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Abstract: Many phenomena in the economy are influenced by geography. The size of new firm start-ups vary in many dimensions, among them industry and geography. The purpose of this paper is to explore the determinants of the geographical distribution of the size of new firms. Regional size itself can be expected to influence the size of the new firm. Given that there are fixed costs present in the new firms small and low-density regions will demand a larger size of the new firm. The reason for this is that in small regions the firm may not be able to find customers nearby, but need to sell its produce over some distance. This means that the firm must house capacities to do so and this increases the fixed cost component and hence forces the firm to produce a larger amount of the output. Another possible reason can be found in the availability of producer services. In small regions, the number of producer services is more limited and, hence, force the firms to produce some of these services in-house. Generally, the overall diversity found in small regions is smaller compared to large regions. This means that the variation in goods and services available in the market will be smaller, once again forcing the new firm to do more things within the firm. In addition, it is expected that there is a relationship between entry rate and the size of the entrants.

Keywords: Entry, Start-up size, Market Potential, Region, Industry, Sweden.

JEL-codes: L11, M13, C21, R11, R12

1 Introduction

A vibrant regional economy requires that new firms become large enough to compete with incumbents and to contribute to regional economic growth (Geroski, 1995). There are two major ways for new firms to become large: either they start large or they grow rapidly after entry. However, post-entry growth tends to be very uncertain, since firm growth seems to be best approximated by a random walk process (Geroski, 2000; Coad, 2009). Thus, it seems obvious that the entry-size of new firms is a critical factor in regional economic growth. A contributing factor is that the chances of survival of new firms seem to be positively related to the entry-size of firms (Persson, 2004).[1] In this paper, we analyse the determinants of start-up size in different industries at the regional level.

A review of the literature on entrepreneurship and industrial organization clearly highlights that the start-up size of firms, the determinants of start-up size and the effects of start-up size have mainly been neglected in the theoretical and empirical literature. The start-up size of firms is ignored in studies applying Gibrat's law and generally in the literature on firm size distributions (Cabral & Mata 2003; Angelini & Generale 2008). Some models assume that all firms enter with equal size (Jovanovic, 1982). However, some considerations of entry and exit phenomena (Ijiri & Simon, 1977) and firm size at entry (Levinthal, 1991; Coad, et al., 2012a) has been introduced during the years in models of industrial dynamics. Agarwall & Audretsch (2001) find that there exists a positive relationship between entry size and survival rate in general but that it differs between industries and situations. Entry size seems to be in particular important for firms in low-tech industries and in industries that are early in their life cycle. Mata & Portugal (1994) found that larger entrant and entrants with multiple establishments stayed in the market longer. They also found that entry into growing industries increased the probability for survival. However, they did not find any influence of the prevalence of scale economies. Although the impact of firm size on survival time is widely accepted, the question of whether the initial size of a business or, rather, its current size affects the probability of survival has been answered variously (Falck, 2007). Mata, et al., (1995) found that current size is a better predictor of failure than initial size. Their findings indicate that past business growth matters for survival, suggesting a partial adjustment process for firm size in the post-entry period. However, Geroski, et al., (2002) found that the conditions

[1] The survival rate can be expected to be lower for new establishments that enter on a sub-optimal level in industries where there are economies of scale (Jovanovic 1982; Audretsch 1995).

prevailing at the time new businesses are set up have a longer-lasting effect on the firms' survival prospects. In a study by Dunne, Roberts & Samuelson (1989) on U.S. manufacturing plants it was found that relative to small plants, larger plants have higher survival rates but also lower growth rates if they survive. Despite the fact that the size distribution of new firms depends on geographic location, the role of location in determining start-up size of firms has been largely neglected (Audretsch & Tamvada, 2008). According to Falck (2007), industry characteristics are frequently taken into account when studying survival of new firms but the same is not true for regional characteristics. In his study, Falck (2007) finds that of three types of factors: i) firm specific, ii) industry specific, and iii) regional, the regional factors are the most important for firm survival. Another finding in Falck's study is that of the firm specific factors the most important one is firm size. In that study, firm size is interpreted as an overall measure of access to resources such as capital and knowledge.

Since the growth of firms after entry is mainly random, exploring the determinants of start-up size in different industries at the regional level opens up interesting avenues for regional policy, not least since the probability of survival of new firms increase with the start-up size (to be established below for the Swedish context). This is important since the tendency is that a large share of all start-ups closes within a couple of years. Start-up size might provide a kind of signalling in the sense that the larger the start-up the easier it might be to find financing for future expansion.

2 The determinants of the start-up size of firms

In this section, we present and discuss a theoretical framework capable at explaining the start-up size of firms.[2] We start by making a distinction between the optimal and the actual start-up size. The optimal start-up size is the start-up size that maximizes expected profits. It varies between industries due to differences in production technologies and economies of scale (Acs & Audretsch, 1989; Mata & Machada, 1996; Görg, Strobl & Ruane, 2000; Arauzo-Carod & Segarra-Blasco, 2005). We could imagine that entry in some cases occurs in a small scale, i.e. an under-optimal scale, and to become viable entrants need to expand towards the Minimum Efficient Scale (MES). Certainly, we can assume that the larger the MES, the greater the troubles to attain it, and the lower the prospects of new firm survival.

[2] Generally speaking there are three sets of factors that influence the start-up size of firms (Falck, 2007): i) firm- or entrepreneur-specific factors, ii) industry-specific factors, and iii) geographical location factors.

However, what is more interesting is that it varies between different locations since different locations offer different opportunities for start-ups also within the same industry. The following characteristics of locations influence the optimal start-up size of different industries:

1. Accessibility to market potential. The accessible market naturally influences the optimal start up size. For firms producing products with distance-sensitive geographical transaction costs, the internal market potential of a locality is the critical factor. For firms producing products with low geographical transaction costs it is the total market potential of a locality that matters.
2. The degree of competition. One can assume that the tougher the competition in a locality, the smaller the optimal start-up size.
3. Labour productivity. The lower the labour productivity in a region, the lower the optimal start-up size.
4. Labour costs. The higher the labour costs in a locality, the lower the optimal start-up size.
5. Capital costs and availability of financing. The higher the capital costs in a locality, the lower the optimal start-up size. We also expect that the smaller the number of financial institutions in a locality, the lower the optimal start-up size, since lower competition in the local financial market may reduce the volume of external finance available.
6. Input costs. The higher the costs of inputs in a locality, the lower the optimal start-up size.
7. Start-up costs. The higher the start-up costs in a locality, the lower the optimal start-up size.
8. Specialization of a locality. The lower the degree of specialization in a locality, the lower the localization economies and the lower the optimal start-up size.
9. Diversity. The lower the degree of diversity in a locality, the lower the urbanization economies and the lower the optimal start-up size.

The actual start-up size may differ from the optimal start-up size for a number of reasons. Entrepreneurs may lack the necessary information, knowledge and/or experience and/or start-up services and support to be able to derive the optimal start-up size (Barkham, 1994; Mata, 1996; Colombo, Delmastro & Grilli., 2004; Astebro & Bernhardt, 2005; Colombo & Grilli, 2005 Coad, et al., 2012b). They may be risk takers or risk averters, which change their estimations of the optimal start-up size. The entrepreneurs may also under- or over-estimate their capacity as entrepreneurs and business managers, which will also influence the actual

choice of start-up size. They may lack enough personal wealth (Holtz-Eakin, Joulfaian & Rosen, 1993; Cabral & Mata, 2003; Colombo & Grilli, 2005; Hvide & Moen, 2010) or be unable to borrow the necessary capital to start-up at an optimal scale.[3] However, there are also examples in boom periods, such as the IT-boom, when it was possible to get a too large capital for a start-up making the actual start-up size larger than the optimal start-up size. Unfortunately, we in our data lack information about the entrepreneurs, which implies that the deviances between the optimal and the actual start-up size will be taken up by the residuals.

2.1 Industry specific factors and the start-up size of firms

The start-up size of new firms is influenced by industry characteristics (Acs & Audretsch, 1989; Mata & Machada, 1996; Görg, Strobl & Ruane, 2000; Arauzo-Carod & Segarra-Blasco, 2005). Start-up size is determined by size of markets, turbulence, growth, and the extent of the scale economies in different industries (Mata & Machado, 1996; Mata, 1996). Entry typically occurs in a small scale and to become viable, in most cases, entrants need to expand towards the Minimum Efficient Scale (MES). Thus, we may assume that the larger the MES, the greater the troubles to attain it, and the lower the prospects of new firm survival. Availability of financial resources is important here. Firms receiving external private equity financing have a larger size at start-up (Colombo & Grilli, 2005).

2.2 Geographical location factors and the start-up size of new firms

Turning to the geographical location factors and their influence on the start-up size of firms we can generally assume that the most critical factors are the accessible market potential, the degree of competition, the characteristics of the regional economic milieu and prevailing regional institutions. Starting with the influence of market potential on start-up size, we assume that the start-up size becomes larger, the larger the internal market potential of the functional region where the start-up occurs. Generally, new entrepreneurs normally have not had resources and time to establish links to external markets, which implies that it is the size of the internal market potential that determines the size of start-ups. Concerning the influence of the external market potential on start-up size, one could imagine that the influence should be positive but much smaller than the effect from the internal market potential. However, a large external market potential might signal that the region is close to some large region that offers a very large internal market potential. A large internal market potential can lead to

[3] Firms receiving external private equity financing have a larger size at start-up (Grilli 2005).

lower unit costs for the firms in this larger region, which makes them more competitive and induces them to serve and compete on other accessible markets. The result might be that new firms in these accessible markets will face stiffer competition, which will induce them to start-up at a smaller scale. We also assume that the larger the competition within a region, the smaller the start-up size of new firms.

It is unclear to what extent the employment conditions at the regional level will influence start-up size. However, one could expect that the higher the regional unemployment rate, the lower the start-up size, since unemployed people starting firms can be assumed to start at a smaller scale due to lack of financial resources. The educational level of the labour force in a region can be expected to have a positive influence on the start-up size for several reasons. Educated people earn more and can thus invest more in new ventures. They might also be better trained to manage larger operations, which would lead on average to a larger start-up size. A better-educated labour force also enables new entrepreneurs to gain from localized knowledge spillovers, which could induce a larger start-up size due to lower risks and/or better products and production processes.

Two other factors that might influence start-up size are current firm structure and the degree of specialization. We can assume that regions that are dominated by smaller firms generally will have a lower start-up size of new firms. Specialization on the other hand indicates that the trade is well developed in the region. The necessary information and knowledge is there as well as a specialized labour force. Furthermore, there must exist links to customers within as well as outside the region. As a result, specialization will stimulate a larger start-up size.

We test for the influence of the variables mentioned in this section on the start-up size of new firms in three broad sectors: manufacturing, ordinary services and advanced services. As a comparison, we also test for to what extent these variables also explain the number of start-ups and the number of employees in new firms in functional regions in Sweden.

3 Entry size and survival

This section is devoted to show empirically that start-up size actually is important in the sense that it is closely related to survival probabilities. Studies such as Agarwall & Audretsch (2001) and Mata & Portugal (1994) have found a positive relationship between entry size and survival probability. Below we will show that this also holds true for Swedish start-ups. The methodology we use in this section is mainly descriptive and is only concerned with the rela-

tion between start-up size and survival rates. The only controls used are different dummy variables that we do not try to interpret. We use data for start-ups of different sizes occurring in 1995 and describe their survival rates unto 2010. In Figure 3.1 below, survival rates for four size groups are presented. Size is measured in terms of number of employees. The four groups are; 1) firms with one employee at start-up, 2) firms with between 2 and 5 employees, 3) firms with between 6 and 10 employees and 4) firms with more than 11 employees. In the figure, we see that the survival probability drops at a more or less constant rate over the years. We also observe that there is a ordering in survival rates so that survival probability is higher the higher the start-up size.

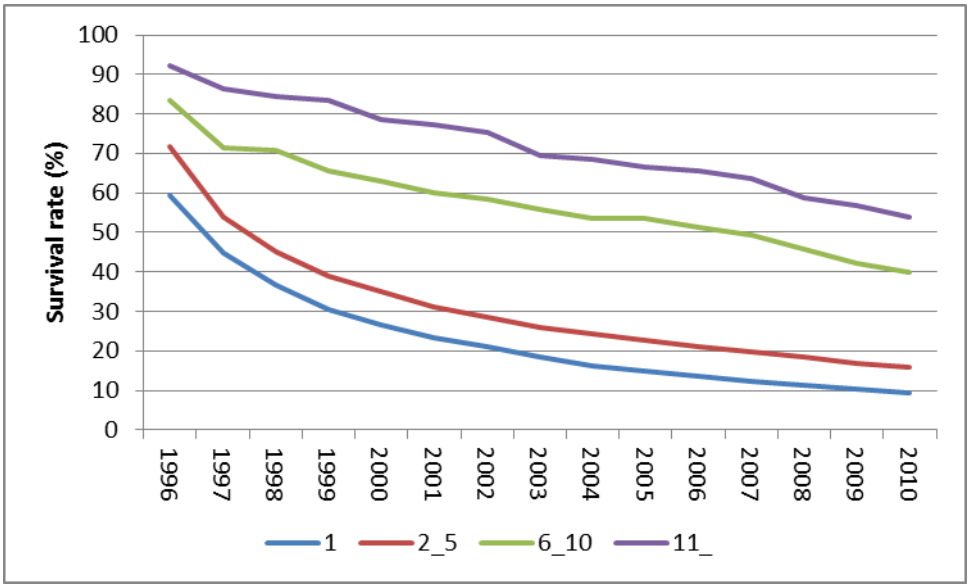

Figure 3.1: *Survival rates for firms started in 1995 by size-group*

In Table 3.1 the number of start-ups in each size-group in 1995 is given. We see that the vast majority of firms start up small. About half of the number of start-ups starts with one employee only. At the other end of the spectrum, less than 0.5 percent of the firms starting up do so with at least 11 employees. After five years only about a quarter of the smallest firms are still active, in contrast, almost 80 percent of the largest start-ups

Table 3.1: *Start-ups in 1995 and survivors at 2000, 2005 and 2010*

Start-up size (employees)	No start-ups 1995	Survivors 2000	Survivors 2005	Survivors 2010
1	22193	5913 (27)	3270 (15)	2093 (9)
2-5	3141	1098 (35)	714 (23)	497 (16)
6-10	140	88 (63)	75 (54)	56 (40)
11-	102	80 (78)	68 (67)	55 (54)
Sum	25576	7179 (28)	4127 (16)	2701 (11)

Ten years after start-up, 16 percent of the firms are still active and after five more years, only 11 percent are active. For each of the years 2000, 2005 and 2010 the pattern is the same the survival rate for larger firms (in terms of employees) is much higher. In Table 3.2 below, we report the results from a simple regression exercise. We regress years of survival on number of employees at start-up. The different specifications entail different combinations of dummy variables for, survival the whole observed period, industry and municipality where the firm is located. For both the measure for start-up size and survival, we take the logarithm so the reported coefficients can be interpreted as elasticities.

Table 3.2: *Relationship between start-up size and survival*

Size (log)	0.369***	0.383***	0.370***	0.379***	0.151***	0.168***	0.154***	0.167***
	(0.0173)	(0.0181)	(0.0177)	(0.0183)	(0.0141)	(0.0149)	(0.0144)	(0.0151)
Constant	0.971***	1.782***	1.075***	1.871***	0.793***	1.467***	0.837***	1.498***
	(0.00661)	(0.400)	(0.101)	(0.415)	(0.00555)	(0.326)	(0.0812)	(0.338)
Dfulltime	No	No	No	No	Yes	Yes	Yes	Yes
Industry dummies	No	Yes	No	Yes	No	Yes	No	Yes
Municipality dummies	No	No	Yes	Yes	No	No	Yes	Yes
No. Obs.	25,576	25,576	25,576	25,576	25,576	25,576	25,576	25,576
R-sq.	0.017	0.081	0.030	0.093	0.360	0.389	0.368	0.396

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

The results from the different regressions show that the relationship between start-up size and years of survival is highly significant. We can observe that including the dummy for survival for the whole time period influence the elasticity downwards. The other two control dummies do not seem to influence the result. For the full model, the result is an elasticity of about 0.17. This means that doubling the size at start-up increases the survival time in years with 17 percent.

4 The empirical model

Based on the discussion in the above section we derive the following model in order to test our hypotheses.

$$\ln Y_{i,r} = \alpha + \beta_1 \ln MP_r + \beta_2 \ln MP_{ext} + \beta_3 LM_r + \beta_4 Edu_r + \beta_5 Small_r + \beta_6 \ln Spec_{i,r} + \beta_7 \ln Comp_{i,r} + \varepsilon_{i,r}$$

Dependent variables:

$Emp_{i,r}$ = employment in new firms in industry *i* in region *r*

$Firm_{i,r}$ = number of new firms in industry *i* in region *r*

$Fsize_{i,r}$ = average size of new firms in industry *i* in region *r*

Independent variables

MP_r = market potential in region *r*

MP_{ext} = market potential in region *r* from regions external to region *r*

LM_r = labour market condition in region *r* (employment rate)

Edu_r = education rate in region *r*

$Small_{i,r}$ = share of small firms in industry *i* in region *r*

$Spec_{i,r}$ = location quotient for industry *i* in region *r*

$Comp_{i,r}$ = level of competition in industry *i* in region *r*

In the model all variables are logged except labour market condition (LM_r), education rate (Edu_r) and share of small firms ($Small_{i,r}$).

We make use of a special relationship when we estimate both employment in new firms and the number of new firms. We observe both the number of employees in new firms and the number of new firms. The size of new firms is simply the number of employees per new firm. Given that we estimate the equation above for each of the three dependent variables, we can discriminate between the relative impact on number of firms and on employment and the resulting impact on firm's size, as illustrated below.

$$Fsize_{i,r} = {Emp_{i,r}}/{Firm_{i,r}}$$

$$\ln Fsize_{i,r} = \ln Emp_{i,r} - \ln Firm_{i,r}$$

$$\ln Emp_{i,r} = \alpha^e + \beta_1^e \ln MP_r$$

$$\ln Firm_{i,r} = \alpha^f + \beta_1^f \ln MP_r$$

$$\ln Fsize_{i,r} = \alpha^s + \beta_1^s \ln MP_r$$

$$\beta_1^s = \beta_1^e - \beta_1^f$$

Thus, in estimating the effects on average firm size of entrants at the regional level, the relative importance of employment and number of firms can be determined.

5 Data and descriptive statistics

Swedish data from Statistics Sweden, System for Regional Analysis and Forecast, is used. The unit of observation in this study is the regional level. We observe 290 Swedish regions over an eight-year period, from 2002 until 2010 in our study but we also provide some information for the period 1993-2010. The total number of observations used in our panel estimations is 2610. The three sectors in the study are:

- Manufacturing
- Ordinary Services (e.g. retail, wholesale, hotels, transport)
- Advanced services (e.g. financial, real estate, consultants)

In Figure 5.1, we present some general information (The exact numbers are given in Table 5.1). We can see that the sector ordinary services contain the largest number of firms followed by advanced services. Manufacturing is the smallest sector in terms of number of firms. New firm formation is on the other hand largest in absolute numbers in the advanced service sector, followed by the ordinary service sector. The number of firm's exits is among the same for both ordinary and advanced services. Entry and exit in manufacturing is much lower in absolute terms than in the two service sectors.

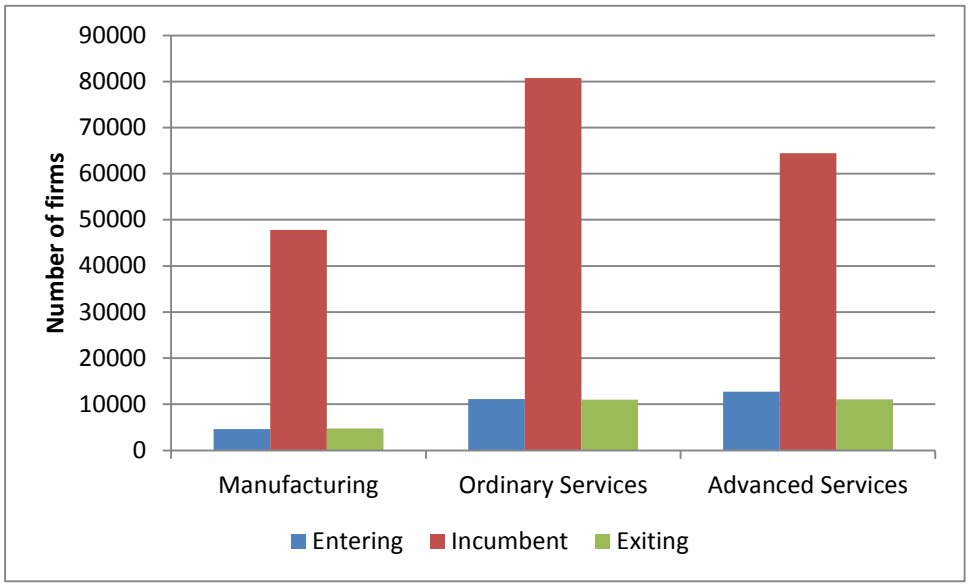

Figure 5.1: *Number of entering, incumbent and exiting firms in Sweden (Yearly averages during the period 1993-2010)*

The number of start-ups in the three sectors during the period 1993-2010 is illustrated in Figure 5.2. The number of start-ups in manufacturing and ordinary services shows a U-shaped pattern, while the start-ups in advanced services show a very clear upward trend for the period 2003-2010.

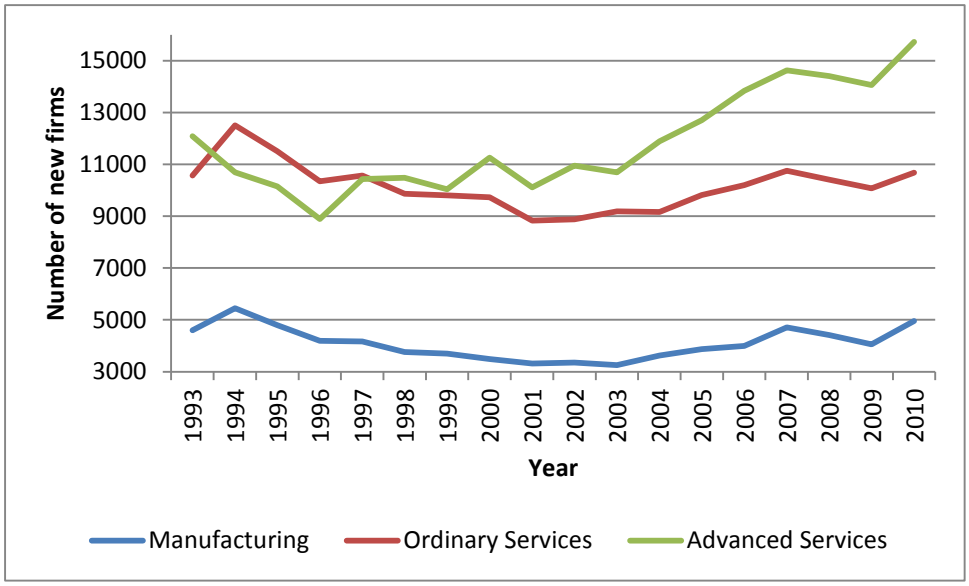

Figure 5.2: *Number of Start-ups in three sectors from 1993 to 2010*

In Table 5.1, we highlight the firm dynamics in the three sectors during the period 1993-2010. The number of firms in the ordinary services sector is 69 per cent larger that the number of firms in the manufacturing sector. The advanced services sector contains 35 per cent more firms than the manufacturing sector. The number of entering firms in the advanced services sector is 175 per cent larger than for the manufacturing sector. The same number for the ordinary services sector is 140 per cent. We see that while the number of firms is decreasing in the manufacturing sector, it increases slowly in the ordinary services sector and rapidly in the advanced services sector. The table also illustrates that the "churning", defined as (entries + exits)/incumbents is lowest in the manufacturing sector and highest in the advanced services sector, showing the we find the highest dynamics in the advanced services sector.

Table 5.1: *Firm dynamics in three sectors 1993-2010 (average)*

	Manufacturing	Ordinary Services	Advanced Services
Entering	4633	11116	12750
Incumbent	47802	80745	64428
Exiting	4738	10978	11037
Entry/Exit	0.978	1.013	1.155
(Entry+Exit)/Incumbents	0.196	0.274	0.369

Entrants are on average smaller than incumbents, which are illustrated in Figure 5.3. Both incumbents and new firms in the advanced services sector are distinctly smaller than the firms in the other two sectors are.

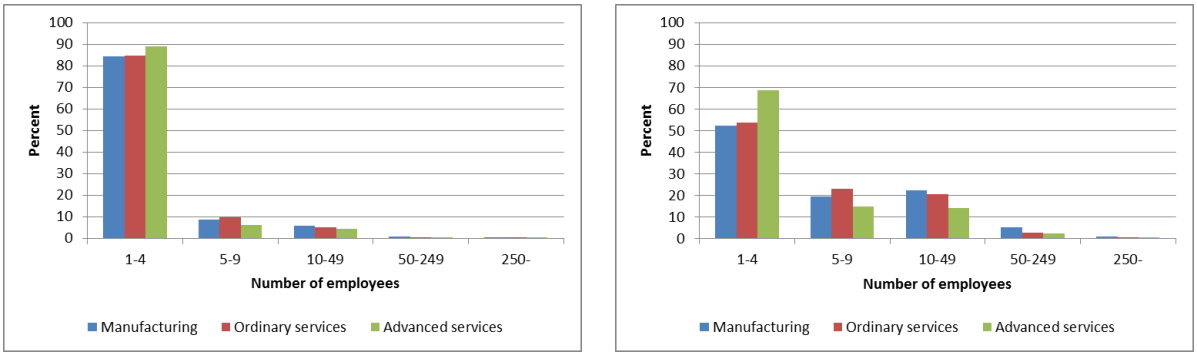

Figure 5.3: *Size distribution of entrants and incumbents 1993-2010 (average)*

Descriptive statistics are presented in Table 5.2. We can observe that the average number of new manufacturing firms per region is about half that of both ordinary and advances service firms. From the standard deviation, we can also see that the variation in number of new firms is 143 per cent higher for the advanced services sector than for the manufacturing sector. This indicates that advanced services firms has a strong preference for locating in a limited number of regions. The average employment generated by new firms is 96 per cent higher for the ordinary services sector than for the manufacturing sector. The same number for the advanced services sector is 66 per cent. The standard deviation is large indicating a very substantial variation in the number of new jobs between regions. Finally, we see that the average plant size is small but also that the average new manufacturing plant is 28 per cent larger than the average new plant in the advanced services sector and 6 per cent larger than the average new plant in the ordinary services sector. From the standard deviations, we can see that the variation in the size of new firms is substantially larger for the manufacturing sector than for the other two sectors.

Table 5.2: *Descriptive statistics for 290 Swedish regions (average 2002-2010)*

		Mean	Std.Dev.	Min	Max
New firms	Manufacturing	8.202	4.135	0	41.841
	Ordinary Services	16.228	7.849	0	80.062
	Advanced Services	16.779	10.047	0	112.047
Employment in new firms	Manufacturing	19.165	27.429	0	706.069
	Ordinary Services	37.519	29.383	0	454.076
	Advanced Services	31.727	23.734	0	262.494
Plant size of new firms	Manufacturing	2.391	3.785	1	118.667
	Ordinary Services	2.256	1.183	1	25
	Advanced Services	1.864	0.922	1	15.6
Specialization	Manufacturing	126.123	51.473	26.282	294.682
	Ordinary Services	81.851	27.701	32.568	266.118
	Advanced Services	59.67	34.02	9.646	305.173
Competition	Manufacturing	0.44	0.239	0.072	1.704
	Ordinary Services	2.511	0.74	0.556	5.744
	Advanced Services	1.967	0.749	0.505	6.594
Market potential		10116.38	17741.8	101.864	170420.8
Regional market pot.		2820.686	8346.687	84.763	140407.3
X-regional market pot.		7295.693	14168.39	0.000131	137910.3
Labour market		0.815	0.045	0.558	0.941
Education		.0862	.0414	.0335	.326
Small firms		0.937	0.019	0.877	0.977

We now continue by presenting our empirical results in Section 6.

6 Results

In this section, we present and discuss the results from our empirical analysis.

We conduct our analysis in three steps. In the first step, we test with only one explanatory variable – the total market potential of regions (Table 6.1). We see that the total market potential has a positive influence on the size of new plants in all three sectors. It has a positive influence on employment in new firms in both ordinary and advanced services but a positive effect on the number of new plants only in the advanced services sector.

In our second step, we divide the total market potential into internal and external market potential of regions and use these two variables as explanatory variables. The results are reported in Table 6.2. The internal market potential has a significant positive influence except in one case – the number of new manufacturing plants. In this case, the influence is significantly negative. The external market potential has a significant negative influence in all cases, probably the result of spatial shadow effects. If there exists a large nearby market, entrepreneurs will prefer to locate there.

Our third step implies that we now estimate the full model (Table 6.3). The explanatory power is increased in most cases. Here the influence from the internal market potential is sig-

nificant and positive in all cases. The external market potential is significant and negative in all cases. Labour markets conditions, when they are significant have a negative influence. Good labour market conditions induce fewer new manufacturing plants and fewer jobs in new manufacturing plants and they tend to reduce the size of new plants in advanced services. The education level of employees in regions has a significant positive influence on the number of new plants and employment in new plants in all three sectors but a negative influence on the size of new plants in advanced services. Could it be that educated people prefer smaller firms when they start advanced service plants? This deserves future research.

A high share of small firms in the sector tends to reduce the number of start-ups and the employment in new plants in all three sectors. It also significantly reduces the size of new manufacturing plants. The effects here are interesting. A high share of small plants in a region is sometimes believed to be a sign of an entrepreneurial region. The results here show the opposite. Specialization, on the hand, is a factor that has a significant positive influence on the number of start-ups and employment in new plants in all three sectors. Furthermore, it increases the start-up size in both ordinary and advanced services. One can imagine that specialization in principle is equal to a presence of Marshall's location factors: a common labour pool, presence of specialized input suppliers and 'information about the trade in the air". The level of competition has a significant positive influence on the number of start-ups and employment in new plants in all three sectors but a weak negative influence on the start-up size of plants in advanced services.

Now summarizing the significant determinants of the start-up size of plants in in manufacturing is positively influenced by the size of the internal market potential of regions and negatively influenced by the size of the external market potential of regions and of the presence of a high share of small firms. For ordinary services, we find a positive influence on start-up size of plants from the internal market potential of regions and the degree of specialization in ordinary services and a negative influence from the external market potential. Advanced services are a bit different. Internal market potential and degree of specialization within advanced services have a significant positive influence on start-up size of plants. A significant negative influence on start-up size of plants in advanced services comes from the external market potential, good employment conditions, and a high share of highly educated in the labour force and a high degree of competition within the sector.

Table 6.1: *Start-up size explained by market potential*

	Manufacturing	Ordinary Services	Advanced Services
Market potential	0.0295***	0.0620***	0.0338***
	(4.063)	(12.10)	(5.969)
Constant	0.403***	0.168***	0.269***
	(6.039)	(3.436)	(5.071)
Observations	2,570	2,604	2,584
R-squared	0.017	0.051	0.023

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 6.2: *Start-up size explained by internal and external market potential*

	Manufacturing	Ordinary Services	Advanced Services
Regional market potential	0.0915***	0.139***	0.103***
	(11.75)	(25.13)	(17.17)
X-regional market potential	-0.0170***	-0.0183***	-0.0195***
	(-3.598)	(-5.833)	(-5.038)
Constant	0.127**	-0.165***	-0.0356
	(2.086)	(-3.702)	(-0.741)
Observations	2,570	2,604	2,584
R-squared	0.049	0.157	0.093

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 6.3: *Start-up size – Full model*

	Manufacturing	Ordinary Services	Advanced Services
Regional market potential	0.0737***	0.0879***	0.0886***
	(4.801)	(6.602)	(7.895)
X-regional market potential	-0.0154***	-0.0180***	-0.0130***
	(-2.926)	(-5.708)	(-3.281)
Labour market	-0.330	-0.0855	-0.402**
	(-1.367)	(-0.421)	(-2.369)
Education	-0.142	0.0996	-0.677***
	(-0.426)	(0.480)	(-2.761)
Small firms	-1.777**	-0.451	0.393
	(-1.988)	(-0.747)	(0.668)
Specialization	0.0125	0.202***	0.0684***
	(0.224)	(5.646)	(2.954)
Competition	0.00636	-0.102	-0.0571*
	(0.142)	(-1.550)	(-1.951)
Constant	2.141**	-0.119	-0.188
	(2.326)	(-0.219)	(-0.331)
Observations	2,570	2,604	2,584
R-squared	0.054	0.193	0.109

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

7 Conclusion and summary of results

The purpose of this paper was to analyse the determinants of start-up size in different industries at the regional level. Our general result is that the size of the internal market potential has a positive influence on the start-up size of plants in manufacturing as well as in ordinary and advanced services. Regional specialization in ordinary and advanced services has a significant positive influence on start-up size of plants in the two sectors, respectively. Given that the start-up size of plants is important for the survival of firms we can draw the general policy conclusion that it is important for policy makers to try to increase the market potential of regions. The main instrument to do that is investments in transport infrastructure that increases the accessibility of regions.

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Table A.1: *Entering number of firms and employment explained by market potential*

	Manufacturing		Ordinary Services		Advanced Services	
	Plants	Employment	Plants	Employment	Plants	Employment
Market potential	-0.0593***	-0.0298***	-0.000696	0.0613***	0.149***	0.183***
	(-8.214)	(-2.892)	(-0.0873)	(5.835)	(16.89)	(16.26)
Constant	2.724***	3.126***	2.722***	2.890***	1.587***	1.856***
	(39.18)	(32.03)	(36.38)	(28.84)	(19.41)	(17.97)
Observations	2,570	2,570	2,604	2,604	2,584	2,584
R-squared	0.090	0.025	0.019	0.028	0.177	0.146

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table A.2: *Entering number of firms and employment explained by internal and external market potential*

	Manufacturing		Ordinary Services		Advanced Services	
	Plants	Employment	Plants	Employment	Plants	Employment
Regional market potential	-0.069***	0.0222*	0.0836***	0.223***	0.217***	0.320***
	(-8.669)	(1.872)	(10.77)	(22.16)	(27.81)	(31.10)
X-regional market potential	-0.014***	-0.031***	-0.039***	-0.057***	-0.00083	-0.0203***
	(-3.254)	(-4.463)	(-7.624)	(-8.400)	(-0.173)	(-3.112)
Constant	2.826***	2.953***	2.414***	2.248***	1.307***	1.271***
	(42.12)	(31.51)	(35.38)	(25.68)	(18.35)	(14.26)
Observations	2,570	2,570	2,604	2,604	2,584	2,584
R-squared	0.101	0.029	0.064	0.139	0.241	0.261

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table A.3: *Entering number of firms and employment – Full model*

	Manufacturing		Ordinary Services		Advanced Services	
	Plants	Employment	Plants	Employment	Plants	Employment
Regional market potential	0.0404***	0.114***	0.0993***	0.187***	0.0726***	0.161***
	(2.708)	(5.027)	(6.892)	(8.925)	(5.974)	(9.220)
X-regional market potential	-0.040***	-0.055***	-0.038***	-0.056***	-0.041***	-0.054***
	(-6.853)	(-5.996)	(-8.784)	(-9.302)	(-8.170)	(-7.363)
Labor market	-0.723***	-1.053***	-0.237	-0.322	0.146	-0.256
	(-3.149)	(-2.992)	(-1.232)	(-1.103)	(0.807)	(-0.983)
Education	1.248***	1.106**	1.323***	1.423***	2.085***	1.408***
	(3.278)	(2.123)	(4.840)	(3.887)	(7.625)	(3.502)
Small firms	-1.506*	-3.282***	-2.757***	-3.208***	-2.736***	-2.343***
	(-1.945)	(-2.628)	(-4.216)	(-3.356)	(-4.384)	(-2.624)
Specialization	0.573***	0.585***	1.130***	1.332***	0.832***	0.901***
	(9.763)	(6.840)	(27.34)	(22.34)	(31.93)	(24.47)
Competition	0.737***	0.744***	1.044***	0.942***	0.842***	0.785***
	(15.82)	(10.71)	(18.56)	(10.07)	(24.94)	(16.49)
Constant	2.051***	4.192***	-0.760	-0.879	1.105*	0.917
	(2.594)	(3.267)	(-1.231)	(-1.006)	(1.851)	(1.071)
Observations	2,570	2,570	2,604	2,604	2,584	2,584
R-squared	0.224	0.085	0.370	0.350	0.614	0.492

Robust t-statistics in parentheses, *** p<0.01, ** p<0.05, * p<0.1