Firm growth and profitability: The role of age and size in shifts between growth–profitability configurations

Firm growth and profitability: The role of age and size in shifts between growth–profitability configurations

Susanna Mansikkamäki*

Jyväskylä University School of Business and Economics, University of Jyväskylä, P.O. Box 35, FI-40014, Jyväskylä, Finland

ARTICLE INFO

Keywords:
Firm performance
Growth
Profitability
Firm age
Firm size
Replication

ABSTRACT

To investigate the routes toward profitable growth, this study partially replicates and extends the work of Davidsson et al. (2009) on firm growth–profitability dynamics with multi-industry data on over 66,000 Finnish firms. The results support prior findings on initial profitability being more important than initial growth for achieving high performance in both performance dimensions. Additional investigations on the role of firm age and size reveal further interesting dynamics: Very small young firms face fewer risks from growing at a low profitability level than other firms, and the benefits of firm size for future performance depend on the firm’s current profitability. The results advance the understanding of the reasons and consequences of the different modes (i.e., profitable vs. non-profitable) of firm growth.

1. Introduction

Firm growth is a central theme in entrepreneurship research and it is generally seen as a positive performance outcome (Pierce and Aguinis, 2013, p.321). Yet, it may not always be that, unless accompanied by sufficient financial performance (Brännback et al., 2013; Kiviluoto, 2013; Ramezani et al., 2002), and the question of interest thus is how to achieve profitable growth. More precisely, does profitability follow from growth or vice versa (i.e., which one should be prioritized in the pursuit of profitable growth; Davidsson et al., 2009; Steffens et al., 2009).

Davidsson et al. (2009) addressed this question by investigating shifts in firm growth–profitability configurations in Swedish and Australian settings. Here, I start with a partial replication of their work. Following their categorization of firms into different growth–profitability configuration groups based on the relative (to other firms in the industry) level of these two performance indicators, I replicate their investigation of how firms move between the different configurations in short- and medium-term time frames.1 I then extend the investigation to the role of firm age and size in the firms’ navigation, or drift, within the growth–profitability space. While the work subsequent to that of Davidsson et al. (2009) has indicated that the two variables may affect moves toward the highest and lowest-performing configurations (Ben-Hafaïedh and Hamelin, 2022; Jang, 2011; Steffens et al., 2009), the investigation here digs deeper into the role of age and size with a comprehensive investigation of the full range of transitions between the different configurations of high and low levels of growth and profitability by age and size groups.

The dataset used is from Statistics Finland and covers over 66,000 Finnish firms in multiple industries. The replication results confirm the findings of Davidsson et al. (2009) and subsequent work (see Ben-Hafaïedh and Hamelin, 2022; Brännback et al., 2009;...
Jang, 2011), showing that the state of high growth and high profitability more likely follows when reaching for high profitability first than when going for high growth first. The extended investigation reveals interesting interactions between firm age, size, and profitability in relation to firm growth, showing that a carefully crafted growth strategy that avoids non-profitable growth becomes increasingly important with age, and that size either benefits or hinders future performance, depending on current profitability. The contribution of the work (further addressed in the discussion section) lies in advancing the understanding of the qualitatively different modes of firm growth.

2. Literature review — firm growth–profitability dynamics and the role of age and size

The theoretical approaches to whether growth drives profit or profitability, or vice versa, if they are correlated in the first place, rely on explanations related to market dynamics, on the resource-based view, where firms’ internal factors play the main role, or on the evolutionary economics hypothesis of the growth of the fitter (Federico and Capelleras, 2015; Schlichter et al., 2021; Senderovitz et al., 2016). The first one generally supports the idea of growth driving profitability via cost or positional advantages achieved with growth. This happens through various mechanisms that affect market dynamics, such as economies of scale, experience effects, network externalities, or first-mover advantages (see Steffens et al., 2009, p. 131).

On the other hand, the resource-based view (Barney, 1991) perspective suggests that profitable growth follows from achieving profitability first because it requires achieving competitive advantage (indicated by high profitability) and then pursuing those growth opportunities that fit the resource advantage (Davidsson et al., 2009). Similarly, the growth of the fitter principle from evolutionary economics suggests that profitability drives growth. Because of their financial constraints, weaker (i.e., less profitable) firms are unable to grow, while the fitter (i.e., more profitable) firms grow and gain market share (Coad, 2007).

Empirical work on the growth–profitability relationship has provided evidence of growth being a significant predictor of profitability (e.g., Delmar et al., 2013; Senderovitz et al., 2016; Federico and Capelleras, 2015) and profitability being a significant predictor of growth (e.g., Cowling, 2004; Goddard et al., 2004; Yazdanfar and Ohman, 2015), but also suggested a non-significant or only weak correlation between the two (e.g., Bottazzi et al., 2010; Markman and Gartner, 2002; Roper, 1999). A trade-off between these performance dimensions is also possible (Reid, 1995), as the organizational challenges that growth brings can hamper profit generation (Gartner, 1997).

The seemingly competing theoretical approaches introduced above may not be strictly exclusive as firms may simultaneously pursue a favorable market position to attain market advantages and construct a unique resource base to achieve growth, and moderating factors might affect how the growth–profitability dynamics unfold (Schlichter et al., 2021). Age and size, both broadly recognized as factors affecting firm performance (see Bakker and Josefy, 2018; Coad, 2018; Josefy et al., 2015), could be such moderating factors as work subsequent to Davidsson et al. (2009) has shown that both variables may play a role in a firm’s ability to achieve or sustain the performance state of high growth with high profitability or end up in the state where both are at a low level (Ben-Hafaiedh and Hamelin, 2022; Jang, 2011; Steffens et al., 2009). From the theoretical point of view as well, young and small firms may form a special case for the growth–profitability dynamics. Their resource constraints and suboptimal size may force them to grow before significant profits can be made (Federico and Capelleras, 2015).

In conclusion, there is theoretical ambiguity on whether growth follows profitability or vice versa and no clear guidance on how age and size affect this dynamic. Thus, the analysis part focuses on observing the patterns that emerge from the data in order to further elucidate these relationships.

3. Materials and methods

3.1. Data

The data consists of over 66,000 Finnish limited companies. It comes from the Financial Statement Data Panel, which provides yearly financial information on close to the full population of Finnish enterprises, and the Business Register, both from Statistics Finland. The data set was restricted to limited companies with at least one employee (in the initial year of the analysis, measured as full-time equivalents) and non-zero sales. Some industries with potential data quality issues were excluded (see Statistics Finland, 2019). The industry division of the data is shown in the electronic supplementary material. The firms with data available at the beginning and end of the observed transition period and one year prior (required for growth calculation) were included. The period studied is 2015–2018. As Statistics Finland corrects the Financial Statement Data Panel to rectify missing or erroneous inputs in the raw data, all main analyses were run also with a second data set that excludes firms with corrected data to check that data imputation does not affect the results.

3.2. Variables

Growth is measured as the relative change in sales from the previous year (growth at the beginning of the observed transition period) and from the beginning of the observed transition period (growth at the end of the transition period). The size measure is also sales (in euros).

Profitability is measured as the return on assets, calculated as the sum of net profit, financial expenses, and taxes divided by the balance sheet total. Age is the legal age of the independent business enterprise, calculated in years since the start date of the enterprise.

3.3. Method

To investigate firm movements in the growth–profitability space, I have followed Davidsson et al. (2009) by cross-classifying firms
based on their performance state at the beginning and the end of the observation period. To do this, firms are divided into quartiles based on profitability and growth separately and the performance group is then defined based on combinations of these quartiles. The quartile division is done separately for each industry (each firm is compared to the firms in the same industry) to account for potential industry-level performance differences. The final categorization involving five possible performance states is shown in Fig. 1.

The poor group firms have low growth and profitability (no higher than the second quartile, and in the lowest quartile at least in one of the dimensions). The star group firms perform high in both dimensions (no lower than the third quartile, and in the highest quartile in at least one dimension). The growth group firms have high growth (the 3rd or the 4th quartile) but low profitability (below median), whereas in the profit group the firms have high profitability (the 3rd or the 4th quartile) but low growth (below median), excluding those firms that fall in the middle category. The middle group includes average performers (2nd or 3rd quartile in both growth and profitability) and it is separated from other groups to be able to rule out the possibility that small shifts in performance around the medians would drive the results. All firms are assigned to one of the categories at the start and the end of the period and transitions between the initial and final categories are the point of interest. See Davidsson et al. (2009, p. 395) for the original description of the categories.

4. Results

The investigated transition periods are one and three years. The results for the full data are reported for both periods. The age and size group results are reported only for the three-year transition due to space limitations, but differences to the (unreported) results obtained with the one-year data are noted where relevant. The Stata software version 16.0 (StataCorp, 2019) was used for the analyses.

4.1. Transitions between performance configurations with the full data

Table 1 shows firm movements between the five performance configurations. The results confirm the findings of Davidsson et al. (2009) on Australian and Swedish multi-industry data and from the consequent work of Ben-Hafaïedh and Hamelin (2022) on European SMEs, Brännback et al. (2009) on small Finnish biotechnology firms, and Jang (2011) on US restaurants: Firms are highly likely to remain in the category they started in, and the star (poor) position more (less) often follows from the profit state than from the growth state. That is, pursuing profitability, rather than growth, first is a better route toward profitable growth.

The difference in the likelihood of the growth group and the profit group members reaching the star position narrows down over time (see Table 1) which may indicate a delay in the materialization of the profitability benefits from growth. Yet, even in the medium-term (three years), the growth firms are outperformed by both the profit firms (in the likelihood of ending up in the poor group and of becoming a star) and the middle firms (in the likelihood of ending up in the poor group). Growth and profitability also appear to be connected as it is more common (see the far-right column in Table 1) to have them both at a low (poor), medium (middle), or high (star) level than to have one on a high and the other on a low level (growth or profit).

As a supplementary analysis, the analysis of the three-year transition was rerun after defining the final year growth not as the change from the initial year (as in the results reported above), but as the average yearly growth for 2016–2018 and the final year profitability as the average profitability for 2016–2018. The results were in line with the above-reported ones.

4.2. Transitions by firm age and size groups

Table 2 shows the share of firms by age and size groups. Fig. 2a–d presents the share of firms moving between the four performance groups representing the highest- and the lowest-performing firms (i.e., poor, growth, profit, and star) for the three-year transition period by age groups. Fig. 3a–d shows the same information by size groups.

In line with the findings of Steffens et al. (2009) and Ben-Hafaïedh and Hamelin (2022), older firms move less (more) often into the star (poor) state than young firms (Fig. 2). Yet, in contrast to the findings of Steffens et al. (2009) on young firms being less likely to maintain a star position, the finding here holds regardless of initial performance (also when starting from the star state). With younger firms also more often maintaining a growth position (Fig. 2b), the results on both high- and low-profitability growth are, instead, in line with the observation of young firms undergoing positive growth rate autocorrelation most often (Coad et al., 2018), and being most likely to reach and sustain a high-growth firm state (e.g., Esteve-Pérez et al., 2022).

Fig. 2 further shows that the greater tendency of older firms to end up in the poor position is especially attributable to the initial state of growth. For firms starting from the other three groups, the differences between the age groups are more subtle. Also, the higher

![Fig. 1. Categorization of firms based on profitability and growth quartiles (adapted, with permission, from Davidsson et al., 2009).](image-url)
The number of firms in the age and size groups (three-year data). (A)

<table>
<thead>
<tr>
<th>Age group</th>
<th>1–3</th>
<th>4–6</th>
<th>7–9</th>
<th>10–14</th>
<th>15–19</th>
<th>≥20</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of firms</td>
<td>7980</td>
<td>9522</td>
<td>9080</td>
<td>8437</td>
<td>7762</td>
<td>23,354</td>
<td>66,135</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size group</th>
<th>X ≤ 100K</th>
<th>100K &lt; X ≤ 300K</th>
<th>300K &lt; X ≤ 500K</th>
<th>500K &lt; X ≤ 1M</th>
<th>1M &lt; X ≤ 3M</th>
<th>X &gt; 3M</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of firms</td>
<td>6287</td>
<td>19,475</td>
<td>9947</td>
<td>11,369</td>
<td>10,928</td>
<td>8129</td>
<td>66,135</td>
</tr>
</tbody>
</table>

The youngest age group is underrepresented in number because size information from one year before the initial year was required to calculate the initial growth. The final age group was set to ≥20 because the reliability of the start date-based categorization may decrease in age groups older than that. (The source data are based on the Business taxation register data from 1994 onwards and have narrower coverage until that year.)
Fig. 2. Share of firms transitioning to different final performance groups by age groups for firms starting from the group poor (2a), growth (2b), profit (2c), and star (2d) with 95% confidence intervals for the three-year transition. N is the number of firms in each age group starting from the initial performance group in question.
Fig. 3. Share of firms transitioning to different final performance groups by size groups for firms starting from the group poor (3a), growth (3b), profit (3c), and star (3d) with 95% confidence intervals for the three-year transition. The size groups are as in Table 2. N is the number of firms in each size group starting from the initial performance group in question.
non-linear age patterns than the trends in Fig. 2 and the data of Ben-Hafaïedh and Hamelin (2022) and one of the two datasets of Davidsson et al. (2009) is on small and medium-sized firms. The results corresponding to Fig. 2 for the data set with this additional size restriction are reported in Fig. 4. There the age trends become more non-linear, showing more resemblance with the results of Davidsson et al. (2009) and Ben-Hafaïedh and Hamelin (2022).

In a comparison of Figs. 2 and 4, the superiority of young firms reported above erodes or even disappears when the sample is restricted to firms with at least 10 employees. For example, with the smallest firms excluded from the data in Fig. 4, younger firms in the poor category are no longer less likely to stay there than the older ones, and the youngest age group in the growth category is no longer more likely to move to the star than to the poor state. The benefits of young age observed in the original analysis (in Fig. 2) seem to partly arise from being young and small. Moreover, although non-profitable growth still is less harmful to younger than older firms in Fig. 4b if the slightly increasing (decreasing) age trend for firms moving to the poor (star) group is considered, the downsides of the growth-first strategy for young firms are clearer than in Fig. 2. Thus, the “blind” growth strategy as an alternative for carefully selecting only profitable growth options might be a reasonable choice only when a firm is both young and very small.

To conclude this section, Table 3 summarizes the main findings and addresses the relationship of the study with the work of Davidsson et al. (2009) and other prior work building on their work.

5. Discussion and conclusions

Firm growth studies often remain in the growth domain, overlooking the simultaneous development in other performance dimensions. This study has joined the small but growing number of studies that highlight the importance of assessing such simultaneity to acknowledge the qualitatively different modes of firm growth, some more successful than others (e.g., Ben-Hafaïedh and Hamelin, 2022; Brännback et al., 2013; Coad et al., 2020). The study also responds to the need for more replication studies to reduce the uncertainty of research findings (van Witteloostuijn et al., 2021). The results, together with the original work of Davidsson et al. (2009) and other studies continuing from their work (Ben-Hafaïedh and Hamelin, 2022; Brännback et al., 2009; Jang, 2011), begin to provide strong support for profitability first, rather than growth first, more likely leading to high performance in both performance dimensions.

The age and size group analyses show that, although the above result holds for different age and size groups, very small young firms have the greatest likelihood to succeed despite the growth strategy (profitability-first vs. growth-first) because they face the fewest risks from non-profitable growth. A carefully planned growth strategy that avoids non-profitable growth becomes increasingly important with age and size.

The study contributes to the literature on firm growth by tackling the question of how firms grow (McKelvie and Wiklund, 2010) from the perspective of broader firm performance (i.e., whether they grow profitable or non-profitable). The question partially tackled, but also in place for further work is what leads to the different performance modes and their durability. In addition to confirming the important role of the preceding performance configuration, firm age and size were identified as affecting factors. Yet, they are unlikely the only variables affecting the growth–profitability dynamics (see Schlichter et al., 2021) and consequently the performance configuration of a firm. An interesting factor to look further into in this regard could be innovation (i.e., are innovating firms better off in achieving profitable growth) as innovation is often considered a positive driver of both growth and profitability, although the empirical evidence is inconclusive (see e.g., Grillitsch et al., 2019, p. 235; Rosenbusch et al., 2011).

Another suggestion for further work is to further assess the role of potential interactive effects of firm characteristics on firm performance. Here the initially observed benefits of youth eroded when the smallest firms were excluded from the data, implying that it is the firms that are young and very small that do not significantly suffer from non-profitable growth. In a similar vein, the recent results from Coad and Karlsson (2022) show that old micro firms have different growth prospects from other firms. Indeed, groups such as “young firms” or “small firms” are rather heterogeneous, and looking at the interactive effects, such as that of age and size, could allow more accurate predictions of future performance than looking at the variables independently.

Furthermore, an interesting interaction to further investigate in the growth context is that of size and profitability. Size is often seen as a negative driver of firm growth (Coad, 2009, p. 42). The results here imply that in the case of profitable growth, size can be beneficial, at least if the firm initially stands in a profitable position. As the findings are from a descriptive analysis, there is room for further validation and investigation of the size-profitability-growth dynamic.

The fundamental message for practitioners is that growth should not be pursued for the mere sake of growth by assuming that profitability follows. Instead, the profitability side of performance should be carefully considered when crafting a growth strategy. The findings add further nuances to this message for firms in different developmental stages. Avoiding non-profitable high growth is increasingly important with growing age and size. For young and very small firms the non-profitable high growth is least risky. As these firms may also lack resources (due to their small size) and skills (due to their short experience) for scanning and evaluating different growth opportunities, a growth strategy of “blind” growth may be a smart one as it, in addition to the lower risk, also saves their scarce resources from scanning and planning to other uses. Furthermore, larger firms may have a size-based competitive advantage but only if they stay profitable. When profitability drops, the advantage can become a disadvantage.

From the policy viewpoint, the results support the argument of Davidsson et al. (2009, p. 401) on the importance of supporting firm profitability rather than growth directly when aiming for policies that encourage job creation through firm growth: Through high

---

2 The size results better align with those of Ben-Hafaïedh and Hamelin (2022) and Jang (2011).
3 This article was published in Journal of Business Venturing, 24, Davidsson, P., Steffens, P., & Fitzsimmons, J. Growing profitable or growing from profits: Putting the horse in front of the cart? 388–406, Crown Copyright (2008), Published by Elsevier Inc.
Fig. 4. Analysis of Fig. 2 rerun after limiting the data to firms with at least 10 (full-time equivalent) employees for firms starting from the group poor (4a), growth (4b), profit (4c), and star (4d).

Table 3
Summary of the main findings and their relationship with prior work on the topic.

<table>
<thead>
<tr>
<th>Main findings</th>
<th>Relationship of the study and findings with the study of Davidson et al. (2009) and other prior work building on their study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General findings</strong></td>
<td>The state of high growth with high profitability (star) more likely follows from the state of high profitability (with low growth; profit) than from high growth (with low profitability; growth). The reverse is true for ending up in the state of low growth with low profitability (poor). The above result holds for different age and size groups of firms but there appears to be age- and size dependence in the movements between the different performance configurations. Confirms the similar prior findings of Davidson et al. (2009) and the consequent work of Ben-Hafaiedh and Hamelin (2022), Brännback et al. (2009), and Jang (2011). Disconfirms the notion of Davidson et al. (2009) on no clear age (or size) pattern in the transitions (indicated by robustness tests of the main findings) and confirms the findings of Ben-Hafaiedh and Hamelin (2022), Jang (2011), and Steffens et al. (2009) on age and/or size affecting the transitions.</td>
</tr>
<tr>
<td>Age-related findings in more detail</td>
<td>The risks of non-profitable high growth (for future performance) increase with age. The group of firms that is both very young and very small differs from other firms in its growth-related risk as it is able to turn the non-profitable high growth into a star status more or as often as into a poor status (for other firms the poor status is the more likely outcome). Inspired by previous findings on firm age (Ben-Hafaiedh and Hamelin, 2022; Steffens et al., 2009) and size (Ben-Hafaiedh and Hamelin, 2022; Jang, 2011) affecting the likelihood of a firm reaching different performance configuration states, potentially in interaction with the initial orientation toward growth vs. profitability (Jang, 2011; Steffens et al., 2009), the present work extends the investigation of the role of age and size in the growth-profitability space dynamics by building a comprehensive picture of how differently aged and sized firms move between the configurations of high and low growth and profitability. The findings extend the general findings (in the rows above) by elucidating the change in the relative risks and benefits of the different growth strategies when firms grow in age and size.</td>
</tr>
<tr>
<td>Size-related findings in more detail</td>
<td>Size is beneficial for future performance when the firm is initially positioned in a high profitability configuration (profit or star). For firms starting from the low profitability configurations (poor or growth), size brings no benefits or even relates to a disadvantage.</td>
</tr>
</tbody>
</table>

S. Mansikkamäki
profitability firms more often achieve a sustainable state of growth, the one that combines high profitability and growth and best satisfies both the business and policy goals. The age and size results further imply that policies “blindly” (i.e., without considering the profitability side) supporting firm growth are likely to work with young and very small firms but become increasingly misguided later. This finding is in line with the recent suggestion by Coad and Karlsson (2022, p. 5) in the context of high-growth firms about public support targeted for potential growth firms perhaps being more effective if its criteria differed for different types of firms. Looser criteria could apply for small young firms whereas the requirements of sufficient prior profitability could be in place for older and larger firms.

The limitations of the study also leave room for future work. First, the results from Ben-Hafiedh and Hamelin (2022) show that the superiority of the profit position over the growth position holds also for longer time frames (than the short- and medium-term investigated here) but the difference between the categories decreases over time. Such longer-term testing could be in the future research agenda for the age and size results introduced here as well. Second, the data does not allow a distinction between organic and inorganic growth. Yet, the growth–profitability dynamics could differ between the two (Ben-Hafiedh and Hamelin, 2022, p. 15; Davidsson et al., 2009, p. 401). Third, the focus here was on limited companies (due to potential issues in comparing financial information between legal forms; see Statistics Finland, 2019). Evidence from the firm exit context (Cefis et al., 2021) indicates, however, that firm performance patterns with age may differ between legal forms. Lastly, the start dates used in the firm age calculation link to firm identifier codes in the source data. A new identifier usually means a new firm, but sometimes a continuing entity can get a new code (e.g., a merger can create a newly formed entity of continuing firms). In both types of births, the firm is legally new, but only in the first case, it starts from scratch. Thus, the results here could be flatter than if only truly new firms were followed.

Author statement

The corresponding author is the single author of the paper and is solely responsible for all aspects of the research and reporting.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Susanna Mansikkamaki reports financial support was provided by Foundation for Economic Education. Susanna Mansikkamaki reports financial support was provided by Central Finland Fund.

Data availability

The data that has been used is confidential.

Acknowledgements

I thank the editor, Professor Pablo Munoz, and an anonymous reviewer for the insightful comments that greatly helped to improve the manuscript. I am also grateful to Dr. Mirva Peltoniemi and Associate Professor Mikko Ronkkö for their helpful comments at the early stage of the research process. Partial financial support from the Foundation for Economic Education (Liikesivistysrahasto) and the Central Finland Regional Fund is gratefully acknowledged. The data utilized in the study comes from Statistics Finland’s enterprise-level research data sets. An access right to the data can be applied from the Research Services of Statistics Finland.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jbvi.2023.e00372.

References
