

# Impact of SMEs and fast-growing companies on survey estimates

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## Introduction

Large companies are usually selected in samples with certainty because of their high impact on aggregate figures. The contribution of SMEs (small and medium enterprises), on the other hand, is small with respect to their number, so data collection from SMEs may even be completely abandoned below a certain threshold. This may be problematic at least for fast-growing SMEs that may quickly become big players and thus have a significant impact on aggregate figures.

The debate on the importance of small companies for an economy started in the US after David Birch published a report in 1979 claiming that these companies accounted for the majority of job growth in the US (Landström, 2005). Numerous studies were conducted afterwards either to support or reject Birch's claims. Birch himself admitted that the small business share of job creation varies enormously in time and across places (e.g., 1989). However, he also pointed out that a small number of firms that grow rapidly – gazelles – account for most of the new jobs. He used the metaphors "elephants", "mice" and "gazelles" to distinguish between big companies, small companies committed to remain small and small companies committed to growth (Landström, 2005). Recently, a panel at the European level agreed that gazelles are rare but they matter since 3 % to 10 % of any new cohort of firms will end up delivering from 50 % to up to 80 % of the aggregate economic impact of the cohort over its lifetime (Autio & Hözl, 2008).

Growth is a hallmark of a gazelle company. Birch defined a gazelle as "a business establishment which has achieved a minimum of 20% sales growth each year over the interval, starting from a base-year revenue of at least \$100,000" (Henrekson & Johansson, 2009). Its sales are thus doubled over the most recent 4-year period (Acs, Parsons, & Tracy, 2008). Other approaches to defining high-growth companies are used. Some authors use a high-growth threshold, e.g. 5 or 10 %, of the fastest growing companies (e.g., Davidsson & Henrekson, 2002). Some authors use several conditions. For instance, Hözl (2009) takes top 10 % (and includes a variation with 5 %) of companies with less or equal to 250 employees in the base year based on Birch index on employment growth.

Other kinds of companies may be defined, sometimes to explicitly distinguish them from gazelles. Van Praag and Versloot (2007) thus define *entrepreneurial firms* as firms employing fewer than 100 employees, being younger than 7 years old and new entrants into the market. Acs, Parsons and Tracy (2008) distinguish between gazelles that double the sales and *high-impact firms* that double the sales and have Birch index on employment growth at least two over the most recent 4-year period. Eurostat and OECD (2007) distinguish between:

- *High-growth enterprises* with an average annualised growth in employment or turnover exceeding 20% p.a. over a 3-year period and (provisional) threshold of 10 employees at the beginning of the period.
- *Gazelles* as young high-growth firms that are less than 5 years old.

The heterogeneity in definitions makes comparison of findings very tricky. Delmar, Davidsson and Gartner (2003) showed that heterogeneity arises from:

- Growth measures. These can be absolute, relative, multiple or composite.
- Growth indicators. Studies use assets, employment, market share, physical output, profits, and sales. Sales and employment are the most widely used.
- Regularity of growth over time. Studies typically use two points in time; smoothing is rare; development in-between (and outside of) two points in time is often neglected.

- Kind of growth. Growth can be organic or acquired.
- Firm demographics. Growth processes may be associated with firm size, firm age, type of activity, and type of governance (independent versus affiliated).

In addition, Henrekson and Johansson (2009) noted different benchmarks (non-gazelles, total) and different populations (continuing, new, all firms). Their meta-analysis of the empirical evidence on gazelles showed that gazelles create all or a large share of new net jobs and exist in all industries, though they seem to be overrepresented in services (not in high-tech); on average, they are younger and smaller than other firms, but it is young age more than small size that is associated with rapid growth. On the other hand, Acs and Mueller (2008) report that gazelles unfold their major employment effects after they have been in business for at least five years; and Acs, Parsons and Tracy (2008) conclude that high-impact firms are relatively old (on average 25 years old), rare (2-3 % of all firms) and contribute to the majority of overall economic growth in the private sector. Neumark, Wall and Zhang (2008) reiterate Birch findings that small businesses do create more jobs.

Given the mixed findings in the literature, our research aims to study the impact of two specific groups of companies on survey estimates and costs. It attempts to answer the following research questions:

- What is the contribution of SMEs and fast-growing companies to relevant statistical indicators (in particular sums and growth rates) in total and by activity?
- Do surveys which do not pay attention to these companies produce biased estimates of some economic categories and their growth? If yes, is this bias negligible or not; can we model it?
- What are the recommendations for business surveys? Is there evidence for a different approach to these companies in sampling designs?

## Data

In our analyses, we used data from January 2004 to December 2008 from four data sources:

- *Business Register of Slovenia* was used as the source of data on business subjects. The Register is maintained by the Agency for Public and Legal Records and Services (AJPES) mostly by using the data from primary registers and records kept by different register bodies (regional courts, administrative units, ministries, chambers, bodies of internal affairs, inland revenues and other register bodies) authorized for keeping registers and records on business subjects. Since the register comprises business subjects of many different organizational and legal forms, we first narrowed our target population to the entities with the following organizational forms: Limited Liability Company, Joint Stock Company, General Partnership, Limited Partnership, Limited Partnership Joint Stock Company, Mutual Insurance Company, Individual Private Entrepreneurs (and some other Natural Persons).
- *Statistical Register of Employment (SRDAP)* was used as the source for the data on employment. In SRDAP those persons in paid employment and self-employed persons are taken into consideration who have social insurance, irrespective of whether they work full time or part time. Persons working under copyright contracts, contracts for work/service, unpaid family members, self-employed persons who do not pay social insurance and citizens of the Republic of Slovenia working in Slovenian enterprises, on construction sites, etc., abroad are not covered. SRDAP is monthly updated with data originally used for registration data for pension, disability and health insurance, parental protection insurance, unemployment insurance and records on employment.
- The data which are reported by enterprises to the Tax Administration of the Republic of Slovenia for the purpose of *value added tax return* (VAT declaration) are used as a basis for the estimation of the monthly turnover. The estimation of the monthly turnover is calculated by summing up the several turnover items of the VAT declaration. Since the data on VAT declarations are gathered for non-statistical purposes, such estimation does not fully comply with the statistical definition of the

turnover, but an exhaustive feasibility study carried out by the Statistical Office of the Republic of Slovenia in 2006 proved that it can serve the monthly indices estimation well enough. Statistical Office of the Republic of Slovenia also uses these data as a complementary source in the regular production of the monthly turnover indices in Retail Trade, Wholesale Trade and Other Services.

- *Statistical Business Register (SBR)*, which is kept and maintained by the Statistical Office of the Republic of Slovenia, was used as a source for the annual data on turnover. The sources for the derivation of the annual turnover in SBR are Annual Accounts, Turnover Tax Declaration and statistical inquiries for insurance companies. For enterprises that have no turnover but have some persons employed, turnover is imputed according to the appropriate statistical methodology. Data on turnover do not comprise banks and savings banks.

## Methods

The analysis was conducted separately for yearly and quarterly data (the latter were derived from monthly data). In both cases firms were divided into different groups according to:

- Size (4 groups): micro firms with less than 10 employees, small firms with 10 to 49 employees, medium-sized with 50 to 249 employees and large firms with at least 250 employees.
- Activity (6 groups): agriculture and fishing (sections A and B of NACE Rev. 1), industry (sections C, D and E), construction (section F), trade (section G), other prevalently market services (sections H, I, J, K and O) and prevalently non-market services (sections L, M and N).
- Region (2 groups): less developed eastern part, more developed western part.
- Origin of capital (3 groups): domestic, foreign, mixed.
- Ownership (3 groups): private, government, mixed.
- Eurostat's degree of urbanization (3 groups): thinly populated area, intermediate area, densely populated area.
- Gazelle or not.

As discussed in Introduction, it is possible to define gazelles in various ways. There seems to be an emerging consensus that if only one indicator is to be chosen as a measure of firm growth, the most preferred measure should be sales because it applies to most sorts of firms and across different conceptualisations of the firm, it is relatively insensitive to capital intensity and degree of integration, and may figure as a precursor of growth in other indicators (Delmar, Davidsson, & Gartner, 2003). In addition, employment-based measures seem to fail in detecting those businesses that use new forms of organisation. Such organisations do not use employment contracts to tie people up with the organisation but rely on partnership with self-employed people. At least in Slovenia, this is an expanding phenomenon (identified also in the dataset used).

Furthermore, several growth measures may be used in gazelle definition. We used four variants based on definitions proposed by Eurostat and OECD:

- (a) average yearly sales growth at least 20 % over the last three years
- (b) average yearly sales growth at least 20 % over the last three years and the firm has to be younger than 5 years
- (c) as (a) plus a threshold of at least 10 employees at the beginning of the period
- (d) as (b) plus a threshold of at least 10 employees at the beginning of the period

Yearly and quarterly sales growth rates and growth indices were calculated for all firms together and by groups. We only focused on total growth as our data did not allow separation of organic and acquired growth. We compared the following samples to all units:

- All large enterprises (all SMEs excluded)\*.
- All large enterprises and all gazelles (all SMEs except gazelles excluded)\*.
- All medium and large enterprises (micro and small enterprises excluded)\*.

- All medium and large enterprises and all gazelles (micro and small enterprises except gazelles excluded)\*.
- All enterprises with 10 or more employees (micro enterprises excluded)\*.
- All enterprises with 10 or more employees and all gazelles (micro enterprises except gazelles excluded)\*.
- All large enterprises, others sampled by simple random sampling.
- All large enterprises and all gazelles, others sampled by simple random sampling.
- All large enterprises, others sampled by stratified sampling according to size.
- All large enterprises and all gazelles, others sampled by stratified sampling according to size.
- All large enterprises, others sampled by stratified sampling according to size and activity.
- All large enterprises and all gazelles, others sampled by stratified sampling according to size and activity.

For samples marked with \*, comparisons of growth were also made by groups. In addition, comparisons of growth were made between gazelles identified according to different definitions.

We used SAS procedure PROC SURVEYMEANS to calculate standard errors of indices (ratios). The procedure is based on Taylor linearization approach.

For results, please, consult, presentation slides.

## References

- Acs, Z. J., & Mueller, P. (2008). Employment effects of business dynamics: Mice, Gazelles and Elephants. *Small Business Economics*, 30(1), 85-100.
- Acs, Z., Parsons, W., & Tracy, S. (2008, June 2008). *High-impact firms: gazelles revisited*. no. 328. Retrieved 31.7.2009, from <http://www.sba.gov/advo/research/rs328tot.pdf>
- Autio, E., & Hözl, W. (2008, 7.7.2008). *Europe INNOVA Gazelles Innovation Panel: Summary and conclusions from panel discussions*. Retrieved 31.7.2009, from <http://www.europe-innova.org/servlet/Doc?cid=10529&lg=EN>
- Birch, D. L. (1989). Change, Innovation, and Job Generation. *Journal of Labor Research*, 10(1), 33-38.
- Davidsson, P., & Henrekson, M. (2002). Determinants of the Prevalance of Start-ups and High-Growth Firms. *Small Business Economics*, 19(2), 81-104.
- Delmar, F., Davidsson, P., & Gartner, W. (2003). Arriving at the high-growth firm. *Journal of Business Venturing*, 18(2), 189-216.
- Eurostat, & OECD. (2007). *Eurostat – OECD manual on business demography statistics: European Communities / OECD*.
- Henrekson, M., & Johansson, D. (2009). Gazelles as job creators: a survey and interpretation of the evidence. *Small Business Economics*.
- Hözl, W. (2009). Is the R&D behaviour of fast-growing SMEs different? Evidence from CIS III data for 16 countries. *Small Business Economics*, 33(1), 59-75.
- Landström, H. (2005). *Pioneers in entrepreneurship and small business research*. New York, N.Y.: Springer Science+Business Media.
- Neumark, D., Wall, B., & Zhang, J. (2008). *Do small businesses create more jobs? New evidence from the Unites States from the National Establishment Time Series*. Retrieved 24.7.2009, from <http://ideas.repec.org/p/iza/izadps/dp3888.html>
- van Praag, C. M., & Versloot, P. H. (2007). What is the value of entrepreneurship? A review of recent research. *Small Business Economics*, 29(4), 351-382.