LITERATURE REVIEW ON DETERMINANTS OF FIRM GROWTH[#]

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Abstrakt

The aim of this paper is to provide an overview of research on the firm growth, drawing on literature from economics, management and sociology, and also highlighting areas where further research is needed. We discuss several determinants of firm growth such as age, innovation, relative productivity, other firm - or industry specific factors and results of existing empirical research studies. The main result of this paper is that firm growth is mainly affected by purely stochastic shocks. We also identified a gap in literature, that is the link between innovation and firm growth.

Key words: *Firm growth. Productivity. Firm specific factors. Industry specific factors. Innovations.*

1. Introduction

There are many different measures of firm size, the more usual indicators are employment, total sales, value added, total assets, or total profits. In this paper we consider growth in terms of a range of indicators, although we devote little attention to the growth of profits (because this is more of a financial than an economic variable).

There are also different ways of measuring growth rates. Some authors make the distinction between relative growth and absolute growth (usually measured in the absolute increase in numbers of employees)[1]. In this paper we focus on relative growth rates only.

We discuss several determinants of firm growth such as age, innovation, financial performance, relative productivity, other firm - or industry specific factors and results of existing empirical research studies. The relationship between firm size and growth has received a great deal of attention in empirical work, too. This paper does not involve the relationship between firm size and firm growth, because it would exceed the allowed extent of the paper.

2. Age of the firm

The influence of a firm's age on its growth rate has been frequently analyzed. One of the earliest investigations was made by Fizaine, who observed, that age has a negative effect on the growth of French firms, and also that the variance of growth rates decreases with age. Fizaine also argued, that the correct causality runs from age to growth, rather than from size to growth as supposed by many investigations into firm growth based on Gibrat's law. Dunne et al. analyse US firms and agree with Fizaine's findings, that both the expected growth rate and also the growth variance decrease with age [11].

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[1] We can mention the Birch index, which is a weighted average of both relative and absolute growth rates (this latter was taken into account to emphasize, that large firms, due to their large size, have the potential to create many jobs).

Other studies also observed, that age has a negative effect on growth at the firm level in the see Evans for US manufacturing firms, Variyam and Kraybill for US manufacturing and services firms, Liu for Taiwanese electronics plants, Geroski and Gugler for large European companies, and Yasuda for Japanese manufacturing firms [12, 35, 17].

On the other side, Das examines the growth of firms in a young, fast-growing industry in a developing economy (i.e. the computer hardware industry in India) and obtains the unusual results, that that growth increases with age [9]. Another exception to the general rule is in Barron et al., who observe a non-monotonic relationship between age and growth for New York Credit Unions [4]. They observe, that older firms grow faster than adolescent firms, although the very young firms experience the fastest growth.

3. Innovation

The influence of innovation is analyzed in different ways. One of them is the relationship between ***innovation and sales growth***, which can be described as a paradox – on the one hand, a broad range of theoretical approaches of firm growth stress the important role that innovation plays when firms want to expand their market share. For example, one of the main results of the McKinsey Global Survey of Business Executives is, that „Executives overwhelmingly say, that innovation is what their companies need most for growth." Another survey focusing on SMEs (Small and Medium Enterprises) reports, that investment in product innovation is the single most popular strategy for expansion, a finding which holds across various industries [22]. On the other hand, empirical studies have had difficulty in identifying any strong link between innovation and sales growth, and the results have often been modest and disappointing. Indeed, some studies fail to find any influence of innovation on sales growth at all.

There are some difficulties in observing the effect of innovation on growth. First of all, it may take a firm a long time to convert increases in economically valuable knowledge (i.e. innovation) into economic performance. Even after an important discovery has been made, a firm has to invest in product development. In addition, converting a product idea into successful manufacturing procedures and routines may also be costly and difficult. Furthermore, even after an important discovery has been patented, a firm in an uncertain market environment may prefer to treat the patent as a „real option" and delay associated investment and development costs [7]. There may therefore be shorter or longer lags between the time of discovery of a valuable innovation and its conversion into commercial success.

Another characteristic of the innovation process is, that there is uncertainty at every stage. In a pioneering empirical study, Mansfield et al. identify three different stages of innovation, that correspond to three different conditional probabilities of success [27]:

- the probability that a project's technical goals will be met (x);
- the probability that, given technical success, the resulting product or process will be commercialized (y);
- and finally the probability that, given commercialization, the project yields a satisfactory return on investment (z).

The overal success of the innovative activities will be the product of these three conditional probabilities ($x \times y \times z$).

Mansfield analyzed the US steel and petroleum sectors over a 40-year period, and found that successful innovators grew quicker, especially if they were initially small [26]. Another early study by Scherer looks at 365 of the largest US corporations and observes, that inventions (measured by patents) have a positive effect on company profits via sales growth [33]. Furthermore, he observes, that innovations typically do not increase profit margins, but

instead increase corporate profits via increased sales at constant profit margins. Geroski and Machin look at 539 large quoted UK firms over the period 1972-83, of which 98 produced an innovation during the period considered. They observe, that innovating firms (i.e. firms that produced at least one major innovation) are both more profitable and grow faster than non-innovators. Their results say, that innovations generate a short, sharp one-off increase in sales turnover. In addition, and contrary to Scherer's findings, they observe, that innovation has a more noticeable influence on profit margins than on sales growth. Roper uses survey data on 2721 small businesses in the UK., Ireland and Germany to show, that innovative products introduced by firms, made a positive contribution to sales growth [31]. Finally, Bottazzi et al. study the dynamics of the worldwide pharmaceutical sector and, surprisingly, do not find any significant contribution of a firm's innovative position to sales growth [8].

Another way to analyse the influence of innovation is to take a look at the relationship between ***innovation and employment growth***. Innovation is often associated with increases in productivity that lower the amount of labour required for the production of goods and services. In this case it is useful to decompose innovation into product and process innovation. Product innovations are often associated with employment gain, because the new products create new demand (although it is possible that they might replace existing products). Process innovations, on the other hand, often increase productivity by reducing the labour requirement in manufacturing processes. That is way process innovations are often accused of creating „technological unemployment".

Research into technological unemployment has been undertaken in different ways and the result are mixed. Doms et al. analyse survey data on US manufacturing firms, and observe, that the use of advanced manufacturing technology (that means process innovation) has a positive effect on employment [10]. Similarly, Greenhalgh et al. observe that R&D intensity and also the number of patent publications have a positive effect on employment for British firms [18]. On the other hand, Evangelista and Savona observe a negative overall effect of innovation on employment in the Italian services sector [13].

Harrison et al. consider the relationship between innovation and employment growth in four European countries (France, Italy, the UK and Germany) using data for 1998 and 2000 on firms in the manufacturing and services industries [21]. Whilst product innovations are consistently associated with employment growth, process innovation appears to have a negative effect on employment.

To summarize, therefore, we can consider that product innovations generally have a positive impact on employment, whilst the role of process innovations is more ambiguous.

4. Relative productivity

We may assume, that the most productive firms will grow, while the least productive will decrease in size. However, a number of studies have not prooved the validity of the evolutionary principle of „growth of the fitter". One explanation for this is, that while some firms become more productive through expansion, others become more productive through downsizing. An illustration of this is provided by Baily et al. who observe, that about a third of labour productivity growth is attributable to growing firms, about a third to downsizing firms, and the remaining third is attributable to the processes of entry and exit [3]. In addition, using a database of Italian manufacturing firms, Bottazzi et al. fail to find a robust relationship between productivity and growth [8].

There is quite a lot evidence suggesting that low productivity helps to predict exit (see e.g. Foster et al.), however, productivity levels are not very helpful in predicting growth rates [15].

For Baily and Farrell, the lack of a positive relationship between relative productivity and growth corresponds to a lack of competition [3]. In an ideal scenario, firms would compete for growth opportunities, and selective pressures would attribute these growth opportunities discriminating in favour of the most productive firms. In this way, there would be some sort of dynamic efficient reallocation at work, whereby an economy's scarce resources are redistributed to those firms, that are able to employ them most efficiently. In reality, however, this mechanism does not seem to be operating. Instead, the evidence is consistent with the hypothesis, that many of the more productive firms may not actually seek to grow, or may be unable to grow.

5. Other firm-specific factors

A number of other firm-specific variables have been associated with growth rates. ***Ownership structure*** appears to be a relevant factor, because there is evidence for US small businesses, large European corporations and also Italian manufacturing firms, that multiplant[2] firms have higher growth rates, on average, than single-plant firms [35, 2, 17, 14]. Harhoff et al. analyzed West German firms, and identified, that subsidiary firms grow faster than non-subsidiaries in construction and trade industries, although no difference can be found for manufacturing and services. Furthermore, a plant-level analysis reveals, that plants, which belong to large companies, have higher growth than stand-alone plants [11]. Whilst there is weak evidence that foreign-owned firms experience faster growth rates, government-owned firms seem to grow more slowly [6].

A firm's ***legal status*** is also proposed as a determinant of its growth rate. Harhoff et al., among others, examine the growth of West German firms and observe, that firms with limited liability have significantly higher growth rates in comparison to other firms. However, these firms also have significantly higher exit hazards. These results are in line with theoretical contributions of Stiglitz and Weiss, that emphasize, that the limited liability legal form provides incentives for managers to pursue projects, that are characterized by both a relatively high expected return and a relatively high risk of failure [34].

Another variable that could be taken into account is the ***characteristics of the management***. The „managerial" theory suggests, that managers attach utility to the size and growth of their firms, such that they will pursue growth above the shareholder-valuemaximizing level. This leads to the hypothesis, that owner-controlled firms will have lower growth rates (and perhaps higher profits) than manager controlled firms. Whilst Radice and Holl find no support for this claim in their analyses of large UK firms, Hay and Kamshad find that owner-controlled SMEs have lower growth rates than non-ownercontrolled SMEs [30, 24, 22].

The ***human capital*** embodied in the owner has also been target of empirical research. Whilst Almus identifies a positive effect of human capital (i.e. university degree or above) on growth for fast-growing German firms, Robson and Bennett fail to find a significant effect of skill level in explaining employment or profitability growth in their sample of UK small businesses [1, 32].

Characteristics relating to the ***nature of the firm's activity*** also have an influence on firm´s growth. The level of diversification appears to have a negative overall influence on the growth of large European corporations, although a positive and significant influence can be detected in the particular cases of advertising intensive industries [17], and the life insurance industry [20].

[2] A firm which operates two or more plants. These may be either branches or run by subsidiary companies.

In the past, because of the ***antitrust legislation*** large firms tried to limit their growth in order to avoid antitrust intervention. In developing countries, firms can ***avoid or evade taxes*** by remaining small and informal. Larger firms, on the other hand, can effectively lobby governments to reduce their tax burden.

There is also some evidence, that ***uncertainty*** may lower a firm's investment. Guiso and Parigi present evidence, that uncertainty of demand plays a significant role in reducing firm-level investment in the case of Italian manufacturing firms [19]. According to Lensink et al. survey on Dutch SMEs uncertainty has a mixed effect on investment [25]. Uncertainty increases the *probability* of investing, but it reduces the overall *amount* of investment.

6. Macroeconomic factors

We continue our literature review by considering the influence of macroeconomic factors on firm growth rates. Several studies have discussed how firm growth varies over the ***business cycle***. For example, Higson et al. analyse US and UK firms over periods of 30 years and above and observe that the mean growth rate is indeed sensitive to macroeconomic fluctuations [23]. Furthermore, higher moments of the growth rate distribution appear to be sensitive to the business cycle. Hardwick and Adams found, that smaller firms grow relatively faster during booms, whereas larger firms grow faster during recessions and recoveries [20].

Gabe and Kraybill consider the role of ***regional factors*** in explaining the growth of firms in Ohio (US) [16]. However, both the county growth rate and a metropolitan area dummy do not appear to have a statistically significant effect on growth rates. Contrasting evidence can be found in McPherson, however, who reports that Southern African small businesses grow faster in urban areas than in rural areas [29].

Bartelsman et al. explore differences in firm growth in developed countries, and observe that the post-entry growth of successful firms is much higher in the USA than in Europe [5]. The authors suggest, that this difference is due to institutional barriers to growth that are in place in Europe, such as the lack of market-based financial systems, relatively high administrative costs that may deter smaller firms at entry, and tighter hiring-and-firing restrictions.

Several interesting results relating to ***cross-country differences*** in firm growth rates can be found in the study by Beck et al. [6]. They observe that firms in richer, larger, and faster-growing countries have significantly higher growth rates. The growth rate of GDP is positively correlated with firm growth, which indicates that firms grow faster in an economy with greater growth opportunities. Furthermore, importance of indicators of financial and legal obstacles (prevalence of corruption) vary across countries and are negatively correlated with firm growth rates.

Conclusions

In our view, the main result that emerges from our literature review on firm growth is that the stochastic element is predominant. The empirical evidence suggests that although there are systematic factors at the firm and industry levels that affect the process of firm growth, growth is mainly affected by purely stochastic shocks [28].

Among the findings of this review is, that financial performance and productivity do not predict growth. Selection by differential growth does not seem to work very effectively at all. Instead, selection appears to operate via exit of the weaker only – this considerably reduces the power of selective forces.

Second, the link between innovation and firm growth has not been investigated yet in a satisfactory manner, althoug much theoretical work, as well as questionnaire evidence from managers, stresses the crucial role of innovation in explaining growth.

Future empirical work should be focused also on explaining growth by referring to variables that vary more over time within particular firms than they vary between firms (in the cross-section) at any given time. However, firm-specific variables are not easy to find.

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