The "Real" Value of Failure in Entrepreneurship

Edwin A. Goñi Pacchioni
Alessandra Gonzales
Guadalupe Montenegro

The "Real" Value of Failure in Entrepreneurship

Edwin A. Goñi Pacchioni
Alessandra Gonzales
Guadalupe Montenegro

http://www.iadb.org

Abstract[*]

Evidence about the effectiveness of entrepreneurship public programs in Latin America on beneficiary startups across the region has shown average positive impacts on survival rates, attraction of investments, sales, profits, hiring, wages paid, taxes paid, etc. Yet, for those beneficiaries whose startups fail to succeed under these metrics (either due to failure to launch or failure to survive and grow), there is a commonly accepted notion that such a failure brings in social value as the likelihood of founding future successful startups should increase after learning from failure. This paper empirically addresses this contention by exploiting two datasets of administrative records from Brazil: the registry of firms (Cadastro), which identifies founders of firms, and the payroll administrative records (RAIS), which provide longitudinal information on characteristics of employers and employees for all formal firms in the country. By tracing the founding history of serial founders and after controlling for several characteristics of the founders and their businesses, we find that serial founders whose previous startups reach the top quintiles of the productivity distribution (whether or not these previous startups exited the market) are more likely to establish successful startups in subsequent ventures. Conversely, founders whose previous startups belong to the lower quintiles of the productivity distribution (whether these previous startups exited the market or not) tend to continue founding unsuccessful startups. These findings validate the theory of learning after serial founding, but only in those cases where failure happens after previous ventures have reached an intermediate stage of productivity progress among top-tier startups. Failure is an absorbing state for founders who repeatedly found bottom-tier startups, and therefore, public funding should consider this aspect both in the selection of prospective beneficiaries and in the ex post social valuation of beneficiaries that fail to startup or grow.

1. Introduction and Literature Review

A growing body of literature in macroeconomics shows the importance of new firms in economic growth both in the generation of new jobs and in the increased persistence of positive economic shocks (Haltiwanger et al 2017, Eslava et al 2019; Westhead et al., 2003; Ucbasaran et al. 2006, 2008; Sarasvathy et al., 2013; Bilbiie et al. ,2012; Clemente and Palazzo, 2016). Recent evidence suggests that it is younger startups and small firms are the responsible of most job growth (Haltiwanger, 2012; Haltiwanger et al.; 2017; Eslava et al., 2019). The importance of nascent small firms for growth is even higher when these firms are innovative driven startups, as those firms grow even faster (Goñi et al., 2019; Gonzalez-Uribe et al., 2019; Decker et al., 2014,) and by nature, through creation or adoption of innovation, they induce productivity gains. In order to promote the startup and growth of such firms, publicly sponsored startup programs provide seminal capital and specialized incubation and acceleration services. While existing literature has evaluated the success of these programs based on outcomes such as investment leverage, survival, employment, sales, wages, etc.[1], there is a prevailing belief among actors involved in entrepreneurial ecosystems that even for beneficiaries who do not succeed according to these metrics, public seed investment/incubation services still hold value due to the potential learning from failure and its subsequent impact on the creation and management of future ventures. In fact, related evidence on the economic contribution of business founders suggests that individuals with past entrepreneurial experience are more likely to re-enter into business (Stam et al., 2008; Amaral et al., 2011; Spivack, et al., 2014) and when they do, they tend to be more successful than first-time entrepreneurs (Westhead et al., 2003; Alsos and Carter, 2006; Gompers et al., 2010; Toft-Kehler et al., 2014). This paper contributes to the literature of entrepreneurship and role of founders in the largest Latin American economy by assessing this last contention: that there is a positive marginal contribution of an entrepreneur's serial founding experience on the performance of their subsequent startups.

In particular, the study contributes to three strands of literature. Firstly, we seek to evaluate whether ventures founded by Brazilian serial founders are more successful than those founded by non-serial founders. Existing literature generally indicates that firms founded by serial founders are more likely to succeed in terms of survival, managerial strategies, sales, or productivity, compared to businesses founded by first-time founders (Gompers et al., 2010; Parker, 2013; Lafontaine and Shaw, 2014; Shaw and Sorensen, 2019; Rocha and Pozzoli, 2021). For example, Lafontaine and Shaw (2014) show that an owner's prior experience at starting a business increases the longevity of the next business opened, and that controlling for person fixed effects, prior experience still matters. Shaw and Sorensen (2017) find that firms led by serial founders have 98% higher sales than those led by non-serial founders and establish larger firms in terms of initial capital and labor, resulting in 49% higher productivity. However, most of this literature does not control for specific characteristics of founders' prior experience, nor does it distinguish the contribution of successful

---

[1] Goñi et al (2019) find that beneficiaries of Startup Peru experienced a 20%, 13%, 5%, 16% increase in labor productivity, sales, employment, investment, respectively, compared to similar non-participating firms. Gonzalez-Uribe and Leatherbee (2017) find that beneficiaries of Start-Up Chile had higher survival rates, revenue growth, investment (11 pp, 15 pp, 13 pp higher, respectively) than comparable non-participating firms. Gonzalez-Uribe and Reyes (2019) find that acceleration services in Cali increase the revenue of nascent entrepreneurs, doubling the sales of similar non-treated projects.

founders from the effect of non-successful ones. As a result, the evidence is not conclusive around whether the successful prior experience of the founders is a prerequisite for their firms' performance. For example, while Kaplan et al. (2019) and Nahata (2019) find that previously successful founders are more likely to have a significant advantage getting investments than non-successful ones, Vaillant and Lafuente (2018) and Lafuente et al. (2019) find that practical experience is an essential prerequisite for entrepreneurial learning, and even negative entrepreneurial experience may lead to generative entrepreneurial learning suitable that benefits subsequent ventures. To address this dichotomy, we distinguish the marginal contribution of serial founders according to the qualities of their previous ventures.

Secondly, this paper aims to identify the characteristics of successful serial founders. Our work builds on literature that delves into the nature and origins of serial entrepreneurship. For instance, Plehn-Dujowich (2010) discovered that highly skilled entrepreneurs tend to close down low-quality businesses to transition into serial founder, whereas less skilled entrepreneurs often shutter such businesses to re-enter the labor market. Furthermore, Hyytinen and Ilmakunnas (2007) find an inverse relationship between public sector workers, union members, and the likelihood of becoming serial founders, with serial founders predominantly emerging from the private sector.

Regarding personal characteristics, it is observed that serial founders typically initiate their first venture at a younger age (Westhead and Wright, 1998), possess a higher endowment of human and social capital (Wiklund and Shepher, 2008; Li et al., 2009; Sieger et al., 2011), and accumulate more years of prior entrepreneurial experience (Westhead et al., 2005). Another study reveals that serial founders in Australia compared to non-serial ones are more likely to be male, well educated, aged between 30 and 49 (older than non-serial ones), locally born, concurrently operating another business, and from a family with a history of entrepreneurship (Schaper et al., 2007).

Additionally, research has focused on identifying characteristics of serial founders that are correlated with success. Research conducted in India suggests that successful serial founders possess entrepreneurial capabilities, particularly the ability to develop strong entrepreneurial teams (Kumar, 2012). Thus, serial founders typically have several years of managerial experience. Similarly, a study in China suggests that serial founders excel in developing networks and exhibit superior managerial skills compared to non-serial ones, although their performance levels may not be significantly better (Li et al., 2009). To the best of our knowledge there very few studies that identify predictive characteristics of serial founders' success, particularly in Latin America. Lecuna et al. (2017) show that entrepreneurs with higher levels of education and export-oriented perspectives are more successful than the rest of local entrepreneurs, and that having an entrepreneurial team and prior entrepreneurial experience are positively associated with starting a large firm. Goni and Reyes (2019) show that serial founders that were able to grow their firms to at least ten employees, were more likely to succeed than those who did not, and that founders that did not meet that threshold, has the same probability of success than a first-timer one.

The remainder of the paper is organized as follows: Section 2 describes the data sources and reports aggregate descriptive statistics. Section 3 explains the empirical

strategy and reports the main results of the paper and Section 4 provides concluding remarks.

2.   Data and Descriptive Statistics

Our analysis exploits registries from two administrative datasets. First, founders are identified using information from the Brazilian National Registry of Legal Entities ("Cadastro Nacional da Pessoa Juridical", in Portuguese; Cadastro hence after) which is the registry from tax system records published by the Brazilian Federal Revenue Service ("Receita Federal do Brasil", in Portuguese). Second, and to complement this dataset, we retrieve firms and workers characteristics from the RAIS ("Relacao Annual de Informacoes Sociais", in Portuguese) dataset, which provides matched employer-employee longitudinal information on all employees of Brazilian formal sector.

2.1. Identification of Founders

Business founders are directly and unequivocally identified from the Cadastro which is a nationwide registry of firms, partnerships, foundation, and other legal entities created by the Brazilian Federal Revenue Service ("Receita Federal do Brasil", in Portuguese)[2]. All firms and partnerships are automatically enrolled in the system upon incorporation and provide each firm with a unique fourteen-digit number. The Cadastro provides data in 3 levels: (i) at the firm level, the Cadastro provides data of size, legal nature, legal responsible, status of the companies; (ii) at the establishment level, start/end dates of activities, among others; (iii) at the partners' level, it provides information on each firm's partners, their role, their start date in the firm[3]. The Brazilian Ministry of Economy releases these registries on their website, updating all the mentioned variables each month[4].

For our analysis, data is constructed by processing the data of Cadastro at three levels: (i) we merge the information at the firm and establishment levels and retrieve all the information of firms that operate as private for-profit entities[5]. This represents 42.6 million of private firms (or 88.9% of the original sample of Cadastro) ; (ii) we then match this sample with the whole list of partners and find partners information for 9.8 million of private firms. We constrain the sample to the period of 1994-2010 (to be

---

[2] In the absence of administrative records of firms' incorporation or founding, which contains explicitly the information of founding members, existing studies in the entrepreneurship literature identify the founder as the top paid manager or worker of a new firm in the firm's first year of operation (Kerr et al. 2015, Babina, 2015; Kerr and Kerr, 2016; Azoulay et al., 2020; Bernstein et al., 2022). Using data on workers occupations, this approach identifies workers that are managers of a firm and define the founder as the top paid manager or worker in the first year of operation of the firm. As mentioned in Kerr and Kerr (2016), Azoulay et al. (2020) confirms that the top paid worker in the firm at the first year of operations is usually the founder: these authors confirmed that fact in 90% of the United States firms' observations. However, as stated by Bernstein et al. (2022), some founders (specially in ventures) may opt to receive only a very small salary or no wage at all in the first years of firm operation.
[3] Examples of partners' role categories are director, president, partner, administrative partner, among others.
[4] We accessed the information in December 2021.
[5] Private firms exclude public administration, non-profit, or international organizations. From the private firms, 25% are Limited Liability Companies, 67% are entrepreneurs (individuals who professionally perform economic activity without being a legal entity, and can have hire any amount of employees), 3% are Individual Limited Liability Companies (individuals with a legal entity, assets and debts are different between the firm and the individual, they can hire a maximum of 100 employees). Firms with just a founder and no workers are not included in any of these definitions.

consistent with the period for which we have individual nominal identifiers in the RAIS dataset) and find 4.5 million of firms born in this period.

First column of Table 1A reports the number of firms observed in Cadastro by the end of each year from 1994 to 2010. 4.4 million were observed at the end of 1994, and 5.2 million firms were observed at the end of 2010, which accounts for an average annual growth of 0.8% in the stock of firms in Cadastro. Table 1B, in turn, shows the subset of firms reported in Table 1A that were founded per year: as explained before, there were 4.5 million of new firms founded during the period of 1994-2010 (representing between 2.9% and 6.9% of the stock observed in the respective year).

In these new firms, we identify founders under these criteria[6]: (i) partners whose entry date is the same as the firm's start of operation, (ii) partners with an enrollment date to the firm before or within six months of the firm's start of operations. The final sample drawn from Cadastro is compounded by 5.1 million of unequivocally identified founders of 4.5 million unique private firms that were born in the period of 1994-2010.

2.2.   Employer–employee Longitudinal Sata

The Cadastro data is complemented with RAIS, which is an administrative database from the Brazilian Ministry of Labor which contains individual-level data on the population of formal sector workers and, therefore, allows us to generate worker aggregated measures of firm performance. As mentioned by Bernstein et al (2022), the RAIS database is used by government agencies to generate statistics and to target social payments such as the unemployment insurance payment and worker benefits. Thus, firms, individuals and the central government have incentive to ensure the accuracy of the information.

RAIS provides information on the firm and the establishments of each employee, including legal nature, start of activities, location, tax classification, firm activity status, among others. At the worker level, RAIS provides data on gender, nationality, education, wage, hours worked, occupation, among others. RAIS includes identifiers for firms, workers, and establishments which allows for them to be tracked over time and across states. For example, data allows to capture possible transitions of workers among different firms and possible transitions of firms among different operation status (i.e., new firms, operating firms, closing firms). Although the data is available from 1976, we were able to access RAIS information for the period 1994-2013. Given that this information only has nominal identification of the person in the period 1994-2010, we restrict the identification sample of firms and their founders to this period and we follow firms' performance up to 2013.

Second column of Table 1A reports the number of private firms observed in RAIS by the end of each year from 1994 to 2010. 1 million firms were observed at the end of 1994, and 2.3 million firms were observed at the end of 2010, which accounts for an average annual growth of 5.12% in the stock of firms. As it is shown in the second column of Table 1B, in RAIS, 5.2 million of new firms were founded during the period 1994-2010 (representing between 1.3% and 1.9% of the stock observed in the respective

---

[6]Although there are categories for various partnership roles, there is no specific category that designates someone as a founder.

year). These new firms have 94.5 million workers, most of whom are men (57%), with an average age of 32 years, and an average real wage per hour from 5 to 5.6 BRA R$ depending on the methodology used (Table 2). Throughout the period studied, the workers of these new firms have been getting more years of education. As seen in Table 2, the percentage of workers with secondary and tertiary education has grown. In 1994, only 11.8% and 9.1% reached secondary and tertiary education, respectively. While in 2013, 41.5% and 18.1% reached them, respectively.

2.3.   Merge between Cadastro and RAIS

Merging the subset of new firms' data from RAIS with founders' information from Cadastro presents a significant challenge. Columns 2 to 4 of Table 3A demonstrate the various possible methods for merging at the founder's level, including using the person's identification number (CPF), name, CPF and name, and CPF and an approximation of the name. Using the common name alone leads to the least successful match (13% of founders, or 0.68 million), while using the common name and CPF leads to the most successful match (31% of founders, or 1.6 million). Column 5 displays the total number of founders who match using any of the four described methods. As indicated, 1.5 million founders were matched, and their labor history characteristics were retrieved. Column 6 reveals that only 37.2% of these founders (0.58 million) have a registered firm in RAIS. This dataset constitutes the primary dataset for use in the econometric analysis below.

Table 4a shows some characteristics of these founders in Brazil. In the period of 1994-2013, 64% of them are men, they started the companies with an average age of 42 years, and with a real hourly wage of 11 or 12 BRA$. 20% of founders did not have other partner in the founding team ("Single founders", hereafter). The single founders are mostly men (68%), they are also on average 42 years old and have a real hourly wage of 10 or 11 BRA$ (See: Table 4b). Compared to workers, founders have higher salary and associated education levels. A founder earns 2 or 3 times the real hourly wage of a worker in the period, and 41% of founders reach the tertiary level (vs. 14% of workers). Among these founders, 82.8% started just one firm, 13% started 2, 2.6% started 3 and 0.01% started more than 3 (Table 5). The rest of the paper analyses the effect that serial founding experience of these entrepreneurs starting more than one firm has on the performance of their successive startups. For instance, Table 6 provides a first estimation of the influence of serial founders on firm performance: a higher number of firms founded is related with a greater probability of surviving.

3. Results

We conduct two different exercises to assess the value of a serial entrepreneur. In the first exercise, we estimate conditional correlations between a specific outcome related to business performance and a variable that serves as a proxy for the potential value brought by the serial founding experience of the entrepreneur. This allows us to examine the relationship between serial entrepreneurship and business success. In the second exercise, we estimate the causal impact of the death of a serial founder. We investigate this impact on two different groups of startups: those whose founders have a successful track record of business founding and those whose founders have previously founded non-successful businesses. By comparing the value of the loss

between these two groups, we gain insights into the differential effects of the deaths of a serial founder on business outcomes.

3.1. Conditional Correlations between Businesses Performance and Former Founding Experience of Serial Entrepreneurs

In our first specification (Equation 1), we estimate cross section correlations between a measure of business performance (average wage paid to employees or average number of employees) and a variable that identifies the serial founding experience of a serial entrepreneur, after controlling for several covariates. In particular, we estimate the coefficients of the following specification:

$$y_i = \alpha_j + \delta_t + \beta X_i + \gamma Z_i + \varepsilon_i \text{ (Equation 1)}$$

Where y_i corresponds to a performance variable for business i[7] measured at the last year in which the firm is observed in the dataset (the performance variable is either related to salaries per worker or to employment[8]); α_j represents a state (region) fixed effect; δ_t represents a year fixed effect; X_i captures a number of covariates to control for firms' characteristics, founders' characteristics and workers' characteristics at the last year in which the firm is observed in the dataset[9]; Z_i is the explanatory variable of interest and captures some metric related to the previous founding experience of the founder; ε_i is the residual of the regression. Tables 7A and 7B report the results for the estimation of Equation 1 for the wage related outcomes and employment outcomes respectively.

In the specifications for the wage related variables (Tables 7.A.1 to 7.A.8), Z_i measures one of the following variables[10]: number of previously founded firms (Column 1); accumulated number of previously founded firms that shut down (Column 2); accumulated number of previously founded firms that were still in operation by the latest year of the sample (Column 3); accumulated number of previously founded firms that shut down while they belonged to the first, second, third or fourth quartile

---

[7] 90.78% of the businesses founded by serial founders have a single serial founder. 8.03% have two serial founders and 1.19% have more than two serial founders. For the 9.22% of firms founded by multiple serial founders, the observations per firm are replicated as much as serial founders they have. To take this into consideration, inference in estimations is based on robust standard errors clustered at the firm level.

[8] We estimate the regressions using several transformations of the wage variable. In particular, related to wage, y_i is considered under the following transformations measured in natural logarithm at December of the last year in which the firm is observed: monthly wage (average per worker of firm i), hourly wage (average per worker of firm i), weighted monthly maximum wage (for all workers of firm i, where the weight is determined by the time worked by each employee during the month), weighted monthly wage (for all workers of firm i, where the weight is determined by the time worked by each employee during the month), weighted hourly wage (for all workers of firm i, where the weight is determined by the time worked by each employee during the month), weighted monthly maximum wage (for active workers of firm i, where the weight is determined by the time worked by each employee during the month), weighted monthly wage (for active workers of firm i, where the weight is determined by the time worked by each employee during that month), weighted hourly wage (for active workers of firm i, where the weight is determined by the time worked by each employee). In the case of the employment variable, y_i measures the number of workers observed in December of the last year in which the firm is observed. For all definitions, wages are measured in real terms for the corresponding year of analysis.

[9] We control for the following characteristics: age, size group and sector (for firm i); age, sex, education, and occupation (for the founder of firm i); average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of firm i).

[10] Column 1 intends to capture the effect of the previous founding experiences controlling by the quantity but without controlling by the quality of such previous experiences. Columns 2 onwards, intend to control by different proxies of quality of previously founded business.

respectively of the firms' productivity[11] distribution of the exiting period (Columns 4 to 7); number of previously founded firms that are still in operation and that reached in their best performing year the first, second, third or fourth quartile respectively of the productivity distribution (Column 8); number of previously founded firms that are still in operation and that reached in the latest observed period the first, second, third or fourth quartile respectively of the productivity distribution (Column 9); number of previously founded firms that are still in operation and that reached in most of the years the first, second, third or fourth quartile respectively of the productivity distribution (Column 10); average wage[12] paid in previously founded firms (Column 14); and natural logarithm of the average number of employees in previously founded firms (Column 15). Columns 11 to13 collapse the results reported in Columns 8 to 10 and show the contribution (on firms' performance) of serial founders who previously founded firms reaching the bottom or top two quartiles of the productivity distribution.

Results in Column 1 for all alternative definitions of wages, render similar positive significant estimates of semi elasticities hovering around 0.03. These findings suggest that as the number of firms previously founded by a serial entrepreneur increase, the wages paid in subsequently founded startups also tend to increase.

When we discriminate between successful (surviving) and unsuccessful (shut down) previously founded firms, the marginal contribution remains similar for the successful previously founded business (Column 3 shows an increase on expected wages for successive founded firms of 0.03% per unit of previously founded businesses) but it increases noticeably for the unsuccessful ones (Column 2 shows an increase on expected wages for successive founded firms of between 3.7% and 5.8% per unit of previously founded businesses). This could be suggestive that failure may indeed bring in valuable learning, even possibly more than success.

When we discriminate further, within the group of unsuccessful firms according to the productivity level reached at the year of market exit, it becomes apparent that the effect that failure has on future success is heterogeneous: serial entrepreneurs who previously founded startups that exited the market without surpassing the bottom quartiles of the productivity distribution (Columns 4 and 5) do not bring any contribution to the wages paid in future startups. Conversely, serial entrepreneurs who previously founded startups that exited the market after reaching the top quartiles of the productivity distribution (Columns 6 and 7) increments the average waged paid in future founded startups. This indicates that the impact of failure on future success varies depending on the level of productivity achieved by exited ventures.

Columns 8 to 13 extend the analysis of heterogenous contributions or "quality" of learning after failure or success. In these regressions all previously founded firms (not only those exiting the market as in Columns 4 to 7) are qualified according to the quartile of the productivity distribution to which these previously founded businesses belonged to. For instance, Column 8 shows that businesses founded by serial

---

[11] For the definitions involving Productivity, it is computed as the residual of the Mincerian wage estimation for the year of observation of the outcome. The dependent variable on this estimation is the logarithm of the workers' weighted average monthly salary, and the controls are the average age of workers, the square and cubic power of this average age, average number of workers with secondary education, and average number of workers with tertiary education.

[12] For all definitions, wages are measured in real terms.

entrepreneurs whose previously founded startups reached the top quartile (Q4) of the productivity distribution in their best year of operations pay higher wages (7% more per previously business founded that gets to top quartile of the productivity distribution), while businesses founded by serial entrepreneurs whose previously founded businesses belong to the bottom quartile pay between 23% and 34% less wages per previously founded business. Columns 9 and 10 explore alternative definitions of quality of previously founded businesses[13] and depict very similar results. As mentioned before, Columns 11 to 13 report the same analysis by merging the two bottom quartiles and the two top ones for a simplified interpretation of the results. In all cases, the experience of serial entrepreneur founding businesses that fail to reach higher productivity levels has a negative impact on the performance of subsequently founded businesses. On the other hand, experience gained from founding more productive business leads to an average wage increase of approximately 10% per previously founded business, while experience founding less productive business results in an average decrease of 20%. Finally, Columns 14 and 15 report results proxying the quality of previous founding experience through wages paid, or employees hired in previously founded businesses. These results demonstrate that better wages paid and higher employment rates in previously founded startups contribute to better wages or more hiring in successively founded businesses.

In employment outcome specifications (Table 7B), Z_i measures the same variables (Columns 1 to 13). In this case, we run additional specifications for different measures of wages observed in the business previously founded by the serial entrepreneur. In this case, Columns 14 to 21 measure the simple average at the founder level of the following transformations of the average wage (in ln) taken from their previously founded firms[14]: December monthly wage (average per worker of firm i), December hourly wage (average per worker of firm i), weighted monthly maximum wage (for all workers of firm i, where the weight is determined by the time worked by each employee), weighted monthly wage (for all workers of firm i, where the weight is determined by the time worked by each employee), weighted hourly wage (for all workers of firm i, where the weight is determined by the time worked by each employee), weighted monthly maximum wage (only for workers of firm i perceiving a wage in December, where the weight is determined by the time worked by each employee), weighted monthly wage (only for workers of firm i receiving a wage in December, where the weight is determined by the time worked by each employee), weighted hourly wage (only for workers of firm i receiving a wage in December, where the weight is determined by the time worked by each employee).

The results of the estimations with the employment outcome are in line with those described previously for the wage outcome. First, Columns 1 to 3 in Table 7B indicate a positive and significant contribution of previous founding experience of one of the founding members on the employment levels of newly founded firms. For example, firms with serial founders generate an additional 0.97 employment per previously founded business, but only when those former businesses are still in operation. Second, Columns 4 to 13 report the results when controlling for the productivity quartile

---

[13] Column 9 approximates quality by the top quartile to which previously founded firms belonged to in the most recent period, while Column 10 approximates quality by the top quartile to which previously founded firms belonged to for the most periods.

[14] At first, all the wage variables are calculated at the firm – year level. Then, we calculate the simple average of the firm's wage variables at the founder – year level to measure the performance of previously founded firms.

achieved by previously founded businesses. Similar to the wages outcome results, the performance of previously founded business correlates positively with employment in newly founded firms, but only when former businesses manage to reach the top quartiles of the productivity distribution. In this case, former businesses belonging to the lower quartiles are not significant into explaining hiring in subsequently founded businesses. Finally, Columns 14 to 21 show that the higher wages are paid in former founded businesses, the higher the number of employees hired in the most recently founded ones. Likewise, Column 22 shows that subsequently founded business hire 0.6 more employees per additional employee hired in previously founded firms.

Further checks are carried out running the following specification in first differences for the outcome[15], to test the robustness of these results.

$$\Delta y_i = \alpha_j + \delta_t + \beta X_i + \gamma Z_i + \varepsilon_i \text{ (Equation 2)}$$

Tables 8A and 8B report the results of the estimation of Equation 2 and replicate the previous exercises by measuring the conditional correlations between wages (Tables 8A) or employment (Tables 8B) in businesses founded later-on and the performance of previously founded firms by the same serial entrepreneur.

Tables 8A1 to 8A3 report the results for the same eight transformations of the wage outcome as in Tables 7A but rather than taking these transformations in levels, in these estimations the transformations are taken in three alternative measures of first differences. In particular, Table 8A1 measures the performance of the most recently founded business through the annual growth of the average wage paid by the firm, Table 8A2 measures performance through the annual average growth of wages paid by the firm, and Table 8A3 through the annual difference in the levels of wages paid by the firm. In this case, we only report the results related to the experience of previously founded businesses when this experience discriminates according to the quartile of the productivity distribution (in the most recent year) that the previously founded businesses manage to achieve. It is observed that consistent with previous results, when the previously founded business gets to the lower quartiles, the contribution of the serial founder experience is significantly negative to determine wage variations in the businesses founded later, while it is positive (when significant) for founders that started up businesses that got to the top quartiles.

Tables 8B1 and 8B2 report the results for other performance outcomes in first differences. Table 8B1 measures performance by the accumulated growth rates of the number of workers in firms founded by serial founders and find a significant negative contribution of founding experience when this experience is related to startups that managed to get to the lowest quartiles of the productivity distribution. Table 8B2 measures performance by the likelihood of survival of firms founded by serial founders. It shows that founders whose previous startups did not surpass the lowest quartile of the productivity distribution do not exert any effect on the survival probability of successive foundations. Conversely, founders with previously founded startups that

---

[15] Variables, either in levels or in first differences, are measured at the last available year for each firm. All variables are defined in the same way as in Equation 1 except for the dependent variable that in this case is expressed in first difference.

achieved higher quartiles manage to increase the probability of survival of successive startups.

In order to further isolate the effect of learning after failure or success, Tables 9 reports the results of estimations of the same specification shown in Tables 7A1 and 7B1 but partitioning the sample into two sets. The first partition constrains the sample to those serial founders with previously founded businesses that exited the market. The idea is to learn if there is a heterogeneous effect on the performance of later founded businesses, of the experience and knowledge gained after shutting down businesses according to the performance achieved by those businesses prior to their exit. The second partition does the same for previously founded businesses that keep operating. The Tables consistently show that learning and contributions for later foundations stem exclusively from previous "relevant" founding history (this is from either exiting or surviving formerly founded firms that managed to achieve the higher quartiles of the productivity distribution).

Finally, in order to test if the results hold for high-tech sectors, as there might be more room for trial and error and learning from failure in those sectors, we re-estimate the specification of Table 7A1 for those firms operating in high-tech sectors[16]. The results persist (Table 10).

3.2 Causal Effect of a Serial Founder Experience on the Performance of a Business

To evaluate the causal effect of an exogeneous separation of a founding team member on firm performance, Haltiwanger et al. 2017 use premature death shocks as source of identification. We apply a similar idea to the unexpected separation of serial founders from "successful" and "unsuccessful" startups. Our objective is to measure the impact of unexpected separations of serial founders on business performance and test whether the loss of knowledge carried by serial entrepreneurs exerts differential effect on the performance on startups according to their degree of success (where success is defined in consistency with the previous notion of firms achieving the top quartiles of the productivity distribution in the most recent year). This approach complements the conditional correlations analysis explained in the previous section. We expect to find that the sudden separation of a serial founder in startups that managed to achieve top productivity quartiles leads to higher losses (compared to similar top-performing startups that do not lose a serial founder) than the sudden separation of a serial founder in bottom-tier startups (when compared to other similar bottom-performing startups that do not lose a serial founder).

The exercise begins by identifying the firms founded by serial founders that suddenly and permanently drops from the datasets. Then, we identify the firms that achieved the bottom two quartiles of the productivity distribution in the year prior to the founder's departure. A control group for these unsuccessful firms is then identified from the group of firms that do not lose founders, using propensity score matching

---

[16] The high-tech sector is identified using the sectorial technology intensity definition from the OECD (2011) which classifies sectors based on direct R&D intensity. The classification considers (i) High, (ii) Medium-High, (iii) Medium-low, (iv) Medium-high technology sectors; the cut-off points were revealed by R&D relative to value-added and gross production statistics. Thus, the high-technology concentration industries consider aircraft and spacecraft; pharmaceutical; office, accounting, and computing machinery; radio, TV, and communications equipment; medical, precision, and optical instruments.

based on observable characteristics of the founder, the firm and the firm´s workers[17]. The same procedure is applied to firms that achieved the top two quartiles. Given the randomness of the "unexpected" separation event[18], the assignment into treatment (the separation of the serial founder) is taken as exogenous to any observable or unobservable characteristic related to the founder, the business, or its workers. Tables 11 report the results of this natural experiment and Tables 12 report the results of balance tests for both groups.

Table 11A reports the results for the case of unsuccessful firms. Consistent with the correlation analysis, it is observed that the separation of a serial founder in startups that only manage to achieve productivity levels within the bottom two quartiles of the aggregate productivity distribution improves the performance of the firm. This finding aligns with the correlation analysis, which indicated a lack of contribution from serial founders to the performance of subsequent startups when these serial founders originated from unsuccessful firms (as they drag grow in such firms and little or nothing is gained from such experiences). In particular, the separation of the serial founder in these firms cause a 2% increase in the average of wages paid by the firm (under different measurements of the wage variable), an increase of one unit in the headcount of employees, a reduction in the probability of staying in the bottom quartiles of the productivity distribution (between 2% and 4%) and an increase in the probability of moving towards the top quartiles (between 2% and 4%). Conversely, Table 11B reports the results for the case of successful firms. In this case, it is observed that the separation of the serial founder impacts negatively to the performance of the more productive firms. For instance, separation of serial founders in these firms cause a reduction in the wages paid by the firm (around 3%), an increase in the probability for the firm to transit to lower quartiles of the productivity distribution (between 2.5% and 4.8%) and a decrease in the probability of moving towards the top quartiles (between 2.5% and 4.8%).

4. Conclusions and Policy Recommendations

Is experience gained after failure always valuable in entrepreneurial founding? This paper intends to answer this question exploiting two sets of Brazilian administrative records: Receita Federal and RAIS. By tracing business founding history in the period 1994 – 2010 in order to identify serial founders (this is, entrepreneurs that found several businesses along years), the study finds that history of failures translates into success of businesses founded later on only when previously founded failing businesses manage to achieve top quartiles in the aggregate productivity distribution. Conversely, startups founded by serial entrepreneurs whose previously founded businesses never leave the bottom quartiles of the aggregate productivity distribution before exiting do not gain from the previously founding experience of the serial entrepreneur.

These results are robust under different specifications of conditional correlations to explain gains in wages paid or labor hired in business founded by serial

---

[17] Number of founded firms, quality quartile when firm was founded (dummy for each quartile), age of the founder distributed in three groups, firm's age distributed in three groups, number of workers active in December of baseline year, and founder's female sex.

[18] As we do not have access to the official records of defunctions, a founder is considered dead if no record on any variable (as for example, age, sex or education) is found for the last year of our sample (2013). The period of analysis is chosen to have as much as possible of prior founding experience of the serial founders.

entrepreneurs. The results also hold in the broader case where previous failure is not constrained to the event of exiting the market. For instance, estimations suggest that businesses found by serial entrepreneurs gain between 4% and 7% (lose between 11% and 17%) in average wages paid to workers per unit of (un)successful previously founded business (when the definition of success is related to the quartile achieved in previous foundations whether they eventually exited the market or not).

Furthermore, these results also hold under causal estimations conducted for firms where founders are unexpectedly and permanently separated from the firm. The paper shows that unsuccessful businesses which lose a founding serial entrepreneur improve after the separation of the serial founder while successful businesses losing serial founders are negatively impacted.

Although there are possibilities for extensions in this line of work, such as examining the indirect effects of serial founding through spillovers on co-founders who may later initiate other businesses[19], these findings already help to debunk the myth that indiscriminate failure in entrepreneurship is valuable per se and that public funding of startups with high chances of failure is still beneficial for founders who gain experience and learn from such failures. Learning after failure does occur, but only when there is something substantial to learn, such as managing financial and human resources and driving the startup to achieve minimal levels of productivity. Therefore, due diligence in the selection of potential candidates for public funding of entrepreneurial programs should involve evaluating past founding history and assigning a value to final failure only when it is conditional on evidence of intermediate success.

---

[19] Estimations of this exercise are already underway and will be included in later versions.

References

Alsos, G.A., & Carter, S. (2006). Multiple business ownership in the Norwegian farm sector: Resource transfer and performance consequences. Journal of Rural Studies, 22, 313-322.

Amaral, M., Baptista, R., & Lima, F. (2011). Serial entrepreneurship: impact of human capital on time to re-entry. Small Business Economics, 37, 1-21.

Bernstein, S., Colonnelli, E., Malacrino, D., McQuade, T. (2022). Who creates new firms when local opportunities arise?. Journal of Financial Economics. Volume 143. Issue 1.

Brandt, L., D. Ruochen, G. Kambourov, K. Storesletten and X. Zhang (2022); "Serial Entrepreneurship in China," mimeo

Choi, J., N. Goldschlag, J. Haltiwanger (2019); "Founding Teams and Startup Performance," mimeo

Decker, Ryan, John Haltiwanger, Ron Jarmin, and Javier Miranda. 2014. "The role of entrepreneurship in US job creation and economic dynamism." Journal of Economic Perspectives 28 (3):3–24.

Eslava, M., J. Haltiwanger and A. Pinzon (2019); "Job Creation in Colombia vs the U.S.: Up or out dynamics meets the life cycle of plants", NBER working paper 25550.

Gompers, P., Kovner, A., Lerner, J., & Scharfsteina, D. (2010). Performance persistence in entrepreneurship. Journal of Financial Economics, 96, 18-32.

Goñi Pacchioni, E. A., and Reyes, S. (2019). On the role of resource reallocation and growth acceleration of productive public programs: Effectiveness of a Peruvian dynamic entrepreneurship program and the implications of participants' selection. Washington DC: Inter-American Development Bank.

Guiso, Luigi, Luigi Pistaferri, and Fabiano Schivardi. 2020. "Learning Entrepreneurship From Other Entrepreneurs?".

Haltiwanger, J. (2012). Job Creation and Firm Dynamics in the United States. Innovation Policy and the Economy, 12(1), 17–38. https://doi.org/10.1086/663154

Haltiwanger, J., R. Jarmin, R. Kulick and J. Miranda (2017); "High Growth Young Firms: Contribution to Job, Output, and Productivity Growth," in "Measuring Entrepreneurial Businesses: Current Knowledge and Challenges" Haltiwanger, J., E. Hurst, J. Miranda, and A. Schoar, editors, University of Chicago Press.

Hyytinen, Ari & Ilmakunnas, Pekka. (2007). What distinguishes a serial entrepreneur?. Industrial and Corporate Change. 16. 793-821. 10.1093/icc/dtm024.

Isenberg, D. J. (2010). How to start an entrepreneurial revolution. Harvard Business Review, 88(6), 40–50.

Kaplan, S., Sensoy, B., Stromberg, P. (2009). Should investors bet on the jockey or the horse? Evidence from the evolution of firms from early business plans to public companies. Journal of Finance, 75-115.

Klenow, Peter J and Huiyu Li. 2021. "Innovative growth accounting." NBER Macroeconomics Annual 35 (1):245–295.

Kumar, N. (2012). International entrepreneurship: Case of happiest minds. South Asian Journal of Business and Management Cases, 1(1), 17–30. https://doi.org/10.1177/2277977912001100103

Lafontaine, Francine & Kathryn Shaw. (2014). "Serial Entrepreneurship: Learning by Doing?". NBER Working Papers 20312, National Bureau of Economic Research, Inc.

Lafuente, Esteban & Vaillant, Yancy & Vendrell-Herrero, Ferran & Gomes, Emanuel. (2019). Bouncing Back from Failure: Entrepreneurial Resilience and the Internationalisation of Subsequent Ventures Created by Serial Entrepreneurs. Applied Psychology. 68. 658-694. 10.1111/apps.12175.

Lecuna, Antonio & Cohen, Boyd & Chavez, Roberto. (2017). Characteristics of high-growth entrepreneurs in Latin America. International Entrepreneurship and Management Journal. 13. 10.1007/s11365-016-0402-y.

Lerner, Josh and Ulrike Malmendier. 2013. "With a little help from my (random) friends: Success and failure in post-business school entrepreneurship." The Review of Financial Studies 26 (10):2411–2452.

Li, S., Schulze, W., & Li, Z. (2009). Plunging into the sea, again? A study of serial entrepreneurship in China. Asia Pacific Journal of Management, 26(4), 667–680. https://doi.org/10.1007/s10490-008-9102-7

Nahata, Rajarishi. (2019). "Success is good but failure is not so bad either: Serial entrepreneurs and venture capital contracting," Journal of Corporate Finance, Elsevier, vol. 58(C), pages 624-649.

Nanda, Ramana and Jesper B Sørensen. 2010. "Workplace peers and entrepreneurship." Management Science 56 (7):1116–1126.

OECD (2011), OECD ISIC Rev. 3 Technology Intensity Definition, OECD Publishing. Available in https://www.oecd.org/sti/ind/48350231.pdf

Parker, Simon. (2013). Do serial entrepreneurs run successively better-performing businesses?. Journal of Business Venturing. 28. 652–666. 10.1016/j.jbusvent.2012.08.001

Plehn-Dujowich, J. (2010). A Theory of Serial Entrepreneurship. Small Business
        Economics,
35(4): 377-398.

Rocha, Vera & Pozzoli, Dario. (2021). "Give it Another Shot: Startup Experience and
        the Mobilization of Human Resources in New Ventures," Working Papers 11-
        2021, Copenhagen Business School, Department of Economics.

Sarasvathy, S., Menon, A., & Kuechle, G. (2013). Failing firms and successful
        entrepreneurs: serial entrepreneurship as a tempo

Schaper, M., Mankelow, G., & Gibson, B. (2007). Are serial entrepreneurs different? An
        examination of Australian microfirms. Journal of Small Business &
        Entrepreneurship, 20 (1), 15–24.
        https://doi.org/10.1080/08276331.2007.10593383ral portfolio. Small Business
        Economics, 40, 417-434.

Shaw, Kathryn & Anders Sorensen. (2019). "The Productivity Advantage of Serial
        Entrepreneurs," ILR Review, Cornell University, ILR School, vol. 72(5), pages
        1225-1261, October.

Sieger, P., T. Zellweger, R.S. Nason and E. Clinton (2011). Portfolio Entrepreneurship in
        Family Firms: A Resource-Based Perspective. Strategic Entrepreneurship
        Journal, 5(4): 327-351.

Spivack, A., McKelvie, A., & Haynie, J.M. (2014). Habitual Entrepreneurs: Possible
        cases of entrepreneurship addiction? Journal of Business Venturing, 29(5),
        651-667.

Stam, E., Audretsch, D., & Meijaard, J. (2008). Renascent entrepreneurship. Journal of
        Evolutionary Economics, 18(3-4), 493-507

Toft-Kehler, R., Wennberg, K., & Kim, P. (2014). Practice makes perfect:
        Entrepreneurialexperience curves and venture performance. Journal of
        Business Venturing, 29(4), 453-470.

Ucbasaran, D., Westhead, P., & Wright, M. (2006). Habitual Entrepreneurs. Aldershot,
        UK: Edward Elgar Publishing.

Ucbasaran, D., Westhead, P., & Wright, M. (2008) Opportunity identification and
        pursuit: does an entrepreneur's human capital matter? Small Business
        Economics, 2, 153-173.

Vaillant, Yancy & Lafuente, Esteban. (2018). Entrepreneurial experience and the
        innovativeness of serial entrepreneurs. Management Decision. 57. 10.1108/MD-
        06-2017-0592

Wallskog, M. (2022). Entrepreneurial Spillovers Across Coworkers. Working paper.

Westhead, P. and M. Wright (1998). Novice, Portfolio, and Serial Founders: Are They Different?. Journal of Business Venturing, 13(3): 173-204.

Westhead, P., Ucbasaran, D., & Wright, M. (2003). Differences between private firms owned by novice, serial and portfolio entrepreneurs: implications for policy-makers and practitioners. Regional Studies, 37, 187-200. Westhead, P., D. Uchasaran, M. Wright and M. Binks (2005). Novice, Serial and Portfolio Entrepreneur Behaviour and Contributions. Small Business Economics, 25(2): 109-132.

Wiklund, J. and D.A. Shepherd (2008). Portfolio Entrepreneurship: Habitual and Novice Founders, New Entry, and Mode of Organizing. Entrepreneurship Theory and Practice, 32(4): 701-725.

Table 1. Firms in Brazil, Registry Data (*Cadastro*) and RAIS 1994-2010

A. Stock observed at the end of the period

Year	Receita	RAIS	Receita and RAIS
1994	4,485,307	1,003,886	503,716
1995	4,535,272	1,104,273	572,835
1996	4,590,989	1,154,251	628,370
1997	4,654,692	1,264,942	726,027
1998	4,703,955	1,326,492	796,488
1999	4,760,156	1,383,882	854,912
2000	4,812,114	1,433,206	899,410
2001	4,876,365	1,532,619	969,779
2002	4,916,127	1,616,197	1,026,962
2003	4,955,439	1,671,918	1,063,148
2004	4,994,022	1,754,905	1,114,446
2005	5,043,050	1,839,360	1,166,339
2006	5,085,908	1,918,594	1,215,353
2007	5,134,716	1,985,925	1,262,588
2008	5,020,367	2,094,500	1,341,021
2009	5,085,989	2,199,427	1,414,418
2010	5,158,452	2,347,194	1,504,774
Total	5,526,753	4,945,562	2,767,868

Source: *Cadastro* Dataset up to 2021, RAIS 1994-2010.
Notes: (1) *Cadastro* dataset includes all private firms with partners information born until 2010, and were still in operation each year; (2) RAIS includes all firms with at least an active worker in December; (3) Merge *Cadastro* and RAIS - Includes private firms with partners information available in both *Cadastro* and RAIS

B. New firms founded during the period 1994-2010

Year	Receita	RAIS	Receita and RAIS
1994	127,901	174,851	89,160
1995	143,137	199,392	96,894
1996	165,568	192,365	108,546
1997	284,993	246,284	148,883
1998	262,450	222,396	136,838
1999	281,119	223,346	147,974
2000	292,001	230,437	149,626
2001	300,027	241,253	153,450
2002	278,774	242,337	145,657
2003	253,602	231,891	133,052
2004	258,236	245,747	137,670
2005	270,023	255,864	142,587
2006	262,121	253,622	136,479
2007	292,531	262,374	152,243
2008	335,664	296,698	171,934
2009	345,249	309,758	175,419
2010	355,661	351,031	172,615
Total	4,509,057	5,273,263	2,399,027

Source: *Cadastro* Dataset up to 2021, RAIS 1994-2010.
Notes: (1) Using the data of Cadastro/*Receita*, a new private firm is identified by its year of foundation on the database; (2) Using RAIS, a new firm is identified by the date of its first appearance in RAIS; (3) The merge of *Receita* and RAIS includes firms that were born between 1994 – 2010 identified by each firm's foundation year. First we merged at the establishment level (using 14 digits of cnpj variable). Then, we identify the firms that merged with at least 1 establishment between both datasets.

Table 2. Workers and their characteristics in Brazil, RAIS 1994-2013

A. Workers of new firms founded during the period 1994-2010

Year	Number	% Male	Average Age	% Education = Primary	% Education = Secondary	% Education = Tertiary	December Wage (BRA R$)			Average wage in the year (BRA R$)		
							Wage (mean)	Wage (max)	Hourly wage	Weighted wage	Max. Wage	Weighted hourly wage
1994	21,328,597	63.2	33.9	66.1	11.8	9.1	1188.3	1203.1	6.6	996.3	1047.1	5.5
1995	21,590,711	62.5	34.1	64.0	12.5	9.6	1291.7	1307.5	7.1	1205.0	1262.7	6.6
1996	22,008,880	62.1	34.2	62.8	13.2	9.8	1291.5	1307.2	7.1	1194.1	1245.3	6.6
1997	22,597,171	61.9	34.2	61.2	13.9	10.3	1314.0	1330.5	7.2	1211.8	1264.8	6.7
1998	22,957,234	61.3	34.3	59.0	15.1	11.0	1337.4	1354.4	7.4	1245.1	1299.6	6.9
1999	23,445,654	60.5	34.5	57.1	16.3	11.5	1236.0	1251.3	6.9	1151.8	1201.7	6.4
2000	24,231,349	60.5	34.6	55.1	17.8	11.8	1267.5	1283.3	7.0	1179.7	1233.9	6.5
2001	25,617,473	60.2	34.6	53.4	19.1	11.7	1240.8	1258.8	6.9	1176.1	1240.7	6.5
2002	26,817,563	59.8	34.7	51.4	20.7	11.9	1152.3	1170.3	6.4	1074.1	1129.8	6.0
2003	27,726,344	59.4	34.8	48.9	22.2	12.8	1152.3	1169.7	6.4	1084.0	1135.6	6.0
2004	29,567,897	59.4	34.8	47.1	23.8	13.0	1167.0	1184.9	6.4	1089.6	1140.9	6.0
2005	31,146,832	59.0	34.8	44.7	25.9	13.5	1188.6	1207.2	6.5	1138.0	1193.7	6.3
2006	32,952,753	58.9	34.9	42.7	27.7	13.9	1256.2	1276.3	6.9	1190.0	1247.9	6.6
2007	35,099,674	58.9	34.9	41.0	29.4	14.3	1261.3	1280.5	7.0	1181.9	1239.7	6.5
2008	37,344,875	58.6	35.0	39.2	31.3	14.7	1308.8	1328.9	7.1	1204.1	1263.8	6.6
2009	38,823,116	58.2	35.1	37.1	33.3	15.4	1338.3	1358.8	7.3	1240.6	1300.8	6.8
2010	41,674,509	57.9	35.1	35.3	35.4	15.7	1361.2	1381.6	7.4	1246.7	1307.8	6.8
2011	43,715,126	57.4	35.3	33.3	37.5	16.4	1404.8	1425.9	7.7	965.1	1345.9	5.2
2012	45,081,758	56.9	35.4	30.9	39.8	17.3	1439.9	1459.7	7.8	1327.3	1388.3	7.2
2013	46,408,964	56.6	35.6	28.1	41.5	18.4	1486.9	1506.4	8.1	1370.0	1432.7	7.5
Total	94,458,826	57.4	32.0	49.5	40.0	14.1	1019.9	1029.6	5.6	935	986	5

Source: RAIS 1994-2013. Sample: Active workers in December from firms born between 1994-2010. All wages have been adjusted by the annual CPI and are in Brazilian Reales. December wage: Wage received in December for active workers in that month. Average wage in the year: includes all the wages reported in the same year across firms and establishments. We include the weighted sum according to the number of months worked in different firm/establishment.

Table 3. Founders in Brazil, Registry Data (Receita) and RAIS 1994-2013

A. All founders (includes firms with single and multiple founders)

Year	Receita	In Receita and RAIS merging with				Matched RAIS + Receita	
		Common CPF	Common Name	Common CPF and Name	Common CPF and Matchit Name	Number of Founders	N Founders w/at least 1 firm in RAIS
1994	104,275	384,611	740,092	564,012	565,531	625,176	231,166
1995	219,652	397,519	775,714	596,855	598,521	663,490	244,481
1996	358,180	393,765	783,161	607,784	609,531	676,883	249,136
1997	744,060	394,457	800,711	626,245	628,159	699,212	256,892
1998	1,072,422	399,442	820,979	643,123	645,031	720,198	264,986
1999	1,398,882	386,394	811,583	638,371	640,318	716,317	262,941
2000	1,739,829	389,095	834,449	661,279	663,368	743,762	271,541
2001	2,074,065	419,556	910,929	725,137	727,472	817,349	298,142
2002	2,377,375	428,427	945,219	755,835	758,323	854,489	312,585
2003	2,613,465	433,327	971,930	782,388	784,962	885,631	325,315
2004	2,854,115	442,999	1,019,320	826,957	829,688	937,449	343,859
2005	3,099,636	455,671	1,070,739	876,529	879,414	994,166	364,563
2006	3,339,552	471,648	1,132,859	934,527	937,550	1,061,371	389,574
2007	3,599,611	489,623	1,197,603	995,554	998,690	1,131,304	415,388
2008	3,895,161	520,023	1,293,838	1,082,714	1,086,125	1,231,890	453,999
2009	4,008,477	552,529	1,402,060	1,187,800	1,191,288	1,350,523	501,891
2010	4,292,252	681,026	1,606,344	1,377,306	1,380,664	1,567,859	583,536
2011	4,181,021	577,953	1,400,529	1,191,955	1,195,508	1,358,900	496,369
2012	4,073,478	522,758	1,297,722	1,106,009	1,109,540	1,262,796	456,367
2013	3,979,131	478,122	1,213,890	1,039,242	1,042,637	1,187,716	426,805
Total	5,136,765	681,026	1,606,344	1,377,306	1,380,664	1,567,859	583,536

Source: *Cadastro* (Receita) Dataset up to 2021 (name and truncated CPF information available). RAIS have name and CPF full information available from 2004-2010. Sample: Founders from firms born between 1994-2010. Column 1: Number of founders in *Cadastro (*Receita). Columns 2-4: Number of founders when merged between Receita and RAIS using: a) only cpf, b) only name, c) cpf and name, and) using cpf and name (command matchit, matches names based on similar text patterns). Column 5: Total founders that matched between Receita and RAIS. We include founders with a unique ID and RAIS's worker's ID (pis). Column 6: Total founders that matched and have at least 1 of their firm available in RAIS dataset between 1994-2010.

B. Single founders

Year	Receita	In Receita and RAIS merging with				Matched RAIS + Receita	
		Common CPF	Common Name	Common CPF and Name	Common CPF and Matchit Name	Number of Founders	N Founders w/at least 1 firm in RAIS
1994	22,515	64,347	110,270	70,763	71,016	81,913	44,780
1995	46,685	66,533	114,849	74,326	74,586	86,533	47,366
1996	73,545	65,699	115,457	75,372	75,651	88,056	48,376
1997	124,862	65,749	117,813	77,706	77,991	91,088	49,918
1998	173,881	66,880	120,353	79,510	79,809	93,634	51,495
1999	226,373	64,499	118,589	78,673	78,983	93,005	51,265
2000	280,319	65,176	121,403	81,095	81,401	96,289	52,999
2001	335,855	70,152	132,054	88,261	88,605	105,241	58,010
2002	387,152	71,833	136,621	91,489	91,843	109,723	60,791
2003	434,554	72,638	140,105	94,535	94,910	113,642	63,195
2004	482,264	74,250	146,607	99,724	100,119	120,146	66,808
2005	532,001	76,367	153,913	105,807	106,233	127,615	70,912
2006	580,536	79,155	163,216	113,506	113,965	137,097	76,320
2007	633,567	82,129	172,709	121,659	122,122	146,833	81,647
2008	693,343	87,264	187,337	133,795	134,281	161,451	89,853
2009	741,669	92,657	204,827	150,192	150,711	180,387	100,684
2010	800,775	114,194	237,031	178,421	178,965	213,674	118,604
2011	791,189	97,182	201,262	146,292	146,816	177,268	97,086
2012	781,379	87,849	183,786	131,923	132,412	161,039	87,438
2013	771,430	80,243	170,772	122,019	122,503	149,745	81,073
Total	855,585	114,194	237,031	178,421	178,965	213,674	118,604

Source: *Cadastro* (Receita) Dataset up to 2021 (name and truncated CPF information available). RAIS have name and CPF full information available from 2004-2010. Sample: Single Founders from firms born between 1994-2010. Define single founders as founding all the firms up to 2010 without a partner. Column 1: Number of founders in *Cadastro (*Receita). Columns 2-4: Number of founders when merged between Receita and RAIS using: a) only cpf, b) only name, c) cpf and name, and) using cpf and name (command matchit, matches names based on similar text patterns). Column 5: Total founders that matched between Receita and RAIS. We include founders with a unique ID and RAIS's worker's ID (pis). Column 6: Total founders that matched and have at least 1 of their firm available in RAIS dataset between 1994-2010.

Table 4. Characteristics Founders in Brazil, 2004-2010

A. All founders (includes firms with single and multiple founders)

Year	Number	% Male	Average Age	% Education = Primary	% Education = Secondary	% Education = Tertiary	December Wage (BRA R$)		Average wage in the year (BRA R$)		
							Wage (mean)	Hourly wage	Weighted wage	Max. Wage	Weighted hourly wage
1994	227,802	67	30	39	15	25	1,863	11	1,499	1,602	9
1995	240,074	67	31	37	15	26	2,078	12	1,878	2,003	11
1996	244,565	66	31	36	16	27	2,106	13	1,888	2,005	11
1997	252,315	66	32	34	16	28	2,158	13	1,935	2,060	11
1998	260,282	65	32	32	17	29	2,227	13	2,018	2,146	12
1999	258,181	65	33	31	17	30	2,075	12	1,893	2,006	11
2000	266,740	64	33	29	18	31	2,155	13	1,946	2,066	11
2001	293,262	64	34	28	19	32	2,178	13	2,030	2,182	12
2002	307,555	64	34	27	20	33	2,048	12	1,864	2,004	11
2003	320,105	64	35	25	20	35	2,063	12	1,891	2,027	11
2004	338,355	64	36	24	21	35	2,114	13	1,913	2,048	11
2005	358,856	64	37	22	22	36	2,187	13	2,022	2,169	12
2006	383,573	64	37	21	22	37	2,329	14	2,127	2,282	13
2007	409,217	64	38	20	23	38	2,382	14	2,142	2,299	13
2008	447,516	64	39	19	24	38	2,466	15	2,194	2,351	13
2009	494,790	64	39	18	26	39	2,474	15	2,245	2,401	13
2010	574,964	64	40	18	27	38	2,551	15	2,221	2,363	13
2011	489,559	63	41	16	26	40	2,801	17	1,777	2,606	10
2012	450,401	63	42	14	26	42	2,935	17	2,605	2,763	15
2013	421,248	63	43	13	26	43	3,086	18	2,754	2,920	16
Total	580,500	64	42	38	40	41	2,040	12	1,871	2,021	11

Source: List of founders with a firm born between 1994-2010 that matched between *Cadastro* (Receita) dataset up to 2021 and RAIS. Sample: Matched list of founders with at least 1 firm in RAIS. Founder's characteristics and wages retrieved from RAIS 1994-2013. Column 1: Number of founders in estimation sample. Columns 2-6: Founders characteristics (sex, age, education level), Columns 7-8: December wages adjusted by CPI in Brazilian Reales. Columns 9-11: Weighted wage by the number of months worked in different firms, adjusted by CPI and in Brazilian Reales.

B. Single founders

Year	Number	% Male	Average Age	% Education = Primary	% Education = Secondary	% Education = Tertiary	December Wage (BRA R$)		Average wage in the year (BRA R$)		
							Wage (mean)	Hourly wage	Weighted wage	Max. Wage	Weighted hourly wage
1994	44,099	71	30	43	15	20	1,713	10	1,380	1,473	8
1995	46,468	71	30	41	15	21	1,879	11	1,717	1,831	10
1996	47,438	70	30	40	16	22	1,910	11	1,717	1,822	10
1997	48,993	70	31	38	16	23	1,940	11	1,745	1,856	10
1998	50,527	69	31	36	17	24	1,979	12	1,814	1,928	11
1999	50,266	69	32	35	18	25	1,835	11	1,684	1,787	10
2000	51,999	69	32	33	19	26	1,892	11	1,725	1,832	10
2001	56,997	68	33	31	20	27	1,905	11	1,786	1,920	11
2002	59,752	68	34	30	21	28	1,791	11	1,629	1,753	10
2003	62,140	68	34	28	21	30	1,810	11	1,650	1,766	10
2004	65,640	68	35	27	22	31	1,852	11	1,678	1,792	10
2005	69,713	68	36	25	23	32	1,914	12	1,776	1,900	11
2006	75,076	68	36	24	24	33	2,020	12	1,857	1,984	11
2007	80,353	68	37	22	25	34	2,079	12	1,873	2,003	11
2008	88,543	68	38	21	26	34	2,159	13	1,922	2,055	11
2009	99,206	68	39	20	28	35	2,171	13	1,976	2,110	12
2010	116,812	68	39	19	29	35	2,239	13	1,960	2,077	11
2011	95,669	67	41	17	29	37	2,465	15	1,636	2,289	10
2012	86,190	67	42	16	28	38	2,576	15	2,286	2,416	13
2013	79,939	67	43	14	29	39	2,706	16	2,418	2,561	14
Total	117,984	68	42	41	42	37	1,806	11	1,668	1,794	10

Source: List of founders with a firm born between 1994-2010 that matched between *Cadastro* (Receita) dataset up to 2021 and RAIS. Sample: Matched list of founders with at least 1 firm born between 1994-2010 in RAIS and founders who have always been a single founder until 2010. Founder's characteristics and wages retrieved from RAIS 1994-2013. Column 1: Number of founders in estimation sample. Columns 2-6: Founders characteristics (sex, age, education level), Columns 7-8: December wages adjusted by CPI in Brazilian Reales. Columns 9-11: Weighted wage by the number of months worked in different firms, adjusted by CPI and in Brazilian Reales.

Table 5. Serial Founders (SF) in RAIS

A. All founders (includes firms with single and multiple founders)

Year	Number	No SF (Only 1 Business)	SF 2 business	SF 3 business	SF More than 3 business
1994	231,166	187,486	33,906	6,833	2,941
1995	244,481	199,056	35,352	7,064	3,009
1996	249,136	203,006	35,905	7,188	3,037
1997	256,892	209,886	36,588	7,297	3,121
1998	264,986	216,834	37,495	7,433	3,224
1999	262,941	216,003	36,530	7,242	3,166
2000	271,541	223,732	37,329	7,318	3,162
2001	298,142	245,615	40,937	8,079	3,511
2002	312,585	258,132	42,548	8,297	3,608
2003	325,315	268,862	44,097	8,625	3,731
2004	343,859	284,714	46,240	9,008	3,897
2005	364,563	301,798	49,107	9,524	4,134
2006	389,574	322,808	52,323	10,100	4,343
2007	415,388	343,778	56,148	10,816	4,646
2008	453,999	375,955	61,219	11,768	5,057
2009	501,891	415,260	68,066	12,990	5,575
2010	583,536	482,960	79,103	15,115	6,358
2011	496,369	410,318	67,616	12,986	5,449
2012	456,367	377,735	61,832	11,836	4,964
2013	426,805	353,803	57,455	11,000	4,547
Total	583,536	482,960	79,103	15,115	6,358

Source: List of founders with a firm born between 1994-2010 that matched between *Cadastro* (Receita) and RAIS. Sample: Matched list of founders with at least 1 firm born between 1994-2010 in RAIS. Number of matched founders whose worker's ID is found in RAIS between 1994-2013. Distributed by the total number of firms founded until 2010.

B. Single founders

Year	Number	No SF (Only 1 Business)	SF 2 business	SF 3 business	SF More than 3 business
1994	44,780	42,562	2,043	148	27
1995	47,366	45,046	2,128	168	24
1996	48,376	46,007	2,172	175	22
1997	49,918	47,482	2,230	182	24
1998	51,495	49,010	2,277	181	27
1999	51,265	48,798	2,255	186	26
2000	52,999	50,459	2,321	193	26
2001	58,010	55,259	2,519	203	29
2002	60,791	57,948	2,595	215	33
2003	63,195	60,230	2,705	227	33
2004	66,808	63,720	2,811	236	41
2005	70,912	67,588	3,025	259	40
2006	76,320	72,790	3,215	272	43
2007	81,647	77,833	3,474	296	44
2008	89,853	85,630	3,854	319	50
2009	100,684	95,967	4,304	360	53
2010	118,604	113,079	5,043	421	61
2011	97,086	92,482	4,196	355	53
2012	87,438	83,319	3,753	320	46
2013	81,073	77,291	3,447	291	44
Total	118,604	113,079	5,043	421	61

Source: List of founders with a firm born between 1994-2010 that matched between *Cadastro* (Receita) and RAIS. Sample: Matched list of founders with at least 1 firm born between 1994-2010 in RAIS and who is a single founder. Number of matched founders whose worker's ID is found in RAIS between 1994-2013. Distributed by the total number of firms founded until 2010.

Table 6. Probability of Exit and Survival of businesses founded by serial founders (1994 - 2010)

# of founded Status by the SF	First business (i)				Second business (II)				Third business (III)				Third and beyond business (IV)			
	Out of business		In operation		Out of business		In operation		Out of business		In operation		Out of business		In operation	
	Single	Multiple (founded with partners)	Single	Multiple (founded with partners)	Single	Multiple (founded with partners)	Single	Multiple (founded with partners)	Single	Multiple (founded with partners)	Single	Multiple (founded with partners)	Single	Multiple (founded with partners)	Single	Multiple (founded with partners)
	(I.1)	(I.2)	(I.3)	(I.4)	(II.1)	(II.2)	(II.3)	(II.4)	(III.1)	(III.2)	(III.3)	(III.4)	(IV.1)	(IV.2)	(IV.3)	(IV.4)
1	56%	72%	44%	28%												
2	52%	74%	47%	25%	64%	86%	36%	14%								
3	48%	70%	51%	28%	52%	76%	40%	17%	71%	90%	29%	10%				
>3	41%	61%	54%	33%	34%	45%	37%	21%	23%	35%	30%	15%	57%	65%	43%	35%

Note: Sample of matched founders between Receita and RAIS firms born between 1994-2010. Table calculated based on the order of the firms available in RAIS and Receita.Probabilities add up 100 % for even (1 and 3) and odd (2 and 4) sub-columns of Columns I, II, III and IV respectively.

Table 7. Performance of a business founded by a serial founder
(Cross section analysis – Firm's latest year in RAIS)
A.1. Dependent variable: Logarithm of (ln) of Average monthly wage paid to workers in December

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Number of founded firms	0.032*** (0.002)														
Accumulated Number unsuccessful firms (closed)		0.053*** (0.007)													
Accumulated Number successful firms (survived)			0.031*** (0.002)												
Number of closed firms in Q1 (recent quartiles)				-0.016 (0.013)											
Number of closed firms in Q2(recent quartiles)					0.015 (0.011)										
Number of closed firms in Q3 (recent quartiles)						0.078*** (0.010)									
Number of closed firms in Q4 (recent quartiles)							0.120*** (0.022)								
Def Max Quality: Accumulated number of firms in Q1								-0.290*** (0.008)							
Def Max Quality: Accumulated number of firms in Q2								-0.117*** (0.005)							
Def Max Quality: Accumulated number of firms in Q3								-0.047*** (0.004)							
Def Max Quality: Accumulated number of firms in Q4								0.070*** (0.005)							
Def Most recent Quality: Accumulated number of firms in Q1									-0.244*** (0.006)						
Def Most recent Quality: Accumulated number of firms in Q2									-0.077*** (0.004)						
Def Most recent Quality: Accumulated number of firms in Q3									0.003 (0.004)						
Def Most recent Quality: Accumulated number of firms in Q4									0.082*** (0.006)						
Def Longest Quality: Accumulated number of firms in Q1										-0.202*** (0.006)					
Def Longest Quality: Accumulated number of firms in Q2										-0.074*** (0.004)					
Def Longest Quality: Accumulated number of firms in Q3										0.008** (0.004)					
Def Longest Quality: Accumulated number of firms in Q4										0.078*** (0.006)					
Def Max Quality: Accumulated number of firms (Q1+Q2)											-0.171*** (0.005)				
Def Max Quality: Accumulated number of firms (Q3+Q4)											0.052*** (0.003)				
Def Longest Quality: Accumulated number of firms (Q1+Q2)												-0.133*** (0.004)			
Def Longest Quality: Accumulated number of firms (Q3+Q4)												0.062*** (0.004)			
Def Most Recent Quality: Accumulated number of firms (Q1+Q2)													-0.153*** (0.004)		
Def Most Recent Quality: Accumulated number of firms (Q3+Q4)													0.067*** (0.004)		
Wage average (ln) of founded firms														0.442*** (0.005)	
Average number employees of previous founded firms															0.000*** (0.000)
Observations	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038
R-squared	0.279	0.271	0.278	0.269	0.269	0.270	0.273	0.388	0.414	0.386	0.356	0.364	0.384	0.511	0.272

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS. Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality.

A.2 Dependent variable: Logarithm (ln) of Average hourly wage paid to workers in December

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Number of founded firms	0.033*** (0.002)														
Accumulated Number unsuccessful firms (closed)		0.058*** (0.007)													
Accumulated Number successful firms (survived)			0.032*** (0.002)												
Number of closed firms in Q1 (recent quartiles)				0.003 (0.015)											
Number of closed firms in Q2(recent quartiles)					0.008 (0.012)										
Number of closed firms in Q3 (recent quartiles)						0.075*** (0.011)									
Number of closed firms in Q4 (recent quartiles)							0.128*** (0.023)								
Def Max Quality: Accumulated number of firms in Q1								-0.241*** (0.009)							
Def Max Quality: Accumulated number of firms in Q2								-0.111*** (0.005)							
Def Max Quality: Accumulated number of firms in Q3								-0.045*** (0.004)							
Def Max Quality: Accumulated number of firms in Q4								0.069*** (0.005)							
Def Most recent Quality: Accumulated number of firms in Q1									-0.211*** (0.007)						
Def Most recent Quality: Accumulated number of firms in Q2									-0.077*** (0.004)						
Def Most recent Quality: Accumulated number of firms in Q3									0.001 (0.004)						
Def Most recent Quality: Accumulated number of firms in Q4									0.081*** (0.006)						
Def Longest Quality: Accumulated number of firms in Q1										-0.173*** (0.007)					
Def Longest Quality: Accumulated number of firms in Q2										-0.073*** (0.004)					
Def Longest Quality: Accumulated number of firms in Q3										0.007** (0.003)					
Def Longest Quality: Accumulated number of firms in Q4										0.076*** (0.006)					
Def Max Quality: Accumulated number of firms (Q1+Q2)											-0.150*** (0.005)				
Def Max Quality: Accumulated number of firms (Q3+Q4)											0.051*** (0.003)				
Def Longest Quality: Accumulated number of firms (Q1+Q2)												-0.119*** (0.004)			
Def Longest Quality: Accumulated number of firms (Q3+Q4)												0.061*** (0.004)			
Def Most Recent Quality: Accumulated number of firms (Q1+Q2)													-0.137*** (0.004)		
Def Most Recent Quality: Accumulated number of firms (Q3+Q4)													0.065*** (0.004)		
Wage average (ln) of founded firms														0.443*** (0.005)	
Average number employees of previous founded firms															0.000*** (0.000)
Observations	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038
R-squared	0.299	0.291	0.297	0.289	0.289	0.290	0.293	0.380	0.401	0.380	0.357	0.365	0.381	0.523	0.292

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS. Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality.

A.3 Dependent variable: Logarithm (ln) of Average maximum monthly wage paid to workers in the year

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Number of founded firms	0.026*** (0.001)														
Accumulated Number unsuccessful firms (closed)		0.037*** (0.005)													
Accumulated Number successful firms (survived)			0.025*** (0.001)												
Number of closed firms in Q1 (recent quartiles)				-0.137*** (0.010)											
Number of closed firms in Q2(recent quartiles)					-0.031*** (0.007)										
Number of closed firms in Q3 (recent quartiles)						0.019** (0.008)									
Number of closed firms in Q4 (recent quartiles)							0.198*** (0.021)								
Def Max Quality: Accumulated number of firms in Q1								-0.343*** (0.007)							
Def Max Quality: Accumulated number of firms in Q2								-0.159*** (0.004)							
Def Max Quality: Accumulated number of firms in Q3								-0.073*** (0.003)							
Def Max Quality: Accumulated number of firms in Q4								0.048*** (0.003)							
Def Most recent Quality: Accumulated number of firms in Q1									-0.295*** (0.005)						
Def Most recent Quality: Accumulated number of firms in Q2									-0.113*** (0.003)						
Def Most recent Quality: Accumulated number of firms in Q3									-0.017*** (0.003)						
Def Most recent Quality: Accumulated number of firms in Q4									0.055*** (0.003)						
Def Longest Quality: Accumulated number of firms in Q1										-0.247*** (0.005)					
Def Longest Quality: Accumulated number of firms in Q2										-0.102*** (0.003)					
Def Longest Quality: Accumulated number of firms in Q3										-0.011*** (0.003)					
Def Longest Quality: Accumulated number of firms in Q4										0.051*** (0.003)					
Def Max Quality: Accumulated number of firms (Q1+Q2)											-0.212*** (0.004)				
Def Max Quality: Accumulated number of firms (Q3+Q4)											0.038*** (0.002)				
Def Longest Quality: Accumulated number of firms (Q1+Q2)												-0.166*** (0.003)			
Def Longest Quality: Accumulated number of firms (Q3+Q4)												0.044*** (0.002)			
Def Most Recent Quality: Accumulated number of firms (Q1+Q2)													-0.195*** (0.003)		
Def Most Recent Quality: Accumulated number of firms (Q3+Q4)													0.048*** (0.002)		
Wage average (ln) of founded firms														0.475*** (0.005)	
Average number employees of previous founded firms															0.000*** (0.000)
Observations	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054	73,173
R-squared	0.281	0.272	0.279	0.274	0.271	0.271	0.282	0.409	0.436	0.398	0.375	0.375	0.405	0.523	0.275

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS. Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality.

A.4. Dependent variable: Logarithm (ln) Average monthly weighted wage paid to workers in the year

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Number of founded firms	0.026*** (0.001)														
Accumulated Number unsuccessful firms (closed)		0.037*** (0.005)													
Accumulated Number successful firms (survived)			0.025*** (0.001)												
Number of closed firms in Q1 (recent quartiles)				-0.138*** (0.010)											
Number of closed firms in Q2(recent quartiles)					-0.031*** (0.007)										
Number of closed firms in Q3 (recent quartiles)						0.019** (0.008)									
Number of closed firms in Q4 (recent quartiles)							0.197*** (0.021)								
Def Max Quality: Accumulated number of firms in Q1								-0.343*** (0.007)							
Def Max Quality: Accumulated number of firms in Q2								-0.158*** (0.004)							
Def Max Quality: Accumulated number of firms in Q3								-0.073*** (0.003)							
Def Max Quality: Accumulated number of firms in Q4								0.048*** (0.003)							
Def Most recent Quality: Accumulated number of firms in Q1									-0.295*** (0.005)						
Def Most recent Quality: Accumulated number of firms in Q2									-0.113*** (0.003)						
Def Most recent Quality: Accumulated number of firms in Q3									-0.016*** (0.003)						
Def Most recent Quality: Accumulated number of firms in Q4									0.055*** (0.003)						
Def Longest Quality: Accumulated number of firms in Q1										-0.247*** (0.005)					
Def Longest Quality: Accumulated number of firms in Q2										-0.102*** (0.003)					
Def Longest Quality: Accumulated number of firms in Q3										-0.011*** (0.003)					
Def Longest Quality: Accumulated number of firms in Q4										0.051*** (0.003)					
Def Max Quality: Accumulated number of firms (Q1+Q2)											-0.212*** (0.004)				
Def Max Quality: Accumulated number of firms (Q3+Q4)											0.038*** (0.002)				
Def Longest Quality: Accumulated number of firms (Q1+Q2)												-0.166*** (0.003)			
Def Longest Quality: Accumulated number of firms (Q3+Q4)												0.044*** (0.002)			
Def Most Recent Quality: Accumulated number of firms (Q1+Q2)													-0.195*** (0.003)		
Def Most Recent Quality: Accumulated number of firms (Q3+Q4)													0.048*** (0.002)		
Wage average (ln) of founded firms														0.475*** (0.005)	
Average number employees of previous founded firms															0.000*** (0.000)
Observations	76,021	76,021	76,021	76,021	76,021	76,021	76,021	76,021	76,021	76,021	76,021	76,021	76,021	76,021	73,140
R-squared	0.281	0.272	0.279	0.274	0.271	0.271	0.282	0.409	0.436	0.398	0.375	0.375	0.405	0.523	0.275

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS. Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality.

A.5. Dependent variable: Maximum wage in the year (for active workers at the end of period)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Number of founded firms	0.029*** (0.001)														
Accumulated Number unsuccessful firms (closed)		0.046*** (0.006)													
Accumulated Number successful firms (survived)			0.029*** (0.002)												
Number of closed firms in Q1 (recent quartiles)				-0.020 (0.013)											
Number of closed firms in Q2 (recent quartiles)					0.011 (0.011)										
Number of closed firms in Q3 (recent quartiles)						0.066*** (0.010)									
Number of closed firms in Q4 (recent quartiles)							0.109*** (0.020)								
Def Max Quality: Accumulated number of firms in Q1								-0.280*** (0.008)							
Def Max Quality: Accumulated number of firms in Q2								-0.111*** (0.005)							
Def Max Quality: Accumulated number of firms in Q3								-0.045*** (0.003)							
Def Max Quality: Accumulated number of firms in Q4								0.065*** (0.004)							
Def Most recent Quality: Accumulated number of firms in Q1									-0.235*** (0.006)						
Def Most recent Quality: Accumulated number of firms in Q2									-0.072*** (0.004)						
Def Most recent Quality: Accumulated number of firms in Q3									0.002 (0.004)						
Def Most recent Quality: Accumulated number of firms in Q4									0.077*** (0.006)						
Def Longest Quality: Accumulated number of firms in Q1										-0.196*** (0.006)					
Def Longest Quality: Accumulated number of firms in Q2										-0.070*** (0.003)					
Def Longest Quality: Accumulated number of firms in Q3										0.006* (0.003)					
Def Longest Quality: Accumulated number of firms in Q4										0.074*** (0.005)					
Def Max Quality: Accumulated number of firms (Q1+Q2)											-0.164*** (0.004)				
Def Max Quality: Accumulated number of firms (Q3+Q4)											0.048*** (0.003)				
Def Longest Quality: Accumulated number of firms (Q1+Q2)												-0.129*** (0.003)			
Def Longest Quality: Accumulated number of firms (Q3+Q4)												0.059*** (0.003)			
Def Most Recent Quality: Accumulated number of firms (Q1+Q2)													-0.146*** (0.004)		
Def Most Recent Quality: Accumulated number of firms (Q3+Q4)													0.063*** (0.004)		
Wage average (ln) of founded firms														0.403*** (0.005)	
Average number employees of previous founded firms															0.000*** (0.000)
Observations	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038
R-squared	0.317	0.309	0.316	0.307	0.307	0.308	0.310	0.436	0.463	0.434	0.401	0.410	0.431	0.530	0.310

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS. Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality.

A.6. Dependent variable: Logarithm (ln) Average weighted wage in the founding year (for active workers at the end of period)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Number of founded firms	0.029*** (0.001)														
Accumulated Number unsuccessful firms (closed)		0.046*** (0.006)													
Accumulated Number successful firms (survived)			0.029*** (0.002)												
Number of closed firms in Q1 (recent quartiles)				-0.020 (0.013)											
Number of closed firms in Q2 (recent quartiles)					0.011 (0.011)										
Number of closed firms in Q3 (recent quartiles)						0.066*** (0.010)									
Number of closed firms in Q4 (recent quartiles)							0.108*** (0.020)								
Def Max Quality: Accumulated number of firms in Q1								-0.279*** (0.008)							
Def Max Quality: Accumulated number of firms in Q2								-0.111*** (0.005)							
Def Max Quality: Accumulated number of firms in Q3								-0.045*** (0.003)							
Def Max Quality: Accumulated number of firms in Q4								0.065*** (0.004)							
Def Most recent Quality: Accumulated number of firms in Q1									-0.235*** (0.006)						
Def Most recent Quality: Accumulated number of firms in Q2									-0.072*** (0.004)						
Def Most recent Quality: Accumulated number of firms in Q3									0.002 (0.004)						
Def Most recent Quality: Accumulated number of firms in Q4									0.077*** (0.005)						
Def Longest Quality: Accumulated number of firms in Q1										-0.196*** (0.006)					
Def Longest Quality: Accumulated number of firms in Q2										-0.070*** (0.003)					
Def Longest Quality: Accumulated number of firms in Q3										0.006* (0.003)					
Def Longest Quality: Accumulated number of firms in Q4										0.074*** (0.005)					
Def Max Quality: Accumulated number of firms (Q1+Q2)											-0.163*** (0.004)				
Def Max Quality: Accumulated number of firms (Q3+Q4)											0.048*** (0.003)				
Def Longest Quality: Accumulated number of firms (Q1+Q2)												-0.128*** (0.003)			
Def Longest Quality: Accumulated number of firms (Q3+Q4)												0.058*** (0.003)			
Def Most Recent Quality: Accumulated number of firms (Q1+Q2)													-0.146*** (0.004)		
Def Most Recent Quality: Accumulated number of firms (Q3+Q4)													0.062*** (0.004)		
Wage average (ln) of founded firms														0.403*** (0.005)	
Average number employees of previous founded firms															0.000*** (0.000)
Observations	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021
R-squared	0.318	0.309	0.316	0.307	0.307	0.308	0.311	0.436	0.464	0.435	0.401	0.410	0.431	0.530	0.311

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS. Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality.

A.7. Dependent variable: Logarithm (ln) Average weighted hourly wage in the founding year (for active workers at the end of period)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Number of founded firms	0.031*** (0.002)														
Accumulated Number unsuccessful firms (closed)		0.051*** (0.006)													
Accumulated Number successful firms (survived)			0.030*** (0.002)												
Number of closed firms in Q1 (recent quartiles)				-0.000 (0.013)											
Number of closed firms in Q2 (recent quartiles)					0.004 (0.011)										
Number of closed firms in Q3 (recent quartiles)						0.063*** (0.010)									
Number of closed firms in Q4 (recent quartiles)							0.116*** (0.021)								
Def Max Quality: Accumulated number of firms in Q1								-0.230*** (0.009)							
Def Max Quality: Accumulated number of firms in Q2								-0.106*** (0.005)							
Def Max Quality: Accumulated number of firms in Q3								-0.043*** (0.003)							
Def Max Quality: Accumulated number of firms in Q4								0.064*** (0.004)							
Def Most recent Quality: Accumulated number of firms in Q1									-0.202*** (0.007)						
Def Most recent Quality: Accumulated number of firms in Q2									-0.072*** (0.004)						
Def Most recent Quality: Accumulated number of firms in Q3									0.001 (0.003)						
Def Most recent Quality: Accumulated number of firms in Q4									0.076*** (0.005)						
Def Longest Quality: Accumulated number of firms in Q1										-0.167*** (0.006)					
Def Longest Quality: Accumulated number of firms in Q2										-0.070*** (0.004)					
Def Longest Quality: Accumulated number of firms in Q3										0.005 (0.003)					
Def Longest Quality: Accumulated number of firms in Q4										0.072*** (0.005)					
Def Max Quality: Accumulated number of firms (Q1+Q2)											-0.143*** (0.005)				
Def Max Quality: Accumulated number of firms (Q3+Q4)											0.048*** (0.003)				
Def Longest Quality: Accumulated number of firms (Q1+Q2)												-0.114*** (0.004)			
Def Longest Quality: Accumulated number of firms (Q3+Q4)												0.057*** (0.003)			
Def Most Recent Quality: Accumulated number of firms (Q1+Q2)													-0.130*** (0.004)		
Def Most Recent Quality: Accumulated number of firms (Q3+Q4)													0.061*** (0.004)		
Wage average (ln) of founded firms														0.405*** (0.005)	
Average number employees of previous founded firms															0.000*** (0.000)
Observations	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021	41,021
R-squared	0.338	0.330	0.336	0.328	0.328	0.328	0.331	0.424	0.446	0.425	0.399	0.408	0.424	0.542	0.331

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS. Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality.

A.8. Dependent variable: Logarithm (ln) Average maximum wage in the year (for active workers at the end of period)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Number of founded firms	0.029***														
	(0.001)														
Accumulated Number unsuccessful firms (closed)		0.046***													
		(0.006)													
Accumulated Number successful firms (survived)			0.029***												
			(0.002)												
Number of closed firms in Q1 (recent quartiles)				-0.020											
				(0.013)											
Number of closed firms in Q2(recent quartiles)					0.011										
					(0.011)										
Number of closed firms in Q3 (recent quartiles)						0.066***									
						(0.010)									
Number of closed firms in Q4 (recent quartiles)							0.109***								
							(0.020)								
Def Max Quality: Accumulated number of firms in Q1								-0.280***							
								(0.008)							
Def Max Quality: Accumulated number of firms in Q2								-0.111***							
								(0.005)							
Def Max Quality: Accumulated number of firms in Q3								-0.045***							
								(0.003)							
Def Max Quality: Accumulated number of firms in Q4								0.065***							
								(0.004)							
Def Most recent Quality: Accumulated number of firms in Q1									-0.235***						
									(0.006)						
Def Most recent Quality: Accumulated number of firms in Q2									-0.072***						
									(0.004)						
Def Most recent Quality: Accumulated number of firms in Q3									0.002						
									(0.004)						
Def Most recent Quality: Accumulated number of firms in Q4									0.077***						
									(0.006)						
Def Longest Quality: Accumulated number of firms in Q1										-0.196***					
										(0.006)					
Def Longest Quality: Accumulated number of firms in Q2										-0.070***					
										(0.003)					
Def Longest Quality: Accumulated number of firms in Q3										0.006*					
										(0.003)					
Def Longest Quality: Accumulated number of firms in Q4										0.074***					
										(0.005)					
Def Max Quality: Accumulated number of firms (Q1+Q2)											-0.164***				
											(0.004)				
Def Max Quality: Accumulated number of firms (Q3+Q4)											0.048***				
											(0.003)				
Def Longest Quality: Accumulated number of firms (Q1+Q2)												-0.129***			
												(0.003)			
Def Longest Quality: Accumulated number of firms (Q3+Q4)												0.059***			
												(0.003)			
Def Most Recent Quality: Accumulated number of firms (Q1+Q2)													-0.146***		
													(0.004)		
Def Most Recent Quality: Accumulated number of firms (Q3+Q4)													0.063***		
													(0.004)		
Wage average (ln) of founded firms														0.403***	
														(0.005)	
Average number employees of previous founded firms															0.000***
															(0.000)
Observations	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038	41,038
R-squared	0.317	0.309	0.316	0.307	0.307	0.308	0.310	0.436	0.463	0.434	0.401	0.410	0.431	0.530	0.310

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS. Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality.

B.1 Dependent variable: Average employment (number of workers at the end of the years) in firms founded by serial founders (1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Number of founded firms	0.953*** (0.182)												
Accumulated Number unsuccessful firms (closed)		0.319 (0.606)											
Accumulated Number successful firms (survived)			0.973*** (0.178)										
Number of closed firms in Q1 (recent quartiles)				0.046 (1.647)									
Number of closed firms in Q2(recent quartiles)					1.202 (2.859)								
Number of closed firms in Q3 (recent quartiles)						-0.719 (0.845)							
Number of closed firms in Q4 (recent quartiles)							1.236 (1.429)						
Def Max Quality: Accumulated number of firms in Q1								-1.374* (0.757)					
Def Max Quality: Accumulated number of firms in Q2								0.352 (0.600)					
Def Max Quality: Accumulated number of firms in Q3								0.587 (0.463)					
Def Max Quality: Accumulated number of firms in Q4								1.009*** (0.196)					
Def Most recent Quality: Accumulated number of firms in Q1									-1.192* (0.635)				
Def Most recent Quality: Accumulated number of firms in Q2									0.766 (0.495)				
Def Most recent Quality: Accumulated number of firms in Q3									2.031*** (0.589)				
Def Most recent Quality: Accumulated number of firms in Q4									0.915*** (0.209)				
Def Longest Quality: Accumulated number of firms in Q1										-1.205** (0.611)			
Def Longest Quality: Accumulated number of firms in Q2										0.694 (0.547)			
Def Longest Quality: Accumulated number of firms in Q3										1.593*** (0.537)			
Def Longest Quality: Accumulated number of firms in Q4										0.965*** (0.210)			
Def Max Quality: Accumulated number of firms (Q1+Q2)											-0.225 (0.544)		
Def Max Quality: Accumulated number of firms (Q3+Q4)											0.977*** (0.182)		
Def Longest Quality: Accumulated number of firms (Q1+Q2)												-0.308 (0.489)	
Def Longest Quality: Accumulated number of firms (Q3+Q4)												1.036*** (0.190)	
Def Most Recent Quality: Accumulated number of firms (Q1+Q2)													-0.296 (0.511)
Def Most Recent Quality: Accumulated number of firms (Q3+Q4)													1.041*** (0.182)
Observations	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054	76,054
R-squared	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS. Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality.

B.2 Dependent variable: Average employment (number of workers at the end of the year) in firms founded by serial founders (2)

	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Average Wage (ln): December monthly wage	8.464*** (0.846)								
Average Wage (ln): December hourly wage		8.615*** (0.924)							
Average Wage (ln): Weighted monthly max wage - all workers			7.563*** (0.854)						
Average Wage (ln): Weighted monthly wage - all workers				7.548*** (0.847)					
Average Wage (ln): Weighted hourly wage - all workers					7.835*** (1.003)				
Average Wage (ln): Monthly max wage -workers active in December						8.677*** (0.871)			
Average Wage (ln): Weighted monthly wage -workers active in							8.674*** (0.864)		
Average Wage (ln): Weighted hourly wage -workers active in								8.846*** (0.965)	
Average number employees of previous founded firms									0.590*** (0.148)
Observations	73,173	73,173	76,054	76,054	76,054	73,173	73,173	73,173	73,173
R-squared	0.016	0.017	0.015	0.015	0.015	0.016	0.016	0.017	0.364

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS. Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality.

Table 8: Determinants of performance of a business founded by serial founders (Annual change for all firms)

A.1. Performance measured by the annual growth of average wages in firms founded by serial founders

	Ln(wage): Average wage in December (mean)		Ln(wage): December Hourly wage		Ln(wage): Average monthly max wage in the year - for all workers		Ln(wage): Average monthly weighted wage in the year - for all workers		Ln(wage): Maximum wage in the year - for active workers at the end of period		Ln(wage): Average weighted wage in the year - for active workers at the end of period		Ln(wage): Average weighted hourly wage in the year - for active workers at the end of period		Ln(wage): Average max wage in the year - for active workers at the end of period	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Def Most recent Quality: Accumulated number of firms in Q1	-0.0163***		-0.0125***		-0.0623***		-0.0622***		-0.0146***		-0.0144***		-0.0111***		-0.0146***	
	(0.0025)		(0.0028)		(0.0026)		(0.0026)		(0.0019)		(0.0019)		(0.0023)		(0.0019)	
Def Most recent Quality: Accumulated number of firms in Q2	-0.0045**		-0.0054**		-0.0307***		-0.0307***		-0.0024		-0.0026		-0.0033*		-0.0024	
	(0.0021)		(0.0023)		(0.0020)		(0.0020)		(0.0016)		(0.0016)		(0.0018)		(0.0016)	
Def Most recent Quality: Accumulated number of firms in Q3	-0.0010		-0.0001		-0.0181***		-0.0179***		-0.0002		-0.0001		0.0010		-0.0002	
	(0.0021)		(0.0022)		(0.0018)		(0.0018)		(0.0016)		(0.0016)		(0.0017)		(0.0016)	
Def Most recent Quality: Accumulated number of firms in Q4	0.0024		0.0024		0.0036***		0.0036***		0.0012		0.0012		0.0012		0.0012	
	(0.0026)		(0.0026)		(0.0013)		(0.0013)		(0.0012)		(0.0012)		(0.0012)		(0.0012)	
Def Most Recent Quality: Accumulated number of unsuccessful firms (Q1+Q2)		-0.0098***		-0.0086***		-0.0438***		-0.0437***		-0.0081***		-0.0081***		-0.0069***		-0.0081***
		(0.0018)		(0.0020)		(0.0019)		(0.0019)		(0.0013)		(0.0013)		(0.0015)		(0.0013)
Def Most Recent Quality: Accumulated number of successful firms (Q3+Q4)		0.0018		0.0020		0.0016		0.0016		0.0010		0.0010		0.0012		0.0010
		(0.0021)		(0.0021)		(0.0011)		(0.0011)		(0.0010)		(0.0010)		(0.0010)		(0.0010)
Observations	37,669	37,669	37,669	37,669	68,063	68,063	67,996	67,996	37,669	37,669	37,636	37,636	37,636	37,636	37,669	37,669
R-squared	0.004	0.003	0.003	0.003	0.021	0.017	0.021	0.017	0.004	0.003	0.004	0.003	0.003	0.002	0.004	0.003

Notes: The table reports the estimation of coefficient g of Equation 2 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects and a set of covariates X. The set of covariates includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively.

A.2. Performance measured by the annual average growth of wages in firms founded by serial founders

	Ln(wage): Average wage in December (mean)		Ln(wage): December Hourly wage		Ln(wage): Average monthly max wage in the year - for all workers		Ln(wage): Average monthly weighted wage in the year - for all workers		Ln(wage): Maximum wage in the year - for active workers at the end of period		Ln(wage): Average weighted wage in the year - for active workers at the end of period		Ln(wage): Average weighted hourly wage in the year - for active workers at the end of period		Ln(wage): Average max wage in the year - for active workers at the end of period	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Def Most recent Quality: Accumulated number of firms in Q1	-0.0154***		-0.0116***		-0.0597***		-0.0596***		-0.0138***		-0.0137***		-0.0103***		-0.0138***	
	(0.0025)		(0.0028)		(0.0025)		(0.0025)		(0.0018)		(0.0018)		(0.0022)		(0.0018)	
Def Most recent Quality: Accumulated number of firms in Q2	-0.0040*		-0.0049**		-0.0300***		-0.0300***		-0.0020		-0.0021		-0.0028		-0.0020	
	(0.0021)		(0.0023)		(0.0019)		(0.0019)		(0.0016)		(0.0016)		(0.0018)		(0.0016)	
Def Most recent Quality: Accumulated number of firms in Q3	-0.0005		0.0004		-0.0176***		-0.0174***		0.0001		0.0002		0.0012		0.0001	
	(0.0021)		(0.0022)		(0.0018)		(0.0018)		(0.0015)		(0.0015)		(0.0016)		(0.0015)	
Def Most recent Quality: Accumulated number of firms in Q4	0.0023		0.0024		0.0033***		0.0033***		0.0012		0.0011		0.0012		0.0012	
	(0.0026)		(0.0026)		(0.0013)		(0.0013)		(0.0012)		(0.0012)		(0.0012)		(0.0012)	
Def Most Recent Quality: Accumulated number of unsuccessful firms (Q1+Q2)		-0.0092***		-0.0079***		-0.0423***		-0.0422***		-0.0075***		-0.0075***		-0.0063***		-0.0075***
		(0.0018)		(0.0020)		(0.0018)		(0.0018)		(0.0013)		(0.0013)		(0.0015)		(0.0013)
Def Most Recent Quality: Accumulated number of successful firms (Q3+Q4)		0.0018		0.0020		0.0013		0.0014		0.0010		0.0010		0.0012		0.0010
		(0.0021)		(0.0021)		(0.0011)		(0.0011)		(0.0010)		(0.0010)		(0.0010)		(0.0010)
Observations	37,669	37,669	37,669	37,669	68,063	68,063	67,996	67,996	37,669	37,669	37,636	37,636	37,636	37,636	37,669	37,669
R-squared	0.004	0.003	0.003	0.003	0.021	0.017	0.021	0.017	0.004	0.003	0.004	0.003	0.003	0.002	0.004	0.003

Notes: The table reports the estimation of coefficient g of Equation 2 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects and a set of covariates X. The set of covariates includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively.

A.3. Performance measured by the annual difference in the levels of nominal wages in firms founded by serial founders

	Ln(wage): Average wage in December (mean)		Ln(wage): December Hourly wage		Ln(wage): Average monthly max wage in the year - for all workers		Ln(wage): Average monthly weighted wage in the year - for all workers		Ln(wage): Maximum wage in the year - for active workers at the end of period		Ln(wage): Average weighted wage in the year - for active workers at the end of period		Ln(wage): Average weighted hourly wage in the year - for active workers at the end of period		Ln(wage): Average max wage in the year - for active workers at the end of period	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Def Most recent Quality: Accumulated number of firms in Q1	-35.2465***		-0.1380***		-80.0254***		-79.6630***		-20.6590***		-20.5245***		-0.0862***		-20.6590***	
	(5.4679)		(0.0384)		(6.9513)		(6.9423)		(2.9265)		(2.9333)		(0.0222)		(2.9265)	
Def Most recent Quality: Accumulated number of firms in Q2	-17.6277***		-0.0926***		-45.3859***		-44.9738***		-7.1146***		-6.6891***		-0.0384***		-7.1146***	
	(4.1141)		(0.0236)		(3.8217)		(3.8123)		(2.2837)		(2.2647)		(0.0142)		(2.2837)	
Def Most recent Quality: Accumulated number of firms in Q3	-10.4916**		-0.0409*		-34.1490***		-34.0826***		-4.5626**		-4.3391**		-0.0114		-4.5626**	
	(4.3134)		(0.0243)		(3.5314)		(3.5218)		(2.0873)		(2.0479)		(0.0130)		(2.0873)	
Def Most recent Quality: Accumulated number of firms in Q4	5.2762		0.0274		10.5380***		10.5655***		4.1206**		3.9854**		0.0188*		4.1206**	
	(10.1173)		(0.0508)		(3.4813)		(3.4778)		(1.9467)		(1.9372)		(0.0101)		(1.9467)	
Def Most Recent Quality: Accumulated number of unsuccessful firms (Q1+Q2)		-24.9914***		-0.1099***		-57.6957***		-57.3113***		-12.9758***		-12.7080***		-0.0591***		-12.9758***
		(4.3967)		(0.0269)		(4.7082)		(4.7014)		(2.1564)		(2.1513)		(0.0147)		(2.1564)
Def Most Recent Quality: Accumulated number of successful firms (Q3+Q4)		2.2732		0.0143		6.2121**		6.2436**		2.4809		2.4165		0.0131		2.4809
		(8.1098)		(0.0408)		(3.0871)		(3.0848)		(1.5745)		(1.5734)		(0.0083)		(1.5745)
Observations	37,669	37,669	37,669	37,669	68,063	68,063	68,063	68,063	37,669	37,669	37,669	37,669	37,636	37,636	37,669	37,669
R-squared	0.006	0.006	0.005	0.004	0.013	0.011	0.013	0.010	0.006	0.005	0.006	0.006	0.004	0.004	0.006	0.005

Notes: The table reports the estimation of coefficient g of Equation 2 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects and a set of covariates X. The set of covariates includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively.

B.1 Performance measured by the accumulated growth rates of the number of workers in firms founded by serial founders

	Accumulated growth rate - number of workers	
	(1)	(2)
Def Most recent Quality: Accumulated number of firms in Q1	-0.011**	
	(0.006)	
Def Most recent Quality: Accumulated number of firms in Q2	-0.005	
	(0.006)	
Def Most recent Quality: Accumulated number of firms in Q3	0.010	
	(0.007)	
Def Most recent Quality: Accumulated number of firms in Q4	-0.005	
	(0.004)	
Def Most Recent Quality: Accumulated number of unsuccessful firms (Q1+Q2)		-0.009**
		(0.004)
Def Most Recent Quality: Accumulated number of successful firms (Q3+Q4)		-0.002
		(0.004)
Observations	37,669	37,669
R-squared	0.019	0.019

Notes: The table reports the estimation of coefficient g of Equation 2 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects and a set of covariates X. The set of covariates includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively.

B.2. Performance measured by the likelihood of survival of firms founded by serial founders

	Probability of surviving	
	(1)	(2)
Def Most recent Quality: Accumulated number of firms in Q1	-0.002	
	(0.003)	
Def Most recent Quality: Accumulated number of firms in Q2	0.030***	
	(0.003)	
Def Most recent Quality: Accumulated number of firms in Q3	0.036***	
	(0.003)	
Def Most recent Quality: Accumulated number of firms in Q4	0.016***	
	(0.001)	
Def Most Recent Quality: Accumulated number of unsuccessful firms (Q1+Q2)		0.012***
		(0.002)
Def Most Recent Quality: Accumulated number of successful firms (Q3+Q4)		0.018***
		(0.001)
Observations	68,063	68,063
R-squared	0.213	0.212

Notes: The table reports the estimation of coefficient g of Equation 2 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects and a set of covariates X. The set of covariates includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively.

Table 9. Performance of a business founded by a serial founder discriminating by survival status of previously founded businesses (Cross section analysis – Firm's latest year in RAIS)
A. Dependent variable: Logarithm of (ln) of Average monthly wage paid to workers in December
A.1. Serial founders of previously founded firms that shut down

	(1)	(2)	(3)	(4)	(5)	(6)
Def Recent Quality: Accumulated number of closed firms in Q1	-0.022*					
	(0.014)					
Def Recent Quality: Accumulated number of closed firms in Q2	0.015					
	(0.011)					
Def Recent Quality: Accumulated number of closed firms in Q3	0.071***					
	(0.010)					
Def Recent Quality: Accumulated number of closed firms in Q4	0.118***					
	(0.022)					
Def Max Quality: Accumulated number of closed firms in Q1		-0.021				
		(0.018)				
Def Max Quality: Accumulated number of closed firms in Q2		-0.004				
		(0.012)				
Def Max Quality: Accumulated number of closed firms in Q3		0.046***				
		(0.010)				
Def Max Quality: Accumulated number of closed firms in Q4		0.109***				
		(0.016)				
Def Longest Quality: Accumulated number of closed firms in Q1			-0.012			
			(0.015)			
Def Longest Quality: Accumulated number of closed firms in Q2			0.002			
			(0.011)			
Def Longest Quality: Accumulated number of closed firms in Q3			0.074***			
			(0.010)			
Def Longest Quality: Accumulated number of closed firms in Q4			0.123***			
			(0.023)			
Def Most Recent Quality: Accumulated number of closed unsuccessful firms (Q1+Q2)				-0.006		
				(0.009)		
Def Most Recent Quality: Accumulated number of closed successful firms (Q3+Q4)				0.101***		
				(0.012)		
Def Max Quality: Accumulated number of closed unsuccessful firms (Q1+Q2)					-0.014	
					(0.011)	
Def Max Quality: Accumulated number of closed successful firms (Q3+Q4)					0.089***	
					(0.010)	
Def Longest Quality: Accumulated number of closed unsuccessful firms (Q1+Q2)						-0.007
						(0.009)
Def Longest Quality: Accumulated number of closed successful firms (Q3+Q4)						0.105***
						(0.013)
Observations	41,038	41,038	41,038	41,038	41,038	41,038
R-squared	0.273	0.273	0.274	0.273	0.273	0.273

A.2. Serial founders of previously founded firms that continue operating

	(1)	(2)	(3)	(4)	(5)	(6)
Def Most Recent Quality: Accumulated number of survived firms in Q1	-0.017***					
	(0.001)					
Def Most Recent Quality: Accumulated number of survived firms in Q2	-0.005***					
	(0.000)					
Def Most Recent Quality: Accumulated number of survived firms in Q3	0.002***					
	(0.000)					
Def Most Recent Quality: Accumulated number of survived firms in Q4	0.011***					
	(0.001)					
Def Max Quality: Accumulated number of survived firms in Q1		-0.020***				
		(0.001)				
Def Max Quality: Accumulated number of survived firms in Q2		-0.008***				
		(0.000)				
Def Max Quality: Accumulated number of survived firms in Q3		-0.003***				
		(0.000)				
Def Max Quality: Accumulated number of survived firms in Q4		0.008***				
		(0.000)				
Def Longest Quality: Accumulated number of survived firms in Q1			-0.013***			
			(0.001)			
Def Longest Quality: Accumulated number of survived firms in Q2			-0.004***			
			(0.000)			
Def Longest Quality: Accumulated number of survived firms in Q3			0.002***			
			(0.000)			
Def Longest Quality: Accumulated number of survived firms in Q4			0.010***			
			(0.001)			
Def Recent Quality: Accumulated number of survived unsuccessful firms (Q1+Q2)				-0.011***		
				(0.000)		
Def Recemt Quality: Accumulated number of survived successful firms (Q3+Q4)				0.009***		
				(0.000)		
Def Max Quality: Accumulated number of survived unsuccessful firms (Q1+Q2)					-0.012***	
					(0.000)	
Def Max Quality: Accumulated number of survived successful firms (Q3+Q4)					0.006***	
					(0.000)	
Def Longest Quality: Accumulated number of survived unsuccessful firms (Q1+Q2)						-0.008***
						(0.000)
Def Longest Quality: Accumulated number of survived successful firms (Q3+Q4)						0.008***
						(0.000)
Observations	41,038	41,038	41,038	41,038	41,038	41,038
R-squared	0.377	0.346	0.352	0.356	0.326	0.337

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS whose previously firms exited (Panel A.1) or survived (Panel A.2). Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality.

B. Dependent variable: Dependent variable: Average employment (number of workers at the end of the years) in firms founded by serial founders

B.1. Serial founders of previously founded firms that shut down

	(1)	(2)	(3)	(4)	(5)	(6)
Def Recent Quality: Accumulated number of closed firms in Q1	0.017					
	(1.670)					
Def Recent Quality: Accumulated number of closed firms in Q2	1.240					
	(2.889)					
Def Recent Quality: Accumulated number of closed firms in Q3	-0.885					
	(0.874)					
Def Recent Quality: Accumulated number of closed firms in Q4	1.297					
	(1.431)					
Def Max Quality: Accumulated number of closed firms in Q1		-1.116				
		(1.658)				
Def Max Quality: Accumulated number of closed firms in Q2		3.539				
		(3.625)				
Def Max Quality: Accumulated number of closed firms in Q3		-0.873				
		(0.724)				
Def Max Quality: Accumulated number of closed firms in Q4		0.410				
		(1.033)				
Def Longest Quality: Accumulated number of closed firms in Q1			-0.075			
			(1.573)			
Def Longest Quality: Accumulated number of closed firms in Q2			0.932			
			(2.709)			
Def Longest Quality: Accumulated number of closed firms in Q3			-1.006			
			(0.989)			
Def Longest Quality: Accumulated number of closed firms in Q4			1.422			
			(1.422)			
Def Most Recent Quality: Accumulated number of closed unsuccessful firms (Q1+Q2)				0.570		
				(1.365)		
Def Most Recent Quality: Accumulated number of closed successful firms (Q3+Q4)				0.380		
				(0.890)		
Def Max Quality: Accumulated number of closed unsuccessful firms (Q1+Q2)					1.400	
					(1.880)	
Def Max Quality: Accumulated number of closed successful firms (Q3+Q4)					0.066	
					(0.794)	
Def Longest Quality: Accumulated number of closed unsuccessful firms (Q1+Q2)						0.365
						(1.272)
						0.511
Def Longest Quality: Accumulated number of closed successful firms (Q3+Q4)						(0.899)
Observations	76,054	76,054	76,054	76,054	76,054	76,054
R-squared	0.014	0.014	0.014	0.014	0.014	0.014

B.2. Serial founders of previously founded firms that continue operating

	(1)	(2)	(3)	(4)	(5)	(6)
Def Most Recent Quality: Accumulated number of survived firms in Q1	-0.009					
	(0.095)					
Def Most Recent Quality: Accumulated number of survived firms in Q2	0.157***					
	(0.057)					
Def Most Recent Quality: Accumulated number of survived firms in Q3	0.301***					
	(0.077)					
Def Most Recent Quality: Accumulated number of survived firms in Q4	0.165***					
	(0.040)					
Def Max Quality: Accumulated number of survived firms in Q1		-0.072				
		(0.096)				
Def Max Quality: Accumulated number of survived firms in Q2		0.164**				
		(0.074)				
Def Max Quality: Accumulated number of survived firms in Q3		0.101*				
		(0.059)				
Def Max Quality: Accumulated number of survived firms in Q4		0.177***				
		(0.040)				
Def Longest Quality: Accumulated number of survived firms in Q1			-0.051			
			(0.078)			
Def Longest Quality: Accumulated number of survived firms in Q2			0.166***			
			(0.061)			
Def Longest Quality: Accumulated number of survived firms in Q3			0.240***			
			(0.072)			
Def Longest Quality: Accumulated number of survived firms in Q4			0.174***			
			(0.044)			
Def Recent Quality: Accumulated number of survived unsuccessful firms (Q1+Q2)				0.059		
				(0.067)		
Def Recemt Quality: Accumulated number of survived successful firms (Q3+Q4)				0.180***		
				(0.037)		
Def Max Quality: Accumulated number of survived unsuccessful firms (Q1+Q2)					0.088	
					(0.063)	
Def Max Quality: Accumulated number of survived successful firms (Q3+Q4)					0.171***	
					(0.037)	
Def Longest Quality: Accumulated number of survived unsuccessful firms (Q1+Q2)						0.047
						(0.058)
						0.181***
Def Longest Quality: Accumulated number of survived successful firms (Q3+Q4)						(0.039)
Observations	76,054	76,054	76,054	76,054	76,054	76,054
R-squared	0.014	0.014	0.014	0.014	0.014	0.014

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group -micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS whose previously firms exited (Panel A.1) or survived (Panel A.2). Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality.

Table 10. Performance of a "high-tech" business founded by a serial founder
(Cross section analysis – Firm's latest year in RAIS)
Dependent variable: Logarithm of (ln) of Average monthly wage paid to workers in December

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Number of founded firms	0.072*** (0.021)										
Accumulated Number unsuccessful firms (closed)		0.114** (0.052)									
Accumulated Number successful firms (survived)			0.070*** (0.023)								
Def Max Quality: Accumulated number of firms in Q1				-0.651*** (0.103)							
Def Max Quality: Accumulated number of firms in Q2				-0.156*** (0.048)							
Def Max Quality: Accumulated number of firms in Q3				-0.044 (0.036)							
Def Max Quality: Accumulated number of firms in Q4				0.112*** (0.023)							
Def Most recent Quality: Accumulated number of firms in Q1					-0.377*** (0.063)						
Def Most recent Quality: Accumulated number of firms in Q2					-0.178*** (0.043)						
Def Most recent Quality: Accumulated number of firms in Q3					-0.027 (0.030)						
Def Most recent Quality: Accumulated number of firms in Q4					0.168*** (0.027)						
Def Longest Quality: Accumulated number of firms in Q1						-0.378*** (0.068)					
Def Longest Quality: Accumulated number of firms in Q2						-0.123*** (0.043)					
Def Longest Quality: Accumulated number of firms in Q3						-0.046 (0.032)					
Def Longest Quality: Accumulated number of firms in Q4						0.125*** (0.025)					
Def Max Quality: Accumulated number of firms (Q1+Q2)							-0.272*** (0.060)				
Def Max Quality: Accumulated number of firms (Q3+Q4)							0.097*** (0.023)				
Def Longest Quality: Accumulated number of firms (Q1+Q2)								-0.195*** (0.044)			
Def Longest Quality: Accumulated number of firms (Q3+Q4)								0.103*** (0.023)			
Def Most Recent Quality: Accumulated number of firms (Q1+Q2)									-0.242*** (0.043)		
Def Most Recent Quality: Accumulated number of firms (Q3+Q4)									0.117*** (0.023)		
Wage average (ln) of founded firms										0.492*** (0.043)	
Average number employees of previous founded firms											0.000* (0.000)
Observations	481	481	481	481	481	481	481	481	481	481	481
R-squared	0.459	0.445	0.456	0.582	0.594	0.571	0.532	0.534	0.557	0.649	0.442

Notes: The table reports the estimation of coefficient g of Equation 1 for different definitions of the explanatory variable of interest z (each row represents a regression with an alternative definition of z) after controlling by state fixed effects, year fixed effects and a set of covariates X. X includes the firm's characteristics, founder's characteristics and the worker's characteristics in the firm. Firm's characteristics: firm's age, firm's size group - micro, medium or big- and firm's sector. Founder's characteristics: founder's age, founder's sex, founder's education and founder's occupation. Worker's characteristics: average workers' age, percentage of male workers, percentage of workers with secondary education and percentage of workers with tertiary education (for the average worker of the firm). Robust standard errors clustered by firm in parentheses, ***, ** and * denote significance at 1%, 5% and 10% respectively. Estimation Sample: Only serial founders with at least 1 firm in RAIS. Definition of firm's quality is based on residuals from mincer equation for every year. Q1: lower quality to Q4: higher quality. The high-tech sector is identified using the sectorial technology intensity definition from the OECD (2011) which classifies sectors based on direct R&D intensity. The classification considers (i) High, (ii) Medium-High, (iii) Medium-low, (iv) Medium-high technology sectors; the cut-off points were revealed by R&D relative to value-added and gross production statistics. Thus, the high-technology concentration industries consider aircraft and spacecraft; pharmaceutical; office, accounting, and computing machinery; radio, TV, and communications equipment; medical, precision, and optical instruments.

Table 11. Impact of the death of a serial founder in business performance

A. Firms that achieved the bottom two quartiles of the productivity distribution in the year previous to founder's death

	ATT	SE	P-VAL		N
Average Wage (ln): December monthly wage	0.01	0.008	0.197		9,972
Average Wage (ln): December hourly wage	0.01	0.010	0.341		9,972
Average Wage (ln): Weighted monthly max wage - all workers	0.01	0.006	0.102		9,972
Average Wage (ln): Weighted monthly wage - all workers	0.01	0.007	0.286		9,972
Average Wage (ln): Weighted hourly wage - all workers	0.01	0.008	0.465		9,972
Average Wage (ln): Monthly max wage -workers active in December	0.02	0.007	0.012	**	9,972
Average Wage (ln): Weighted monthly wage -workers active in December	0.02	0.008	0.014	**	9,972
Average Wage (ln): Weighted hourly wage -workers active in December	0.02	0.009	0.057	*	9,972
Number employees at 31/12 (end of the year)	0.63	0.262	0.017	**	9,972
Def Max Quality: 1=Firm is Q1 or Q2 in 2013	-0.04	0.011	0.000	***	9,972
Def Max Quality: 1=Firm is Q3 or Q4 in 2013	0.04	0.011	0.000	***	9,972
Def Most recent Quality: 1= firm is Q1 or Q2 in 2013	-0.04	0.009	0.000	***	9,972
Def Most recent Quality: 1= firm is Q3 or Q4 in 2013	0.04	0.009	0.000	***	9,972
Def Longest Quality: 1= firm is Q1 or Q2 in 2013	-0.02	0.008	0.017	**	9,972
Def Longest Quality: 1= firm is Q3 or Q4 in 2013	0.02	0.008	0.017	**	9,972

Note: Date of founder's death: 2013. Sample composition: Firms with serial founders, with at least 1 year with RAIS information, with at least 1 year of operation and with less than 50 workers at the end of the period in the baseline. Baseline period: immediate year before "death" (years 2010-2013). Estimation method: pscore matching (using nearest neighbor method). Baseline covariates: Number of founded firms, quality quartile when firm was founded (dummy for each quartile), age of the founder distributed in three groups, firm's age distributed in three groups, number of workers active in December of baseline year, and founder's sex.

B. Firms that achieved the top two quartiles of the productivity distribution in the year previous to founder's death

	ATT	SE	P-VAL		N
Average Wage (ln): December monthly wage	-0.012	0.012	0.338		10,170
Average Wage (ln): December hourly wage	-0.016	0.013	0.221		10,170
Average Wage (ln): Weighted monthly max wage - all workers	-0.033	0.011	0.002	***	10,170
Average Wage (ln): Weighted monthly wage - all workers	-0.027	0.011	0.014	**	10,170
Average Wage (ln): Weighted hourly wage - all workers	-0.028	0.011	0.012	**	10,170
Average Wage (ln): Monthly max wage -workers active in December	-0.014	0.012	0.223		10,170
Average Wage (ln): Weighted monthly wage -workers active in December	-0.014	0.012	0.223		10,170
Average Wage (ln): Weighted hourly wage -workers active in December	-0.018	0.012	0.136		10,170
Number employees at 31/12 (end of the year)	1.166	0.304	0.000	***	10,170
Def Max Quality: 1=Firm is Q1 or Q2 in 2013	-			-	
Def Max Quality: 1=Firm is Q3 or Q4 in 2013	0.000	0.000	0.000	***	10,170
Def Most recent Quality: 1= firm is Q1 or Q2 in 2013	0.048	0.008	0.000	***	10,170
Def Most recent Quality: 1= firm is Q3 or Q4 in 2013	-0.048	0.008	0.000	***	10,170
Def Longest Quality: 1= firm is Q1 or Q2 in 2013	0.025	0.008	0.001	***	10,170
Def Longest Quality: 1= firm is Q3 or Q4 in 2013	-0.025	0.008	0.001	***	10,170

Note: Date of founder's death: 2013. Sample composition: Firms with serial founders, with at least 1 year with RAIS information, with at least 1 year of operation and with less than 50 workers at the end of the period in the baseline. Baseline period: immediate year before "death" (years 2010-2013). Estimation method: pscore matching (using nearest neighbor method). Baseline covariates: Number of founded firms, age of the founder distributed in three groups, firm's age distributed in three groups, number of workers active in December of baseline year, and founder's sex.

Table 12. Balance (unmatched sample)

A. Sample: Firms in two bottom quality distribution in the year previous to founder's "death"

	T=0		T=1		t-test
		(1)		(2)	Difference
	N	Mean/SE	N	Mean/SE	(1)-(2)
1=Firm is microenterprise	7101	0.718 [0.005]	2871	0.730 [0.008]	-0.011
1=Founder is female	7079	0.297 [0.005]	2865	0.295 [0.009]	0.003
1=Founder has secondary or tertiary education	5780	0.853 [0.005]	2553	0.847 [0.007]	0.006
Number of active employees at the end of period (December)	7101	5.036 [0.086]	2871	4.998 [0.134]	0.039
Accumulated number of founded firms	7101	1.767 [0.011]	2871	1.777 [0.018]	-0.010
Accumulated number of closed firms	7101	0.150 [0.005]	2871	0.132 [0.007]	0.018**
Super founder: Age	6892	43.350 [0.131]	2787	42.023 [0.224]	1.327***
Firm: Age	7101	7.741 [0.053]	2871	6.408 [0.081]	1.334***
Firm's age <= 5 years	7101	0.402 [0.006]	2871	0.512 [0.009]	-0.111***
Firm's age>5 & < 10 years	7101	0.306 [0.005]	2871	0.282 [0.008]	0.023**
Firm's age > 10 years	7101	0.292 [0.005]	2871	0.205 [0.008]	0.087***
Founder's age <=25	6892	0.044 [0.002]	2787	0.066 [0.005]	-0.022***
Founder's age >25 & Founder's age <=50	6892	0.687 [0.006]	2787	0.681 [0.009]	0.006
Founder's age >50	6892	0.269 [0.005]	2787	0.253 [0.008]	0.016
1= Firm is in quality quartile 1 in their founding year	7101	0.383 [0.006]	2871	0.381 [0.009]	0.002
1= Firm is in quality quartile 2 in their founding year	7101	0.334 [0.006]	2871	0.349 [0.009]	-0.014
1= Firm is in quality quartile 3 in their founding year	7101	0.202 [0.005]	2871	0.195 [0.007]	0.007
1= Firm is in quality quartile 4 in their founding year	7101	0.081 [0.003]	2871	0.076 [0.005]	0.006
Average Wage (ln): December monthly wage	6351	6.346 [0.003]	2539	6.289 [0.005]	0.056***
Average Wage (ln): Weighted hourly wage December - all workers	6351	1.104 [0.004]	2539	1.051 [0.007]	0.053***
Average Wage (ln): Weighted monthly max wage - all workers	7101	6.290 [0.003]	2871	6.242 [0.004]	0.048***
Average Wage (ln): Weighted monthly wage - all workers	7101	6.289 [0.003]	2871	6.239 [0.004]	0.050***
Average Wage (ln): Weighted hourly wage - all workers	7101	1.049 [0.003]	2871	1.002 [0.006]	0.047***
Average Wage (ln): Monthly max wage -workers active in December	6351	6.307 [0.003]	2539	6.258 [0.005]	0.049***
Average Wage (ln): Weighted monthly wage -workers active in December	6351	6.307 [0.003]	2539	6.256 [0.005]	0.051***
Average Wage (ln): Weighted hourly wage -workers active in December	6351	1.066 [0.003]	2539	1.020 [0.006]	0.046***
Def Max Quality: Accumulated number of firms in Q1	7101	0.306 [0.006]	2871	0.292 [0.011]	0.015
Def Max Quality: Accumulated number of firms in Q2	7101	0.538 [0.008]	2871	0.534 [0.013]	0.004
Def Max Quality: Accumulated number of firms in Q3	7101	0.454 [0.008]	2871	0.474 [0.013]	-0.020
Def Max Quality: Accumulated number of firms in Q4	7101	0.330 [0.007]	2871	0.348 [0.012]	-0.018
Def Most recent Quality: Accumulated number of firms in Q1	7101	0.704 [0.008]	2871	0.677 [0.014]	0.026
Def Most recent Quality: Accumulated number of firms in Q2	7101	0.565 [0.009]	2871	0.555 [0.013]	0.010
Def Most recent Quality: Accumulated number of firms in Q3	7101	0.233 [0.006]	2871	0.268 [0.010]	-0.035***
Def Most recent Quality: Accumulated number of firms in Q4	7101	0.127 [0.005]	2871	0.149 [0.008]	-0.021**
Def Longest Quality: Accumulated number of firms in Q1	7101	0.728 [0.009]	2871	0.710 [0.015]	0.018
Def Longest Quality: Accumulated number of firms in Q2	7101	0.577 [0.009]	2871	0.594 [0.014]	-0.017
Def Longest Quality: Accumulated number of firms in Q3	7101	0.207 [0.006]	2871	0.216 [0.009]	-0.008
Def Longest Quality: Accumulated number of firms in Q4	7101	0.116 [0.005]	2871	0.128 [0.008]	-0.012
Number of firms founded	7101	1.767 [0.011]	2871	1.777 [0.018]	-0.010
Accumulated Number unsuccessful firms (closed)	7101	0.150 [0.005]	2871	0.132 [0.007]	0.018**
Accumulated Number successful firms (survived)	7101	1.617 [0.011]	2871	1.645 [0.017]	-0.027
Def Max Quality: Accumulated number of unsuccessful firms (Q1+Q2)	7101	0.844 [0.009]	2871	0.825 [0.015]	0.019
Def Max Quality: Accumulated number of unsuccessful firms (Q3+Q4)	7101	0.784 [0.011]	2871	0.822 [0.017]	-0.038*
Def Longest Quality: Accumulated number of unsuccessful firms (Q1+Q2)	7101	1.305 [0.009]	2871	1.304 [0.015]	0.001
Def Longest Quality: Accumulated number of successful firms (Q3+Q4)	7101	0.323 [0.008]	2871	0.344 [0.013]	-0.021
Def Most Recent Quality: Accumulated number of unsuccessful firms (Q1+Q2)	7101	1.268 [0.009]	2871	1.232 [0.015]	0.037**
Def Most Recent Quality: Accumulated number of successful firms (Q3+Q4)	7101	0.360 [0.008]	2871	0.416 [0.013]	-0.056***

Notes: The value displayed for t-tests are the differences in the means across the groups. Standard errors are clustered at variable codefirm. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

B. Sample: Firms in two top quality distribution in the year previous to founder's "death"

| | T=0 | | T=1 | | t-test |
| | (1) | | (2) | | Difference |
	N	Mean/SE	N	Mean/SE	(1)-(2)
1=Firm is microenterprise	7161	0.509 [0.006]	3009	0.533 [0.009]	-0.024**
1=Founder is female	7148	0.232 [0.005]	3006	0.244 [0.008]	-0.011
1=Founder has secondary or tertiary education	5926	0.834 [0.005]	2677	0.820 [0.007]	0.015
Number of active employees at the end of period (December)	7161	7.135 [0.108]	3009	7.021 [0.161]	0.114
Accumulated number of founded firms	7161	2.078 [0.031]	3009	1.992 [0.029]	0.086**
Accumulated number of closed firms	7161	0.180 [0.006]	3009	0.145 [0.008]	0.035***
Super founder: Age	6988	43.256 [0.132]	2944	42.326 [0.222]	0.930***
Firm: Age	7161	7.750 [0.053]	3009	6.400 [0.080]	1.349***
Firm's age <= 5 years	7161	0.410 [0.006]	3009	0.510 [0.009]	-0.100***
Firm's age>5 & < 10 years	7161	0.305 [0.005]	3009	0.287 [0.008]	0.018*
Firm's age > 10 years	7161	0.285 [0.005]	3009	0.203 [0.007]	0.082***
Founder's age <=25	6988	0.050 [0.003]	2944	0.070 [0.005]	-0.020***
Founder's age >25 & Founder's age <=50	6988	0.680 [0.006]	2944	0.660 [0.009]	0.020*
Founder's age >50	6988	0.270 [0.005]	2944	0.270 [0.008]	-0.000
1= Firm is in quality quartile 1 in their founding year	7161	0.086 [0.003]	3009	0.061 [0.004]	0.024***
1= Firm is in quality quartile 2 in their founding year	7161	0.149 [0.004]	3009	0.135 [0.006]	0.015*
1= Firm is in quality quartile 3 in their founding year	7161	0.290 [0.005]	3009	0.307 [0.008]	-0.017*
1= Firm is in quality quartile 4 in their founding year	7161	0.475 [0.006]	3009	0.497 [0.009]	-0.021**
Average Wage (ln): December monthly wage	6552	6.847 [0.005]	2747	6.787 [0.008]	0.060***
Average Wage (ln): Weighted hourly wage December - all workers	6552	1.566 [0.006]	2747	1.501 [0.008]	0.065***
Average Wage (ln): Weighted monthly max wage - all workers	7161	6.785 [0.005]	3009	6.735 [0.008]	0.050***
Average Wage (ln): Weighted monthly wage - all workers	7161	6.784 [0.005]	3009	6.732 [0.008]	0.053***
Average Wage (ln): Weighted hourly wage - all workers	7161	1.505 [0.005]	3009	1.448 [0.008]	0.056***
Average Wage (ln): Monthly max wage -workers active in December	6552	6.793 [0.005]	2747	6.735 [0.008]	0.058***
Average Wage (ln): Weighted monthly wage -workers active in December	6552	6.793 [0.005]	2747	6.733 [0.008]	0.060***
Average Wage (ln): Weighted hourly wage -workers active in December	6552	1.512 [0.005]	2747	1.449 [0.008]	0.063***
Def Max Quality: Accumulated number of firms in Q1	7161	0.036 [0.002]	3009	0.038 [0.004]	-0.002
Def Max Quality: Accumulated number of firms in Q2	7161	0.070 [0.003]	3009	0.079 [0.005]	-0.009
Def Max Quality: Accumulated number of firms in Q3	7161	0.410 [0.008]	3009	0.450 [0.014]	-0.040**
Def Max Quality: Accumulated number of firms in Q4	7161	1.390 [0.029]	3009	1.290 [0.024]	0.099***
Def Most recent Quality: Accumulated number of firms in Q1	7161	0.114 [0.004]	3009	0.128 [0.007]	-0.014*
Def Most recent Quality: Accumulated number of firms in Q2	7161	0.211 [0.006]	3009	0.274 [0.010]	-0.063***
Def Most recent Quality: Accumulated number of firms in Q3	7161	0.577 [0.009]	3009	0.599 [0.015]	-0.022
Def Most recent Quality: Accumulated number of firms in Q4	7161	1.004 [0.028]	3009	0.858 [0.021]	0.147***
Def Longest Quality: Accumulated number of firms in Q1	7161	0.133 [0.005]	3009	0.128 [0.007]	0.005
Def Longest Quality: Accumulated number of firms in Q2	7161	0.208 [0.006]	3009	0.249 [0.010]	-0.041***
Def Longest Quality: Accumulated number of firms in Q3	7161	0.596 [0.011]	3009	0.623 [0.016]	-0.027
Def Longest Quality: Accumulated number of firms in Q4	7161	0.970 [0.028]	3009	0.859 [0.022]	0.110***
Number of firms founded	7161	2.078 [0.031]	3009	1.992 [0.029]	0.086**
Accumulated Number unsuccessful firms (closed)	7161	0.180 [0.006]	3009	0.145 [0.008]	0.035***
Accumulated Number successful firms (survived)	7161	1.898 [0.030]	3009	1.847 [0.027]	0.050
Def Max Quality: Accumulated number of unsuccessful firms (Q1+Q2)	7161	0.106 [0.004]	3009	0.117 [0.006]	-0.011
Def Max Quality: Accumulated number of unsuccessful firms (Q3+Q4)	7161	1.800 [0.029]	3009	1.741 [0.026]	0.059
Def Longest Quality: Accumulated number of unsuccessful firms (Q1+Q2)	7161	0.341 [0.008]	3009	0.376 [0.012]	-0.035**
Def Longest Quality: Accumulated number of successful firms (Q3+Q4)	7161	1.565 [0.030]	3009	1.482 [0.026]	0.083**
Def Most Recent Quality: Accumulated number of unsuccessful firms (Q1+Q2)	7161	0.325 [0.007]	3009	0.402 [0.012]	-0.077***
Def Most Recent Quality: Accumulated number of successful firms (Q3+Q4)	7161	1.581 [0.029]	3009	1.456 [0.025]	0.125***

Notes: The value displayed for t-tests are the differences in the means across the groups. Standard errors are clustered at variable codefirm. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level