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Does Unemployment Insurance Change the Selection into Entrepreneurship?

Johan Hombert, Antoinette Schoar, David Sraer, and David Thesmar

Between 2003 and 2005, the pace of new firm creations rose by about 25 percent in France (see figure 8.1). This increase was induced by a major reform of the French unemployment insurance (UI) system, which led to greater protection against downside risk for unemployed people who became entrepreneurs. Such protection was introduced via two changes to the Plan d'Aide au Retour à l'Emploi (PARE). First, unemployed people who become entrepreneurs could retain their rights to unemployment insurance in case of failure for up to three years. Before, they would have lost all future claims to UI if they started a business. Second, unemployed entrepreneurs were allowed to keep their unemployment benefits *while* starting their own firm and complement entrepreneurial income with up to 70 percent of their pre-unemployment income. This reform led to massive entry of unemployed people into entrepreneurship in France (Hombert et al. 2014).

However, some observers have pointed out that these reforms may change the composition of firms. In particular the concern was that greater downside insurance, which means reduced failure risk, might lead to an increase

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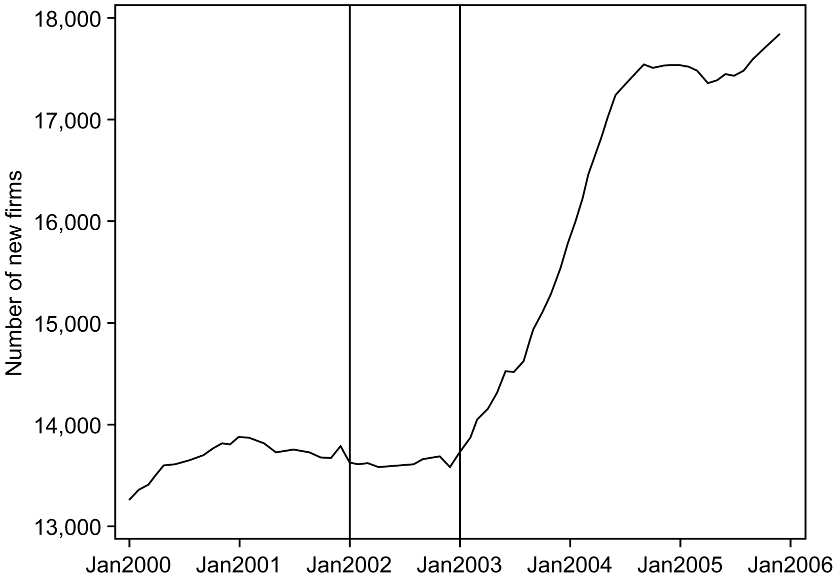

Fig. 8.1 Number of new firms created in France
Source: Hombert et al. (2014).

in "subsistence" entrepreneurship (small firms with no ambition to grow) or less competent entrepreneurs starting a firm as opposed to "transformational" entrepreneurs (Schoar 2010). The implicit assumption in many of these arguments is that greater risk tolerance might be positively correlated with competence level or the ability to generate high returns. While the correlation ex ante could take on any sign, it is important to understand this selection criterion. The effect of making entrepreneurship safer is a priori ambiguous. If entrepreneurs *know* their ability, more insurance leads to more entry of less "able" entrepreneurs (this is the basic force in the model by Lucas [1978]). If entrepreneurs *do not know* their ability, more insurance leads to more entry but no change in composition (Jovanovic 1982). Because of its large scale, this reform may have visibly changed the composition of the entrepreneurial pool along many dimensions such as ability (Lucas 1978), risk tolerance (Kihlstrom and Laffont 1979), private benefits of being "one's own boss" (Moskowitz and Vissing-Jørgensen 2002), optimism (Landier and Thesmar 2009), or ambition (Hurst and Pugsley 2011). In previous work (Hombert et al. 2014), we look at observable measures of entrepreneurial ability and measures of short-term performance.

In this chapter, our goal is to build on the prior analysis to investigate the effect of the reform on the likelihood that the newly created firms will become "big" as opposed to an effect of whether the new firms have the same chance of surviving or creating one job. This is unfortunately impossible to do directly in the context of the PARE reform, because our accounting data stop in 2007, giving us too little perspective on the postcreation growth of these firms. To deal with this problem, we start by building a predictor of long-term success on an older cohort of firms—created in 1994—for which we have detailed firm-level information (entrepreneur's background, ambition, education, etc.). We then check in which direction these success-predicting characteristics changed before and after the PARE reform. To investigate this, we use the same methodology as in Hombert et al. (2014): We compare industries that are the most exposed to the reform to industries that are the least exposed.

We also investigate the equilibrium implications of the reform, which is large enough to shift the industry equilibrium. Our methodology rests on a difference-in-differences estimation strategy: We compare industries in which the typical new firm that is started is small (the treated group) to industries in which new start-ups are typically larger (the control). The idea is that industries where the natural firms' size at start is small are more affected by the reform, since entrepreneurs who were previously unemployed tend to start smaller firms.

We show that the PARE reform had a stronger impact in treated industries than in control sectors. We then look at whether average "quality" of new start-ups was any different between most exposed and less exposed industries, where quality is measured with metrics of firm survival and growth. We find that the propensity of new start-ups to hire or to survive in the first two years did not decline more in treated sectors. New entrepreneurs were not less educated or ambitious; the new firms appeared to have the same quality as the previously created ones. At the industry level, we found that the new jobs created by the reform crowded out job creation among incumbents, but there was a gain in efficiency as the newly created firms are more productive than the incumbents they displaced and also pay higher wages to workers.

The chapter follows the structure of our two-step methodology. In section 8.1, we rapidly survey the existing literature showing that entrepreneurial characteristics predict firm performance. In section 8.2, we focus on the cohort of firms created in 1994, and show which characteristics predict the probability of becoming big. In section 8.3, we investigate whether these characteristics changed around the PARE. Section 8.4 concludes.

8.1 Entrepreneurial Characteristics and Firm Performance: Literature Review

Our analysis relies on our ability to predict firm performance based on entrepreneurial characteristics. In doing so, this chapter relies on a large literature that documents the link between characteristics and firm performance. This section is a brief review of this literature.

One important dimension that has been shown to have strong predictive power on a person's propensity to start a business is wealth of the founder or shocks to the wealth of the founder (see, for example, Evans and Jovanovic 1989; Holtz-Eakin, Joulfaian, and Rosen 1994a, 1994b). In a world where people are credit constrained, wealth shocks are also correlated with a relaxation of credit constraints. While the two interpretations similarly predict that wealth correlates with entry rate, they have opposite predictions regarding entrepreneurial success. Under the financing constraints hypothesis, wealthy entrepreneurs are able to invest more and thus to grow faster. In contrast, a pure wealth effect would lead people to start lower-quality firms and the luxury good hypothesis predicts that wealthy individuals start lower-quality firms. The evidence is mixed. In support of the financing constraints hypothesis, Adelino, Schoar, and Severino (2013) and Schmalz, Sraer, and Thesmar (2013) find that positive shocks to real estate prices lead to more entry and higher postentry growth, and Fracassi et al. (2016) show that positive shocks to debt supply have similar effects. In contrast, Hurst and Lusardi (2004) find that wealthy entrepreneurs are more likely to start less capital-intensive businesses and Nanda (2008) shows that these wealthy entrepreneurs have low quality and are less likely to be profitable. Similarly, Andersen and Nielsen (2012) show that exogenous wealth shocks lead to the entry of low-quality entrepreneurs. This latter set of evidence is consistent with the view that some entrepreneurs start up because they derive nonpecuniary benefits from running a business (Moskowitz and Vissing-Jørgensen 2002). Consistent with this, Hurst and Pugsley (2011) show that the majority of business owners state they became entrepreneurs for nonpecuniary reasons and that these nonpecuniary motives predict low growth.

A second dimension is the effect of entrepreneurial skills. Entrepreneurs might be more successful if they have higher education (Van Der Sluis, Van Praag, and Vijverberg 2008) and if they have higher cognitive and social skills (Hartog, Van Praag, and Van Der Sluis 2010). Lazear (2005) also argues that entrepreneurs are jacks-of-all-trades rather than specialists. Consistent with this, Hartog, Van Praag, and Van Der Sluis (2010) show that entrepreneurs with a balanced portfolio of skills perform better.

A third dimension is the role of preferences and beliefs. Theory suggests that risk-tolerant (Kihlstrom and Laffont 1979) and optimistic individuals (De Meza and Southey 1996) are more likely to become entrepreneurs and, conditional on entry, are of lower average quality. Consistent with this, Hvide and Panos (2014) find that more risk-averse individuals are more likely to become entrepreneurs and less likely to survive, and Landier and Thesmar (2009) show that optimistic entrepreneurs choose more risky capital structures. On the other hand, access to information can assuage optimism: Lerner and Malmendier (2013) show that individuals exposed to previous entrepreneurs are less likely to start low-quality ventures.

Finally, there is a literature that investigates the effect of family ownership on firm behavior (Bertrand and Schoar 2006). In particular, it finds that businesses are more profitable when they are run by their founders (Adams, Almeida, and Ferreira 2009) whereas they are less profitable when they are run by heirs of the founder (Pérez-González 2006; Bennedsen et al. 2007; Bertrand et al. 2008). However Sraer and Thesmar (2007) show that family firms are more profitable because they can honor implicit labor contracts and pay lower wages.

8.2 Forecasting Long-Term Performance

8.2.1 Empirical Strategy and Data

Statistical Framework

Our goal in this section is to lay out the framework for how we predict the long-term success of a firm using some of its characteristics at birth. We simply seek to run a regression of the following form:

$$Y_i = X_i\beta + \varepsilon, \tag{1}$$

where i indexes the firm; Y_i is our measure of long-term success and X_i is the set of characteristics. To ease readability, we present in this chapter the results of linear regressions, but have verified that a logistic specification does not give qualitatively different results. The idea is to establish correlations between long-term success and certain observable characteristics of the firm and the founder. We are not trying to argue that these characteristics are causally driving the long-term outcome at the exclusion of other variables, but we believe that they might be an indicator of some underlying fundamental difference of successful start-ups.

We focus on the cohort of French firms started in 1994, for which we have long-term performance data (until 2007) and for which we can obtain founder characteristics using a separate survey.

Firm Characteristics

To measure the characteristics, X_i, we rely on a large-scale survey run by the National Institute of Statistics and Economic Studies (INSEE), the French statistical office, every four years starting in 1994 (see Landier and Thesmar [2009] for an extensive description of this survey). This survey samples approximately one-third of all new firms registered in the country during the first semester of a given year. To achieve maximum representativeness it uses stratified sampling, where the strata are the headquarters' region and the two-digit industry code of the firm. The New Enterprise Information System (SINE) survey has been run in 1994, 1998, 2002, 2006, and 2010. Each time the coverage is high because filling in the questionnaire is compulsory: The response rate is typically around 85 percent. This survey contains a firm-level identifying number, which allows it to be matched with accounting data (see below).

In the 1994 wave of the SINE survey, we have 26,674 different new firms. As predictors of long-term success, we use variables that relate both to characteristics of the project and of the entrepreneur. These variables are selected because they have been shown in other studies to be predictors of the upside potential of a new venture. They are:

- **New idea.** This variable is a dummy equal to 1 if the motivation of the entrepreneur was to "implement a new idea" as opposed to "seizing an opportunity," "not being able to find a job," or "be autonomous." Landier and Thesmar (2009) have shown that this variable correlates very strongly with measures of entrepreneurial optimism, a finding consistent with the behavioral literature.
- **Local market.** This variable is equal to 1 if, at the moment of the survey, the entrepreneur declares that his clientele is "local" as opposed to "international," "cross-border," "national," or "regional." In contrast to "new idea," we expect firms addressing a local clientele to have, a priori, less upside potential.
- **Subsidized.** This variable is equal to 1 if the entrepreneur declares that he receives at least one subsidy. During the 1990s, a popular state-funded subsidy was given under the ACCRE program, which gives a lump sum to unemployed people who became entrepreneurs. Regions and municipalities also subsidize entrepreneurship through cash transfers or in-kind support. These subsidies are typically small, and should not make a difference for a truly ambitious entrepreneur unless he is credit constrained.
- **Ambition.** We use two separate questions: one about hiring plans and one about growth expectations. Both of these questions are intended to measure the entrepreneur's ambition to grow, that is, his belief in the upside potential of the firm. The first question specifically asks the entrepreneur, during the year when the firm was founded (here, in 1994), whether the entrepreneur plans to hire one or more employees in the coming year. The entrepreneur can reply: "Yes," "No," or "Don't Know." We set the "hiring plans" dummy to 1 if the entrepreneur answers "Yes." The second question is formulated the following way: "What do you think will happen to your start-up over the next six months? (a) it will grow, (b) it will keep steady, (c) I will have to turn around a difficult situation, (d) I will shut down the firm, or (e) don't know." We code the "growth plans" dummy to 1 if the answer is (a).
- **Serial entrepreneur.** This dummy is equal to 1 if the entrepreneur declares that the present start-up is not his first.
- **Former manager.** This dummy is equal to 1 if the entrepreneur is a for-

mer executive. It is intended to measure both entrepreneurial ability and outside options on the salaried labor market. The question allows the surveyed entrepreneur to select within broad categories of the French job classification: independent (shopkeepers, lawyers), entrepreneur, executive, supervisor/middle manager, white- and blue-collar worker, student, or inactive.

- **College education.** This dummy is equal to 1 if the entrepreneur declares to have a college degree. It is related to the "former manager" dummy in that it measures both outside options and potentially entrepreneurial ability. The options in this question are: no high school degree, high school degree below high school graduation, high school graduate, short college degree (two years), college graduate, or engineering degree. We take all college degrees (short, long, engineering) into our dummy.

We report summary statistics for these variables in table 8.1. For comparison, we tried as much as possible to reconstruct the same variables for other waves of the SINE survey (1998, 2002, 2006). It was not always possible to do it exactly, as the phrasing of some questions changed somewhat.

We report these numbers to discuss robustness only. In our subsequent analysis of 1994 data, about half of the entrepreneurs were selling to local clients and just over 30 percent took a subsidy in one form or another. About our "ambition measure": about 40 percent of the entrepreneurs expect further growth and 20 percent plan on hiring at least an additional person. About 20 percent of entrepreneurs are former executives and about 30 percent have a college degree (short, long, or engineering). This makes the average entrepreneur significantly more skilled than the average person

Table 8.1 The characteristics of French entrepreneurs

	Wave of the SINE survey			
	1994	1998	2002	2006
Motivation: Implementing a new idea (%)	8.3	14	20	2.8
Most clients local (%)	50	55	55	58
Took subsidy (%)	31	27	28	43
Plans to grow (%)	43	48	47	55
Plans to hire (%)	21	24	24	24
Serial entrepreneur (%)	6.4	12	13	12
Former executive (%)	18	15	22	27
College diploma (%)	36	33	30	33
Average number of observations	30,778	30,067	47,668	48,597

Note: These numbers are obtained using four different waves of the SINE survey (firms created in 1994, 1998, 2002, and 2006). The bottom line is the average number of observations across variables (some variables are not defined on the entire sample due to missing values). Definitions for 1994 are described in the main text. Questions change slightly from year to year; we tried to harmonize the variable definition across cohorts as much as possible.

in the labor force. For instance, Schmalz, Sraer, and Thesmar (2013) report that in the general population age twenty to sixty-five in France, on average from 1990 to 2002, approximately 16 percent have a college degree (see their table 3).We make one more change to ease readability. In our regressions, we invert the sign of the two variables "local markets" and "subsidized" so that all characteristics in our list are expected to have a positive impact on long-term growth.

Accounting Data

Accounting data come from tax files made available by INSEE to researchers (see Bertrand et al. [2007] for a more detailed description). Besides detailed accounting information, the tax files also provided us with the number of employees. They cover all firms subject to the regular corporate tax regime (*Bénéfice Réel Normal*) or to the simplified corporate tax regime (*Régime Simplifié d'Imposition*), which together represent 55 percent of newly created firms during our sample period. Small firms with annual sales below €32,600 (€81,500 in retail and wholesale trade) can opt out and choose a special microbusiness tax regime (*Micro-Enterprise*), in which case they do not appear in the tax files. Since expenses, and in particular, wages cannot be deducted from taxable profits under the microbusiness tax regime, firms opting for this regime are likely to have zero employees. For this reason, in the empirical analysis we will assume that firms that do not appear in the tax files do not have employees.

Besides accounting and employment information, tax files include the same firm identifying number as the SINE survey. We thus use it to merge the two data sets. We show in figure 8.2 the product of this operation. For each date t, we plot in this figure the number of firms present in the 1994 SINE survey that are also found in the tax files at date t. Figure 8.2 shows that the matching procedure is quite efficient, as about 18,000 firms—out of some 31,000—from the SINE survey reported accounts to the tax authorities in 1995—the number is slightly smaller in 1994 because firms are not mandated to report accounts after their first year of activity. The firms not present in the tax files have either exited or do not generate enough annual turnover to make it into the regular corporate tax regime. The other lesson of figure 8.2 is that there is significant attrition, as expected in the demographics of young firms: starting from 18,000 in 1995, the number of firms still alive shrinks to about 12,000 in 2000, which corresponds to a five-year attrition rate of about 33 percent.We use the tax files to compute several measures of "long-run success" of the firm, Y_i. Our main measure is a dummy equal to one if the firm has more than fifty employees in 2007 (after twelve years). We set this dummy equal to missing if the firm exits the sample before its twelfth anniversary, so our main measure of long-term success jointly measures growth *conditional* on survival. In figure 8.3, we plot the fraction of surviving firms from the 1994 SINE survey that have reached at least fifty employees. This

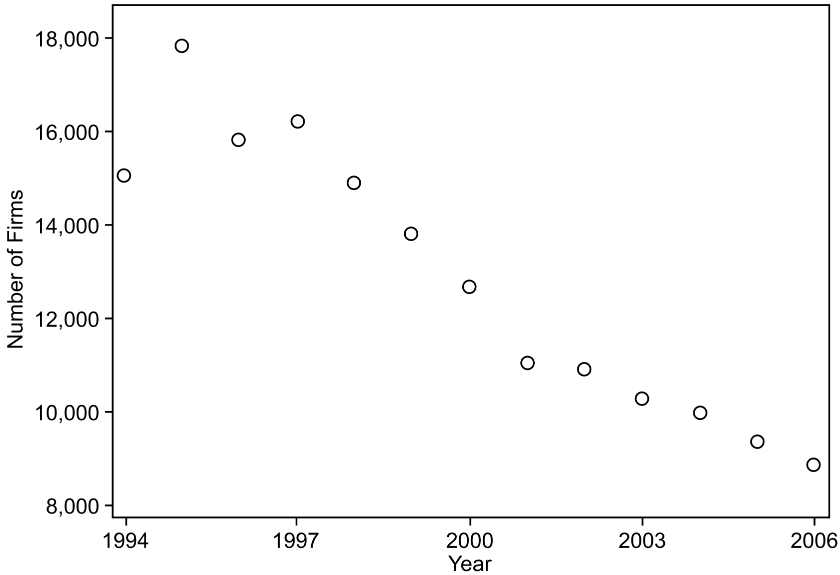

Fig. 8.2 Attrition in the 1994 cohort of firms present in both SINE and the tax files

Note: To draw this figure, we start with the initial sample of all firms present in the SINE survey in 1994. For each year *t*, we then plot the number of firms from this sample that are present in the tax files. For instance, about 18,000 firms from the 1994 SINE survey are found in the tax files.

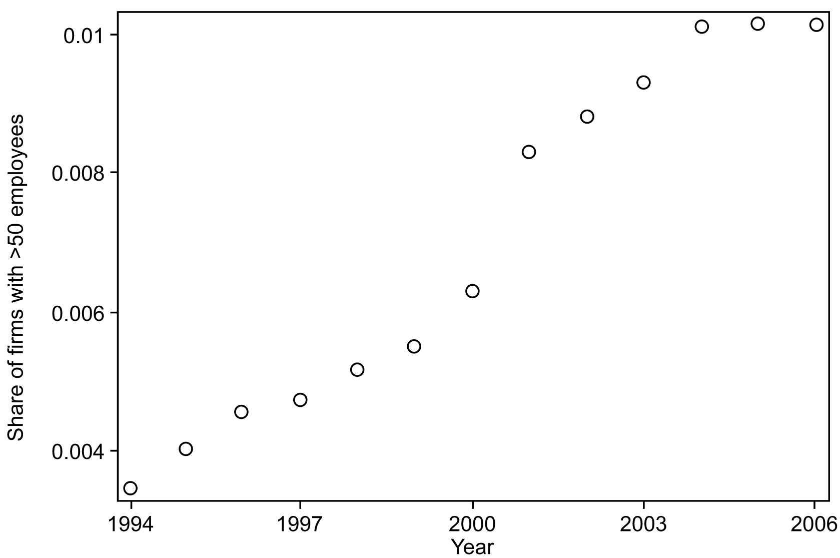

Fig. 8.3 Fraction of firms created in 1994 with more than fifty employees

Note: To draw this figure, we start with the initial sample of all firms present in both the tax files and the SINE survey in 1994. In year *t*, we compute the fraction of firms in the initial sample that are still in tax files at date *t* and have more than fifty employees.

number doubles between 1994 and 2007, from less than 0.4 percent to about 1 percent at the end of the period. This both reflects the fact that surviving firms grow and cross the fifty-employee threshold and that the total number of firms decreases over time, as shown in figure 8.2. Note that 1 percent of firms surviving up to 2007 corresponds to about ninety firms. While the number of “large” firms is not very big, it is not surprising that these firms account for a large share of all jobs. In figure 8.4, we illustrate this skewness effect by reporting, for each year *t* after 1994, the fraction of the cohort’s total employment coming from members of this cohort that employ more than fifty workers. This number goes up over time, as expected, given the rising fraction of large firms shown in the previous figure, and it is in the vicinity of 20 percent toward the end of the period. Hence, the job-creation potential of, cohort of firms after a few years is greatly affected by the contribution of the best performers.We have experimented with alternative measures of long-term growth such as, for instance, a dummy equal to one if the firm grows its workforce by at least 600 percent in the first ten years, and zero else (including if the firm exits). Another alternative measure was simply the log of one plus the number of employees ten years after creation, and

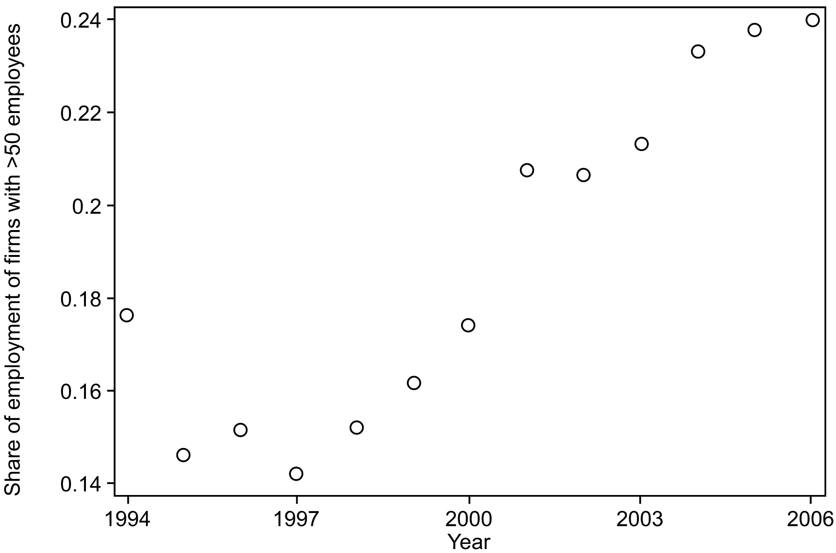

Fig. 8.4 Fraction of employment of the 1994 cohort that is accounted for by “large” firms

Note: For each date *t* we compute the total employment of firms present in the 1994 SINE survey and still present in the tax files. Out of this total employment, we calculate the share of employment that comes from firms born in 1994, present in the SINE survey, and still present in the tax files. For example, in 2001 about 21 percent of the employment of the 1994 cohort was accounted for by firms hiring at least fifty employees.

zero if the firm exits before ten years. These alternative measures give similar results, which we choose not to report to save space. Finally, to analyze risk taking we create a dummy variable equal to one if a firm from our cohort present in tax files at date t is not in the tax files at date $t + 1$. Thus, we study the propensity to exit on the panel of all firms in the 1994 SINE survey, tracked from 1994 to 2007. Our contention is that characteristics that predict long-term growth are characteristics that also predict failure, since we expect transformational entrepreneurs to both "aim bigger" and take more risk.

8.2.2 Results

We regress various specifications of equation (1) and report the results in table 8.2. Significant or not, we find that all variables predict long-term success in the expected direction. When we focus on statistically significant variables, we find that the main predictors of long-term success are not the obvious measures of intrinsic ability (such as education or past work experience), but variables related to the "seriousness" of the project: ambition, serial entrepreneurs, and new idea motivation. We estimate linear probability models, so the coefficients receive direct interpretations. We find pretty large effects. For instance, entrepreneurs motivated by new ideas are 1 percentage point more likely to become large. This is a large effect, given that the probability of being large conditional on survival up until 2007 is equal to 1 percent (see figure 8.3), so the fact is that the new idea motivation doubles the probability of success. Another very strong predictor of success is our ambition measure, in particular the fact that the entrepreneur declares hiring plans a few months after creation. Given the rigidity of French labor laws, hiring is a major decision for a small firm, and it is not entirely surprising that it has predictive power over long-term growth. When the entrepreneur plans to grow in the year of creation, the probability of eventual success increases by about 50 basis points (bp), which corresponds to an increase by 50 percent. Last, a serial entrepreneur is approximately 1 percentage point more likely to succeed conditionally on survival, which again corresponds to a doubling of the average probability.We then find evidence weakly consistent with the idea that the entrepreneurs more likely to achieve long-term success are also the ones that take more risk. To show this, we regress the exit dummy on entrepreneurial characteristics, and report the result of this investigation in table 8.3. Again we estimate a very simple ordinary least squares (OLS) regression to ease readability. Some of the variables that predict long-term success also correlate with exit probability. For instance, a serial entrepreneur is 1 percentage point more likely, every year, to exit from the tax files—to be compared to an average exit rate of about 8 percent per year. A new idea-driven entrepreneur is about 60 bps more likely to exit every year. An entrepreneur still forecasting business growth a few months after creation is about 40 bps more likely to exit every year. Some other variables that do not strongly predict long-term success

Table 8.2 Predicting the probability of exiting the data in the following year

	= 1 if > 50 empl. in 2007								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Percent new-idea driven	.01***								.008***
	(.0029)								(.003)
Percent nonsubsidized		.0016							.00094
		(.0022)							(.0017)
Percent selling globally			.0073***						.0018
			(.0022)						(.0017)
Percent serial entrepreneurs				.0097***					.0072**
				(.0033)					(.0034)
Percent managers					.0066***				.0041*
					(.002)				(.0021)
Percent college grads						.0013			.00033
						(.0019)			(.0019)
Percent growth plans							.01***		.0028
							(.0021)		(.0017)
Percent hiring plans								.016***	.0056***
								(.0025)	(.0021)
Observations	7,672	8,583	8,583	7,716	7,672	7,672	8,520	8,520	7,610
R-squared	.017	.026	.027	.016	.017	.016	.029	.031	.021
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The OLS regression results with two-digit industry fixed effects. In all regressions, the LHS variable is a dummy equal to 1 if the firm created in 1994 (a) is still present and (b) has more than fifty employees in 2007. Columns (1)–(8) only include one potential project-entrepreneur characteristic, while column (9) includes them all together.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

Table 8.3 Predicting the long-term success probability

	= 1 if firm at *t* disappears from data in *t* + 1								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Percent new-idea driven	.0049*								.0036
	(.0027)								(.0027)
Percent nonsubsidized		–.0044***							–.0047***
		(.0015)							(.0016)
Percent selling globally			.004***						.0046***
			(.0014)						(.0015)
Percent serial entrepreneurs				.0088***					.012***
				(.0029)					(.003)
Percent managers					–.0058***				–.0087***
					(.0019)				(.0019)
Percent college grads						.0078***			.0083***
						(.0017)			(.0017)
Percent growth plans							.0024*		.0025
							(.0014)		(.0016)
Percent hiring plans								.002	.0019
								(.0017)	(.0019)
Observations	144,526	161,038	161,038	145,391	144,526	144,526	160,076	160,076	143,604
R-squared	.0096	.0095	.0095	.0097	.0096	.0097	.0091	.0091	.0097
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: The OLS regression results with two-digit industry and year fixed effects. In these regressions we focus on firms present in the 1994 wave of the SINE survey, and use all observations from 1994 to 2007. In all regressions, the LHS variable is a dummy equal to 1 if the firm present in year *t* exits from tax files in year *t* + 1. Columns (1)–(8) only include one potential project-entrepreneur characteristic, while column (9) includes them all together.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

also predict failure: college graduates are more likely to fail (1.1 percentage points). Nonsubsidized businesses are also more likely to fail.

8.3 Did the PARE Reform Alter the Fraction of High-Potential Start-Ups?

Our goal in this section is to look at whether characteristics that predict long-term success change around the 2002 PARE reform, which drew many unemployed individuals into the entrepreneurship pool. First, we describe the empirical methodology and the data. Then, we discuss our results.

8.3.1 Methodology and Data

Methodology

In this section, we follow the methodology developed in Hombart et al. (2014). We look at the evolution of entrepreneurial characteristics in industries that are the most exposed to the PARE reform *compared* to the evolution in the sectors that were the least exposed to the reform. In mathematical terms, this amounts to running the following regression:

$$X_{ist} = a_s + \sum_{k=1}^{4} b_k \mathrm{POST}_t \times T_{s,k} + \sum_{k=1}^{4} \mathrm{POST}_t \times Z_s + \varepsilon_{ist}, \tag{2}$$

where X_{ist} is a start-up/entrepreneur characteristic; X_{ist} corresponds to the predictors of long-term success that we have identified in the previous section such as new idea, serial entrepreneurs, or initial ambition. We also look at the "predicted probability of long-term success" estimated in equation (1) as the linear combination of all entrepreneurial/firm characteristics that optimally predicts long-term success; $T_{s,k}$ is a treatment variable, which is equal to 1 if the firm is in the kth quartile of exposure to the PARE reform. We will measure exposure to PARE as a "small-scale" industry, that is, an industry where it is easy to start small (see below). Thus, if the reform has a clean, identifiable effect on the entrepreneurial composition, the coefficient b_k should be monotonically increasing or decreasing in k. Finally, Z_i stands for a set of observable controls, which may explain changes in the composition of entrepreneurs independently of the reform.

Measuring Treatment

To construct the sector-level treatment variable, $T_{s,k}$, we follow Hombert et al. (2014) and compute the fraction of firms created as sole proprietorships in each industry. To do this, we exploit the French registry of firms. The registry contains the universe of firms that are registered each month in France. This is a monthly data set, and it is available from 1993 to 2008. Each newly created firm includes the number of employees at creation and the industry in which the firm operates, using a four-digit classification system similar to the four-digit North American Industry Classification System (NAICS). It also provides the firm's legal status (sole proprietorship, limited liability corporation, or corporation). For each four-digit sector, we compute the fraction of sole proprietorships among newly created firms from 1999 to 2001, and then sort industries into quartiles of the treatment intensity. This leads to the four treatment variables $T_{s,k}$ for $k \in \{1,2,3,4\}$. In Hombert et al. (2014), we show that sectors in the high-treatment group are those one would expect: business consultants, contractors, hairdressers, taxi drivers, and so forth.

Characteristics

The industry controls, Z_s, are computed using the tax files described previously. We use two variables that are defined in the prereform period. The average fixed asset to employment ratio of all firms in sector s over the period 1999–2001 is $(K / L)_s$; Salesgr_s is the average annual sales growth of all firms over the same period. These two industry variables are designed to pick up any change in characteristics that is due to differential industry exposure to the business cycle. They turn out to be statistically insignificant. The characteristics X_{ist} on the LHS of equation (2) are obtained from the SINE survey described in the Firm Characteristics section. We use two waves of the survey: 2002 (before the PARE reform) and 2006 (after the PARE reform), so we only have two observations per industry s. We report averages of the characteristics in the two periods in table 8.1: Some variables receive the exact same definitions as in the Firm Characteristics section. These are cases where the phrasing of the question is identical (local clients, ambition variables, serial entrepreneur, former executive, and college graduates). Two variables (new idea and subsidy) exhibit significant breaks, however, because the alternatives provided in the questions differ a bit. This means that it is difficult to interpret the aggregate change in characteristics directly, but our difference-in-differences framework will help somewhat. The assumption here is that the change in variable coding between 2002 and 2006 is orthogonal to whether an industry is small scale or not. Finally, we construct the expected probability of success of a venture using the coefficients on characteristics estimated in the previous section for the 1994 cohort. We use a dummy equal to 1 if the firm reaches at least fifty employees twelve years after creation, and the coefficients estimated in column (9) of table 8.2. The underlying assumptions here are that (a) the relationship between characteristics X and long-term success probability is stable over time, including for the 2002 and 2006 cohort, and (b) that the noise introduced by the changes in the exact definitions of characteristics is uncorrelated with our treatment variables. Using this technique to estimate, at the start-up level the predicted probability of success, we find that the average (median) is equal to 1 percent

(0.5 percent) in 2002 and 1.3 percent (0.5 percent) in 2006. It thus remains to be seen whether such an estimated probability increases more in exposed industries, which is the goal of the next section.

8.3.2 Empirical Results

We estimate equation (2) and report the results in table 8.4. We find that, if anything, the share of entrepreneurs with characteristics predicting success in the long-run increases more in exposed industries. The fraction of entrepreneurs motivated by the implementation of a new idea increases by 11 percentage points more in exposed industries than in less exposed ones. This difference is significant at 1 percent and large given that the fraction of such entrepreneurs in the 2002 sample is only 20 percent. A similarly big effect can be found for the frequency of serial entrepreneurs, which increases by 7 percentage points more in exposed sectors (while the sample frequency in 2002 is 13 percent). Finally, the fraction of ambitious entrepreneurs also grows significantly more in treated sectors, but the effect is smaller economically: the fraction of entrepreneurs who expect to grow increases by 2.5 percentage points, only one-tenth of the sample frequency in 2002 (24 percent). One variable, however, goes in the opposite direction: the fraction of former executives, which drops by 14 percentage points, almost half of the sample mean of 30 percent in 2002. We then aggregate all of these variables into a single predicted success probability, and check in column (9) how this predicted success is affected by the reform. We do not find much statistical action here. The decrease in the fraction of former executives among entrepreneurs fully compensates the increase in the fraction of entrepreneurs endowed with new ideas, serial entrepreneurs and ambitious ones, so that the impact on the average probability is marginally negative. To further highlight the role of the "former executive" dummy, we use in column (10) a predicted probability computed using all the coefficients from column (9), in table 8.2, *except* the coefficient on "former executive," which we set to zero. If we remove this effect, the proportion of potential successful start-ups actually *rises* by 0.6 percentage points (for a sample mean of 1 percent) in the most exposed industries. All in all, given that the "former executive" is not a very precisely estimated predictor of long-term success (it is statistically significant at 10 percent only in table 8.2), we conservatively conclude that the PARE reform has little effect on the long-term potential of new ventures.

8.4 Conclusion

The French Reform of 2003, documented in Hombert et al. (2014), led to a massive increase in the supply of entrepreneurs. The question we investigate in this chapter is whether it led to a significant reduction in the potential for long-term success of new ventures, since the reform might have drawn in people with different competence levels or ambitions to grow their firms. We

Table 8.4 **Predicting the long-term success probability**

	Entrepreneur/project characteristics									
	New idea (1)	Nonsubsidized (2)	Global market (3)	Serial entrepreneur (4)	Former manager (5)	College graduate (6)	Wants to grow? (7)	Wants to hire? (8)	Predicted success I (9)	Predicted success II (10)
POST	–.26***	–.15***	–.0097	–.07***	.29***	.0095	.059**	–.03	.0041**	–.0075***
	(–6.5)	(–6)	(–.32)	(–4.2)	(3.5)	(.28)	(2.3)	(–1.6)	(2.5)	(–5.3)
POST x Q2	–.008	–.028	–.0089	.032***	.0081	–.012	.011	–.016	–.00069	.0021**
	(–.27)	(–1.5)	(–.42)	(2.7)	(.16)	(–.63)	(.6)	(–1)	(–.55)	(2.1)
POST x Q3	.042	–.019	–.0048	.052***	–.013	.002	.01	.0066	–.00067	.0042***
	(1.4)	(–1.2)	(–.29)	(4.8)	(–.22)	(.11)	(.75)	(.58)	(–.55)	(4.6)
POST x Q4	.11***	–.0023	.0091	.071***	–.14***	.0044	.045***	.025**	–.002*	.0063***
	(4.1)	(–.14)	(.61)	(6.5)	(–2.9)	(.25)	(3.3)	(2.2)	(–1.7)	(7.1)
POST x K/L	.014	.01	–.0068	.0037	–.077**	.01	–.0043	.0088	.00036	.00048
	(1.3)	(1.3)	(–.72)	(.75)	(–2.3)	(.82)	(–.52)	(1.5)	(.8)	(1.1)
POST x Salesgr	–.027*	–.029**	–.02	–.0055	.063	.008	.003	–.014*	–.00072	–.00079
	(–1.7)	(–2.4)	(–1.6)	(–.74)	(1.1)	(.5)	(.25)	(–1.8)	(–1.1)	(–1.3)
Observations	89,670	87,816	87,498	87,993	70,364	88,026	89,670	87,526	69,967	87,247
R^2	.11	.067	.17	.025	.11	.25	.034	.057	.032	.035

Note: In this table, we estimate equation (2) using the 2002 and 2006 waves of the SINE survey. POST = 1 in 2006 and 0 in 2002; Q2–Q4 are quartile of intensity of exposure to the PARE reform; Q4 is equal to 1 for sectors in the top quartile of the fraction of firms started as sole proprietorships. Columns (1)–(8) use as LHS each of the characteristics investigated in tables 8.2 and 8.3. Column (9) uses as LHS the predicted probability of having at least fifty employees twelve years after creation, using the coefficients in column (9) of table 8.2. In column (10), we use an alternative measure of predicted probability that uses all the coefficients of column (9) of table 8.2, *except* the "former executive" coefficient that we set to zero.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

proceed in two steps. First, we show that some entrepreneurial and project characteristics, which we can measure using a large-scale survey, significantly predict the probability that newly founded firms succeed in the long run. We show that firms started by entrepreneurs who plan on growing, have already had entrepreneurial experience, and are motivated by new ideas are significantly more likely to employ at least fifty persons after twelve years. We then use this relationship to see if the success potential of start-ups was significantly deteriorated by the 2003 reform. We find that it was not. A caveat of our analysis is that we observe few very successful firms, and that we have to content ourselves with the fifty-employees threshold as a measure of success. A possible route for improvement in our methodology would be to estimate Pareto coefficients for the tail of the distribution of long-term firm size.

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