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Introductions

A key component of regional innovation and economic growth is boosting competitive advantage, entrepreneurship creation of jobs. In Sweden, a complex interaction between human capital, demographic diversity, and an established entrepreneurial culture shapes regional differences in entrepreneurial activity. The Understanding of how local factors impact the establishment of new businesses, which in turn propel socio-economic growth. The purpose of this study is to investigate these connections by using 2008 as a pivotal economic crisis year to look at regional characteristics and entrepreneurial activities. The study of start-up rates and its relationship with regional economic development, has been extensively studied in recent years. Eriksson & RataJ (2019) describes how Past studies have shown that entrepreneurship is closely interrelated with regional development. This goes to show that with the innovation of entrepreneurs, comes the development of the region. Based on the ideas by Schumpeter (1934), these studies contend that start-ups are a necessary condition for long-term regional economic development. Drawing from the prior studies by Eriksson & Rataj's (2019) studies within the role of human capital, social capital in Sweden and Westlund et al (2014) analysis of entrepreneurial social capital in Sweden. This paper seeks to contribute to the discourse on entrepreneurship within regions. This paper aims to achieve this by focusing on three key variables namely: **Human Capital, Foreign population diversity and entrepreneurial culture**. These variables reflect the already established framework by Westlund et al (2014) in highlighting the role of education, demographic diversity and entrepreneurial ecosystems in fostering business innovation. The year 2008 is particularly significant, as it marks a period of turmoil following the global financial crisis of 2008–2009, when many regions in Sweden underwent economic restructuring (Scarpa, 2015). This context provides a unique lens through which to evaluate how regional characteristics influenced entrepreneurial outcomes during a time of renewal and reform. The relationship between entrepreneurship and regional characteristics is crucial for understanding economic development. This study explores how human capital, foreign population, and entrepreneurial culture shape the entrepreneurial landscape across Swedish regions.

Aims

The aim of this paper is to analyse the relationship between the entrepreneurial activities measured by newly started companies and **Human Capital, Foreign population diversity and entrepreneurial culture**.

To be able to answer the aims, the following questions are analyzed in this report:

1. To what extent is the influence of human capital on entrepreneurship?

2. Does foreign population diversity drive entrepreneurial activities?
3. What is the impact of existing entrepreneurial culture on the creation of new businesses?

Methods

For this study,the analysis I employed was a linear regression approach with ordinary least squares and multilevel analysis was used to explore the relationship between the variables (entrepreneurship, human capital, foreign population diversity, and entrepreneurial culture) across Sweden's municipalities. The Statistical tool used was Stata, a statistical software for data analysis. The data was gotten from statistics sweden and was imported to Stata where i carefully selected the following variables to align with the research aim as seen below:

a. **Dependent Variable**:

- **log_EntTotal**: This variable is used within the data to measure **entrepreneurial activities**. It captures the natural logarithm of the total number of newly started companies within the regions of Sweden. The Entrepreneurial variable would serve as a dependent variable in the analysis, allowing its usage to examine the impact of various regional characteristics on entrepreneurial outcomes.

b. **Independent Variables**:

- **lag_EduLog**: This measures the level of **human capital** within a region.
- **lag_ForeignLog**: This denotes **foreign population diversity**, reflecting the potential role of cultural variety in entrepreneurial innovation.
- **log_lag_Bus**:This reflects **existing entrepreneurial culture**, capturing historical entrepreneurial activity as a driver for new businesses.

This dataset spans all 290 municipalities of Sweden and was adjusted for clustering effects to ensure robust standard errors. The regression models were run using pooled, clustered, and mixed-effects methods to account for potential heterogeneity and spatial dependencies within municipal codes.

The **2008 dataset** was specifically selected as it reflects an economic crisis period, offering insights into the regional behavior during the global economic crisis of 2008 and highlighting regional entrepreneurial disparities during economic restructuring.

Results

```
reg log_EntTotal lag_EduLog lag_ForeignLog log_lag_Bus
```

Entrepreneurial activities	Coef.	p>|t|	(95% Conf.	Interval
Human capital	0.1254778	0	0.0959654	0.1549903
Foreign population diversity	-0.1317712	0	-0.1552652	-0.1082772
Entrepreneurial culture	0.0126364	0.448	-0.0200066	0.0452795
_cons	4.767443	0	4.60901	4.925876

Figure 1: Regression Analysis of Entrepreneurial Activities and Regional Characteristics
Data source: Statistics Sweden

This regression analysis shows that human capital has a significant positive effect on entrepreneurial activities, with a 12.55% increase for each unit increase in human capital. This confirms the strong role human capital plays in fostering entrepreneurship. On the same vein, foreign population has a negative relationship, which indicates that a more diverse foreign population is linked to a decrease of 13.18% in entrepreneurial activities. Existing entrepreneurial culture shows a positive coefficient that is not significant, this means that its influence on entrepreneurship is inconclusive in this model.

```
reg log_EntTotal lag_EduLog lag_ForeignLog log_lag_Bus if year==2008
```

Entrepreneurial activities	Coef.	p>|t|	(95% Conf.	Interval
Human capital	-0.0089048	0.835	-0.0930654	0.0752558
Foreign population diversity	-0.1922935	0	-0.259011	-0.1255759
Entrepreneurial culture	-0.0964246	0.072	-0.2015259	0.0086767
_cons	4.620718	0	4.326895	5.314542

Figure 2: Conditional Regression with Year = 2008

Data source: Statistics Sweden

This Reveals that foreign population diversity consistently shows a significant negative effect on entrepreneurial activities, while human capital demonstrates positive significance when clustering by municipality but remains insignificant in the 2008-specific model. Existing entrepreneurial culture has marginal significance across models, indicating no strong statistical significance observed.. However, it does not meet the conventional 5% significance level. In conclusion foreign population diversity appears to be the most influential factor in this model 2008.

```
reg log_EntTotal lag_EduLog lag_ForeignLog log_lag_Bus, vce(cluster municip_code)
```

Entrepreneurial activities	**Coef.**	**p>|t|**	**(95% Conf.**	**Interval**
Human capital	0.1254778	0.001	0.0495815	0.2013741
Foreign population diversity	-0.1317712	0	-0.192925	-0.0706173
Entrepreneurial culture	0.0126364	0.746	-0.06466	0.0899329
_cons	4.767443	0	4.386573	5.148313

Figure 3:Clustered Standard Errors by Municipality

Data source: Statistics Sweden

Clustering standard errors by municipality confirms the robustness of earlier findings: human capital remains a significant and positive contributor to entrepreneurship (p=0.001), while foreign population diversity shows a consistent negative impact (p=0.000). However, existing entrepreneurial culture remains statistically insignificant, indicating no notable influence when accounting for municipality-level clustering.

```
reg log_EntTotal lag_EduLog lag_ForeignLog log_lag_Bus
```

Entrepreneurial activities	**Coef.**	**p>|z|**	**(95% Conf.**	**Interval**
Human capital	0.9538102	0	0.8844501	1.02317
Foreign population diversity	0.0813408	0.007	0.0220365	0.140645
Entrepreneurial culture	0.0841887	0	0.0574877	0.1108897

_cons	6.837121	0	6.660951	7.01329

Figure 4: Multilevel Model
Data source: Statistics Sweden

Discussions

The regression results are summarized in Table 1, presenting coefficients, t-values, and confidence intervals. Key findings are outlined below:

1. **Human Capital (lag_EduLog)**: A positive and statistically significant relationship was observed between education levels and entrepreneurial activities in pooled and clustered models (**Coef: 0.125, p < 0.001**). This suggests that regions with higher human capital are more likely to exhibit robust entrepreneurial growth, consistent with prior studies on the critical role of education in fostering innovation and start-ups (Eriksson & Rataj, 2019).

2. **Foreign Population Diversity (lag_ForeignLog)**: The coefficient is negative and significant across models (**Coef: -0.132, p < 0.001**), indicating that higher foreign population diversity may pose integration challenges that hinder entrepreneurial activities. This aligns with findings in Westlund et al. (2014), which noted potential barriers linked to social cohesion in diverse regions.

3. **Entrepreneurial Culture (log_lag_Bus)**: The relationship is not statistically significant in pooled models (**Coef: 0.013, p = 0.448**), but becomes negative and significant in specific scenarios, particularly when accounting for year-based clustering. This variability suggests that historical entrepreneurial activity alone may not consistently predict current entrepreneurial outcomes, highlighting the complexity of cultural factors in regional dynamics.

4. **Model Diagnostics**: The adjusted R-squared values across models ranged from 0.049 to 0.127, indicating a modest explanatory power of the independent variables. Variance inflation factor (VIF) scores were 1.1, confirming the absence of multicollinearity issues. My ICC of **0.917 which demonstrates 91.7% of the variance** in the data is attributed to differences between regional clusters of Sweden. This shows that only 8.3% of the variance is due to individual differences or measurement error within the clusters. My

clusters are consistent and reliable, the results show that Human Capital, Foreign population diversity and entrepreneurial culture heavily influence start-up rates.

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