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High-Growth Firms: Not So Vital after All?

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Abstract: High-growth firms have received considerable interest recently since they create most of the new jobs in the economy. The purpose of our paper is to investigate the characteristics of high-growth firms prior to their growth period, and whether these characteristics differ across industries. Using data on a large sample of limited liability firms in Sweden for the period 2007-2010, we find that high-growth firms do not have the characteristics that we typically associate with successful firms. On the contrary, our results indicate that high-growth firms initially have low profits and a weak financial position. This might explain why studies have found that so few high-growth firms are capable of sustaining their high growth rates in subsequent periods, and thus question policies that are targeted towards these companies.

Keywords: entrepreneurship, firm growth, gazelles, high-growth firms, high-impact firms, innovation

JEL-codes: L11; L25

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1. Introduction

Studies have shown that a small number of high-growth firms (HGFs) are very important for job creation (Henrekson and Johansson, 2010; Coad et al., 2014). NESTA (2009), for example, found that the 6 percent fastest growing firms in the United Kingdom created almost 50 percent of all new jobs during 2002-2008.

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These firms were given the name "the vital 6 percent" to highlight their remarkable importance for job creation.[2]

HGFs' ability to create job opportunities has attracted increasing attention from policymakers (Daunfeldt et al., 2016). Support for high-growth SMEs is, for example, stated as a political objective in the Europe 2020 strategy of the European Commission (European Commission, 2010). Some researchers also support the idea of targeting potential HGFs (e.g., Shane, 2009; Mason and Brown, 2013), arguing that policy should be redirected towards firms with growth aspirations instead of start-up firms with low survival rates.

The share of fast-growing innovative firms is emphasized by the European Commission (2010) as an important indicator to measure whether policies targeted towards potential HGFs are successful. However, the assumption that HGFs are overrepresented in high-tech industries seems to have little empirical support (Henrekson and Johansson, 2010). On the contrary, Daunfeldt et al. (2016) found that HGFs in Sweden were less common in R&D-intensive industries and overrepresented in knowledge-intensive service sectors. This points towards a "knowledge problem" embedded in the political initiative to promote the growth of HGFs, suggesting that we need more research on what actually characterizes the rapidly growing firms in the economy.

Previous studies have indicated that young (Reichstein et al., 2010; Barba Navaretti et al., 2014) and small firms (Birch, 1979; Almus, 2002; Goedhuys and Sleuwaegen, 2010) are more likely to be characterized by fast growth than older and larger firms. However, recent studies have argued that no systematic relationship exists between firm growth and firm size once age is controlled for (Haltiwanger et al., 2013; Lawless, 2014). The importance of firm age for explaining high-growth events is also highlighted by Daunfeldt et al. (2014), who identified HGFs in nine different ways and found that the common denominator regardless of definition was their relatively young age. There is also some evidence indicating that HGFs do not grow through acquisitions, but are more likely to enter into alliances with other firms (Mohr et al., 2014). HGFs also seem more likely to engage in export behavior than non-HGFs (Hölzl and Friesenbichler, 2007).

However, most previous studies on HGFs have not controlled for the profitability and the financial strength of the firms before they entered their period of fast growth. This is troublesome, considering that Penrose (1959) had long ago emphasized the importance of profits for achieving long-term growth. As stated by Brännback et al. (2014, p. 71): "Being profitable clearly seems to be a far more productive, and in the long run, better approach to being a star firm." Davidsson et al. (2009) also found that the ability to grow in subsequent periods is positively

2. Similar results have been shown by other researchers as well. Storey (1994), for example, found that the 4 percent fastest growing firms in the UK contributed to 50 percent of all new jobs, and Daunfeldt et al. (2013) indicated that the 6 percent fastest growing firms generated 42 percent of all new jobs in Sweden during 2005-2008.

associated with the firm's profitability. It was found that, if initial growth coincides with high profitability, firms are more likely to display growth in future periods also.

Previous studies on the characteristics of HGFs have in most cases also been based on economy-wide data or data from selective industries, such as the manufacturing industry (Coad, 2009). This is unfortunate since we know that there are large differences across industries that might influence the likelihood of observing high-growth events (Audretsch et al., 2004). The manufacturing industry, for example, is capital intensive and characterized by high sunk costs, which is often interpreted as a sign that small and young manufacturing firms might be forced to grow fast in order to survive. On the other hand, such scale economies are less likely to be important for firms in low-tech service industries, such as the accommodation and food services industry.

We contribute to the HGF literature by investigating whether the characteristics of HGFs differ across industries after controlling for both initial profits and financial strength. Our analysis is based on a comprehensive dataset, covering a large sample of limited liability firms in Sweden during 2007-2010. We find that HGFs are characterized by low profits and low solidity prior to their growth episodes. This finding is perplexing since these character-features are atypical compared to the ones we associate with firms that achieve long-term growth. Viewed in light of recent studies (Hölzl, 2014; Daunfeldt and Halvarsson, 2015), however, it might help to explain why HGFs are unlikely to repeat their initial high growth rates in coming periods.

Policies to promote HGFs are often targeted towards R&D-intensive industries (Daunfeldt et al., 2016), but we find no evidence of substantial industry differences regarding the characteristics of HGFs prior to their growth period. As a consequence, we find no support for the view that HGFs within certain industries are more suitable to target than firms in other industries when designing industry policy.

In the next section, we present a brief theoretical background on why HGFs are seen as important job creators. Data and descriptive statistics are presented in Section 3, and our empirical method is described in Section 4. Results for the full sample and for five selected industries are then presented in Section 5. The final section concludes the paper with a summary and discussion of our key findings.

2. Theoretical background

Which firms are important for the creation of new jobs and economic growth? This question has interested researchers and policymakers for a long time. The answer, however, has shifted markedly over the past 100 years.

As far back as 1911, Schumpeter (1911/1934) emphasized the importance of entrepreneurs and new firms for creating economic growth and prosperity.

According to the young Schumpeter, the entrepreneur was considered the individual force that introduced new ideas in the economy, often by establishing new firms. In his view, these young firms, most of which were also small, were crucial for economic development and growth because they challenged the incumbents with new technology. Incumbents that could not keep up with the progress of these small, innovative firms were eventually replaced – a process that Schumpeter popularly called "creative destruction." The image is clear yet powerful, portraying young companies as the destroyers of old, inefficient technology.

The older Schumpeter (1942), on the other hand, emphasized the importance of scale economies for both production and research and development. In the first decades after World War II, it was considered self-evident that it was the large and, naturally, the older companies that created jobs and growth. At this time, economic policy was attuned to the economic theories of return-to-scale production as was research and development. New and small businesses were viewed as inefficient. Occasionally, they were even considered a waste of resources (Galbraith, 1956, 1967). As a result, economic policies were designed to target large industrial companies.

In a very influential report, however, David Birch (1979) came to question this view. In accordance with the prevailing view at that time, he found that large firms accounted for the majority of all new jobs. However, when observing these firms over time, he found that large firms lost jobs and were replaced by firms that had once been small but had grown big. Small firms thus created the majority of all jobs over time, while larger businesses reduced their number of employees. The important insight and contribution was that the perception that large enterprises were important for job creation was based on a static approach, while the importance of small firms takes precedence in a dynamic analysis.

Birch's (1979) results were controversial and criticized in several studies (e.g., Davis et al., 1996; Haltiwanger and Krizan, 1999). Later studies, however, confirmed most of his initial results (Van Praag and Versloot, 2008), but with one important addition: most small firms were not growing. The new jobs were instead being created by a small number of HGFs (Birch and Medoff, 1994; Henrekson and Johansson, 2010). Storey (1994) found, for example, that 50 percent of the new jobs in the UK were created by the 4 percent fastest growing companies. In a recent study, entitled *The Vital 6 Per Cent*, NESTA (2009) showed that it was rather the 6 percent fastest growing companies in the UK that accounted for half of all new jobs in the economy.

The job creation ability of HGFs has led to suggestions that policymakers should devote more resources to supporting these companies, rather than investing in start-ups that normally have no ambitions to grow or cannot survive market competition (Shane, 2009; Mason and Brown, 2013). The European Commission, for example, states in its strategy documents that more efforts

should be directed towards supporting the fast-growing small and medium-sized firms (European Commission, 2010).

The idea of supporting potential HGFs has, however, been criticized recently since the growth of HGFs does not seem to be sustained over time (Hölzl, 2014; Daunfeldt and Halvarsson, 2015) and because it seems to be difficult to predict which firms will be characterized by high growth in the future (Storey, 1994; Hölzl, 2009). Another problem with the orientation towards HGFs is that it leads to policies that are focused on R&D-intensive industries (Daunfeldt et al., 2016). However, there is little evidence that rapidly growing firms are more common in R&D-intensive industries (Hölzl, 2009; Henrekson and Johansson, 2010). Daunfeldt et al. (2016), for example, present results indicating that HGFs are less common in R&D-intensive industries and rather overrepresented in the knowledge-intensive service industries.

3. Data and Descriptive Statistics

All limited liability firms in Sweden are required by law to submit annual reports to the Swedish Patent and Registration Office (PRV). We use data from PAR, a Swedish consulting firm, which gathered this information from PRV. The data include information on all figures in the annual reports, such as profits, number of employees, industry classification, and sales.

In the dataset, firms are classified into industries according to the European Union's NACE standard. We use these industry classification codes to select data on surviving firms in eight different industries during 2007-2010 (Table 1). We have selected these industries to induce possible variation in the likelihood of receiving policy interventions and the degree of technological knowledge. While some industries, such as manufacturing, are frequently studied (Coad, 2009) and are of considerable interest among politicians, industries such as hospitality and retail have received less attention. Compared to manufacturing with relatively high R&D expenditures, hospitality and retail are often considered to be low-tech industries that provide jobs for low-qualified workers and are rarely the focus of policy interventions. A similar observation can be made about policies that are targeted towards potential HGFs, which are dominated by R&D-intensive sectors. The relative lack of interest in retail and hospitality can also be observed in previous literature, with very few studies that specifically investigate the characteristics of fast-growing firms within these industries.[3] Our final dataset consists of 39,241 firms active during 2007-2010.

3. A notable exception is Daunfeldt et al. (2013), who investigated firm growth within the Swedish retail and wholesale trade industries during 2000-2004 using a quantile regression model.

Table 1: Industries and number of firms included in the analysis

NACE	Industry	Frequency	Percent
25	Manufacture of fabricated metal products, except machinery and equipment	4,039	10.29
42	Civil engineering	415	1.06
43	Specialized construction activities	13,111	33.41
47	Retail trade, except motor vehicles and Motorcycles	12,460	31.75
55	Accommodation	1,211	3.09
56	Food and beverage serving activities	3,420	8.72
62	Computer programming	4,341	11.06
63	Information service activities	244	0.62
Total		39,241	100

One inescapable obstacle when investigating the characteristics of HGFs is that there is no consensus definition or way of identifying these firms (Coad et al., 2014). It is therefore necessary to make decisions regarding the growth indicator, firm growth measure, length of growth period, and growth process (Delmar and Davidsson, 1998).

Two of the most common growth indicators in the literature are sales and number of employees (Delmar et al., 2003; Daunfeldt et al., 2014), which are known to be modestly correlated (Shepherd and Wiklund, 2009). The indicators represent different aspects of the production process even if results seem little influenced when choosing one or the other (Daunfeldt et al., 2014). While the number of employees is an input factor (often considered to be quasi-fixed), sales represents a firm's gross output. Thus, in using employment growth, "firm growth" captures the rate of change of internal resources, whereas using sales growth reflects the product's or service's acceptance in the market (Delmar et al., 2003). We therefore choose to apply both of these growth indicators in the paper. More specifically, employment growth and sales growth are calculated by:

$$Growth_{i2010} = \ln Size_{i2010} - \ln Size_{i2007} \quad (1)$$

where *Size* corresponds to the level of sales and employees for a firm *i*. *Growth* is here taken as the logarithmic change in firm size between 2007 and 2010.[4] It is worth noting here that the logarithmic difference is one of the most frequently used measures in the firm growth literature (Coad, 2009), with the convenient property of being symmetric for positive and negative growth rates

4. Note that relative growth measures, such as the one we apply, tend to favor smaller firms, whereas absolute growth measures are biased towards larger firms (Delmar et al., 2003).

(Tornqvist et al., 1985). This means that real changes in either indicator give the same percentage change, whether it is positive or negative.

As stated in equation (1), we follow the previous literature on HGFs and consider changes over the course of 3 years, more specifically between 2007 and 2010 (Coad et al., 2014). By avoiding annual growth rates we can avoid a lot of idiosyncrasy that exists for more narrowly defined growth rates. However, as Bjuggren et al. (2013) remark, results do not seem particularly sensitive to the length of the period chosen.

Finally, it is well known that growth can be divided into organic growth and acquired growth. Most studies do not have access to data on mergers and acquisitions and must therefore rely on measures of total growth, that is, the sum of organic and acquired growth. This is a drawback since what is interesting to investigate are the characteristics of and mechanisms by which firms achieve high levels of growth by increasing output and enhancing sales (organic growth), and not by mergers and acquisitions – growth that is generated outside the firm. Fortunately, the PAR database includes information on mergers and acquisitions and we choose to exclude all firms from the sample that registered any such activity during the growth period 2007 - 2010. To further ensure that we mainly capture organic growth episodes, we include a dummy variable ($Group_{i2006}$) to capture differences between firms that already (in 2006) operated in a business group. In contrast to most previous studies, we can thus focus on organic growth and also control whether the firm was part of a corporate group before the growth period studied.

Previous studies have indicated that HGFs tend to be young and small, and we therefore control for both firm age (Age_{i2010}) and initial firm size, one year prior to the growth period (i.e. $\ln Size_{i2006}$), in our regressions. Firm age is measured using information on the registered start year, and defined as the observation year (i.e., 2010) minus the registered start year. Access to registered start year is rare (Coad et al., 2015), and in contrast to previous studies we therefore do not need to work with truncated or censored age data. Firm size is measured using either sales or number of employees in 2006, depending on which growth indicator we use.

Returns on total assets (ROA_{i2006}) and solidity ($Solidity_{i2006}$) are included as independent variables in order to investigate the profitability and financial strength of HGFs prior to their growth period. We use returns on total assets as our profit measure since it is not affected by the type of financing (Libby et al., 2011), and although multiple profitability measures have been used in the literature (Richard et al., 2009), ROA is the one that seems most commonly used (Davidsson et al., 2009; Steffens et al., 2009). Financial strength of the firms is measured by their solidity, that is, the percentage share of equity out of total assets in 2006. This shows the relative proportion of equity that is used to finance a firm's assets and indicates the firm's solvency in the long term. The higher the

proportion of equity that finances the company, the higher and better the solidity and the lower the financial risk.

Except for firm age, all of our control variables capturing initial conditions are measured in 2006 to avoid simultaneity issues with the dependent variables that are measured during 2007-2010. Finally, to control for regional and industry time-invariant heterogeneity that might affect firm growth rates, we include regional fixed effects (γ_m) measured at the level of 82 local labor-markets in Sweden (Korpi and Clark, 2015), and industry-specific fixed effects[5] (α_j). Descriptive statistics of the variables that we include in our empirical analysis are presented in Table 2.

Table 2: Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
$Growth_{2010}$ (Sales)	39,241	0.039	0.746	-7.722	10.544
$Growth_{2010}$ (Empl)	39,241	-0.005	0.443	-4.007	5.193
Age_{2010}	39,241	18.335	12.574	4.000	112.000
$\ln Sales_{2006}$	39,241	8.290	1.383	0.000	17.332
$\ln Empl_{2006}$	39,241	1.350	1.040	0.000	9.292
ROA_{2006}	39,241	7.794	19.751	-103.800	88.000
$Solidity_{2006}$	39,241	35.817	28.548	-132.000	100.000
$Group_{2006}$	39,241	0.236	0.425	0.000	1.000

The descriptive statistics indicate that the average firm in the sample had 3.9% of sales growth and -0.5% of employment growth between 2007 and 2010, is around 18 years old, has 4 employees, 7.8 percent in returns on total assets, and a solidity of 35.8. Sales are, on average, 3,980,000 SEK in 2006 (corresponds on 31 August 2015 to 430,000 EUR).

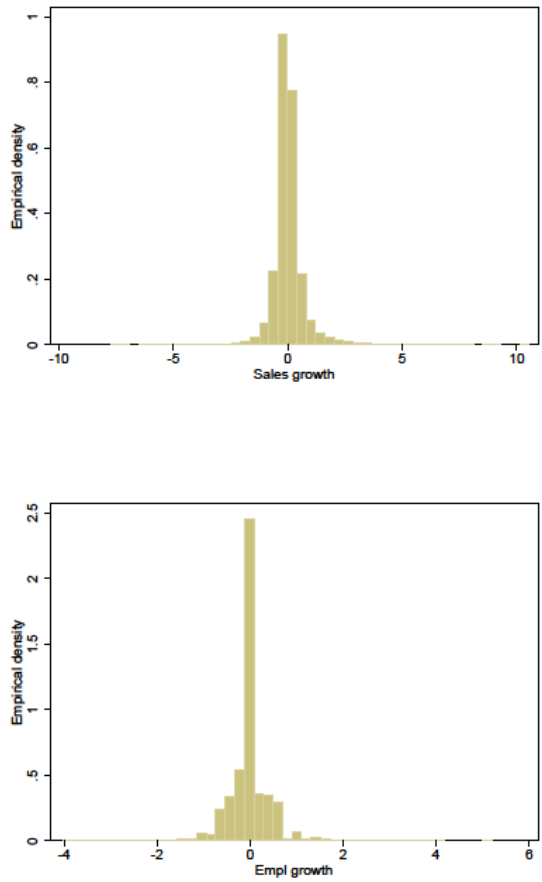
4. Empirical Method

It is well known that firm growth tends to follow the "tent-shaped" Laplace distribution (Stanley et al., 1996; Bottazzi and Secchi, 2006; Bottazzi et al., 2011), with most firms not growing and a few firms growing very fast. The familiar tent-shaped distribution is also evident in our dataset for both employment growth and sales growth (Figure 1). This violates the standard least-squares assumption of a normally distributed error term, and means that OLS estimation becomes less attractive. It is of little interest to estimate the average effect when the average firm is characterized by very marginal growth rates. Neither do we want to consider HGFs as outliers, as OLS would, since our focus is on investigating what determines the growth rates of these fast-growing firms.

5. Industry-specific fixed effects are used only for estimations conducted on the aggregated dataset including all eight industries considered in the analysis.

Quantile regression, which assumes the error terms to be Laplace distributed, becomes more suitable in our case. Following Fotopoulos and Louri (2004), Coad and Rao (2008), and Reichstein et al. (2010), we therefore rely on quantile regression to investigate what characterizes firms across the entire growth-rate distribution, including the fastest growing firms.

Figure 1: Frequency distributions, change in total sales and number of employees, 2007-2010.



Using the definition of growth in employees or sales, given by equation (1), we estimated the following model:

$$Growth_{i2010} = \alpha + \beta_1 Age_{i2010} + \beta_2 \ln Size_{i2006} + \beta_3 ROA_{i2006} + \beta_4 Solidity_{i2006} + \beta_5 Group_{i2006} + \alpha_j + \gamma_m + \varepsilon_i \quad (2)$$

where Age_{i2010} is the age of firm *i* in 2010; $Size_{i2006}$ is the number of employees or sales in 2006; ROA_{i2006} is returns on total assets in 2006; $Solidity_{i2006}$ is the solidity of firm *i* in 2006; and $Group_{i2006}$ is an indicator variable that equals one if the company belongs to a business group in 2006. We also include industry-specific fixed effects, α_j to account for time-invariant differences across industries that might influence firm growth rates, and regional effects, γ_m to account for time-invariant heterogeneity across 82 local labor-markets in Sweden. Finally, ε_i captures random elements in the firm's growth rate.

5. What Characterizes High-growth Firms?

5.1. Results, All Firms

The results when equation (2) is estimated for all firms are presented in Table 3 (sales growth) and Table 4 (employment growth). In order to evaluate the appropriateness of using OLS, we present results both from an OLS model and from a quantile regression model.

Our results indicate that older firms in general are characterized by faster sales growth than younger firms (Table 3). A positive and statistically significant relationship is also observed between firm size and firm growth in the OLS results, indicating that large firms grow faster than small firms. However, the quantile regression results reveal that this result is driven by firms with marginal growth rates and that sales growth is negatively related to firm size for firms in the 0.80 quantile. This shows the importance of not relying on OLS when investigating determinants of firm growth rates.

Profitability and solidity are two firm-specific variables that have seldom been controlled for in previous firm growth studies, although some researchers have argued that they might be important determinants for firm growth rates (Davidsson et al., 2009; Steffens et al., 2009). Our results show that returns on total assets has a statistically significant negative sign for both the 0.80 and 0.90 quantile. Thus, sales HGFs are less likely to be profitable, suggesting that they tend to grow before achieving profits. Solidity is also significantly negatively related to sales growth for firms in the 0.80 and 0.90 quantile, implying that sales HGFs start their growth period from a relatively weak financial position. The estimated coefficients for these two highest quantiles imply that a one percent point higher value for either ROA or solidity is associated with a 0.1 percent point loss of sales growth. Finally, no significant effect of whether the firm is part of an establishment group prior to their growth period is found for sales HGFs.

In Table 4, the corresponding results for growth in number of employees are presented. Firm age is positively related to firm growth when estimating an OLS model, but negatively related to employment growth for the fastest growing firms.

According to the results, employment HGFs are thus younger than firms that are growing more slowly. Firm size, on the other hand, does not seem to influence employment growth for the fastest growing firms, but is positively related to growth in the 0.80 quantile. These results are considerably different than those presented in Table 3 for sales growth, suggesting that results from growth equations can be dependent on the choice of growth indicator.

The results furthermore indicate that employment HGFs are more likely to be characterized by low profitability and a low degree of solidity. These variables are significantly negatively related to employment growth for firms in both the 0.80 and 0.90 quantile, confirming the results in Table 3 for sales growth. Firms that are growing fast in terms of number of sales and employees thus seem to have lower initial profits and less financial strength than firms that are growing more slowly.

Note finally that the results for the 0.5 quantile are difficult to interpret since in most of the firms in this quantile the number of employees does not change, which means that the variation in the dependent variable is very low.

Table 3: Estimation results for sales growth, 2007-2010, regional and industry fixed effects included. OLS and quantile regressions.

	OLS	**Quantile regression**				
Variable		**0.10**	**0.20**	**0.50**	**0.80**	**0.90**
Age_{2010}	0.003***	0.004***	0.004***	0.002	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln $Sales_{2006}$	0.028***	0.076***	0.032***	-0.011	-0.043***	-0.068
	(0.004)	(0.001)	(0.000)	(0.000)	(0.002)	(0.000)
ROA_{2006}	0.000	0.001***	0.001***	-0.000	-0.000**	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Solidity_{2006}$	-0.000**	0.000	0.000***	0.000	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Group_{2006}$	-0.079***	-0.102	-0.046***	-0.008**	0.000	-0.010
	(0.010)	(0.000)	(0.005)	(0.004)	(0.007)	(0.013)
Constant	-0.112***	-1.206	-0.598	0.168	0.897***	1.462
	(0.038)	(0.000)	(0.000)	(0.000)	(0.025)	(0.000)
Obs.	39,241	39,241	39,241	39,241	39,241	39,241
R^2	0.015					
Pseudo R^2		0.0604	0.0334	0.0132	0.0211	0.0255

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Robust standard errors in parentheses.

Table 4: Estimation results for employment growth, 2007-2010, regional and industry fixed effects included. OLS and quantile regressions.

	OLS	**Quantile regression**				
Variable		**0.10**	**0.20**	**0.50**	**0.80**	**0.90**
Age_{2010}	0.002***	0.005	0.004***	0.000	-0.000***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln $Empl_{2006}$	0.050***	0.092	0.015***	0.000	0.090***	0.035
	(0.003)	(0.000)	(0.003)	(0.000)	(0.002)	(0.000)
ROA_{2006}	-0.001***	-0.001	-0.002***	0.000	-0.000***	-0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Solidity_{2006}$	-0.000	0.001***	0.001***	0.000	-0.000***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Group_{2006}$	-0.044***	-0.091***	-0.044***	0.000	-0.004	-0.044***
	(0.006)	(0.007)	(0.006)	(0.000)	(0.003)	(0.010)
Constant	-0.041***	-0.667	-0.313***	0.000	0.104	0.648
	(0.010)	(0.000)	(0.014)	(0.000)	(0.000)	(0.000)
Obs.	39,241	39,241	39,241	39,241	39,241	39,241
R^2	0.025					
Pseudo R^2		0.0644	0.0302	0	0.0392	0.0178

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Robust standard error in parentheses.

5.2. Industry Differences Among High-Growth Firms

The analysis has so far been focused on the characteristics of HGFs for all eight industries presented in Table 1. In order to test whether the characteristics of HGFs differ across industries, we have also estimated equation (2) separately for the following five industries: (i) Manufacturing (NACE-code 25); (ii) Construction (NACE-codes 42 and 43); (iii) Retail (NACE-code 47); (iv) Hospitality (NACE-codes 55 and 56); and (v) Computer programming (NACE-codes 62 and 63). The results for the fastest growing firms (0.90 quantile) are presented in Table 5 (sales growth) and Table 6 (employment growth).[6]

6. The results for the other growth quantiles are left out due to space limitations, but are available from the authors upon request.

Table 5: Estimation results sales-HGFs (0.90 percentile), per industry, 2007-2010.

			Industry		
Variable	**Manufacturing**	**Construction**	**Retail**	**Hospitality**	**Computer**
Age_{2010}	0.000***	0.002***	-0.002***	0.001***	0.007***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln $Sales_{2006}$	-0.064***	-0.063***	-0.035***	-0.071***	-0.152***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA_{2006}	-0.002***	-0.001***	-0.002***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Solidity_{2006}$	-0.001***	-0.000***	-0.002***	-0.004***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Group_{2006}$	-0.006***	-0.002***	-0.025***	-0.020***	0.059***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	1.306	1.125	1.059	1.161	2.134
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Obs.	4,039	13,526	12,460	4,631	4,585
Pseudo R^2	0.0435	0.0185	0.0253	0.0442	0.0404

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Robust standard error in parentheses.

Table 6: Estimation results employment-HGFs (0.90 percentile), per industry, 2007-2010.

			Industry		
Variable	**Manufacturing**	**Construction**	**Retail**	**Hospitality**	**Computer**
Age_{2010}	-0.001***	-0.002***	0.000	-0.000***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln $Empl_{2006}$	0.002***	0.076	0.016***	0.002***	0.137***
	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)
ROA_{2006}	-0.003***	-0.003***	-0.003***	-0.001***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Solidity_{2006}$	-0.000***	-0.001***	-0.002***	-0.003***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Group_{2006}$	-0.096***	-0.081***	-0.026	-0.000***	0.036***
	(0.000)	(0.016)	(0.000)	(0.000)	(0.000)
Constant	0.598	0.484	0.530	0.517***	0.486***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Obs.	4,039	13,526	12,460	4,631	4,585
Pseudo R^2	0.0557	0.0207	0.0244	0.0467	0.0565

*** significant at the 1% level; ** significant at the 5% level; * significant at the 10% level. Robust standard error in parentheses.

The results in Table 5 indicate that sales HGFs within the retail industry tend to be young, while older firms experience more rapid growth in the other industries. In all industries, sales HGFs tend to be small before they grow. Note also that sales HGFs within the hospitality and computer industry tend to grow with profits, while sales HGFs in the other industries are characterized by low returns on total assets in 2006. Sales HGFs within computer industry are, in

contrast to the HGFs within the other industries, also characterized by high initial solidity.

Employment HGFs (Table 6) in most cases share the same characteristics across industries. Only small differences across the industries under study can be observed, which means that they confirm the aggregated results presented in Table 4. Thus, despite considerable industry differences regarding scale economies, capital intensity, and human capital, employment HGFs are characterized by low initial profits and have a weak financial position prior to the growth period. The only differences that we can observe are that fast-growing firms in the computer industry, that is, more knowledge-intensive services, seem to be older and have taken part in a merger before the study period.

6. Conclusions

The purpose of this paper has been to analyze the characteristics of HGFs in Sweden during 2007-2010, and to investigate whether they differ for firms active in different industries. This question is of importance since policymakers have started to design policies that are targeted towards potential HGFs in R&D-intensive industries (Daunfeldt et al., 2016).

HGFs were found to be characterized by low profits prior to their growth period, which is troublesome since profits seem important in predicting future growth (Davidsson et al., 2009; Steffens et al., 2009). The lack of profits would be less of a problem if HGFs were financially strong, but we found that HGFs had also grown from a weak financial position. This implies that HGFs do not have the characteristics that we typically associate with firms that are able to become successful in the long run. We believe that our results might help to explain why recent studies (e.g., Hölzl, 2014; Daunfeldt and Halvarsson, 2015) have found that HGFs are "one-hit wonders," unlikely to sustain their high growth rates in subsequent periods. Possibly, in firms where high growth is achieved from a weak initial financial position, organizational development can not keep up with the growth of the firm, causing 'growing pains' that may hamper subsequent growth (Flamholtz and Brzezinski, 2016). Our study adds reason for concern regarding the efficacy of policies that are targeted towards HGFs.

Policies that are targeted towards potential HGFs have in general been focused on R&D-intensive industries. However, we did not find any large differences among HGFs belonging to five industries that are very different in terms of, for example, capital intensity, minimum efficient scale, and share of educated workers. Thus, our results do not seem to be driven by industry-specific differences.

Our results question the current fascination with HGFs, and suggest that policies targeted towards these firms are unlikely to be successful. Maybe policymakers should instead focus on improving the general conditions for firm

growth. As noted by Bornhäll et al. (2015), many profitable firms might choose to grow if the conditions for firm growth become more favorable. This implies that politicians should try to remove growth barriers for all firms instead of trying to pick winners or design policies targeted towards those firms that have high historical growth rates. We believe, therefore, that there is a need for more research on the conditions for firm growth, and on the kinds of policies that can promote firm growth that is sustainable in the long run.

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