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NEWS FROM RFR

New firms are the most productive

In Denmark, productivity is higher in newly-started firms than in their more established competitors.

This is one of the main conclusions drawn in a new study entitled *Beskæftigelseseffekter af iværksætter* (The employment effects of entrepreneurship) which was carried out by Johan Kuhn, Nikolaj Malchow-Møller and Anders Sørensen in collaboration with the Rockwool Foundation Research Unit.

According to the analysis, total productivity in new firms is 1.5 percent higher than in established ones, while for firms operating within industry-area clusters with employment growth, start-ups show fully 7 percent greater productivity (see Figure 1).

The results are surprising, since an examination of firms with a focus on labour productivity only (production or turnover per working hour) reveals that, new firms significantly underperform compared to established firms/incumbents.

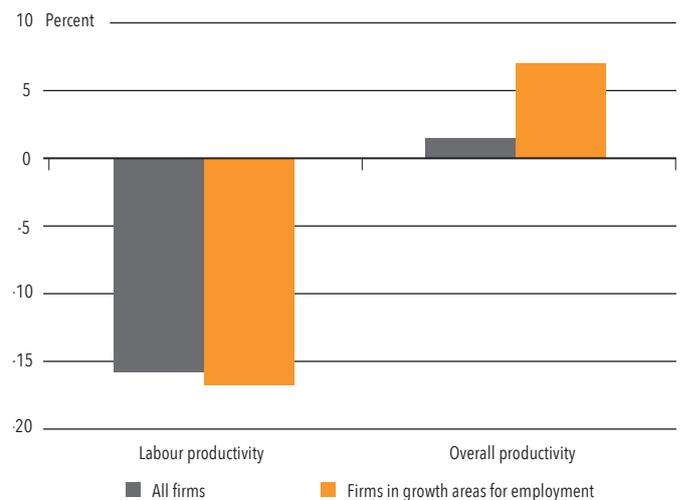
The explanation is most likely that new firms tend to have less production capital than other firms. While incumbents use more IT, machinery, and so on, employees in new firms put in more working hours. However, not so many additional hours that the new firms are less productive than others when all production inputs are taken into account.

Important for the economy

The higher productivity level is one of many findings from the study concerning how newly-opened firms perform. It turns out that among other things, these new firms to a large extent are most capable of creating both *additional* employment overall and jobs that are *completely new*, especially for skilled and unskilled workers, while the more incumbent firms are better at creating jobs for higher educations. The results also demonstrate that wages in new firms are clearly competitive with those paid elsewhere.

According to Professor Anders Sørensen, the analysis

Figure 1. Productivity of new firms in relation to that of established firms, 2010



Source: The Rockwool Foundation Research Unit

Productivity measured for all new firms is 1.5 percent higher than that of incumbents. Within industry-area clusters with employment growth, new firms are 7 percent more productive than old firms.

can throw new light in the debate about new firms in Denmark. ‘In previous studies, it was found that jobs in new firms were perhaps not of the highest quality,’ he says. ‘We have shown otherwise. We have documented the important role played by these firms in the Danish economy. Their productivity levels are higher, which may be an indication of their significance for innovation and development.’

He goes on to point out that the study is also innovative in that it is based on data that truly permit the separation of new firms from incumbents.

‘Earlier studies in this area have been influenced by a number of sources of error. For example, small firms have often been compared to large firms, rather than new firms being compared to old firms. Other studies have had difficulty in establishing when a ‘new’ firm is just an old firm in a new guise. We have not had these problems, because of the very high quality of the data,’ Anders Sørensen explains.

About the data used for the analysis

In the past, researchers have had a difficult time to document reliably differences between new and established firms.

A large share of existing knowledge is based on comparisons between small and large firms. The problem with this is obvious – namely that small firms are simply small, and not necessarily new.

Moreover, even ‘new’ firms are not necessarily *truly* new. A new registration does not always indicate a true start-up; some newly-registered firms may simply be the result of existing firms restructuring, reorganising, or adding new activities. A Danish example of such a new registration is NNIT, created in 1994 when Novo Nordisk separated its IT activities in a new firm. Firms of this type are formally recorded as being ‘new’, but in reality they are not.

There is a simple explanation for why such errors have occurred – namely, that it is difficult to obtain good-quality data for analysis. Researchers have, for example, used firm registration numbers – but these can sometimes be changed, for example in the event of firm restructuring.

This study is again based on firm registration numbers, but other criteria are also used in the categorisation of firms to ensure that that firms classed as start-ups are genuinely new. The data are taken from a relatively new database held by Statistics Denmark, where everything possible has been done to ensure that firms described as new really are just that. This means, for example, that checks have been made to establish that the firms are new payers of VAT; and that any previous names, owners and legal forms have also been checked. If firms are started by individuals who are already firm-owners, and thus known to the VAT authorities, they are not included in the register of new firms.

The table below gives an impression of the significance of being able to identify truly new firms. As the table shows, there were nearly 80,000 truly new firms in Denmark in the period under investigation. If new firms are taken to be the same as small firms, i.e. those with ten employees or fewer, the number is more than doubled, to 165,000. It should be noted, too, that in fact not all new firms are small:

there were 4,500 firms during the period that were truly new, but which were not small according to the above definition.

If the definition of a new firm is taken to be a firm that is less than ten years old, then there existed around 106,000 new firms in the period. This means that there were around 26,000 firms that were formally new, but not truly new.

Overall, then, there is a considerable risk of incorrectly assessing the importance of new firms if being young or small are taken as the defining criteria for a firm to be considered new. Similarly, there is a risk that the evaluation of the quality of jobs in new firms as opposed to existing ones is incorrect if the evaluation is based on small firms or young firms.

Truly new firms	79,712
Small firms	165,721
Young firms	105,894
Small, truly new firms	75,215
Young, truly new firms	79,712
Total number of firms	188,044

It would have been useful to be able to carry out the analysis for a later date than 2007.

However, this was not possible, because of a data break in the data held by Statistics Denmark in 2008. The period studied, 2002-07, was marked by recession up until 2003 and growth thereafter, with 2006 being a particularly peak year in economic activity. The years 2006 and 2007 were also distinguished by very low levels of unemployment. To check whether the results found were driven by the peak years, the analysis was repeated for the period 2002-05 alone. This robustness check did not indicate any difference in the results found. There is thus nothing to suggest that the peak years distorted the results of the analysis.

New firms create jobs for skilled and unskilled workers

While many incumbents in Denmark are destructing jobs for skilled and unskilled workers, this is more than counter-balanced by jobs created for these workers in newly established firms.

This is demonstrated in the study *Beskæftigelseseffekter af iværksætteri*, which investigates job creation and destruction in the private sector.

Specifically, an analysis was made for the period 2002-2007 of jobs creation and destruction. Firms were divided into newly established firms and incumbents, and the analysis was based on education length and type of the individuals who filled the jobs. As Figure 2 shows, a clear-cut picture is presented. Incumbents destruct 40,000 unskilled and 61,000 skilled jobs over the period. In contrast, the newly established firms created 63,000 unskilled and 78,000 skilled jobs. Overall, this implies that a total of 40,000 additional jobs for skilled and unskilled workers on net were created in the private sector.

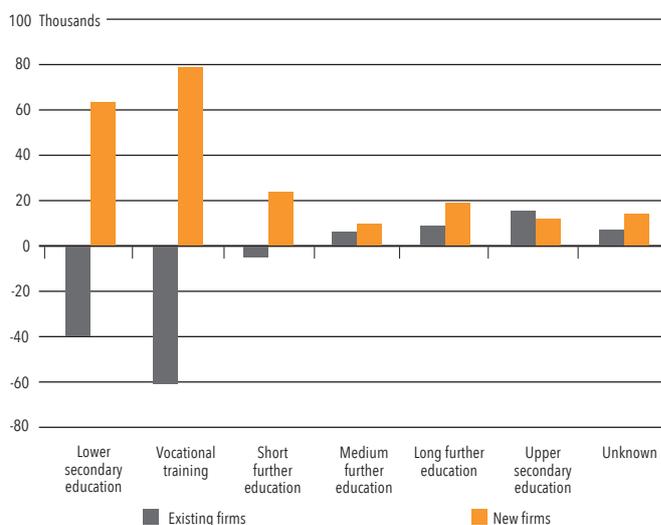
Creation of education-intensive jobs

However, it is important to note that the incumbents did not simply destruct jobs – they also created new ones, but these were for skills within higher education.

The conviction that *more* and *new* employment is only created through newly established firms has been held for a long time in the economics profession. Incumbents, empirical findings suggest, contribute nothing to changing employment. Of course, there are new job openings in incumbents, but these are offset by an equal number, or perhaps even a larger number, of jobs that are closed down in other functions in the same incumbent, or in other incumbents.

This new study presents a more subtle picture. As Figure 2 shows, incumbents do also open new jobs. However, these new jobs are for individuals with higher education, so that while newly established firms are able to create jobs for employees with all levels of education, the case is different for incumbents.

Figur 2. Job creation (and destruction) in Danish firms, 2002-07



Note: The employee group with *unknown education* can be assumed to include immigrants, whose education is not included in the data.

Source: The Rockwool Foundation Research Unit

Newly established firms create jobs for individuals with all education lengths, but especially for the unskilled and individuals with vocational training. This is precisely the type of job destructed by incumbents, but these firms create education-intensive jobs.

The study also stands out from others studies because it is based on data that make it possible to distinguish between genuinely new firms and incumbents. In earlier studies, there have usually been a number of sources of error – the most obvious that the comparisons made have not been between newly established firms and incumbents, but between small and large firms. Another source of error is that many of the ‘newly’ established firms are in fact nothing more than old firms that are only formally new.

Much larger gross changes

The figures for job creation and destruction given above represent *net* numbers. When it is stated, for example, that established firms have abolished 40,000 unskilled jobs, this net figure covers over the fact that these firms have created 200,000 jobs, but destroyed 240,000.

Table 1. Total gross job creation and destruction in 2002-07 (in thousands)

Number of jobs in 2002	Gross: New jobs created, 2002-07	Gross: Jobs destroyed, 2002-07	Net: Difference between jobs created and destroyed	Net: Contribution from incumbents	Net: Contribution from newly established firms
1,800	880	730	150	-70	220

The Danish labour market has had large-scale changes, as Table 1 on page 5 shows. In 2002 there were 1.8 million jobs in private firms. Over the following five years, around half as many new jobs – actually 880,000 of them – were created. At the same time, however, 730,000 jobs were destroyed, resulting in a net gain of 150,000 jobs.

If the educational dimension is ignored for jobs, then it turns out that conventional wisdom is correct. The increase in the number of jobs arises solely because newly established firms were capable of creating more new jobs than the incumbents destroyed during the period studied.

Half of all truly new jobs are created in incumbents

Truly new jobs – i.e. jobs that are created and are not replacements for other jobs – are created in equal numbers in newly established firms and incumbents.

This is found in the study of Danish jobs in the private sector during the period 2002-07.

Of these truly new jobs – jobs which had not existed previously in any form – 150,000 were created by incumbents during the period, while the remaining 140,000 such jobs were generated in newly established firms.

More than 8,000 job-clusters

What is special about this study is the precise definition used of a *truly new job* – which is not just *another* job. If a food producer in Northern Jutland destroys ten jobs, and a neighbouring firm operating in the same industry creates ten jobs, then these are not counted as being truly new jobs – only as jobs which have been reallocated. This happens all the time in economies where some firms expand while others contract.

The requirements for a job to be considered as *truly new* are very stringent in this study. For a job to be counted as truly new, it must be an additional job created within a given region, sector and education group. Since in Denmark there are five regions, 233 business sectors and seven education groups, the study divides the Danish economy up into more than 8,000 local labour markets, or *job-clusters*, as they are termed.

A measurement was made for each of these job-clusters of how many truly new jobs were created during the study period. Thus, five truly new unskilled jobs are counted where firms in the same region and industry together created a net total of five additional unskilled jobs.

If the result of the calculation is negative, the cluster is counted as having contributed zero truly new jobs.

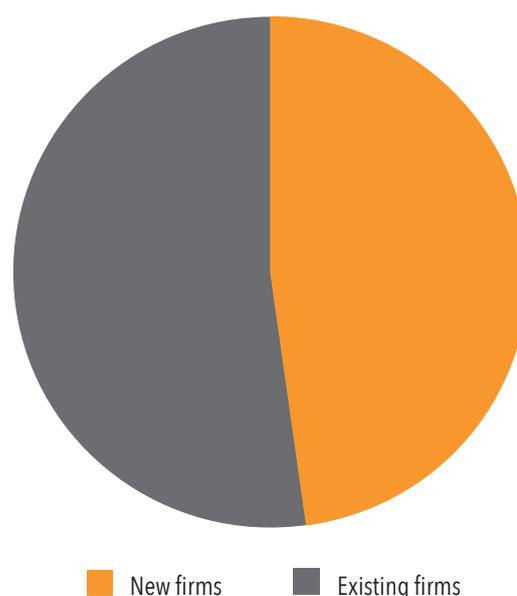
This means that the number of truly new jobs is neither a measure of gross job creation (all jobs created) nor a measure of net job creation (all jobs created minus all jobs destroyed). It is something entirely different – the total of truly new jobs in clusters where there was a positive measure of job creation.

Jobs for those with higher education

An interesting picture emerges when the jobs on which Figure 3 is based are divided up according to education groups, as shown in Figure 4.

It emerges that both newly-started firms and incumbents are able to create jobs for individuals in all education groups. However, there is a clear difference in this

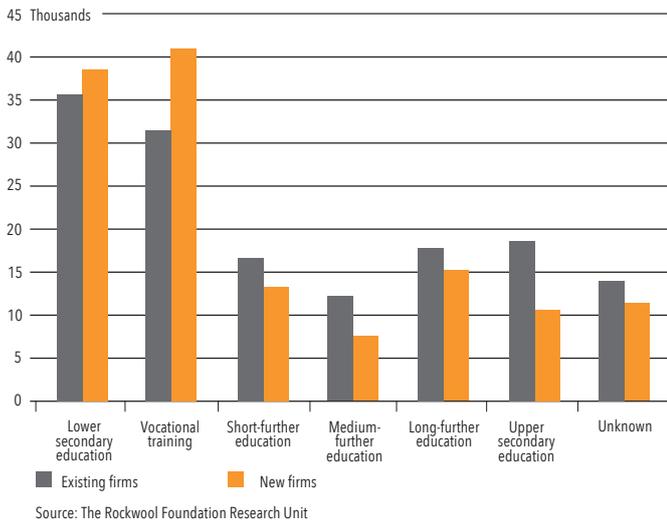
Figure 3. Creation of truly new jobs, 2002-07



Source: The Rockwool Foundation Research Unit

Truly new jobs are created in roughly equal numbers in existing and new firms.

Figur 4. Creation of truly new jobs by education groups, 2002-07



Source: The Rockwool Foundation Research Unit.

Incumbents are in a better position than newly-started firms to create truly new jobs for individuals with higher education.

respect between the two firm types: incumbents are considerably better than newly-started firms at creating truly new jobs for individuals with higher education.

This is especially true with respect to individuals who have taken long-further education. In this category, just under 20,000 truly new jobs were created in incumbents during the period under investigation, whereas newly-started firms provided truly new jobs for only 11,000 people with such higher education over the same period.

Newly started firms pay higher wages and are more productive

Many people would expect to find that incumbent firms would outdo newly started firms in various important respects – for example, with regard to wages, educational level of employees, and productivity.

However, this is not the case. Newly-started firms are more productive than incumbents, are more education-intensive and tend to pay higher wages.

These findings are revealed by a study of Danish private-sector firms in 2010.

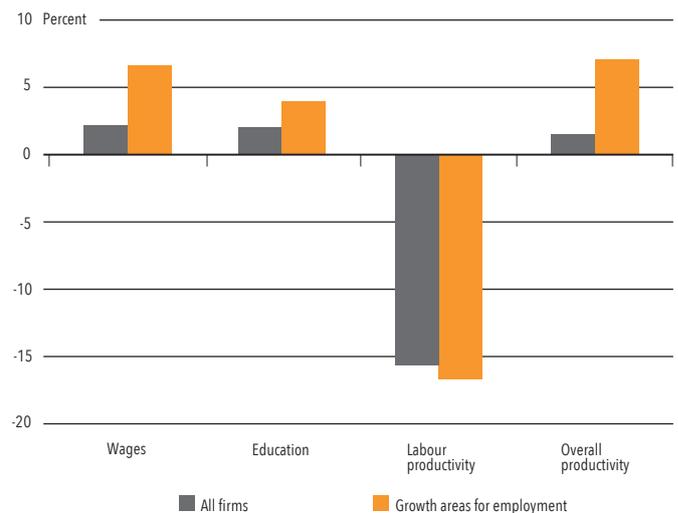
The difference is evident if one considers all firms together, divided simply into newly started firms and incumbents. But the result is even more marked for industry-region clusters that experienced employment growth in 2010, as Figure 5 shows.

The Grey columns indicate the raw differences between all newly-started firms and all incumbent firms. The wages in newly started firms were a bit higher (two percent) than in incumbent firms, and education levels among employees were also marginally higher.

There is a special factor to consider in relation to productivity. Newly started firms were significantly less productive than incumbent firms in terms of labour productivity, i.e. the amount they produce or turn over for each hour worked.

The explanation is simply that newly started firms tend to have less in productive capital than incumbent firms. In other words, employees in incumbent firms have

Figure 5. How newly started firms fared in comparison with established firms, 2010



Source: The Rockwool Foundation Research Unit

In terms of labour productivity, newly started firms fared worse than incumbent firms. However, this was solely because the newly started firms used more labour input than the incumbent firms, which had more production capital available. In fact, the newly started firms fared better in terms of overall productivity.

access to a large amount of resources in terms of IT, equipment, machinery, etc., while those in newly started firms have fewer such resources available, and thus need to use more hours on work. Overall productivity – that is to say, production in relation to inputs in total, including labour, capital and materials – was a little (1.5 percent) higher in newly started firms than in incumbent firms.

Best in growing industries

Newly started firms do best in areas with growing employment, as shown by the orange columns in Figure 5.

These orange columns are based on a division of the Danish labour market into nearly 1,200 job-clusters that take region and industry into account (education groups were not included in this particular analysis). An analysis was made of how newly started firms fared in job-clusters with employment growth.

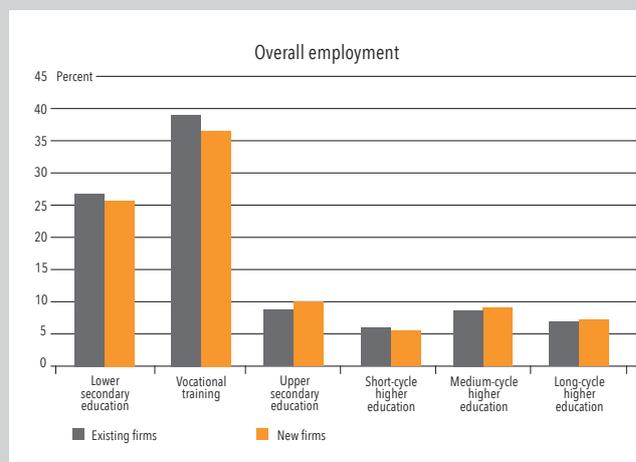
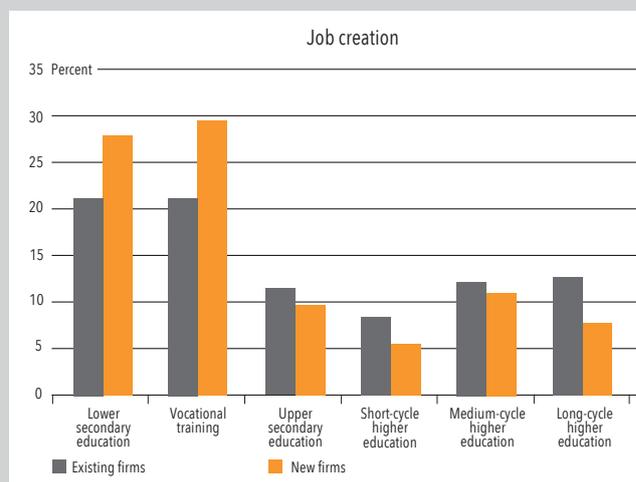
Again, the newly started firms did well. Wages were seven percent higher than in corresponding incumbent firms in the same clusters, and similarly productivity was over seven percent higher than for the newly started firms' older competitors.

On differences in approach

There is an important difference between the jobs examined in the articles on pages 3 and 5 and those described here. The other articles are concerned with *job creation*, while this one is concerned with *total employment*. If a company with 90 employees hires ten more, the number of jobs created is ten, but the total employment is now 100.

If the ten new employees have high levels of education, and the 90 original employees lower levels of education, the jobs created will be counted as requiring a high level of education, whereas the overall employment consists largely of less-educated labour.

The results found in the study show that there are differences in the characteristics of average jobs with regard to both jobs created and total employment. The charts to the right present the characteristics of jobs by education level with regard to both job creation and overall employment. The picture that emerges shows that new firms create a larger proportion of jobs for people with lower secondary education or vocational training than do existing firms, and smaller proportions for people with medium- or long-cycle higher education. The results are to some extent reversed for overall employment.



Spin-offs fare much better than other newly started firms

The best route to success as an entrepreneur is to start a new firm within an industry where one has already been employed. Spin-off firms, as they are called – newly started firms which are created with roots in existing ones – fare much better than others, being fully 12 percent more productive.

This is shown by an analysis which compares newly started firms which either are or are not categorised as spin-offs.

In this analysis, a spin-off is defined as a truly new firm where the owner was previously employed in a firm in the same industry during the year before the new firm was started.

Figure 6 shows that spin-off firms are much more productive than other newly started firms, despite the fact that both wages and educational backgrounds for employees are roughly the same on both sides of the dividing line.

In the raw comparisons, it is found that labour productivity (production per hour worked) is 25 percent greater in spin-off firms, while overall productivity (production from total inputs of working hours, production capital, and equipment) is 12 percent greater.

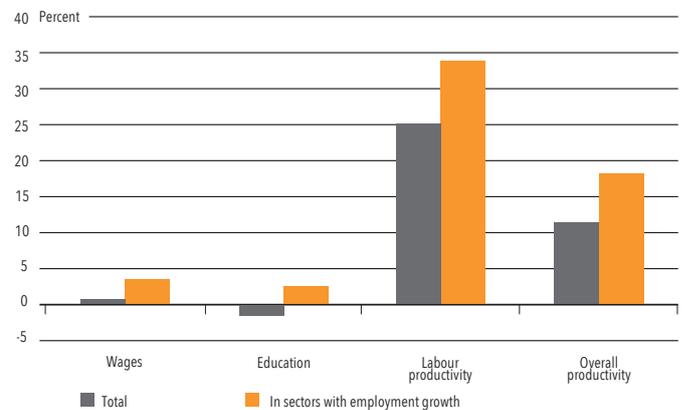
However, even greater differences are found between the two types of firm among those firms that operate in growing markets. Spin-off firms appear to be able to get more out of growing markets than others. In these growing markets their labour productivity is 34 percent higher, and their overall productivity is 18 percent greater, than that of other newly started firms.

Across industries and regions

The comparison above, as noted, is based on raw data. This means that all firms in a category are lumped together, without considering any possible differences among different types of firm.

Cleaning involves taking into account a variety of factors. If, for example, the spin-offs were more involved in the actual manufacture of goods than other newly started

Figure 6. How spin-offs firms fare in relation to other newly started firms



Source: The Rockwool Foundation Research Unit

Wages and employee educational backgrounds are much the same in spin-off firms and other newly-started firms. However, spin-offs have significantly higher levels of labour productivity, and overall productivity is also higher. These findings apply in general, but in particular in areas with employment growth.

ted firms, a comparison such as that described above might actually represent a comparison between different markets rather than between types of firm.

To overcome this problem, equivalent analyses were performed taking other background variation into account. In these analyses, comparisons were made, for example, between newly-started firms in exactly the same industry, in the same region, and operating in exactly the same type of market (a growing market, for instance, or the reverse).

The results of these analyses reveal very slightly differences, but the overall picture remains the same. Regardless of the factors taken into account, spin-offs are more productive than other newly started firms.

Project publications

This newsletter is based on a number of study papers, which can be downloaded from
www.rockwoolfonden.dk.

They are also available for purchase in printed form from the University Press of Southern Denmark.