005 | 0.29 | 0.35 | 0.24 | 0.10 | 0.28 | 0.35 |
| 2006 | 0.29 | 0.35 | 0.23 | 0.09 | 0.26 | 0.35 |
| 2007 | 0.30 | 0.41 | 0.20 | 0.08 | 0.24 | 0.41 |
| 2008 | 0.32 | 0.42 | 0.24 | 0.11 | 0.33 | 0.42 |
| 2009 | 0.34 | 0.43 | 0.25 | 0.13 | 0.34 | 0.43 |
| 2010 | 0.34 | 0.44 | 0.24 | 0.08 | 0.28 | 0.44 |
| 2011 | 0.32 | 0.42 | 0.23 | 0.11 | 0.30 | 0.42 |

Note: The Kauffman Index of Entrepreneurial Activity is the percent of individuals (ages twenty to sixty-four) who do not own a business in the first survey month that start a new firm in the following month with fifteen or more hours worked for 1998-2011.

Table 4 shows the KIEA entrepreneurship index over time, adjusted for the CPS weights. The KIEA shows a slight drop after the dot-com bubble, but the rate returned to pre-contraction rates in 2002. Interestingly, the two largest increases occur from 2001-2002 and 2008-2009. On the surface, these may reflect a rising supply of entrepreneurs that were previously unemployed. The number of entrepreneurs appears to be increasing over the period, primarily among men.

Finally, Table 5 summarizes the region characteristics for entrepreneurs and non-entrepreneurs. Entrepreneurs appear to be located in different regions than non-entrepreneurs. Entrepreneurs are more likely to be located in less concentrated and lower MES industry regions than non-entrepreneurs, consistent with lower barriers to entry or lower competition. Entrepreneurs are also more likely to be located in regions with higher overall concentrations of new and small firms. The average entrepreneur's region is about 13 percent more concentrated with other entrepreneurs and has about 13 percent greater share of small firms. Additionally, entrepreneurs are located in denser regions with higher wages.

## 4. Empirical Estimation

### 4.1 Model

We present our empirical framework used to estimate the probability of an individual starting a new firm. We begin by considering a general model and then analyze the determinants by industry sector.

A logit binary outcome model with cumulative density function (logistic distribution) $F$ is given by:

$$(1) \qquad p_{ijrt} = F(\beta_1 + \beta_2 individual_j + \beta_3 industry_{ri(t-1)} + \beta_4 region_{ri(t-1)}),$$

**Table 5: KIEA Region Indicators**

| Variable | Mean |
|---|---|
| **MES** | |
| Non Entrepreneur | 0.752 |
| Entrepreneur | 0.434 |
| **Location Quotient** | |
| Non Entrepreneur | 1.394 |
| Entrepreneur | 1.139 |
| **New Firm LQ** | |
| Non Entrepreneur | 1.070 |
| Entrepreneur | 1.211 |
| **Small Business Share** | |
| Non Entrepreneur | 0.438 |
| Entrepreneur | 0.565 |
| **Average Wage** | |
| Non Entrepreneur | 30.932 |
| Entrepreneur | 31.255 |
| **Employment Density** | |
| Non Entrepreneur | 290.472 |
| Entrepreneur | 325.561 |
| **Jacobs** | |
| Non Entrepreneur | 0.366 |
| Entrepreneur | 0.369 |

Note: Statistics are derived from Kauffman Index of Entrepreneurial Activity and County Business Patterns 1998-2011. Formulas for measures are provided in the text.

where $p_{ijrt}$ is the probability that individual *j* in region *r* becomes an entrepreneur in industry *i* and time period *t*.

The results are reported as logit coefficients using the weights of the CPS with standard errors calculated using a Taylor linearization. Industry and region fixed effects are added to control for unobserved time-invariant heterogeneity, such as the natural advantage of New York City's location and its historical importance as a port. Removing variation common to all entrepreneurs within a city or industry yields estimates based on the variation of individuals within region-industries. We also add year fixed effects to control for any macroeconomic changes that affect all individuals in a particular time period.

One concern is the possibility that current income is endogenous if entrepreneurs are likely to be those laid off from a well-paying job. Older workers who earn a higher income may be unlikely to start a new firm and earn less. In this case, lower income is a consequence of being laid off and the entrepreneur may attempt to make up the difference in income from a prior job through entrepreneurship. To resolve this issue, the model is also run excluding income and the results are presented in the appendix. The results are similar to our main findings and do not present any concerns.

Another concern is endogeneity arising from simultaneity between the region characteristics and the probability of becoming an entrepreneur. Startups may be more likely in regions with a greater concentration of new firms. Still, the concentration of new firms may be driven by the probability of becoming an entrepreneur in that same year. Hence, lagged region and industry characteristics are used throughout the estimations.

**4.2 Results**

Table 6 displays the results from survey-weight-adjusted logit estimations where the dependent variable is an indicator for whether or not the individual starts a new firm after controlling for industry and region characteristics. An *F*-test of joint significance and the individual coefficients' significance suggest that region and industry characteristics should be included when modeling the propensity of individuals to open new firms. Model 1 accounts for year fixed effects, Model 2 accounts for year and industry fixed effects, and Model 3 includes year, industry, and region fixed effects. The main findings are quite robust to the fixed effect treatments.

Local industrial, social, and institutional conditions are significant determinants of startups; given the significance of the majority of industry and region regressors, there is strong evidence that characteristics of the region are important when starting a new firm. Chinitz's hypothesis is the only statistically significant agglomeration theory. A higher concentration of entrepreneurs in a region increases the likelihood of starting a new firm and is highly significant for all of the models. A 10 percent rise in the new firm location quotient increases the likelihood of starting a new firm by over 6 percent. The share of small businesses also positively affects the probability of starting a new firm. A 10 percent rise in the share of small businesses increases the likelihood of starting a new firm by 15 percent. A higher-than-average concentration of new and small firms indicates a more entrepreneurial region with business churn, supplier networks, and entrepreneur training and assistance programs. This is consistent with social and institutional structures of a dense ecosystem of other small businesses that further encourages individuals to open their own firms, perhaps in part through absorbing the tacit managerial skills of running a firm. The benefits of regions characterized by small and new firms enable potential entrepreneurs to make the choice to open a new firm.

Chinitz's hypothesis appears to be of greater importance to startup decisions than are other agglomerations, which is consistent with findings of Glaeser and Kerr (2009). Interestingly, when excluding Chinitz agglomeration, Jacobs's industry diversity is statistically significant. While Jacobs and Marshallian agglomeration are insignificant in the full models, they may be statistically significant in denser locations. Model 4 includes interaction terms between density and these two agglomeration theories. Both interaction terms are statistically significant, suggesting that concentrated and diverse regions increase the likelihood of a new launch in denser regions.

The industry controls are highly significant and negatively associated with starting a new firm. A 10 percent rise in the MES will decrease the likelihood of starting a new firm by almost 3 percent. This suggests that individuals consider the scale of investment or their ability to compete with larger and more efficient incumbents when opening a new firm. The effect of the average wage of the region-industry is also highly significant, such that a 10 percent rise in the region-industry's average wage decreases the likelihood of starting a new firm by about 1.5 percent. Higher wages may deter individuals from starting a firm because of higher opportunity

costs of the owner's time or because of the larger overhead cost and inability to attract quality workers that are employed by incumbents.

**Table 6: Regression Results - KIEA**

| Variables | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| *HS Diploma* | -0.177*** | -0.213*** | -0.174*** | -0.174*** |
| *Some College* | -0.136*** | -0.196*** | -0.170*** | -0.170*** |
| *Bachelors* | 0.049 | -0.052 | -0.035 | -0.036 |
| *Graduate Degree* | 0.117** | -0.023 | 0.002 | 0.001 |
| *Medium-low Income* | -0.002 | -0.047 | -0.062 | -0.061 |
| *Medium-high Income* | -0.093* | -0.151*** | -0.175*** | -0.174*** |
| *High Income* | 0.034 | -0.021 | 0.055 | 0.056 |
| *Married* | 0.239*** | 0.242*** | 0.242*** | 0.243*** |
| *Previously Unemployed* | 0.939*** | 0.938*** | 0.941*** | 0.942*** |
| *Previously Disabled/Retired* | 1.244*** | 0.752*** | 0.752*** | 0.753*** |
| *Black* | -0.247*** | -0.213*** | -0.241*** | -0.240*** |
| *Asian* | -0.175*** | -0.139** | -0.156** | -0.159** |
| *Other Race* | -0.115 | -0.086 | -0.103 | -0.103 |
| *Female* | -0.407*** | -0.342*** | -0.341*** | -0.341*** |
| *U.S. Native* | -0.233*** | -0.256*** | -0.229*** | -0.233*** |
| *Same Industry* | -3.205*** | -3.632*** | -3.623*** | -3.622*** |
| *Age* | 0.151*** | 0.156*** | 0.155*** | 0.155*** |
| *Age Squared* | -0.002*** | -0.002*** | -0.002*** | -0.002*** |
| *Home Owner* | 0.112*** | 0.128*** | 0.136*** | 0.138*** |
| *Employment Density* | 0.000 | 0.000 | 0.001 | 0.001 |
| *Location Quotient* | -0.008 | -0.002 | 0.005 | -0.006 |
| *Jacobs* | -0.065 | 0.060 | -0.165 | 0.324 |
| *Employment Density x LQ* | - | - | - | 0.001*** |
| *Employment Density x Jacobs* | - | - | - | -0.001*** |
| *New Firm LQ* | 0.223*** | 0.233*** | 0.150*** | 0.148*** |
| *Small Business Share* | 3.717*** | 3.508*** | 3.701*** | 3.666*** |
| *Average Wage* | -0.006*** | -0.005*** | -0.006*** | -0.006*** |
| *Minimum Efficient Scale* | -0.521*** | -0.401*** | -0.434*** | -0.447*** |
| *Metro Area Fixed Effects* | No | No | Yes | Yes |
| *Industry Fixed Effects* | No | Yes | Yes | Yes |
| *Sample Size* | 2,404,524 | 2,352,841 | 2,341,779 | 2,341,779 |

Note: Statistics are derived from Kauffman Index of Entrepreneurial Activity and County Business Patterns 1998-2011. Formulas for measures are provided in the text. The coefficients are estimated using a logit binary outcome model adjusted for Current Population Survey weights and standard errors are estimated using Taylor linearization. Year fixed effects are included in each regression.

Individual characteristics associated with starting a new firm have been studied extensively, and the results are confirmed here. Individuals with a high school diploma or some college are less likely to start a new firm, relative to individuals with only some high school. These individuals have better employment options than individuals without a diploma, for whom acceptable employment options may be slim. Older, married, male, and home-owning individuals are also more likely to start a firm. Married individuals are able to draw on support from spouses, and homeowners can draw on the equity of their homes to finance startups. The CPS labor-force codes reveal that previously unemployed and disabled or retired individuals are more likely to start a new firm, compared to currently employed individuals. Immigrants rather than native U.S. citizens are more likely to start a new firm, consistent with previous literature.

Minorities are less likely than white individuals to start a firm. The income categories reveal that the middle-income individuals are less apt than low-income individuals to start a new firm. Low-income individuals may expect higher net returns to self-employment, while high-income individuals have greater opportunity costs in starting a new firm.

The determinants of emergent entrepreneurship and the nature of agglomeration effects may differ according to the industry an entrepreneur enters. Table 7 presents logit estimates of launching a new firm (alternative is being employed) in five large industry sectors: Manufacturing (MFG), Trade and Transportation (TT), Information, Finance, and Real Estate (IFR), Education and Health Care (EHC), and Entertainment, Recreation, and Food Services (ERF).

The coefficients for the local industrial conditions vary in significance and sign across industries. Chinitz's hypothesis for agglomeration is highly significant for all industries except EHC. The small business share affects the probability of starting a new firm more than the concentration of entrepreneurs. Hence, small suppliers may be more important when considering self-employment, but the region's entrepreneurial culture still matters. A one standard deviation increase in the small business share in a region makes individuals 3 percent more likely to start a MFG firm.

The Chinitz effect again eliminates the effect of Marshallian agglomerations, except for EHC startups. Labor pooling may be particularly important in medical startups (e.g., physicians' offices or laboratory testing centers), which need specialized workers. Furthermore, health care startups may agglomerate around hospitals to benefit from complementarities. Individuals in regions with a one standard deviation higher industry location quotient have 2.5 percent higher probability of starting a new EHC firm. Jacobs's hypothesis is only significant for the IFR industry. Industrial diversity increases the probability of launching a new IFR firm. Knowledge spillovers between industries may be more important for software and financial services: urbanization encourages startups in these industries. Chinitz agglomeration also yields employment density insignificant for all industries. Employment density may not be a sufficient measure for customer and supplier linkages.

The industry controls are statistically and economically meaningful in the expected directions. Higher wage industry-regions deter entry for all industries except ERF. Larger MES industries deter entry in IFR and EHC, while encouraging startups in ERF. IFR and EHC individuals may be less likely to launch firms because of difficulties attracting customers and labor away from larger incumbents or obtaining enough startup capital to compete with larger scale incumbents. Audretsch (1991) finds entry into capital-intensive industries is promoted by

prices above minimum average cost, which explains the positive influence of MES in ERF startups. Restaurant launches may be encouraged despite the entry barriers.

Finally, the individual controls reveal a few interesting characteristics of startups in particular industries. Previously retired, previously disabled, older, or married individuals are more likely to start a new firm in all industries. But the remaining individual characteristics affect startups differently. Having a graduate degree increases the probability that an individual will start a new firm in the MFG, IFR, and ERF industries. But having a graduate degree decreases the odds of starting an EHC firm by 53 percent. Child care and community relief

**Table 7: Regression Results by Sector**

| Variables | MFG | TT | IFR | EHC | ERF |
|---|---|---|---|---|---|
| *HS Diploma* | 0.096 | -0.159 | -0.236*** | -0.550*** | 0.529*** |
| *Some College* | 0.761*** | -0.065 | -0.140 | -0.964*** | 0.474** |
| *Bachelors* | 0.987*** | 0.307** | 0.070 | -1.184*** | 0.965*** |
| *Graduate Degree* | 1.151*** | 0.206 | 0.298*** | -0.762*** | 1.367*** |
| *Medium-low Income* | 0.040 | -0.015 | 0.054 | -0.190** | 0.254* |
| *Medium-high Income* | -0.398 | -0.086 | -0.096 | -0.281** | 0.212 |
| *High Income* | -0.298 | 0.136 | 0.057 | -0.238** | 0.242*** |
| *Married* | 0.345*** | 0.569*** | 0.160*** | 0.162** | 0.303*** |
| *Previously Unemployed* | 0.787*** | 0.763*** | 1.022*** | 0.780*** | 1.263*** |
| *Previously Disabled/Retired* | 1.247*** | 0.593*** | 0.728*** | 0.910*** | 0.943*** |
| *Black* | -0.449 | -0.031 | -0.545*** | -0.239** | -0.610*** |
| *Asian* | -0.627 | 0.268* | -0.568*** | -0.412** | 0.450** |
| *Other Race* | 0.353 | 0.077 | -0.216 | -0.164 | -0.578* |
| *Female* | 0.100 | -0.135** | -0.612*** | 0.141 | -0.385*** |
| *U.S. Native* | 0.396 | -0.532*** | -0.212*** | -0.310*** | -0.218 |
| *Same Industry* | -4.044*** | -3.826*** | -3.569*** | -3.973*** | -3.125*** |
| *Age* | 0.124*** | 0.151*** | 0.152*** | 0.131*** | 0.172*** |
| *Age Squared* | -0.001** | -0.001*** | -0.002*** | -0.001*** | -0.002*** |
| *Home Owner* | 0.191 | 0.155* | 0.251*** | -0.081 | 0.245** |
| *MES* | -0.131 | -0.016 | -0.636*** | -2.093*** | 0.420* |
| *Location Quotient* | -0.085 | -0.054 | 0.014 | 0.974*** | -0.087 |
| *New Firm LQ* | 0.323** | 0.190*** | 0.185*** | 0.089 | 0.053 |
| *Small Business Share* | 2.706*** | 5.043*** | 3.039*** | 0.287 | 6.471*** |
| *Average Wage* | -0.017*** | -0.007*** | -0.006*** | -0.050*** | -0.000 |
| *Employment Density* | -0.002 | 0.000 | 0.002 | 0.001 | -0.001 |
| *Jacobs* | -0.185 | -0.062 | -0.458** | 0.034 | -0.521 |
| Sample Size | 244,749 | 435,007 | 560,384 | 587,497 | 185,266 |

Note: Statistics are derived from Kauffman Index of Entrepreneurial Activity and County Business Patterns 1998-2011. Formulas for measures are provided in the text. The coefficients are estimated using a logit binary outcome model adjusted for Current Population Survey weights and standard errors are estimated using Taylor linearization. MSA and year fixed effects are included in each regression.

startups do not require specialized knowledge obtained through an advanced degree like lawyers (IFR) opening a new practice. Immigrants have a greater probability of starting a new firm than native citizens, but this is not significant for MFG where fewer immigrant startups occur. Finally, home owners have a higher probability of starting a new firm in all industries but MFG and EHC.

## 5. Conclusion

We have estimated the effect of local industrial conditions on the probability of an individual launching a new firm. We have contributed to the expanding literature on entrepreneurship growth by using the KIEA dataset, considering individual startup decisions that control for individual motivations, and confirming the importance of Chinitz;s hypothesis in new firm launches. Chinitz's hypothesis maintained that a network of smaller suppliers would create social and institutional structures that promote entrepreneurship. We find strong evidence of Chinitz's hypothesis, both small suppliers and an entrepreneurial culture, across several large industry sectors. The theories of Marshall and Jacobs were significant in denser regions, though startups in the Education and Health Care sector were more likely in industrially concentrated regions and startups in the Information, Finance, and Real Estate sector were more likely in diverse regions.

Policy makers interested in promoting entrepreneurship growth should foster an entrepreneurial environment. Feldman et al. (2015) suggests that governments interested in realizing economic development must build an entrepreneurial capacity characterized by "a risk-taking culture, networks, and access to financial capital and a skilled workforce." Regions must develop a culture of entrepreneurship where individuals can receive advice from role models, managerial skills, or benefit from open supplier networks. A greater concentration of new firms can also encourage social structures that support startup failures and encourage new startups. As Feldman (2014, p. 14) points out, "it is impossible to compete against Silicon Valley using the Silicon Valley model," but investments in entrepreneur safety nets, equity/debt pools, and small business support services may foster entrepreneurial activities and support the required capacity for entrepreneurship to flourish. Additionally, the policies supporting entrepreneurship tend to "focus on starting companies-not growing them or even providing timely assistance to aid their continued operations" (Feldman, 2014, p. 19). Public venture funds and incubators have generally failed to provide their promised boost to entrepreneurship because they do not focus on "creating communities characterized by dense connections among entrepreneurs and organizations that support them" (Motoyama and Wiens, 2015, p. 3).

Future work might consider more specific measures for Chinitz's hypothesis. Specific supplier linkages and cultural attitudes may provide additional insights. We would also like to consider the effects of startup costs, the costs of doing business, and taxes. Additional research may apply spatial econometric models to examine the distance at which Chinitz's hypothesis affects startups. While Marshall's agglomeration economies are highly local, social and institutional structures that support entrepreneurship may have a more distant effect. Other future work might consider individuals who transition from unemployment and the effect of safety net policies on entrepreneurship.

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