Economic Entrepreneurship, Startups and Their Effects on Local Development: The Case of Sweden*

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ABSTRACT

The current empirical entrepreneurship literature mainly shows a positive correlation between entrepreneurship (measured as the number of startups) and economic growth. However, the mechanisms by which entrepreneurship exerts its positive influence are not obvious. This paper studies the connections between startups and local development at the municipal level in Sweden 2000-2008. We use a unique database including not only total startups, but data on startups divided in six branches to study the impact of entrepreneurship on population and employment growth. Analyses are performed on all municipalities as well as by municipality type and by growth rate. In contrast to previous research, our results indicate that for several branch groups startup effects on growth may be more pronounced in low density areas than in urban agglomerations.

This paper also contains one of the first empirical attempts to investigate the influence of local norms, values, networks and other spacebound assets on entrepreneurship propensity. We find that this "local Entrepreneurial Social Capital" (ESC) is highly correlated with startup frequency in Swedish municipalities.

Keywords: Entrepreneurship, Local growth, Entrepreneurial social capital

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1. Introduction

"Entrepreneurship" has become a buzzword in contemporary policies and public debate. Promoting entrepreneurship in the form of startups is a policy activity being given high priority all over the world, at the transnational (for example the EU), national, regional and local levels. In Sweden, measures for supporting entrepreneurship are among the most prioritized in the Regional Growth Programs (RTP). Recent research has shown that local government in Sweden is producing a broad spectrum of measures to promote local entrepreneurship (Rader Olsson & Westlund 2011). At the local government level, expenditures for business promotion activities were on average about €30 per inhabitant in 2009, with a variation between €0 and €490 (www.kolada.se).

The entrepreneurship concept is increasingly being used in a number of areas outside its "core" of foundation of new businesses (see Westlund 2010). Being aware of these broader interpretations of the concept, in this paper we limit ourselves to analyzing entrepreneurship in the form of startups.

The bulk of the entrepreneurship literature focuses on its determinants or on its effects and studies firms and their emergence and growth. Only a small proportion of the literature deals with spatial aspects. The few empirical studies of the determinants of variations in startup rates are most often based on regional data as the availability of comparable national data is much more limited (Gries & Naudé 2008). Early contributions in this area focused on describing regional variations in startups (Johnson 1983, Keeble 1993) and their causes (Storey & Johnson 1987).

As to the effects of entrepreneurship, much of the literature deals with firms and establishments and their performance, whereas only a small proportion analyzes regional or local effects of entrepreneurship (Carree & Thurik 2003). However, in the past decade an increasing number of particularly German and Swedish studies have explored this topic.

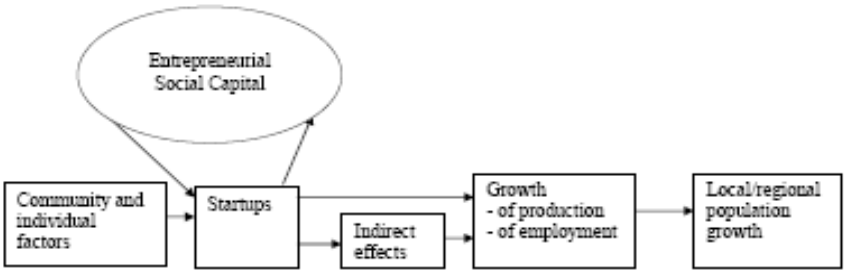
As noted by among others Wennekers & Thurik (1999), Carree & Thurik (2003) and Fritsch & Mueller (2004) the effects of startups on firm level can be distinguished as direct effects and indirect supply side effects (intermediate linkages). Direct effects are the startups' new employment and new production, and startups' direct contributions to in-migration and increased regional productivity. Direct effects also

include decline or closure of incumbents that cannot face the new competition be counted. The indirect supply side effects are by Fritsch & Mueller (2004) divided in four types: 1) Secured efficiency: startups force incumbents to behave more efficiently; 2) Acceleration of structural change: incumbents are substituted by new firms; 3) Amplified innovation: new firms may introduce innovations, and 4) Greater variety: New firms may lead to greater variety of products and problem solutions. Together these indirect supply side effects enhance the regional competitiveness and growth.

However, the impacts of startups are not limited to effects among the startups themselves or indirectly to effects on other firms. In line with the views of Saxenian (1994), Markusen (1996) and Johannisson (2000) that entrepreneurship is a collective phenomenon, it can be argued that variations in the rate of startups of regions contribute to variations in their *entrepreneurial social capital* (Westlund & Bolton 2003). In this perspective, the propensity to start new firms is both a function of regions' entrepreneurial social capital and actions that contribute to the spreading and strengthening of this social capital. This local/regional entrepreneurial social capital can be viewed as a spacebound asset that contributes to the "place surplus" (Bolton 2002, Westlund 2006) of a place or a region, which spurs entrepreneurship and makes the place attractive for investors, migrants and visitors.

Figure 1 depicts the relationship between startups, the abovementioned variables and (local/regional) economic development. Entrepreneurial social capital (ESC) is considered as a summarizing concept of the norms, values and networks that are being connected to a region's entrepreneurial activities. It has been discussed whether social capital is a cause to or an effect of other social phenomena. Here we view the ESC as something that both influences startup propensity and that is affected by the intensity and structure of the startups. In addition, there are a number of other variables that can be assumed to influence the propensity to start a firm, for example human capital/education, potential profits, and agglomeration factors (Gries & Naudé 2008). Regarding the effects of startups, in line with Fritsch & Mueller (2004) and others, they can be divided in direct effects on production and net employment as well as indirect (supply side) effects. Finally, these effects are influencing the population growth of places and regions.

Figure 1.
Schematic View of Causes and Effects of Startups



Research on the determinants of entrepreneurship has traditionally been focusing on individual qualities of the entrepreneur, or a *dispositional* approach (Thornton 1999, Autio & Wennberg 2009). However, during the last 10-15 years a *contextual* approach, strongly connected to what some scholars call "institutional factors" (Raposo et al. 2008, Lafuente et al. 2007) seems to have strengthened its positions considerably (see for example Aldrich 1999, Sørensen 2007).

Due to lack of register data, the main bulk of empirical research on both the dispositional and the contextual approach has been based on samples of individual firms and data have been collected by interviews and questionnaires. However, recent Swedish research has gained access to detailed, de-identified register data on individual self-employed/employers and their environments (for example Delmar et al. 2008, Eklund & Vejsiu 2008). A regional perspective has mainly been lacking in these studies. One exception is Eliasson & Westlund (2010) that differ between urban and rural areas in Sweden.

Research on the effects of entrepreneurship has mainly been performed on firm level and has as noted above, until recently, rarely dealt with regional or national economic effects of entrepreneurship (Carree & Thurik 2003). Within this new field of research, several studies have indicated a clear positive influence of startups on regional employment in the USA (for example Reynolds 1999, Acs & Armington 2002). European studies have been more ambiguous. Early studies of West Germany and the Netherlands (Audretsch & Fritsch 1996, Fritsch 1996, 1997, EIM 1994) showed no correspondence between entrepreneurship and regional economic growth during the 1980s. However, later German studies (for example Audretsch & Fritsch 2002, Fritsch & Mueller 2004) showed the opposite results for the 1990s. They and other contributions (for example Acs & Mueller 2008, Fritsch & Mueller 2008, Andersson & Noseleit 2011) come to the conclusion that the net effect of startups

might be negative in a short term period but thereafter turn positive in processes that might have a significant impact on growth for up to10 years.

Swedish research of the impact of entrepreneurship on regional employment and other regional economic variables has showed significant positive effects (Davidsson et al. 1994, Fölster 2000, Braunerhjelm & Borgman 2004, Borgman & Braunerhjelm 2007,).[1] Andersson & Noseleit (2011) have also confirmed that the wave pattern of first negative and then positive effects of startups on employment seem to hold for Sweden as well. Another result of theirs is that when they divide the startups in three sector aggregates: manufacturing, low-end services and high-end services, the effects of startups on employment vary.

Frisch & Schroeter (2011) have highlighted another problem: why there are regional variations in the employment effects of startups. In a study of Germany they include a number of regional characteristics as control variables. The most important variable seems to be population density, that is the positive effects of startups on employment growth are more pronounced in high-density areas than in rural regions. Another conclusion is that the positive effects of startups diminish with increasing startup rates.

In contrast to most of the existing literature on entrepreneurship on regional level, we in this paper focus on the local government (municipality) level. The reason is that in Sweden the municipalities are the most important policy actors concerning promoting local entrepreneurship. By focusing on the municipalities we focus on the level where entrepreneurship most clearly can be influenced by policy measures.

As shown above, there are recent studies of the regional impact of startups divided by sectors and of regional variations of the effects. To our knowledge, there are no studies that combine these approaches and examine the effects of startups in various sectors on local economic development and in different types of regions.

Our aim is to test the following hypotheses:

1. Startups are affected by a number of socioeconomic variables, including local Entrepreneurial Social Capital.
2. Startups, over a time period of about 6-8 years, have in general a positive impact on local employment and population.

[1] Some of these studies used the share of self-employed without employees as a measure of entrepreneurship, assuming that this would be an approximate value of the share of new firms. However, as will be shown in Section 3, the correlation between firms per capita 2000 and startups 2002-08 in the Swedish municipalities was not higher than 0.31.

3. Startups' impacts on employment growth should be stronger than impacts on population growth, since the effects on employment are of a more direct nature.
4. The effects of startups on employment and population growth vary by branch groups. We expect that startups in service sectors have a stronger impact on employment growth for two reasons: a) low costs of entry for startups in services, and b) most new employment in Sweden occurs in service sectors.
5. The effects of startups on employment and population growth vary by type of municipality. In line with Frisch & Schroeter (2011) we expect the effects of startups to be strongest in metropolitan areas.

2. Data and Methods

We use data on startups provided by the Swedish Agency for Growth Policy Analysis (*Tillväxtanalys*), the official provider of statistics on startups of new firms and bankruptcies in Sweden. To avoid effects of coincidental occurrences a certain year, the data covers the period 2002-08. Only genuinely new firms are included in the statistics. The number of startups is divided per capita and besides the total sum they are divided in six branch groups:

- manufacturing
- construction
- trade, hotels and restaurants
- transportation and communications
- financial and business services (excl. real estate service)
- education, health and medical service, other public and personal service

The other data are with one exception downloaded from Statistics Sweden (www.scb.se). The exception is a variable aimed at measuring local entrepreneurial social capital. Here we use results from the yearly questionnaires by the Federation of Swedish Enterprise (*Svenskt Näringsliv*) on enterprise's comprehension on local public opinion's attitudes towards entrepreneurship during the period 2000-08.[2]

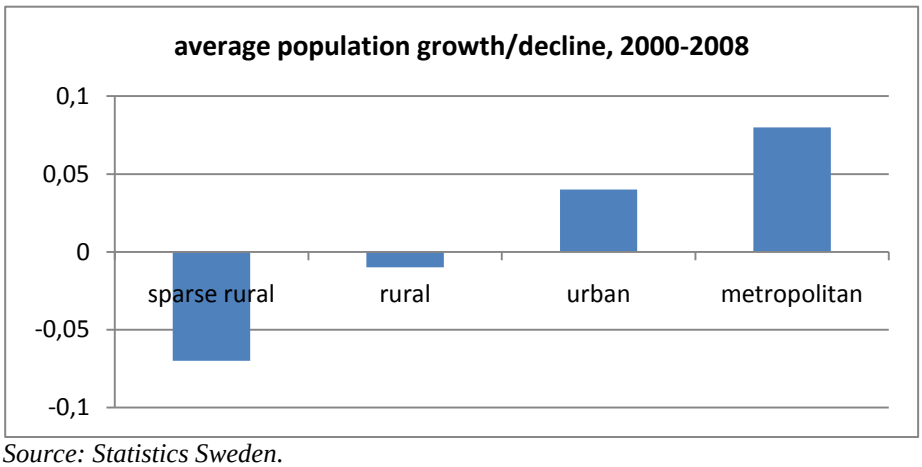
As has been shown by among others Fritsch & Mueller (2008) and Andersson & Noseleit (2011), the effects of startups on employment may be negative in the short

[2] Here too we used the average values for a number of years to compensate for possible limited samples and other facts that could affect date for a certain year.

run but positive in a longer perspective. For this reason we are studying the connections between startups and local development over a period of six years.

The analyses are performed with all municipalities and with the municipalities divided in accordance with two types of divisions. In the first division, municipalities in Sweden are classified into four different groups: municipality type (MT) 1, 2, 3, and 4. (MT 1) metropolitan areas (N=46), (MT 2) urban areas (N=47), (MT 3) rural areas/countryside (N=164), and (MT 4) sparse populated rural areas (N=33). The four types of areas are defined as follows: Metropolitan areas (MT 1): Includes municipalities where 100 percent of the population lives within cities or within a 30 km distance from the cities. Using this definition, there are three metropolitan areas in Sweden: Stockholm, Gothenburg and Malmo. Urban areas (MT 2): Municipalities with a population of at least 30 000 inhabitants and where the largest city has a population of 25 000 people or more. Smaller municipalities that are neighbors to these urban municipalities will be included in a local urban area if more than 50 percent of the labor force in the smaller municipality commutes to a neighbor municipality. In this way, a functional-region perspective is adopted. Rural areas/countryside (MT 3): Municipalities that are not included in the metropolitan areas and urban areas are classified as rural areas/countryside, given they have a population density of at least 5 people per square kilometer. Sparse populated rural areas (MT 4): Municipalities that are not included in the three categories above and have less than 5 people per square kilometer. In addition to this typological division, the municipalities are also divided after their population growth in three groups of uniform size.

Figure 2.
Population Change in Swedish Municipalities by Type, Average Annual Change 2000-2008.



Source: Statistics Sweden.

As shown in Figure 2 general the rural areas are losing population while the urban and particularly the metropolitan regions are growing, many at rates approaching one percent every year.

The first part of Figure 1 is not empirically examined in detail. In the introduction to the Analysis Section, a correlation matrix with variables correlated to startups/capita is presented for all municipalities. This is followed by a short presentation of how these results correspond to the results when the municipalities are divided in the four abovementioned types.

The main part of the analysis is devoted to an empirical analysis of the second part of Figure 1, that is the local effects of startups. The impact of startups and control variables on employment ratio and population growth respectively is analyzed for startups in total and for the six branch groups. Also, we analyze the impact of startups for the four types of municipalities separately and with the municipalities divided after population growth.

3. Analysis

Factors Affecting Startup Propensity

As a first step we analyze which factors that can be assumed to affect the frequency of startups in Swedish municipalities. Table 1 shows that all the tested variables, with the exception of employment rate, correlate positively and significantly with startup rates. Market's strength, measured in the form of small house prices, is showing the highest correlation. Human capital (share of university educated), accessibility and average income follow in the next places. Entrepreneurial Social Capital (ESC) (enterprise's comprehension on local public opinion's attitudes on entrepreneurship), initial population, as well as the number of firms per capita also show highly significant correlations.

When the municipalities are divided in the four groups the variables correlations with startups show somewhat varying results. Small house prices (market's strength) and firms per capita have the highest values in all groups, with the exception of the sparse rural group in which firms per capita is the only significant variable.[3]

[3] The correlation matrixes can be obtained from the authors.

Table 1.
Correlations Between Startups and Variables Assumed to Influence Startup Frequency on Local Government (Municipality) Level.

		Startups per inhabitant and year 2002-2008	Share of university educated 2001	Small house prices 2002	Employment share 2002	Firms per capita 2000	Public opinion on entrepreneur-ship 2000-08 (ESC)	Accessibility 2000	Average income 2000	Population 2002
Startups per inhabitant and year 2002-2008	Pearson Correlation	1	,621**	,777**	,061	,311**	,410**	,601**	,487**	,402**
	Sig. (2-tailed)		,000	,000	,303	,000	,000	,000	,000	,000
	N	290	290	290	290	289	290	290	290	290
Share of university educated 2001	Pearson Correlation	,621**	1	,780**	-,048	-,155**	,317**	,701**	,492**	,527**
	Sig. (2-tailed)	,000		,000	,420	,008	,000	,000	,000	,000
	N	290	290	290	290	289	290	290	290	290
Small house prices 2002	Pearson Correlation	,777**	,780**	1	,193**	-,011	,499**	,824**	,676**	,401**
	Sig. (2-tailed)	,000	,000		,001	,852	,000	,000	,000	,000
	N	290	290	290	290	289	290	290	290	290
Employment rate 2002	Pearson Correlation	,061	-,048	,193**	1	,036	,523**	,125*	,309**	-,174**
	Sig. (2-tailed)	,303	,420	,001		,542	,000	,033	,000	,003
	N	290	290	290	290	289	290	290	290	290
Firms per capita 2000	Pearson Correlation	,311**	-,155**	-,011	,036	1	,205**	-,088	-,188**	-,022
	Sig. (2-tailed)	,000	,008	,852	,542		,000	,136	,001	,713
	N	289	289	289	289	289	289	289	289	289
Public opinion on entrepreneurship 2000-08 (ESC)	Pearson Correlation	,410**	,317**	,499**	,523**	,205**	1	,388**	,374**	,100
	Sig. (2-tailed)	,000	,000	,000	,000	,000		,000	,000	,090
	N	290	290	290	290	289	290	290	290	290
Accessibility 2000	Pearson Correlation	,601**	,701**	,824**	,125*	-,088	,388**	1	,543**	,500**
	Sig. (2-tailed)	,000	,000	,000	,033	,136	,000		,000	,000
	N	290	290	290	290	289	290	290	290	290
Average income 2000	Pearson Correlation	,487**	,492**	,676**	,309**	-,188**	,374**	,543**	1	,145*
	Sig. (2-tailed)	,000	,000	,000	,000	,001	,000	,000		,013
	N	290	290	290	290	289	290	290	290	290
Population 2002	Pearson Correlation	,402**	,527**	,401**	-,174**	-,022	,100	,500**	,145*	1
	Sig. (2-tailed)	,000	,000	,000	,003	,713	,090	,000	,013	
	N	290	290	290	290	289	290	290	290	290

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 2 shows the "best" OLS-model for all municipalities, where variables too strongly correlated with the remaining ones have been left out. The variables that are having the strongest significant positive influence on startups are thus according to Table 2, human capital, market's strength and the existing stock of companies. The variables measuring local Entrepreneurial Social Capital (ESC), accessibility and average incomes are being left out of the final model due to multicollinearity, which of course does not mean that they are insignificant *per se*, but that their influence is too similar to the remaining variables.

Table 2.
OLS-Model of Variables' Influence on ln (Startups) (All Municipalities)

Dep. Var. Startups	
Univ. Edu.	1.096***
	(0.370)
ln (Small House Prices)	0.298***
	(0.0293)
Empl. Share	-0.699**
	(0.277)
Firms/capita	10.92***
	(1.050)
Constant	-0.850***
	(0.215)
Observations	289
R-squared	0.636
	Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Entrepreneurship Effects: model Specifications

Next, two models were constructed estimating the effects of startups on employment growth and population in Swedish municipalities (2002-2008). In both cases, startups per capita were used as the independent variable, along with two control variables: house prices and population in the year 2002. Results were estimated for all municipalities as well as for the four municipal types (metropolitan, urban, rural, sparse rural) and terciles representing the speed of population growth.

Entrepreneurship and Employment Growth

Entrepreneurship, as predicted, has an effect on employment growth in municipalities. This variable is highly significant in our model when considering all Swedish municipalities. It is also a highly significant variable explaining employment growth in urban and rural communities, but not metropolitan or sparse rural areas. This is not consistent with the findings of Frisch & Schroeter (2011) and our hypothesis No 5. We also found that employment growth effects were somewhat more pronounced in municipalities with the slowest population growth rates (0.0733***) compared with the fastest growing tercile (0.0525***).

Table 3
Entrepreneurship and Employment Growth

VARIABLES	All municipalities	Metropolitan	Urban	Rural	Sparse rural
Entrepreneurship 2002-2008*	0.0521***	0.0394	0.0671***	0.0518***	0.0431
	(0.00995)	(0.0370)	(0.0228)	(0.0123)	(0.0313)
House prices 2002*	0.0133**	-0.0225	0.00489	0.0161	0.132***
	(0.00538)	(0.0223)	(0.0178)	(0.00982)	(0.0427)
Population 2002	7.14e-08*	6.56e-08	1.88e-07	6.56e-07**	-1.59e-06
	(3.84e-08)	(4.81e-08)	(1.14e-07)	(2.53e-07)	(1.67e-06)
Constant	-0.358***	-0.0174	-0.385***	-0.388***	-0.984***
	(0.0420)	(0.162)	(0.112)	(0.0637)	(0.227)
Observations	290	46	47	164	33
R-squared	0.331	0.103	0.372	0.292	0.443

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Entrepreneurship is measured as startups per inhabitant and year, 2002-2008. Employment growth is measured as ln(employment2008)-ln(employment2002)and house prices are ln(house prices 2002)

Entrepreneurship and population growth

Table 4
Entrepreneurship and Population Growth

VARIABLES	All municipalities	Metropolitan	Urban	Rural	Sparse rural
Entrepreneurship 2002-2008	1.982**	2.637	3.437	2.848***	3.563*
	(0.765)	(2.988)	(2.266)	(0.828)	(1.919)
House prices 2002	6.145***	0.0391	4.846***	4.201***	8.561***
	(0.414)	(1.798)	(1.771)	(0.661)	(2.622)
Population 2002	-3.51e-06	-3.32e-06	-1.08e-05	4.87e-05***	-1.60e-05
	(2.95e-06)	(3.88e-06)	(1.13e-05)	(1.70e-05)	(0.000103)
Constant	-51.02***	-9.494	-49.12***	-44.69***	-75.70***
	(3.231)	(13.08)	(11.10)	(4.284)	(13.93)
Observations	290	46	47	164	33
R-squared	0.689	0.040	0.384	0.528	0.550

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Entrepreneurship is measured as startups per inhabitant and year, 2002-2008. Population change is measured as the percent change in population 2002-2008 and house prices are ln(house prices) 2002.

The basic model supports the hypothesis that entrepreneurship has a significant and positive effect on population change. Highly significant results were also evident in rural areas and, to a lesser extent in sparser rural areas, when the data was

disaggregated into the four municipal types. However, the model totally fails in explaining population growth in metropolitan areas. Estimating the model using terciles representing the rate of population growth resulted in highly significant and positive effects of entrepreneurship in municipalities with slower population growth ($p<005$ and $p<0.01$), but not those with more rapid population growth. The effect was also almost three times as strong in the lowest tercile (4.356***) as in the middle tercile (1.530**).

Branch-Specific Effects of Entrepreneurship

The models estimating the effect of startups on population and employment growth in Swedish municipalities was also used to test the hypothesis that startup effects vary by branch groups.

Manufacturing

Manufacturing accounts for about 20 percent of non-farm jobs in Sweden. About three percent of manufacturing jobs are in sparse rural areas, and 43 percent are in areas classified as rural. The rest are rather evenly distributed among urban and metropolitan areas (about 27 percent each).

Specifying the model for this branch indicates a positive effect of new manufacturing startups on employment growth in all municipalities, and further specifying by municipality type reveals this variable as highly significant in urban communities and significant in rural communities.

Manufacturing startups did *not* have a significant effect on population growth when all municipalities were taken into account, but in urban and sparse rural communities the model predicts a significant effect on $p<0.1$ level. In other areas, this indicates that manufacturing startups are employing existing workers. The model also predicts that startups in this sector have a $p<0.1$ significant effect on population in the slowest growing municipalities. This may reflect the fact that manufacturing facilities are large compared to other facilities. In other words, a single manufacturing facility can have a large effect on population growth in a slow-growing or declining municipality.

Table 5
Entrepreneurship in Manufacturing and Employment Growth

VARIABLES	All municipalities	Metropolitan	Urban	Rural	Sparse rural
Entrepreneurship 2002-2008	2.123***	1.978	4.318***	1.674*	2.220
	(0.638)	(1.438)	(1.433)	(0.867)	(1.732)
House prices 2000	3.851***	-0.276	4.253***	4.648***	11.55***
	(0.358)	(1.432)	(1.072)	(0.773)	(2.487)
Population 2000	-17.20***	-17.23	-21.35*	-4.209	-56.52***
	(5.186)	(10.63)	(12.06)	(7.170)	(15.81)
Constant	-15.59***	15.31	-21.22*	-29.63***	-30.84*
	(4.630)	(13.74)	(11.81)	(6.949)	(17.65)
Observations	287	45	47	162	33
R-squared	0.300	0.096	0.376	0.210	0.574

Standard errors in parentheses
*** p<0.01, ** p<0.05, *p<0.1

Construction

The construction industry accounts for about seven percent of all non-farm jobs in Sweden. Jobs in this sector are expected to increase between 2008 and 2030 (Statistics Sweden, 2008). As in most countries, the share of jobs in this sector is highest in metropolitan areas (36%) and lowest in sparse rural areas (3%).

The model indicates that construction startups do affect employment growth in Swedish municipalities, but disaggregating the data by municipal type reveals that this reflects significance only in rural areas.

Table 6
Entrepreneurship in Construction and Employment Growth

VARIABLES	All municipalities	Metropolitan	Urban	Rural	Sparse rural
Entrepreneurship 2002-2008	1.342***	0.433	1.386	1.566**	1.056
	(0.496)	(1.497)	(0.903)	(0.762)	(1.072)
House prices 2000	3.416***	0.139	4.179***	3.996***	11.77***
	(0.379)	(1.486)	(1.149)	(0.848)	(2.514)
Population 2000	-17.39***	-18.17	-16.39	-1.859	-52.76***
	(5.234)	(12.10)	(12.83)	(7.214)	(15.63)
Constant	-10.55**	17.77	-15.46	-27.57***	-30.97*
	(4.220)	(14.50)	(12.43)	(6.605)	(17.85)
Observations	287	45	47	162	33
R-squared	0.291	0.056	0.283	0.213	0.564

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The model also indicates that entrepreneurship in the construction industry has a positive effect on population growth in Swedish municipalities. Estimating the model by municipality type reveals that this effect is concentrated in rural areas. Here again, the effect is largest, and the variable most significant, in municipalities with the slowest rates of population growth (lowest tercile).

Table 7
Entrepreneurship in Construction and Population Growth

VARIABLES	All municipalities	Metropolitan	Urban	Rural	Sparse rural
Entrepreneurship 2002-2008	1.455***	2.133*	1.335	1.777***	0.424
	(0.384)	(1.078)	(0.957)	(0.507)	(0.832)
House prices 2000	6.352***	1.548	5.890***	4.322***	10.50***
	(0.318)	(1.188)	(1.469)	(0.631)	(2.514)
Population 2000	-1.59e-07	-3.32e-07	-7.67e-06	6.99e-05***	-5.63e-05
	(2.94e-06)	(3.39e-06)	(1.22e-05)	(1.81e-05)	(0.000106)
Constant	-46.44***	-13.36	-41.00***	-36.19***	-67.70***
	(2.009)	(10.59)	(9.257)	(3.391)	(13.93)
Observations	287	45	47	162	33
R-squared	0.697	0.108	0.379	0.541	0.501

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Trade, Hotels and Restaurants

The trade, hotels and restaurant branches account for about eighteen percent of all employed in Sweden. Here again, jobs are rare in sparse rural areas (2 percent of all Swedish jobs in these sectors) but fairly evenly divided among rural and urban areas (24 and 29 percent, respectively with the expected highest share (44 percent) in the metropolitan areas. Trade, hotels and restaurants are branches with a traditionally high rate of startups compared to mature firms.

The model indicates that startups in these dynamic branches have a fairly significant effect on employment growth in Swedish municipalities. These effects are, as indicated by the model, both strongest and most significant in urban areas and (to a somewhat lesser extent) in rural areas (where the model as a whole has lower explanatory value).

Table 8
Entrepreneurship in Trade, Hotels and Restaurants and Employment Growth

VARIABLES	All municipalities	Metropolitan	Urban	Rural	Sparse rural
Entrepreneurship 2002-2008	2.631***	1.841	5.797***	2.374**	0.987
	(0.780)	(2.354)	(1.871)	(0.945)	(2.426)
House prices 2000	3.254***	0.109	3.577***	4.021***	12.39***
	(0.385)	(1.438)	(1.088)	(0.816)	(2.449)
Population 2000	-12.31**	-15.36	-11.02	1.517	-52.16***
	(5.276)	(10.90)	(11.55)	(7.412)	(15.83)
Constant	-19.95***	9.038	-36.23**	-34.78***	-35.60*
	(5.318)	(18.77)	(13.52)	(7.563)	(20.30)
Observations	287	45	47	162	33
R-squared	0.301	0.068	0.382	0.223	0.552

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9
Entrepreneurship in Trade, Hotels and Restaurants and Population Growth

VARIABLES	All municipalities	Metropolitan	Urban	Rural	Sparse rural
Entrepreneurship 2002-2008	1.904***	-0.580	5.458***	1.858***	1.659
	(0.593)	(2.024)	(1.922)	(0.595)	(1.880)
House prices 2000	6.529***	1.101	5.328***	4.850***	10.23***
	(0.308)	(1.234)	(1.380)	(0.584)	(2.515)
Population 2000	-2.76e-06	-1.24e-06	-7.79e-06	5.73e-05***	-3.18e-05
	(2.91e-06)	(3.64e-06)	(1.06e-05)	(1.76e-05)	(0.000108)
Constant	-50.38***	1.550	-56.59***	-40.67***	-72.15***
	(2.787)	(13.91)	(10.50)	(3.766)	(14.75)
Observations	287	45	47	162	33
R-squared	0.693	0.024	0.453	0.534	0.510

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The model for population growth indicates that startups in trade, hotels and new restaurants affect population growth in urban and rural municipalities, but not metropolitan areas or sparse rural areas. Because the two former categories of municipality together represent almost three quarters of all municipalities, this also produces a significant and positive result when running the model for all Swedish municipalities. The insignificance of this variable in sparse rural areas is perhaps not surprising, but it is less clear why startups in these "urban" branches do not affect population (or employment) growth in metropolitan areas.

Transportation and Communications

Transportation and communications branches together comprise about seven percent of Swedish jobs with an average of 5 employees per facility but including both large and small employers. Almost half of all employees in this branch (46 percent) are employed metropolitan areas, 29 percent in urban areas, 22 percent in rural areas, and only three percent in sparse rural areas.

These branches appear to be a significant explanatory variable for employment growth in Swedish municipalities taken as a whole. Estimating the model for these branches reveals a significant difference between municipal types, with a strong and highly significant effect of startups on employment growth in urban and sparse rural areas.

Interestingly, the model does not indicate that startups in these sectors significantly affect population growth in sparser rural areas, but are highly significant variables explaining population growth in urban areas (coefficient=3.196, $p<0.01$, R-squared=0.54). This branch deserves further study to determine whether or not startups are hiring existing workers or leading to the restructuring of skill profiles in local municipalities.

Table 10
Entrepreneurship in Transportation/Communications and Employment Growth

VARIABLES	All municipalities	Metropolitan	Urban	Rural	Sparse rural
Entrepreneurship 2002-2008	1.098***	-0.999	1.832**	0.431	2.557**
	(0.411)	(1.591)	(0.873)	(0.559)	(1.174)
House prices 2000	3.320***	0.0164	3.534***	4.495***	12.36***
	(0.394)	(1.439)	(1.173)	(0.834)	(2.350)
Population 2000	-13.57**	-18.59	-13.48	-3.120	-46.49***
	(5.292)	(11.26)	(12.20)	(7.282)	(15.68)
Constant	-10.47**	23.81	-12.63	-24.78***	-42.50**
	(4.225)	(15.64)	(12.17)	(6.533)	(17.49)
Observations	286	45	47	162	32
R-squared	0.288	0.063	0.314	0.195	0.618

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Financial and Business Services

The financial and business services sectors (excluding real estate service) account for about fifteen percent of jobs in Sweden. As might be expected, this branch is highly concentrated in metropolitan areas (60 percent of jobs in these sectors) and is almost

nonexistent in sparse rural areas (one percent of jobs). Twelve percent of jobs in this sector are located in rural areas, and 26 percent in urban areas.

The model indicates that startups in these sectors positively affect employment growth in metropolitan areas, as might be expected given the relatively low cost of entry and large customer base in metropolitan areas. Less obvious is the significant effect of this variable on employment growth in rural areas. These sectors comprise a number of services that can, thanks to advances in IT, effectively serve customers from remote locations—particularly in Sweden where IT infrastructure is well developed. In other words, our model may be capturing the effect of startup business and financial consulting firms registered in rural communities but serving predominantly "urban" clients. In other words, urban professionals may be moving to rural communities and taking their jobs with them. Disaggregating the municipal employment growth data into terciles indicates that the employment effect of startups is strongest within the group of municipalities having the lowest growth rates. The model explaining population growth does indicate much smaller effects of startups in these branches; only in metropolitan areas does startups significantly, positively affect population growth ($p<0.1$).

Table 11
Entrepreneurship in Financial/Business Services and Employment Growth

VARIABLES	All municipalities	Metropolitan	Urban	Rural	Sparse rural
Entrepreneurship 2002-2008	3.387***	6.499***	2.518	3.102***	2.786*
	(0.711)	(2.191)	(1.777)	(0.983)	(1.539)
House prices 2000	1.114*	-6.233**	1.999	2.481**	10.25***
	(0.653)	(2.487)	(1.961)	(1.039)	(2.628)
Population 2000	-12.82**	-13.26	-10.48	-2.947	-50.32***
	(5.113)	(9.921)	(12.51)	(7.036)	(15.09)
Constant	-9.207**	29.01**	-11.85	-24.53***	-31.84*
	(4.057)	(12.94)	(12.59)	(6.349)	(17.18)
Observations	287	45	47	162	33
R-squared	0.327	0.221	0.277	0.240	0.595

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Education, Health and Medical Service, Other Public and Personal Service

The service sector (excluding business and financial services) represents over a third of all Swedish jobs (34 percent). Many of these jobs are those that require personal

contact with clients: teachers, health care professionals and many of the other types of jobs associated with both public and private services in Sweden.

Our model indicates that startups in these service sectors affect employment growth in all municipalities, but particularly in rural and metropolitan contexts. Why similar effects are not clearly seen in other types of communities is more difficult to explain. The model indicates that this variable is highly significant in all terciles of employment growth.

Table 12
Entrepreneurship in Education, Health/Medical Service, Other Public and Personal Service and Employment Growth

VARIABLES	All municipalities	Metropolitan	Urban	Rural	Sparse rural
Entrepreneurship 2002-2008	3.682***	4.324**	1.770	4.155***	3.166
	(0.772)	(2.139)	(1.872)	(0.985)	(1.990)
House prices 2000	2.200***	-2.221	3.598**	3.037***	10.34***
	(0.476)	(1.774)	(1.353)	(0.842)	(2.708)
Population 2000	-11.78**	-15.35	-9.600	2.605	-56.46***
	(5.145)	(10.38)	(12.81)	(7.037)	(15.46)
Constant	-17.68***	14.59	-19.33	-36.45***	-29.18
	(4.476)	(13.32)	(13.67)	(6.799)	(17.46)
Observations	287	45	47	162	33
R-squared	0.327	0.140	0.259	0.273	0.586

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

A similar pattern is evident when considering the effect of start-ups in these sectors on population growth. This is a significant variable when considering all municipalities (taken together) and for the group of rural municipalities.

Table 13
Entrepreneurship in Education, Health/Medical Service, Other Public and Personal Service and Population Growth

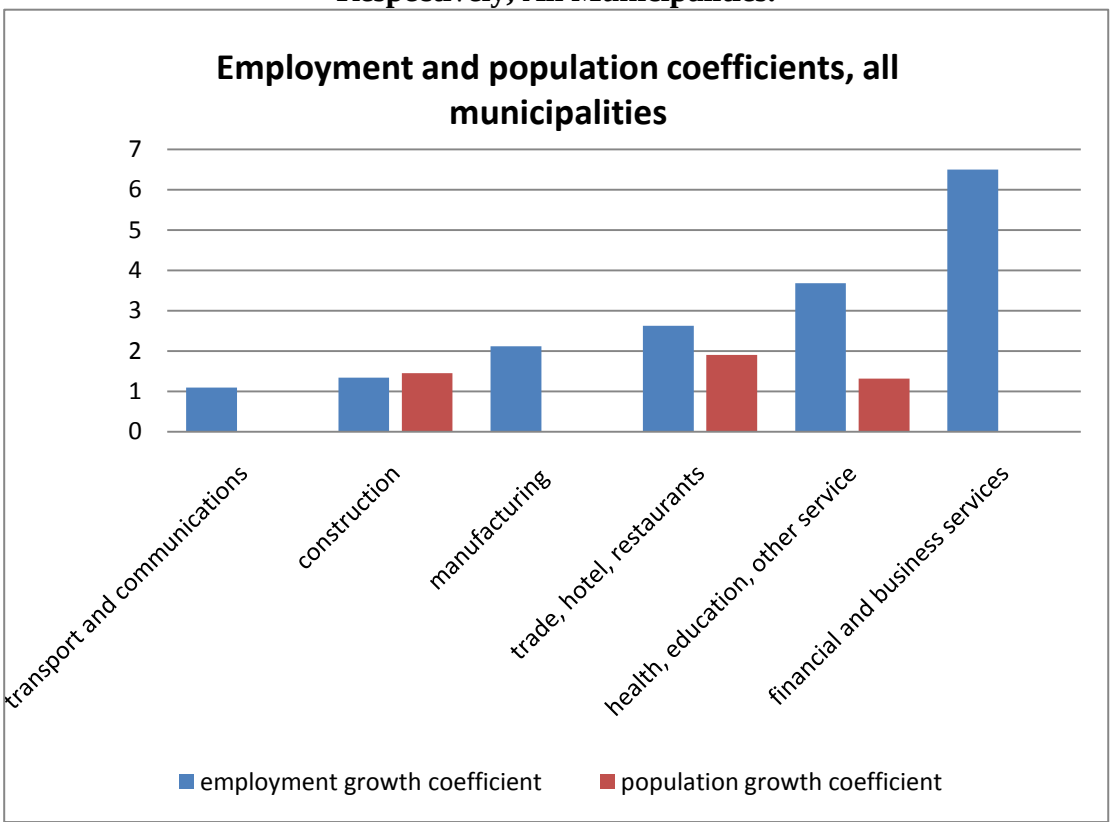
VARIABLES	All municipalities	Metropolitan	Urban	Rural	Sparse rural
Entrepreneurship 2002-2008	1.323**	2.514	-0.807	1.649**	2.031
	(0.616)	(1.972)	(1.833)	(0.661)	(1.526)
House prices 2000	6.334***	-0.0207	6.782***	4.826***	9.113***
	(0.374)	(1.511)	(1.573)	(0.606)	(2.700)
Population 2000	-3.36e-06	-3.40e-06	-1.48e-05	4.87e-05***	-3.86e-05
	(2.97e-06)	(3.72e-06)	(1.12e-05)	(1.78e-05)	(0.000104)
Constant	-46.34***	-4.459	-37.98***	-39.15***	-66.65***
	(2.247)	(9.247)	(10.10)	(3.716)	(13.59)
Observations	287	45	47	162	33
R-squared	0.687	0.060	0.354	0.524	0.526

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Summary: Branch Specific Effects

When considering all Swedish municipalities, startups in all non-farm sectors had a net positive effect on employment growth.[4] Startups also had a positive effect on population growth in half the sectors (construction, trade/hotels/restaurants and education/health/medical services). As the figure below indicates, the magnitude of employment effects is higher than population growth effects for all sectors except construction. Transportation and communications startups had the lowest effect on employment in Swedish municipalities, and financial and business services the highest. Trade, hotels and restaurants had the most effect on population growth.

Figure 3
Beta Coeffecients for Startups' Impacts on Employment and Population, Respectively, All Municipalities.



It is hardly surprising that employment effects are larger in magnitude than population effects. In accordance with Figure 1, employment change is a direct effect of startups, and employment is also affected through the indirect supply-side effects that startups

[4] Although the models do not explain all variance in population and employment change values, the high significance of the variable representing startups makes a relative comparison of beta coefficient values useful to the analysis.

bring. Population change is in this perspective an effect of employment change, but not necessarily a proportional effect, as an increase in local employment can happen by people already living in the municipality, for example unemployed and students. The fact that population and employment in certain cases seem to grow at a similar rate may reflect an in-migration effect, as many entrepreneurs "bring their jobs with them" to new areas but then remain small or grow slowly.

However, when this data was analyzed by municipal type, some important differences are revealed. In metropolitan areas, only startups in the financial and business services and education & health/medical services were highly significant ($p<0.05$) in explaining employment growth. In urban areas, three branch groups had significant employment effects. In sparse rural areas, the transport and communication branches had the only significant employment effect, and were not significant in explaining population growth.

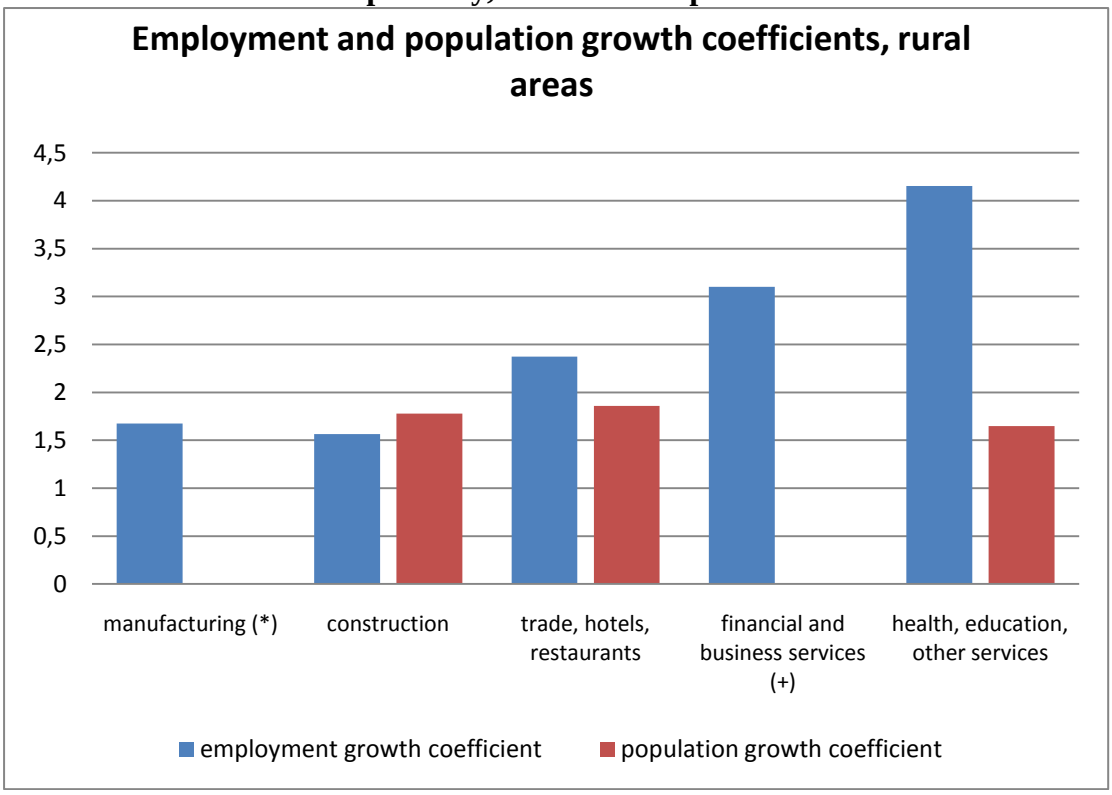
Table 14
Summary of Branch-Specific Effects of Startups on Employment and Population Growth in Swedish Municipalities

Branch	Positive and effect on employment growth in all municipalities ($p<0.01$)?	Municipal type where effect is most evident?	Positive and effect on population growth in all municipalities ($p<0.01$)?	Municipal type where effect is most evident?
Manufacturing	Yes	Urban*** rural*	No	Urban* sparse rural*
Construction	Yes	Rural**	Yes	Rural*** metropolitan*
Trade, hotels and restaurants	Yes	Urban*** rural**	Yes	Urban*** rural***
Transportation and communications	Yes	Urban** Sparse rural**	No	Urban***
Financial/business services	Yes	Metropolitan*** rural*** sparse rural*	No	Metropolitan***
Education, health/medical service, other public and personal service	Yes	Rural*** metropolitan**	Yes	Rural***

*** p<0.01, ** p<0.05, * p<0.1

Interestingly, the municipal type where most types of branches affected employment and population growth was rural areas.[5] Manufacturing and construction startups had the least effect, and health, education and other services the highest. Here again employment effects of startups are higher, but there is wider variation among branches. Also noteworthy is the extent to which financial and business service startups seem to affect employment growth, but affect population growth to a lesser extent.

Figure 4
Beta Coeffecients for Startups' Impacts on Employment and Population, Respectively, Rural Municipalities.



**employment effects significant at the p<0.1 level*
+population effects significant at the p<0.1 level
All other coefficients significant at the p<0.05 level or higher

4. Concluding Remarks

This study has focused on the effect of startups on key development goals such as employment and population growth. We find considerable evidence that startups affect employment growth positively at municipality level, and some evidence that

[5] When considering only branches estimated in the models to be significant at the p<0.05 level or higher

population also is affected. Analyzing the data by municipal type and by branch reveals some important differences in the ways in which startups affect municipal development. Perhaps most interesting is the indication that the marginal effects of entrepreneurship on employment appear to be most significant in areas with the weakest population development and that several branch types appear to affect employment growth positively in rural areas. This is good news for development specialists frustrated by the seemingly intractable challenges of development outside of metropolitan and urban areas. Entrepreneurship may have an important role to play in restructuring areas dominated by sectors with declining employment trends.

This paper also contains one of the first empirical attempts to investigate the influence of local Entrepreneurial Social Capital (ESC) on startups (and vice versa). ESC showed a highly significant correlation with startups, but due to multicollinearity with other explanatory variables it was left out of the final model over factors influencing entrepreneurship. However, the significant, positive connection between ESC and entrepreneurship calls for deeper studies of the relation between the two variables, in general and with regard to branches and municipality types.

The results of this study highlight two persistent gaps in our understanding of the relationship between entrepreneurship and local development. First, while several studies show a positive effect of population on entrepreneurship (see that is Armington and Acs, 2002), the opposite causal relationship may be equally relevant. Indeed, such recursive relationships are at the heart of agglomeration theories of sustained economic growth. This is the second gap: our understanding of entrepreneurship effects on development outside of large agglomerations. In as much as our study indicates that multidirectional causalities may also be at work in rural areas and smaller agglomerations, we feel that there is more to understand about the complex relationships between startup propensity and development potential. In contrast to previous research, our results indicate that for several branch groups startup effects on growth may be more pronounced in low density areas than in urban agglomerations.

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