The Intangible Capital of Young Serial Entrepreneurs

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VERY PRELIMINARY. DO NOT QUOTE. WORK IN PROGRESS.

Abstract

Much has been written about serial entrepreneurs, but little is known about the performance of their businesses. Until better data becomes available on U.S. firms, we use panel data from Denmark on 216,524 newly founded firms for 2001-2013. Several key results are uncovered. First, the serial entrepreneur builds intangible capital – in the form of unexplained increases in productivity—in his first firm, which he then passes on to his second firm. Second, the serial entrepreneur learns: when the serial entrepreneur starts his second business, he starts with 90% higher sales than that of his first and more than three times higher productivity. This evidence suggests that the serial entrepreneur is learning on the job: if he were innately better than other non-serial entrepreneurs, his second business would perform as well as his first, but not better. Third, the young serial entrepreneur is learning by far the most – the jump in his firm's productivity from his first firm to his second firm is striking, but the jump of the older entrepreneur's performance is much more minor. However, older serial entrepreneurs open their first firm with higher sales (and capital and labor) than do younger serial entrepreneurs. All of these results are comparisons of the serial entrepreneur over time. Also not shown previously is that the serial entrepreneur's first business has about 67% higher sales and 30% higher productivity than that of a novice entrepreneur who never opens a second business. Part of the serial entrepreneur's higher performance is from higher observed skills (like education and experience), but most is from unmeasured ability. In sum, learning by young serial entrepreneurs occurs between his firms and within firms over time, suggesting the serial entrepreneur amasses knowledge about intangible capital that he acquires while running the first firm (but couldn't implement) and that is relevant for starting the second firm.

Abstract

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Entrepreneurs are an important source of growth for every economy. Much has been written about the degree to which new entrepreneurial startups contribute to employment growth.[3] Much has also been written about the personal characteristics of these entrepreneurs: they are a jack-of-all trades (Lazear, 2005); they learn from experience in their firm prior to entrepreneurship (Phillips and Sorensen. 2011); they learn from family experience (Fairlie and Robb, 2007); they learn from others in their networks (Gujarat Indian entrepreneurs paper); and they are risk takers (Blanchflower and Oswald, 1998). But much less has been written about the degree to which an entrepreneur learns from his own past startup experience.[4]

The first goal is to answer the following question: does the serial entrepreneur learn from his first firm, so the second firm is a higher performer [alternative phrasing: does the serial entrepreneur learn a large enough amount from his first firm to the point that his second firm is a higher performer?]? The serial entrepreneur starts businesses sequentially. If he is learning in the process, then his second endeavor should have higher sales, productivity, employment, and profitability. The second goal of this paper is to answer the question of whether the performance of the startup by the serial entrepreneur is better than that of the novice entrepreneur.

The data used to model the impact of serial entrepreneurship is from Denmark. Data from Denmark is used to study entrepreneurship because it is currently the richest data set in the world for this type of research. Statistics Denmark carefully identifies who the founder is of an establishment (so it is not necessary to use self-employment data). This data is linked to data on sales (2001-2014) and employment (2001-2013), annual data on capital, the human capital of the workforce, and profits. These data also follow the characteristics of the entrepreneur – the education, experience, age, gender, marital status, and immigrant status when he or she opens each firm.[5] From 2001 to 2013, there are 216,524 new firms established by 191,053 entrepreneurs, making serial entrepreneurs about 10% of the founders. The firms are small, having an average of 1.7 employees (in addition to the founder).

The results are as follows:

1. Serial entrepreneurs possess intangible capital built from experience that they draw upon as they open their second firm. Their second firm starts with higher sales and higher productivity than their first firm. Some of these gains arise from greater investment in capital and labor within and between firms.
2. The young serial entrepreneur is the one who gains by far the most. After controlling for the capital and employment, an entrepreneur who is age 25 when his first firm opens grows that firm slightly for intangible reasons; however, big gain is that his second firm has sales that are higher due to

[3] For evidence from U.S. data see Haltiwanger, Jarmin, and Miranda (2013). For evidence from Danish data see Kuhn, Malchow-Moller, and Sorensen (2016), Malchow-Moller, Schjerning, and Sorensen (2011).

[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).

[5] The data also contains the work history of the entrepreneur at his prior companies, which is used by Phillips and Sorensen. 2011, Nanda and Sorensen (2010).

intangible capital that had not been utilized at his first firm. In contrast, the older serial entrepreneur opens much bigger first businesses, but builds much less intangible capital within or between firms.

3. Serial entrepreneurs are innately better performers than novices. The first business of the serial entrepreneur has 67% higher sales and 30% higher productivity than the novice entrepreneur who never starts a second firm.
4. The first firm of the serial entrepreneur survives longer than that of the novice.
5. Though there are more male serial entrepreneurs than male novices, the serial entrepreneurs are neither better educated nor more experienced than the novices.

This suggests that serial entrepreneurs are passing on intangible capital from one business to the next. Holding constant the underlying quality of the serial entrepreneur, his second firm starts with higher sales, suggesting he has learned something about how to run a business. Such knowledge is likely intangible capital, commonly regarded as being embedded in the relationships the entrepreneur has built, the knowledge of good business practices, and possibly the product reputation, market knowledge, or intellectual property that was learned but not incorporated in the first business.

The outline of the paper is as follows. Section I outlines the empirical framework for estimating differential performance by type of entrepreneur. Section II describes the Danish data. Section III presents regression results and figures of average of sales and productivity by type of founder, and Section IV shows differences in exports and profits. The conclusion follows.

I. Empirical Framework

It is widely believed that entrepreneurship can be learned. Every business school offers extensive courses in entrepreneurship. In the world of high tech entrepreneurship, venture capitalists have a preference for the serial entrepreneur because he has learned from experience, good and bad.[6] Lazear (2005) shows that a manager who performs many roles at work and learns to be a jack-of-all trades is more likely to become an entrepreneur. There is less evidence that entrepreneurship training programs work. There are thousands of training programs for entrepreneurs, but evidence from a random controlled trial of training finds that it is hard to pinpoint high returns from these training programs (Fairlie, Karlan, and Zinman, 2015).

Evidence that the serial entrepreneur performs better would reinforce the view that managerial quality matters. It would not be surprising to find that some managers are better than others, so the more relevant question is how much better are they, and why are they better? There is a large literature that explores this question. This literature starts with the point that when you look across firms that are doing the same thing, some firms are much more productive than others. Holding constant capital and labor, it appears that the choice of management practices matter. For example, within manufacturing, those firms that choose lean manufacturing methods or innovative human resource management systems are more productive.[7] Results show that performance is higher due to these practices, not because the managers are higher quality. However, managerial quality does matter on top of the choice of practices. And in studies that lack data on management practices, it is shown that the quality of the CEO matters, mid-level managerial quality matters, and the quality of the boss matters.[8]

These management studies have implications for the study of serial entrepreneurship. For convenience, define the serial entrepreneur as one who opens more than one business and the novice as one who opens only one in the thirteen years that we observe them.

The serial entrepreneur may have innate qualities that make him a better manager and that show up in his education and the success of his first business, relative to how the novice fares.

The data set used in this paper follows entrepreneurs and their firms from 2001-2014 in Denmark. The firm-level data includes the following metrics: average monthly sales, the capital and labor inputs, the exports, the industry, and the profitability of the firms. The entrepreneur-level data offers background information on the entrepreneur at the time of each firm's opening, covering the standard variables of education, experience, age, gender, and marital status.

[6] Gompers, , Kovner, Lerner, and Scharfstein (2010) study venture entrepreneurs.

[7] Bloom and Van Reenen (2011), Bloom Eifert, Mahajan, McKenzie, and Roberts (2013), Ichniowski and Shaw (2003), Ichniowski, Shaw, and Prennushi (1997).

[8] Hoffman and Tadelis (2016) show highly evaluated managers have higher performing employees, and Lazear, Shaw, and Stanton (2015) show lower-level bosses explain a considerable share of their subordinates productivity.

The performance regressions are as follows:

$$(1) \quad logY_{ijt} = \beta_1 + \beta_{21}\text{Serial}_{it}^{\text{first}} + \beta_{22}\text{Serial}_{it}^{\text{second}} + \beta_3 \text{t} + \beta_{41}\text{Serial}_{it}^{\text{first}} \times \text{t} + \beta_{42}\text{Serial}_{it}^{\text{second}} \times \text{t} + \Gamma \text{X}_{ijt} + \alpha_1 log\text{K}_{ijt} + \alpha_2 log\text{L}_{ijt} + ¥\text{Z}_{ijt} + \varepsilon_{ijt}$$

where Y_{ijt} is the average monthly log sales or log productivity or log employment for person i for business j at time t, when the sales data is measured in 6-month semi-annual intervals. Based on all the data, a variable Serial_i is created that designates a person a serial entrepreneur for the entire time period. However, he opens multiple businesses, so there is a $\text{Serial}_{it}^{\text{first}}$ dummy equal to 1 during the panel data that he is operating his first business. The dummy $\text{Serial}_{it}^{\text{second}}$ is equal to 1 during the panel data that he is operating his second business. Importantly, the time variable t is the six-month interval relevant to the sales data, starting when the business was founded (or more precisely, since the firm has registered VAT).[9] In other words, this is not calendar time but firm age for each firm j. The X_{ijt} variables (described further below) are controls for the quality of the entrepreneur, the K and L are the measured capital and labor inputs, and the Z_{ijt} variables are the industry of the firm and the time effects.

The empirical analysis is divided into two themes, the gain of the serial entrepreneur's second firm relative to his first, and the gain of the serial entrepreneur relative to the novice.

A. Learning by Serial Entrepreneurs

The first hypothesis is that:

Hypothesis 1: The second firm of the serial entrepreneur is a higher performing firm than the first one, for reasons that could be either observable or unobservable.

The first test of Hypothesis 1 is simply to test how much greater performance the serial entrepreneur achieves for his first and second firms, relative to all novices. In equation (1), the parameter β_1 (the constant term) measures the average value of *Y* in the reference category, which is a novice entrepreneur, at the time the businesses are founded. A serial entrepreneur's Firm 1 intercept is measured by $\beta_1 + \beta_{21}$, i.e., β_{21} measures the difference between a novice entrepreneur and a serial entrepreneur for his first business. The serial entrepreneur's second firm is $\beta_1 + \beta_{22}$, i.e., β_{22} measures the difference between the novice and serial entrepreneur during his second business. If the second firm is higher performing than the first firm, then $\beta_{22} > \beta_{21}$.

If the results of (1) show that the mean gain between firms for the serial entrepreneur is sizable, the question is, how did he achieve that gain. There are many possibilities. The dataset contains the X_{ijt} information on his education and

[9] The estimation data is organized as a panel data set with cross section dimension measured by "id" (person-id and firm-id) and time dimension measured as months since establishment.

experience, so the regression can add these controls to see if the unobserved quality of the serial entrepreneur falls after introducing observed human capital that could be relevant.

The firm-specific control variables include Capital and Labor inputs and the industry dummies Z_{ijt}, so it is possible to determine whether (or if) serial entrepreneurs achieve performance gains with increased inputs or within industries. Most important are capital and labor: do serial entrepreneurs invest in more inputs as they open new firms? Industry dummies hold constant the production technologies. The regression also includes bi-annual year dummies to allow performance to vary across time to capture general productivity trends. Without the time dummies, it is possible that higher-performing serial entrepreneurs just have better market timing.

In sum, it is revealing to estimate (1) without controls, and then introduce them to identify why the firms run by serial entrepreneurs improve over time (if they do). There are two possible sources of improvement: performance gains within firms over time, and performance gains between firms.

The within firm learning or growth can be estimated as a function of observable and unobservable sources of gains. On possibility is that the coefficient on the age of the firm since it was founded, or variable "t," is larger for the second firm than the first firm. In equation (1), this means that $\beta_{42} > \beta_{41}$. There is a very large literature on learning curves (Argote, 1999). In these studies, the researchers get very high frequency data on manufacturing plants or retail establishments and assess how fast unit costs fall as the sales of the establishment rise. The literature shows that when a new plant is opened, that produces a product that is remarkably similar to the old product, there is a much faster learning curve in the plant: as you would expect, there is knowledge transfer between similar production lines. The implication of the learning curve literature is that experience does matter, particularly when the experience is within the same product or industry. This suggests that the second firm could grow faster than the first firm of the serial entrepreneur.

Hypothesis 2: Serial entrepreneurs are fast learners, and the gains within their second firm could be greater than the gains within their first firm.

When testing whether there is greater within firm growth, or $\beta_{42} > \beta_{41}$, it is important to do so without and with capital controls. When capital and labor controls are introduced, the gap should narrow between the growth rates if second firms are growing more for observable reasons (the capital and labor growth) as well as unobservable reasons (the remaining residual gap between $\beta_{42} > \beta_{41}$ after capital and labor controls).

The OLS estimation of the within firm growth from equation (1) will produce upward biased estimates due to sorting. Because the data is an unbalanced data set, the worst (lowest sales) firms should have fewer observed months of performance data. This should introduce an upward bias in the slope coefficients: the observed "t" (for firm age) will be positively correlated with firm quality (as measured by the firm-specific fixed effect), so that firms that survive will have higher performance and bias upward the estimated β_{41} and β_{42} coefficients on t when the fixed effects are omitted.

The testing of the Hypothesis 2 learning curve effects requires that firm-specific fixed effects be added to (1). The regression becomes:

$$(2) \qquad logY_{ijt} = \lambda_j + \beta_3 \mathrm{t} + \beta_{41} \mathrm{Serial}_{it}^{\mathrm{first}} \times \mathrm{t} + \beta_{42} \mathrm{Serial}_{it}^{\mathrm{second}} \times \mathrm{t} + \alpha_1 log\mathrm{K}_{ijt} + \alpha_2 log\mathrm{L}_{ijt} + ¥\mathrm{Z}_{ijt} + \varepsilon_{ijt}$$

where the firm fixed effect is λ_j.

As a result of adding these fixed effects, the intercepts designating the firm either as the first one of the serial entrepreneur ($\mathrm{Serial}^{\mathrm{first}}$) or the second one of the serial entrepreneur ($\mathrm{Serial}^{\mathrm{second}}$) will drop out of the regression, so $\beta_{21}$and β_{22} cannot be estimated with this functional form. Likewise, the personal entrepreneur characteristics drop out after adding firm fixed-effects.

Given these within firm growth estimates, how much better does the second firm of the serial entrepreneur do on the day it opens relative to the opening day of the first firm? This is paramount to the performance gains of a serial entrepreneur. The second firm should open with either higher sales or higher productivity, in part because the entrepreneur made tangible improvements while running his first firm, or because there are likely intangible gains that were never incorporated in the first firm, but could be in the second firm.

Hypothesis 3: The second firm of the serial entrepreneur performs better on the day it opens than did the first firm on the day that it opened.

This hypothesis also cannot be estimated from the OLS regressions of (1): the within firm learning curves are biased by sorting, so the estimation of the opening day sales is contaminated by these biased controls for within firm growth. The steps needed to recover opening day sales are as follows. First, estimate the within firm regression (2) with the firm fixed effects, λ_j . Then save these implied firm fixed, which are the opening day sales given the controls for within firm growth.

$$(3) \qquad \lambda_j = \delta_1 + \delta_{21} \mathrm{Serial}_i^{\mathrm{first}} + \delta_{22} \mathrm{Serial}_i^{\mathrm{second}} + \psi \mathrm{X}_{ij} + \delta_1 log\mathrm{K}_{ij} + \delta_2 log\mathrm{L}_{ij} + £\mathrm{Z}_{ij} + \mu_{ij}$$

Regression (3) then introduces the Serial dummy variables (recall that the data set still contains the novice firms that are analyzed later), followed by the reasons by these firms would open with greater sales or productivity. There are the usual possibilities, that the entrepreneur is educated or has other personal qualities, or that he invests in more capital or labor. That is, the Serial effects can be estimated with and without the other control variables in the regression, to see why each firm performs better than the other.

A final possibility is that some types of entrepreneurs may learn more while operating their first firm. As the title of this paper suggests, the key question is, do young serial entrepreneurs learn more from their first businesses than do older serial entrepreneurs? This is captured first in the estimation of OLS (1), but addition the coefficients on Serial, with the X being the characteristics of the entrepreneurs. people may be faster learners than others. Given only two firms for each entrepreneur, it is not possible to estimate person-specific growth rates. So it is possible to let the gain achieved between the first and second firm vary by the observed personal characteristics:

$$\begin{aligned}(4) \qquad logY_{ijt} = {} & \beta_1 + \beta_{21} \mathrm{Serial}_{it}^{\mathrm{first}} + \gamma_{21} \mathrm{X}_{ijt} \mathrm{Serial}_{it}^{\mathrm{first}} + \beta_{22} \mathrm{Serial}_{it}^{\mathrm{second}} + \gamma_{22} \mathrm{X}_{ijt} \mathrm{Serial}_{it}^{\mathrm{second}} + \beta_3 \mathrm{t} \\ & + \beta_{41} \mathrm{Serial}_{it}^{\mathrm{first}} \times \mathrm{t} + \beta_{42} \mathrm{Serial}_{it}^{\mathrm{second}} \times \mathrm{t} + \Gamma \mathrm{X}_{ijt} + \alpha_1 log\mathrm{K}_{ijt} + \alpha_2 log\mathrm{L}_{ijt} + ¥\mathrm{Z}_{ijt} + \varepsilon_{ijt}\end{aligned}$$

Hypothesis 4: Some serial entrepreneurs may learn more from their first firm than do others. Young entrepreneurs may be particularly impressed by their first firm.

II. Data: Measuring Serial Entrepreneurs and Their Firms

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.[10] 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 who frequently achieve significant growth. As pointed out by Hurst and Pugsley (2011) most small businesses are run by entrepreneurs who will never grow beyond a few employees. However, these founders (in these data) 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.[11] Finally, the data are cleaned for registrations that are due to re-starts of businesses after closure or

[10] 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.

[11] 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 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).

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.[12]

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 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).

Employment, capital, and education of the workforce are annual data.[13] 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.

[12] 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.

[13] 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.

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.

Another important point to keep in mind that many first firms will stay in business when the entrepreneur opens the second firm. 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, in these data the majority of all founders run their first two firms currently at some time. These might be called "portfolio" entrepreneurs, compared to "sequential" entrepreneurs who open firms sequentially.[14]

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 all the control variables is required.

D. The Characteristics of Entrepreneurs and Their Firms

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).

[14] 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).

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 get married as they open their second firm: 53% are married for their first firm, and 59% for their second firm (recall that personal characteristics are measured on the day the firm is opened). All firm run by serial entrepreneurs are more likely to be run by 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).[15]

The biggest difference between serial entrepreneurs and novice entrepreneurs is that the companies that serial entrepreneurs open are much more likely to be limited liability corporations (LLCs) and this LLC registry is more likely with each firm: 48% of first firms are LLC; 83% of second firms are LLC; but only 24% of novice firms are LLC. The novice firms are largely (74%) sole proprietorships. 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 much 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. In some sense, the serial entrepreneur opens a "higher quality" firm, and the rising rates of LLC status for the second firm of the serial entrepreneur may suggest that he is opening a higher quality firm. [not clear if quality is in the person's non-cognitive skills, but could be working harder]

However, their industry choices are the same: 40-45% are in services and 23-24% are in retail for all entrepreneurs. Because a serial entrepreneur must open two or more businesses within 2001-2013, their first company is likely to be opened in the early years and their second company in the later years, whereas novice entrepreneurs open companies at about the same rate every year. (So these differences in opening year imply that year dummies should be introduced in the performance regressions below.)

Another feature of these firms, is that the entrepreneurs do not open multiple establishments. 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.

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[15] 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.

E. The Relative Success of Serial Entrepreneurs

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 (see Table 4). 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. Note that it is important to realize that the duration in business of the first serial firm is not truncated by the "serial" designation: these entrepreneurs do not close their first business before opening their second. As a result, the serial first firm has somewhat more years in business than the novice firm.

Regarding sales, the difference in mean sales by entrepreneur are very pronounced.[16] When running his first firm, the serial entrepreneur has more than twice the average sales of the novice entrepreneur (Table 5), 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 best way of capturing differences in sales by type is in Figure 1, the distributions of sales and employment by firm type. Across all firm types, sales have a very long right tail, even for novices. The real difference between novices and serial entrepreneurs is that the novices do not have firms that are mid-sized, with average monthly sales in the range of $50,000 to $300,000.

Novices do have some very successful businesses, and the duration in business and the sales data support this view. The average duration of the first firm is 4.73 years; it is 4.4 years for the novice. However, the medians are more different: 3.75 for the serial, and 3.25 for the novice. This comparison between the means and medians is an important first result: the difference between the means (4.73-4.4 years, or 7.6% greater) is not as different as that between the medians (3.75-3.25, or 15% greater), because it will be shown later that there are a small subset of very high performing novice firms. The means and medians of the sales data produces that same conclusion. Comparing the novice firm to the first firm of the serial, serial mean sales are 2.54 times that of the novice, and serial median sales are a lesser 2.17 times that of the novice. At this point, it is harder to compare the serial firm 2 performance to that of the novice, because the firm 2 results are right censored.

[16] The bottom of Table 5 displays mean values for the characteristics of the entrepreneurs. Means for these variables were also displayed in Table 4 – the difference in mean values between Table 4 and Table 5 is that Table 5 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.

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

III. Empirical Results: Sales and Employment

A. Background Basic Regression

The first step is the estimation of (1), introducing controls to identify why there may be differences in the performance of entrepreneurs.

Table 6 shows the striking mean differences in the performance of these varied entrepreneurs. For sales, the serial entrepreneur's first firm is 67% more productive than the novice, and his second firm is 79% more productive. The subsequent regressions for employment and productivity begin to reveal why sales is higher for the serial entrepreneur – he employs more people, and more capital. The productivity gap between the serial entrepreneur and the novice is smaller than the sales gap, implying that higher sales are due in part to higher capital. But these conclusions are not surprising: the mean values in Table 5 showed these results, and Table 6 regressions confirm that these mean differences are significant.

The focus of the paper from here on is on sales regressions. The reason is that after capital and labor are added to the right-hand-side of a sales regression, the estimated coefficients on Serial dummies are effectively the same as in a regression with productivity as the dependent variable. Therefore, the regressions of sales on capital and labor will be referred to as productivity regressions. *Employment regressions are de-emphasized because the data is low quality: prior to 2008, it is annual data; after 2008 it is monthly data. In contrast, recall that sales data is bi-annual.*

B. Regression Results following the Sales of the Serial Entrepreneur Over Time

1. OLS Results on the Sales of Serial Entrepreneurs

The Hypothesis 1 is that the second firm of the serial entrepreneur is higher performing for observable and unobservable reasons. This hypothesis is examined in a sequence of regressions that progressively introduce more control variables.

The first step in estimating regression (1) is to omit the X control variables but introduce the firm's aging as "t" episodes of bi-annual Experience. Controlling for "t," the Firm 1 and Firm 2 dummies are intended to capture sales the day the firm opens. After controlling only for industry and year, the first business a serial entrepreneur opens has 54% higher sales on the day it opens and the second business of the serial entrepreneur has 94% higher sales, compared to the novice (Table 7, column 2). The point that serial entrepreneurs are innately better (because the coefficient on Serial E Firm 1 is positive and sizeable), but also suggesting that serial entrepreneurs have probably learned something in running their first business that they transfer to their second business.[18] These serial sales have

[18] Note that some serial entrepreneurs disappear by Firm 2 in this table, because this table uses the maximum sample available, and not all serial entrepreneurs have complete data on their second firm.

declined between column 1 and column 2 for Firm 1 because there is a lot of learning in the "t" coefficient – for Firm 1, sales appear to go up by over 20% per year. As explained in the Empirical Framework, this apparent gain can be strongly influenced by the dropping out of the smaller firms over time. This will be addressed in column 7.

The gain in sales from Firm 1 to Firm 2 cannot be explained by changing personal characteristics (added in column 3),[19] but rising investment in capital does contribute substantially (in columns 4 and 5). When capital and labor are introduced, the within entrepreneur gains for the serial entrepreneur fall because he opens his second firm with more capital. But these are OLS results with biased coefficients on "t," so the next step is to add firm fixed effects.

2. Within-Firm Sales Growth

Thus far, serial entrepreneurs innately open high sales firms, but are they also innately better at growing firms after they open them. The best way to identify this is in regression (2) that introduces firm fixed effects in column 7 of Table 7: the average performance of each individual firm is held constant, so that the regression estimates the coefficient on the months of experience with controls for entrepreneur's ability.[20] The novice firms definitely grow: the β_3 is very sizable, showing about 4.8% growth every six months (Table 7, column 7).

The learning curves are flatter in the firm-fixed effects models than in the OLS results of column (2). The First Firm of the serial entrepreneur grows sales by 6.4 percent in the first six months (measured as $\beta_3 \mathrm{t} + \beta_{41} \mathrm{Serial}_{it}^{\mathrm{first}} \mathrm{x\ t}$), and the Second Firm grows by 4.9% in the first six months. Some of the within firm growth is due to the adding of capital and labor over time. These results have implied growth within the firm due to capital and labor investments: for Firm 1, the growth is 4.0% per six month interval, and for Firm 2, it is the same 4.1%.[21] After controlling for investments in capital and labor, the learning curve flattens further: in the First Firm, sales grow by 2.4% the first six months, and in the Second Firm, sales growth by a lesser .8% in the first six months. These values will be examined more in the Summary Subsection 5 below.

An important question in estimating the learning done by the entrepreneur is what functional form should the learning curve take? Table 7 introduces a linear time trend "t" for the firm's first six years, with "t" taking values from 1 to 12. In this short time period, a quadratic growth curve is rejected.

Note that the implied R-squared in these regressions are high. Column (6) shows results without control variables – the estimated R-squared from add firm fixed effects is a huge 84%. Each firm has an average of five years of bi-annual data; the R-squared is so large because the firm fixed effects are overfitting the data.

[19] Recall that some entrepreneurs marry between firms, and that a marriage is a strong positive effect on sales, but there are too few making this change to alter the coefficients on Serial in the regressions.

[20] Table 5 estimates the sales regression with firm fixed effects. No comparable fixed effects regressions are estimated for employment and productivity, because the monthly values of these variables come from interpolated data, which would be subject to too much error to scrutinize within a firm fixed effects model.

[21] These numbers are from: Firm 1, .064-.024=.04 (column 8-7), and Firm 2, .049-.008=.041.

Note also that the contribution of within-firm investment and learning explains little of the variation in firm sales. The R-squared rises from .837 (column 6) to .857 (column 8) when within firm learning and capital and labor investments are added to the regression.

In sum, Hypothesis 2 is rejected. The second firm of the serial entrepreneur does not grow more quickly from learning than does his first firm; his second firm does not grow at all from learning, but his first firm does. Both firms grow a lot, and at the same rate, from new investments in capital and labor.

3. Across Firm Sales Growth

Controlling for the within firm fixed effects, equation (3) is estimated with the fixed effects as the dependent variable (Table 8). The first column shows the average jump in sales for the serial entrepreneur, when he opens his doors: Firm 2 has 38 percentage points higher sales than Firm 1 (.802-.422). What causes this gain in performance? It is not caused by a change in personal characteristics between the opening dates of the two firms (column 2). Only a small portion of it is caused by an increase in capital investment: Firm 2 has a 36 percentage points higher sales than Firm 1 (.504-.144), after controlling for the capital and labor invested in these firms. The implication is that serial entrepreneurs gain in sales due to intangible investments in their own learning, or in growing their customer base or developing their marketing plan. Column 4 is also a statement that productivity is 36 percentage points higher, because the sales regression that controls for capital and labor input is the productivity regression.

4. Learning by Young Entrepreneurs

It could not be expected that all serial entrepreneurs are equally high performers, or learn as much between firms. Who, among serial entrepreneurs, are the fastest learners?[22] The purpose of estimating (4) is to introduce reasons why some entrepreneurs learn from early experience and some don't.

The striking result is that young people learn much more than older people. Table 9 estimates equation (4) adding an interaction between founders Age and Serial Entrepreneurs Firms 1 and 2, to show that learning from experience is much greater for young serial entrepreneurs. Across all OLS specifications in this Table, Older people open much bigger Firm 1 firms than younger people. But younger people learn more between firms: their Firm 2 is much bigger than their Firm 1. Comparing columns (5) versus (1), after controlling for capital, the performance gain for the young person in his second firm is not as great in column (5) as it was in column (1), because portion of the young person's growth in sales between his two firms is that he buys more capital and labor for his second firm than for his first firm. However, the values in Table 9 are only illustrative – more precise coefficient values are estimated subsequent to holding constant the firm-fixed effects to produce the within-firm learning curve, as was done above.

Table 8b regresses the recovered fixed effects from estimating (2) in column (7) of Table 7 on the set of personal characteristics and inputs, but now adding an Age interaction for Serial as specified in (4). As in Table 9, it remains strikingly true that youth learn more from the practice of running their first firm than do older people.

[22] Age is the only variable that consistently affects the growth of sales between the first and second firm. No other demographic or capital variables affected this rate of learning.

5. Putting It All Together: Why the Firms of Serial Entrepreneurs Improve?

The results of Table 10 are best displayed through a small table of the predicted values of the Age*Serial coefficients. They are:

Predicted Increase in Sales

	No capital/labor controls (Table 10, column 1)			Controlling for K/L, X (Table 10, column 4)		
	Firm 1	Firm 2	**Diff F2-F1**	Firm 1	Firm 2	**Diff F2-F1**
AGE 25	.327	.921	**.594**	.099	.58	**.481**
AGE 45	.527	.781	**.254**	.199	.500	**.301**

where these are the coefficients on "Serial" firms, relative to novice firms.

Young people realize more than twice the sales gain (of .594) between their first and second firms, relative to older people (of .254). However, these are not just sales gains, they are productivity gains: column (6) above shows that much of the gain that the young achieve persists after holding constant capital and labor. This suggests, as the title of the paper conveys, that young people achieve these within-career gains in sales from intangible capital, not from the tangible K and L.

Do these young serial entrepreneurs learn while they are running their first firm, or are they unable to raise their sales while they run their first firm, but can open their second firm with new ideas or new methods not previously implemented? Recall that the within-firm increase in sales are sizable, due to new K and L and due to intangible learning. Assume the first Firm 1 stays in business for 4 years. At the end of four years, the predicted increase in sales within Firm 1 is: a 51% increase in sales with no K or L controls; a 19% increase in sales within the Firm 1 after controlling for K and L.

Therefore, for the young person, who starts with small firms, these increases in sales within the first firm are too small to explain the jump in sales when they open the doors of Firm 2. After controlling for increased within firm capital inputs, the young person's first firm only increases sales from 9.9% to 11.7% above a novice, and adding the increase in capital and labor raises his sales to a 14.9% increase above the novice at the end of Firm 1. Since the second firm of a young person opens with sales 58% higher than the novice, the young person achieves little by the end of his first firm that he transfers to is second firm.

For the older person, his sales gain is much smaller between Firm 1 and Firm 2. That is because his first Firm 1 opens much bigger and his second firm seems to have further to grow.

There are huge differences in firm size by the age of the serial entrepreneur. When a person opens his first firm, the average sales at age 25 are $56,000 per month, and the average sales at age 45 are $102,000 per month.[23] So it appears that the older person has accumulated human capital before opening any firms.

C. Regression Results for Novice versus Serial Entrepreneurs

The key to this paper is to focus on the performance of the serial entrepreneur, because no other research paper has done so. At time, other researchers have compared serial entrepreneurs to novice entrepreneurs. But they have done so looking at duration in business (Lafontaine and Shaw, 20xx and references therein). None have compared sales.

All the tables used above contain the comparisons of the serial firms to the novice firms, so these tables will be used again to examine how much lower the sales of novices are relative to serial firms. The emphasis will be on a comparison between the novice firm and the first Firm 1 of the serial entrepreneur's firms. The reason is that this two firms are most alike – they are being run by unexperienced entrepreneurs.

As shown in Table 6, the first serial Firm 1 has sales that average 67% higher than the novice. What accounts for that gain in sales? First, the serial entrepreneur Firm 1 has a slighter steeper learning curve--his learning is .016 greater per bi-annual unit that the novice's firm (Table 7, column 7, estimating regression (2) with firm fixed effects). However, column (8) adds capital and labor, and demonstrates that the within firm performance of the serial Firm 1 is due to greater capital and labor. Controlling for the learning curve, when the serial Firm 1 opens its doors, it has 42% greater sales than the novice (Table 8a, column 1, estimating regression (3) with estimated firm fixed effects as the dependent variable). The gap between the novice and the serial entrepreneur is not due to observed personal characteristics: their introduction changes the results very little (Table 8a, column 2). However, capital and labor matter a great deal. After adding those in column 4, the productivity gain of the serial Firm 1 relative to the novice is only 14.4% (column 4).

The results presented just now are "clean" in that they compare the performance of the novice and the serial entrepreneur when they each start their first firm. But such a comparison is incomplete. The section above looking the sales gains of the serial entrepreneur as he opens a second firm shows there is a big performance gain for the second firm. Therefore, to compare the average performance of the serial entrepreneur to the average performance of the novice, both the serial firms should ultimately be included, to find their average gain relative to the novice.

The average sales of the serial entrepreneur, across all his firms, is 73% high than that of the novice. After controlling for personal characteristics, within firm growth in sales, and labor and capital inputs, the serial entrepreneur will have a productivity level that is 31% higher than the novice on the day each opens his stores.

[23] These are raw averages from tables that are not displayed. The smaller gap by age is median sales: $15,000 per month at age 25 and $20,000 per month at age 45. By age 45, there is a much longer rightward tail in Sales.

D. Employment

The employment data is only annual data, so little analysis of substance is done with employment as the dependent variable. These are also small firm, with mean employment of 2.5 people (including the entrepreneur), so employment differences are not substantial.

On average, the serial entrepreneur runs firms with 20% more people than the novice entrepreneur, but the serial entrepreneur decreases his employment from his first firm to his second firm (Table 10). There is modest within-firm growth of employment, but this is significantly biased by sorting, as bigger firms stay in business longer (column 2). No within-firm fixed effects regressions are displayed because there are too few annual observations for each firm to estimate these regressions. The reasons why serial entrepreneurs open firms with more employees is quite clear in subsequent regressions: married men are more likely to be serial entrepreneurs (than novices) and they open bigger firms (column 3), and firms that open with more capital are more likely to employ more people (column 4). Controlling for the higher capital inputs of serial entrepreneurs, they employ slightly fewer people than do novices. This is one reason why the firms of serial entrepreneurs are more productive than those of novices.

IV. Empirical Results: Exports and Profits

A. Exports

Serial entrepreneurs are much more likely to become exporters, but the probability of exporting for all these firms is very small. The regression estimating mean differences is in column 1 of Table 11. The percent of novice entrepreneurs who export is a small 7%. For a serial entrepreneur, the percent who export is 5 percent greater than the novice, to 12%. Serial entrepreneurs open second firms that export slightly more often, after controlling for variables like experience, and capital, and labor, that make all entrepreneurs export more often

If they export, serial entrepreneurs export much more than novices—exports are about 50% higher. Once again, the serial entrepreneur is more likely to export because he hires more people, uses more capital, and is a married male.

B. Profits

Ultimately, it is important to know whether serial entrepreneurs run more profitable firms. This data is available at an annual level for a subset of the firms.

The measure of profits is the Operating Returns on Assets ($OROA$) This is measured as the ratio of earnings before interest and taxes (EBIT). $OROA$ is a measure of performance that has been previously used to assess whether a firm's operation changes (see, for example, Bennedsen et al., 2007, who use similar accounting data). $OROA$ compares a proxy of the firm's cash flows to the total asset base used to generate them. Unlike net income-based measures, such as return on assets, $OROA$ is unaffected by differences in the firm's capital structure decisions. In

contrast to return on equity or $ROCE$, it compares a firm's performance to its total assets, rather than a fraction of the firm's assets.

Profits are only 1% higher for the serial entrepreneur's first firm relative to the novice, but 4% higher for his second firm. Thus, there is some evidence of gains for the serial entrepreneur as he learns over time, consistent with the productivity gains he achieves when he opens his second firm.

V. Conclusion

The businesses founded by serial entrepreneurs improve over time, as the serial entrepreneur learns. When the serial entrepreneur opens the doors of his second business, he starts with 90% higher sales than his first, and 3.5 times the productivity of his first. This evidence suggests that the serial entrepreneur is learning on the job: if he were only innately better than novice entrepreneurs (who never start a second business), his second business would perform as well as his first, but not better.

Some entrepreneurs learn more than others from running their first business: young people improve much more than older people between their serial businesses. That arises in part because older people open their first businesses with twice the sales that younger people have when they open theirs.

Though the serial entrepreneur is learning from experience, he is also innately better at running a business. Even looking within the same industry, his businesses start at higher performance levels (in sales and productivity) than those of the novice who never opens a second business. Part of his higher performance is from higher observed skills (like education and experience) but almost all is from unmeasured ability. The serial entrepreneur also starts businesses that are more capital intensive than novices. He is also just more saavy or has higher expectations: he is twice as likely as a novice to start his first business as a limited liability corporation than a sole proprietorship, and then his second business triples the probability of opening as a corporation. This is true even though he operates in the same industries as do the sole proprietors. In all of this, men are more likely to be serial entrepreneurs than are women (85 percent of serial entrepreneurs are men; 65 percent of novice entrepreneurs are men).

In sum, serial entrepreneurs are innately better at running a business, but there is pronounced learning that is interpreted as building intangible capital. Because learning by the entrepreneur occurs more between firms (and less within firms over time), the implication is that the serial entrepreneur amasses knowledge about intangible capital that he acquires while running the first firm (but couldn't implement) and that is relevant for starting the second firm.

Prior literature on serial entrepreneurship has shown that their businesses last longer. Though not rigorously analyzed here, Danish serial entrepreneurs' first firms also last longer. No previous literature has shown that serial entrepreneurs' sales and productivity are higher during either their first or second businesses, as is shown here.

One key question is whether the Danish entrepreneurship data is representative of entrepreneurship in other developed countries. Denmark is not known for its high tech sector, and high tech is a small percent of the data below. But others have pointed out that most entrepreneurs are not in high tech – they are in retail, construction, and consulting when highly educated (Lazear, 2005).

So, who are these entrepreneurs? These are not the entrepreneurs of Silicon Valley in the U.S., who would be running "high tech" firms and would aim for VC money (though few get it). Across all research studies of entrepreneurship, it must be remembered that most entrepreneurs are starting small businesses in the service sector (about 50% in these data), or retail (about 23%) or construction (about 13%). There is a separate industry in the Danish data called "high tech knowledge intensive services" that includes programmers, but also movie producers and others, and these are about 7% of the entrepreneurs. One big advantage of the Danish data is that these are new business owners, because they must be "founders" who employ at least one person (though it is only two employees for serial entrepreneurs and less for novices, so these firms are small). In contrast, some studies of entrepreneurship use data on those who are self-employed and thus would not be considered founders of businesses.

In the U.S., there has been a time-series decline in entrepreneurship that is concerning (Haltiwanger, 2015). Though each entrepreneur does not hire many people, there are so many of them that they contribute significantly to employment growth and GDP growth. In the U.S., startups account for about 20% of gross job creation (Decker, Haltiwanger, Jarmin, and Miranda, 2014). Also, the relatively rare tech firms that flourish offer huge employment and innovation gains. In these Danish data, the role of entrepreneurs in sales growth is indeterminate because the data follows only entrepreneurs, not all firms in Denmark. But the message is likely to be similar to the U.S., where entrepreneurs are a dynamic part of the economic landscape. Note finally that in Denmark, serial entrepreneurs matter: they are 10% of all entrepreneurs, but they open 20% of all firms.

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TABLE 1: Types of Entrepreneurs and Entrepreneurial Firms

		# of firms per entrepreneur	# of entrepreneurs	Cumulative	# of firms	Percent	Cumulative
Novice Entrepreneurs	1	171,716	89.98	89.98	171,716	89.85	89.85
	2	15,505	8.12	98.11	31,010	8.17	98.02
	3	2,526	1.32	99.43	7,578	1.38	99.40
	4	696	0.36	99.8	2,784	0.37	99.77
	5	192	0.1	99.9	960	0.12	99.89
Serial Entrepreneurs	6	92	0.05	99.94	552	0.05	99.94
	7	38	0.02	99.96	266	0.02	99.96
	8	22	0.01	99.98	176	0.01	99.97
	9	11	0.01	99.98	99	0.01	99.98
	>=10	36	0	99.99	504	0.00	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 entrepreneurs - second experience			Serial entrepreneurs - first experience			Novice entrepreneurs		
		Frequency	Percent	Cum	Frequency	Percent	Cum	Frequency	Percent	Cum
Persons	Total	18,499	100.00	100.00	18,499	100.00	100.00	171,716	100.00	100.00
Education of entrepreneur	Elementary	2,760	14.9	14.9	2,875	15.5	15.5	34,088	19.9	19.9
	High-School	1,798	9.7	24.6	1,937	10.5	26.0	14,322	8.3	28.2
	Vocational	7,386	39.9	64.6	7,327	39.6	65.6	66,748	38.9	67.1
	2 year college	1,418	7.7	72.2	1,289	7.0	72.6	9,327	5.4	72.5
	4 year college	2,525	13.7	85.9	2,444	13.2	85.8	22,024	12.8	85.3
	University	2,266	12.3	98.1	2,100	11.4	97.2	17,166	10.0	95.3
	Unknown	346	1.9	100	527	2.9	100	8,041	4.7	100
Marital Status	Married	10,873	58.8	58.8	9,784	52.9	52.9	88,404	51.5	51.5
	Single	7,601	41.1	99.9	8,690	47.0	99.9	80,047	46.6	98.1
	Unknown	25	0.1	100	25	0.1	100	3,265	1.9	100
Gender	Man	16,008	86.5	86.5	16,008	86.5	86.5	117,943	68.7	68.7
	Woman	2,476	13.4	99.9	2,476	13.4	99.9	50,893	29.6	98.3
	Unknown	15	0.1	100	15	0.1	100	2,880	1.7	100
Danes, Immigrants and descendants	Danes	16,926	91.5	91.5	16,926	91.5	91.5	145,546	84.8	84.8
	Immigrants	1,277	6.9	98.4	1,277	6.9	98.4	20,340	11.8	96.6
	Descendants	276	1.5	99.9	276	1.5	99.9	2,565	1.5	98.1
	Unknown	20	0.1	100	20	0.1	100	3,265	1.9	100

	Mean	Percent	Cum	Mean	Percent	Cum	Mean	Percent	Cum
Age	40.9	99.9	99.9	37.4	99.9	99.9	39.0	98.3	98.3
	NA	0.1	100	NA	0.1	100	NA	1.7	100
Experience from wage work in years	13.6	99.9	99.9	12.2	99.9	99.9	12.5	98.1	98.1
	NA	0.1	100	NA	0.1	100	NA	1.9	100

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

		Serial entrepreneurs - second experience			Serial entrepreneurs - first experience			Novice entrepreneurs		
		Frequency	Percent	Cum	Frequency	Percent	Cum	Frequency	Percent	Cum
All firms	Total	18,499	100.00	100.00	18,499	100.00	100.00	171,716	100.00	100.00
Firm type	Sole proprietorship	2,355	12.7	12.7	8,599	46.5	46.5	126,667	73.8	73.8
	Stock-based corporation	918	5.0	17.7	967	5.2	51.7	3,266	1.9	75.7
	Limited liability company	15,182	82.1	99.8	8,902	48.1	99.8	41,689	24.3	99.9
	Other	44	0.2	100	31	0.2	100	94	0.1	100
Sectors	Manufacturing	955	5.2	5.2	997	5.4	5.4	7546	4.4	4.4
	Service	8,123	43.9	49.1	8,012	43.3	48.7	85,234	49.6	54.0
	High Tech Knowledge intensive service	1,793	9.7	58.8	1,810	9.8	58.5	12,469	7.3	61.3
	Retail	4,318	23.3	82.1	4,301	23.2	81.7	39,964	23.3	84.6
	Construction	2,398	13.0	95.1	2,545	13.8	95.5	21,849	12.7	97.3
	Other	912	4.9	100	834	4.5	100	4654	2.7	100
Year of establishment	2001	165	0.9	0.9	2,287	12.4	12.4	12,741	7.4	7.4
	2002	378	2.0	2.9	2,040	11.0	23.4	11,492	6.7	14.1
	2003	621	3.4	6.3	1,993	10.8	34.2	11,737	6.8	21.0
	2004	929	5.0	11.3	1,984	10.7	44.9	13,320	7.8	28.7
	2005	1,223	6.6	17.9	2,108	11.4	56.3	15,164	8.8	37.5
	2006	1,574	8.5	26.4	1,889	10.2	66.5	15,821	9.2	46.8
	2007	1,929	10.4	36.9	1,624	8.8	75.3	16,207	9.4	56.2
	2008	1,976	10.7	47.5	1,306	7.1	82.3	15,319	8.9	65.1
	2009	1,577	8.5	56.1	945	5.1	87.4	10,166	5.9	71.0
	2010	1,816	9.8	65.9	928	5.0	92.5	11,809	6.9	77.9
	2011	2,140	11.6	77.5	741	4.0	96.5	12,642	7.4	85.3
	2012	1,951	10.6	88.0	511	2.8	99.2	12,336	7.2	92.5
	2013	2,220	12.0	100	143	0.8	100	12,962	7.6	100

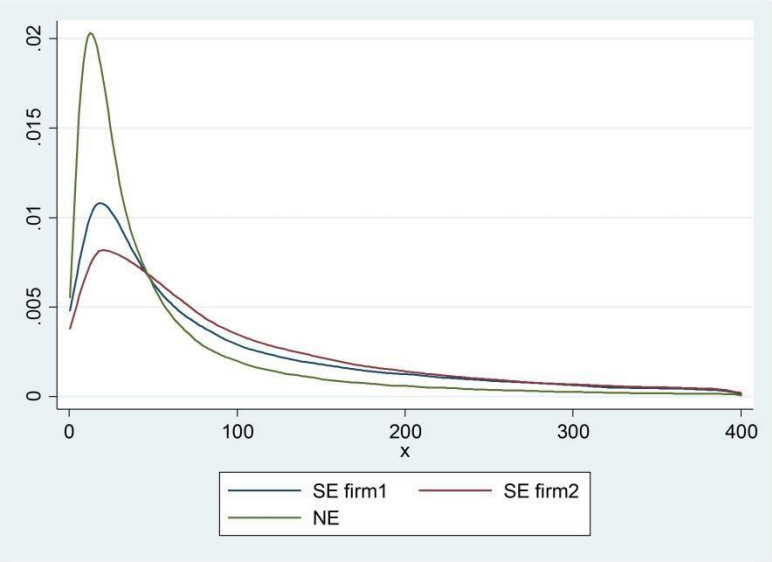
TABLE 4: Average Lifetime of Entrepreneurial Firms; Across Types of Entrepreneur

	Serial entrepreneur – second experience			**Serial entrepreneur – first experience**			**Novice entrepreneur**		
	# months		#firms	# months		#firms	# months		#firms
Year of establishment	Median	Mean		Median	Mean		Median	Mean	
2001	63	79.5	105	60.2	76.1	1,717	57	76.5	9,017
2002	87***	89.2***	265	60	73.3	1,527	60	74.7	8,144
2003	79.6***	83.5***	415	57**	66.9***	1,514	60	71.2	8,639
2004	71***	77.3***	649	51	63.5***	1,433	55	66.9	9,515
2005	68.2***	70.3***	833	45***	55.6***	1,554	51	62.1	10,700
2006	65.2***	64.7***	1,066	42***	51.4***	1,409	48	58.0	11,627
2007	60***	58.3***	1,291	39***	46.6***	1,162	48	53.3	11,377
2008	66***	55.2***	1,260	41.2***	44.8***	882	48	48.3	10,172
2009	63***	50.1***	993	36***	38.3***	621	48	44.3	6,678
2010	51***	43.4***	1,182	33***	34.1***	594	48	39.5	7,626
2011	39***	36.3***	1,357	27***	28.5***	481	39	32.9	8,639
2012	30***	28.0***	1,227	23***	22.6***	303	30	26.3	8,187
2013	18***	18.8***	1,150	21	18.2	61	18	18.1	7,427
All	42***	54.5***	11,793	45	56.8***	13,258	39	52.8	117,748

Note: Stars indicate whether the number months for the average serial entrepreneur are statistically different from the number of months for the average novice. *** p<0.01, ** p<0.05, * p<0.1. The median values are not exactly the median but is calculated as the mean value of 5 or 6 observations around the median. Measures based on single observations such medians cannot be revealed due to Statistics Denmark rules for confidentiality.

Figure 1: Distribution of Average Monthly Sales in US Dollars

Sales **log(sales)**



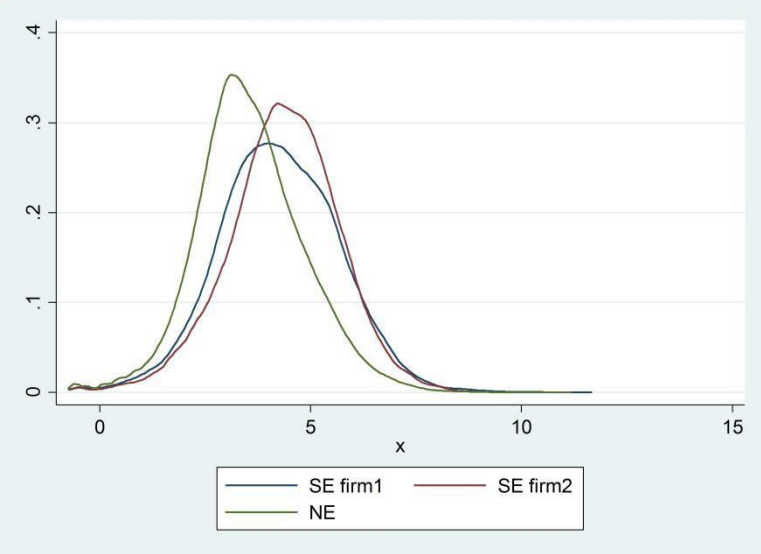


TABLE 5: Characteristics of Entrepreneurial Firms and Entrepreneur; Across Types of Entrepreneur; average for six years

	Serial entrepreneur - second experience				Serial entrepreneur - first experience				Novice entrepreneur			
Variable	Number	Mean	Median	Std. Dev.	Number	Mean	Median	Std. Dev.	Number	Mean	Median	Std.
Firm Characteristics												
Sales	11,793	49.81	21.63	169.4	13,258	67.27	18.81	718.2	117,748	26.42	8.64	180.4
Employment	11,793	2.86	1.38	5.0	13,258	3.29	1.25	10.9	117,748	1.93	1.00	6.3
Labor Productivity	11,181	8.89	5.54	19.6	12,615	9.74	4.62	165.7	111,812	5.53	3.66	23.0
Capital Stock	11,793	369.72	49.78	9715.7	13,258	428.22	47.43	8320.3	117,748	131.94	23.94	2610.9
Capital Intensity	11,793	155.04	30.47	1596.7	13,258	366.49	27.86	31009.8	117,748	73.61	19.38	932.8
Exports if positive	2,339	49.04	7.28	338.3	2,414	146.21	7.74	1892.0	13,243	43.40	4.53	402.8
Share of observations with exports	11,793	0.12	0	0.3	13,258	0.12	0	0.3	117,748	0.07	0	0.3
Average # of workplaces	11,260	1.03	1	0.2	13,050	1.03	1	0.4	116,578	1.01	1	0.2
Entrepreneur Characteristics												
Married	11,793	0.58		0.49	13,258	0.52		0.50	117,748	0.53		0.50
Male	11,793	0.87		0.34	13,258	0.87		0.33	117,748	0.75		0.43
Experience	11,793	13.47		8.88	13,258	12.13		8.43	117,748	13.06		9.63
Age	11,793	40.02		9.58	13,258	36.55		9.39	117,748	38.88		11.05
Years of Schooling	11,793	13.74		2.55	13,258	13.67		2.55	117,748	13.38		2.69

Note: The averages are based on 842,796 observations; 69,922 observations for serial entrepreneurs second experience, 79,448 observations for serial entrepreneurs first experience, and 693,426 for novice entrepreneurs. Due to Statistics Denmark rules for confidentiality, median values are calculated as the mean value of 5 observations around the median.

TABLE 6: Sales, Employment, and Labor Productivity of Novice and Serial Entrepreneurs – 6 Years Semi-Annual Sales Data*

	log(sales)	log(employment)	log(labor productivity)
Serial E Firm 2	0.791***	0.237***	0.443***
	(0.013)	(0.009)	(0.009)
Serial E Firm 1	0.673***	0.282***	0.296***
	(0.014)	(0.009)	(0.009)
R-squared	0.050	0.026	0.018
Number of observations	842796	842796	749766

Col 1 and 2: Number of firms: All: 142,799; Serial E Firm 2: 11793; Serial E Firm 1: 13258; Novice E: 117748.
Col 3: Number of firms: All: 135669; Serial E Firm 2: 11190; Serial E Firm 1: 12622; Novice E: 111857.
*Average monthly sales in US dollars.

TABLE 7: Sales of Novice and Serial Entrepreneurs – 6 Years Semi-Annual Sales Data*

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) Firm FE	(7) Firm FE	(8) Firm FE
Serial E Firm 2	0.791***	0.942***	0.891***	0.541***	0.523***			
	(0.013)	(0.014)	(0.014)	(0.011)	(0.011)			
Serial E Firm 1	0.673***	0.538***	0.490***	0.306***	0.285***			
	(0.014)	(0.014)	(0.014)	(0.010)	(0.010)			
Semi-annual experience		0.097***	0.094***	0.032***	0.031***		0.048***	0.025***
		(0.001)	(0.001)	(0.001)	(0.001)		(0.001)	(0.001)
Semi-annual exp. of SE Firm 2		-0.022***	-0.021***	-0.031***	-0.031***		0.001	-0.017***
		(0.002)	(0.002)	(0.002)	(0.002)		(0.002)	(0.002)
Semi-annual exp. of SE Firm 1		0.017***	0.018***	-0.016***	-0.016***		0.016***	-0.001
		(0.002)	(0.002)	(0.002)	(0.002)		(0.002)	(0.002)
Married			0.193***		0.078***			
			(0.008)		(0.004)			
Years of Schooling			-0.004***		0.011***			
			(0.001)		(0.001)			
Male			0.311***		0.164***			
			(0.008)		(0.005)			
Experience			0.001*		0.004***			
			(0.001)		(0.000)			
Age			-0.004***		-0.004***			
			(0.000)		(0.000)			
Immigrant			-0.160***		-0.050***			
			(0.011)		(0.007)			
Descendant			-0.034		0.038**			
			(0.029)		(0.019)			
Log(Capital)				0.260***	0.256***			0.100***
				(0.002)	(0.002)			(0.002)
Log(Employment)				0.861***	0.857***			0.573***
				(0.004)	(0.004)			(0.004)
R-squared	0.050	0.098	0.112	0.565	0.569	0.837	0.838	0.857
Number of observations	842796	842796	842796	842796	842796	842796	842796	842796

Number of firms: All: 142,799; Serial E Firm 2: 11793; Serial E Firm 1: 13258; Novice E: 117748.

*Average monthly sales in US dollars.

TABLE 8a: Firm fixed effect of Novices and Serial Entrepreneurs – 6 Years Semi-Annual Sales Data* (No Age Interactions)

	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Serial E Firm 2	0.802***	0.760***	0.518***	0.504***
	(0.009)	(0.009)	(0.009)	(0.009)
Serial E Firm 2 * Age				
Serial E Firm 1	0.422***	0.390***	0.155***	0.144***
	(0.009)	(0.009)	(0.008)	(0.008)
Serial E Firm 1 * Age				
Married		0.125***		0.055***
		(0.005)		(0.005)
Years of Schooling		0.007***		0.012***
		(0.001)		(0.001)
Male		0.233***		0.129***
		(0.006)		(0.005)
Experience		0.004***		0.004***
		(0.000)		(0.000)
Age		-0.001*		-0.002***
		(0.000)		(0.000)
Immigrant		-0.121***		-0.005
		(0.008)		(0.008)
Descendant		0.024		0.131***
		(0.020)		(0.017)
log(Capital)			0.292***	0.287***
			(0.003)	(0.003)
log(Employment)			0.193***	0.192***
			(0.005)	(0.005)
R-squared	0.064	0.084	0.325	0.331
Number of observations	142799	142799	142799	142799

Number of firms: All: 142,799; Serial E Firm 2: 11793; Serial E Firm 1: 13258; Novice E: 117748.
*Average monthly sales in US dollars.

TABLE 8b: Firm fixed effect of Novices and Serial Entrepreneurs – 6 Years Semi-Annual Sales Data* (with Age Interactions)

	(5) OLS	(6) OLS	(7) OLS	(8) OLS
Serial E Firm 2	1.096***	1.053***	0.685***	0.680***
	(0.039)	(0.039)	(0.037)	(0.037)
Serial E Firm 2 * Age	-0.007***	-0.007***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Serial E Firm 1	0.077**	0.060*	-0.028	-0.026
	(0.035)	(0.035)	(0.030)	(0.030)
Serial E Firm 1 * Age	0.010***	0.009***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)
Married		0.123***		0.054***
		(0.005)		(0.005)
Years of Schooling		0.007***		0.012***
		(0.001)		(0.001)
Male		0.233***		0.129***
		(0.006)		(0.005)
Experience		0.004***		0.004***
		(0.000)		(0.000)
Age	0.004***	-0.001**	0.001***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)
Immigrant		-0.121***		-0.005
		(0.008)		(0.008)
Descendant		0.023		0.130***
		(0.020)		(0.017)
log(Capital)			0.291***	0.287***
			(0.003)	(0.003)
log(Employment)			0.193***	0.191***
			(0.005)	(0.005)
	0.067	0.085	0.325	0.331
	142799	142799	142799	142799

Number of firms: All: 142,799; Serial E Firm 2: 11793; Serial E Firm 1: 13258; Novice E: 117748.
*Average monthly sales in US dollars.

TABLE 9: Sales of Novice and Serial Entrepreneurs with age interactions - 6 Years Semi-Annual Sales Data*

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
Serial E Firm 2	1.185***	1.300***	1.254***	0.714***	0.709***
	(0.057)	(0.057)	(0.057)	(0.036)	(0.036)
Serial E Firm 2 * Age	-0.010***	-0.009***	-0.009***	-0.004***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Serial E Firm 1	0.097*	-0.014	-0.017	0.107***	0.112***
	(0.054)	(0.053)	(0.053)	(0.030)	(0.030)
Serial E Firm 1 * Age	0.016***	0.015***	0.014***	0.005***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Semi-annual experience	-0.001***	-0.001***	-0.004***	-0.001***	-0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Semi-annual exp. of SE Firm 2		0.097***	0.094***	0.032***	0.031***
		(0.001)	(0.001)	(0.001)	(0.001)
Semi-annual exp. of SE Firm 1		-0.023***	-0.022***	-0.032***	-0.031***
		(0.002)	(0.002)	(0.002)	(0.002)
Married		0.016***	0.017***	-0.017***	-0.016***
		(0.002)	(0.002)	(0.002)	(0.002)
Years of Schooling			0.191***		0.077***
			(0.008)		(0.004)
Male			-0.004***		0.011***
			(0.001)		(0.001)
Experience			0.310***		0.165***
			(0.008)		(0.005)
Age			0.001*		0.004***
			(0.001)		(0.000)
Immigrant			-0.160***		-0.050***
			(0.011)		(0.007)
Descendant			-0.035		0.037**
			(0.029)		(0.019)
Log(Capital)				0.260***	0.256***
				(0.002)	(0.002)
Log(Employment)				0.860***	0.856***
				(0.004)	(0.004)
R-squared	0.051	0.099	0.113	0.566	0.570
Number of observations	842796	842796	842796	842796	842796

Number of firms: All: 142,799; Serial E Firm 2: 11793; Serial E Firm 1: 13258; Novice E: 117748.

*Average monthly sales in US dollars.

TABLE 10: Employment of Novice and Serial Entrepreneurs - 6 Years Annual Data (employee FTE)

	(1) OLS	(2) OLS	(3) OLS	(4) OLS
Serial E Firm 2	0.169***	-0.017	-0.028**	-0.212***
	(0.010)	(0.012)	(0.012)	(0.011)
Serial E Firm 1	0.260***	0.019*	0.010	-0.078***
	(0.009)	(0.010)	(0.010)	(0.009)
Annual experience		0.110***	0.108***	0.077***
		(0.001)	(0.001)	(0.001)
Annual exp. of SE Firm 2		0.074***	0.075***	0.099***
		(0.004)	(0.004)	(0.004)
Annual exp. of SE Firm 1		0.073***	0.073***	0.070***
		(0.004)	(0.004)	(0.003)
Married			0.077***	0.049***
			(0.005)	(0.004)
Years of Schooling			-0.007***	0.006***
			(0.001)	(0.001)
Male			0.052***	0.009*
			(0.005)	(0.005)
Experience			-0.002***	-0.002***
			(0.000)	(0.000)
Age			-0.001**	-0.000
			(0.000)	(0.000)
Immigrant			-0.073***	-0.112***
			(0.007)	(0.006)
Descendant			-0.072***	-0.078***
			(0.016)	(0.015)
Log(Capital)				0.206***
				(0.002)
R-squared	0.017	0.074	0.078	0.247
Number of observations	459734	459734	459734	459734

Number of firms: All: 142,799; Serial E Firm 2: 11793; Serial E Firm 1: 13258; Novice E: 117748.

TABLE 11: Probability of Exporter for Novice and Serial Entrepreneurs - 6 Years Annual Data - External Margin

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) Firm FE	(7) Firm FE	(8) Firm FE
Serial E Firm 2	0.050***	0.040***	0.033***	0.013***	0.010***			
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)			
Serial E Firm 1	0.048***	0.029***	0.026***	0.006**	0.005*			
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)			
Annual experience		0.004***	0.004***	0.001***	0.002***		0.004***	0.003***
		(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)
Annual exp. of SE Firm 2		0.002***	0.003***	0.001**	0.002***		0.003***	0.002***
		(0.001)	(0.001)	(0.001)	(0.001)		(0.001)	(0.001)
Annual exp. of SE Firm 1		0.003***	0.003***	0.001**	0.001**		0.002***	0.001***
		(0.001)	(0.001)	(0.001)	(0.001)		(0.000)	(0.000)
Married			0.012***		0.004***			
			(0.002)		(0.001)			
Years of Schooling			0.006***		0.003***			
			(0.000)		(0.000)			
Male			0.022***		0.019***			
			(0.002)		(0.002)			
Experience			-0.002***		-0.001***			
			(0.000)		(0.000)			
Age			0.002***		0.001***			
			(0.000)		(0.000)			
Immigrant			-0.021***		0.007***			
			(0.003)		(0.003)			
Descendant			-0.013**		-0.006			
			(0.005)		(0.005)			
Log(Capital/Employment)				0.009***	0.008***			0.001***
				(0.000)	(0.000)			(0.000)
Log(Employment)				0.047***	0.045***			0.030***
				(0.001)	(0.001)			(0.001)
R-squared	0.005	0.008	0.018	0.137	0.140	0.733	0.733	0.734
Number of observations	842796	842796	842796	842796	842796	842796	842796	842796

Number of firms: All: 142,799; Serial E Firm 2: 11793; Serial E Firm 1: 13258; Novice E: 117748.

TABLE 12: Exports of Novice and Serial Entrepreneurs - 6 Years Annual Data - Internal Margin

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) Firm FE	(7) Firm FE	(8) Firm FE
Serial E Firm 2	0.412***	0.496***	0.454***	0.278***	0.270***			
	(0.053)	(0.066)	(0.065)	(0.062)	(0.062)			
Serial E Firm 1	0.520***	0.355***	0.360***	0.229***	0.233***			
	(0.055)	(0.069)	(0.068)	(0.062)	(0.062)			
Annual experience		0.058***	0.059***	0.006*	0.008**		0.081***	0.067***
		(0.004)	(0.004)	(0.004)	(0.004)		(0.009)	(0.009)
Annual exp. of SE Firm 2		-0.010	-0.009	-0.005	-0.006		0.002	-0.010
		(0.010)	(0.010)	(0.010)	(0.010)		(0.010)	(0.010)
Annual exp. of SE Firm 1		0.023**	0.020**	0.002	0.001		0.026***	0.014
		(0.009)	(0.009)	(0.009)	(0.009)		(0.009)	(0.009)
Married			0.241***		0.090***			
			(0.038)		(0.033)			
Years of Schooling			0.018***		0.033***			
			(0.007)		(0.006)			
Male			0.512***		0.218***			
			(0.045)		(0.040)			
Experience			-0.005**		-0.008***			
			(0.002)		(0.002)			
Age			0.013***		0.005***			
			(0.002)		(0.002)			
Immigrant			0.194***		0.391***			
			(0.064)		(0.056)			
Descendant			0.553**		0.519**			
			(0.269)		(0.219)			
Log(Capital/Employment)				0.193***	0.191***			0.048***
				(0.011)	(0.011)			(0.008)
Log(Employment)				0.598***	0.592***			0.516***
				(0.020)	(0.020)			(0.024)
R-squared	0.012	0.020	0.038	0.215	0.222	0.843	0.843	0.848
Number of observations	68256	68256	68256	68256	68256	68256	68256	68256

Number of firms: All: 17996; Serial E Firm 2: 2339; Serial E Firm 1: 2414; Novice E: 13243.

Table 13: Models of Profits via OLS and Quantile Regression

	OLS	Q(0.10)	Q(0.25)	Q(0.50)	Q(0.75)	Q(0.90)
Serial E Firm 2	0.0415***	0.0470***	0.0187***	0.0108***	0.00861***	0.00484
	(2.77)	(13.35)	(13.91)	(8.64)	(4.72)	(1.25)
Serial E Firm 1	0.0119*	0.0147***	0.00498***	0.00451***	0.00686***	0.00499
	(1.71)	(3.46)	(3.52)	(2.98)	(2.87)	(1.05)
Semi-annual experience	0.00241***	0.00812***	0.00234***	0.000351**	-0.000856***	-0.00260***
	(3.03)	(15.19)	(14.94)	(2.46)	(-3.86)	(-4.65)
Semi-annual exp. of SE Firm 2	-0.00858***	-0.00505***	-0.00215***	-0.00162***	-0.00286***	-0.00506***
	(-2.75)	(-6.14)	(-6.46)	(-5.19)	(-6.23)	(-5.55)
Semi-annual exp. of SE Firm 1	-0.00323	-0.000272	-0.000157	-0.000257	-0.00133**	-0.00253**
	(-1.41)	(-0.32)	(-0.46)	(-0.76)	(-2.32)	(-2.12)
Married	0.00805***	0.0109***	0.00408***	0.00252***	0.00149**	0.00175
	(2.91)	(6.45)	(7.94)	(5.47)	(2.13)	(1.03)
Years of Schooling	-0.00137***	0.00134***	0.000219**	-0.000165*	-0.00108***	-0.00342***
	(-2.83)	(4.01)	(2.09)	(-1.87)	(-7.84)	(-10.39)
Male	0.0111***	0.00996***	0.00599***	0.00569***	0.00572***	0.00968***
	(3.68)	(4.53)	(9.06)	(9.88)	(6.84)	(5.02)
Experience	0.000300*	0.000187*	0.0000930***	0.000209***	0.000328***	0.000527***
	(1.87)	(1.75)	(3.04)	(7.46)	(7.30)	(4.81)
Age	-0.000869***	-0.000257**	-0.000301***	-0.000584***	-0.000880***	-0.00144***
	(-6.53)	(-2.52)	(-11.62)	(-23.55)	(-23.62)	(-17.33)
Immigrant	-0.0105**	-0.0694***	-0.0173***	0.00282**	0.0191***	0.0428***
	(-2.38)	(-10.05)	(-9.29)	(2.20)	(10.01)	(9.22)
Descendant	0.0322	-0.0546***	-0.00995**	-0.000894	0.0101**	0.0246*
	(0.76)	(-3.92)	(-2.34)	(-0.27)	(2.40)	(1.90)
Constant	0.106***	-0.0504***	0.0161***	0.0661***	0.139***	0.295***
	(8.77)	(-5.79)	(4.97)	(25.64)	(11.07)	(18.31)
R-squared	0.001	0.000	0.001	0.001	0.000	0.000
Number of observations	143214	143214	143214	143214	143214	143214

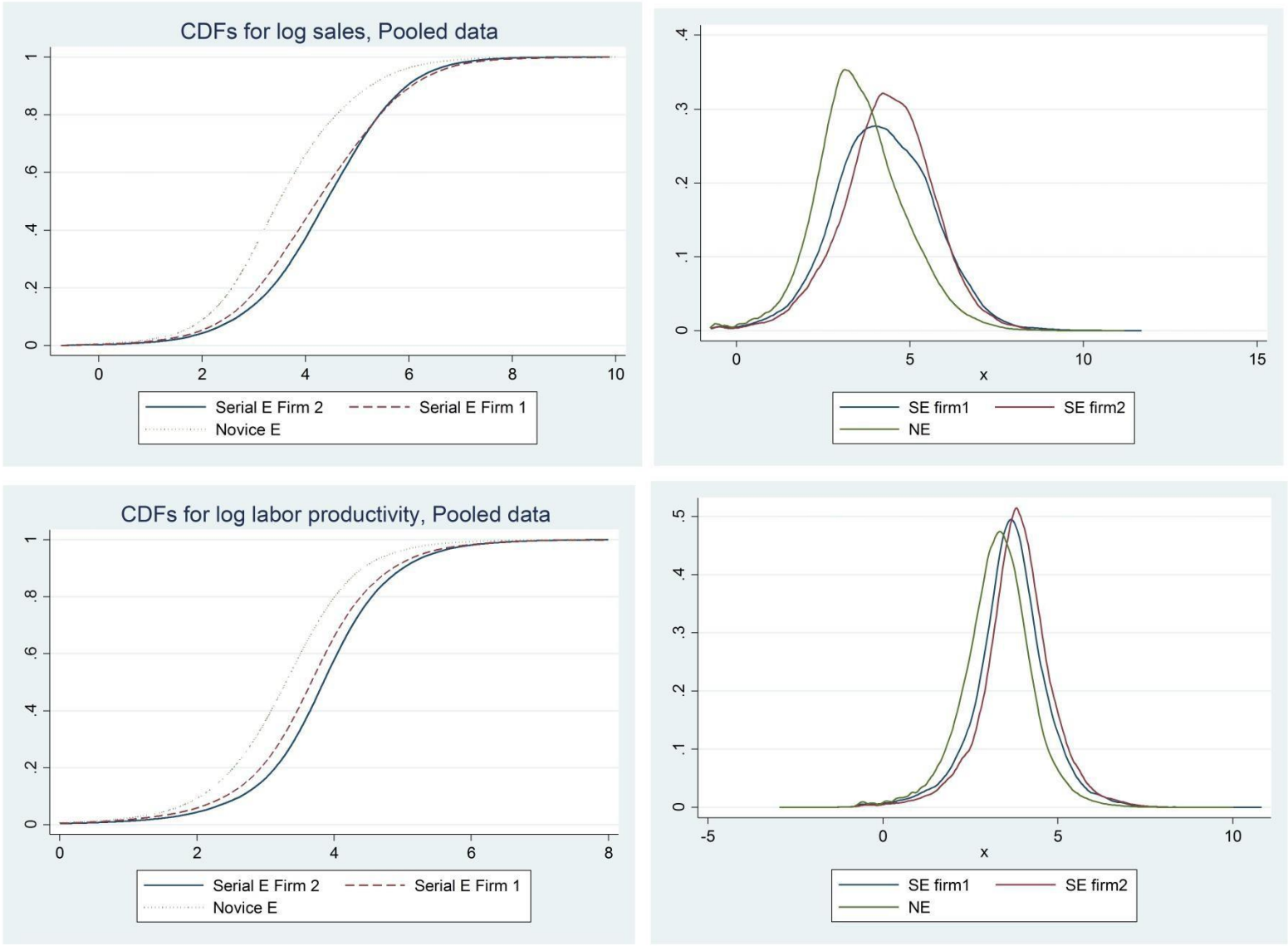
t statistics in parentheses

* p<0.10, ** p<0.05, *** p<0.010

Accounting data on costs for intermediate inputs and wage sum- no interpolated data from Statistics Denmark.

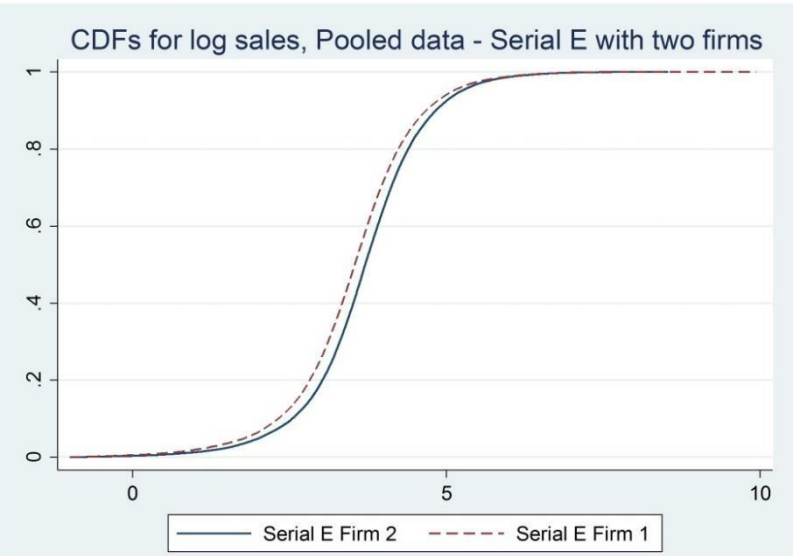
APPENDIX TABLES

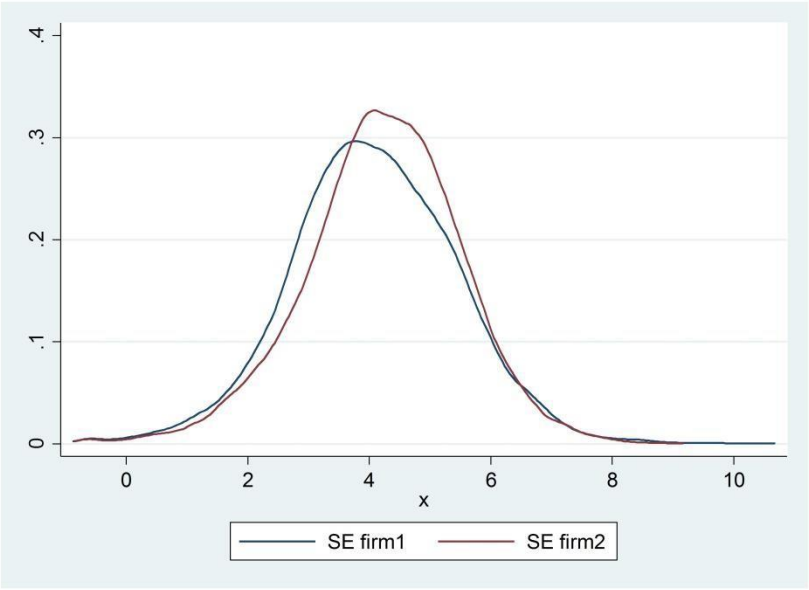
Appendix FIGURE A1: CDFs and PDFs for log(sales) and log(labor productivity); Serial E Firm 2, Serial E Firm 1, Novice Entrepreneur.

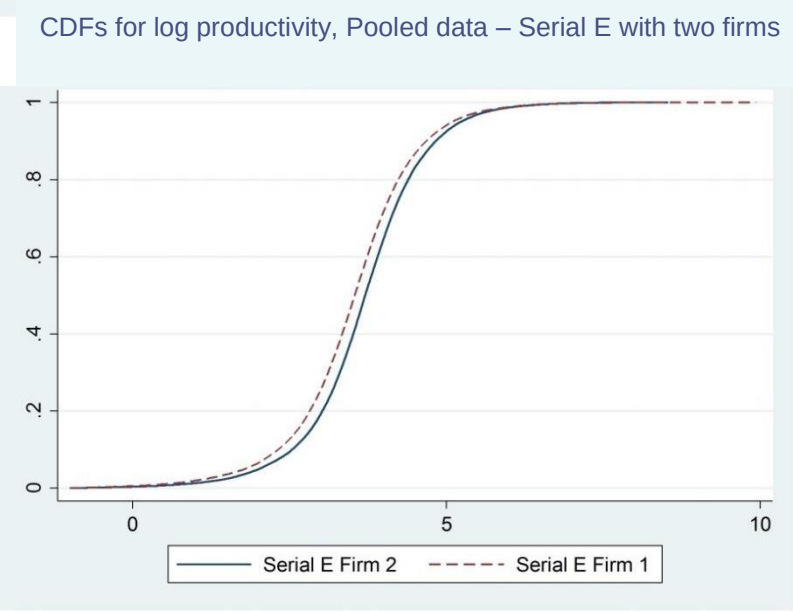


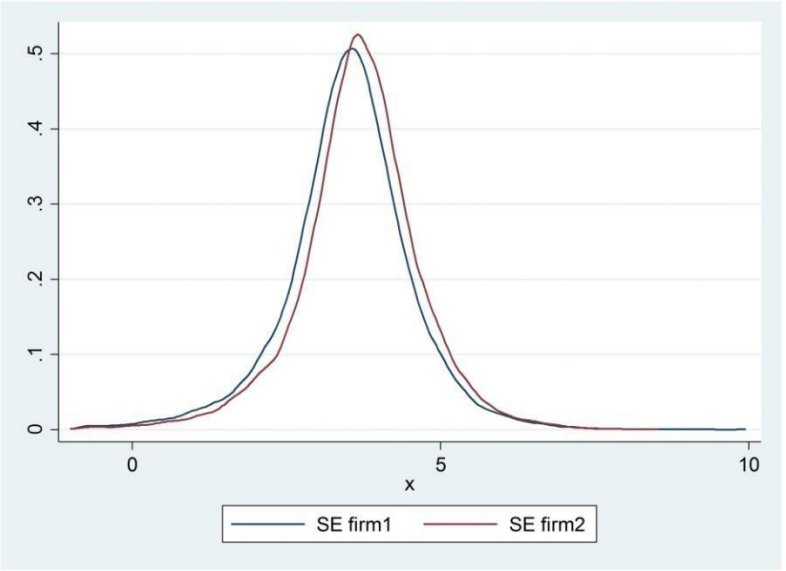
Note: Due to Statistics Denmark rules for confidentiality, CDF and PDF are calculated on a 5-firm running average from the lowest to highest observation.

Appendix FIGURE A2: CDFs and PDFs for log(sales) and log(labor productivity); Serial E Firm 2, Serial E Firm 1: Same entrepreneurs









Note: Due to Statistics Denmark rules for confidentiality, CDF and PDF are calculated on a 5-firm running average from the lowest to highest observation.

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 in first 12 six months of business life	% of unrestricted sample
Serial - second experience[1)]	18,499	100	17,626	95	11,793	64
- first experience	18,499	100	17,729	96	13,258	72
Novice	171,716	100	159,036	93	117,748	69
All	208,714	100	194,391	93	142,799	68

Appendix TABLE A2: Models of log sales via OLS and Quantile Regression

	OLS	Q(0.10)	Q(0.25)	Q(0.50)	Q(0.75)	Q(0.90)
Serial E Firm 2	0.942***	0.688***	0.895***	1.080***	1.106***	0.915***
	(67.32)	(27.74)	(52.97)	(68.17)	(65.04)	(42.13)
Serial E Firm 1	0.538***	0.377***	0.430***	0.545***	0.684***	0.633***
	(38.37)	(19.69)	(27.98)	(33.88)	(32.90)	(25.80)
Semi-annual experience	0.0971***	0.0761***	0.0814***	0.0986***	0.114***	0.115***
	(120.24)	(69.58)	(93.95)	(107.04)	(98.71)	(71.98)
Semi-annual exp. of SE Firm 2	-0.0220***	-0.0133***	-0.0145***	-0.0259***	-0.0317***	-0.0225***
	(-8.93)	(-2.61)	(-4.79)	(-9.03)	(-10.54)	(-5.23)
Semi-annual exp. of SE Firm 1	0.0165***	0.00172	0.0196***	0.0303***	0.0173***	0.0149***
	(6.99)	(0.46)	(5.91)	(10.43)	(5.63)	(3.63)
Constant	3.523***	1.961***	2.670***	3.418***	4.333***	5.253***
	(175.60)	(45.37)	(127.84)	(133.85)	(147.82)	(150.99)
R-squared	0.098	0.095	0.096	0.097	0.097	0.095
Number of observations	842796	842796	842796	842796	842796	842796

Number of firms: All: 142,799; Serial E Firm 2: 11,793; Serial E Firm 1: 13,258; Novice E: 117,748. *t* statistics in parentheses; * p<0.10, ** p<0.05, *** p<0.010

Appendix TABLE A3: Models of log sales via OLS and Quantile Regression

	OLS	Q(0.10)	Q(0.25)	Q(0.50)	Q(0.75)	Q(0.90)
Serial E Firm 2	0.523***	0.334***	0.394***	0.513***	0.614***	0.660***
	(49.67)	(19.88)	(34.99)	(47.68)	(48.73)	(42.49)
Serial E Firm 1	0.285***	0.179***	0.207***	0.261***	0.323***	0.381***
	(29.46)	(11.43)	(19.66)	(29.10)	(30.43)	(24.86)
Semi-annual experience	0.0307***	0.0353***	0.0293***	0.0292***	0.0257***	0.0201***
	(57.14)	(40.14)	(53.23)	(58.76)	(44.12)	(23.22)
Semi-annual exp. of SE Firm 2	-0.0305***	-0.0146***	-0.0229***	-0.0326***	-0.0385***	-0.0389***
	(-17.52)	(-6.05)	(-12.18)	(-18.87)	(-20.62)	(-16.90)
Semi-annual exp. of SE Firm 1	-0.0155***	-0.0163***	-0.0113***	-0.0127***	-0.0153***	-0.0181***
	(-9.85)	(-6.55)	(-6.40)	(-8.62)	(-9.09)	(-7.61)
Log(Capital)	0.256***	0.289***	0.290***	0.267***	0.232***	0.219***
	(111.02)	(92.73)	(123.16)	(123.17)	(109.35)	(89.10)
Log(Employment)	0.857***	0.930***	0.878***	0.858***	0.841***	0.795***
	(219.27)	(158.96)	(208.53)	(237.95)	(234.18)	(184.21)
Married	0.0775***	0.0751***	0.0704***	0.0768***	0.0756***	0.0733***
	(17.62)	(11.83)	(16.47)	(19.31)	(16.30)	(10.93)
Years of Schooling	0.0112***	0.00241*	0.00795***	0.0112***	0.0143***	0.0177***
	(12.69)	(1.93)	(9.71)	(13.86)	(15.29)	(13.67)
Male	0.164***	0.102***	0.120***	0.150***	0.195***	0.228***
	(30.45)	(12.75)	(22.89)	(29.89)	(33.62)	(27.41)
Experience	0.00372***	0.00661***	0.00487***	0.00415***	0.00263***	0.000655
	(11.85)	(13.91)	(16.82)	(13.77)	(7.74)	(1.37)
Age	-0.00387***	-0.00662***	-0.00565***	-0.00452***	-0.00254***	-0.000533
	(-14.00)	(-15.55)	(-22.36)	(-16.98)	(-8.34)	(-1.26)
Immigrant	-0.0500***	0.0435***	-0.00199	-0.0496***	-0.0938***	-0.150***
	(-6.72)	(4.33)	(-0.28)	(-7.10)	(-11.77)	(-13.85)
Descendant	0.0376**	0.0186	-0.00124	0.0205	0.0295	0.0292
	(2.02)	(0.71)	(-0.08)	(1.31)	(1.50)	(1.05)
Constant	1.662***	0.153	1.002***	1.654***	2.390***	3.118***
	(20.88)	(0.41)	(14.41)	(27.73)	(30.71)	(9.96)
R-squared	0.569	0.545	0.562	0.568	0.561	0.539
Number of observations	842796	842796	842796	842796	842796	842796

Number of firms: All: 142,799; Serial E Firm 2: 11,793; Serial E Firm 1: 13,258; Novice E: 117,748. *t* statistics in parentheses; * p<0.10, ** p<0.05, *** p<0.010

Appendix TABLE A4: Models of log sales via OLS and Quantile Regression – Age Interactions

	OLS	Q(0.10)	Q(0.25)	Q(0.50)	Q(0.75)	Q(0.90)
Serial E Firm 2	1.300***	1.189***	1.360***	1.499***	1.419***	1.197***
	(22.87)	(14.72)	(21.70)	(23.20)	(21.43)	(14.31)
Serial E Firm 2 * Age	-0.00885***	-0.0117***	-0.0113***	-0.0106***	-0.00803***	-0.00691***
	(-6.33)	(-6.26)	(-7.37)	(-6.65)	(-4.88)	(-3.30)
Serial E Firm 1	-0.0140	-0.0179	-0.0694	-0.0500	0.0798	0.0978
	(-0.26)	(-0.27)	(-1.26)	(-0.83)	(1.11)	(1.03)
Serial E Firm 1 * Age	0.0151***	0.0108***	0.0138***	0.0165***	0.0166***	0.0148***
	(10.50)	(5.67)	(9.24)	(9.95)	(8.75)	(5.82)
Semi-annual experience	0.0971***	0.0783***	0.0815***	0.0986***	0.114***	0.116***
	(120.13)	(73.04)	(96.24)	(107.07)	(97.85)	(77.40)
Semi-annual exp. of SE Firm 2	-0.0233***	-0.0160***	-0.0166***	-0.0279***	-0.0322***	-0.0240***
	(-9.48)	(-3.21)	(-5.85)	(-9.04)	(-10.03)	(-5.50)
Semi-annual exp. of SE Firm 1	0.0157***	-0.00236	0.0177***	0.0290***	0.0184***	0.0148***
	(6.66)	(-0.58)	(5.89)	(10.00)	(5.61)	(3.62)
Age	-0.000958***	-0.00706***	-0.00595***	-0.00214***	0.00406***	0.00955***
	(-2.66)	(-20.24)	(-18.86)	(-5.50)	(7.25)	(14.03)
Constant	3.561***	2.211***	2.890***	3.494***	4.182***	4.891***
	(148.42)	(55.38)	(106.97)	(131.01)	(104.00)	(129.21)
R-squared	0.099	0.092	0.096	0.098	0.097	0.091
Number of observations	842796	842796	842796	842796	842796	842796

Number of firms: All: 142,799; Serial E Firm 2: 11,793; Serial E Firm 1: 13,258; Novice E: 117,748. *t* statistics in parentheses; * p<0.10, ** p<0.05, *** p<0.010

Appendix TABLE A5: Models of log sales via OLS and Quantile Regression – Age Interactions

	OLS	Q(0.10)	Q(0.25)	Q(0.50)	Q(0.75)	Q(0.90)
Serial E Firm 2	0.709***	0.530***	0.579***	0.677***	0.719***	0.794***
	(19.47)	(11.75)	(16.54)	(19.93)	(17.59)	(14.88)
Serial E Firm 2 * Age	-0.00461***	-0.00480***	-0.00455***	-0.00409***	-0.00262**	-0.00331***
	(-5.24)	(-4.48)	(-5.42)	(-4.86)	(-2.56)	(-2.59)
Serial E Firm 1	0.112***	0.0291	0.0563**	0.110***	0.156***	0.187***
	(3.74)	(0.67)	(1.97)	(3.97)	(4.44)	(3.97)
Serial E Firm 1 * Age	0.00475***	0.00424***	0.00417***	0.00418***	0.00453***	0.00521***
	(5.97)	(3.53)	(5.54)	(5.55)	(4.97)	(4.19)
Semi-annual experience	0.0307***	0.0354***	0.0294***	0.0293***	0.0257***	0.0201***
	(57.25)	(40.20)	(53.49)	(59.29)	(44.18)	(23.14)
Semi-annual exp. of SE Firm 2	-0.0311***	-0.0157***	-0.0241***	-0.0334***	-0.0391***	-0.0400***
	(-17.83)	(-6.52)	(-13.57)	(-19.59)	(-19.67)	(-16.55)
Semi-annual exp. of SE Firm 1	-0.0157***	-0.0167***	-0.0114***	-0.0128***	-0.0150***	-0.0180***
	(-10.03)	(-6.65)	(-6.83)	(-9.11)	(-8.37)	(-7.33)
Log(Capital)	0.256***	0.288***	0.290***	0.267***	0.232***	0.219***
	(110.98)	(92.99)	(123.09)	(125.07)	(110.77)	(91.37)
Log(Employment)	0.856***	0.929***	0.876***	0.857***	0.840***	0.795***
	(218.95)	(157.91)	(211.71)	(241.92)	(231.09)	(183.03)
Married	0.0766***	0.0745***	0.0692***	0.0760***	0.0749***	0.0727***
	(17.42)	(11.64)	(16.10)	(19.22)	(16.11)	(10.82)
Years of Schooling	0.0111***	0.00229*	0.00787***	0.0112***	0.0142***	0.0177***
	(12.60)	(1.84)	(9.62)	(13.85)	(15.19)	(13.72)
Male	0.165***	0.103***	0.120***	0.150***	0.195***	0.227***
	(30.48)	(13.05)	(22.87)	(29.81)	(33.56)	(27.89)
Experience	0.00373***	0.00660***	0.00491***	0.00414***	0.00264***	0.000594
	(11.88)	(14.03)	(16.89)	(13.74)	(7.73)	(1.23)
Age	-0.00390***	-0.00661***	-0.00568***	-0.00458***	-0.00267***	-0.000616
	(-13.73)	(-15.09)	(-21.84)	(-16.72)	(-8.47)	(-1.40)
Immigrant	-0.0501***	0.0425***	-0.00240	-0.0496***	-0.0941***	-0.150***
	(-6.73)	(4.17)	(-0.35)	(-7.15)	(-11.79)	(-13.90)
Descendant	0.0374**	0.0184	-0.00141	0.0196	0.0299	0.0286
	(2.01)	(0.75)	(-0.08)	(1.21)	(1.47)	(1.07)
Constant	1.666***	0.158	1.007***	1.658***	2.393***	3.126***
	(20.95)	(0.42)	(13.83)	(30.95)	(30.56)	(9.99)
R-squared	0.570	0.545	0.562	0.568	0.562	0.539
Number of observations	842796	842796	842796	842796	842796	842796

Number of firms: All: 142,799; Serial E Firm 2: 11,793; Serial E Firm 1: 13,258; Novice E: 117,748. *t* statistics in parentheses; * p<0.10, ** p<0.05, *** p<0.010

Appendix TABLE A6: Labor productivity of Novice and Serial Entrepreneurs - 6 Years Annual Data - Value Added per Worker

	OLS	OLS	OLS	OLS	OLS	Firm FE	Firm FE	Firm FE	Person FE
Serial E Firm 2	0.496***	0.760***	0.708***	0.523***	0.506***				0.365***
	(0.010)	(0.016)	(0.016)	(0.015)	(0.015)				(0.027)
Serial E Firm 1	0.300***	0.385***	0.339***	0.218***	0.207***				
	(0.009)	(0.016)	(0.015)	(0.015)	(0.015)				
Annual experience		0.060***	0.057***	0.064***	0.063***		0.013***	0.049***	0.015
		(0.001)	(0.001)	(0.001)	(0.001)		(0.002)	(0.002)	(0.032)
Annual exp. of SE Firm 2		-0.088***	-0.086***	-0.050***	-0.048***		-0.067***	-0.024***	-0.010**
		(0.004)	(0.004)	(0.004)	(0.004)		(0.005)	(0.004)	(0.004)
Annual exp. of SE Firm 1		-0.033***	-0.030***	-0.013***	-0.012***		-0.013**	0.013***	0.032***
		(0.004)	(0.004)	(0.004)	(0.004)		(0.005)	(0.005)	(0.005)
Married			0.077***		0.068***				0.110***
			(0.006)		(0.005)				(0.033)
Years of Schooling			0.045***		0.025***				0.099***
			(0.001)		(0.001)				(0.017)
Male			0.231***		0.120***				
			(0.006)		(0.007)				
Experience			0.003***		0.003***				-0.110***
			(0.000)		(0.000)				(0.009)
Age			0.003***		-0.000				0.021
			(0.000)		(0.000)				(0.030)
Immigrant			-0.318***		-0.160***				
			(0.010)		(0.010)				
Descendant			-0.224***		-0.147***				
			(0.027)		(0.025)				
Log(Capital/Employment)				0.227***	0.222***			0.075***	0.089***
				(0.003)	(0.003)			(0.003)	(0.003)
Log(Employment)				-0.050***	-0.061***			-0.460***	-0.401***
				(0.004)	(0.004)			(0.007)	(0.006)
R-squared	0.025	0.030	0.058	0.148	0.155	0.703	0.704	0.726	0.699
Number of observations	411787	411787	411787	411787	411787	411787	411787	411787	411787

Number of firms: All: 132,628; Serial E Firm 2: 10927; Serial E Firm 1: 12320; Novice E: 109381