

1996 Award Winner

David L. Birch's Contributions to Entrepreneurship and Small Business Research¹

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"By posing new research questions and developing the methods needed, Dr Birch obtained findings that have influenced a whole generation of researchers. [...] His scientific contribution has considerably influenced not only research but also public policy in many countries."

The aim of this essay is to present the research of David L. Birch, the 1996 FSF-NUTEK Award Winner. Only research within the area of the Award will be presented. The presentation starts off with an introduction to the winner's career and continues with an overview of his most important research contributions.

Career in Brief

David L. Birch did not start his academic career as an economist but as an engineer and computer programmer with a degree in applied physics and nuclear reactor design from Harvard University in 1962. Between 1962 and 1966, he combined a position as research engineer at General Dynamics/Astronautics and Jet Propulsion Laboratory with studies in economics at Harvard Business School, where he presented his PhD thesis on the economics of the US space program in 1966. He worked for a couple of years at Harvard Business School, but the burden of teaching became too heavy. In the mid 1970s, he moved to MIT and the Centre for Urban Studies. He was appointed Director of the MIT Programme on Jobs, Enterprise and Markets in 1974. Most of the research at the centre was focussed on the changes taking place in US cities. Cities were the big issue in the

US in the post-Vietnam era, and there was a substantial amount of research money available to study the dynamics of big cities.

In the studies of large cities, jobs seemed to be of interest. For example, jobs were moving away from the city centres, but no one appeared to know how jobs were created or how important they were for regional development. This led to Birch's research interest being increasingly directed toward job creation rather than to the cities and their neighbourhoods.

Research Contributions

David Birch is best known for his seminal work *The Job Generation Process*, and in the first section this report will be presented in more detail. The report had an enormous impact on the research community as well as among politicians and policymakers. David Birch not only took an interest in which companies created new jobs but also in where these jobs were created, i.e., the regional effects of enterprise. After the first section the book *Job Creation in America* published in 1987 is presented. David Birch was among the first to emphasize the importance of rapidly growing firms, and he introduced the felicitous term "gazelles" to describe them.

The Job Generation Process (1979)

The Job Generation Process represents, as already mentioned, a genuine groundbreaking report and is one of Birch's most cited works. It is a research report comprising a mere 52 pages, published within the framework of the MIT Program *Neighborhood and Regional Change*. In the report Birch aimed at developing an "economic microscope" that could reach beyond aggregate statistics in order to explain how the behavior of individual firms caused employment changes in the US. One of the main problems for Birch was to obtain adequate data; existing databases were not well equipped to cope with large longitudinal data. Birch used the Dun & Bradstreet database originally developed for credit ratings. The research group

¹ This presentation covers David Birch's main contributions to small business research until around the year 2000.

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acquired the complete files for the US as per 31 December 1969, 1972, 1974 and 1976 – containing about 12 million records and over 100 reels of magnetic tape. Considerable efforts were made to reduce the files into a compact set, with all four years merged together, which made it possible to analyze changes in each firm between years. Each establishment was assigned a unique identification number, and the files for the four years were matched on a case-by-case basis.

The database had its limitations. Even if Dun & Bradstreet had a strong incentive to ensure high quality information, the database was not developed for the purpose of studying economic change. Firstly, it was never intended to be a census of the corporate population in the US, i.e., it was a sample, and it made no pretence of covering all businesses. For a variety of reasons, Dun & Bradstreet had concentrated their efforts on manufacturing firms, but improvements were made between 1969 and 1976 to expand coverage in the trade and service sectors as well. Contrary to what could be expected, smaller firms were not underrepresented in the database – smaller firms usually pose greater credit risks than larger ones, and therefore they were well represented in the database. Secondly, the data were collected for credit rating purposes. For example, new firms entered the database as credit information was required of them, which probably created a bias in terms of underreporting new firm births. In addition, there were difficulties separating “branches” – branches are an inherent part of the corporation – and, therefore, were less interesting from a credit point of view. Thus, the Dun & Bradstreet data file could be regarded as a unique resource – it contained a large sample of firms that could be analyzed over time on an individual firm basis. But the file was not designed for analytical purposes and, of course, there were several biases in the database.

With these limitations in mind, what did David Birch and his research colleagues find? As mentioned, the study was focussed on employment creation, and it indicated that migration of establishments from one state to another played a virtually negligible role. Much attention was often given in the media to the migration of firms from one region to another, but the symbolic effect seemed to be more important than the effect on the job base. In addition, job losses seemed to be about the same everywhere – the death and contraction rate varied little from one region to another, despite the rather large range of net change rates between regions. Thus, the variation in net change is mainly due to variation in the rate of replacement, not the rate of loss, i.e., differential rates of job replacement are the crucial determinant of the growth or decline of a region. But what kind of firms play the critical role in job generation? In this respect, some highly interesting results emerged from the study:

- The majority of expansion growth consisted of independent firms, and independent firms played a more important role in industries like farming, trade and service sectors, i.e., growing sectors of the economy during the 1970s.

- On average, about 60 percent of all jobs in the US were generated by firms with 20 or less employees, and about 50 percent of all jobs were created by independent small entrepreneurs, whereas large firms (with more than 500 employees) generated less than 15 percent of all net new jobs.

- Not all small firms were job providers. It was the smaller, younger firms that generated jobs – once the firms were more than four years old, their job generation powers declined substantially.

It could also be concluded that these results seemed to vary very little across industries and regions, but at the end of the report Birch emphasized the need to conduct more thorough studies on why firms locate where they do and on the regional effects of the dynamics of the job creation process. However, the answers were not presented until almost ten years later when Birch presented the book *Job Creation in America* (1987).

The report *The Job Generation Process* was only sold in twelve copies, but its influence was enormous, not least on politicians and policy-makers around the world. The report was in line with the new political winds that had started to blow across the western world with Reagan and Thatcher as the most prominent protagonists. The report alerted both Congress and the local economic-development officials all over the US, and it interested politicians and policymakers not only in the US but around the world. Small business was no longer a mere economic sideshow – it was the main event.

The report also had an enormous impact on the research community – it provided the intellectual foundation for researchers throughout the world to incorporate smaller firms into the analyses of economic development. However, as with any influential work, it was inevitably subjected to intense scrutiny. The report has for a long time been a source of considerable controversy, and Birch's methodology of using the underlying data, his way of documenting data, the statistical analyses in the report, and his reluctance to publish his works in refereed academic journals have been discussed and criticized. For example, as a consequence of the remarkable results of the study, the US Small Business Administration (SBA) asked the Brookings Institute in Washington DC to look at the 1978–1980 period using the same Dun & Bradstreet database as used by Birch. Despite the use of an identical data set, they were unable to replicate the findings. Their results (Armington and Odle 1982) showed that small firms were growing no faster in terms of employment than other firms in the economy. However, the time period differed – Birch covered the period 1969 to 1976, whereas the Brookings Institute covered the period 1978–1980 – which of course could explain the conflicting results. Therefore, SBA provided Birch with a copy of the data set for 1978–1980 and asked him to produce an estimate of the job creation contribution of small firms. Based on the identical data set and the same time period, Birch obtained a much higher job contribution compared to Armington and Odle, who found that about 38 percent of all jobs were created by firms with 100 employees or less, which was approximately proportionate to their share of total employment in the economy, whereas the corresponding figure from Birch was 70 percent (see the discussion in Giaoutzi *et al.* 1988).

The difference in results was due to confusion between enterprises and establishments but also to the assumptions made about missing data in the Dun & Bradstreet data set. Dun & Bradstreet collected data at both the establishment and enterprise level. However, Armington and Odle observed that the sum of establishments was less than the enterprise employment for multi-site enterprises, and they believed the enterprise figure to be “true”, whereas Birch based his analyses on the establishment data. Furthermore, the data used by Birch were incomplete with many missing establishments, and assumptions needed to be made about these. Armington and Odle showed that the nature of these assumptions fundamentally

affected the number of jobs that could be generated by small firms (Atkinson and Storey 1994).

Birch's study has been replicated for other countries using different data sources and methods. For example, in the UK, Gallagher and his colleagues (Gallagher *et al.* 1990; Daly *et al.* 1991) have made similar analyses based on the Dun & Bradstreet data for the UK. The results indicate that small firms in the UK make a disproportionately large contribution to net job creation, but the contribution is not nearly as high as originally estimated by Birch. It can be concluded that, while Birch's study has been a source of considerable controversy, his qualitative conclusion that the bulk of new jobs emanate from small firms has been largely confirmed – his main findings seem to be very robust and have been verified in many subsequent studies.

Job Creation in America (1987)

The book *Job Creation in America*, published in 1987, summarizes twelve years of research on job generation (see also Birch's essay "Who creates jobs?" in the Public Interest in 1989, where some of the key findings are summarized). In the book, Birch argued against the view of an aggregated description of the economy and posed the question: What do we see when we put these aggregates under the microscope and look at the individual units? Beneath the quiet surface there is a chaotic and turbulent collection of individual companies, all of which are constantly undergoing change. A large number of new firms appear each year, some of which grow rapidly while many mature firms decline, and a large number of them go out of business every year. In addition, every year 20 million Americans leave their jobs, half of them involuntarily – they are either fired or laid off with little or no prior notice. But the remarkable thing is that this balance on the aggregate level is maintained. In order to understand the extraordinary dynamics and job transformation that occur, there is a need for detailed analyses of the economy, which is what Birch tried to provide in this book.

In this chaotic and turbulent context, the small firms seem to be the engine in the economy – they create more jobs than the giant companies, grow more rapidly, run greater risks of failure, and show more adaptability. Firms with 1–19 employees accounted for 88 percent of all net new jobs during the period 1981–1985. However, it could have been expected that there is safety in numbers, i.e., the larger the firm, the more secure it would be in terms of employment. But the results in Birch's study indicate that although smaller firms may close down with greater frequency, they nevertheless offer just about the same job security as the larger ones, and this holds true even over a longer period – over the business cycle. The conclusion could be that "the aggregate, macro stability of an economy flows from its micro instability, the instability of the individual firm" (p. 52).

We often believe that firms behave as human beings – it starts small, grows steadily, and more rapidly during a "growth phase", matures and stabilizes and eventually becomes out-dated and declines. An interesting observation was that, of the firms that experienced high growth during the 1970–1972 period, only a small proportion did well in 1973 and 1974, and several of the winners became big losers. Furthermore, almost one fifth of those that suffered major losses came back with large advantages, which would indicate that, if trying to predict the major winners it would make sense to look among the firms that suffered the heaviest losses during the

previous period. In addition, the firms that showed little change during previous periods seem to be most at risk of dying. The conclusion is that, instead of a "life cycle model" of business development, we could talk about a "pulsation model" to explain how firms respond to a changing economy and technological developments. Dynamic firms pulsate quite strongly as they grow, and aggregate growth is constructed on massive, continual failure.

The 1980s was a decade of conflicts in US society, as well as a time of military-political conflict with the USSR and economic warfare against Japan. Moreover, the US was undergoing a transition from a manufacturing economy to one that was increasingly dominated by service-oriented trade and industries. Birch argues that the main problem is that the US is doing quite well in products and services with short half-lives, i.e., the short time that elapses before half of the value dissipates, but rather poorly with those with long half-lives. On the other hand, other countries, led by Japan, have become very adept at copying and improving upon products with long half-lives. As a consequence, the growth segments of the US economy were those whose products and services have relatively short half-lives.

In order to sustain competitiveness, not least in relation to Japan, creativity and innovation constitute a central part in the US industry. What, then, characterizes the high-technology segments of the US economy? Firstly, the segment was very small – it represented only 2.8 percent of all jobs. Secondly, Birch identified a couple of high-innovation sectors in US industry, including, for example, high-technology manufacturers (e.g., computers, communication equipment, electronic components), information-age firms, leisure time firms (e.g., toys and sporting goods, charter services), baby boom/yuppie/women-in-the-labor-force/aging firms. Thirdly, Birch's results indicated that creativity and innovations in the US economy were not only to be found in the small high-technology sectors – innovative firms can be found in virtually every industry. Entrepreneurial firms in innovative sectors accounted for 2.7 percent of the firms and 20.8 percent of replacement jobs, whereas entrepreneurial firms in non-innovative sectors made up 15.4 percent of the total and provided 65.6 percent of the jobs. Thus, entrepreneurial firms provided 86.4 percent of the replacement jobs, which provides strong evidence for the fact that innovative firms, irrespective of industry, were the engine of job generation.

An interesting observation was that every region in the US loses about the same percentage of firms and job bases each year due to firm layoffs and closures – about 7–8 percent per year – but that there were variations in average loss rates over the business cycle. Relocation of firms is rarely a solution – firms seldom make radical moves from one metropolitan or rural area to another. Many firms move each year but mainly only short distances; the net effect of firm "migration" was rather negligible relative to the job base. Instead, the variation in growth in different areas was mainly attributed to variation in the start-up rate of new firms and the growth rate of existing firms, which compensated for the fixed losses of firms. However, there was a great variation in the formation and growth rate between different geographic areas.

Which areas of the US are doing well? Contrary to earlier days when the key to success was low labor and material costs, many areas exhibiting strong growth were high-cost areas, such as San Francisco, Phoenix, Denver, Dallas, Boston, Atlanta and Miami. As has been indicated, it is the high-innovation firms that create most

of the growth in the US economy, and these firms primarily depend on “brains”, not land or raw material. The key to attracting well-educated people is quality, not cheapness, i.e., high-innovation firms will locate in an environment that creative and highly educated people find attractive.

Furthermore, Birch analyzed the propensity of new firms to form and young firms to grow in 239 US metropolitan areas. The results indicated an enormous variance in performance. The best metropolitan areas showed almost ten times greater entrepreneurial activity compared to poorly performing areas – but the entrepreneurial activity was not limited to a few “hot-shot” cities – it emerged everywhere, even in areas considered extremely unlikely. One conclusion may be that some of the elements necessary to create an appealing area for high-innovation firms and workers cannot be created overnight – it may take generations. On the other hand, when compared to industrial firms, high-innovation entrepreneurs are much freer with regard to the location of their firms, although in order to establish attractive locations they need assistance from far-sighted political leaders.

Gazelles (1994)

As has been shown throughout this presentation, David Birch is one of the leading proponents of the notion that the majority of new jobs are created by small firms. However this view has not gone unchallenged. For example, in the book *Employers Large and Small* (1990), Charles Brown, James Hamilton and James Medoff wrote: “Perhaps the most widespread misconception about small businesses in the United States is that they generate the vast majority of jobs and are therefore the key to economic growth. ... Small employers do not create a particularly impressive share of jobs in the economy, especially when we focus on jobs that are not short lived” (p. 1–2).

In the chapter “Gazelles” published in *Labor Markets, Employment Policy, and Job Creation* (1994), edited by Lewis Solomon and Alec Levenson, the two protagonists David Birch and James Medoff collaborated in order to find some common ground in the debate. What could they agree about? Their common efforts resulted in the following:

1. The relative role of smaller firms in generating jobs varies enormously from time to time and from place to place.
2. Most small-firm job creation occurs within a relatively small number of firms – the Gazelles.
3. There is a great and growing instability in the US stock of jobs due to the rapidly changing fates of US firms.

Thus, one conclusion may be that the distinction between small and large firms as job creators is of less importance – most jobs are created by the Gazelles, which are firms that are neither large nor small.

Our knowledge about these Gazelles is limited. However, from Birch's research we know that, in 1993, the average size of a Gazelle firm was 61 employees and that they employed around 20 million people in the whole of the US. Contrary to popular myth, there is no particular sector of the economy that produces Gazelles, they are found in health care, the fishing industry, wholesales, textiles, etc., and only a very small proportion is “high-tech”. Furthermore, Gazelles are extremely volatile and inherently unstable. They are constantly taking risks and making mistakes as well as enjoying great success if everything goes well. This means that the best predictor of decline in these firms is present growth and that the best predictor

of growth is present decline. Finally, Gazelles make conscious choices regarding their localization. Gazelles seek places where skilled workforces want to live and where managers can easily commute from home-to-work and try to move away from city centers, locating instead near airports, highways and universities.

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