

THE IMPORTANCE OF INDUSTRY STRUCTURE IN THE ANALYSIS OF REGIONAL ENTRY AND EXIT: THE CASE OF SWEDEN

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Abstract:

Previous empirical research has suggested that a large amount of the regional variation of new firm formation can be explained by differences in industrial structure. This paper studies the regional patterns of entry and exit in Sweden 1997-2001 considering these findings. It is shown that for the country as a whole, on average during these five years between 0.5 and 2.7 per cent of the regional variation in entry and exit rates remain to be explained when regional industrial entry and exit rates are compared to the national average. However, there are substantial regional variations, which should be acknowledged by policy-makers.

Keywords: Entry, exit, industry structure, regions

JEL classification: L1 R12

1.Introduction

New firms are considered to play an important role as regards employment generation and economic growth (see e.g. Ashcroft and Love, Wennekers and Thurik, 1999) and entrepreneurs play an important role in the society as agents of change (Audretsch, 2005). It is now well known that there are substantial differences in entry and exit rates between industrial sectors (see e.g. Beesley and Hamilton, 1984, Dunne et al., 1988, Geroski, 1995 and Nyström (2006) for the Swedish industrial sectors). Moreover, the entry and exit rates vary substantially across regions (see e.g. Reynolds, Storey and Westhead 1994, Keeble and Walker, 1994 and Davidsson, Lindmark and Olofsson, 1994 and Nyström, 2006 for regarding the variation across Swedish regions).

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From a theoretical perspective the interest in regional new firm formation is relying on new economic geography and endogenous growth theories (see e.g. Romer, 1986, Krugman, 1991 and Aghion and Howitt, 1998). These theories emphasise Firms may gain from location advantages in terms of spill-overs and co-operation with other firms located in the region. Location advantages may then be one additional factor influencing the very complex location decision. In addition to the possible agglomeration effects there is of course many other factors that determine the firms decision about were to locate, which has been frequently investigated in the empirical literature.

The regional determinants of regional firm entry includes for example, market prospects in terms of local demand, supply of founders i.e potential entrepreneurs, and the nature of the policy environment and these determinants may differ across sectors. (see e.g. Johnson and Parker, 1996, Audretsch and Fritsch, (1999) and Armington and Acs, 200). The regional attractiveness for firms in different industries to locate in a region is then naturally reflected by the prevalent industrial structure. The observed patterns of regional entry can obviously be expected to be influenced by regional differences in industrial structure. The scope of this phenomenon is discussed by Fritsch (1997). He shows that the number of regional new firm start-ups in Germany evidently depends on the industry structure in the region and that more than half of the new firm start-ups can be explained by industry differences.

This also raises questions if there is similar pattern for other countries and regions.. The alert reader may also note that the empirical literature to a great extent concerns new firm formation. This paper also intends to contribute to the literature by also analysing both firm entry and exit since exit is a fundamental ingredient in industrial and regional development and structural change processes. Hence, the important question to be answered in this paper is how much of the variation of Swedish regional entry and exit rates can be explained by differences in industrial structure. By comparing the result of the entry and exit rates and the entry and exit rates adjusted for industrial structure we are able to gain additional knowledge about what kind of problems the regions

potentially face. The methodology for adjusting entry and exit rate for the structural component used in the paper is similar to the one applied by Johnson, (2004) The paper uses unique data, which enable us to investigate the regional patterns of entry and exit in 81 Swedish regions over the period 1997-2001.

From a policy perspective the issue regarding the importance of the structural component in the analysis of regional new firm formation is of course of considerable interest. The Swedish government has tried to remedy the uneven growth patterns across regions by for example applying several measures. In addition to measures aimed at stimulating new firm formation, strategies to prevent firms from exiting by using subsidies to enterprises in problematic regions are adopted. The underlying assumption of applying such regional policies is of course that new firm formation are expected to have positive effects on regional economic growth and in fact Braunerhjelm and Borgman, (2004) found a positive effect of entrepreneurship on regional economic grow, especially for service industries.

However, according to Andersson (2005) subsidies to firms in problematic regions have uncertain and the effect may even be negative, due to the possibility that they distort competition and might delay the industrial restructuring process. There is also an obvious problem for policy-makers associated with identifying and choosing the strategically 'correct' firms or industries to support. As emphasised by Johnson (2004) it is great interest to regional policymakers to know whether the low (or high) firm formation rates in their region are due to region specific influences such as a less supportive environment for business formation or if the low (or high) formation rates actually can be explained by industry specific differences and clearly should influence which policy directions should be taken.

The paper is organized as follows: Next section presents the data and methodology used in the empirically study. Section three presents the Swedish regional variation in entry and exit rates and compares them with entry and exit rates adjusted for regional industrial structure. Finally conclusions and policy implications are presented.

2.Data and methodology

1.1 Data

The data used in the empirical analysis were collected by Statistics Sweden and consist of firm-level data. The data consist of information about the financial variables for enterprises in the corporate sector.¹ The total number of observations in the dataset for each year is between 200,000 and 300,000. Information from joint-stock companies, cooperatives, partnerships, limited partnerships, associations and some foundations is available in the dataset², which makes the dataset unique in its coverage. Further details about the dataset can be found in Nyström, (2006). The firms are coded in a way that makes it possible to identify when each individual firm enters or exits. Data for 1996 to 2001 are available, which makes it possible to compute entry and exit rates for the five years 1997 to 2001. Since this paper has a regional perspective, it is possible to consider a regional entry either as a totally new firm or a firm previously located somewhere else but re-locating to another region. However, such a distinction is not made in this paper since the definition of entry and exit is made from a national perspective.

Two alternative approaches of computing entry and exit rates are commonly used; the ecological approach or the labour market approach. The ecological approach relates the number of entering or exiting firms to the number of already existing firms in a specific industry. This means that entries and exits are rather viewed as births and deaths in a population. The labour market approach instead relates the number of entering or exiting firms to the number of employees in the industry (Armington and Acs, 2002), and this view is preferred by those who investigate entrepreneurship as a result of people's decisions to start a new firm or not. The regional

¹ This means that all industries included in the SIC classification system, except Financial intermediation (SIC code 65-67), Real estate activities (SIC code 70) and Activities of membership organizations (SIC code 91) are included in the dataset.

² In order to only take firms with real economic activity into account, firms with no employees and firms that report no sales are not included in the dataset. After removing these non-active firms almost 200,000 firms remain for each year.

classification introduced by NUTEK, (1998) in which Sweden comprises of 81 regions are used in the empirical analysis. The regional classification is based on commuting patterns and intends to reflect the scope of the local labour market.

1.2 *Methodology for adjusting entry and exit rates for industrial structure*

Johnson (2004) studies to what extent regional differences in new firm formation can be explained by two components: differences between regions due to different industrial structures (structural component) and differences between regions regarding the new firm formation in the same industrial sector (formation component). He finds that the sources of the differences in regional new firm formation vary significantly across regions, and he emphasises that an important implication of this finding is that regional policy has to consider the causes of, for example, low regional new firm formation in order to develop efficient tools for stimulating new firm formation.

In order to better understand the sources of variation in entry rates across regions a type of shift-share analysis for adjusting entry and exit rate for industrial structure is applied. This means that the national average number of entrants is subtracted from the number of real entrants for a specific industry and region (Fritsch 1997). This means that the measure used in this paper is a similar measure as the measure previously labelled “formation component” and used by Johnson (2004). It shows if the region over- or underperforms in terms of entry for the same industrial sector. Note that in the following description of computation methodology, the industry adjusted entry rate is defined. The similar procedure is then applied for the industry adjusted exit rates.

The adjusted entry rate $E_{r,i}(adjusted)$ for region r and industry i at a specific time period t is calculated as follows:

$$E_{r,i,t}(adjusted) = \frac{ENTRY_{r,i,t}}{N_{r,i,t}} - \frac{\sum_{r=1}^{81} ENTRY_{r,i,t}}{\sum_{r=1}^{81} N_{r,i,t}} \quad (1)$$

where $ENTRY_{r,i,t}$ is the number of entering firms in region r and industry i at time t , and $N_{r,i,t}$ is the number of firms in region r and industry i at time t . When we subtract the average entry rate for the whole country in an industry i , from the actual industry entry rate in the region we get the adjusted entry rate. The adjusted exit rate ($X_{r,i,t}(adjusted)$) is calculated correspondingly. Note that the adjusted entry and exit rates can have negative signs if the actual entry rate in a specific region is lower than the national entry or exit rate of the industry in the country.

As a first step in the analysis of regional entry and exit rates the unadjusted regional entry and exit rates are computed, using the ecological approach. These regional entry and exit rates can then be compared with the adjusted regional entry and exit rates. These regional adjusted entry rates are computed by calculating the average adjusted entry and exit rates presented in equation 1 for each region:

$$\text{Regional average adjusted entry rate} = \left[\sum_{i=1}^{47} E_{r,i,t}(\text{adjusted}) \right] / 47 \quad (2)$$

Both the unadjusted and the adjusted entry and exit rates will be presented in maps in Figures 1-4. It is interesting to look at the general Swedish pattern regarding the unadjusted and adjusted entry and exit rates. This can be done if we sum the average adjusted entry rates over all regions and divide the computed value by the number of regions we get a country average.

$$\text{Country average adjusted entry rate} = \left[\sum_{r=1}^{81} \text{Regional average adjusted entry rate} \right] / 81 \quad (3)$$

3. Empirical results

Let us start to look at the general patterns represented by the country average adjusted entry and exit rates. The results from these computations are presented in Table 1. The table shows that if we do not control for industrial structure the entry rate is between 9.7 and 11.3% during the five years but if we control the entry rates for

industrial structure the average adjusted entry rate is only between -1.2 and -2.7 %. When the same computations are performed regarding exit rates the unadjusted exit rate ranges between 9.2 and 11.7%, but if we adjust for industry structure the exit rates vary only between -0.5 and -1.0% during the five years.

Table 1: Mean, minimum and maximum values of entry and exit rates 1997-2001

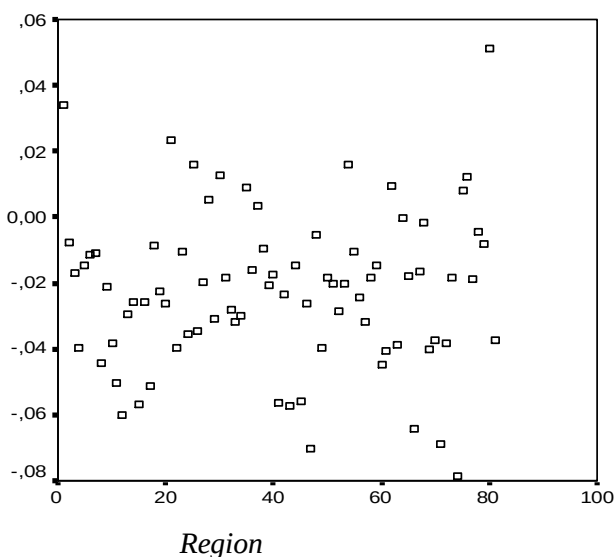
	1997	1998	1999	2000	2001
<i>Entry rate</i>					
Mean	0.101	0.113	0.097	0.113	0.100
Minimum	0.059	0.045	0.039	0.056	0.033
Maximum	0.158	0.178	0.149	0.186	0.182
Std Dev.	0.019	0.023	0.019	0.024	0.022
<i>Entry rate adjusted</i>					
Mean	-0.012	-0.027	-0.016	-0.022	-0.020
Minimum	-0.054	-0.095	-0.076	-0.079	-0.087
Maximum	0.045	0.038	0.034	0.051	0.062
Std Dev.	0.019	0.023	0.018	0.024	0.022
<i>Exit rate</i>					
Mean	0.117	0.102	0.111	0.092	0.102
Minimum	0.033	0.066	0.075	0.047	0.056
Maximum	0.199	0.155	0.145	0.143	0.156
Std Dev.	0.022	0.016	0.014	0.018	0.012
<i>Exit rate adjusted</i>					
Mean	-0.008	-0.005	-0.007	-0.010	-0.010
Minimum	-0.092	-0.041	-0.043	-0.054	-0.056
Maximum	0.074	0.049	0.026	0.041	0.044
Std Dev.	0.022	0.016	0.014	0.018	0.019

It is also worth mentioning that even though the average figures for the adjusted entry and exit rates are quite low, the standard deviation and minimum and maximum values show that the adjusted entry and exit rates vary a great deal across regions. It is also interesting to observe that the adjusted entry and exit rates both have negative means. The implication of this result is that a majority of

the regions have lower entry and exit rates compared with the national average, given their industrial structure. This means that there is skewness in the distribution of the adjusted entry and exit rates among the regions. Graph1 provides an example of what the distribution looks like for adjusted entry rates in the year 2000.

Graph 1. The distribution of regional average adjusted entry rates 2000

Average Adjusted entry rate



Figures 1 and 2, in the Annex, give a deeper understanding of the regional differences in entry rates by showing the regional average entry and adjusted entry rates for 1997-2001 calculated according to the definition in equation 2. The four different colours represent quartiles of the entry rates in the regions. Some regions in the inner parts of northern Sweden have the lowest entry rates whereas the two largest labour markets in Sweden, Stockholm and Gothenburg, have among the highest entry rates. The construction of the adjusted entry rate variable suggests that a region with a positive adjusted entry rate is a region with higher entry rate than the national average in most

industries. Since the unadjusted entry depends on both industry composition and other regional milieu factors the adjustment procedure applied here sheds some light on the importance of these other regional milieu factors. The adjusted entry rates show the differences between the national means in the industries, i.e. if the entry rate in the same industrial sector varies between regions. The remaining adjusted entry rates can therefore be assumed to reflect the regional milieu. In this sense the interpretation of the low entry rate but at the same time positive adjusted entry rate means that given a bad starting point, in terms of an industrial structure with low entry rate, firms still perform somewhat better than the national average for many industries. Note also that Stockholm, which had among the highest entry rates, now has among the lowest adjusted entry rates, which means that the entry rates in Stockholm could have been even higher if the national average entry rates had been achieved for more industries. Also Gothenburg performs worse if we consider the industry adjusted entry rates compared to the unadjusted entry rates.

Figures 3 and 4, in the Annex, compare the unadjusted exit rates with the adjusted exit rates. In these figures we can see that many of the regions with the highest exit rates are located in the northern parts of Sweden, but also that the Stockholm and Gothenburg regions have rather high exit rates. In the southern part, on the contrary, exit rates are low in many regions. In this case the construction of the adjusted exit rate implies that a positive adjusted exit rate means that we have a higher exit rate than the national average in a particular region. Many of the regions with positive adjusted exit rates are located in the northern part of Sweden. Therefore we can conclude that these regions face some severe problems with exiting firms, since they do not only have high exit rates but also higher exit rates than the national average exit rates in these industries. Remember that we previously mentioned that some of these regions were regions which actually performed better than the national average in terms of entry rates and hence we can conclude that the problem that the policymakers in these regions face is how one should deal with the fact that the ability for firms to survive is lower than for firms in the same industry in other parts of Sweden. The two largest regions has, as previously mentioned high exit rates but the correspond quite

well to the national average since the industry adjusted exit rates are quite close to zero and the two regions remain in the same relative position as before adjusting the exit rates.

4. Conclusions and policy implications

In this paper it has been shown that a large part of the differences in regional entry and exit rates can be explained by differences in industrial structure. During the five years included in the empirical analysis between 0.5 and 2.7% of the regional variation in entry and exit rates remain to be explained when the regional industrial entry and exit rates are compared with the national average. If one compares the unadjusted entry and exit rates with the adjusted entry rate we get a clearer picture of the causes of entry and exit dynamics in different regions. The northern part of Sweden is often considered as an area that has severe problems with firms and people moving out of the regions. The analysis in this paper shows that there is indeed a problem in these regions with high exit and low entry rates. The problem with high exit rates remains if one takes the industrial structure into account, but on the other hand if one looks at the entry rates some of these regions perform better than the national average for the industry. This may be an indicator that there is a structural change process going on in which regions that have been locked in by a certain industrial structure now are revitalised through a process that replaces stagnating industries with more expansive ones.

However, it should once more be emphasised that the industry structure in a region is a result of the regional characteristics and history. In regions where the problem of low firm formation rates are mainly due to the industrial structure it is dangerous to draw the conclusion that the industrial structure needs to be altered. As emphasised by Johnson (2004) such a policy might be very inappropriate since a very wide range of factors determines the regional industrial structure. Still it is crucial for policy-makers to have knowledge about the causes of low or high entry and exit rates in order to be able to make better decisions regarding regional policies. In addition, as emphasised by Audretsch and Fritsch (1999), the effect of policy measures is dependent on which specific policy instrument that is used i.e. certain measures to stimulate new firm

formation may be efficient in certain industries but perhaps not that efficient for the specific industries that the policy makers are aiming at. Policymakers should, as empirically shown for Germany by Fritsch and Mueller, (2004) also be aware of that the positive employment effect of regional new firm formation can be expected to take considerable time.

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Annex

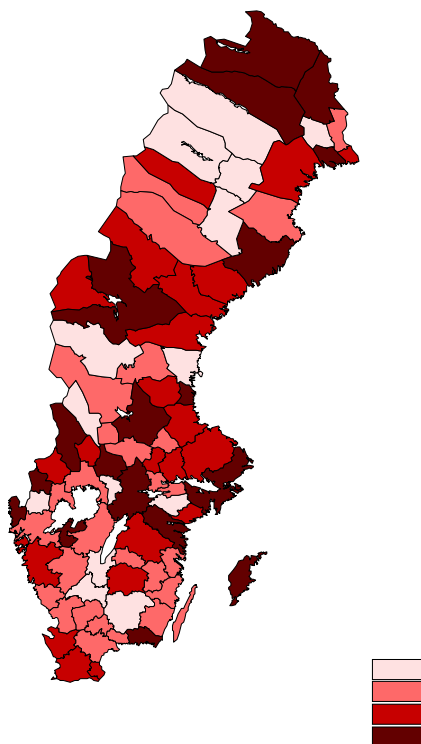


Figure 1: Average entry rates 1997-2001 in 81 Swedish regions.

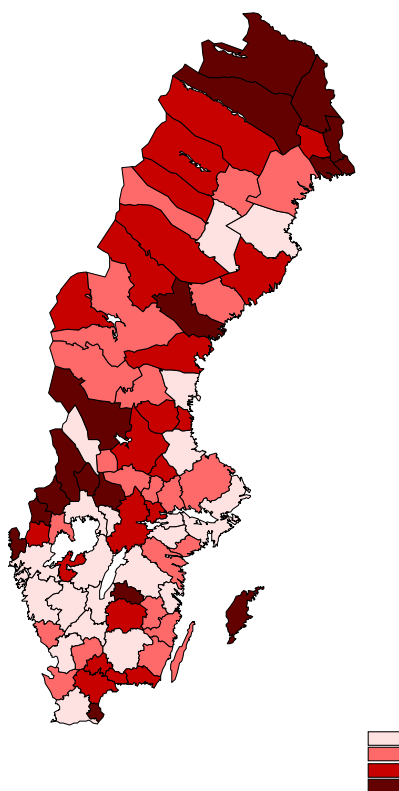


Figure 2: Average adjusted entry rates 1997-2001 in 81 Swedish regions.

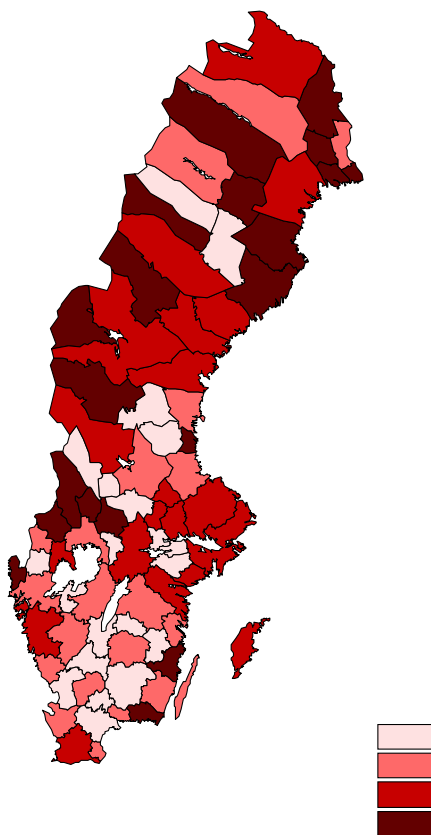


Figure 3: Average exit rates 1997-2001 in 81 Swedish regions.

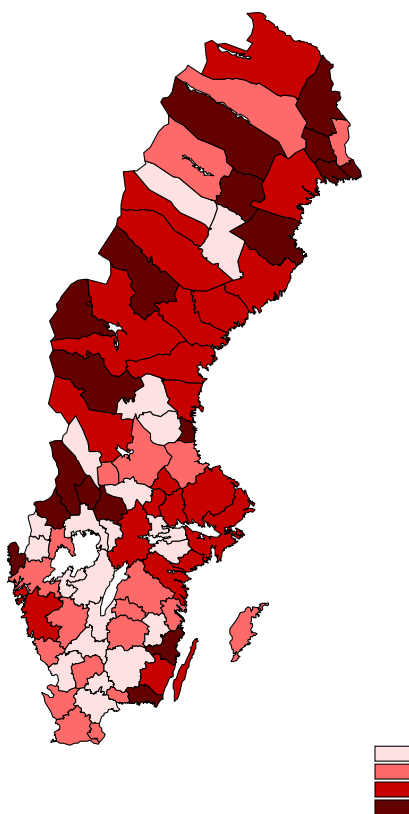


Figure 4: Average adjusted exit rates 1997-2001 in 81 Swedish regions.