Growth persistence and profile robustness of high-growth firms

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Abstract: This paper analyses the persistence of high business growth and the robustness of the profile characteristics of high-growth firms (HGFs). By having company information for all firms that are active in Flanders (i.e., the northern part of Belgium) for a ten-year period (i.e., from 2000 to 2009), different subsets of HGFs were identified for different time periods. Several questions arise, such as whether the firms that were qualified as an HGF in a certain period were able to maintain the high growth rates for multiple (consecutive) periods and whether the profile characteristics of the HGF-subsets are stable over time. It appeared that the majority of the firms that were identified as an HGF in the period 2000–2009 were 'one-shot HGFs'. Notwithstanding the rapidly changing composition of the subsets, the profile features of the HGFs in the subset remained relatively constant over time.

Keywords: growth; business growth; firm growth; rapid-growth firms; high-growth firms; HGFs; growth persistence.

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1 Introduction

In the last decade, there has been an increasing awareness of the importance of high-growth firms (HGFs) for the employment growth and dynamics in a region or economy (European Commission, 2011; Harms et al., 2010). This awareness has – together with the raised availability of high-quality data on business growth – produced a number of excellent studies in the research field of HGFs. The studies of Davidsson and Henrekson (2002) and Barringer et al. (2005) gave interesting insights into the attributes and determinants that can be associated with rapid firm growth, whereas the study of Delmar et al. (2003) found the growth pattern of HGFs during the high-growth period to be extremely heterogeneous. Recently, some studies have pointed to the episodic nature of high business growth. Being a HGF appears to be frequently a temporary phenomenon (Garnsey et al., 2006). Mason and Brown (2010) stated in a research report that HGFs indeed appear to have difficulty in sustaining their frenetic pace of growth, whereas Acs et al. (2008) found that the most typical pattern for former HGFs is to return to the average industry growth rates. Also Parker et al. (2010) concluded that firms may show fast growth for short periods of time, but only very few are able to maintain this growth pace into the medium or long term. The approach of Parker et al. (2010) was novel in the way that they identified a group of HGFs in one period and tracked their subsequent performance over time.

We try to get some more profound insights into the phenomenon of growth persistence which can be defined in this context as the capability of firms to retain strong positive growth rates for a long period of time. Concretely, strong growth rates are measured in two ways: the change in the number of employees and the change in the yearly value added. Our focus will be on the growth persistence of HGFs with an approach that differs from the one that has been used in other studies. By having

company information over a ten-year period, different subsets of HGFs were identified for different time periods. The question arises

1 whether the firms that were qualified as a HGF in a certain period were able to maintain the high growth rates for multiple periods

2 whether the profile characteristics (e.g., firm size, firm age, industry, total assets, solvency, …) of such a HGF-subset are consistent over time.

Hence, we not only try to gain a deeper insight into the growth persistence of HGFs but also to learn more about the stability or 'robustness' of the profile characteristics of the different subsets of HGFs. Stated differently, we will test if the profile features of HGFs remain stable over different time periods and different groups of HGFs. Up to now, studies identified a group of HGFs, analysed their profile characteristics and compared them to the profile characteristics of the remainder of the business population for the same period. In our approach, the profile characteristics of HGFs can be compared over time and between different HGF-subsets.

Only a very limited number of HGFs could hold their strong growth rates for a long time period. This finding has implications from a managerial and academic perspective but especially from a policy perspective. Initiatives that have been undertaken in recent years by government and other institutions to support HGFs should be aware of the fact that the clear majority of the firms that can be qualified as a HGF at a certain moment in time will only be a HGF for a relatively short period. Measures that are taken to support these firms should be seen in the light of the short-lived character of high firm growth. These initiatives should primarily be directed to the firms with the potential to become a HGF in a later phase. The challenge then is to identify the firms that have the potential of becoming a HGF in the future. Notwithstanding the high in-and outflow of firms in the HGF-subsets, we found that the profile features of these different subsets remain relatively constant over time which can be a reassurance for policy makers and government institutions who have launched initiatives towards HGFs as the initiatives may benefit from the finding that the subsets consist of more or less the same type of firms. Supportive measures should then not ever be adjusted to the changing outlook of the HGF-subset.

This paper proceeds as follows. First, some theoretical perspectives on the length of the high-growth period will be introduced. Second, the database and the research method are described. Third, we analyse the persistence of the high-growth phenomenon and the results are discussed. Fourth, the different profile characteristics of the identified HGFs are shown and compared, including a comparison between some features of the so-called '*one-shot HGFs*' and '*persistent HGFs*'. Finally, some concluding comments are offered.

2 Theoretical perspectives on the persistence of high business growth

Different theories and theoretical concepts exist that can be linked to the persistence of high business growth. In this section, we will discuss the life cycle theory of the firm, the concepts of minimum efficient size (MES), sustained competitive advantage, Gibrat's law and the growth theory of Penrose.

2.1 Life cycle theory of the firm

Following the life cycle theory of a firm, business growth can be considered as a natural process where every company will go through (Churchill and Lewis, 1983; Greiner, 1972; Kanzanjian, 1988). A firm will grow via sequential steps, from birth to maturity, where each phase can be characterised by priorities, configuration issues and strategies. In the phase model of Greiner (1972) a company goes through various stages of evolution and revolution where each growth phase is associated with series of internal crises. After a crisis is solved a period of growth can follow as a result of which the company enters the second phase of the life cycle. By each time surviving the crisis that is unique to a specific stage, a firm can evolve to the last phase of the life cycle. Phelps et al. (2007) identified different states that can be related to managerial problems. To encounter a period of growth, a firm must successfully resolve the challenges that are associated by each phase or state. In this logic, a period of growth in general and a period of high growth in particular is a temporary phenomenon in the life of a firm which may occur several times in the life of a firm.

2.2 Minimum efficient size

As to Lipczynski et al. (2005), the long-term survival of small firms depends on their ability to achieve the so-called minimum efficient scale or MES. Almus (2002) defined the MES as a certain threshold that newly founded businesses should reach if they want to survive in their sector. Small firms that are not able to achieve the MES tend to exit. It can be expected therefore that faster-than-average growth may occur among a cohort of surviving firms when these firms are striving to reach the MES (Lipczynski et al., 2005). As this MES varies strongly per sector, firms that are active in sectors characterised by a high MES often will have a greater tendency to grow fast (Almus, 2002). Consequently, high-firm growth can be linked to the fact that firms need to grow rapidly in order to achieve the MES. Once this threshold has been attained, however, growth rates are expected to become more moderate. Again, following this logic, a high-growth period can be seen as a temporary phase in the life of a firm.

2.3 Sustained competitive advantage

Also the resource-based view can give some explanations to the persistence of high business growth. As to Barney (1991), a firm is said to have a *competitive advantage* if a value creating strategy is implemented which is not at the same time implemented by a current or potential competitor. A *sustained competitive advantage* arises then when these competitors are not able to duplicate the benefits of the value creating strategy. Concretely, a firm may obtain a *sustained competitive advantage* by "*implementing strategies that exploit their internal strengths, through responding to environmental opportunities, while neutralizing external threats and avoiding internal weaknesses*" [Barney, (1991), p.99]. To have the potential to build up a *competitive advantage*, a firm resource has to be valuable[1] and rare among competitors. Apart from being valuable and rare, firm resources have to be imperfectly imitable and not easily substitutable for strategically equivalent resources to have the potential for contributing to a *sustained competitive advantage* (Barney, 1991). HGFs could relate the extreme growth rates to a certain competitive advantage that enables this growth. The distinction between a

competitive advantage and a *sustained competitive advantage* can then be linked to the growth persistence of HGFs. Firms that can maintain the HGF-status for several consecutive periods are more likely to have a *sustained*[2] *competitive advantage* that will not be competed away by possible duplication efforts of competing firms. The fact that achieving a *sustained competitive advantage* is much more difficult for a firm than achieving a *competitive advantage* – as the resources that are at the basis of the *sustained competitive advantage* have to be apart from valuable and rare also imperfectly imitable and not easily substitutable (cf., Barney, 1991) – could imply that extending the high-growth period for a longer time is a difficult task for a large part of the HGFs. Consequently, the amount of '*one-shot HGFs*', i.e., the firms that are only a HGF for a short period (cf., supra), would be much higher than the amount of '*persistent HGFs*', i.e., the firms that retain high growth rates for a long period of time, as moving from a competitive advantage to a sustained competitive advantage may be only reserved for *the happy few*.

2.4 Gibrat's Law

Robert Gibrat tried to explain the differences in growth rates between firms already back in 1931. He stated in his famous Gibrat's Law that firm growth rates are independent random variables. This implies that firms that grow faster in one period will not grow faster (or slower) than other firms in a later time period (Gibrat, 1931). However, Sutton (1997) conducted a review of Gibrat's Law and concluded that growth rates were serially correlated: firms that grew faster in one period were more likely than others to have an above-average growth rate in subsequent periods. A study of Coad (2009) found, on the other hand, that the serial correlation of growth rates is more likely to be negative for firms that have experienced extreme growth rates. Even more than 80 years after the emergence of Gibrat's Law, evidence is mixed regarding the serial correlation of firm growth. A large proportion of so-called '*one-shot HGFs*' (cf., infra) would be consistent with Gibrat's Law. If there are, on the other hand, many firms that can hold their HGF-status for multiple periods, this would be contrary to the propositions of Gibrat.

2.5 Growth theory of Penrose

Also the growth theory of Penrose (1959) may give important insights into the persistence of business growth. In her view, the bundle of resources a firm possesses, will limit the opportunities a firm can seize (Kor and Mahoney, 2004). More specifically, management availability is considered as the most constraining element to firm growth. Penrose (1959) stated that managers function as a catalyst in the conversion of the firm's resources into capabilities. However, the pool of managerial resources is limited and not easily transferrable from one firm to another as the experience of the management with the firm-specific resources produces knowledge that is unique to the firm. Hence, the experience-based knowledge is proprietary as it cannot be easily purchased on the market and transferred to new managers (Kor and Mahoney, 2004). The availability and quality of the management is consequently a bottleneck for the growth rates that a firm can achieve in the long run. Attracting new managers may be necessary for a HGF to overcome certain growing pains, but the effectiveness of the appointment of these new managers may be limited as their knowledge is not fully applicable to the new

firm-specific setting. This may impede HGFs to keep on growing fast for a longer time period.

As was stated in the introduction, high firm growth is often characterised by its episodic nature. The five concepts and theories that are mentioned in this theoretical section all give explanations for the potential difficulties that firm face to retain high growth rates for a long time period. In the empirical analysis that we have conducted, it is analysed to what extent HGFs are capable of sustaining their high growth for multiple periods, by making a distinction between '*one-shot HGFs*' and '*persistent HGFs*'. The way in which the analysis is carried out is new and can give more profound insights into the described phenomenon of temporary high growth.

3 Method

3.1 Data

The Central Balance Sheet Office of the National Bank of Belgium provided an extensive database that consists of company information for all firms that were active in Flanders (i.e., the northern part of Belgium) in the period 2000–2009. Hence, financial statement information of an entire decade is available for about 200.000 firms. This makes a longitudinal approach possible. The database contains a wide variety of items such as firm age, sector, year of foundation as well as a number of balance sheet items. In our study we selected only those firms for which all the necessary data are available. In accordance with an increasing number of studies in the domain, the OECD-definition of a HGF will be used as a guideline (e.g., BERR, 2008; Mason and Brown, 2010; Anyadike-Danes et al., 2009; Mason et al., 2009; Teruel and de Wit, 2011). According to this definition, a HGF is a firm:

> "that experiences annualized growth rates in employees or turnover greater than 20 percent per annum over a three year period with a minimum of 10 employees at the beginning of the study period." [Eurostat – OECD, (2007), p.61]

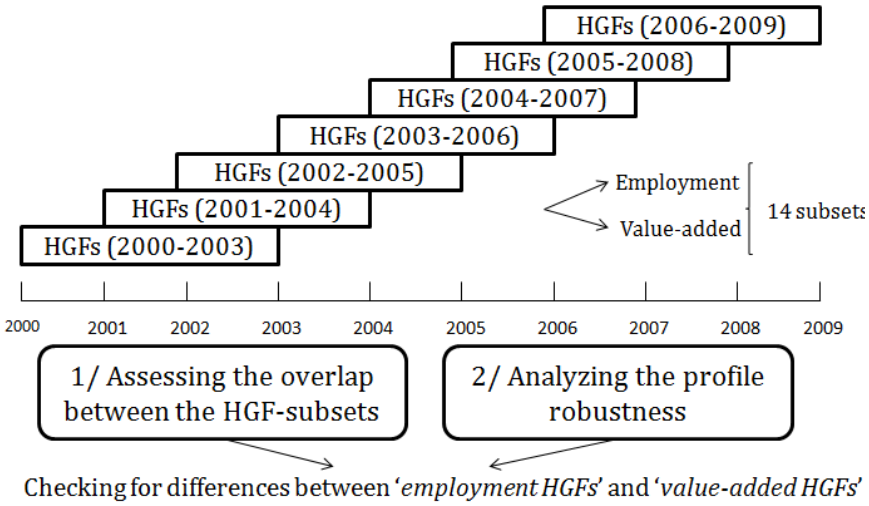
In order to avoid small businesses from becoming too dominant in the group of HGFs, a minimum employee size is imposed of ten employees in the first year of the analysed period. The average annual growth percentage is set on 20% and has to be reviewed along the entire period of time. This implies that it is not necessary for the business to grow more than 20% in each of the three years. Practically, a firm should have a growth rate of at least 72.8%[3] during the entire period in order to be classified as a HGF. The OECD-definition normally leaves the choice between two growth measures, i.e., employment and turnover. However, in our analysis, turnover will be replaced by value-added as a growth indicator. First, there is a pragmatic reason for this as the majority of the Belgian SMEs are not obliged to publish turnover figures, whereas the publication of value-added figures is mandatory for all Belgian firms. However, another and perhaps even more important reason for the choice for value-added as growth measure is the fact that value-added figures also have an important social value as the sum of all value-added figures is a building block of the domestic product of a region. Hence, the two growth measures that are used have both – directly or indirectly – an impact on the prosperity of a region as strong employment growth gives rise to job creation and strong value-added growth enables GDP growth.

Hence, we consider a HGF as a firm:

> "that realizes annualized growth rates in employees or value-added figures that are greater than 20 percent per annum over a three year period with a minimum of 10 employees at the beginning of the study period."

As company information is available for a ten-year period (i.e., from 2000 to 2009), seven overlapping three-year periods can be identified (cf., Figure 1). Furthermore, two types of HGFs will be analysed for each period, namely '*employment HGFs*' and '*value-added HGFs*'. '*Employment HGFs*' are the firms that have realised an annual employee growth of at least 20% for a three-year period, whereas '*value-added HGFs*' are the firms that have realised an annual growth in their value-added of at least 20% for a three-year period. A total of 14 HGF-subsets were created (i.e., seven subsets of '*employment HGFs*' and seven subsets of '*value-added HGFs*'). A schematic overview is presented in Figure 1.

Figure 1 Schematic overview of the adopted approach



3.2 Research method

Two topics will be analysed (cf., Figure 1). First, the overlap between the different HGF-subsets is assessed, which will provide insight into the phenomenon of the growth persistence of HGFs. Second, some profile characteristics – such as the firm size, firm age and industry – will be analysed for the 14 HGF-subsets and a comparison will be made between them. Hence, it is tested if these characteristics are stable over time. The potential differences between '*employment HGFs*' and '*value-added HGFs*' will be discussed as well.

Table 1 gives an overview of the absolute and relative number of HGFs in the 14 identified subsets. Starting from the Flemish business population and after filtering for five excluded NACE-sections[4] and the minimum employee size of ten employees in the first year of the analysed period, an absolute number of firms ranging from 11,504 (in the period 2000–2003) to 13,295 (in the period 2006–2009) is obtained. After applying the OECD-definition for the seven overlapping three-year periods, a relative number of

'*employment HGFs*' ranging from 3.00% (for the period 2000–2003) to 4.39% (for the period 2005–2008) was found. With respect to the '*value-added HGFs*', a minimum percentage of 7.08% (for the period 2000–2003) and a maximum percentage of 9.75% (for the period 2005–2008) was encountered. Hence, it appears that the number of '*value-added HGFs*' is approximately twice as high as the number of '*employment HGFs*' and that the number of HGFs has steadily risen from the first until the sixth analysed period with a relapse in the last three-year period. A possible explanation for the lower number in the last period is the fact that this period was more affected by the financial and economic crisis. The overlap between the two HGF-categories is represented in the last column of Table 1. A relatively high number of firms can be catalogued both as an '*employment HGF*' and '*value-added HGF*' in the same period. For instance, 370 of the 1,008 '*value-added HGFs*' (i.e., 36.70%) for the period 2006–2009 could also be qualified as an '*employment HGF*' in this period.

Table 1 Composition of the 14 HGF-subsets

Period	*Employment HGFs (seven subsets)*		*Value-added HGFs (seven subsets)*		*Absolute number of firms that are in both HGF-subsets*
	Absolute number	*Relative* number*	*Absolute number*	*Relative* number*	
2000–2003	345	3.00%	814	7.08%	231
2001–2004	381	3.16%	917	7.60%	259
2002–2005	407	3.28%	944	7.61%	281
2003–2006	461	3.67%	1,137	9.05%	314
2004–2007	551	4.25%	1,240	9.56%	406
2005–2008	583	4.39%	1,296	9.75%	433
2006–2009	489	3.68%	1,008	7.58%	370

Note: *Which is the absolute number relative to the number of Flemish firms with at least ten employees in the first year of the period.

Testing the statistical significance of the differences between the average firm age, firm size, total assets and solvency of the different subsets has been done by applying the student's t-test which is identical to the one-way ANOVA done on data with two categories. The average values of each three-year period are compared to each other. P-values lower than 0.05 indicate a significant difference between the average firm age, firm size, total assets or solvency of two different HGF-subsets. The tables with the detailed calculations of the p-values can be found in Appendix 3.

4 Assessing the overlap between the subsets: how persistent is high business growth?

Based on the earlier mentioned theoretical considerations, one would expect to encounter a limited number of HGFs that are able to realise high growth rates for a long period of time. The identification of the seven (overlapping) HGF-subsets offers the opportunity to learn more about this persistence of high business growth. Table 2 gives an overview of the number of firms that could be qualified as a HGF in one or more three-year periods. It

appears that 1 908 different firms could be qualified as an '*employment HGF*' in one or more of the seven periods and that 4,319 different firms were identified as a '*value-added HGF*' in one or more of the seven periods. With respect to the '*employment HGFs*', 1 083 of the 1 908 firms (i.e., 56.8%) were only a HGF in one period and are qualified in this paper as so-called '*one-shot HGFs*'. A one-shot HGF is consequently a firm that is only an '*employment HGF*' or '*value-added HGF*' in one of the seven overlapping periods. Practically the same percentage of '*one-shot HGFs*' is found for the total group of '*value-added HGFs*'. Hence, it appears that more than half of the firms that were qualified as a HGF between 2000 and 2009 could only retain this status for one three-year period[5]. Furthermore, it becomes clear that a very limited number of firms were able to be a HGF in four or more periods. The firms that could be identified as a HGF in four or more periods out of the seven overlapping periods are defined in this paper as '*persistent HGFs*'. Being a '*persistent HGF*' appears to be achieved by only 90 '*employment HGFs*' (i.e., 4.72% of the total number of 'employment HGFs') and by 254 '*value-added HGFs*' (i.e., 10.37%). Hence, it also appears that it is easier – or better stated less difficult – for the '*value-added HGFs*' to become a '*persistent HGF*'. Finally, it is noteworthy to mention that only one '*employment HGF*' and five '*value-added HGFs*' were present in each of the seven overlapping HGF-subsets.

Table 2 Number of firms that are qualified as a HGF for one or more three-year periods

Number of high-growth periods		*Number of firms that are x time(s) a HGF*	
		Employment HGFs	*Value-added HGFs*
One-shot HGFs	1	1,083	2,449
	2	461	1,061
	3	274	555
Persistent HGFS	4	68	174
	5	15	61
	6	6	14
	7	1	5
Total		*1,908*	*4,319*

Table 3 gives an overview of the number of firms that have been qualified as an '*employment HGF*' or '*value-added HGF*' in the first analysed period (i.e., the numbers before the first arrow) and the number of firms of this initial group that could retain this status in the next overlapping three-year period(s). So concretely, 134 firms of the 345 that were identified as an '*employment HGF*' in the period 2000–2003 were still an '*employment HGF*' in the period 2001–2004 (i.e., 38.84%). Fifty four of the initial 345 firms could retain the HGF-status for three consecutive overlapping periods (i.e., 15.65%). The same tendency can be found for '*value-added HGFs*' with an initial group of 814 firms of which 326 firms were still a '*value-added HGF*' in the period 2001–2004 (i.e., 40.05%). 140 of the initial 814 '*value-added HGFs*' retained their HGF-status for three consecutive periods (i.e., 16.65%).

Table 3 Number of consecutive ‘employment HGFs’ and ‘value-added HGFs’

	2000–2003		*2001–2004*		*2002–2005*		*2003–2006*		*2004–2007*		*2005–2008*		*2006–2009*
Employment HGFs	345	→	134	→	54	→	11	→	3	→	2	→	1
Value-added HGFs	814	→	326	→	140	→	53	→	25	→	12	→	5

Table 4 Number of 'one-shot HGFs' in the subsets of 'employment HGFs'

	2000–2003	*2001–2004*	*2002–2005*	*2003–2006*	*2004–2007*	*2005–2008*	*2006–2009*
Number of 'employment HGFs'	345	381	407	461	551	583	489
Number of 'one-shot HGFs'	176	115	103	111	143	177	258
	51.01%	*30.18%*	*25.31%*	*24.08%*	*25.95%*	*30.36%*	*52.76%*

Table 5 Number of 'one-shot HGFs' in the subsets of 'value-added HGFs'

	2000–2003	*2001–2004*	*2002–2005*	*2003–2006*	*2004–2007*	*2005–2008*	*2006–2009*
Number of 'value-added HGFs'	814	917	944	1,137	1,240	1,296	1,008
Number of 'one-shot HGFs'	377	265	264	314	364	417	448
	46.31%	*28.90%*	*27.97%*	*27.62%*	*29.35%*	*32.18%*	*44.44%*

Table 4 and Table 5 represent the number of firms that are qualified as an '*employment HGF*' (Table 4) or a '*value-added HGF*' (Table 5) in only one of the seven periods. For instance, 177 of the 583 '*employment HGFs*' for the period 2005–2008 could only be qualified as a HGF in this period (i.e., 30.36%). The differences in the percentages of '*one-shot HGFs*' are though remarkable. For the period 2006–2009 nearly 53% of the '*employment HGFs*' were '*one-shot HGFs*', whereas only 24.08% '*one-shot HGFs*' were reported for the subset of the period 2003–2006.

It appeared already that a large part of the HGFs were not able to retain their strong growth rates for a longer period. In this context, it is interesting to consider the growth rates that are realised by the firms that were a HGF in a certain period and who were no longer a HGF one period later. Table 6 shows the number of this so-called '*drop-out*' firms that have been qualified as an '*employment HGF*' or '*value-added HGF*' in the period 2000–2003 and were no longer an '*employment HGF*' or '*value-added HGF*' in the period 2001–2004. For the '*employment HGFs*', it appeared that approximately a quarter of the '*drop-out*' firms could recapture the HGF-status in one of the subsequent periods. With respect to the '*value-added HGFs*', 183 of the 488 firms (i.e., 37,5%) that were identified as a '*value-added HGF*' in the period 2000–2003 and that were no longer a '*value-added HGF*' in the period 2001–2004 came back as a HGF in a later three-year period. The percentage of firms that could return as a HGF after a drop-out is consequently higher for the '*value-added HGFs*' (i.e., 38% of the '*value-added HGFs*' compared to 26% of the '*employment HGFs*'). Though it holds for both HGF-categories that the clear majority of the '*drop-outs*' could not regain their HGF-status in later years. Nevertheless, it appears that the drop-out firms still realise – on average – growth rates around 30% in the next overlapping three-year period. For instance, the 211 '*employment HGFs*' for the period 2000–2003 that were no longer an '*employment HGF*' in the period 2001–2004 realised on average a growth rate of 28,2% in the period 2001–2004. Only 32 of these 211 firms had a negative growth rate in this subsequent three-year period.

Table 6 HGFs that return after a 'drop-out'

Period	*Employment HGFs*	*Value-added HGFs*
	211 drop-out firms	*488 drop-out firms*
	Number of firms that could return as a HGF after the drop-out	
2002–2005	11	31
2003–2006	7	29
2004–2007	12	41
2005–2008	13	51
2006–2009	12	31
Total	55 / 211 (26.07%)	183 / 488 (37.5%)

5 Robustness of the profile characteristics of the different HGF-subsets

As was stated in the introduction, this paper not only tries to learn more about the persistence of high firm growth but also wants to gain insight into the so-called 'robustness' of the profile characteristics of the different HGF-subsets. In recent years, several studies have been conducted in which the profile features of HGFs are compared

to the profile features of non-HGFs (e.g., Henrekson and Johansson, 2010; Davidsson and Delmar, 2006). Given the existence of these studies, we will not make a comparison between the profile characteristics of HGFs and non-HGFs as in these studies, it was already found that HGFs are clearly younger and smaller than non-HGFs and that HGFs are overrepresented in knowledge intensive service industries. In our study, however, we will adopt a different approach in which we aim to make a comparison between the profile characteristics of the different HGF-subsets. This kind of analysis, which has not been conducted until now, can test if the profile features of HGFs are consistentfor the different HGF-subsets and if these features are stable over time. The following section will analyse the average firm age, the average firm size, the average amount of total assets, the average solvency and the geographical and sectoral distribution of the different HGF-subsets. With respect to outliers, observations that deviated from the average by more than five times the standard deviation were omitted from the calculations.

5.1 Firm age

Table 7 gives an overview of the average age of the firms in the different HGF-subsets. No significant differences were found between the average age of the firms in the seven subsets of '*employment HGFs*' as the average ages ranged only between 16.1 years (i.e., the 2000–2003 subset) and 17.8 years (i.e., the 2005–2008 and 2006–2009 subset). With respect to the '*value-added HGFs*' – who are on average older than the '*employment HGFs*' –, it appears that the average age of the firms in the two first subsets is significantly lower than the averages of the other subset.[6] As from the third analysed period, however, the average age stabilises around 20 years. Hence, one can conclude that the average firm age of the different subsets is quite stable over time.

Table 7 Average age of the firms in the HGF-subsets

Period	*Average firm age (year*)*	
	Employment HGFs	*Value-added HGFs*
2000–2003	16.1	17.5
2001–2004	17.5	18.5
2002–2005	17.1	20.0
2003–2006	16.6	20.4
2004–2007	17.1	20.8
2005–2008	17.8	20.2
2006–2009	17.8	19.5

Notes: *Firm age calculated on the basis of the last year of each three-year period;
p-values were calculated by using the Student's t-test at a level of significance of 5%.

5.2 Firm size

Table 8 shows that also the average size of the different HGF-subsets – measured by the number of employees – remains quite stable over time as no significant differences between the averages were encountered. The average size of the '*employment HGF*'-subsets varied between 82.5 and 102.5 whereas the average size of the

'*value-added HGF'*-subsets ranged from 64.9 to 73.8. Therefore, *'value-added HGFs*' appear to be larger than '*employment HGFs*'.

Table 8 Average size of the firms in the HGF-subsets

Period	*Average firm size (number of employees)*	
	Employment HGFs	*Value-added HGFs*
2000–2003	83.4	69.3
2001–2004	85.0	73.8
2002–2005	99.3	64.9
2003–2006	97.4	69.9
2004–2007	101.3	65.1
2005–2008	102.5	71.1
2006–2009	82.5	71.6

5.3 Total assets

Table 9 shows that the '*employment HGF*'-subsets for the periods 2004–2007 and 2005–2008 have a significantly higher average total amount of assets than most other subsets.[7] The same holds for the '*value-added HGF*'-subsets for the periods 2001–2004 and 2002–2005. The subset of '*value-added HGFs*' for the period 2006–2009 has, however, a significantly lower average.[8] Apart from these 'outlying' averages, the average total assets of the other subsets varies roughly around 20 million EUR, both for '*employment HGFs*' and '*value-added HGFs*'. Consequently, even though there are respectively two and three aberrant results, it still appears that the fluctuations remain fairly limited for the other HGF-subsets.

Table 9 Average total assets of the firms in the HGF-subsets

Period	*Total assets (average; inEUR)*	
	Employment HGFs	*Value-added HGFs*
2000–2003	16,257,270	19,989,299
2001–2004	19,170,046	33,063,890
2002–2005	18,824,550	27,627,605
2003–2006	23,078,790	21,952,835
2004–2007	26,063,515	20,128,904
2005–2008	32,703,325	17,077,250
2006–2009	20,237,284	12,622,710

5.4 Solvency

The solvency of the firms in the '*employment HGF*'-subsets remain quite stable over the analysed decade as only one significant difference between the seven averages was encountered (cf., Table 10).[9] The average debt ratios vary from 71.0% to 75.2%. With respect to the '*value-added HGFs*', the average debt ratios of the first subsets are significantly higher than the averages of the latest subsets. The average solvency of the

2003–2006 subset (i.e., 77.1%) is also significantly higher than all other averages of the '*value-added HGF*'-subsets. No clear differences between the two HGF-categories can be encountered.[10]

Table 10 Average solvency of the firms in the HGF-subsets

Period	*Solvency (liabilities/total assets)*	
	Employment HGFs	*Value-added HGFs*
2000–2003	75.2%	72.7%
2001–2004	73.1%	73.0%
2002–2005	74.4%	71.3%
2003–2006	72.6%	77.1%
2004–2007	71.7%	68.9%
2005–2008	73.6%	69.7%
2006–2009	71.0%	69.2%

5.5 Sectoral distribution

A similar picture can be found for the sectoral distribution over the seven periods. Tables B and C – who are included in Appendix – show the distribution of the HGFs over the 15 included NACE-sections. The differences in the relative shares of each section over the seven periods remain fairly limited. The strongest fluctuation can be found in NACE-Section G (i.e., wholesale and retail trade) for the '*employment HGF*'-subsets with a rather small difference of 6.39 percentage points between the maximum and minimum share.

6 'One-shot HGFs' versus 'persistent HGFs'

Table 11 compares some profile characteristics of the so-called '*one-shot HGFs*' and '*persistent HGFs*'. It has to be noted, though, that this comparison is made between subsets of which the size is very diverse. The group of 90 persistent '*employment HGFs*' is compared to a group of 1,083 one-shot '*employment HGFs*', whereas the 254 persistent '*value-added HGFs*' are compared to 2,449 one-shot '*value-added HGFs*'. It appears that the persistent HGFs – with an average age of approximately 25 years – are clearly older than the one-shot HGFs. It could be expected that the persistent HGFs are larger than the one-shot HGFs given their longer period of high-growth. The magnitude of the difference in size is however remarkable. The 90 firms that were qualified as persistent '*employment HGFs*' had an average workforce of 233.2 employees in 2009 whereas the one-shot '*employment HGFs*' had an average number of 68.3 employees in the last year of their high-growth period. A similar picture can be found for the '*value-added HGFs*' where the persistent HGFs had an average number of 161.7 employees in 2009 compared to an average workforce of 55,2 for the one-shot HGFs. Also with respect to the total amount of assets, large differences can be found between both categories of HGFs. It appears as well that the differences between persistent and one-shot HGFs are greater for '*employment HGFs*' than for '*value-added HGFs*'.

Table 11 One-shot HGFs versus persistent HGFs

	One-shot 'employment HGFs' (1,083 firms)	*Persistent 'employment HGFs' (90 firms)*
Average firm age	15.7 years	24.6 years
Average firm size	68.3 employees	233.2 employees
Average total assets	13,437,600 EUR	101,865,798 EUR
Average solvency	74.61%	72.32%

	One-shot 'value-added HGFs' (2,449 firms)	*Persistent 'value-added HGFs' (254 firms)*
Average firm age	19.8 years	25.0 years
Average firm size	55.2 employees	161.7 employees
Average total assets	15,342,165 EUR	54,988,313 EUR
Average solvency	72.32%	71.30%

7 Conclusions and implications

7.1 Persistence of high business growth

It appeared that more than half of the firms that were identified as a HGF in the period 2000–2009 could only maintain this status for one of the seven analysed three-year periods, and this both for '*employment HGFs*' and '*value-added HGFs*'. Furthermore, it became clear that only a very limited number of firms were able to be qualified as a HGF in at least four of the seven periods. There is – in other words – a large difference between the number of '*one-shot HGFs*' and the number of '*persistent HGFs*'. This phenomenon of temporary high-growth can be linked to the five concepts and theories that were mentioned earlier on.

1 With respect to the MES that a firm may want to reach in order to survive in their sector, temporary high-growth can be explained by the fact that these firms will try to attain this size as fast as possible and once the size is reached their growth intentions will fade away.

2 The life cycle theory of the firm can explain temporary high-growth as a firm grows, according to this theory, in sequential steps from birth to maturity. A relatively short period of high-growth may occur in one of the earlier phases as growth is considered as a natural process where every company will go through.

3 The difference that is made in the resource-based view between a *competitive advantage* and a *sustained competitive advantage* can also give an explanation to the encountered small number of '*persistent HGFs*' as possessing a sustained competitive advantage is considered to be 'reserved' for a very limited number of firms, namely the firms that own resources that are apart from valuable and rare also imperfectly imitable and not easily substitutable.

4 The low number of '*persistent HGFs*' is in line with Gibrat's Law as this law states that firm growth rates are independent random variables. Following this logic, firms that have grown fast in one period will not grow faster than other firms in the next period.

5 In the growth theory of Edith Penrose, it is stated that the availability and quality of the management can be considered as a bottleneck for the growth rates that a firm can achieve in the long run. The difficulties that HGFs are having to sustain high growth rates can consequently be linked to this theory: the pool of managerial resources is limited which impedes HGFs from attracting experienced managers that are needed to overcome certain growing pains and to keep the firm on the high-growth track.

The life cycle theory of the firm, the MES, (sustained) competitive advantage, Gibrat's Law and the growth theory of Penrose all together, give all rise to the conclusion that high firm growth has an episodic nature. The striking difference between the encountered amount of '*one-shot HGFs*' and '*persistent HGFs*' clearly supports this statement.

'*Persistent HGFs*' appeared to be clearly older and larger than the '*one-shot HGFs*' which is not surprisingly given their long period of strong growth rates. It was also shown that only 40% to 50% of the firms that were a HGF in period *x* were still a HGF in period *x + 1*. If three consecutive periods are considered (i.e., the periods x; x + 1 and x + 2), this percentage reduces even to approximately 20%. Moreover, the majority of the so-called '*drop-out*' firms could not return as a HGF in a later period. Realising high growth rates for more than three consecutive years or returning as a HGF after a drop-out are consequently difficult tasks for most of the Flemish HGFs.

As mentioned, the above findings confirm the earlier made statement that only a very limited number of firms are able to maintain high growth rates for a long period of time. This may have implications from a policy, academic and managerial perspective. In recent years, many regions have launched governmental initiatives that aim to stimulate the HGFs that are present in their region. In establishing these initiatives, it has to be kept in mind that the majority of the firms that can be qualified as a HGF at a certain moment in time will only be a HGF for a relatively short period. Supportive measures towards these firms should be seen in the light of the short-lived character of high business growth. It can be suggested that the initiatives should primarily be directed to firms that have the potential to become a HGF instead of the firms that have already – according to the OECD definition – attained the status of a HGF. The latter would carry the risk that the support only comes about at a moment when a firm's high growth period has already passed. From an academic perspective, the presence in the HGF-subset of '*one-shot HGFs*' and '*persistent HGFs*' may have some implications. Given the profile differences that exist between these two types of HGFs, it could be useful to separate between both categories when the aim is to analyse the determinants of the high growth rates. Moreover, when conducting case studies in HGFs, focusing on the '*persistent HGFs*' could give new insights as these type of firms have proven to be capable of sustaining high growth for a long period. Given their strong track record of high growth, these firms could be more suitable for case analyses that have the goal to study the determinants of high business growth. From a managerial point of view, HGFs are often considered to be a sort of *best practice*. Managers of non-HGFs could look upon these firms as an example for their own business. However, these managers have to realise that a large part of the HGFs are '*one-shot HGFs*' whose strong growth rates could possibly be related to an

accidental or unforeseen growth boost in a certain year. Again, the group of '*persistent HGFs*' may serve better as a *best practice* for these managers.

7.2 Profile robustness of HGFs

Different profile characteristics were analysed over time for the 14 HGF-subsets. As presented earlier, a large part of the firms in these subsets could be qualified as '*one-shot HGFs*'. The subsets consist consequently of many different firms. Hereby, it could be expected that the profile characteristics are subject to the rapidly changing composition of the subsets and that there would consequently be large differences between the averages of the different subsets. It appeared, however, that very few significant differences could be encountered with respect to the average firm age, firm size, total assets and solvency of the HGF-subsets. Also the sectoral distribution of the HGFs over the seven overlapping periods remained fairly stable. So, the profile features of the firms in the HGF-subsets remain relatively constant over time, notwithstanding the high in- and out-flow of firms in these subsets. This message could be a reassurance for the policy makers and government institutions who have launched initiatives towards HGFs. These initiatives may benefit from the finding that the subsets consist of more or less the same type of firms as supportive measures should then not ever be adjusted to the changing outlook of the HGF-subset.

8 Limitations and future research

As mentioned before, the majority of the Flemish firms do not have the obligation to publish turnover figures. Because of this limited availability, value-added was chosen as a growth measure instead of turnover. This could possibly hamper the comparability of the findings as the applied OECD definition prefers normally employment and turnover as growth indicators.

The distinction that was made between '*persistent HGFs*' and '*one-shot HGFs*' could offer new opportunities for future research. What are the exact factors that prevent the '*one-shot HGFs*' from retaining their high growth rates for a longer time period? Is it merely a matter of a declining demand for their service or product, or are there other internal and external factors that play a role in explaining the phenomenon of temporary high growth. Learning more about this topic is important as it might give new '*one-shot HGFs*' and potential HGFs new insights into how the growth pains that are associated with high growth can be overcome.

Moreover, it could be instructive to analyse the sectoral distribution of the two HGF-types. Are there any industries that are characterised by a relatively higher amount of '*persistent*' or '*one-shot HGFs*'? And what are the possible explanations for this presence? Second, the determinants of the high growth rates that are realised by the '*persistent HGFs*' on the one hand and the '*one-shot HGFs*' on the other hand can be analysed in future research as this paper only considered some profile characteristics of this two types of HGFs. Which factors determine the high growth of these firms? Why are many HGFs not able to retain their high growth for more than one period? And which factors can explain the persistent high growth of the '*persistent HGFs*'? Also with respect to the '*drop-out*' firms, more research can be performed in the future. Why are certain firms able to return as a HGF after such a drop-out and others not?

It appears that many questions still need to be addressed when it comes to the issue of the persistence of high business growth. In any case, it has become clear in this article that future research on HGFs should ideally always take the distinction between '*persistent*' and '*one-shot HGFs*' into account as they represent clearly two different types of HGFs.

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Notes

1 A resource is valuable if it has the potential to exploit opportunities and/or to neutralize threats (Barney, 1991).

2 Barney (1991) points out that a *sustained competitive advantage* does not imply that it will 'last forever'. It only suggests that other firms will not compete it away through duplication efforts. Empirically, however, *sustained competitive advantages* last on average a long period of time (Barney, 1991).

3 When a business gets below the minimum threshold of ten employees in year x-1 of x-2 it can still be qualified as an HGF if the total growth between year x-3 and year x exceeds 72.8%.

4 A list with the excluded and included NACE-sections can be found in Appendix (cf., Table A1).

5 Tables 4 and 5 give a more detailed picture of the presence of '*one-shot HGFs*'

6 '*Value-added HGFs*': significant differences between the average age of the 2000–2003-subset and the average firm age of the subsets of the periods 2002–2005, 2003–2006, 2004–2007, 2005–2008 and 2006–2009. Also significant differences between the average age of the 2001–2004 subset and the average age of the subsets of the periods 2002–2005, 2003–2006, 2004–2007 and 2005–2008.

7 '*Employment HGFs*': two subsets (i.e., the subsets of the periods 2004–2007 and 2005–2008) have a clearly higher average amount of assets than the other subsets.

8 '*Value-added HGFs*': two subsets (i.e., the subsets of the periods 2004–2007 and 2005–2008) have a clearly higher average amount of assets than the other subsets whereas the subset of the period 2006–2009 has a clearly lower average.

9 '*Employment HGFs*': only one significant difference could be found (i.e., between the average solvency of the firms in the 2000–2003 subset and the firms in the 2006–2009 subset).

10 '*Value-added HGFs*': the average solvency of the firms in the 2003–2006 subset is significantly higher than all other averages. The average solvencies of the three latest subsets (i.e., 2004–2007; 2005–2008 and 2006–2009) are significantly lower than the averages of the two first HGF-subsets (i.e., 2000–2003 and 2001–2004).

Appendix 1

Table A1 NACE-BEL 2008 sections

Excluded sections	*NACE-BEL 2008*
Section K	Financial and insurance activities
Section O	Public administration and defence; compulsatory social security
Section P	Education
Section Q	Human health and social work activities
Section T	Activities of households as employers
Section U	Activities of extraterritorial organisations and bodies
Included sections	*NACE-BEL 2008*
Section A	Agriculture, forestry and fishing
Section B	Mining and quarrying
Section C	Manufacturing
Section D	Electricity, gas, steam and air conditioning supply
Section E	Water supply, sewerage, waste management and remediation activities
Section F	Construction
Section G	Wholesale and retail trade; repair of motor vehicle and motorcycles
Section H	Transporting and storage
Section I	Accommodation and food service activities
Section J	Information and communication
Section L	Real estate activities
Section M	Professional, scientific and technical activities
Section N	Administrative and support service activities
Section R	Arts, entertainment and recreation
Section S	Other service activities

Appendix 2

Table A2 Sectoral distribution of the '*employment HGFs*' over the NACE-sections for the seven overlapping periods

NACE-section	*2000–2003*	*2001–2004*	*2002–2005*	*2003–2006*	*2004–2007*	*2005–2008*	*2006–2009*	*Difference between highest and lowest percentage*
A	1.21	0.55	0.25*	0.44	0.93	1.37**	1.02	*1.12*
B	0.60**	0.00*	0.00	0.00	0.00	0.00	0.00	*0.60*
C	15.71	17.53	16.54	17.52	19.22**	16.3	15.54*	*3.68*
D	0.00*	0.27	0.5**	0.44	0.37	0.00	0.20	*0.50*
E	0.60	1.92**	1.50	1.33	0.75	0.34*	0.41	*1.58*
F	10.57*	12.60	12.03	11.31	14.74**	13.38	12.88	*4.17*
G	25.98**	23.84	23.06	23.06	19.59*	21.27	21.68	*6.39*
H	16.31	16.16	16.54**	12.86	16.42	14.07	12.68*	*3.86*
I	3.32	3.84	3.26	4.21**	3.17	4.12	3.07*	*1.14*
J	5.14*	5.48	7.52	7.54	6.16	8.06	9.20**	*4.06*
L	0.00*	0.00	0.00	0.22	0.37	0.69**	0.61	*0.69*
M	8.76	7.12	7.02*	10.42	8.58	10.29	10.84**	*3.82*
N	8.46	8.49	9.77	7.32*	8.77	8.4	11.04**	*3.72*
R	2.11**	1.37	1.25	1.11	0.37	0.34	0.00*	*2.11*
S	1.21	0.82	0.75	2.22**	0.56*	1.37	0.82	*1.66*

Notes: *Minimum-percentage for the section; **maximum-percentage for the section

Table A3 Sectoral distribution of the '*value-added HGFs*' over the NACE-sections for the seven overlapping periods

NACE-section	*2000–2003*	*2001–2004*	*2002–2005*	*2003–2006*	*2004–2007*	*2005–2008*	*2006–2009*	*Difference between highest and lowest percentage*
A	0.77	1.26	0.66	0.63*	1.57	1.17	1.68**	*1.05*
B	0.13**	0*	0	0	0	0	0	*0.13*
C	23.85**	20.66	22.55	21.62	22.52	20.75	19.9*	*3.95*
D	0.26**	0*	0	0.09	0	0.16	0.1	*0.26*
E	0.77	1.71	2.09**	1.8	1.16	0.7*	0.52	*1.39*
F	9.44*	12.21	11	13.78	15.56	15.82**	13.61	*6.38*
G	29.97	32.65**	32.23	30.45	29.14	28.03	27.85*	*4.8*
H	11.86**	10.62	9.02	8.47*	9.77	11.74	9.53	*3.39*
I	3.19**	2.74	2.42	2.16	1.32*	2.11	2.41	*1.87*
J	5.74	4.57*	5.5	6.13	4.8	5.17	6.28**	*1.71*
L	0.77**	0.23	0.55	0.18*	0.25	0.23	0.52	*0.59*
M	6.25*	6.51	7.48	6.85	6.79	6.97	9.21**	*2.96*
N	5.1	5.02	4.84*	6.04	5.38	6.11	7.02**	*2.18*
R	0.89	0.8	0.88	0.9**	0.75	0.39*	0.63	*0.51*
S	1.02	1.03**	0.77	0.9	0.99	0.63*	0.73	*0.4*

Notes: *Minimum-percentage for the section; **maximum-percentage for the section

Appendix 3

Table A4 Firm age (employment HGFs)

Period	*2000–2003*	*2001–2004*	*2002–2005*	*2003–2006*	*2004–2007*	*2005–2008*	*2006–2009*
2000–2003	/	p = 0.105	p = 0.233	p = 0.595	p = 0.207	p = 0.081	p = 0,084
2001–2004		/	p = 0.677	p = 0.266	p = 0.658	p = 0.742	p = 0.737
2002–2005			/	p = 0.494	p = 0.998	p = 0.892	p = 0.887
2003–2006				/	p = 0.464	p = 0.323	p = 0.309
2004–2007					/	p = 0.337	p = 0.329
2005–2008						/	p = 0.997
2006–2009							/

Note: P-values calculated by using the student's t-test at a level of significance of 5%.

Table A5 Firm age (value-added HGFs)

Period	*2000–2003*	*2001–2004*	*2002–2005*	*2003–2006*	*2004–2007*	*2005–2008*	*2006–2009*
2000–2003	/	p = 0.088	p = 0.000*	p = 0.000*	p = 0.000*	p = 0.000*	p = 0,009*
2001–2004		/	p = 0.016*	p = 0.003*	p = 0.000*	p = 0.006*	p = 0.062
2002–2005			/	p = 0.622	p = 0.235	p = 0.924	p = 0.613
2003–2006				/	p = 0.474	p = 0.834	p = 0.184
2004–2007					/	p = 0.322	p = 0.021
2005–2008						/	p = 0.212
2006–2009							/

Notes: P-values calculated by using the student's t-test at a level of significance of 5%.
*Significant difference between the averages of the two involved periods.

Table A6 Firm size (employment HGFs)

Period	*2000–2003*	*2001–2004*	*2002–2005*	*2003–2006*	*2004–2007*	*2005–2008*	*2006–2009*
2000–2003	/	p = 0.871	p = 0.271	p = 0.303	p = 0.172	p = 0.154	p = 0.911
2001–2004		/	p = 0.346	p = 0.386	p = 0.236	p = 0.212	p = 0.769
2002–2005			/	p = 0.911	p = 0.902	p = 0.842	p = 0.183
2003–2006				/	p = 0.797	p = 0.736	p = 0.209
2004–2007					/	p = 0.932	p = 0.101
2005–2008						/	p = 0.088
2006–2009							/

Note: P-values calculated by using the student's t-test at a level of significance of 5%.

Table A7 Firm size (value-added HGFs)

Period	*2000–2003*	*2001–2004*	*2002–2005*	*2003–2006*	*2004–2007*	*2005–2008*	*2006–2009*
2000–2003	/	p = 0.600	p = 0.599	p = 0.943	p = 0.557	p = 0.824	p = 0.738
2001–2004		/	p = 0.311	p = 0.665	p = 0.248	p = 0.794	p = 0.387
2002–2005			/	p = 0.570	p = 0.976	p = 0.440	p = 0.366
2003–2006				/	p = 0.527	p = 0.888	p = 0.821
2004–2007					/	p = 0.386	p = 0.304
2005–2008						/	p = 0.926
2006–2009							/

Note: P-values calculated by using the student's t-test at a level of significance of 5%.

Table A8 Total assets (employment HGFs)

Period	*2000–2003*	*2001–2004*	*2002–2005*	*2003–2006*	*2004–2007*	*2005–2008*	*2006–2009*
2000–2003	/	p = 0.279	p = 0.282	p = 0.038*	p = 0.012*	p = 0.002*	p = 0.128
2001–2004		/	p = 0.838	p = 0.215	p = 0.035*	p = 0.009*	p = 0.642
2002–2005			/	p = 0.133	p = 0.028*	p = 0.007*	p = 0.577
2003–2006				/	p = 0.258	p = 0.041*	p = 0.283
2004–2007					/	p = 0.102	p = 0.127
2005–2008						/	p = 0.010*
2006–2009							/

Notes: P-values calculated by using the student's t-test at a level of significance of 5%.
*Significant difference between the averages of the two involved periods.

Table A9 Total assets (value-added HGFs)

Period	*2000–2003*	*2001–2004*	*2002–2005*	*2003–2006*	*2004–2007*	*2005–2008*	*2006–2009*
2000–2003	/	p = 0.044*	p = 0.077	p = 0.528	p = 0.959	p = 0.263	p = 0.014*
2001–2004		/	p = 0.411	p = 0.047*	p = 0.013*	p = 0.002*	p = 0.000*
2002–2005			/	p = 0.136	p = 0.030*	p = 0.002*	p = 0.000*
2003–2006				/	p = 0.461	p = 0.040*	p = 0.000*
2004–2007					/	p = 0.137	p = 0.002*
2005–2008						/	p = 0.048*
2006–2009							/

Notes: P-values calculated by using the student's t-test at a level of significance of 5%.
*Significant difference between the averages of the two involved periods.

Table A10 Solvency (employment HGFs)

Period	*2000–2003*	*2001–2004*	*2002–2005*	*2003–2006*	*2004–2007*	*2005–2008*	*2006–2009*
2000–2003	/	p = 0.243	p = 0.697	p = 0.191	p = 0.055	p = 0.404	p = 0.039*
2001–2004		/	p = 0.448	p = 0.810	p = 0.424	p = 0.794	p = 0.289
2002–2005			/	p = 0.352	p = 0.130	p = 0.651	p = 0.088
2003–2006				/	p = 0.607	p = 0.626	p = 0.421
2004–2007					/	p = 0.293	p = 0.716
2005–2008						/	p = 0.188
2006–2009							/

Notes: P-values calculated by using the student's t-test at a level of significance of 5%.
*Significant difference between the averages of the two involved periods.

Table A11 Solvency (value-added HGFs)

Period	*2000–2003*	*2001–2004*	*2002–2005*	*2003–2006*	*2004–2007*	*2005–2008*	*2006–2009*
2000–2003	/	p = 0.866	p = 0.435	p = 0.011*	p = 0.013*	p = 0.035*	p = 0,027*
2001–2004		/	p = 0.361	p = 0.021*	p = 0.010*	p = 0.028*	p = 0.024*
2002–2005			/	p = 0.007*	p = 0.124	p = 0.280	p = 0.202
2003–2006				/	p = 0.000*	p = 0.000*	p = 0.000*
2004–2007					/	p = 0.509	p = 0.821
2005–2008						/	p = 0.694
2006–2009							/

Notes: P-values calculated by using the student's t-test at a level of significance of 5%.
*Significant difference between the averages of the two involved periods.