NBER WORKING PAPER SERIES

THE PRODUCTIVITY ADVANTAGE OF SERIAL ENTREPRENEURS

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Working Paper 23320
http://www.nber.org/papers/w23320

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
April 2017

An earlier version of this paper was prepared for the conference on "The Labor Market and Human Resource Management Implications of Entrepreneurship" supported by the National Academy of Sciences in Washington, D.C. in October 2016, organized by Diane Burton, Rob Fairlie, and Don Siegel. We are thankful for the thoughtful comments of the conference organizers, and the seminar participants at the University of Toronto, the University of Maryland, and Stanford University Business School. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 23320
April 2017
JEL No. G24,J24,L26,M13

ABSTRACT

Serial entrepreneurs, who open more than one business, are found to have higher sales and higher productivity than novice entrepreneurs, who open one business. Using panel data on entrepreneurs and their firms from Denmark for 2001-2013, the serial entrepreneur has 67% higher sales than the novice, but also opens firms that are larger in terms of the initial capital and labor, and thus is 39%more productive. There are subsets of firms that perform especially well – serial entrepreneurs that hold a portfolio of overlapping ongoing firms perform the best, as do those that open as limited liability firm rather than proprietorships. Female serial entrepreneurs do as well as male serial entrepreneurs relative to the performance of novices of their own genders. The second firms of the serial entrepreneurs also stay in business longer than the first (and only) firms of the novices.

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The popular press often idolizes a few very visible serial entrepreneurs. Two that come to mind are Elon Musk, founder of Tesla and SpaceX, and Steve Jobs, founder of Apple, Next, and Pixar. The popular press and researchers also suggest that the VCs look to fund tech serial entrepreneurs at higher rates than novices who have never opened a previous business. Is there strong evidence that serial entrepreneurs perform better – or, are Musk and Jobs just a few visible outliers?

The question is, are serial entrepreneurs remarkably more successful? A few other researchers have examined this issue, but not many. Those that have, have looked only at how long new firms stay in business, showing serial firms stay in business longer than novice firms. The novice firm is the one opened by a novice entrepreneur, who, by definition, either has not opened a business before or never will again.

The reason serial entrepreneurship is little studied is that it is very hard to obtain a long time-series of longitudinal data on the small new firms that they open. For that reason, the data here is from Denmark. Denmark is now very widely studied, because they link all their data sets on people and firms for the population of all people and firms. Entrepreneurship has been a particularly popular topic using Danish data, so there is much to draw on that we know about the characteristics of Danish entrepreneurs.[1] The institutions of setting up a new business and the market conditions are similar in Denmark to the U.S., but Denmark probably has a smaller high tech sector.[2]

The emphasis here is on the sales, employment, and productivity of new ventures opened by ordinary people. Around the world, most new ventures are not tech ventures. Tech ventures surely have more upside successes than non-technology companies—and technology successes lead to greater employment and higher GDP—though Walmart is a good example of the upside success for a non-tech firm. Most importantly, it is hard to say exactly what a high-tech firm is: Amazon is succeeding in retail due to technology, and Tesla is succeeding in manufacturing due to technology, and even Walmart is known for its innovation in supplier relationships.

The goal of the paper is to determine how much more successful serial entrepreneurs are relative to novices (if serial entrepreneurs even are more successful), and if the success of the serial entrepreneur depends on the characteristics of the entrepreneur or the characteristics of the firm. The results are as follows:

1. Serial entrepreneurs are 39% more productive than novice entrepreneurs. Serial entrepreneurs have sales that are 67% higher. Because serial entrepreneurs open firms with more capital and labor, their productivity advantage is not as great as their sales advantage.
2. There are subsets of serial entrepreneurs that perform especially well. Those entrepreneurs that hold a portfolio of firms – rather than opening and closing firms sequentially – are 46% more productive than novices.
3. The serial advantage is conferred equally across the industries of their firms and the education levels of the entrepreneurs.

[1] Researchers in the U.S. may in the future get access to U.S. data (Goetz, Hyatt, McEntarfer, and Sandusky, 2015)
[2] The establishments started by entrepreneurs in Denmark tend to be smaller than those establishments started by existing firms (Malchow-Møller, Schjerning, Sørensen (2011), which would be true in the U.S. as well.

4. Women exhibit performance advantages as serial entrepreneurs that are greater than those of male entrepreneurs, when women serial entrepreneurs are compared to female novices, and when male serial entrepreneurs are compared to male novices. To identify who is most likely to run a thriving business, the firms are divided up into those that open as employers (43% of firms have employees) and those that open as non-employers (57%), but may employ people later. For these two subgroups, female serial entrepreneurs are 41% more productive among employers, and 30% more productive among non-employers. As a group, all women open smaller companies than men (i.e., lower sales), but those who are female serial entrepreneurs are about as productive as all male entrepreneurs (including novices).
5. Serial entrepreneurs close their first businesses much faster than do novice entrepreneurs and run their second businesses much longer than novices do.

These results are discussed in the Empirical results section below, which is preceded by the Empirical Framework and Data description. The Conclusion describes the full picture of who succeeds as a serial entrepreneur.

I. Theoretical Framework and Literature Review

There are two avenues to pursue in the literature – what makes a good manager or executive (since entrepreneurs are managers) and what makes a good entrepreneur? Start with the latter.

There is past evidence that some entrepreneurship skills are learned. Lazear (2005) shows that a person is more likely to found a firm if he has more "roles" in school or work from which to learn how to do the multi-faceted job of founding and running firms. He is also, therefore, suggesting that an entrepreneur can learn to be a good entrepreneur from past jobs in firms he does not run. Liang, Chang, and Lazear (2017); Phillips and Sorensen (2011); and Hvide (2009) show that prior business experience inside firms, either engaging in multiple roles or obtaining general managerial experience, matters. Nanda and Sorensen (2010) suggest the existence of a "ripple effect"—that individuals are more likely to become entrepreneurs if their co-workers have been self-employed in the past. Klepper (2001) emphasizes the importance of co-workers in creating new high-tech startups. Entrepreneurs also learn from family experience (Fairlie and Robb, 2007a, b), and from others in their community (Glaser, Kerr, and Ponzello, 2006).

Another indicator of the importance of learning to be an entrepreneur is does entrepreneurship go up with age, suggesting people need to learn before opening a firm? If the probability of entrepreneurship does rise with age and peak, this suggests that learning (or access to capital) is more important than the creativity and low opportunity cost of time that are more characteristic of young entrepreneurs (Liang, Chang, and Lazear, 2017). More generally, all business schools teach a very extensive number of classes on entrepreneurship, suggesting it is a learned activity. Experiments in developing countries have tested whether entrepreneurship can be taught: it is hard to find high returns from these training programs (Fairlie, Karlan, and Zinman, 2015).

There is also past evidence that some entrepreneurs have personal traits that lead them into entrepreneurship. The most common focus is that entrepreneurs are risk-takers (Blanchflower and Oswald, 1998; Levine and Rubinstein, 2016; Hvide and Panos, 2013) and are more capable, in terms of their own education and parents' education (Levine and Rubinstein, 2016; Hartog, et.al., 2010). Second,

is that they have personal wealth that affects entrepreneurship, often in a non-linear way.[3] They are also likely to have many personal traits that are identified more anecdotally than in rigorous research, such as that entrepreneurs set direction, coach, and are decisive and inspiring (Shaw and Schrifin, 2015, applied to managers). Such anecdotal qualities, however, are bolstered by the evidence that the founder has a lasting impact on his business (Becker and Hvide, 2014).

Entrepreneurs are ultimately managers, so does managers' quality really matter for improving the performance of their subordinates or of their entire firms? A growing literature shows that there are "manager effects" that are large in shaping their subordinates' productivity (Lazear, Shaw, and Stanton (2015), in lowering attrition (Hoffman and Tadalis, 2016), and in improving firm performance (Bertrand and Schoar, 2003).

In sum, what are the traits and the skills of a typical entrepreneur? They are risk takers, they are wealthier, they are creative, they are inspiring, they have had broad managerial experience at prior firms, they have business networks and social networks that enable them to attract financing and customers and increase their knowledge, and their past history of success signals that they are capable. These are the traits and skills that a serial entrepreneur is either likely to have in advance or likely to build through on-the-job learning.

There is evidence that the firms opened by serial entrepreneurs stay open longer because serial entrepreneurs are more talented to begin with and also learn on the job. [4] Venture capitalists have a preference for the serial entrepreneur because he has learned from experience, good and bad, and has strong social networks.[5]

The goal of this paper is to determine whether serial entrepreneurs have higher sales or productivity, and if so, how high these are, and which types of serial entrepreneurs achieve the most. Past research has never performed analyses to answer these questions. The likely reason for this omission in the literature is that researchers have not had panel data on the performance of entrepreneurs' firms. Data on the performance of serial entrepreneurs' firms – in terms of sales, productivity, and employment – has not been available because few countries keep this data for very small firms, and in order to study serial entrepreneurs, a very long time series of years is needed to see which entrepreneurs open multiple firms over time. [6]

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[3] Hurst and Lusardi (2004), Anderson and Nielsen (2012), Vereshchagina and Hopenhayn (2009), and for Norway, Hvide and Hoen (2010), and Malacrino (2016).

[4] See Lafontaine and Shaw (2106) for evidence that the businesses opened by serial entrepreneurs last longer in retail trade. See also Amaral, Baptista, Lima (2011), Hyytinen and Ilmakunnas (2007), Parker (2013), Rocha,Carneiro, Amorim Varum (2015), Wagner (2003), Westhead and Wright(1998). Amaral, Baptista, and Lima (2009) expand upon the importance of past entrepreneurial experience by indicating past experience as an entrepreneur is a primary indicator of future entrepreneurship in Portugal.

[5]Gompers, Kovner, Lerner, and Scharfstein (2010), Hsu (2007), and Zhang (2011) study venture-backed entrepreneurs.

[6] Despite the challenges associated with locating data for those smaller and micro enterprises not publicly traded, some firm performance metrics have been studied by amalgamating data from several different national sources, as achieved by Malacrino (2016) using specifically Norwegian data. Humphries (2016) also shows that the self-employed who have higher cognitive skills are more likely to run firms that have higher levels of capital in Sweden.

II. Empirical Framework

The first step using Danish panel data is to calculate who is a serial entrepreneur and who is a novice (i.e, only operating one firm ever). Serial_i is a dummy variable that indicates that a person is a serial entrepreneur if he/she opened more than one business in the 13 years of data from 2001-2013. The data is then organized to follow the performance of the Serial entrepreneur's businesses. He/she opens multiple businesses, but the question here is, how does his/her average business fare compared to the one business of the novice?

Using the longitudinal data, the sales regression is:

$$(1)\quad logS_{ijt} = \beta_1 + \beta_2 \text{Serial}_i + \beta_3 \text{Experience}_{ijt} + \beta_4 \text{Serial}_i \times \text{Experience}_{ijt} + \Upsilon Z_{ijt} + \Gamma \text{X}_{ijt} + \beta_5 log\text{K}_{ijt} + \beta_6 log\text{L}_{ijt} + \varepsilon_{ijt}$$

where S_{ijt} is the log of average monthly sales for entrepreneur "i" and for firm "j." The time "t" a bi-annual time period, but the panel time for each firm is restricted to be up to six years (so there are up to 12 observations on the sales of each firm "j"). The purpose of the six year restriction is twofold: to compare performance in the early years when firms would grow and learn, and to recognize that the panel of 13 years will very often truncate the duration of firms, so it would be hard to model a learning curve as a non-linear function of experience when the few firms that have long experience are those that happen to open early in the panel and are successful.[7] Controls Z_{ijt} are time dummies (semi-annual period dummies) and 88 industry dummies. The X_{ijt} are the education, gender, age, and immigrant status of the entrepreneur at the beginning of each of his firms. The capital and labor are the $log\text{K}_{ijt}$ and $log\text{L}_{ijt}$, the standard variables that are specific to each firm and measured annually (not bi-annually).

The variable Experience_{ijt} is the experience of the entrepreneur as he runs his business over time for the bi-annual periods that firms are followed. Experience is a linear variable that takes the values of 1 to 12 for the bi-annual observations, and in the regressions Experience will also enter quadratically.

The novice entrepreneur will have only one firm "j" attached to his personal data. The serial entrepreneur can have many firms "j" in the data, and the regression therefore contains a measure of Experience_{ijt} for each of his firms, in the stacked panel data set and in the variables in the regression. So the serial entrepreneur who typically has two firms will have two measures of Experience for each firm.

The Serial_i is a dummy variable equal to 1 if person "i" is a serial entrepreneur. The Serial_i does not have a firm "j" subscript because it is capturing the effect of being a serial entrepreneur averaged across all the "j" firms that he has in the data.

[7] The Experience effect on Sales is identified in the within-firm regression (2) below, and the effects of firms with high Experience on Sales would be identified off the quadratic Experience effect, which could be driven by the small number that stay open a long time.

The Experience variable has one coefficient for the novice entrepreneur, β_3, which is his learning curve. The Serial entrepreneur has his learning curve, which is the learning curve for the novice plus his coefficient, equal to $\beta_3 + \beta_4$.[8]

There are two primary empirical hypotheses imbedded in equation (1):

Hypothesis 1: the serial entrepreneur has higher sales performance on the day he opens his firm, so $\beta_2>0$.

Hypothesis 2: the serial entrepreneur has a faster learning curve, or $\beta_4>0$.

The testing of these two hypotheses becomes complicated in numerous important ways.

In testing Hypothesis 1 that $\beta_2>0$, should there be control variables in the regression? The first regression in tables below is estimated with no controls—testing whether mean Sales are higher for the serial entrepreneur than the novice – except the controls Z_{ijt} for time dummies and 88 industry dummies. If sales are higher for the serial entrepreneur, why? The next step is to introduce the background traits of the entrepreneurs, X_{ijt}, for education, gender, age, immigrant status, to see if the β_2 falls in value, because if serial entrepreneurs are, for example, more educated, then holding constant education would reduce the estimated performance gains by serial entrepreneurs. The interpretation of these traits is discussed with the empirical results. The next set of controls is Capital and Labor, where Labor is the number of FTE employees, and Workforce Education is the average education of the employees in the firm. The regression tests whether the average firm of the Serial entrepreneur is bigger because he opens firms with more capital and labor. After introducing all the controls for capital and labor, the Sales regression (1) is estimating the greater productivity of the serial entrepreneur if $\beta_2>0$.

In testing Hypothesis 2, that $\beta_4>0$, there are two "learning curves," one in an OLS regression, and one in a firm fixed effects regression. The coefficient on Experience in the OLS regression picks up the sorting by firms: firms that live longer should have higher sales, so the coefficient on Experience should be positive in equation (1), even if the firms are not growing at all within the average firm. Therefore, it is necessary to estimate a firm fixed effects model:

$$(2)\quad logS_{ijt} = \lambda_j + \beta_3 \text{Experience}_{ijt} + \beta_4 \text{Serial}_i \times \text{Experience}_{ijt} + \Upsilon Z_{ijt} + \Gamma X_{ijt} + \beta_5 log\text{K}_{ijt} + \beta_6 log\text{L}_{ijt} + \varepsilon_{ijt}$$

where the firm fixed effect is λ_j. The coefficient on Experience is now the within-firm growth of Sales, with Experience entering quadratically. Introducing the firm fixed effect holds constant the quality of the firm, which eliminates the upward bias on the Experience coefficient in (1) that would result from selection (if high-quality firms stay open longer).[9] As with Hypothesis 1, it is important to find out if entrepreneurs increase sales within the firm because they are adding capital and labor, so controls are introduced.

[8] There is a very large literature on organizational learning, which often means the degree to which costs fall as units produced rise, and the literature also asks whether learning is passed from one production line to another. See Argote (1999) and Thompson (2012) for summaries of the literature.

[9] The firm fixed effect holds constant the quality of the entrepreneur, in terms of the personal talent he has in elevating sales or productivity levels. However, equation (2) could still have a person-specific bias if the entrepreneurs that stay in business longer are innately better learners.

Now it is clear that the OLS coefficients on Experience in (1) are useful. If β_3 and β_4 in (1) are greater than they are in (2), then the gap implies that if you look at a cross-section of firms, older firms are bigger because these are the firms that have survived longer.

Note that there are some restrictions placed on the coefficients in (1) through (2) that are relevant. It is assumed that the effects of the X, Z, and capital and labor variables on Sales do not differ by whether the entrepreneur is a serial or a novice. That is, the within-industry production function of translating capital into sales is assumed to be the same across Serial versus Novice, because some functional form restrictions are helpful to test the hypotheses that Serial differ from novices.

There is also annual data on the number of employees. The regression for employment is the same as sales, but the time "t" refers to annual data:

$$(3)\ logE_{ijt} = \alpha_1 + \alpha_2 \text{Serial}_i + \alpha_3 \text{Experience}_{ijt} + \alpha_4 \text{Serial}_i \times \text{Experience}_{ijt} + \Sigma Z_{ijt} + \Phi \text{X}_{ijt} + \alpha_5 log\text{K}_{ijt} + \alpha_6 log\text{L}_{ijt} + \zeta_{ijt}$$

where E is number of employees including the owner, so no firms have zero employees.

The third hypothesis is that not all serial entrepreneurs are alike:

Hypothesis 3: the value of being a serial entrepreneur may differ by industry, gender, or a host of other factors.

That is:

$$(4)\ logS_{ijt} = \beta_1^k + \beta_2^k \text{Serial}_i + \beta_3^k \text{Experience}_{ijt} + \beta_4^k \text{Serial}_i \times \text{Experience}_{ijt} + \Upsilon^k Z_{ijt} + \Gamma^k \text{X}_{ijt} + \beta_5^k log\text{K}_{ijt} + \beta_6^k log\text{L}_{ijt} + \varepsilon_{ijt}^k$$

where the 'k' superscript on each coefficient is either the type of firm or type of entrepreneur, to be described below with the empirical results.[10] For example, k could be industry, the gender or education of the founder.

The last hypothesis is that:

Hypothesis 4: Firms founded by serial entrepreneurs survive longer.

The model used to estimate firm durations is the Weibull duration model. In these models, the rate at which a firm exits, given that it has survived till time t, is written as $h(t)=h_0(t)e^{X'B}$, and B are the exponentiated coefficients that determine the exit rate. If one of the b_1 coefficients in B is greater (smaller) than 1, the difference $(b_1\text{-}1)*100$ specifies the percentage by which a one unit increase (decrease) in the X_1 would increase the hazard of exit. The purpose of using the Weibull model (instead of, for example, a linear model with the months in business as the dependent variable) is that the model accounts for the right-censoring that pertains to all panel data sets that must end with some incomplete spells.

[10] An equivalent but messier way of writing equation (4) for Hypothesis 3 would be to permit all the coefficients of the regressions (1) and (2) to be interacted with the X and Z variables.

III. Data

Descriptions of the key variables are intertwined with descriptions of the data sets used to create them.

A. Linking Four Data Sets

Entrepreneurs: The *Statistics of New Enterprises* identifies all firm start-ups in Denmark during the period 2001-2013. This database includes firms that fulfill a number of conditions that make these newly started (nascent) firms organic start-ups, not spin-offs or re-organized firms. For the majority of the new firms in the *Statistics on New Enterprises*, Statistics Denmark has been able to identify the founder behind the firms. For the personally-owned firms identification is straightforward: The entrepreneur is simply identified as the owner of the firm. For incorporated firms, Statistics Denmark uses a prioritized list of criteria to identify the principal entrepreneur.[11] For around 15% of the cases, Statistics Denmark has not been able to identify the founder behind the firm, so these firms have been dropped from the data below. There are between approximately 14,000 (2009) and 20,000 (2007) firm start-ups with founder identified per year in the database.

As will be shown below, these entrepreneurs are founding small businesses, and are not likely to be tech entrepreneurs seeking large growth. As pointed out by Hurst and Pugsley (2011), most small businesses are run by entrepreneurs who never plan to grow beyond a few employees. However, these founders are not the self-employed, who are likely to be even less ambitious in terms of levels and growth of sales and employment (as pointed out by Glaeser, 2007).

Note that Statistics Denmark has undertaken extensive efforts to identify the organic start-ups. Their scrutiny of firms has eliminated those that could be the result of restructurings or the result of organizing existing or additional activities into new enterprises. Consequently, a firm that appears in the *Statistics on New Enterprises* must not only be newly registered for VAT at the business authorities, but also not previously existed under a different name/company or with a different owner.[12] Finally, the data are

[11] If information about a founder is available from the registration information, this person is identified as the principal entrepreneur. In case of more than one founder, Statistics Denmark selects the one who has the highest salary – or if none of the founders are employed in the firm, they pick the founder who appears first in the registration database. If information about founders is not available, they look for a member of the board (or the executive board) who is also employed in the firm. Again, they pick the one with the highest salary in the case where more than one board (or executive board) member is employed in the firm. If no board (or executive board) member is employed in the firm, they pick the board (or executive board) member who appears first in the registration database.

[12] For administrative reasons, the Danish Business Authorities only use one firm-id per individual that opens sole proprietorships. This implies that an entrepreneur that has a sole proprietorship will always have his firm registered under the same firm-id. Consequently, a serial entrepreneur that establishes two firms as sole proprietorship will appear to be a novice entrepreneur in the data set; not as serial entrepreneur. However, in the data set we find that

cleaned for registrations that are due to re-starts of businesses after closure or changes in the firm-registration information. Thus, the set of start-ups used in this paper is more likely to reflect true organic entrepreneurial start-ups than if we had only used all "new establishments" or all "new firms," as has been the common practice in the literature.

The *Statistics on New Enterprises* is restricted to industries that Statistics Denmark categorizes as "private urban functions". This restriction excludes the public sector and (most of) the primary sector, in addition to industries with activities that are not liable to VAT, such as dentists, transportation of persons, banking, etc.[13]

In the *Statistics of New Enterprises,* the founder-specific information is available on marital status, educational attainment, gender, labor market experience as a wage worker, age, and immigrant status. These variables are measured when each of their firms are opened.

Sales: The *Purchase and Sales of Danish Firms* contains information on sales of VAT liable firms. Sales of firms are determined from the sales tax that VAT registered businesses have reported on the VAT form of the Danish tax authorities. Firms report VAT on a monthly, quarterly, or bi-annual basis dependent on sales size – large firms are required to report at a greater frequency. To make all data comparable, all sales are made bi-annually. The sales data covers the period 2001 to 2014, thus following the entrepreneur as of 2013 into his sales of 2014.

Employment, capital, educational attainment of employees: The *General Enterprise Statistics* that contains annual information about all active firms in the Danish economy. This database includes the data on the capital input and employment of the entrepreneurial firms.

The *Firm Integrated Database* (FIDA) also identifies all the individuals working in a given firm in the last week of November each year. This database provides information on the employees' educational backgrounds from Statistics Denmark's education registers. This information is used to construct measures of average years of education of firms' employees to characterize the educational content of employees. In the analysis, the six different education groups feed into a Workforce Education variable that is the average years of education, where the groups are defined by the length of the education program (and following the Danish Education Classification system): Primary schooling (9 years); vocational training (12 years); high school (12 years); short further education (14 years); medium further education (16 years); and long further education (18 years).

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there are very few sole proprietorships with multiple, which suggests that the number of ("portfolio") entrepreneurs using sole proprietorships is clearly not a problem (Table 4).

[13] These industries are not included because the basis for the *Statistics on New Enterprises* is firms that register for VAT. Hence, we do not have information on new firms that are not liable to VAT. Private sector service firms that are excluded from the analysis for this reason are firms within the following service sectors: child day-care activities, primary education, general secondary education, higher education, nursing homes, activities of household employers, other service activities, general medical practice activities including dentists, hospital activities, real estate agencies etc., and mortgage credit institutions.

Employment, capital, and education of the workforce are annual data.[14] Employment is the total of the owner/entrepreneur plus the people he/she hires. The entrepreneur is always included in the Employment calculation below because in LLC firms, he is an employee, so for comparability, for sole proprietorships, he is also counted as an employee.

B. Measurement of Types of Entrepreneurs

Serial entrepreneurs are measured using data for organic new firms in Denmark. The entrepreneurial firm is identified by a unique firm id and the founder or entrepreneur of the entrepreneurial firm is identified by a unique person id.

The entrepreneurial firm: An organic start-up that has newly registered for the VAT with the business authorities. This includes both personally-owned and incorporated firms that fulfil a number of conditions that allow us to consider them as being organic new firms (described above).

Firm data in the Statistics Denmark registers only include firms that are labelled "truly active," defined as firms that have wage hours for employees of at least 0.5 full time equivalent employees during the year OR have sales above a threshold. The threshold sales vary across industries. In industries such as wholesale trade, the threshold sales equal around USD 75,000, whereas for Manufacturing firms are in the range of USD 22,000 to USD 30,000 DKK.

The founder or entrepreneur: Defined as the person who establishes an organic startup. For the majority of the new firms in the *Statistics on New Enterprises*, Statistics Denmark has been able to identify the entrepreneurs behind the firms (described above).

Serial entrepreneur: In the data, 215,645 new firms have been established by 190,834 founders during the period from 2001 to 2013 (see Table 1.) Around 10% of the entrepreneurs are serial entrepreneurs, meaning that they have founded more than one firm during the 13 year period from 2001-2013. Among the serial entrepreneurs, only 20% open more than one business.

An important point is that serial entrepreneurs establish around 20% of all organic new firms. Though they are 10% of entrepreneurs, because they found multiple firms, they run 20% of new firms.

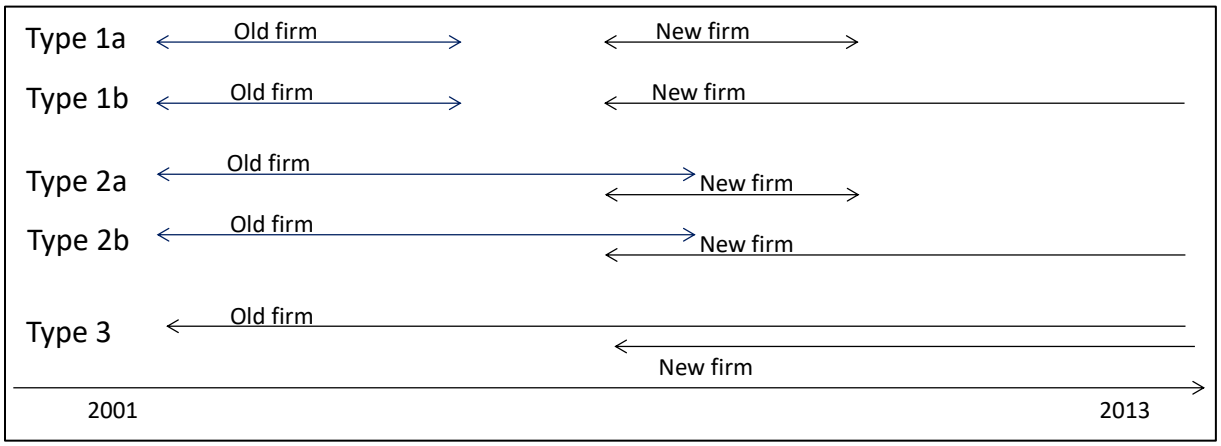
A necessary condition for a serial entrepreneur is - in general terms – a founder that has opened up more than one organic firm during the period 2001-2013. However, such founders can be grouped by their patterns of firm survival. If the serial entrepreneur opens up two firms during the period under investigation, the figure below displays the firm types.[15]

> **Sequential Entrepreneur.** An entrepreneur that opened an organic firm that has been closed again. After the firm was closed, the entrepreneur opened a new firm. The closed firm is active between year t0 and t1, whereas the new firm is active from t2>t1. The new firm may have: a) closed down (Type 1a in figure); or, b) still being active (Type 1b in figure).

[14] After 2008, there is monthly data on Employment for these firms. Prior to 2008, monthly employment data has to be interpolated data, and Statistics Denmark posts interpolated data. But the annual employment data used here is available for all years.

[15] Westhead and Wright (1998) also distinguish between novice, portfolio, and serial to mean sequential. Entrepreneurs, or the self-employed, move often between positions as entrepreneurs and as paid employees, as they map out their careers (Dillon and Stanton, 2016; Manso, 2016; and Humphries, 2016, using Swedish data).

Portfolio Entrepreneur. An entrepreneur that opened an organic firm and opened a second firm before closing the first. The first firm is active between year t0 and t1, whereas the next firm is active from t2<t1. The second firm may have: a) closed down (Type 2a); or, b) still being active (Type 2b). Additionally, an entrepreneur have never closed its first firm. At some point in time the entrepreneur opens up a new firm (Type 3).



A serial entrepreneur can also open more than two firms. In this case, a serial entrepreneur is said to be sequential if two of his firms are sequential (Types 1a and 1b). Otherwise, the serial entrepreneur is portfolio.

C. Measurement of Key Variables

Table 2 provides a summary of the variable names and definitions, and Tables 3 and 4 show mean values for these variables. Appendix Table A1 shows the decline of the sample size when each firm must have information on sales, and a further decline in the sample as information on the control variable is required.

D. The Characteristics and Average Success of Serial Entrepreneurs

As described above, the serial entrepreneur is one who opens more than one business from 2001 to 2013. The means of all the variables by subgroup tell the initial story of whether serial entrepreneurs are different and if they seem to perform better (without introducing the controls of the regressions).

In a few ways, the background characteristics serial entrepreneurs are different from those of novices; in most ways, they are the same (Table 3). Serial entrepreneurs are more likely to be men: 69% of novice entrepreneurs are men; 87% of serial entrepreneurs are men. All other personal characteristics are the same. Regarding education for both types, about 40% have a vocational education, and 28-33% have a 2-year college to a university degree. Perhaps surprisingly, their industry choices are the same. For all types of entrepreneurs, 40-45% are in services and 23-24% are in retail. Appendix Table A2 shows regression results for the linear probability of being a serial entrepreneur. The available characteristics for these people explain little of this probability. The regression results mimic the differences in the means in

Table 3: the biggest factor is that men are more likely than women to be serial entrepreneurs. Entrepreneurship for both types also rises slightly with age (at a declining rate).[16]

The biggest difference between serial entrepreneurs and novice entrepreneurs is that the companies serial entrepreneurs open are much more likely to be limited liability corporations (LLCs) and the companies novices open are sole proprietorships. Serial entrepreneurs' firms are 69% limited liability corporations, and novice entrepreneurs' firms are 24% LLCs (Table 3b). The important distinction between incorporated and un-incorporated firms is made in Levine and Rubinstein (2016)—using U.S. data, they show that those owners who incorporate are more likely to use non-routine cognitive skills and to earn more per hour and to work more hours. No comparable data is available here, but the higher rates of incorporation of serial entrepreneurs could also be a proxy for their higher non-routine cognitive skills that make the serial entrepreneurs perform at higher levels.

Do serial entrepreneurs run firms having higher sales than do novices? Are serial entrepreneurs also more productive? Before turning to the regression results, it is useful to see the raw means of the sales data.

But first, it must be acknowledged that firms have very different durations in business, and that the data on the number of months in business (and thus the sales for those months) is right censored. Firms originate after they open in 2001 or later; with 2013 as the last year of establishment. Most close before the sales data ends in 2014: in the original data (not conditioning on the availability of control variables) only 37% of firms are still in business after 2014. To limit the degree to which right censoring of the data alters the results of the sales performance regressions, firms are followed only for the first six years that they are in business (as described above).

The serial entrepreneur has more than twice the average sales of the novice entrepreneur (Table 4), and the serial entrepreneur is working with more than three times the amount of capital. Also, the serial entrepreneur employs about two people, and the novice only one.[17] The result of these differences is that the serial entrepreneur is almost twice as productive as the novice (row 3).

The bottom of Table 4 displays mean values for the characteristics of the entrepreneurs. Means for these variables were also displayed in Table 3a – the difference in mean values between Table 3 and Table 4 is that Table 4 means are conditional on being in the smaller sample of entrepreneurs who have complete data on their firms. Their mean values show that there are more men in the subsample of firms with complete data on sales and input values.

In some studies, it could be misleading to use data aggregated from the establishment to the firm level, because big firms open many plants or stores and the experience of each of these would differ. However, the distinction between the firm and establishment is not relevant in these entrepreneurship data, because, as Table 4 shows (row showing Average # of Workplaces), these small firms do not have more than one establishment. The firm is the establishment.

[16] Columns 4-6 drop the Experience variable to identify Age effects while omitting the multicollinearity between Age and Experience, and the regression results are the same as in columns 1-3.

[17] The mean Employment levels are 3 and 2 for the serial and the novice because the owner is included in the Employment numbers.

IV. Empirical Results: Sales and Employment

Before turning to the regressions, Table 5 shows the distributions of sales and employment for serial and novice entrepreneurs. The sales data shows that when these firms are big, they are more likely to be run by serial entrepreneurs.[18] The 90th percentile level of sales for the serial entrepreneur is $1.32 million dollars a year, while the 90th percentile of novice sales is $612,000: at each percentile of the sales distribution, the serial entrepreneurs are running much bigger firms.[19]

However, there are more novice entrepreneurs than serial entrepreneurs running all firms in general, so if we look at who is running firms with sales of $1million or more, about 65% of them are run by novices.

The employment distribution in Panel B is especially interesting in one way – the distribution of employment is even more skewed than that of sales. The median 50th percentile firm has only one "employee," and that employee is the owner/entrepreneur. In Table 3, the mean average Employment was 3 and 2 for the serial and the novice firms— these means are twice as big as medians.

A. Sales Regressions

Estimation of regression (1) shows that the serial firms are substantially bigger: with no controls, the serial has 67% higher average sales within detailed industries (Table 6, column 1).[20] Adding Experience and Experience-squared in business (column 2), the serial firm does not appear to grow faster than the novice after it opens, so the greater sales of serial occurs on the day the firm opens (but the Experience coefficient is subject to substantial sample selection bias, addressed shortly in fixed effects regressions).

What causes some firms to be bigger on their first day of business? The coefficients on the personal characteristics show that men open much larger businesses than women, and that married men and women also open larger businesses (column 2). But these person-specific variables cannot explain the serial entrepreneur advantage in sales, which remains at 65%.

Adding capital and labor to the regression, serial entrepreneurs are 39% more productive than novices (column 3). Because serial entrepreneurs open firms with more capital and labor, the relative sales gains of the serial entrepreneur fall from 65% to 39% when capital and labor are added.[21] But these serial gains are now gains in productivity, because capital and labor are held constant in the sales regression.

Do these small firms grow after they open their doors? Yes, within each firm, sales grow markedly, but serial firms do not grow much more than novice firms. The unbiased within-firm growth rates are in column 4, adding firm-fixed effects to the regression, to estimate equation (2). The implied growth is 20% a year in the first few years for the novice with the peak growth at 5.3 years implied by the quadratic

[18] The skewness of the sales data also show why the dependent variables in all regressions take the log of sales (and of employment).
[19] The sales at the 99th percentile have annual sales of $5.84 million.
[20] The mean gain in sales of the serial entrepreneur (relative to the novice) in Table 6 is a bit smaller than the mean gain in Table 4, because Table 6 controls for 88 industry dummies. Though the distribution of entrepreneur type by industry in Table 3 displayed no apparent differences in industry choice, the detailed industry controls suggest that serial owners operate in industries with slightly higher average sales.
[21] In these small firms, the quality of the Workforce Education does not affect sales, and it is shown elsewhere for Denmark that these small firms don't create skilled jobs (Kuhn, Malchow-Møller, Sørensen, 2016).

term on Experience. The within-firm sales growth rate for the serial entrepreneur is slightly greater than that of the novice (at 27% in the first year). What is clear is that there is sorting that goes on over time as these firms age: the smaller ones are more likely to drop out, so half of the apparent 35% annual growth rate in column 3 is because big firms survive longer than small ones.[22]

Within-firm growth of productivity is considerably smaller than within-firm growth of sales, because more than half of the within-firm growth of sales is due to the accumulation of capital and labor (column 5). For the serial entrepreneur, productivity does not grow within the firm.

In sum, firms operated by serial entrepreneurs are 39% more productive than those run by novice entrepreneurs, reinforcing Hypothesis 1 that serial entrepreneurs are stronger performers. But the serial entrepreneur does not increase the productivity of his firm after he opens it, rejecting Hypothesis 2.

B. Employment Regressions

Serial entrepreneurs do not employ many more people than novice entrepreneurs. On average, they employ 22% more people over the first six years in operation (Table 7). This is why the 67% sales advantage translates into a 39% productivity advantage after controlling for employees and capital – serial entrepreneurs achieve their higher sales with a modest increase in employment and also capital.

But the patterns of employing people are different than the patterns of selling goods or services: serial entrepreneurs open their doors with 41% fewer employees than novices (column 3) and then increase their employment 41% in their first year of operations and about 80% after their second year (column 5, recalling that the Employment data is measured annually).

These percentage increases are deceptive. These are tiny firms in terms of employment. Even a 100% increase in employment is going from one employee to two, and the median firm employs a fraction of a person in addition to the owner (Table 5). To focus on job creation by entrepreneurs, section IV.C. below follows the 43% of firms that employ people.

V. Empirical Results: Heterogeneity in the Gains from Being a Serial Entrepreneur

Thus far, these regression results provide estimates of the average serial entrepreneurs' advantage in producing higher productivity and sales in the firms he opens, relative to the novice. Are these advantages to serial entrepreneurship the same across all types of entrepreneurs and their firms? Regression equation (4) introduced possible differences in the returns to being a serial entrepreneur due to differences in the technology, market conditions, or personal characteristics of entrepreneurs. These differences are examined next.

A. Characteristics of the Firm

It could be expected that the sales and productivity advantages displayed by entrepreneurs running multiple businesses could vary by industry, for a range of reasons, such as that the technology of production or the conditions of the market—serial entrepreneurs in some industries that may value serial talent or knowledge more highly in other industries. Is the serial entrepreneur in retailing or services capitalizing on his talent or network as much as he is in construction or manufacturing?

[22] Models of duration in business in tables below show higher sales strongly predict longer durations.

Estimation of (4) with "k" as industry-specific coefficients for the four major industries shows that there are no industry differences in the mean effects of serial on sales (Appendix Table A3, in columns (1), (3), (5), (7)). There are modest industry differences in the productivity of serial entrepreneurs (columns 2, 4, 6, 8): after introducing capital and labor controls, the productivity gains of serial entrepreneurs are not as sizeable in services (where they are 36% more productive than novices) as in construction (where they are 49% more productive).[23] Employment regressions yield results showing that there are no significant industry differences in the coefficients on "Serial" in the level of employment (Appendix Table A4) or in the growth of employment (Appendix Table A5). The conclusion is that the results in Tables 6 and 7 above prevail across industries.

Existing data sets (for Denmark or the U.S.) do not permit researchers to separately examine the "high tech" sector, for several simple reasons: industry codes do not differentiate (except for the software industry and the hardware industry); it would be tough to argue that a sophisticated manufacturing firm today is not high-tech; and if researchers aim to study only software/hardware entrepreneurs, they are a very small subsample of entrepreneurs. Thus, the few studies of high tech use venture capital data. The Danish data especially does not lend itself to the study of high tech firms, because the Danish are not known for having large numbers of possible tech firms. Nevertheless, Appendix Table A6 presents results for a subindustry labelled "HKIS" which is the set of small industries that have labels suggesting they are either knowledge or technology intensive. Once again, the returns to being a serial entrepreneur are not distinguishably different for this sub-industry (more pointedly, they are not higher) compared to all other entrepreneurs (Table 6).

B. Characteristics of the Entrepreneur

These Danish data are a long panel in time and represent the population of entrepreneurs in Denmark, so serial entrepreneurs can be identified as "sequential" (27% of firms) or "portfolio" (73% of firms). Recall that the Data section defines portfolio as those that have run two or more businesses concurrently, and sequential is all others.

Serial entrepreneurs who concurrently maintain a portfolio of businesses (or, more accurately, two businesses concurrently since most have only two) have much higher sales and productivity. The real action in the gains to serial entrepreneurship is for the portfolio entrepreneur: the sales of the portfolio entrepreneur are 77% greater than those of the novice, and the sales of the sequential entrepreneur are 32% greater than those of the novice (Table 8).[24] Portfolio firms are 46% more productive and sequential firms are 22% more productive than novices. Portfolio firms also employ more people, and grow their within-firm employment at faster rates (Table 9). Yet, portfolio entrepreneurs do not have any personal traits that differ from those of serial entrepreneurs (Appendix Table A2).

Perhaps serial entrepreneurs perform better than novices because they are smarter, as measured by their educational attainment. All the evidence here on sales and productivity rejects that hypothesis.[25] Recall from Table 3 that serial entrepreneurs are no better educated. Education does raise sales a little bit: in

[23] Though not shown, the within firm fixed effects regressions for sales show that industries also do not have different growth rates.

[24] The regressions for "portfolio" and "sequential" contain all the novices in each regression, so the results for novices do not differ across these regressions.

[25] But in Table 18 below, well-educated entrepreneurs stay in business longer.

Table 6, the coefficient on education shows the college-educated have 10% higher sales. But considering only the college-educated subsample, where novices and serial entrepreneurs could be equally smart, there are still big gains to being a serial entrepreneur (that education can't explain): their sales are 62% higher and their productivity is 33% higher than novices (Tables 10 and 11).[26]

The conclusion is that either these types of firms (in construction, retail, and services) don't benefit from having better educated founders, or that education is simply a poor proxy for the secret sauce that makes new firms perform, and in particular, that makes new firms run by serial entrepreneurs perform. As a result, controlling for education does not answer the question of whether serial success is innate or learned over time, because even though education is surely correlated with IQ, education need not be correlated with other "innate" traits that result is better performing firms by serial entrepreneurs.[27]

C. Non-employers Versus Employers and Gender Differences

Put aside for the moment the topic of the returns to serial entrepreneurship, and consider the differences in the performance of men versus women, for all types of entrepreneurs. What has not been the focus of past research is that men open bigger firms than women – their sales are 28% higher, all else constant (Table 6, column 2). Table 12 shows the full distribution of sales by gender: new firms run by men have a higher median and a longer thicker right tail in sales (Panel A). Men also employ slightly more people than do women (regressions in Table 7), so the male productivity advantage is a lesser 17% (Table 3, column 3) compared to the male sales advantage of 28% (column 2). The past literature on entrepreneurs has rarely had data on the sales and productivity of their small firms, so all the emphasis has been on the probability of becoming an entrepreneur by gender, when women are shown to be less likely to become entrepreneurs.

But the question here is, do female serial entrepreneurs perform as well as male serial entrepreneurs? What are the returns to serial entrepreneurship by gender?

There is a notion that women open firms as a hobby, and men open firms to make money. To explore this possibility, it is time to compare firms that are opened with employees and those that have no initial employees.

It can be difficult to follow the literature on entrepreneurship because researchers use markedly different definitions of an entrepreneur as researchers access different data sets. Researchers often use "self-employed" to identify entrepreneurs when studying individuals' careers, but at other times, they use "founders." A distinction many would like to make is between those who create jobs for others versus

[26] However, educated entrepreneurs have slightly higher amounts of capital, perhaps due to their wealth or credit rankings, so when regressions control for capital, the overall return to education falls (column 3, Table 6) and the return to serial entrepreneurship among the college educated falls (column 7 , Table 10). Table 11 shows that serial entrepreneurs do not employ many more people but do hire later, within both education subsamples.

[27] For Danish data, Iversen, Malchow-Møller, and Sørensen (2010) show that highly educated self-employed do better as self-employed than do the less educated. Anecdotally, tech firms are by owners who are all highly educated, yet some firms succeed and some fail, and some of the successes are founders who do not complete college (i.e., Bill Gates). Moreover, Iversen, Malchow-Møller, and Sørensen (2016) find support for the hypothesis that theoretical skills from schooling and practical skills acquired through wage-work are complementary inputs in the human capital earnings function of self-employed.

those who work alone. The self-employed are more likely to work alone than are the founders, requiring a careful read of the broad literature that spans different definitions of entrepreneurs.[28]

The founders of these Danish firms are divided into two types: those who employ no one the day they open (the "non-employers") and those who employ others (the "employers").[29] These two groups are then followed over time, comparing the serial entrepreneurs within these two groups to the novice entrepreneurs. The number of observations displayed in the far right column of Table 12 shows that employers are 43% of all new firms. Though not shown in a table, these "employers" are firms that are almost all opened as Limited Liability Corporations, while the "Non-employers" are firms opened as sole proprietorships.

As would be expected, the "employers" have much higher sales than the "non-employers," and a thicker right tail in sales (Panel B, Table 12). At the median, employers are nearly four times bigger, and at the 90th percentile, employers are nearly five times bigger.

Among employers, the gains to serial entrepreneurship for women are greater than they are for men: holding constant their industry choice, the sales gain is 34% for women and 25% for men, for the serial entrepreneur versus the novice (Table 13, columns 5 and 1). The productivity gain of serial entrepreneurs is also greater for women than men, at 41% and 27% for women versus men (Table 13, columns 7 and 3).[30] But women are less likely than men to be employers, and less likely to be serial entrepreneurs (Table 16).

Among non-employers, the gains to serial entrepreneurship are the same for women and men (Table 14.) Mean sales are about 50% higher, but serial entrepreneurs use more capital, so productivity is 26-30% higher for men and women.

After the firm opens, how much does employment grow? Not surprisingly, firms that start as employers also grow employment at a faster rate within the firm over time. Serial entrepreneurs grow over 50% in their first year when they start as employers, and grow 30% when they start as non-employers (Table 15, firm fixed effects, columns 4 and 8). But as pointed out earlier, a big percent gain is a small number of employees, if you start with only one employee other than the owner. The employment gains of female entrepreneurs are the same as male entrepreneurs relative to novices of their own gender (not shown).

Putting the gender results aside for the moment, one big reason that serial entrepreneurs have higher sales when they open their firms compared to novices is that serial entrepreneurs are much more likely to be employers. Serial entrepreneurs are 30% of all employers, but only 12% of all non-employers (Table 16). Looking within each firm type (of employer and non-employer), the sales gains to being a serial

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[28] Lazear (2005) follows Stanford Graduate School of Business graduates, but limited his data to those who are "incorporated self-employed" which he states "eliminates most household and other service workers who work alone" (page 662). So, he does focus on employers. His founders are then in construction, retail trade, professional services, business services, and real estate, in that order.

[29] The "non-employers" are 91% sole proprietors (rather than limited liability corporations) and the "employers" are 70.5% corporations (rather than sole proprietors). The phrase "self employed" is not used here because it could encompass non-employers and employers and span firm type. Fairlie and Miranda (2016) examine the determinants of being an employer.

[30] For women, the productivity advantage of being a serial entrepreneur is greater than the sales advantage, because serial women achieve their sales gains with slightly less capital than do novices.

entrepreneur are large (25% for employers and 50% for non-employers), but not as large as the 67% across all firms (Table 6) when serial firms achieve these higher gains because serial entrepreneurs are more likely to be employers.

VI. The Duration in Business

The length of time that these firms stay in business is a topic studied previously, but worth revisiting here with these data. Past research has found that serial firms survive longer, but past researchers have not had data as rich as these Danish data for explaining durations.[31]

In these Danish data, the mean durations of serial entrepreneurs is 47.8 months (for the entire data set of 41,815 serial entrepreneurs) and 48.6 months (for the entire data set of 159,036 novice entrepreneurs).[32] Thus, both survive about four years.

At first glance, in the regressions, the firms run by serial entrepreneurs do not appear to last much longer.[33] For the 6.6 million observations of months on firm duration, the probability of exit of the serial firm is only 3.5% below all other firms (column 1, Table 17). But there is data on the duration of each of the firms owned by the serial entrepreneur, so the next step is to model the durations of these firms separately.

Serial entrepreneurs close their first firms more quickly than do the novice entrepreneurs: the probability of closure is 17% higher (Table 17, column 2, row 3) for the serial entrepreneurs' first firms relative to the novice, holding constant the personal characteristics of the entrepreneur. Adding controls for how successful the first firm is – the size of the capital and labor inputs (column 3) or the sales of the firm (column 4) – reveals that serial entrepreneurs shut down their first firms even faster than the novice.[34]

However, the second firms of the serial entrepreneurs have much lower exit rates: the probability of exit is 23% lower for his/her second firm relative to the first firm of the novice. The remaining columns of Table 17 show that second firms are open longer because they are more successful: controlling for past sales, the second firm of the serial entrepreneur is no different in duration than the novice firm.

Education does have a striking effect here that it didn't have when modeling sales. The second firms of the college educated stay in business much longer than those run by the vocationally educated. The second firm of a college-educated serial entrepreneur is 29% less likely to exit (with capital controls), and 14% less likely to exit even controlling for sales (column 6, Table 18). (Recall that the serial entrepreneur's sales and productivity are not higher for the well-educated.)

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[31] Lafontaine and Shaw (2015) show that for their 2.3million U.S. retail businesses, the second firm of the serial entrepreneur survives 7% longer than the first or the only firm of the novice.

[32] The longer durations in Table 4 are because these firms have data also on sales.

[33] In these duration regressions, all the observed years of the operation of the business are used – the data is not limited to the first six years in business as was done in the performance regressions.

[34] The coefficients on the control variables in the duration results make sense: high capital and high labor firms shut down less (column 2) because they are high sales firms (column 3). The sales effect on duration was also evident in Table 6, when the OLS returns to experience was biased upwards by the greater experience of high sales firms.

Gender effects in duration are modelled in two ways. First, across all firms, the "male" control variable shows that the firms operated by men have a 20% lower probability of exit than those operated by women (column 2, Table 17). But men open and run bigger firms, so after firm size is introduced, the men have a probability of exit that is only 8% lower than women (column 4). Second, female serial entrepreneurs are once again no different than male serial entrepreneurs. When all the coefficients on Serial are interacted with Male, the interactions are insignificant: serial men and women are equally likely to close first firms and equally likely to retain their second firms (not shown).

VII. Robustness

A concern with the measure of "serial" used here is that some firms labeled as "novice" may be serial if the Danish data went back in time prior to 2001. Some Danish data does: the information on firms opened for individual entrepreneurs goes back to 1990; the data on the sales of all new firms starts in 2001.

By going back in time ten years, it turns out that the number of entrepreneurs who are "serial" rises from 19,118 (based on serial defined from new firms years 2001-2013) to 37,089 (based on serial defined from new firms 1990-2013) (Table 19). This jump in the number of all entrepreneurs who are serial implies that 19% of all entrepreneurs observed for 2001-2013 are serial entrepreneurs, up from 10% used throughout this paper when the early history of entrepreneurs was omitted.[35]

The problem is, for those serial entrepreneurs who started firms prior to 2001, there is no information on the performance of their firms. Therefore, re-estimating all previous tables with this more accurate definition of who a "serial" is results in estimates of their firm performance with only the second firms they opened, not the first.

Table 20 replicates Table 6, but with a new definition of "serial" as those who opened more than one firm from 1990-2013. The estimated coefficients on "serial" fall modestly in the sales and productivity regressions but are still very large: Table 20 shows that serial firms are 57% bigger in sales and 33% more productive than novices; the comparable numbers from Table 6 are 67% and 39%. So, the results are sustained with the broader definition of serial, given the data that only follows their second firms, but not their first firms.

Another robustness check is to estimate Tables 6 and 7 using median regression, because all the performance data is rightward skewed. The median regression results are no different from the OLS, because the log(sales) dependent variable takes into account the rightward skew.

VIII. Conclusion

Serial entrepreneurs are much talked about, but little studied. Venture capitalists are said to seek them out because serial entrepreneurs have a combination of talent and learned experiences that increase the odds that their next company will be more successful than that pitched by a novice entrepreneur. Their visibility is in the high tech sector, but the logic of their value should also prevail for non-high-tech

[35] The much higher 19% is consistent with the U.S. data, that used a panel of 22 years (1990-2011) to identify serial entrepreneurs and found that more than 20% of all retail entrepreneurs in Texas were serial (Lafontaine and Shaw, 2015).

founders who open the vast majority of firms. Therefore, this paper aims to identify whether serial entrepreneurs perform better than novices, and which of these serial entrepreneurs are the highest performers.

The data requirements to study serial entrepreneurs are extensive, requiring many years of panel data to identify entrepreneurs as serial versus novice, and then matching of their personal traits to the performance of the firms they found. The Danish data on the population of entrepreneurs and the performance of their firms for 2001-2013 provides the unique data needed. These are the founders of firms, but, as pointed out by Levine and Rubinstein (2016), they are largely small business owners across a range of industries in which they do not plan to grow big or to innovative.

Serial entrepreneurs are a sizable group of entrepreneurs. When "serial" status is measured using the 2001-2013 data they are 10% of all entrepreneurs, but they run multiple firms, so 20% of all firms are run by serial entrepreneurs. In Denmark, there are 43,929 firms run by people identified as serial entrepreneurs from 2001-2013.[36]

In seeking to identify the relative performance of the serial entrepreneur versus the novice entrepreneur, two more general types of entrepreneurs emerge. First, there are larger scale entrepreneurs, who register their first company as a Limited Liability Corporation and who open their doors with employees and with relatively high sales and capital. These are less than half of all entrepreneurs. Among this group, serial entrepreneurs are the stronger performers: they are about 35% more productive than novices. However, if we focus only portfolio serial entrepreneurs—who operate several businesses simultaneously rather than closing their first business before they open their second—these types of serial entrepreneurs are about 45% more productive than novices.

Second, there are smaller scale entrepreneurs, who register their first (and usually only) company as a sole proprietor, typically without employees and with low sales and capital. These entrepreneurs rarely open second firms to become serial entrepreneurs. But when they do, the productivity of the average firm of the serial entrepreneur is about 30% higher than the only firm run by the novice, and their sales is about 50% higher.

Combining the large and small-scale firms for the entire panel dataset of 877,417 firm-time observations, serial entrepreneurs are 39% more productive and have 67% higher sales than novice entrepreneurs. That is, for the entire population of entrepreneurs, serial entrepreneurs perform much better than novices. The subsample analysis above reveals that a portion of their performance advantage can be explained by the serial entrepreneurs' greater propensity to open corporations with employees: the work of Levine and Rubinstein (2016) suggests that these entrepreneurs who incorporate have better non-routine cognitive skills.[37]

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[36] This is about a 50% underestimate of the number of firms run by serial entrepreneurs during this time. When the time period for calculating who is a serial entrepreneur is extended back to 1990, the number of serial entrepreneurs rises from 19,118 to 37,089 over the entire 1990-2013 period. However, there is no information on the firms run by serial entrepreneurs (or novice entrepreneurs) prior to 2001, so the paper focuses on the definition of "serial" using the 2001-2013 data and shows that the productivity advantage of the group of serial relative to the novice's slightly higher than the group of serial defined back to 1990.

[37] Levin and Rubinstein (2016) also find that the incorporated tend to be male, white, better-educated, and from wealthier families; here, serial entrepreneurs are more likely to be male in Denmark.

The large size and richness of these Danish data permit us to see how female entrepreneurs fare when they open new firms. It has been well established previously that women are less likely to become entrepreneurs, and that is true here. It is also true that the firms women run are smaller on average. But an interesting revelation comes from the focus here on serial entrepreneurs. Relative to other women, the productivity advantage of female serial entrepreneurs is larger than the productivity advantage of male serial entrepreneurs relative to male novices. Because serial female entrepreneurs perform so well, their sales and productivity are as high as the average male entrepreneur (where men are mostly novices). Female serial entrepreneurs also stay in business as long as men.

The conclusion is that the firms run by serial entrepreneurs are 39% more productive than those run by novice entrepreneurs. These entrepreneurs may be born with more talent, may learn it from their parents, may learn it from prior employers, or may develop it as they run multiple firms of their own. This paper focuses on which serial entrepreneurs perform better than novices – a deeper understanding of why they perform better would necessitate the development of an expansive database on their employment prior to entrepreneurship and their early family life.

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Table 1: Types of Entrepreneurs and Entrepreneurial Firms

	# of firms per entrepreneur	# of entrepreneurs	Percent	Cumulative	# of firms	Percent	Cumulative
Novice Entrepreneurs	1	171,716	89.98	89.98	171,716	79.63	79.63
	2	15,505	8.12	98.11	31,010	14.38	94.01
	3	2,526	1.32	99.43	7,578	3.51	97.52
	4	696	0.36	99.8	2,784	1.29	98.81
Serial Entrepreneurs	5	192	0.1	99.9	960	0.45	99.26
	6	92	0.05	99.94	552	0.26	99.52
	7	38	0.02	99.96	266	0.12	99.64
	8	22	0.01	99.98	176	0.08	99.72
	9	11	0.01	99.98	99	0.05	99.77
	>=10	36	0.02	100	504	0.23	100
All	Total	190,834	100		215,645	100	

Table 2: Description of variables

Variable	In regression
Sales	Average monthly sales in US dollars, Thousands
Serial E Firm	Dummy variable equal to one if number of firms by E is 2 or more
Semi-annual experience	Experience variable – measure time since establishment of firm in periods of six months or years
Semi-annual experience of SE Firm	Serial E Firm * Semi-annual or annual experience
Married	Equal to 1 if entrepreneur is married when firm is established
Education	Number of years in school completed by entrepreneur when firm is established
Male	Equal to 1 if entrepreneur is male
Business Experience	Number of years' business experience as wage employed for entrepreneur when firm is established
Age	Age of entrepreneur when firm is established
Immigrant	Equal to 1 if entrepreneur is immigrant
Descendent	Equal to 1 if entrepreneur is descendent
Log(Capital)	Log(Capital in firm) measured in terms of fixed assets and is obtained from accounting data in US dollars, Thousands.
Log(Employment)	Log(Employment) in firm is the quantity of employees measured in full time equivalent units. Including owner for Sole proprietorship
Workforce Education	Average years of schooling of employees in firm (excl. owner).

Table 3a: Characteristics of Entrepreneurs; Across Types of Entrepreneur

		Serial entrepreneur			Novice entrepreneur		
		Frequency	Percent	Cum	Frequency	Percent	Cum
Persons	Total	19,118			171,716		
Education of entrepreneur	Elementary	2,887	15.1	15.1	34,088	19.9	19.9
	High-School	1,902	10.0	25.1	14,322	8.3	28.2
	Vocational	7,599	39.8	64.8	66,748	38.9	67.1
	2 year college	1,407	7.4	72.2	9,327	5.4	72.5
	4 year college	2,596	13.6	85.7	22,024	12.8	85.3
	University	2,284	12.0	97.7	17,166	10.0	95.3
	Unknown	443	2.3	100.0	8,041	4.7	100.0
Marital Status	Married	10,108	52.9	52.9	88,404	51.5	51.5
	Single	8,871	46.4	99.3	80,047	46.6	98.1
	Unknown	139	0.7	100.0	3,265	1.9	100.0
Gender	Man	16,544	86.5	86.5	117,943	68.7	68.7
	Woman	2,558	13.4	99.9	50,893	29.6	98.3
	Unknown	16	0.1	100.0	2,880	1.7	100.0
Danes, Immigrants and descendants	Danes	17,518	91.6	91.7	145,546	84.8	86.7
	Immigrants	1,300	6.8	98.5	20,340	11.9	98.5
	Descendants	279	1.5	100.0	2,565	1.5	100.0
	Unknown	21	0.1	0.1	3,265	1.9	1.9
		Mean	**Percent**	**Cum**	**Mean**	**Percent**	**Cum**
Age		39.6	99.9	99.9	39.0	98.3	98.3
		NA	0.1	100.0	NA	1.7	100.0
Business experience from wage work in years		13.1	99.9	99.9	12.5	98.1	98.1
		NA	0.1	100.0	NA	1.9	100.0

Table 3b: Characteristics of Entrepreneurial Firms; Across Types of Entrepreneur

		Serial entrepreneur			**Novice entrepreneur**		
		Frequency	Percent	Cum	Frequency	Percent	Cum
All firms	Total	43,929	100.0	100.0	171,716	100.0	100.0
Firm type	Sole proprietorship	11,232	25.6	25.6	126,667	73.8	73.8
	Stock-based corporation	2,406	5.5	31.0	3,266	1.9	75.7
	Limited liability company	30,178	68.7	99.7	41,689	24.3	99.9
	Other	113	0.3	100.0	94	0.1	100.0
Sectors	Manufacturing	2,224	5.1	5.1	7,546	4.4	4.4
	Service	19,484	44.4	49.4	85,234	49.6	54.0
	High Tech Knowledge	4,207	9.6	59.0	12,469	7.3	61.3
	Retail	10,471	23.8	82.8	39,964	23.3	84.6
	Construction	5,380	12.2	95.1	21,849	12.7	97.3
	Other	2,163	4.9	100.0	4,654	2.7	100.0

Table 4: Characteristics of Entrepreneurial Firms and Entrepreneur; Across Types of Entrepreneur; Average for first 6 years

	Serial Entrepreneur			Novice Entrepreneur		
	#firms	Mean	Std Dev	#firms	Mean	Std Dev
Firm Characteristics						
Sales (monthly $1000)	27,873	56.3	469.5	115,326	25.6	172.1
Employment	27,873	3.0	8.4	115,326	1.9	5.7
Labor Productivity	27,873	23.6	191.0	115,326	12.7	63.4
Capital Stock	27,873	446.4	9057.0	115,326	137.7	2695.6
Capital Intensity	27,873	328.2	22930.6	115,326	91.5	1699.3
Average workforce education	21,739	12.1	2.4	52,930	11.8	2.4
Average # of workplaces[1]	26,725	1.0	0.3	111,917	1.0	0.2
Months in business	27,873	53.9	38.7	115,326	53.8	41.5
Entrepreneur Characteristics						
Married	27,873	0.6	0.5	115,326	0.6	0.5
Male	27,873	0.9	0.3	115,326	0.8	0.4
Business Experience	27,873	13.1	8.6	115,326	13.6	9.4
Age	27,873	38.6	9.5	115,326	39.1	10.8
Education	27,873	12.9	2.6	115,326	12.5	2.6
Dane	27,873	0.9	0.3	115,326	0.9	0.3
Immigrant	27,873	0.1	0.2	115,326	0.1	0.3
Descendant	27,873	0.0	0.1	115,326	0.0	0.1

Note: The averages are based on 479,739 annual observations; 96,045 observations for serial entrepreneurs and 383,694 for novice entrepreneurs.

[1] The "months in business" uses the available data in months, not truncated to their first 6 years in business.

Table 5:

Panel A: Distribution of Sales of Novice and Serial Entrepreneur, 1,000 USD

Percentiles	1	5	10	25	50	75	90	95	99	#observation
Serial E	0.6	2.0	3.5	8.1	20	50	110	181	487	175,410
Novice E	0.4	1.3	2.1	4.2	8.7	21	51	87	266	702,007
All	0.4	1.4	2.3	4.6	10	26	64	109	318	877,415

Panel B: Distribution of Employment of Novice and Serial Entrepreneur

Percentiles	1	5	10	25	50	75	90	95	99	#observation
Serial E	0.5	0.5	0.5	1.0	1.2	3.2	6.5	9.6	21	175,410
Novice E	0.5	0.5	1.0	1.0	1.0	1.7	3.6	5.6	12	702,007
All	0.5	0.5	0.9	1.0	1.0	2.0	4.2	6.6	15	877,415

Note: The percentiles are presented for averages of 5 firms around the specific percentile. This is done to fulfill Statistics Denmark's regulations on anonymity.

Table 6: Sales of Novice and Serial Entrepreneurs - 6 years Semi-annual data

	OLS	OLS	OLS	FE	FE
Serial E Firm	0.670***	0.653***	0.389***		
	(0.009)	(0.011)	(0.009)		
Experience (time of firm)		0.180***	0.038***	0.107***	0.042***
		(0.002)	(0.001)	(0.001)	(0.001)
Experience-squared		-0.008***	-0.001***	-0.005***	-0.001***
		(0.000)	(0.000)	(0.000)	(0.000)
Experience of SE		-0.005	-0.047***	0.027***	-0.026***
		(0.004)	(0.003)	(0.004)	(0.003)
Experience of SE-squared		0.000	0.003***	-0.002***	0.002***
		(0.000)	(0.000)	(0.000)	(0.000)
Married		0.168***	0.066***		
		(0.007)	(0.004)		
Years of Schooling		0.026***	0.013***		
		(0.001)	(0.001)		
Male		0.282***	0.169***		
		(0.008)	(0.005)		
Business Experience (for entrepreneur)		-0.000	0.004***		
		(0.000)	(0.000)		
Age		-0.000	-0.003***		
		(0.000)	(0.000)		
Immigrant		-0.299***	-0.043***		
		(0.011)	(0.007)		
Descendant		-0.109***	0.030		
		(0.027)	(0.018)		
log(Capital)			0.251***		0.107***
			(0.002)		(0.002)
log(Employment)			0.603***		0.518***
			(0.004)		(0.005)
Workforce Education			0.014***		-0.002
			(0.001)		(0.001)
R-squared	0.180	0.235	0.579	0.830	0.851
Number of observations	877417	877417	877417	877417	877417

Note: The dependent variables are the log of semi-annual sales. "Serial E" is a dummy variable equal to one if the firm is established by a founder that is a serial entrepreneur; 0 otherwise. Experience is the number of six-month periods since the business was founded. Robust standard errors in parentheses clustered on firm-entrepreneur. All regressions include the 88 industry dummies for 2-digit NACE rev.2 and are bi-annual. Also included are time dummies for each bi-annual time period. Number of Firms: All firms: 143199; Novice E: 115326; Serial E: 27873. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Employment of Novice and Serial Entrepreneurs - 6 years Annual data

	OLS	OLS	OLS	FE	FE
Serial E Firm	0.220***	-0.156***	-0.405***		
	(0.006)	(0.008)	(0.008)		
Experience (time of firm)		0.225***	0.098***	0.211***	0.166***
		(0.002)	(0.002)	(0.002)	(0.002)
Experience-squared		-0.020***	-0.008***	-0.021***	-0.016***
		(0.000)	(0.000)	(0.000)	(0.000)
Experience of SE		0.219***	0.229***	0.239***	0.236***
		(0.006)	(0.006)	(0.007)	(0.006)
Experience of SE-squared		-0.024***	-0.024***	-0.027***	-0.026***
		(0.001)	(0.001)	(0.001)	(0.001)
Married		0.070***	0.016***		
		(0.004)	(0.003)		
Years of Schooling		0.009***	0.003***		
		(0.001)	(0.001)		
Male		0.056***	0.007**		
		(0.005)	(0.003)		
Business Experience (for entrepreneur)		-0.002***	-0.000		
		(0.000)	(0.000)		
Age		0.001***	-0.000**		
		(0.000)	(0.000)		
Immigrant		-0.179***	-0.048***		
		(0.007)	(0.005)		
Descendant		-0.114***	-0.055***		
		(0.015)	(0.011)		
log(Capital)			0.115***		0.065***
			(0.001)		(0.001)
Workforce Education			0.009***		0.008***
			(0.001)		(0.001)
R-squared	0.072	0.141	0.476	0.821	0.843
Number of observations	479739	479739	479739	479739	479739

Note: The dependent variables are the log of annual employment. "Serial E" is a dummy variable equal to one if the firm is established by a founder that is a serial entrepreneur; 0 otherwise. Experience is the number of years since the business was founded. Robust standard errors in parentheses clustered on firm-entrepreneur. All regressions include the 88 industry dummies for 2-digit NACE rev.2 and are bi-annual. Also included are time dummies for each bi-annual time period. Number of Firms: All firms: 143199; Novice E: 115326; Serial E: 27873 *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Sales of Novice and Serial Entrepreneurs - 6 years Semi-annual data

	Sequential SE				Portfolio SE			
	OLS	OLS	OLS	FE	OLS	OLS	OLS	FE
Serial E Firm	0.323***	0.386***	0.220***		0.772***	0.764***	0.456***	
	(0.015)	(0.020)	(0.016)		(0.010)	(0.013)	(0.010)	
Experience (time of firm)		0.180***	0.035***	0.108***		0.181***	0.038***	0.107***
		(0.002)	(0.002)	(0.002)		(0.002)	(0.001)	(0.001)
Experience-squared		-0.008***	-0.001***	-0.005***		-0.008***	-0.001***	-0.005***
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Experience of SE		-0.021**	-0.036***	-0.007		-0.010**	-0.055***	0.038***
		(0.008)	(0.007)	(0.007)		(0.005)	(0.004)	(0.004)
Experience of SE-squared		0.001**	0.003***	-0.000		-0.000	0.003***	-0.002***
		(0.001)	(0.001)	(0.001)		(0.000)	(0.000)	(0.000)
Married		0.172***	0.072***			0.164***	0.063***	
		(0.007)	(0.005)			(0.007)	(0.004)	
Years of Schooling		0.026***	0.013***			0.026***	0.013***	
		(0.002)	(0.001)			(0.001)	(0.001)	
Male		0.284***	0.171***			0.282***	0.170***	
		(0.009)	(0.006)			(0.008)	(0.005)	
Business Experience (for entrepreneur)		0.000	0.005***			-0.000	0.004***	
		(0.001)	(0.000)			(0.000)	(0.000)	
Age		-0.002***	-0.004***			-0.000	-0.003***	
		(0.000)	(0.000)			(0.000)	(0.000)	
Immigrant		-0.300***	-0.039***			-0.304***	-0.043***	
		(0.012)	(0.008)			(0.012)	(0.008)	
Descendant		-0.093***	0.040**			-0.112***	0.029	
		(0.029)	(0.020)			(0.028)	(0.019)	
log(Capital)			0.260***				0.251***	
			(0.003)				(0.002)	
log(Employment)			0.613***				0.605***	
			(0.005)				(0.004)	
Workforce Education			0.014***				0.015***	
			(0.002)				(0.001)	
R-squared	0.147	0.207	0.565	0.825	0.188	0.242	0.584	0.831
Number of observations	742654	742654	742654	742654	836770	836770	836770	836770

Note: See footnote to Table 6. Sequential Entrepreneur: An entrepreneur opened an organic firm that has been closed again. After the firm was closed, the entrepreneur opened a new firm. Portfolio Entrepreneur: An entrepreneur opened an organic firm that has been closed again. Before the firm was closed, the entrepreneur opened a new firm. Number of Firms: All firms: 143199; Novice E: 115326; Serial E - sequential: 7653, Serial E - portfolio: 20220

Table 9: Employment of Novice and Serial Entrepreneurs - 6 years Annual data

	Sequential SE				Portfolio SE			
	OLS	OLS	OLS	FE	OLS	OLS	OLS	FE
Serial E Firm	0.056***	-0.079***	-0.230***		0.269***	-0.177***	-0.463***	
	(0.010)	(0.015)	(0.013)		(0.007)	(0.010)	(0.009)	
Experience (time of firm)		0.226***	0.106***	0.211***		0.226***	0.099***	0.211***
		(0.002)	(0.002)	(0.002)		(0.002)	(0.002)	(0.002)
Experience-squared		-0.020***	-0.009***	-0.021***		-0.020***	-0.008***	-0.021***
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Experience of SE		0.101***	0.112***	0.119***		0.255***	0.269***	0.277***
		(0.012)	(0.011)	(0.012)		(0.007)	(0.006)	(0.008)
Experience of SE-squared		-0.012***	-0.013***	-0.015***		-0.029***	-0.029***	-0.031***
		(0.002)	(0.002)	(0.002)		(0.001)	(0.001)	(0.001)
Married		0.064***	0.012***			0.069***	0.016***	
		(0.004)	(0.003)			(0.004)	(0.003)	
Years of Schooling		0.009***	0.002***			0.009***	0.003***	
		(0.001)	(0.001)			(0.001)	(0.001)	
Male		0.055***	0.010***			0.056***	0.007**	
		(0.005)	(0.003)			(0.005)	(0.003)	
Business Experience (for entrepreneur)		-0.002***	-0.000			-0.003***	-0.000	
		(0.000)	(0.000)			(0.000)	(0.000)	
Age		0.001**	-0.000*			0.001***	-0.000*	
		(0.000)	(0.000)			(0.000)	(0.000)	
Immigrant		-0.173***	-0.047***			-0.183***	-0.052***	
		(0.007)	(0.005)			(0.007)	(0.005)	
Descendant		-0.101***	-0.047***			-0.111***	-0.051***	
		(0.015)	(0.012)			(0.015)	(0.012)	
log(Capital)			0.101***				0.113***	
			(0.002)				(0.001)	
Workforce Education			0.006***				0.010***	
			(0.001)				(0.001)	
R-squared	0.059	0.121	0.475	0.821	0.077	0.146	0.479	0.822
Number of observations	406072	406072	406072	406072	457361	457361	457361	457361

Note: See footnote to Table 6. Sequential Entrepreneur: An entrepreneur opened an organic firm that has been closed again. After the firm was closed, the entrepreneur opened a new firm. Portfolio Entrepreneur: An entrepreneur opened an organic firm that has been closed again. Before the firm was closed, the entrepreneur opened a new firm. Number of Firms: All firms: 143199; Novice E: 115326; Serial E - sequential: 7653, Serial E - portfolio: 20220

Table 10: Sales of Novice and Serial Entrepreneurs - 6 years Semi-annual data

	Vocational and below				College			
	OLS	OLS	OLS	FE	OLS	OLS	OLS	FE
Serial E Firm	0.682***	0.685***	0.407***		0.620***	0.553***	0.331***	
	(0.010)	(0.013)	(0.011)		(0.017)	(0.020)	(0.017)	
Experience (time of firm)		0.188***	0.047***	0.120***		0.158***	0.014***	0.075***
		(0.002)	(0.002)	(0.002)		(0.004)	(0.003)	(0.003)
Experience-squared		-0.009***	-0.002***	-0.006***		-0.006***	0.001***	-0.003***
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Experience of SE		-0.007	-0.052***	0.022***		0.005	-0.031***	0.044***
		(0.005)	(0.004)	(0.004)		(0.008)	(0.007)	(0.007)
Experience of SE-squared		0.000	0.003***	-0.001***		-0.001	0.002***	-0.003***
		(0.000)	(0.000)	(0.000)		(0.001)	(0.001)	(0.001)
Married		0.167***	0.065***			0.150***	0.060***	
		(0.008)	(0.005)			(0.014)	(0.009)	
Years of Schooling		0.034***	0.016***			0.034***	0.011***	
		(0.003)	(0.002)			(0.005)	(0.003)	
Male		0.257***	0.162***			0.318***	0.171***	
		(0.010)	(0.006)			(0.015)	(0.010)	
Business Experience (for entrepreneur)		-0.001	0.004***			0.003***	0.004***	
		(0.001)	(0.000)			(0.001)	(0.001)	
Age		0.002***	-0.002***			-0.008***	-0.006***	
		(0.000)	(0.000)			(0.001)	(0.001)	
Immigrant		-0.282***	-0.033***			-0.295***	-0.044***	
		(0.013)	(0.008)			(0.023)	(0.016)	
Descendant		-0.122***	0.037*			0.007	0.011	
		(0.029)	(0.020)			(0.068)	(0.049)	
log(Capital)			0.245***				0.269***	
			(0.003)				(0.005)	
log(Employment)			0.606***				0.590***	
			(0.005)				(0.008)	
Workforce Education			0.020***				0.003	
			(0.002)				(0.002)	
R-squared	0.194	0.251	0.596	0.836	0.164	0.213	0.547	0.816
Number of observations	636000	636000	636000	636000	241417	241417	241417	241417

Note: See note to Table 6. Educational attainment is split into vocational education and below as well as higher education. Number of Firms: Up to Vocational: All firms: 102721; Novice E: 83800; Serial E: 18921; Higher Education: All firms: 40478; Novice E: 31526; Serial E: 8952

Table 11: Employment of Novice and Serial Entrepreneurs - 6 years Annual data

	Vocational and below				College			
	OLS	OLS	OLS	FE	OLS	OLS	OLS	FE
Serial E Firm	0.237***	-0.140***	-0.399***		0.174***	-0.208***	-0.420***	
	(0.007)	(0.010)	(0.009)		(0.011)	(0.015)	(0.014)	
Experience (time of firm)		0.232***	0.104***	0.214***		0.206***	0.084***	0.204***
		(0.003)	(0.002)	(0.003)		(0.004)	(0.004)	(0.005)
Experience-squared		-0.021***	-0.009***	-0.021***		-0.017***	-0.007***	-0.020***
		(0.000)	(0.000)	(0.000)		(0.001)	(0.001)	(0.001)
Experience of SE		0.223***	0.234***	0.248***		0.215***	0.222***	0.220***
		(0.008)	(0.007)	(0.008)		(0.012)	(0.010)	(0.012)
Experience of SE-squared		-0.025***	-0.025***	-0.028***		-0.024***	-0.024***	-0.024***
		(0.001)	(0.001)	(0.001)		(0.002)	(0.002)	(0.002)
Married		0.072***	0.018***			0.056***	0.007	
		(0.005)	(0.003)			(0.008)	(0.006)	
Years of Schooling		0.015***	0.006***			0.010***	-0.001	
		(0.002)	(0.001)			(0.003)	(0.002)	
Male		0.048***	0.013***			0.073***	-0.004	
		(0.006)	(0.004)			(0.008)	(0.006)	
Business Experience (for entrepreneur)		-0.003***	-0.000			-0.001	0.000	
		(0.000)	(0.000)			(0.001)	(0.000)	
Age		0.002***	0.000			-0.003***	-0.001***	
		(0.000)	(0.000)			(0.001)	(0.000)	
Immigrant		-0.178***	-0.054***			-0.162***	-0.030***	
		(0.008)	(0.006)			(0.013)	(0.009)	
Descendant		-0.129***	-0.059***			-0.013	-0.029	
		(0.015)	(0.012)			(0.045)	(0.034)	
log(Capital)			0.115***				0.114***	
			(0.002)				(0.003)	
Workforce Education			-0.007***				0.027***	
			(0.002)				(0.002)	
R-squared	0.073	0.146	0.486	0.819	0.079	0.141	0.457	0.826
Number of observations	347015	347015	347015	347015	132724	132724	132724	132724

Note: See note to Table 7. Educational attainment is split into vocational education and below versus higher education of college. Number of Firms: Up to Vocational: All firms: 102721; Novice E: 83800; Serial E: 18921; Higher Education: All firms: 40478; Novice E: 31526; Serial E: 8952

Table 12:

Panel A: Distribution of Sales by Gender (1,000 USD)

Percentiles	1	5	10	25	50	75	90	95	99	#observation
Male	0.4	1.5	2.5	5.0	11	28	70	119	348	691,983
Female	0.4	1.2	1.8	3.5	7.3	18	41	68	191	185,434
All	.4	1.4	2.3	4.6	10	26	64	108	318	877,417

Panel B: Distribution of Sales by Employer Type (1,000 USD)

Percentiles	1	5	10	25	50	75	90	95	99	#observation
Employer	0.7	2.9	5.0	11	23	52	109	108	490	378,148
Non-employer	0.3	1.1	1.8	3.3	6.1	12	23	37	115	499,269
All	0.4	1.4	2.3	4.6	10	26	64	108	318	877,417

Panel C: Distribution of Employment by Employer Type

Percentiles	1	5	10	25	50	75	90	95	99	#observation
Employer	0.5	0.5	0.6	1.0	2.0	3.7	6.9	9.8	21	378,148
Non-employer	0.5	0.5	1.0	1.0	1.0	1.0	1.3	2.1	5.1	499,269
All	0.5	0.5	0.9	1.0	1.0	2.0	4.2	6.6	15	877,417

Panel D: Distribution of Productivity by Employer Type (1,000 USD)

Percentiles	1	5	10	25	50	75	90	95	99	#observation
Employer	0.6	2.4	4.0	6.9	11	19	35	53	144	378,148
Non-employer	0.3	1.1	1.8	3.3	6.0	11	19	24	86	499,269
All	0.4	1.4	2.2	4.3	8.0	14	26	41	115	877,417

Note: The percentiles are presented for averages of 5 firms around the specific percentile. This is done to fulfill Statistics Denmark's regulations on anonymity.

Table 13: Sales of Novice and Serial Entrepreneurs - 6 years Semi-annual data - Gender and Employers

	Male				Female			
	OLS	OLS	OLS	FE	OLS	OLS	OLS	FE
Serial E Firm	0.249***	0.305***	0.265***		0.339***	0.430***	0.405***	
	(0.012)	(0.016)	(0.013)		(0.028)	(0.036)	(0.032)	
Experience (time of firm)		0.169***	-0.003	0.126***		0.137***	-0.002	0.095***
		(0.003)	(0.003)	(0.003)		(0.006)	(0.005)	(0.005)
Experience-squared		-0.008***	0.001***	-0.007***		-0.006***	0.002***	-0.005***
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Experience of SE		-0.019***	-0.046***	-0.006		-0.026*	-0.070***	0.013
		(0.006)	(0.005)	(0.005)		(0.014)	(0.012)	(0.012)
Experience of SE-squared		0.001***	0.003***	0.001*		0.002	0.005***	-0.001
		(0.000)	(0.000)	(0.000)		(0.001)	(0.001)	(0.001)
Married		0.163***	0.064***			0.117***	0.046***	
		(0.012)	(0.008)			(0.021)	(0.014)	
Years of Schooling		0.025***	0.014***			0.011**	0.010***	
		(0.003)	(0.002)			(0.005)	(0.003)	
Male		0.000	0.000			0.000	0.000	
		(.)	(.)			(.)	(.)	
Business Experience (for entrepreneur)		0.002***	0.005***			0.007***	0.006***	
		(0.001)	(0.001)			(0.002)	(0.001)	
Age		-0.002***	-0.003***			-0.006***	-0.004***	
		(0.001)	(0.000)			(0.001)	(0.001)	
Immigrant		-0.443***	-0.135***			-0.250***	-0.078***	
		(0.021)	(0.014)			(0.035)	(0.024)	
Descendant		-0.239***	-0.023			-0.131	0.046	
		(0.046)	(0.032)			(0.108)	(0.080)	
log(Capital)			0.136***				0.151***	
			(0.003)				(0.007)	
log(Employment)			0.751***				0.746***	
			(0.006)				(0.012)	
Workforce Education			0.009***				0.010***	
			(0.002)				(0.003)	
R-squared	0.093	0.139	0.515	0.812	0.112	0.150	0.503	0.822
Number of observations	305480	305480	305480	305480	72668	72668	72668	72668

Note: See note to Table 6. Employers are firms that begin activities with a positive number of employees. Number of Firms: Male: All firms: 44345; Novice E: 29114; Serial E: 15231;: Female11647; Novice E: 9536; Serial E: 2111

Table 14: Sales of Novice and Serial Entrepreneurs - 6 years Semi-annual data - Gender and Non-employers

	Male					Female			
	OLS	OLS	OLS	FE		OLS	OLS	OLS	FE
Serial E Firm	0.499***	0.325***	0.262***			0.519***	0.408***	0.302***	
	(0.013)	(0.017)	(0.014)			(0.031)	(0.043)	(0.037)	
Experience (time of firm)		0.161***	0.038***	0.105***			0.149***	0.014***	0.085***
		(0.002)	(0.002)	(0.002)			(0.004)	(0.004)	(0.004)
Experience-squared		-0.007***	-0.001***	-0.005***			-0.007***	0.001**	-0.004***
		(0.000)	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)
Experience of SE		0.057***	0.004	0.062***			0.045**	-0.001	0.064***
		(0.007)	(0.006)	(0.007)			(0.018)	(0.016)	(0.018)
Experience of SE-squared		-0.004***	-0.001*	-0.003***			-0.003**	-0.001	-0.004**
		(0.001)	(0.001)	(0.001)			(0.002)	(0.001)	(0.001)
Married		0.123***	0.076***				0.010	0.002	
		(0.008)	(0.006)				(0.012)	(0.009)	
Years of Schooling		0.016***	0.011***				0.005**	0.004*	
		(0.002)	(0.001)				(0.003)	(0.002)	
Male		0.000	0.000				0.000	0.000	
		(.)	(.)				(.)	(.)	
Business Experience (for entrepreneur)		0.003***	0.004***				0.005***	0.005***	
		(0.001)	(0.000)				(0.001)	(0.001)	
Age		-0.006***	-0.004***				-0.002**	-0.002***	
		(0.000)	(0.000)				(0.001)	(0.001)	
Immigrant		-0.065***	0.010				-0.006	0.047***	
		(0.014)	(0.011)				(0.022)	(0.017)	
Descendant		-0.035	0.028				0.142**	0.064	
		(0.030)	(0.023)				(0.064)	(0.051)	
log(Capital)			0.332***					0.348***	
			(0.004)					(0.009)	
log(Employment)			0.377***					0.352***	
			(0.010)					(0.022)	
Workforce Education			0.019***					0.013**	
			(0.003)					(0.005)	
R-squared	0.130	0.188	0.426	0.730		0.156	0.206	0.428	0.741
Number of observations	386503	386503	386503	386503		112766	112766	112766	112766

Note: See note to Table 6. Non-employers are firms that begin activities without employees. Number of Firms: Male: All firms: 66789; Novice E: 57546; Serial E: 9243; Higher Education: Female: 20418; Novice E: 19130; Serial E: 1288

Table 15: Employment of Novice and Serial Entrepreneurs - 6 years Annual data

	Non-Employers				Employers			
	OLS	OLS	OLS	FE	OLS	OLS	OLS	FE
Serial E Firm	0.025***	-0.319***	-0.359***		0.095***	-0.061***	-0.127***	
	(0.006)	(0.009)	(0.010)		(0.009)	(0.013)	(0.011)	
Experience (time of firm)		0.083***	0.027***	0.091***		0.433***	0.354***	0.413***
		(0.002)	(0.002)	(0.002)		(0.005)	(0.004)	(0.005)
Experience-squared		-0.005***	-0.001***	-0.006***		-0.043***	-0.036***	-0.046***
		(0.000)	(0.000)	(0.000)		(0.001)	(0.001)	(0.001)
Experience of SE		0.186***	0.164***	0.218***		0.101***	0.092***	0.110***
		(0.009)	(0.008)	(0.010)		(0.009)	(0.008)	(0.009)
Experience of SE-squared		-0.017***	-0.015***	-0.019***		-0.012***	-0.010***	-0.013***
		(0.001)	(0.001)	(0.002)		(0.001)	(0.001)	(0.001)
Married		0.006**	-0.006***			0.095***	0.043***	
		(0.003)	(0.002)			(0.008)	(0.006)	
Years of Schooling		-0.000	-0.002***			0.011***	0.008***	
		(0.001)	(0.000)			(0.002)	(0.001)	
Male		-0.013***	-0.021***			0.117***	0.043***	
		(0.003)	(0.003)			(0.009)	(0.007)	
Business Experience (for entrepreneur)		0.000	0.001***			-0.001*	0.000	
		(0.000)	(0.000)			(0.001)	(0.000)	
Age		-0.002***	-0.002***			-0.000	-0.001***	
		(0.000)	(0.000)			(0.000)	(0.000)	
Immigrant		-0.009**	0.014***			-0.264***	-0.083***	
		(0.004)	(0.004)			(0.012)	(0.009)	
Descendant		-0.027***	-0.017**			-0.201***	-0.070***	
		(0.009)	(0.008)			(0.028)	(0.021)	
log(Capital)			0.026***				0.188***	
			(0.001)				(0.002)	
Workforce Education			-0.005**				0.016***	
			(0.002)				(0.002)	
R-squared	0.033	0.103	0.289	0.629	0.049	0.144	0.480	0.822
Number of observations	275819	275819	275819	275819	203920	203920	203920	203920

Note: See note to Table 7. Note: Employers are firms that begin activities with a positive number of employees, whereas non-employers are firms that begin activities without employees. Number of Firms: Employers: All firms: 55992; Novice E: 38650; Serial E: 17342; Non-employers 87207; Novice E: 76676; Serial E: 10531

Table 16: Number of Men and Women by Employer Type and Serial Status

	Employer			Non-employers			Total
	Male	Female	Total	Male	Female	Total	
Serial E	15,231 (34%)*	2,111 (18%)*	17,342 (30%)*	9,243 (13%)*	1,288 (16%)*	10,531 (12%)*	27,873
Novice E	29,114	9,536	38,650	57,546	19,130	76,676	115,326
Total	44,345	11,647	55,992 (39%)	66,789	20,418	87,207	143,199 (39%)

* Percent of column total.

Table 17: Duration-models - Hazard ratios - Monthly observations for firms started 2001-2013

	Weibull	Weibull	Weibull	Weibull
Serial E	0.965***			
	(0.010)			
Serial E Second Firm		0.768***	0.817***	1.040**
		(0.013)	(0.014)	(0.018)
Serial E First Firm		1.174***	1.295***	1.413***
		(0.014)	(0.016)	(0.019)
Married		0.837***	0.864***	0.901***
		(0.007)	(0.007)	(0.008)
Education		0.984***	0.957***	0.975***
		(0.001)	(0.002)	(0.003)
Male		0.808***	0.862***	0.924***
		(0.007)	(0.009)	(0.009)
Business experience		0.988***	0.989***	0.991***
		(0.001)	(0.001)	(0.001)
Age		1.006***	1.005***	1.003***
		(0.000)	(0.000)	(0.000)
Immigrant		1.257***	1.113***	1.091***
		(0.017)	(0.016)	(0.017)
Descendant		1.486***	1.325***	1.370***
		(0.046)	(0.041)	(0.045)
log(Capital)			0.892***	1.005
			(0.002)	(0.003)
log(Employment)			0.789***	1.079***
			(0.004)	(0.008)
Workforce education			1.032***	1.009***
			(0.003)	(0.003)
log(Sales)				0.589***
				(0.002)
R-squared				
Number of observations	6612076	6612076	6612076	6595381

Exponentiated coefficients. The standard errors are clustered at the owner level, and significance levels are based on original coefficients and standard errors., with ***p<0.01, ** p<0.05, *p<0.1.

Table 18: Duration-models - Hazard ratios - Monthly observations for firms started 2001-2013, Education

	Vocational and lower			College		
	Weibull	Weibull	Weibull	Weibull	Weibull	Weibull
Serial E	1.000			0.884***		
	(0.012)			(0.016)		
Serial E Second Firm		0.890***	1.138***		0.712***	0.868***
		(0.018)	(0.023)		(0.022)	(0.026)
Serial E First Firm		1.308***	1.412***		1.308***	1.422***
		(0.019)	(0.023)		(0.030)	(0.034)
log(Capital)		0.907***	1.030***		0.873***	0.946***
		(0.003)	(0.004)		(0.003)	(0.005)
log(Employment)		0.774***	1.080***		0.829***	1.069***
		(0.004)	(0.010)		(0.007)	(0.013)
Workforce education		0.968***	0.967***		1.103***	1.018***
		(0.004)	(0.005)		(0.006)	(0.005)
Married		0.850***	0.885***		0.908***	0.941***
		(0.008)	(0.009)		(0.014)	(0.015)
Education		0.976***	0.985***		0.943***	1.003
		(0.003)	(0.003)		(0.007)	(0.007)
Male		0.855***	0.913***		0.883***	0.954***
		(0.010)	(0.011)		(0.016)	(0.017)
Business experience		0.986***	0.989***		0.995***	0.998**
		(0.001)	(0.001)		(0.001)	(0.001)
Age		1.005***	1.004***		1.004***	1.000
		(0.001)	(0.001)		(0.001)	(0.001)
Immigrant		1.094***	1.083***		1.108***	1.099***
		(0.019)	(0.020)		(0.031)	(0.031)
Descendant		1.331***	1.385***		1.121	1.152*
		(0.045)	(0.049)		(0.092)	(0.097)
log(Sales)			0.583***			0.602***
			(0.002)			(0.003)
Number of observations	4848707	4848707	4837563	1763369	1763369	1757818

Exponentiated coefficients. The standard errors are clustered at the owner level, and significance levels are based on original coefficients and standard errors., with ***p<0.01, ** p<0.05, *p<0.1.

Table 19: Number of Now Serial Entrepreneurs After Adding Prior Years 1990-2000.

	Truly New firms 2001-2013 (Used in paper)	Truly New firms 1990-2000 and 2001-2013	Novice entrepreneurs 2001-13 that established one or more firms during 1990-2000	Serial entrepreneurs 2001-13 that did not establish any firm during 1990-2000	Serial entrepreneurs 2001-13 that established one or more firms during 1990-2000
Serial Entrepreneurs	19,118	37,089	17,971	15,537	3,581
			Novice entrepreneurs 2001-13 that did not establish any firms during 1900-2000		
Novice Entrepreneurs	171,716	153,745	153,745		
All Entrepreneurs 2001-2013	190,834	190,834			

Table 20: Robustness of Table 6 after Re-defining "Serial" to include novices who had started firms 1990-2000.

	OLS	OLS	OLS	FE	FE
Serial E Firm	0.571***	0.543***	0.326***		
	(0.008)	(0.009)	(0.008)		
Experience (time of firm)		0.178***	0.042***	0.109***	0.046***
		(0.002)	(0.002)	(0.002)	(0.001)
Experience-squared		-0.008***	-0.001*	-0/005***	-0.002***
		(0.000)	(0.000)	(0.000)	(0.000)
Experience of SE		-0.003	-0.038***	0.013***	-0.029***
		(0.004)	(0.003)	(0.003)	(0.003)
Experience of SE-squared		-0.000	0.002***	-0.001***	0.002***
		(0.000)	(0.000)	(0.000)	(0.000)
Married		0.163***	0.065***		
		(0.007)	(0.004)		
Years of Schooling		0.027***	0.019***		
		(0.001)	(0.001)		
Male		0.280***	0.167***		
		(0.008)	(0.005)		
Business Experience (for entrepreneur)		0.001*	0.005***		
		(0.000)	(0.000)		
Age		-0.002***	-0.004***		
		(0.000)	(0.000)		
Immigrant		-0.304***	-0.041***		
		(0.011)	(0.007)		
Descendant		-0.107***	0.023		
		(0.027)	(0.018)		
log(Capital)			0.251***		0.107***
			(0.002)		(0.002)
log(Employment)			0.570***		0.512***
			(0.004)		(0.005)
Workforce Education			0.016***		0.007***
			(0.001)		(0.000)
R-squared	0.178	0.231	0.580	0.829	0.851
Number of observations	877417	877417	877417	877417	877417

Number of Firms: All firms: 143,199; Novice E: 102509: Serial E: 40690

Appendix Table A1 – Number of Entrepreneurial Firms in Data for Different Restrictions

	Unrestricted Sample:		**Restricted Samples:**			
	# of firms	%	# of firms in register data for sales	% of unrestricted sample	# of firms with all background information	% of unrestricted sample
Serial E	43,929	100	41,815	95	27,873	63
Novice E	171,716	100	159,036	93	115,326	67
All	215,645	100	200,851	93	143,199	66

Appendix Table A2: Probability of Becoming a Serial Entrepreneur – Linear Probability Model

	All	Sequential	Portfolio	All	Sequential	Portfolio
Married	0.012***	0.001	0.012***	0.009***	-0.000	0.010***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
Education	0.005***	0.002***	0.004***	0.005***	0.002***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.082***	0.025***	0.065***	0.079***	0.023***	0.063***
	(0.002)	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)
Age	0.011***	0.004***	0.008***	0.009***	0.003***	0.007***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age-squared	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Experience	-0.001***	-0.001***	-0.000			
	(0.000)	(0.000)	(0.000)			
Experience-squared	-0.000***	0.000	-0.000***			
	(0.000)	(0.000)	(0.000)			
Immigrant	-0.061***	-0.017***	-0.050***	-0.049***	-0.010***	-0.043***
	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
Descendant	-0.001	-0.003	0.002	0.003	-0.000	0.004
	(0.007)	(0.005)	(0.007)	(0.007)	(0.005)	(0.007)
R-squared	0.019	0.005	0.016	0.017	0.004	0.015
Number of observations	131745	120229	126842	131745	120229	126842

Appendix Table A3: Sales of Novice and Serial Entrepreneurs - 6 years Semi-annual data – Sectors – OLS ESTIMATION

	MANU	MANU	SERV	SERV	RETA	RETA	CONS	CONS
Serial E Firm	0.620***	0.445***	0.660***	0.357***	0.624***	0.415***	0.724***	0.488***
	(0.037)	(0.038)	(0.010)	(0.011)	(0.016)	(0.017)	(0.019)	(0.019)
Experience (time of firm)		0.078***		0.028***		0.060***		0.063***
		(0.006)		(0.002)		(0.003)		(0.003)
Experience-squared		-0.003***		-0.000		-0.003***		-0.003***
		(0.000)		(0.000)		(0.000)		(0.000)
Experience of SE		-0.066***		-0.039***		-0.073***		-0.068***
		(0.014)		(0.004)		(0.007)		(0.007)
Experience of SE-squared		0.004***		0.002***		0.005***		0.004***
		(0.001)		(0.000)		(0.001)		(0.001)
log(Capital)		0.230***		0.265***		0.224***		0.205***
		(0.009)		(0.003)		(0.004)		(0.004)
log(Employment)		0.608***		0.593***		0.662***		0.665***
		(0.016)		(0.005)		(0.007)		(0.008)
Workforce Education		-0.008		0.011***		0.008***		0.040***
		(0.007)		(0.002)		(0.003)		(0.003)
Married		0.067***		0.051***		0.037***		0.112***
		(0.018)		(0.005)		(0.009)		(0.008)
Education		0.011**		0.012***		0.007***		0.024***
		(0.005)		(0.001)		(0.002)		(0.003)
Male		0.224***		0.172***		0.217***		0.110***
		(0.031)		(0.006)		(0.009)		(0.019)
Business Experience (for entrepreneur)		0.006***		0.003***		0.003***		0.007***
		(0.001)		(0.000)		(0.001)		(0.001)
Age		-0.001		-0.003***		-0.004***		-0.004***
		(0.001)		(0.000)		(0.001)		(0.001)
Immigrant		-0.079*		-0.037***		-0.075***		-0.126***
		(0.042)		(0.008)		(0.012)		(0.025)
Descendant		0.021		0.021		-0.011		0.075
		(0.097)		(0.020)		(0.028)		(0.053)
R-squared	0.116	0.603	0.204	0.576	0.108	0.567	0.080	0.601
Number of observations	52068	52068	639557	639557	235439	235439	155922	155922

Note: See note to Table 6 in main text. MANU: Manufacturing covers all manufacturing industries, SERV: Service covers all service industries, CONS: Construction: Division 43: Specialized construction activities, Retail: RETA is 45-47 and 55-56. Number of Firms: MANU: All firms: 7850; Novice E: 6215; Serial E: 1635; SERV: All firms: 106874; Novice E: 86369; Serial E: 20505; RETA: All firms: 38686; Novice E: 31055; Serial E: 7631; CONS: All firms: 23798; Novice E: 19327; Serial E: 4471. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table A4: Employment of Novice and Serial Entrepreneurs - 6 years Annual data – Sectors – OLS ESTIMATION

	MANU	MANU	SERV	SERV	RETA	RETA	CONS	CONS
Serial E Firm	0.211***	-0.381***	0.200***	-0.406***	0.234***	-0.408***	0.294***	-0.381***
	(0.027)	(0.033)	(0.007)	(0.009)	(0.011)	(0.015)	(0.014)	(0.018)
Experience (time of firm)		0.148***		0.086***		0.158***		0.124***
		(0.009)		(0.002)		(0.004)		(0.004)
Experience-squared		-0.013***		-0.007***		-0.014***		-0.010***
		(0.001)		(0.000)		(0.001)		(0.001)
Experience of SE		0.197***		0.225***		0.245***		0.232***
		(0.023)		(0.007)		(0.011)		(0.013)
Experience of SE-squared		-0.021***		-0.024***		-0.025***		-0.024***
		(0.003)		(0.001)		(0.002)		(0.002)
log(Capital)		0.160***		0.107***		0.159***		0.123***
		(0.008)		(0.002)		(0.003)		(0.003)
Workforce Education		0.011		0.012***		0.004*		0.004
		(0.007)		(0.001)		(0.002)		(0.004)
Married		0.007		0.011***		0.032***		0.025***
		(0.013)		(0.003)		(0.006)		(0.006)
Education		0.009**		0.002***		-0.001		0.012***
		(0.004)		(0.001)		(0.001)		(0.002)
Male		0.026		0.007**		0.036***		0.050***
		(0.021)		(0.004)		(0.006)		(0.015)
Business Experience (for entrepreneur)		0.003***		0.000		0.001**		-0.002***
		(0.001)		(0.000)		(0.000)		(0.001)
Age		-0.000		-0.001***		-0.001***		0.002***
		(0.001)		(0.000)		(0.000)		(0.000)
Immigrant		-0.091***		-0.054***		-0.100***		0.002
		(0.028)		(0.005)		(0.008)		(0.017)
Descendant		-0.073		-0.070***		-0.105***		-0.027
		(0.147)		(0.012)		(0.016)		(0.032)
R-squared	0.086	0.539	0.082	0.455	0.034	0.466	0.036	0.553
Number of observations	28262	28262	350513	350513	128269	128269	84634	84634

Note: See note to Table 7 in main text. MANU: Manufacturing covers all manufacturing industries, SERV: Service covers all service industries, CONS: Construction: Division 43: Specialized construction activities, Retail: RETA is 45-47 and 55-56. Number of Firms: MANU: All firms: 7850; Novice E: 6215; Serial E: 1635; SERV: All firms: 106874; Novice E: 86369; Serial E: 20505; RETA: All firms: 38686; Novice E: 31055; Serial E: 7631; CONS: All firms: 23798; Novice E: 19327; Serial E: 4471. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table A5: Employment of Novice and Serial Entrepreneurs - 6 years Annual data – Sectors FIXED EFFECTS ESTIMATION

	MANU	MANU	SERV	SERV	RETA	RETA	CONS	CONS
Experience (time of firm)	0.274***	0.220***	0.196***	0.154***	0.282***	0.238***	0.238***	0.184***
	(0.011)	(0.010)	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)
Experience-squared	-0.028***	-0.022***	-0.019***	-0.015***	-0.029***	-0.023***	-0.024***	-0.018***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Experience of SE	0.208***	0.205***	0.238***	0.236***	0.252***	0.243***	0.244***	0.238***
	(0.028)	(0.026)	(0.008)	(0.007)	(0.013)	(0.012)	(0.016)	(0.015)
Experience of SE-squared	-0.023***	-0.023***	-0.026***	-0.026***	-0.028***	-0.027***	-0.028***	-0.027***
	(0.004)	(0.004)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
log(Capital)		0.086***		0.062***		0.087***		0.066***
		(0.008)		(0.002)		(0.003)		(0.002)
Workforce Education		0.006		0.012***		0.008***		-0.004
		(0.006)		(0.002)		(0.002)		(0.004)
R-squared	0.842	0.864	0.823	0.842	0.823	0.844	0.813	0.846
Number of observations	28262	28262	350513	350513	128269	128269	84634	84634

Note: See note to Table 7 in main text. MANU: Manufacturing covers all manufacturing industries, SERV: Service covers all service industries, CONS: Construction: Division 43: Specialized construction activities, Retail: RETA is 45-47 and 55-56. Number of Firms: MANU: All firms: 7850; Novice E: 6215; Serial E: 1635; SERV: All firms: 106874; Novice E: 86369; Serial E: 20505; RETA: All firms: 38686; Novice E: 31055; Serial E: 7631; CONS: All firms: 23798; Novice E: 19327; Serial E: 4471. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table A7: Employment in Different types of firms – Median and Mean

	Calendar year	1st	2nd	3rd	4st	5st	6st
Non-employer							
Novice E	Median	1.0	1.0	1.0	1.0	1.0	1.0
	Mean	1.0	1.1	1.2	1.3	1.4	1.5
	# firms	69,431	53,119	38,506	29,046	23,007	18,437
Serial E	Median	1.0	1.0	1.0	1.0	1.0	1.0
	Mean	0.9	1.2	1.7	1.9	2.2	2.5
	# firms	9,229	7,269	5,736	4,290	3,243	2,463
Employer							
Novice E	Median	1.3	2.0	2.1	2.2	2.3	2.4
	Mean	2.0	3.0	3.5	3.7	4.0	4.3
	# firms	33,880	30,365	24,205	19,691	16,253	13,423
Serial E	Median	1.1	2.1	2.5	2.6	2.8	3.0
	Mean	2.3	3.7	4.2	4.6	5.0	5.5
	# firms	15,275	13,813	10,829	8,446	6,749	5,284

Note: The percentiles are presented for averages of 5 firms around the specific percentile. This is done to fulfill Statistics Denmark's regulations on anonymity.

Appendix Table A6: Sales and Employment of Novice and Serial Entrepreneurs - 6 years Semi-annual data – High-tech knowledge intensive services (HKIS)

	Sales OLS		Employment OLS		Employment Fixed Effects	
Serial E Firm	0.592***	0.302***	0.167***	-0.438***	0.170***	0.139***
	(0.028)	(0.033)	(0.019)	(0.026)	(0.008)	(0.008)
Experience (time of firm)		-0.004		0.057***	-0.016***	-0.012***
		(0.006)		(0.009)	(0.001)	(0.001)
Experience-squared		0.003***		-0.002*	0.231***	0.225***
		(0.000)		(0.001)	(0.023)	(0.022)
Experience of SE		-0.021		0.219***	-0.024***	-0.023***
		(0.013)		(0.020)	(0.003)	(0.003)
Experience of SE-squared		0.001		-0.019***		0.069***
		(0.001)		(0.003)		(0.007)
log(Capital)		0.291***		0.167***		-0.004
		(0.011)		(0.008)		(0.005)
log(Employment)		0.515***				
		(0.017)				
Workforce Education		0.012***				
		(0.002)		-0.006		
Married		0.095***		(0.004)		
		(0.016)		0.017		
Education		0.018***		(0.012)		
		(0.003)		0.007***		
Male		0.070***		(0.002)		
		(0.025)		0.025		
Business Experience (for entrepreneur)		0.007***		(0.016)		
		(0.001)		-0.000		
Age		-0.001		(0.001)		
		(0.001)		-0.003***		
Immigrant		0.014		(0.001)		
		(0.034)		-0.032		
Descendant		0.038		(0.023)		
		(0.084)		-0.045		
R-squared	0.065	0.472	0.024	(0.058)	0.812	0.821
Number of observations	70212	70212	38857	38693	38857	38693

Note: See note to Table 6 in main text. HKIS: High-tech knowledge intensive services (HKIS): 59: Motion picture, video and television programme production, 60: sound recording and music publish activities; 61: Programming and broadcasting activities; 62: Telecommunications; computer programming, consultancy and related activities; 63: Information service activities; 72: Scientific research and development; HKIS: All firms: 12907; Novice E: 9934; Serial E: 2973. *** p<0.01, ** p<0.05, * p<0.1