Some Important Observations Concerning Job Creation by Firm Size and Age

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Introduction

The research presented in this research note relates to two partly overlapping topics in previous research on SMEs. Firstly, it extends earlier findings regarding the role of SMEs in job creation. Secondly, it illustrates in a quite dramatic fashion the importance of definitions and operationalisations in research on small business growth, something which has been suggested in earlier reviews of that line of research.

The role of SMEs in job creation

An ever increasing number of empirical studies from many different countries have suggested that SMEs play a very large and/or growing role as job creators (Birch, 1979; Baldwin and Picot, 1995; Davidsson, 1995; Davidsson, Lindmark and Olofsson, 1993; 1994; 1995a; 1995b; 1998a; 1998b; Fumagelli and Mussati, 1993; Fölster, 1997; Kirchhoff and Phillips, 1988; Picot & Dupuy, 1998; Spilling, 1995; for further reference to studies carried out in a large number of countries see also Aiginger and Tichy, 1991; ENSR, 1994; Loveman and Sengenberger, 1991; OECD, 1987; Storey and Johnson, 1987).

Four issues are often discussed in relation to this research. The first is that some critics maintain that the finding that SMEs dominate job creation simply is not true. Davis, Haltiwanger & Schuh (1996a, 1996b) suggested that the belief that small firms are major contributors of new jobs is largely based on methodological flaws, while the second most well-known critic, Bennet Harrison (1994a, 1994b) alters between saying that SMEs are not over-represented as job creators, and suggesting that they are, but only because large firms who are still in power changed their strategies. Kirchhoff & Greene (1998) and Reynolds (1996) have suggested that the opposing views are in part due to different fundamental theories concerning how the economy works. Careful analyses in countries with very high quality business statistics have clearly demonstrated that Davis’ et al objections are empirically invalid (Davidsson, Lindmark & Olofsson, 1998a; Baldwin & Picot, 1995; Picot & Dupuy, 1998).

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On this first issue--that SMEs are important job creators--the research community is today probably as close to consensus as it ever will get. There is some controversy as regards whether this is mainly a result of many small start-ups and incremental expansions, or if a small minority of high growth SMEs contribute the lion’s share of new employment. This second issue is known as the ‘mice vs. gazelles’ or ‘flyers vs. trundlers’ debate. Storey strongly advocates the position that the small group of high growth SMEs are the ‘real’ job creators (Storey, 1994; Storey & Johnson, 1987). Picot & Dupuy (1998) also emphasise that growth is highly concentrated to a small minority of firms whereas, e.g., the research in Sweden (Davidsson & Delmar, 1997; Davidsson, Lindmark and Olofsson, 1993; 1994; 1995a; 1995b; 1998a; 1998b; Delmar & Davidsson, 1998) gives more support for the ‘mice’ hypothesis.

The different views may in part be due to real country differences. For example, neither Blixt’s (1997) nor Davidsson & Delmar’s (1998) recent investigations of high growth firms in Sweden attributed very impressive absolute amounts of new employment to them, compared with contributions via new entry. This may, of course, be specific for Sweden. Without carefully designed comparative studies we do not really know. It must also be understood, however, that the differential results as they now appear in the literature are to a great extent built into the methodology. As emphasised by Davis, Haltiwanger and Schuh (1996a), the net job creation in the economy-at-large can be attributed to many different sub-sets of firms. Some studies follow the development of a group of firms over time while disregarding start-ups that occur during the period. With such a design, it is a given that if some firms close down during the period and the remaining firms have differential growth rates, a small fraction of the original group will account for an ever increasing share of the group’s total employment as the length of the period is extended. If, on the other hand, the study includes all annual start-ups, close-downs, expansions, and contractions but does not aggregate the contribution of individual firms over time, the typical result will be that it is the many small contributions that sum up to large aggregate effects.

A third issue of interest in the current context is whether small firms create a lot of jobs because they are young or because they are small. It is somewhat paradoxical to suggest that ‘small firms grow more (in employment) than large firms’. If they did they would not remain small, would they (cf. Wiklund, 1998, p. 272)? Picot & Dupuy (1998) found that job creation in different size classes is very similar for established firms. Small firms’ disproportionate role as job creators is due to an entry over exit surplus. While Davidsson et al (1995a) found that 1/3 of small firms job creation is directly attributable to start-ups and 2/3 to growth, they emphasise that newness rather than smallness appears to be the key issue.

The present research note will relate to the three issues discussed above. It will not deal further with the fourth issue, which has to do with job quality by employer size. Suffice it here to say that the bulk of the evidence suggests that jobs in smaller firms are on average lower quality and/or less well paid (e.g., Pyke, 1995; Wagner, 1995). There are contradictory views as to whether this gap is closing or widening (Baldwin, 1998; Popkin & Kochhar, 1995). It is further uncertain whether the wage differential is present in all countries (Davidsson, 1993).
In summary, it can be said that previous research suggests that SMEs are very important as job creators but that the jobs they create are on average somewhat lower quality. There are different opinions concerning whether SME job creation is mainly made up from a large number of births and modest expansions, or from the spectacular growth of a small minority of high-growth SMEs.
Operationalisation in research on firm growth

As late as towards the end of the last decade Davidsson (1989), in a review of research on small firm growth, found that surprisingly few studies had focused on that topic. That has changed dramatically in recent years. In reviewing the literature, Storey (1994), Delmar (1997) and Wiklund (1998) provide ever longer lists of studies on small firm growth. Recently, the interest in high-growth firms has been especially pronounced (Cooney & Bygrave, 1997; Davidsson & Delmar, 1997; Delmar & Davidsson, 1998; Deloitte & Touche, 1996; 1997; 1998; Gundry & Welsch, 1997; Johnson, Baldwin & Hinchley, 1997; Petty & Martin, 1997; Rice & Stitt, 1997; Sexton & Seale, 1997; Vyakarnam, Jacobs & Handelberg, 1997).

Despite all this research, surprisingly little of strong, reproducible findings have emerged. The likely reason for this that business growth is a far more complex phenomenon than researchers have realised when designing their studies. This complexity calls for great care in assessing the explanatory variables and their separate and combined influence on growth. Leaving that aside, the complexity also concerns the dependent variable.

Delmar (1997, p. 199) reviewed 55 recent studies on growth and found that

A large array of different measures were used, making comparisons among studies difficult, if not impossible (...) Furthermore, the results indicated little knowledge of the effects of the choice of time period, and the effect of the choice of indicator. It was also found that growth measured in absolute of relative changes yielded totally different results. It is concluded that research will only evolve if we begin with a systematization of the choices related to the dependent variable...

In a similar fashion, Wiklund (1998, p. 83) notes that

When introducing this mathematical equation for measuring growth, or any other for that matter, the researcher is actually modelling a specific growth pattern. The question of how growth should be modelled and the consequences of the particular equation employed needs to be clarified.

Wiklund then goes on to suggest that the most common growth measure, i.e., size at t1 minus size at t0 over size at t0, is perhaps the least appropriate since it models growth as a quantum size leap.

These researchers convincingly argue that the operationalisation of growth in previous studies has often been simplistic and not thought out with sufficient care and rigour. Their critique as well as that put forward by others has dealt rather thoroughly with the relative merits of sales or employment as the size criterion, and with the effects of using absolute vs. relative growth measures. The discussion about operationalisation of growth has not, however, lingered much on the distinction between organic (internal) and acquired (external) growth. This is understandable from a Management perspective. For the business itself sales growth is much more relevant than employment growth, and it does not matter much whether growth is achieved organically or via acquisitions. What matters is whether or not it is profitable or, more generally stated, whether or not growth leads to goal attainment.
When job creation in the economy-at-large is the key interest, employment growth is the preferred growth indicator and the distinction between organic and acquired growth is crucial. Only organic growth represents genuine job creation. However, previous studies have been restricted by data sets that do not allow the researcher to make the distinction between organic and acquired employment growth. This may, in fact, have led to severely distorted comparisons between job creation through start-up vs. job creation through growth, and between job contributions from firms of different size and age. Therefore, this research note focuses on the following questions:

1. **What share of total employment growth at the firm level is organic (i.e., represents genuine job creation?)**

2. **Is that share markedly different for firms of different size and age?**

**Method**

*Data source.* Data were taken from *Statistics Sweden* (i.e., the official ‘Bureau of Census’). Their registers are complete in the sense that all legal commercial activity is represented, whether run as sole proprietorship, partnership, limited liability company or some other legal form. Data originate from different sources such as tax authorities and mandatory surveys. Updating is frequent and generally speaking the registers are of a very high standard by international comparison. Data from three different registers, and ten annual versions of each, have been utilised in developing the data set. For a more elaborate description of the data set, see Davidsson (1997).

*Unit of analysis.* Three levels of analysis are possible in principle: establishment, enterprise, or company group (if applicable). The establishment level would be the least appropriate when the growth of firms is what we are really after. Both the enterprise and company group level are relevant for academic as well as policy purposes. While we would have preferred to have data for both levels we have for the time being limited our study to the enterprise (firm) level. Codes for enterprises may be changed because of an ownership change, industry re-classification, or spatial relocation. This may make what in reality is an on-going business to appear in the registers as a close down and a start-up. Identification codes for establishments are relatively more insensitive to changes of the mentioned kind. We have therefore not accepted company code as the criterion for tracking enterprises over time. Rather, constellations of establishments (and their employment) associated with a certain company code are regarded as ‘the same’ company if they appear together in the next annual version of the register under a different company code.

The data set comprises *all commercially active enterprises in in the private (non-government) sector in Sweden that in November 1996 had at least 20 employees*. With respect to that category, we are dealing with a census study. There are 11 748 such enterprises. Annual data for all enterprises have been compiled for the 1987-1996 period. In existence the entire period were 8 562 firms. Start-ups during this period are included if they fulfil the size criterion for the final year, as are previous government sector firms that by the final year have transferred to the private sector. Firms that dissolve during the period are excluded regardless of their previous size and growth, as are surviving firms that previously may have had more than 20
employees but do not reach that number in 1996. No upper size limit has been employed.

**Definition of ‘High-growth Firm’ (HGF).** In the remainder of this paper, we will only include high-growth firms in the analysis. In doing this we will employ the most straightforward and relevant definition of HGF for a job creation study. We define HGF as *those ten percent of the valid cases* (11,748 minus the 233 that only appear in the last year of the data base) *that display the highest annual average absolute employment growth.*

The firms’ initial size does not enter into the growth calculations. An important data correction measure we took in this context is that when a firm displays a series of employment over the years like ‘non-existent--zero--forty-two’ we do not accept the increase from zero to forty-two as growth. Instead, we regard the firm as created the next year, with forty-two employees as its initial size.

When assessing the job contributions by different categories of firm, the real interest is normally directed towards genuinely new jobs. In the present study we have the unique feature of being able to separate organic growth from growth through acquisitions. This was achieved by keeping track over time of the status and size changes of all establishments that are associated with a firm and classifying them into five categories: original, previously acquired, previously created, acquired this year, and created this year. We calculate annual total and organic growth in the following ways:

**Total employment growth:** Total employment\(_t\) - total employment\(_{t-1}\).

**Organic employment growth (1):** Total employment\(_t\) - total employment\(_{t-1}\) - employment in establishments acquired during this year (importantly, it is only in the year of the acquisition the acquired units are disregarded. Their development during subsequent years form part of the firm’s organic growth).

**Organic employment growth (2):** Total employment\(_t\) - total employment\(_{t-1}\) - employment in establishments acquired during this year + plus jobs in units that are sold off (as opposed to closed down) during this year.

The reason for including (2) is that the computation of (1) ‘punishes’ firms that provide the economy with a lot of jobs which are subsequently spun off.

**Results**

Table 1 displays the cumulative job contributions by this set of high-growth firms over the ten year period, broken down by firm (register) age. Since the figures are cumulative lower per firm figures should be expected for younger firms. It should also be noted that firm age is cut off at 10 years because 10 years is the length of the period covered by the data set; the average age of the ‘10 or more’ category is likely to be closer to 20 than to 10 years.
A first observation from this table is that the total job contribution from this elite of job creators is not very impressive. Over the entire period they account for 185 000 net new jobs via growth (total employment in Sweden is close to 4 million). In their most productive year, 1996, they created 45 000 new jobs (not displayed in table). This figure is in the same range as what is annually created by genuine start-ups (Statistics Sweden, 1997).

‘Gazelles’ thus do not seem to outperform ‘mice’ in the aggregate in the Swedish economy. This becomes more pronounced when we turn to organic growth. The cumulative organic growth (1) of HGFs was 60 040 new jobs. The answer to our first research question, then, is that less than a third (or less than half, depending on the definition) of the HGFs total growth was organic. Not only does this diminish their role as job creators in this particular study; this result also has a very important implication for the interpretation of results from other studies, where growth-through-acquisition has not been separated from organic growth. We have little reason to believe that the proportions would be much different in other countries.

Table 1  
**Total and organic growth for HGFs of different age**

<table>
<thead>
<tr>
<th>Firm age</th>
<th>No. of cases (n)</th>
<th>Cumulative total employment growth</th>
<th>Cumulative organic (1) employment growth</th>
<th>Organic (1) as pct of total</th>
<th>Cumulative organic (2) employment growth</th>
<th>Organic (2) as pct of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>148</td>
<td>3319</td>
<td>3191</td>
<td>96.1</td>
<td>3195</td>
<td>96.3</td>
</tr>
<tr>
<td>3</td>
<td>205</td>
<td>8865</td>
<td>7052</td>
<td>79.5</td>
<td>7310</td>
<td>82.5</td>
</tr>
<tr>
<td>4</td>
<td>137</td>
<td>6984</td>
<td>6118</td>
<td>87.6</td>
<td>6118</td>
<td>87.6</td>
</tr>
<tr>
<td>5</td>
<td>77</td>
<td>7043</td>
<td>6619</td>
<td>94.0</td>
<td>6633</td>
<td>94.2</td>
</tr>
<tr>
<td>6</td>
<td>40</td>
<td>3912</td>
<td>3429</td>
<td>87.7</td>
<td>3464</td>
<td>88.5</td>
</tr>
<tr>
<td>7</td>
<td>42</td>
<td>6364</td>
<td>4401</td>
<td>69.2</td>
<td>4434</td>
<td>69.7</td>
</tr>
<tr>
<td>8</td>
<td>38</td>
<td>3920</td>
<td>2992</td>
<td>76.3</td>
<td>3002</td>
<td>76.6</td>
</tr>
<tr>
<td>9</td>
<td>29</td>
<td>6919</td>
<td>4038</td>
<td>58.4</td>
<td>4227</td>
<td>61.1</td>
</tr>
<tr>
<td>10 or more</td>
<td>437</td>
<td>137938</td>
<td>22200</td>
<td>16.1</td>
<td>44245</td>
<td>32.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1153</strong></td>
<td><strong>185 264</strong></td>
<td><strong>60 040</strong></td>
<td><strong>32.4</strong></td>
<td><strong>82628</strong></td>
<td><strong>44.6</strong></td>
</tr>
</tbody>
</table>

The most dramatic finding in Table 1, however, is the very strong negative relationship between firm age and what share of total growth is organic. The part of total growth that is organic is much, much higher among those HGFs that were created during the period than among HGFs that were established already in 1987. While almost all growth is organic for the youngest firms, only 16 percent (1) or 32 percent (2) of total growth is organic for older firms. Evidently, for older firms most of the ‘job creation’ really reflects re-structuring. The shift in the image one gets is quite dramatic. With total growth as the criterion almost three quarters of HGF employment growth is attributable to older, established firms, while their share of HGF organic growth (1) is little more than one third. Although there is some stochastic variation the pattern seems clear enough: the younger the firms, the more of their growth is organic. Clearly, lacking the organic-acquired distinction leads to a grossly distorted view of job creation by age group.
Let us turn next to the issue of firm size. In tables 2 and 3 this is done in two ways. In Table 2 we display total and organic growth by initial size for those HGFs that existed the entire 1987-96 period. Since growth is what makes SMEs become large firms, it is useful to look at initial size in order to analyse in what size classes new jobs originate. However, Table 2 only reports data for firms that are at least ten years old, and in that table all growth is assigned to the initial (small) size class even if most of it has occurred after the firm has entered a larger size class. For these reasons, we supplement the analysis with Table 3, which reports total and organic growth for all HGFs defined by their 1996 size class.

On the most important issue these two analyses are in full agreement. That is, the smaller the firm, the larger is the part of total employment growth that is organic. The shift of image one gets is even more dramatic in this case than with firm age, as both analyses show that the ‘HGFs’ (so defined on the basis of total employment growth) with more than 2500 employees actually shrink in organic (1) terms. This is our perhaps most dramatic demonstration that if genuinely new jobs are what we are really interested in, analysing total job creation may lead to completely false results. If we employ the ‘Organic (2)’ criterion the results are not quite as dramatic. Organic job creation figures remain positive also for the largest size class, but a very strong negative relationship between size and share of organic growth remains.

**Table 2**  
*Total and organic growth for HGFs of different 1987 size*

<table>
<thead>
<tr>
<th>1987 size class</th>
<th>No. of cases (n)</th>
<th>Cumulative total employment growth</th>
<th>Cumulative organic (1) employment growth</th>
<th>Organic (1) as pct of total</th>
<th>Cumulative organic (2) employment growth</th>
<th>Organic (2) as pct of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9</td>
<td>35</td>
<td>4461</td>
<td>4182</td>
<td>93.7</td>
<td>4278</td>
<td>95.9</td>
</tr>
<tr>
<td>10-49</td>
<td>91</td>
<td>11 617</td>
<td>7797</td>
<td>67.1</td>
<td>8084</td>
<td>69.6</td>
</tr>
<tr>
<td>50-249</td>
<td>188</td>
<td>32 705</td>
<td>17422</td>
<td>53.2</td>
<td>18675</td>
<td>57.1</td>
</tr>
<tr>
<td>250-499</td>
<td>37</td>
<td>11913</td>
<td>2339</td>
<td>19.6</td>
<td>3569</td>
<td>30.0</td>
</tr>
<tr>
<td>500-2499</td>
<td>73</td>
<td>50 492</td>
<td>3542</td>
<td>7.0</td>
<td>8480</td>
<td>16.8</td>
</tr>
<tr>
<td>2500+</td>
<td>13</td>
<td>26 750</td>
<td>-13082</td>
<td>(-48.9)</td>
<td>1159</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>437</strong></td>
<td><strong>137938</strong></td>
<td><strong>22200</strong></td>
<td><strong>16.1</strong></td>
<td><strong>44245</strong></td>
<td><strong>32.1</strong></td>
</tr>
</tbody>
</table>

**Table 3**  
*Total and organic growth for HGFs of different 1996 size*

<table>
<thead>
<tr>
<th>1996 size class</th>
<th>No. of cases (n)</th>
<th>Cumulative total employment growth</th>
<th>Cumulative organic (1) employment growth</th>
<th>Organic (1) as pct of total</th>
<th>Cumulative organic (2) employment growth</th>
<th>Organic (2) as pct of total</th>
</tr>
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<tbody>
<tr>
<td>20-49</td>
<td>342</td>
<td>8124</td>
<td>7963</td>
<td>98.0</td>
<td>7996</td>
<td>98.4</td>
</tr>
<tr>
<td>50-249</td>
<td>532</td>
<td>44 320</td>
<td>34 208</td>
<td>77.2</td>
<td>35014</td>
<td>79.0</td>
</tr>
<tr>
<td>250-499</td>
<td>127</td>
<td>22 340</td>
<td>12 497</td>
<td>55.9</td>
<td>13382</td>
<td>59.9</td>
</tr>
<tr>
<td>500-2499</td>
<td>127</td>
<td>57 752</td>
<td>15 682</td>
<td>27.2</td>
<td>21245</td>
<td>36.8</td>
</tr>
<tr>
<td>2500+</td>
<td>25</td>
<td>52 728</td>
<td>-10 310</td>
<td>(-19.6)</td>
<td>4991</td>
<td>9.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1153</strong></td>
<td><strong>185 264</strong></td>
<td><strong>60 040</strong></td>
<td><strong>32.4</strong></td>
<td><strong>82628</strong></td>
<td><strong>44.6</strong></td>
</tr>
</tbody>
</table>
Substantial differences occur also for independent firms vs. firms in company groups. Among those firms which in 1996 still belong to the former category, 64.5 percent of their total growth was organic (1). Among company group HGFs the organic share (1) of total growth was much lower, or 25.3 percent. In absolute numbers this means that cumulative organic growth (1) by company group affiliated HGFs still exceeds organic growth (1) by independent HGFs (38 369 vs. 21 671). The relations look quite different, however, from a comparison of cumulative total growth (151 684 vs. 33 580). However, as independent firms also tend to be younger and smaller on average it is uncertain whether ownership status has an independent effect on what share of total employment growth is organic.
Conclusion

Our results show that well less than half of total firm level employment increase by the studied high growth firms can be regarded as genuine job creation. The results further show very clear relationships between firm age and firm size on the one hand, and what share of total employment growth constitutes genuine job creation on the other.

The picture that emerges from this and other studies is one of an economy where new jobs are created by start-ups, some of which also grow substantially (and organically) during their early development. Older and larger growing firms account for important re-structuring of the economy by starting, acquiring, selling off and closing down establishments. In terms of direct job creation, however, their development is, at best, a zero sum game.

Our results suggest that if genuine job creation is the real interest, analysing total growth systematically biases the results against young, small and -- possibly -- independent firms. This ought to be carefully considered when interpreting results from other studies and when designing new studies in the future. In order to develop sound, empirically based theory and to provide policy makers with relevant advice, we need high quality data as well as clear-cut and well thought-out operationalisations.

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National Center for Entrepreneurship Research.


Debating Points: Paper by Davidsson & Delmar

1. Given the data quality requirements, the methodological fallacies, and the complexity of assessing job creation when indirect effects are also considered: Is it really worthwhile to try to estimate job creation contributions by firm size class?

2. Given that we agree that SMEs (spontaneously) create a disproportionately large amount of new jobs -- What is the policy implication. Should and can policy makers make SMEs contribute even more, or should they instead try to improve job creation among large firms?

3. Is the current policy interest in SMEs misdirected? Should not policy interest focus on newness (regardless of firm size class) rather than smallness?